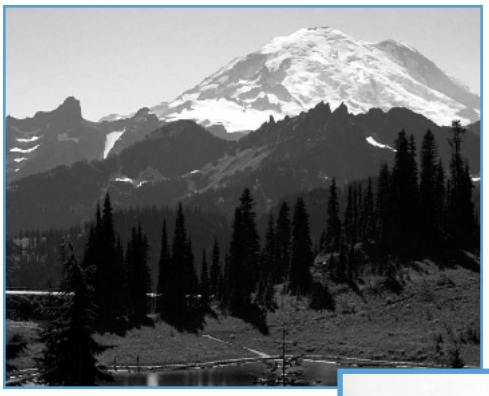
RCRA ORIENTATION MANUAL








EPA
United States
Environmental Protection
Agency

Resource Conservation and Recovery Act

RCRA Orientation Manual

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USE OF THE MANUAL

This document has been reviewed by the U.S. Environmental Protection Agency and has been approved for publication. Mention of trade names, products, or services does not convey, and should not be interpreted as conveying, official EPA approval, endorsement, or recommendation.

This manual serves as an effective introduction to the various facets and basic structure of the RCRA program designed to regulate solid waste, hazardous waste, and underground storage tanks. In order to achieve this goal, the *RCRA Orientation Manual* is designed for EPA and state staff, members of the regulated community, and the general public who wish to better understand RCRA. While this manual constitutes a review of the RCRA program, it is not a substitute for RCRA or its implementing regulations, nor is it a regulation itself. Thus, it cannot impose legally binding requirements on EPA, states, or the regulated community. In addition, the manual is not intended to modify or affect in any way existing statutory or regulatory requirements or Agency policies; it is simply intended to briefly summarize those requirements and policies. If there is any unintended variation between any statements in this manual and existing requirements or policy statements, the requirements or policy statements are controlling.

Further information is available over the Internet on the Office of Solid Waste and Emergency Response's Homepage at: http://www.epa.gov/oswer. For more detailed information about hazardous and nonhazardous solid waste, please see the Office of Solid Waste's Homepage at: http://www.epa.gov/osw. Regulatory information and documents are also available from the RCRA, Superfund & EPCRA Call Center at either (703) 412-9810 in the Washington DC area or (800) 424-9346 toll-free elsewhere. TDD users should call either (703) 412-3323 in the Washington DC area or (800) 553-7673 toll-free elsewhere. The Call Center is accessible over the Internet at http://www/epa.gov/epaoswer/hotline. Many RCRA guidance documents, publications, and other outreach materials are available on the Internet at http://www.epa.gov/rcraonline.

FOREWORD

This manual updates the *2000 RCRA Orientation Manual*, which has proven to be a popular and valuable resource for anyone working with EPA's solid and hazardous waste management program or underground storage tank program. Since the manual's publication in 1990, the RCRA program has evolved dramatically. As a result of changes in the dynamics of solid and hazardous waste management, as well as changes in the regulatory expectations and demands of government, public, and private entities, the RCRA program has been steadily modified through new regulations, policies, Agency-wide initiatives, and Congressional mandates. The manual's revision reflects the progress that has been made in the program and documents the changes in RCRA.

At this time, the RCRA Subtitle C hazardous waste regulatory framework is completely in place, and almost all states are implementing large portions of the program. EPA has achieved significant progress in establishing provisions to fully protect both ground water and air resources. Under Subtitle D, the establishment of municipal solid waste landfill criteria ensures adequate protection of human health and the environment from solid waste disposal practices. In addition, the Agency has significantly expanded initiatives aimed at reducing the amount of waste generated, and in the event that this cannot be achieved, making any resulting waste management more efficient. Lastly, the Subtitle I underground storage tank program is being fully implemented, and tank owners and operators are working towards upgrading their units to meet the most current and environmentally protective management standards.

As we move ahead in the continuing implementation of RCRA, several priority initiatives stand out. For example, EPA continues to encourage waste minimization in order to reduce the quantities of waste generated and the volume of waste that needs to be handled by practices such as land disposal and combustion. Also, the RCRA program is advancing risk-based regulation by evaluating new ways to regulate wastes based on the risk that they might pose to human health and the environment. Lastly, EPA is increasing the incorporation of states, the regulated community, and the public into the regulatory process in order to further a protective environmental strategy that is easy to implement, provides feasible compliance options, and takes into account the interests of citizens.

The continued success of the RCRA program rests on the involvement of all stakeholders. The *RCRA Orientation Manual* provides a mechanism through which affected parties can learn more about the program, and it serves as an effective introduction to the basic structure and various facets of the RCRA program designed to regulate solid and hazardous waste.

In addition to this manual, two new documents provide an informative look back at the past and a speculative look forward to the future of the RCRA program. For a look back at past successes, the report *25 Years of RCRA: Building on Our Past to Protect Our Future* commemorates RCRA's 25th Anniversary in October 2001 and highlights the

accomplishments of RCRA's protective framework to date. For a look ahead, the draft white paper *Beyond RCRA: Prospects for Waste and Materials Management in the Year 2020* identifies trends that could affect the future of waste management and resource conservation and also suggests general strategies that might be used to build a new vision for the future of the program. For information regarding document availability contact the RCRA, Superfund & EPCRA Call Center (see section entitled Use of the Manual).

The *RCRA Orientation Manual* was developed by the Office of Solid Waste, Communications, Information, and Resources Management Division. Special thanks to the many individuals at EPA Headquarters who reviewed the drafts and provided comments.

RCRA ORIENTATION MANUAL

EXECUTIVE SUMMARY

OVERVIEW

The Resource Conservation and Recovery Act (RCRA) was enacted in 1976 to address the huge volumes of municipal and industrial solid waste generated nationwide. After several amendments, the Act as it stands today governs the management of solid and hazardous waste and underground storage tanks (USTs).

The U.S. Environmental Protection Agency (EPA) published the *RCRA Orientation Manual* in order to educate and inform the public about the broad requirements of RCRA's regulatory program. This manual has proven to be a popular and valuable resource for anyone working with EPA's solid and hazardous waste management program or UST program.

Since the manual's initial publication in 1990, the RCRA program has evolved dramatically. As a result of changes in the dynamics of solid and hazardous waste management, as well as changes in the regulatory expectations and demands of government, public, and private entities, the RCRA program has been steadily modified through new regulations, policies, Agency-wide initiatives, and Congressional mandates. This revision reflects the progress that has been made in the program and documents the changes in RCRA that have occurred since the last publication in 2000.

FEATURES OF THIS MANUAL

Specifically, this manual outlines RCRA in seven sections:

- Introduction to RCRA
- Managing Solid Waste — RCRA Subtitle D
- Managing Hazardous Waste — RCRA Subtitle C
- Managing Underground Storage Tanks — RCRA Subtitle I
- Miscellaneous Statutory Provisions
- RCRA and Its Relationship to Other Environmental Statutes
- Public Participation in RCRA.

This manual also contains appendices that present important RCRA forms and paperwork requirements, a glossary, a list of acronyms and abbreviations, an organization chart for EPA's Office of Solid Waste, and useful environmental contacts.

MANUAL HIGHLIGHTS

Each of the seven sections of the manual discusses different aspects of the regulatory program.

Introduction to the Resource Conservation and Recovery Act

- RCRA's goals are to protect human health and the environment from the hazards posed by waste disposal; to conserve energy and natural resources through waste recycling and recovery; to reduce or eliminate the amount of waste generated, including hazardous waste; and to ensure that wastes are managed in an environmentally safe manner.
- RCRA, enacted in 1976, is an amendment to the Solid Waste Disposal Act of 1965. RCRA has been amended several times, most significantly by the Hazardous and Solid Waste Amendments (HSWA) of 1984.
- Within this manual, the acronym RCRA refers not only to the Statute itself, but also to corresponding regulations codified in the Code of Federal Regulations (CFR), guidance, and policy.
- RCRA addresses three programs — solid waste, hazardous waste, and USTs.
- RCRA involves several organizations and entities, including Congress, EPA's Office of Solid Waste and Emergency Response (OSWER), EPA Regions, states, the regulated community, and the general public.
- Current program initiatives include encouraging waste minimization, streamlining RCRA regulations, fostering federal/state partnerships, and enhancing public access to information.

Managing Solid Waste — RCRA Subtitle D

- RCRA's solid waste management program, Subtitle D, encourages environmentally sound solid waste management practices that maximize the reuse of recoverable material and foster resource recovery.
- The term solid waste is very broad, including not only the traditional nonhazardous solid wastes, such as municipal garbage, but also some hazardous wastes. RCRA Subtitle D addresses solid wastes, including those hazardous wastes that are excluded from the Subtitle C regulations (e.g., household hazardous waste), and hazardous waste generated by conditionally exempt small quantity generators (CESQGs).
- The solid waste management program also addresses municipal solid waste, which is generated by businesses and households and is typically collected and disposed in municipal solid waste landfills (MSWLFs).
- EPA recommends an integrated, hierarchical approach to managing municipal solid waste that includes: source reduction, recycling, combustion, and landfilling. Source reduction and recycling are preferred elements of the system.
- The Subtitle D program includes technical criteria for MSWLFs to ensure that such landfills will be fully protective of human health and the environment.

- EPA has a number of programs to encourage sound waste management — Wastewise, the Jobs Through Recycling program, unit pricing, and full cost accounting for municipal solid waste.

Managing Hazardous Waste — RCRA Subtitle C

- The hazardous waste management program, Subtitle C, is intended to ensure that hazardous waste is managed safely from the moment it is generated to the moment it is finally disposed.
- The Subtitle C program includes procedures to facilitate the proper identification and classification of hazardous waste.
- While waste recycling and recovery are major components of RCRA's goals, they must be implemented consistently with proper hazardous waste management. As a result, RCRA contains

provisions to ensure safe hazardous waste recycling, and to facilitate the management of commonly recycled wastestreams.

- The program also includes standards for those facilities that generate (i.e., produce), transport, treat, store, or dispose of hazardous waste. These standards include requirements for general facility management and specific hazardous waste management units. The provisions for treatment, storage, and disposal facilities (TSDFs) include additional precautions to protect ground water and air resources.
- The hazardous waste management program includes safeguards to protect human health and the environment from hazardous waste that is disposed of on the land. These safeguards are known as the land disposal restrictions (LDR). RCRA also minimizes the hazards of burning hazardous waste by imposing strict standards on combustion units.
- Because EPA wants to limit hazardous waste treatment, storage, or disposal only to facilities that can adequately protect human health and the environment, RCRA requires these facility owners and operators to obtain a hazardous waste permit from the Agency.
- Since hazardous waste management may result in spills or releases into the environment, RCRA Subtitle C also contains provisions governing corrective action, or the cleanup of contaminated air, ground water, and soil.
- The RCRA statute additionally grants EPA broad enforcement authority to require all hazardous waste management facilities to comply with the regulations.
- The Subtitle C program also contains provisions that allow EPA to authorize state governments to implement and enforce the hazardous waste regulatory program. State programs must be at least as stringent as the federal program.

Managing Underground Storage Tanks (UST) — RCRA Subtitle I

- The RCRA Subtitle I UST regulatory program regulates underground tanks storing petroleum or hazardous substances.
- In order to protect human health and the environment from threats posed by releases from such tanks, the program governs tank design, construction, installation, operation, release detection, release response, corrective action, closure, and financial responsibility.

- Many UST owners and operators must secure loans from financial and other institutions to comply with environmental regulations, such as UST upgrading and maintenance requirements. The Subtitle I program contains specific provisions to protect lending institutions from liability that they might incur from extending these loans.
- Similar to RCRA Subtitle C, Subtitle I contains provisions that allow EPA to approve state government implementation and enforcement of the UST regulatory program.
- The expense and threats of contamination from leaking USTs necessitate efficient, effective, and thorough cleanups. To guarantee that such cleanups will be conducted in an efficient and protective manner, Subtitle I also established a Leaking Underground Storage Tank (LUST) Trust Fund. The Fund facilitates cleanup oversight and guarantees cleanups when the responsible owner and operator cannot take action, or when the situation requires emergency response.

Miscellaneous Statutory Provisions

- Consistent with RCRA's focus on recycling, the Statute contains provisions for EPA to encourage recycling and promote the development of markets for items with recovered materials content.

- To help achieve this goal, EPA publishes federal procurement guidelines that set minimum recovered materials content standards for certain designated items. RCRA requires federal procuring agencies to purchase items composed of the highest percentage of recovered materials practicable. These requirements are specified in Comprehensive Procurement Guidelines (CPG) and Recovered Materials Advisory Notices (RMAN).
- RCRA's focus is not limited to solid waste, hazardous waste, or USTs. Medical waste can pose similar threats to human health and the environment. As a result, RCRA established a medical waste tracking program to ensure that such waste is properly handled from the moment it is generated to the moment it is disposed. This program was a demonstration program that began June 22, 1989, and ended June 22, 1991. At this time, the program has expired and no federal EPA tracking requirements are currently in effect, although some states have medical waste requirements.

RCRA and Its Relationship to Other Environmental Statutes

- RCRA is only one of several regulatory programs in place to protect the environment. The RCRA regulations work closely with other environmental statutes such as the Clean Air Act (CAA); Clean Water Act (CWA); the Emergency Planning and Community Right-to-Know Act (EPCRA); the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); the Marine Protection, Research, and Sanctuaries Act (MPRSA); the Occupational Safety and Health Act (OSHA); the Safe Drinking Water Act (SDWA); and the Toxic Substances Control Act (TSCA).
- One statute in particular, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or Superfund, is closely tied to RCRA: both are designed to protect human health and the environment from the dangers of hazardous waste. While these programs are similar, they do have different regulatory focuses: RCRA regulates how wastes should be managed to avoid potential threats to human health and the environment; CERCLA focuses on actual releases, or substantial threats of a release in the environment of a hazardous substance, pollutant, or contaminant, that present an imminent and substantial threat to human health.

Public Involvement in RCRA

- RCRA contains extensive public participation and involvement provisions to facilitate public participation in the permitting, corrective action, and state authorization processes.
- EPA, consistent with the requirements of the Administrative Procedures Act (APA), proactively involves the public every time the Agency issues a rulemaking that establishes or changes regulatory provisions.
- EPA is committed to equal protection of all socioeconomic and racial groups in the implementation and enforcement of the nation's environmental laws. Consequently, RCRA seeks to ensure that all segments of the population have an equal opportunity to participate in the regulatory process and equal access to regulatory information.
- Because the RCRA program as a whole is a complex regulatory framework, EPA has established several public outreach and assistance mechanisms to foster public involvement. These include access to information through training grants; the Freedom of Information Act (FOIA); EPA's Office of Ombudsman; the EPA Docket Center; the EPA Dockets (EDOCKET) Web site; and the RCRA, Superfund & EPCRA Call Center.

SECTION I

INTRODUCTION TO THE RESOURCE CONSERVATION AND RECOVERY ACT

In this section...

OVERVIEW

The Resource Conservation and Recovery Act (RCRA), an amendment to the Solid Waste Disposal Act, was enacted in 1976 to address the huge volumes of municipal and industrial solid waste generated nationwide.

Once, the amount of waste produced in the United States was small and its impact on the environment was viewed as relatively minor. Times have changed. With the industrial revolution in the late 1800s, the country began to experience unparalleled growth. New products were developed, and the consumer was offered an ever-expanding array of material goods.

This growth continued through the early 20th Century and accelerated after World War II when the nation's industrial base, strengthened by war, turned its energy toward domestic production. The results of growth, however, were not all positive. While the country produced more goods and prospered economically, it also generated more waste, both hazardous and nonhazardous. For example, at the end of World War II, U.S. industry was generating roughly 500,000 metric tons of hazardous waste per year. This amount continued to increase over the next 50 years. A national survey conducted by EPA in 1996 estimated that 279 million metric tons of hazardous waste were generated nationwide in 1995, more than a 500-fold increase.

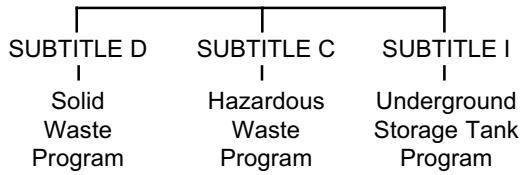
This phenomenal growth in waste production was not mirrored by advancements in the field of waste management. Much of the waste produced entered the environment, where it often posed a serious threat to ecological systems and public health.

In the mid-1970s, it became clear to Congress and the American people that action had to be taken to ensure that wastes were managed properly. This realization began the process that resulted in the passage of RCRA. The goals set by RCRA are:

- To protect human health and the environment from the hazards posed by waste disposal
- To conserve energy and natural resources through waste recycling and recovery
- To reduce or eliminate, as expeditiously as possible, the amount of waste generated, including hazardous waste
- To ensure that wastes are managed in a manner that is protective of human health and the environment.

To achieve these goals, RCRA established three distinct yet interrelated programs (see Figure I-1). RCRA Subtitle D, the solid waste program, encourages states to develop comprehensive plans to manage nonhazardous industrial solid waste and municipal solid waste, sets criteria for municipal solid waste landfills (MSWLFs) and other solid waste disposal facilities, and prohibits the open dumping of solid waste. RCRA Subtitle C, the hazardous waste program, establishes a system for controlling hazardous waste from the time it is generated until its ultimate disposal — in effect, from cradle to grave. RCRA Subtitle I, the underground storage tank (UST) program, regulates underground tanks storing hazardous substances and petroleum products.

Figure I-1: RCRA's Three Interrelated Programs



Although RCRA creates the framework for the proper management of hazardous and nonhazardous solid waste, it does not address the problems of hazardous waste found at inactive or abandoned sites or those resulting from spills that require emergency response. These problems are addressed by a different act, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly called Superfund, which was enacted in 1980.

This section provides an overview of RCRA, including the Act, regulations, guidance, and policy. In addition, this section discusses the three major programs that comprise RCRA and the interrelationships between them. Finally, this section details where RCRA is today, introduces who is involved in RCRA, and outlines the remainder of this manual.

RCRA: WHAT IT IS

Although RCRA is the acronym for the Resource Conservation and Recovery Act, it is often used interchangeably to refer to the law, the regulations, and EPA policy and guidance. To avoid confusion in this manual, the term "the Act" refers to the public law and statutory requirements passed by Congress. The term "regulations" is used interchangeably with standards or regulatory requirements, and means the rules developed by EPA to implement the statute.

■ The Act

The Act provides, in broad terms, general guidelines for the waste management program envisioned by Congress (e.g., EPA is directed to develop and promulgate criteria for identifying hazardous waste). The Act also provides the EPA Administrator (or his or her representative) with the necessary authority to develop these broad standards into specific requirements for the regulated community.

THE ACT

The law that describes the kind of waste management program that Congress wants to establish. The Act also provides the Administrator of EPA (or his or her designee) with the authority to implement the program.

What we commonly know as RCRA, or the Act, is actually a combination of the first federal solid waste statutes and all subsequent amendments (see Figure I-2). In 1965, Congress enacted the Solid Waste Disposal Act, the first statute that specifically focused on improving solid waste disposal methods. The Solid Waste Disposal Act established economic

Figure I-2: The Evolution of Significant RCRA Legislation

SOLID WASTE DISPOSAL ACT OF 1965

⇩

RESOURCE CONSERVATION AND RECOVERY ACT OF 1976

⇩

HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984

⇩

FEDERAL FACILITIES COMPLIANCE ACT OF 1992

⇩

LAND DISPOSAL PROGRAM FLEXIBILITY ACT OF 1996

incentives for states to develop planning, training, research, and demonstration projects for the management of solid waste. The Act was amended in 1976 by RCRA, which substantially remodeled the nation's solid waste management system and laid out the basic framework of the current hazardous waste management program.

The Act, which has been amended several times since 1976, continues to evolve as Congress alters it to reflect changing waste management needs. The Act was amended significantly on November 8, 1984, by the Hazardous and Solid Waste Amendments (HSWA), which expanded the scope and requirements of RCRA. HSWA was created largely in response to citizen concerns that existing methods of hazardous waste disposal, particularly land disposal, were not safe. Because of their significance and differences in their implementation, HSWA provisions are emphasized throughout this manual. Congress also revised RCRA in 1992 by passing the Federal Facility Compliance Act, which strengthened the authority to enforce RCRA at federal facilities. In addition, the Land Disposal Program Flexibility Act of 1996 amended RCRA to provide regulatory flexibility for the land disposal of certain wastes.

Today, the Act consists of 10 subtitles (see Figure I-3). Subtitles A, B, E, F, G, H, and J outline general provisions; authorities of the Administrator; duties of the Secretary of Commerce; federal responsibilities; miscellaneous provisions; research, development, demonstration, and information requirements; and medical waste tracking. Other subtitles lay out the framework for the three major programs that comprise RCRA Subtitle C (the hazardous waste management program), Subtitle D (the solid waste program), and Subtitle I (the UST program).

The text of the Act can be found at www.epa.gov/epahome/laws.htm.

Figure I-3: Outline of the Act

Subtitle	Provisions
A	General Provisions
B	Office of Solid Waste; Authorities of the Administrator and Interagency Coordinating Committee
C	Hazardous Waste Management
D	State or Regional Solid Waste Plans
E	Duties of the Secretary of Commerce in Resource and Recovery
F	Federal Responsibilities
G	Miscellaneous Provisions
H	Research, Development, Demonstration, and Information
I	Regulation of Underground Storage Tanks
J	Standards for the Tracking and Management of Medical Waste

■ Regulations

The Act includes a Congressional mandate directing EPA to develop a comprehensive set of regulations. **Regulations**, or **rulemakings**, are issued by an agency, such as EPA, that translate the general mandate of a statute into a set of requirements for the Agency and the regulated community.

Regulations are developed by EPA in an open and public manner according to an established process. When a regulation is formally proposed, it is published in an official government document called the *Federal Register* to notify the public of EPA's intent to create new regulations or modify existing ones. EPA provides the public, which includes the potentially regulated community, with an opportunity to submit comments. Following an established comment period, EPA may revise the

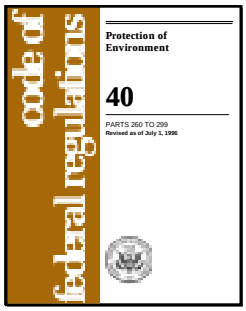
proposed rule based on both an internal review process and public comments.

REGULATIONS

Legal mechanisms that establish standards or impose requirements as mandated by the Act. RCRA regulations are promulgated by EPA, published in the *Federal Register*, and codified in the Code of Federal Regulations.

The final regulation is published, or promulgated, in the *Federal Register*. Included with the regulation is discussion of the Agency's rationale for the regulatory approach, known as preamble language. Final regulations are compiled annually and incorporated in the Code of Federal Regulations (CFR) according to a highly structured format based on the topic of the regulation. This latter process is called **codification**, and each CFR title corresponds to a different regulatory authority. For example, EPA's regulations are in Title 40 of the CFR. The codified RCRA regulations can be found in Title 40 of the CFR, Parts 240-282. These regulations are often cited as 40 CFR, with the part listed afterward (e.g., 40 CFR Part 264), or the part and section (e.g., 40 CFR §264.10).

Although this relationship between an Act and the regulations is the norm, the relationship between HSWA and its regulations differs slightly. Congress, through HSWA, not only provided EPA with a general mandate to promulgate regulations, but also placed explicit instructions in the Statute to develop certain regulations. Many of these requirements are so specific that EPA incorporated them directly into the regulations. HSWA is all the more significant because of the ambitious schedules that Congress established for implementation of the Act's provisions. Another unique aspect of HSWA is that it established **hammer provisions**, or statutory requirements that would go into effect automatically (with the force of regulations) if EPA failed to issue regulations by certain dates.



The interpretation of statutory language does not end with the codification of regulations. EPA further clarifies the requirements of the Act and its regulations through guidance documents and policy.

The RCRA regulations can be found at hww.epa.gov/docs/epacfr40/chapt-I.info/subch-I.htm.

■ Guidance and Policy

Guidance documents are issued by EPA primarily to provide direction for implementing and complying with regulations. They are essentially "how to" documents. For example, the regulations in 40 CFR Part 270 detail what is required in a permit application for a hazardous waste management facility, while the guidance for this Part suggests how to evaluate a permit application to ensure that all information has been included. Guidance documents also elaborate on the Agency's interpretation of the requirements of the Act.

GUIDANCE = *How To*

Documents developed and issued by EPA to provide instructions on how to implement the requirements of either the Act or regulations.

Policy statements, on the other hand, specify operating procedures that should generally be followed. They are mechanisms used by EPA program offices to outline the manner in which the RCRA program are implemented. For example, EPA's Office of Solid Waste (OSW) may issue a policy outlining what actions should generally be taken to achieve RCRA corrective action cleanup goals. In many cases, policy statements are addressed to the staff working on implementation, but they may also be addressed to the regulated community.

POLICY = *Should Do*

Statements developed by EPA outlining a position on a topic or giving instructions on how a procedure should be conducted.

RCRA: HOW IT WORKS

The three programs established under RCRA — solid waste, hazardous waste, and USTs — are described in detail in the following chapters. To provide an overall perspective of how RCRA works, each of these programs and their interrelationships are briefly summarized here. In this manual, the Subtitle D (solid waste) program is discussed before the Subtitle C (hazardous waste) program. Although this is alphabetically out of order, the structure is designed for better understanding by the reader.

■ Subtitle D — Solid Waste

RCRA Subtitle D focuses on state and local governments as the primary planning, regulating, and implementing entities for the management of nonhazardous solid waste, such as household garbage and nonhazardous industrial solid waste. EPA provides these state and local agencies with information, guidance, policy and regulations through workshops and publications to help states and the regulated community make better decisions in dealing with waste issues, to reap the environmental and economic benefits of source reduction and recycling of solid wastes, and to require upgrading or closure of all environmentally unsound disposal units. In order to promote the use of safer units for solid waste disposal, EPA developed federal criteria for the proper design and operation of MSWLFs and other solid waste disposal facilities. Many states have adopted these criteria into their state solid waste programs.

■ Subtitle C — Hazardous Waste

RCRA Subtitle C establishes a federal program to manage hazardous wastes from **cradle to grave**. The objective of the Subtitle C program is to ensure that hazardous waste is handled in a manner that protects human health and the environment. To this end, there are Subtitle C regulations for the generation, transportation, and treatment, storage, or disposal of hazardous wastes. In practical terms, this means regulating a large number of hazardous waste handlers. As of 1999, EPA had on record 1,575 treatment, storage, and disposal facilities (TSDFs); 17,000 transporters; and about 20,000 large quantity generators (LQGs).

The Subtitle C program has resulted in perhaps the most comprehensive regulations EPA has ever developed. The regulations first identify the criteria to determine which solid wastes are hazardous, and then establish various requirements for the three categories of hazardous waste handlers: generators, transporters, and TSDFs. In addition, the Subtitle C regulations set technical standards for the design and safe operation of TSDFs. These standards are designed to minimize the release of hazardous waste into the environment. Furthermore, the regulations for TSDFs serve as the basis for developing and issuing the permits required by the Act for each facility. Permits are essential to making the Subtitle C regulatory program work, since it is through the permitting process that EPA or a state applies the technical standards to TSDFs.

One of the primary differences between Subtitle C and Subtitle D is the type of waste each regulates. Subtitle C regulates only hazardous waste, a subset of solid waste, whereas Subtitle D primarily manages nonhazardous solid waste.

■ Subtitle I — Underground Storage Tanks

RCRA Subtitle I regulates underground storage tanks (USTs) that contain petroleum or hazardous substances (as defined under CERCLA). A major objective of Subtitle I is to prevent and clean up releases from tanks. Under Subtitle I, EPA has developed performance standards for new tanks, upgrading requirements for existing tanks, and regulations to prevent, detect, and clean up releases at all UST sites. State UST programs may be approved to operate in lieu of the federal program.

WHO IS INVOLVED IN RCRA?

The RCRA program involves many people and organizations, all with varying roles. Congress and the President set overall national direction for the RCRA program through amendments to the Act. EPA, through its Office of Solid Waste and Emergency Response (OSWER), translates this

direction into operating programs by developing regulations, guidance, and policy.

Site-specific implementation of the RCRA program is the responsibility of the EPA Regions and states. All three RCRA programs — hazardous waste, solid waste, and USTs — have mechanisms through which states can exercise key program responsibilities. Initial federal responsibilities vary among the different programs.

Under Subtitle D, EPA established minimum criteria for MSWLFs and required each state to gain approval for their MSWLF permitting program through an approval process which ensures that the state's program meets minimum federal criteria. Most of the Subtitle D solid waste program is overseen by the states and compliance is assured through state-issued permits.

State involvement in the Subtitle C program is similar to involvement in the Subtitle D program. Under Subtitle C, in the authorization process, EPA reviews a state's hazardous waste program and, if it is at least as stringent as the federal program, grants the state authority to implement its own program in lieu of the federal program. These states are known as authorized states.

Under Subtitle I, EPA also allows state UST programs to operate in lieu of the federal program provided that a state's regulatory provisions are at least as stringent as the federal provisions.

The **regulated community** that must understand and comply with RCRA and its regulations is a large, diverse group. It includes not only facilities typically thought of as hazardous waste generators, such as industrial manufacturers, but also government agencies and small businesses, such as a local dry cleaner generating small amounts of hazardous solvents, or a gas station with underground petroleum tanks.

Lastly, the general public plays a key role in RCRA by providing input and comments during almost every stage of the program's development and implementation, through rulemaking participation and comments on TSDF permits.

RCRA TODAY

When RCRA was first enacted in 1976, EPA was faced with a huge implementation task. The bulk of the activity during the first few years focused on developing basic regulations for the management of both hazardous and nonhazardous solid waste in order to provide adequate protection of human health and the environment. Although most of these elementary standards are now in place, the RCRA program has not remained stagnant. EPA continues to measure and analyze the program's results to help identify ways to make the RCRA program more efficient and achieve better, more cost-effective protection of public health and the environment.

■ Waste Minimization

EPA has devoted much of its efforts in the past to the treatment and cleanup of pollutants after they are generated. In fact, great strides have been made in environmental protection over the past 20 years. EPA realizes, however, that there are environmental and economic incentives to reducing or eliminating waste before it is even generated. Consequently, both the RCRA solid and hazardous waste programs have adopted waste minimization elements. EPA uses the term **waste minimization** to mean the reduction, to the extent feasible, of solid and hazardous waste. Both programs emphasize source reduction (reducing waste at its source, before it is even generated) and environmentally sound recycling.

In the text of HSWA, Congress specifically declared that the reduction or elimination of hazardous waste generation at the source should be a priority of the RCRA hazardous waste program. To encourage hazardous waste minimization

nationwide, EPA developed the Waste Minimization National Plan. This initiative promotes a long-term national effort to minimize the generation of hazardous chemicals in wastes. The goals of the National Plan include:

WASTE MINIMIZATION

Waste minimization is the reduction, to the extent feasible, of hazardous waste generated prior to any treatment, storage, or disposal of the waste.

- Reducing the presence of the most persistent, bioaccumulative, and toxic (PBT) chemicals in hazardous wastes 50% by the year 2005
- Emphasizing source reduction and environmental source recycling over treatment and disposal
- Preventing transfers of chemical releases from one medium (air, water, land) to another.

EPA has also developed strategies and priorities for encouraging source reduction and recycling of nonhazardous solid waste streams regulated by RCRA Subtitle D. EPA envisions a flexible integrated waste management hierarchy where source reduction, recycling, waste combustion, and landfilling all play a part in the successful management of solid waste at the local level. Source reduction and recycling are preferred approaches and are at the top of the management hierarchy. Waste combustion and landfilling are less emphasized. In addition, to expand the use of recovered materials, EPA has developed the procurement program, which establishes guidelines recommending that federal agencies purchase products containing recycled materials.

■ Streamlining RCRA Regulation

EPA is currently identifying options to reinvent the RCRA program by streamlining compliance requirements. EPA's reinvention philosophy includes providing flexibility in how results are achieved, sharing information and decision-making with all stakeholders, creating incentives for compliance with environmental requirements, lessening the burden of complying with environmental requirements, and seeking a better interface with other environmental regulations.

EPA is also placing an increasing emphasis on making the RCRA hazardous waste program more risk-based and results-based (i.e., ensuring that the regulations correspond to the level of risk posed by the hazardous waste being regulated and that technicalities will not interfere with the ultimate goals for a site). This approach is particularly valuable for the cleanup of contaminated sites. Placing excessive regulation on sites whose contamination poses low risks to human health and the environment may create disincentives for cleanup. Focusing regulations on risk and results would allow states greater flexibility in determining the appropriate way to clean up sites contaminated with relatively small quantities of hazardous waste.

■ Subtitle C Federal/State Partnership

RCRA, like most federal environmental legislation, encourages states to develop their own hazardous waste programs as an alternative to direct implementation of the federal program. At the inception of RCRA, Congress envisioned that a successful national program would be put in place through joint action of the federal and state governments—EPA would set national goals and standards based on the Agency's technical expertise, and the states would be responsible for implementing those policies.

Because EPA's hazardous waste regulations are developed in stages, over time, the Agency has a phased approach to approving state programs. Each state must either adopt the new regulations or upgrade those elements of its program that do not meet federal standards. The authorization process is often long and cumbersome. EPA has developed streamlined procedures for these state revisions to make the process quicker and more efficient. These procedures help reduce the amount of resources needed for preparing and processing authorization applications and speed up state implementation of additional parts of the RCRA program.

■ Demonstrating Results

As important it is for EPA to develop protective environmental goals, it is as important to determine if these goals are actually being achieved. Recognizing this, Congress enacted the Government Performance and Results Act (GPRA) of 1993 to provide for the establishment of strategic planning and performance measurements throughout the federal government. The intent of GPRA is to improve public confidence in federal agencies by holding agencies accountable for achieving program results.

EPA adopted the GPRA framework by developing an Agency-wide strategic plan that encompasses all EPA offices and program areas. The strategic plan contains several goals specific to RCRA, such as preventing pollution, reducing risk to humans and the environment, better waste management, and restoration of contaminated waste sites. As part of the requirements of GPRA, EPA has also developed specific, quantifiable objectives for each of these goals. Progress toward these target objectives are measured and evaluated annually. This framework ensures that EPA can evaluate the success of its different programs and can demonstrate tangible results to the general public.

OUTLINE OF THE MANUAL

The remainder of this manual details the three RCRA programs briefly discussed in this introduction. The manual also describes two other components of RCRA: the federal procurement and medical waste tracking programs. In addition, the manual discusses the interrelationships between RCRA's Subtitle C program and other environmental statutes, as well as RCRA's public participation provisions. To supplement this technical description of the RCRA regulatory program, the manual also contains appendices that present important RCRA forms and paperwork requirements, a glossary (for the reader's convenience, the terms that appear in this glossary have been bolded throughout the text), a list of acronyms and abbreviations, an OSW organization chart, useful environmental contacts, and a keyword index.

SUMMARY

RCRA was passed in 1976, as an amendment to the Solid Waste Disposal Act of 1965, to ensure that solid wastes are managed in an environmentally sound manner. The broad goals set by RCRA are:

- To protect human health and the environment from the hazards posed by waste disposal
- To conserve energy and natural resources through waste recycling and recovery
- To reduce or eliminate, as expeditiously as possible, the amount of waste generated, including hazardous waste
- To ensure that wastes are managed in a manner that is protective of human health and the environment.

To achieve the goals, three distinct yet interrelated programs exist under RCRA:

- Subtitle D – The solid waste program promotes and encourages the environmentally sound management of solid waste. It includes minimum federal technical standards and guidelines for state solid waste plans.
- Subtitle C – The hazardous waste program establishes a management system that regulates hazardous waste from the time it is generated until its ultimate disposal, in effect, from cradle to grave.
- Subtitle I – The UST program regulates underground tanks that contain petroleum or hazardous substances (as defined under CERCLA).

There are several components of RCRA:

- Act – The law that describes the kind of waste management program that Congress wants to establish. The Act also provides the Administrator of EPA (or his or her designee) with the authority to implement the Act.
- Regulations – The legal mechanism that establishes standards or imposes requirements as mandated by the Act. RCRA regulations are

promulgated by EPA, published in the *Federal Register*, and codified in the CFR.

- Guidance – Documents developed and issued by EPA to provide instructions on how to implement requirements of either the Act or regulations.
- Policy – Statements developed by EPA outlining a position on a topic or giving instructions on how a procedure should be conducted.

RCRA continues to change with amendments to the Statute. HSWA, in particular, significantly expanded both the scope and detailed requirements of the Act, especially in the context of the land disposal of hazardous wastes. Congress, EPA, states, regulated entities, and the general public are involved in developing and implementing the RCRA program.

EPA continues to improve the RCRA program by using measurable results to identify and promote new initiatives, such as encouraging waste minimization, improving the federal/state partnership in the hazardous waste program, and aiding state and local governments in reaping the environmental and economic benefits of source reduction and recycling.

SECTION II

MANAGING SOLID WASTE – RCRA SUBTITLE D

In this section…

OVERVIEW

Since the 1960s, Americans have sought to provide efficient and favorable methods of waste management. Congress enacted the Solid Waste Disposal Act of 1965 to address the growing quantity of waste generated in the United States and to ensure its proper management. Subsequent amendments to the Solid Waste Disposal Act, such as RCRA, have substantially increased the federal government's involvement in solid waste management.

During the 1980s, solid waste management issues rose to new heights of public concern in many areas of the United States because of increasing solid waste generation, shrinking landfill capacity, rising disposal costs, and public opposition to the siting of new landfills. These solid waste management challenges continue today, as many communities are struggling to develop cost-effective, environmentally protective solutions. The growing amount of waste generated has made it

WHAT IS A SOLID WASTE?

- Garbage
- Refuse
- Sludges from waste treatment plants, water supply treatment plants, or pollution control facilities
- Nonhazardous industrial wastes
- Other discarded materials, including solid, semisolid, liquid, or contained gaseous materials resulting from industrial, commercial, mining, agricultural, and community activities.

increasingly important for solid waste management officials to develop strategies to manage wastes safely and cost-effectively.

RCRA Subtitle D encourages environmentally sound solid waste management practices that maximize the reuse of recoverable material and foster resource recovery. Solid waste is predominately regulated by state and local governments. EPA has, however, promulgated some regulations pertaining to solid waste, predominately addressing how disposal facilities should be designed and operated. EPA's primary role in solid waste management includes setting national goals, providing leadership and technical assistance, and developing guidance and educational materials. The Agency has played a major role in this program by developing tools and information through policy and guidance to empower local governments, business, industry, federal agencies, and individuals to make better decisions in dealing with solid waste issues. The Agency's involvement is intended to create incentives to motivate behavioral change in reference to solid waste management through a nonregulatory approach.

This section presents an outline of the Subtitle D program. In doing so, it defines the terms solid waste and municipal solid waste, and it describes the role EPA plays in assisting waste officials in dealing with solid waste management problems. The section will provide an overview of the criteria that EPA has developed for solid waste landfills, and will introduce some Agency initiatives designed to promote proper and efficient solid waste management.

DEFINITION OF SOLID WASTE

RCRA defines the term **solid waste** as:

- Garbage (e.g., milk cartons and coffee grounds)
- Refuse (e.g., metal scrap, wall board, and empty containers)
- Sludges from waste treatment plants, water supply treatment plants, or pollution control facilities (e.g., scrubber slags)
- Nonhazardous industrial wastes (e.g., manufacturing process wastewaters and nonwastewater sludges and solids)
- Other discarded materials, including solid, semisolid, liquid, or contained gaseous materials resulting from industrial, commercial, mining, agricultural, and community activities (e.g., boiler slags).

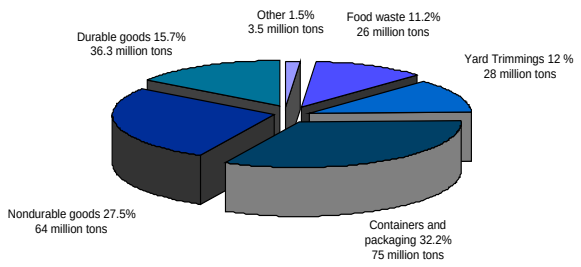
The term solid waste is very broad, including not only the traditional nonhazardous solid wastes, such as municipal garbage, but also some hazardous wastes. Hazardous waste, a subset of solid waste, is regulated under RCRA Subtitle C. (Hazardous waste is fully discussed in Section III.) RCRA Subtitle D addresses solid wastes, including those hazardous wastes that are excluded from the Subtitle C regulations (e.g., household hazardous waste), and hazardous waste generated by conditionally exempt small quantity generators (CESQGs).

The definition of solid waste is not limited to wastes that are physically solid. As noted above, many solid wastes are liquid, while others are semisolid or gaseous.

MUNICIPAL SOLID WASTE

Municipal solid waste is a subset of solid waste and is defined as durable goods (e.g., appliances, tires, batteries), nondurable goods (e.g., newspapers, books, magazines), containers and packaging, food wastes, yard trimmings, and miscellaneous organic wastes from residential, commercial, and industrial nonprocess sources (see Figure II-1).

Figure II-I: Products Generated in MSW by Weight, 2000 (total weight - 232 million tons)



Municipal solid waste generation has grown steadily over the past 35 years from 88 million tons per year (2.7 pounds per person per day) in 1960, to 232 million tons per year (4.5 pounds per person per day) in 2000. While generation of waste has grown steadily, recycling has also greatly increased. In 1960, only about 7 percent of municipal solid waste was recycled. By 2000, this figure had increased to 30 percent.

To address the increasing volumes of municipal solid waste that are generated on a daily basis, EPA recommends using an integrated, hierarchical approach to waste management with four components: source reduction, recycling, combustion, and landfilling. The hierarchy favors source reduction to reduce both the volume and toxicity of waste and to increase the useful life of manufactured products. Next preferred is recycling, including composting of yard and food wastes, because it diverts waste from combustion facilities and landfills and has positive impacts on both the environment and the economy. The goal of EPA's approach is to use a combination of all these methods to safely and effectively manage municipal solid waste. EPA recommends that communities tailor systems from the four components to meet their individual needs, looking first to source reduction, and second to recycling as preferences to combustion and landfilling (see Figure II-2).

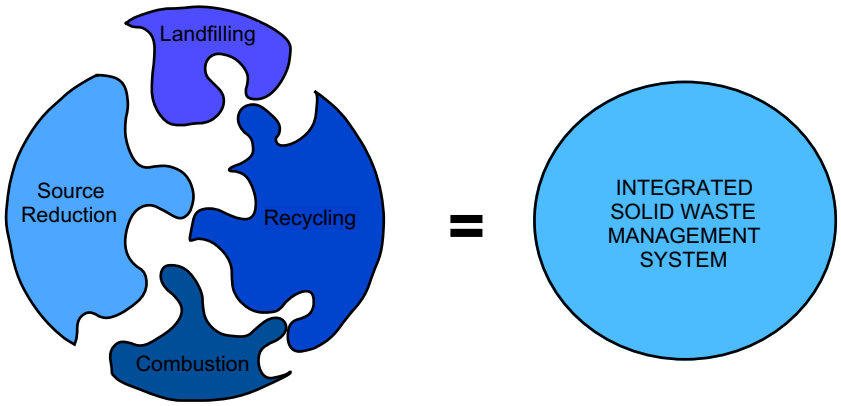
■ Source Reduction

Rather than managing waste after it is generated, **source reduction** is designed to change the way products are made and used in order to minimize waste generation. Source reduction, also called waste prevention, is defined as the design, manufacture, and use of products in a way that reduces the quantity and toxicity of waste produced when the products reach the end of their useful lives. The ultimate goal of source reduction is to decrease the amount and the toxicity of waste generated. Businesses, households, and state and local governments can all play an active role in source reduction. Businesses can manufacture products with packaging that is reduced in both volume and toxicity. They can also reduce waste by altering their business practices (e.g., reusing packaging for shipping, making double-sided copies, maintaining equipment to extend its useful life, using reusable envelopes). Community residents can help reduce waste by leaving grass clippings on the lawn or composting them with other yard waste in their backyards, instead of bagging such materials for eventual disposal. Consumers play a crucial role in an effective source reduction program by purchasing products having reduced packaging or that contain reduced amounts of toxic constituents. This purchasing subsequently increases the demand for products with these attributes. State and local governments include source reduction in their long-term planning for solid waste management in order to ensure its effectiveness.

■ Recycling

Municipal solid waste **recycling** refers to the separation and collection of wastes, their subsequent transformation or remanufacture into usable or marketable products or materials, and the purchase

Figure II-2: The Solid Waste Management Hierarchy

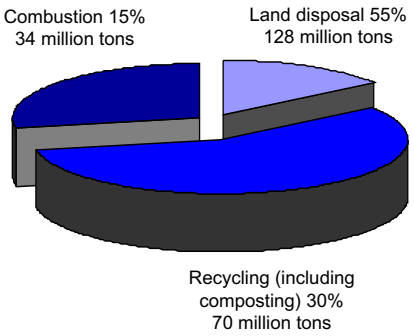


Source reduction, landfilling, recycling, and combustion are all pieces of the solid waste management puzzle. Source reduction and recycling are preferred elements of the system.

of products made from recyclable materials. In 2000, 30 percent (70 million tons), of the municipal solid waste generated in the United States was recycled (see Figure II-3). Solid waste recycling:

- Preserves raw materials and natural resources
- Reduces the amount of waste that requires disposal
- Reduces energy use and associated pollution

Figure II-3: Management of MSW in the U.S., 2000 (total weight = 232 million tons)



- Provides business and job opportunities
- Reduces greenhouse gas emissions
- Reduces pollution associated with use of virgin materials.

Communities can offer a wide range of recycling programs to their residents, such as drop-off centers, curbside collection, and centralized composting of yard and food wastes.

Composting processes are designed to optimize the natural decomposition or decay of organic matter, such as leaves and food. Compost, the end product of composting, is a humus-like material that can be added to soils to increase soil fertility, aeration, and nutrient retention. Composting can serve as a key component of municipal solid waste recycling activities, considering that food and yard wastes accounted for 23 percent of the total amount of municipal solid waste generated in 2000. Some communities are implementing large-scale composting programs in an effort to conserve landfill capacity.

The key to a successful recycling program is to ensure that the recovered material is actually reprocessed or remanufactured, and that the products are bought and used by consumers. Recycling programs will become more effective as markets increase for products made from recycled material. The federal government has developed several initiatives in order to bolster the use of recycled products. The federal procurement guidelines, authorized by RCRA Subtitle F, are designed to bolster the market for products manufactured from recycled materials. The procurement program uses government purchasing to spur recycling and markets for recovered materials. (This program is fully discussed in Section V.)

■ Combustion

For centuries, burning has been a popular method of reducing the volume of solid waste. Before the Clean Air Act (CAA) of 1970 essentially banned it, the burning of waste was rampant and uncontrolled. While uncontrolled burning of solid waste can be detrimental to health and the environment, confined and controlled burning, known as **combustion**, can not only decrease the volume of solid waste destined for landfills, but can also recover energy from the waste-burning process. Modern waste-to-energy facilities use energy recovered from the burning of solid waste to produce steam and electricity. In 2000, combustion facilities handled 15 percent (34 million tons) of the municipal solid waste generated (see Figure II-3). Used in conjunction with source reduction and recycling, combustion can recover resources and materials and greatly reduce the volume of wastes entering landfills.

■ Landfilling

Despite the effectiveness of source reduction, recycling, and combustion, there will always be waste that cannot be diverted from landfills. In fact, landfilling of solid waste still remains the most widely used waste management method as

Americans landfilled approximately 55 percent (128 million tons) of municipal solid waste in 2000 (see Figure II-3). Many communities are having difficulties siting new landfills largely as a result of increased citizen and local government concerns about the potential risks and aesthetics associated with having a landfill in their neighborhoods. To reduce risks to health and the environment, EPA developed minimum criteria that solid waste landfills must meet in order to alleviate some of the concern raised over landfill siting and health concerns.

CRITERIA FOR SOLID WASTE DISPOSAL FACILITIES

One of the initial focuses of the Solid Waste Disposal Act (as amended by RCRA) was to require EPA to study the risks associated with solid waste disposal and to develop management standards and criteria for solid waste disposal units (including landfills) in order to protect human health and the environment. This study resulted in the development of criteria for classifying solid waste disposal facilities and practices.

■ Criteria for Classification of Solid Waste Disposal Facilities and Practices

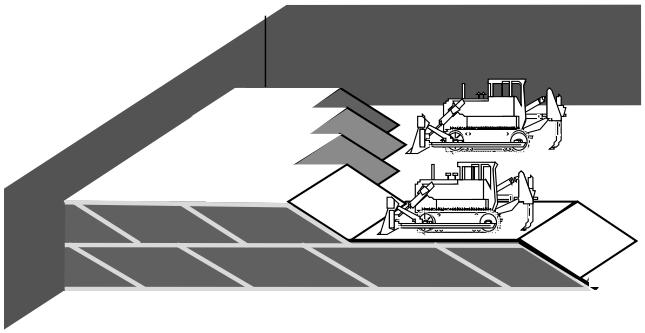
On September 13, 1979, EPA promulgated criteria to designate conditions under which solid waste disposal facilities and practices would not pose adverse effects to human health and the environment (Part 257 Subpart A). Facilities failing to satisfy the criteria were considered **open dumps** requiring attention by state solid waste programs. As a result, open dumps had to either be closed or upgraded to meet the criteria for sanitary landfills. States were also required to incorporate provisions into their solid waste programs to prohibit the establishment of new open dumps.

WHAT IS AN OPEN DUMP?

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D criteria. Using the Part 257, Subpart A criteria as a benchmark, each state evaluated the solid waste disposal facilities within its borders to determine which facilities were open dumps that needed to be closed or upgraded. For each open dump, the state completed an Open Dump Inventory Report form that was sent to the Bureau of the Census. At the end of fiscal years 1981 through 1985, the Bureau compiled all of the report forms and sent them to EPA, where they were summarized and published annually.

■ Technical Criteria for Solid Waste Disposal Facilities

The Part 257, Subpart A regulatory criteria used to classify solid waste disposal facilities and practices consist of general environmental performance standards. The criteria contain provisions designed to ensure that wastes disposed of in solid waste disposal units will not threaten endangered species, surface water, ground water, or flood plains. Further, owners and operators of disposal units are required to implement public health and safety precautions such as disease vector (e.g., rodents, flies, mosquitoes) controls to prevent the spread of disease and restrictions on the open burning of solid waste. In addition, facilities are required to install safety measures to control explosive gases generated by the decomposition of waste, minimize the number of birds attracted to the waste disposed of in the unit, and restrict public access to the facility. The criteria also restrict the land spreading of wastes with high levels of cadmium and polychlorinated biphenyls (PCBs) in order to adequately protect ground water from these dangerous contaminants.



These criteria serve as minimum technical standards for solid waste disposal facilities. As a result, facilities must meet the Part 257 standards to ensure that ongoing waste management operations adequately protect human health and the environment. If they fail to do so, the facility is classified as an open dump and must upgrade its operations or close. States have the option of developing standards more stringent than the Part 257, Subpart A criteria.

■ Technical Criteria for Municipal Solid Waste Landfills

Protection of human health and the environment from the risks posed by solid waste disposal facilities was an ongoing concern of Congress after RCRA was passed in 1976. As a result, HSWA required EPA to report on the adequacy of existing solid waste disposal facility criteria and gather detailed data on the characteristics and quantities of nonhazardous solid wastes.

Report to Congress on Solid Waste Disposal

In October 1988, EPA submitted a Report to Congress indicating that the United States was generating an increasing amount of municipal solid waste. The Report revealed that approximately 160 million tons of municipal solid waste were generated each year, 131 million tons of which were landfilled in just over 6,500 MSWLFs. EPA also reported that although these landfills used a wide variety of environmental controls, they may pose significant threats to ground water and surface water resources. For instance, rain water percolating through the landfills can dissolve harmful constituents in the waste and can eventually seep into the ground, potentially contaminating ground water. In addition, improperly maintained landfills can pose other health risks due to airborne contaminants, or the threat of fire or explosion.

To address these environmental and health concerns, and to standardize the technical requirements for these landfills, EPA promulgated revised minimum federal criteria in Part 258 for MSWLFs on October 9, 1991. The criteria were designed to ensure that MSWLFs receiving solid waste would be protective of human health and the environment. All landfills that were not MSWLFs remained subject to the Part 257, Subpart A criteria.

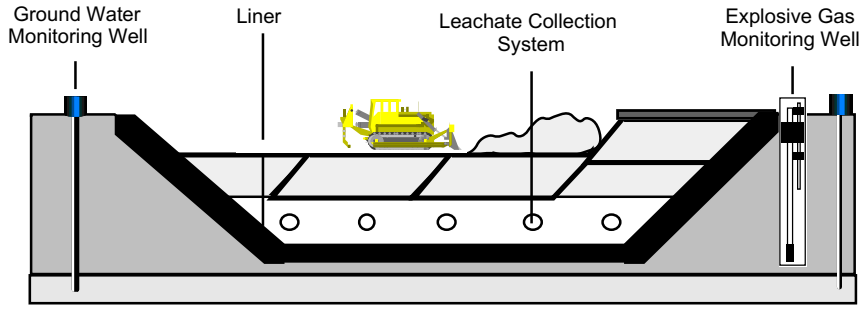
Criteria for Municipal Solid Waste Landfills

A **municipal solid waste landfill** is defined as a discrete area of land or excavation that receives household waste. A MSWLF may also receive other types of RCRA Subtitle D wastes, such as commercial solid waste, nonhazardous sludge, CESQG waste, and industrial nonhazardous solid waste. In 2000, there were approximately 2,000 MSWLFs in the United States.

The revised criteria address seven major aspects of MSWLFs (see Figure II-4):

- Location
- Operation
- Design
- Ground water monitoring
- Corrective action
- Closure and post-closure
- Financial assurance (i.e., responsibility).

Figure II-4: Cross-Section of a Municipal Solid Waste Landfill



The first set of criteria restrict where a MSWLF may be located. New landfills must meet minimum standards for placement in or near flood plains, wetlands, fault areas, seismic impact zones, and other unstable areas. Because some bird species are attracted to landfills, the criteria also restrict the placement of landfills near airports to reduce the bird hazards (i.e., collisions between birds and aircraft that may cause damage to the aircraft or injury to the passengers).

The operating criteria establish daily operating standards for running and maintaining a landfill. The standards dictate sound management practices that ensure protection of human health and the environment. The provisions require covering the landfill daily, controlling disease vectors, and controlling explosive gases. They also prohibit the open burning of solid waste and require the owner and operator of the landfill to control unauthorized access to the unit.

The design criteria require each new landfill to have a liner consisting of a flexible membrane and a minimum of two feet of compacted soil, as well as a leachate collection system. **Leachate** is formed when rain water filters through wastes placed in a landfill. When this liquid comes in contact with buried wastes, it leaches, or draws out, chemicals or constituents from those wastes. States with approved MSWLF permit programs can allow the use of an alternative liner design that controls ground water contamination. The liner and collection system prevent the potentially harmful leachate from contaminating the soil and ground water below the landfill.

In order to ensure that the liner and leachate collection system are working properly and that the landfill is not contaminating surrounding ground water resources, MSWLF owners and operators must also establish a ground water monitoring program. Through a series of monitoring wells, the facility owner and operator is alerted if the landfill is leaking and causing contamination. If contamination is detected, the owner and operator of the landfill must perform **corrective action** (i.e., clean up the contamination caused by the landfill).

When landfills reach their capacity and can no longer accept additional waste, the criteria stipulate procedures for properly closing the facility to ensure that the landfill does not present any danger to human health and the environment in the future. The **closure** activities at the end of a facility's use are often expensive and the owner and operator must have the ability to pay for them. As a result, the criteria require each owner and operator to prove that they have the financial resources to perform these closure and **post-closure** activities, as well as any necessary corrective action.

Most of the solid waste program is overseen by the states, and compliance is assured through state-issued permits. Each state is to obtain EPA approval for their MSWLF permitting program. This approval process assesses whether a state's program is sufficient to ensure each landfill's compliance with the criteria. In addition to the minimum federal criteria, states may impose requirements that are more stringent than the federal requirements.

■ Conditionally Exempt Small Quantity Generator Waste Disposal Facilities

Businesses that produce small amounts of hazardous waste, known as **conditionally exempt small quantity generators**, need not manage their hazardous waste under the Subtitle C program. This means that CESQG waste can be disposed of in solid waste landfills. However, HSWA required EPA to establish standards to ensure that CESQG waste disposal in solid waste disposal units did not pose threats to human health and the environment. As a result, on July 1, 1996, EPA revised the Part 257, Subpart B criteria to contain standards for nonmunicipal, nonhazardous waste disposal units that receive CESQG hazardous waste. These revisions addressed location restrictions, requirements for monitoring for ground water contamination, and corrective action provisions to clean up any contamination. (CESQGs are fully discussed in Section III, Chapter 3.)

■ Bioreactor Landfills

A bioreactor landfill operates to rapidly transform and degrade organic waste. The increase in waste degradation and stabilization is accomplished through the addition of liquid and air to enhance microbial processes. This bioreactor concept differs from the traditional "dry tomb" municipal landfill approach. thus, decomposition and biological stabilization of the waste in a bioreactor landfill can occur in a much shorter time frame than occurs in a traditional landfill providing a potential decrease in long-term environmental risks and landfill operating and post-closure costs. EPA is currently collection information on the advantages and disadvantages of bioreactor landfills through case studies of existing landfills and additional data so that EPA can identify specific bioreactor standards or recommend operating parameters.

Additional information about bioreactor landfills can be found at www.epa.gov/epaoswer/non-hw/muncpl/landfill/bioreactors.htm.

ASSISTANCE TO NATIVE AMERICAN TRIBES

EPA developed a municipal solid waste strategy to assist Native American tribes in the establishment of healthy, environmentally protective, integrated solid waste management practices on tribal lands. The strategy is based on input from tribal focus groups convened by the National Tribal Environmental Council and discussions with tribal organizations, EPA Regional Indian Program coordinators, other EPA offices, and other federal agencies with trust responsibilities on Native American lands. The strategy emphasizes building tribal municipal solid waste management capacity, developing tribal organizational infrastructure, and building partnerships among tribes, states, and local governments. Direct EPA support of these goals includes technical assistance, grant funding, education, and outreach.

Solid waste managers on Native American lands face unique challenges. To address issues such as jurisdiction, funding, and staffing, EPA offers several resource guides featuring in-depth information specific to Native American lands. The Agency recognizes that every solid waste management program needs funding to survive and that, in an era of tightening budgets, it may be difficult to find necessary resources. One of EPA's ongoing priorities is to make current information available to help tribes locate the funding they need to develop and implement safe and effective solid waste programs.

One such initiative is the *Tribal Waste Journal*. The journal contains in-depth information on a variety of solid and hazardous waste topics including interviews with representatives from Native American Tribes and Alaskan Native Villages. Each issue focuses on a single topic and presents ideas, approaches, and activities that other Native American Tribes and Alaskan Native Villages have successfully employed.

Additionally, EPA has initiated the Tribal Open Dump Cleanup Project to assist tribes with closure or upgrade of open dump sites. The project is part of a Tribal Solid Waste Interagency Workgroup, which is working to coordinate federal assistance for tribal solid waste management programs. The cleanup project's specific goals include assisting tribes with 1) completing and implementing comprehensive, integrated waste management plans; 2) developing realistic solid waste management alternatives; 3) closing or upgrading existing open dumps; and 4) developing post-closure programs.

Outreach and education materials are two other tools EPA provides to tribes to support environmentally sound integrated solid waste management practices. The Agency's outreach support helps tribes connect and learn from each other's experiences. Educational resources help tribal leadership as well as the general tribal community understand the importance of good municipal solid waste management. Better understanding ensures that tribal municipal solid waste programs are assigned a high priority and facilitates the communities' adoption of new and improved waste disposal practices.

SOLID WASTE MANAGEMENT INITIATIVES

With the bulk of the RCRA Subtitle D program already in place, EPA launched several new initiatives to further the development of the solid waste management program. These initiatives promote proper waste management, and encourage source reduction by both industry and the public.

■ WasteWise

Many companies, institutions, and governments have demonstrated that they can save money by reducing waste and recycling material that would otherwise be disposed. The **WasteWise** program is designed to assist companies, states, local governments, Native American tribes, and other institutions in developing cost-effective practices to reduce municipal solid waste. These partners set and acheive certain goals within three areas: waste prevention, recycling collection, and buying or manufacturing recycled products. Participation offers the partners several advantages. EPA provides technical assistance, publications, and program updates. Successful waste reduction efforts are highlighted in EPA documents, magazines, and trade publications. Participating organizations can also use the WasteWise logo to promote their participation.

These benefits along with the direct financial savings that result from waste prevention and recycling activities are helping to improve waste management and resource efficiency. In 1999, partners eliminated over 9 million tons of materials through waste prevention, continuing the upward trend in waste reduction. Partners also recycled over 8.4 million tons in 1999, avoiding approximately $300 million in disposal costs. Since the program's inception in 1994, partners have reduced nearly 32 million tons of waste.

Additional information on the WasteWise program is found at www.epa.gov/wastewise.

■ Jobs Through Recycling Program

To support recycling markets, EPA launched the **Jobs Through Recycling** program in 1994. The goal of the program is to foster markets for recycled goods by promoting and assisting the development of businesses using recovered materials, creating new recycling jobs, and spurring innovative technologies. Under the program, EPA awards over $1 million each year in grants to states and tribes. Jobs Through Recycling funds programs that help develop or retain intermediate processing and end-use manufacturing capacity for recyclables and reusable materials. Jobs Through Recycling supports the development and strengthening of state, multi-state, and tribal market development and economic development programs. The activities funded thus far include the creation of Recycling Economic Development Advocates (REDAs), Recycling and Reuse Business Assistance Centers (RBACs), and commodity-specific demonstration projects. REDAs are staff in state or tribal economic development agencies who pursue recycling business growth, whereas RBACs are state full-service centers providing business, technical, and financing assistance to businesses using recovered materials.

Jobs Through Recycling bolsters the job market by actively promoting the recycling industry. Recycling is estimated to create nearly five times as many jobs as landfilling. One 1994 study reported that 103,000 jobs, or 2.7 percent of all manufacturing jobs in the Northeast region of the United States, are attributed to recycling. In addition, the jobs created by recycling businesses draw from the full spectrum of the labor market (ranging from low- and semi-skilled jobs to highly skilled jobs). Materials sorters, dispatchers, truck drivers, brokers, sales representatives, process engineers, and chemists are just some of the jobs needed in the recycling industry.

Since Jobs Through Recycling's inception in 1994, $8 million in funding has been awarded to numerous states, tribes, and multistate organizations. This funding has helped create more than 8,500 jobs, generate $640.5 million in capital investment, create 15.3 million tons of landfill capacity, and utilize 13.9 million tons of recovered materials. One job has

been created for every $1,040 of Jobs Through Recycling grant money invested.

Additional information about Jobs through Recycling is available at www.epa.gov/jtr.

Unit Pricing

Some communities are using economic incentives to encourage the public to reduce solid waste sent to landfills. One of the most successful economic incentive programs used to achieve source reduction and recycling is variable rate refuse collection, or **unit pricing**. Unit pricing programs, sometimes referred to as pay-as-you-throw systems, have one primary goal: customers who dispose of more waste pay more for the collection and disposal service. There are a few different types of unit pricing systems. Most require residents to pay a per-bag fee for refuse collection, and require the purchase of a special bag or tag to place on bags or cans. Other systems allow customers to choose between different size containers, and charge more for collection of larger containers. EPA's role in the further development of unit pricing systems has been to study effective systems in use and to disseminate documentation to inform other communities about the environmental and economic benefits that unit pricing may have for their community. The number of communities using unit pricing grew to more than 4,033 in 1999 and the population served has more than tripled since 1990 to over 35 million today.

Additional information about unit pricing or pay-as-you-throw programs is available at www.epa.gov/payt.

Full Cost Accounting for Municipal Solid Waste

Full cost accounting is an additional financial management tool that communities can use to improve solid waste management. Full cost accounting is an accounting approach that helps local governments identify all direct and indirect costs, as well as the past and future costs, of a MSW management program. Full cost accounting helps solid waste managers account for all monetary costs of resources used or committed, thereby providing the complete picture of solid waste management costs on an ongoing basis. Full cost accounting can help managers identify high-cost activities and operations and seek ways to make them more cost-effective.

EPA is continually studying these and other programs in order to assist communities in deciding whether one of these programs is right for them. In addition to these initiatives, EPA has published numerous guidance documents designed to educate both industry and the public on the benefits of source reduction, to guide communities in developing recycling programs, and to educate students on the benefits and elements of source reduction and recycling.

Additional information about full cost accounting can be found at www.epa.gov/fullcost.

Extended Product Responsibility

Extended product responsibility, also known as product stewardship, is a product-centered approach to environmental protection. This approach recognizes that lasting and substantial environmental improvements in product systems can only occur with the combined expertise, ingenuity, cooperation, and commitment of each individual involved in the product chain, from suppliers, designers, manufacturers, and distributors, to retailers, customers, recyclers, remanufacturers, and disposers. Product manufacturers have the greatest ability, and therefore must take on new responsibilities to reduce the environmental impacts of their products. Reducing use of toxic substances and designing for reuse and recyclability are just a few ways for companies to rethink their products in order to provide more value at less environmental impact.

Additional information about extended product responsibility is available at www.epa.gov/epaoswer/non-hw/reduce/epr/index.htm.

Green Building

Buildings that are designed, constructed, operated, and ultimately removed in such a way as to

minimize their environmental impacts are referred to as "green" buildings. **Green buildings** are characterized by improved energy and water efficiency, use of renewable sources of energy, improved indoor air quality, and efficient use of building materials. EPA supports projects to reduce, reuse, and recycle waste generated from building construction, renovation, deconstruction, and demolition. Construction and demolition wastes commonly include building materials, and products such as concrete, asphalt, wood, glass, brick, metal, insulation, and furniture. From incorporating used or environmentally friendly materials into a building's construction or renovation to disassembling structures for the reuse and recycling of their components, each phase of a building's life cycle offers opportunities to reduce waste.

Additional information about green buildings is available at www.epa.gov/greenbuilding.

■ Industrial Ecology

The study of material and energy flows and their transformations into products, byproducts, and waste throughout industrial and ecological systems is the primary concept of **industrial ecology**. This initiative urges industry to seek opportunities for the continual reuse and recycling of materials through a system in which processes are designed to consume only available waste streams and to produce only usable waste. Wastes from producers and consumers become input for other producers and consumers, and resources are cycled through the system to sustain future generations. Individual processes and products become part of a n interconnected industrial system in which new products or processes evolve out of or consume available waste streams, water, and energy; in turn, processes are developed to produce usable resources.

SUMMARY

Subtitle D addresses primarily nonhazardous solid waste. The term solid waste includes garbage, refuse, sludges, nonhazardous industrial wastes, and other discarded materials. Solid waste also includes hazardous wastes that are excluded from Subtitle C regulation (e.g., household hazardous waste).

Municipal solid waste, a subset of solid waste, is waste generated by businesses and households. EPA recommends an integrated, hierarchical approach to managing municipal solid waste that includes, in descending order of preference:

- Source reduction
- Recycling
- Combustion
- Landfilling.

As part of Subtitle D, EPA has developed detailed technical criteria for solid waste disposal facilities, including specific criteria for MSWLFs. These criteria include specific provisions for MSWLF:

- Location
- Operation
- Design
- Ground water monitoring
- Corrective action
- Closure and post-closure
- Financial assurance (i.e., responsibility).

EPA has helped develop and implement new initiatives and programs that aid businesses, states, local governments, and Native American tribes in implementing effective solid waste management programs. Focusing particularly on the environmental and economic benefits of source reduction and recycling, EPA fosters integrated solid waste management in communities and businesses. These initiatives include:

- WasteWi$e
- Jobs Through Recycling program
- Unit pricing
- Full cost accounting
- Extended product responsibility
- Green buildings
- Industrial ecology.

ADDITIONAL RESOURCES

Additional information about municipal solid waste management can be found at www.epa.gov/msw.

SECTION III

RCRA SUBTITLE C – MANAGING HAZARDOUS WASTE

In this section…

OVERVIEW

The improper management of hazardous waste poses a serious threat to the health of American citizens and their environment. When EPA began developing the hazardous waste management regulations in the late 1970s, the Agency estimated that only 10 percent of all hazardous waste was managed in an environmentally sound manner.

Some threats posed by the mismanagement of hazardous waste are obvious. Reports of chemical accidents or spills of hazardous waste that close highways, or illegal midnight dumping that contaminates property, are familiar. Yet, even when hazardous waste is managed or disposed of in a careful manner, it may still pose a serious threat to human health and the environment. For example, toxic hazardous wastes can leak from a poorly constructed or improperly maintained hazardous waste landfill. Such waste contamination can severely, and sometimes irreversibly, pollute ground water, the primary source of drinking water for half the nation.

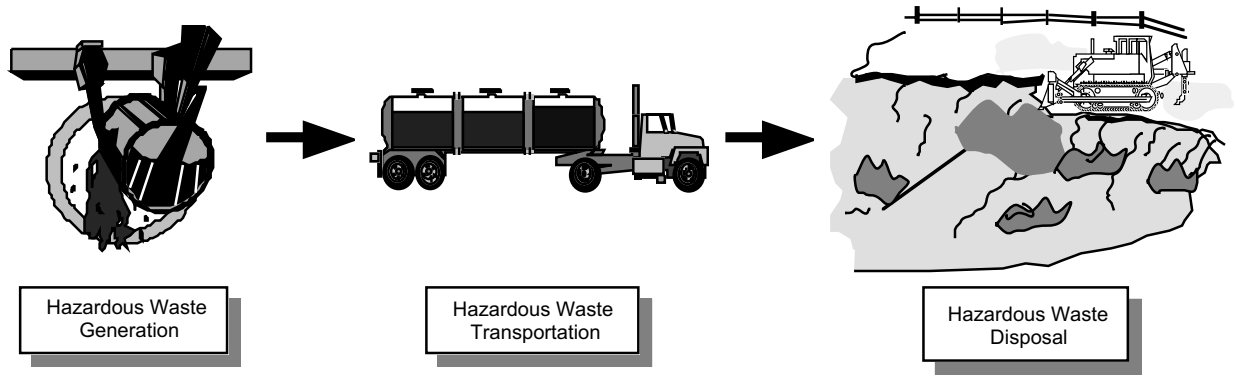
Ground water pollution is not the only problem posed by hazardous waste mismanagement. The improper disposal of hazardous waste has polluted streams, rivers, lakes, and other surface waters, killing aquatic life, destroying wildlife, and stripping areas of vegetation. In other cases, careless waste disposal has been linked to respiratory illnesses, skin diseases (including skin cancer), and elevated levels of toxic materials in the blood and tissue of humans and domestic livestock. In still other cases, the mismanagement of hazardous waste has resulted in fires, explosions, or the generation of toxic gases that have killed or seriously injured workers and firefighters.

Since 1980, under RCRA Subtitle C, EPA has developed a comprehensive program to ensure that hazardous waste is managed safely: from the moment it is generated; while it is transported, treated, or stored; until the moment it is finally disposed (see Figure III-1). This cradle-to-grave management system establishes requirements for each of the following:

- Hazardous Waste Identification — To facilitate the proper identification and classification of hazardous waste, RCRA begins with hazardous waste identification procedures.
- Hazardous Waste Recycling and Universal Wastes — To provide for the safe recycling of hazardous wastes, and facilitate the management of commonly recycled materials, RCRA includes provisions for hazardous waste recycling and universal wastes.
- Hazardous Waste Generators — To ensure proper and safe waste management, the RCRA regulations provide management standards for those facilities that produce hazardous waste, and provide reduced regulations for facilities that produce less waste.
- Hazardous Waste Transporters — To govern the transport of hazardous waste between management facilities, RCRA regulates hazardous waste transporters.
- Treatment, Storage, and Disposal Facilities — To fully protect human health and the environment from hazardous waste treatment, storage, and disposal, the TSDF requirements establish generic facility management standards, specific provisions governing hazardous waste management units, and additional precautions designed to protect soil, ground water, and air resources.
- Land Disposal Restrictions (LDR) — To reduce the hazards posed by permanently land disposed waste, this program requires effective and expeditious hazardous waste treatment.
- Combustion — To minimize the hazards posed by the burning of hazardous waste, RCRA imposes strict standards on units conducting such combustion.
- Permitting — To ensure that only facilities meeting the TSDF standards are treating, storing, and disposing of hazardous waste, and to provide each TSDF facility with a record of the specific requirements applicable to each part of its operation, RCRA requires owners and operators of these facilities to obtain a permit.
- Corrective Action — Since hazardous waste management may result in spills or releases into the environment, the corrective action program is designed to guide the cleanup of any contaminated air, ground water, or soil resulting from such management.
- Enforcement — To ensure that RCRA-regulated facilities, from generators to TSDFs, comply with these regulations, RCRA provides EPA with the authority to enforce provisions of the Act.
- State Authorization — To empower states and make enforcement more efficient, RCRA also allows EPA to authorize state governments to administer various parts of the RCRA program.

Each of these aspects of the RCRA Subtitle C program is carefully detailed in separate chapters in this section.

Figure III-1: RCRA's Cradle-to-Grave Hazardous Waste Management System



CHAPTER 1

HAZARDOUS WASTE IDENTIFICATION

In this chapter…

OVERVIEW

What is a hazardous waste? Simply defined, a **hazardous waste** is a waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment. Unfortunately, in order to develop a regulatory framework capable of ensuring adequate protection, this simple narrative definition is not enough. Determining what is a hazardous waste is paramount, because only those wastes that have specific attributes are subject to Subtitle C regulation.

Making this determination is a complex task which is a central component of the hazardous waste management regulations. Hazardous waste is generated from many sources, ranging from industrial manufacturing process wastes, to batteries, to fluorescent light bulbs. Hazardous waste may come in many forms, including liquids, solids, gases, and sludges. To cover this wide range, EPA has developed a system to identify specific substances known to be hazardous and provide objective criteria for including other materials in this universe. The regulations contain guidelines for determining what exactly is a waste (called a solid waste) and what is excluded from the hazardous waste regulations, even though it otherwise is a solid and hazardous waste. Finally, to promote recycling and the reduction of the amount of waste entering the RCRA system, EPA provides exemptions for certain wastes when they are recycled in certain ways.

This chapter introduces the hazardous waste identification process, describes how to determine if a waste is a solid waste, and provides the regulatory definition for hazardous waste. It also discusses those wastes specifically excluded from Subtitle C regulation, and those wastes exempted when recycled.

HAZARDOUS WASTE IDENTIFICATION PROCESS

Proper hazardous waste identification is essential to the success of the RCRA program. This identification process can be a very complex task. Therefore, it is best to approach the issue by asking a series of questions in a step-wise manner (see Figure III-2). If facility owners and operators answer the following questions, they can determine if they are producing a hazardous waste:

1. Is the material in question a solid waste?
2. Is the material excluded from the definition of solid waste or hazardous waste?
3. Is the waste a listed or characteristic hazardous waste?
4. Is the waste delisted?

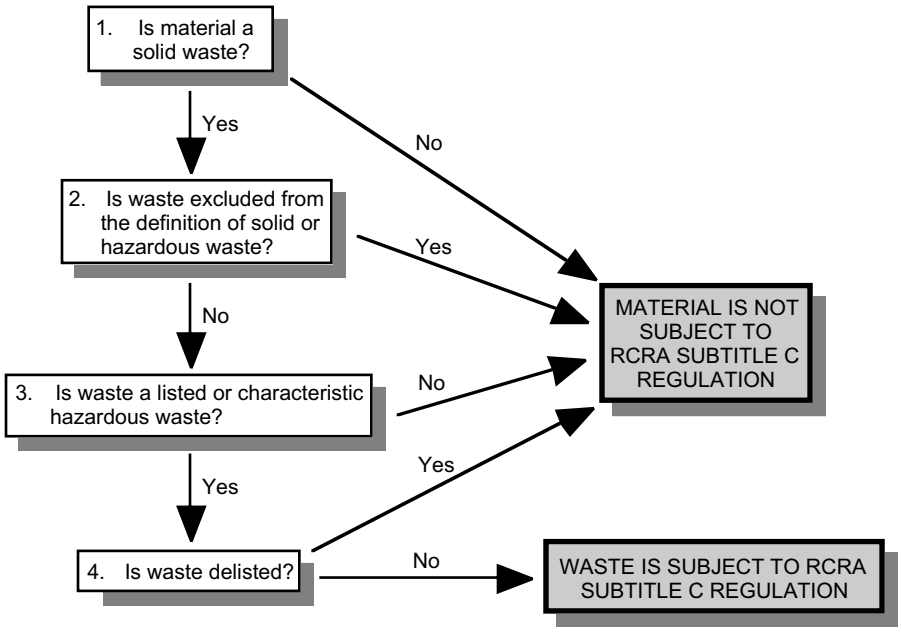
This chapter will examine these key questions.

IS THE MATERIAL A SOLID WASTE?

The Subtitle C program uses the term solid waste to denote something that is a waste. In order for a material to be classified as a hazardous waste, it must first be a solid waste. Therefore, the first step in the hazardous waste identification process is determining if a material is a solid waste.

The statutory definition points out that whether a material is a solid waste is not based on the physical form of the material (i.e., whether or not it is a solid as opposed to a liquid or gas), but rather that the material is a waste. The regulations further define **solid waste** as any material that is discarded by being either abandoned, inherently waste-like, a certain military munition, or recycled (see Figure III-3).

Figure III-2: Hazardous Waste Identification Process



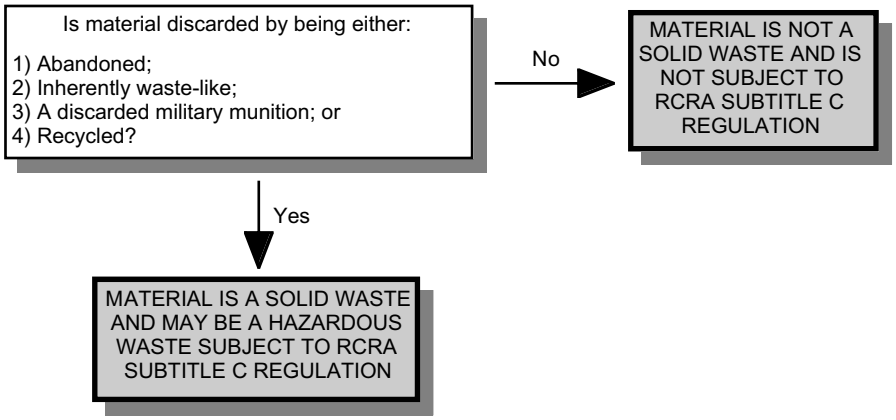
- Abandoned — The term **abandoned** simply means thrown away. A material is abandoned if it is disposed of, burned, or incinerated.
- Inherently Waste-Like — Some materials pose such a threat to human health and the environment that they are always considered solid wastes; these materials are considered to be **inherently waste-like**. Examples of inherently waste-like materials include certain dioxin-containing wastes.
- Military Munition — **Military munitions** are all ammunition products and components produced for or used by the U.S. Department of Defense (DOD) or U.S. Armed Services for national defense and security. Unused or defective munitions are solid wastes when abandoned (i.e., disposed of, burned, incinerated) or treated prior to disposal; rendered nonrecyclable or nonuseable through deterioration; or declared a waste by an authorized military official. Used (i.e., fired or detonated) munitions may also be solid wastes if collected for storage, recycling, treatment, or disposal.
- Recycled — A material is **recycled** if it is used or reused (e.g., as an ingredient in a process), reclaimed, or used in certain ways (used in a manner constituting disposal, burned for energy recovery, or accumulated speculatively). (Recycled materials are fully discussed in Section III, Chapter 2.)

Recycled Materials

Materials that are recycled are a special subset of the solid waste universe. When recycled, some materials are not solid wastes, and therefore, not hazardous wastes, while others are solid and hazardous waste, but are subject to less-stringent regulatory controls. The level of regulation that applies to recycled materials depends on the material and the type of recycling (see Figure III-4). Because some types of recycling pose threats to human health and the environment, RCRA does not exempt all recycled materials from the definition of solid waste. As a result, the manner in which a material is recycled will determine whether or not the material is a solid waste, and therefore potentially regulated as a hazardous waste. In order to encourage waste recycling, RCRA exempts three types of wastes from the definition of solid waste:

- Wastes Used as an Ingredient — If a material is directly used as an ingredient in a production process without first being reclaimed, then that material is not a solid waste.
- Wastes Used as a Product Substitute — If a material is directly used as an effective substitute for a commercial product (without

Figure III-3: Is It a Solid Waste?



first being reclaimed), it is exempt from the definition of solid waste.

- Wastes Returned to the Production Process — When a material is returned directly to the production process (without first being reclaimed) for use as a feedstock or raw material, it is not a solid waste.

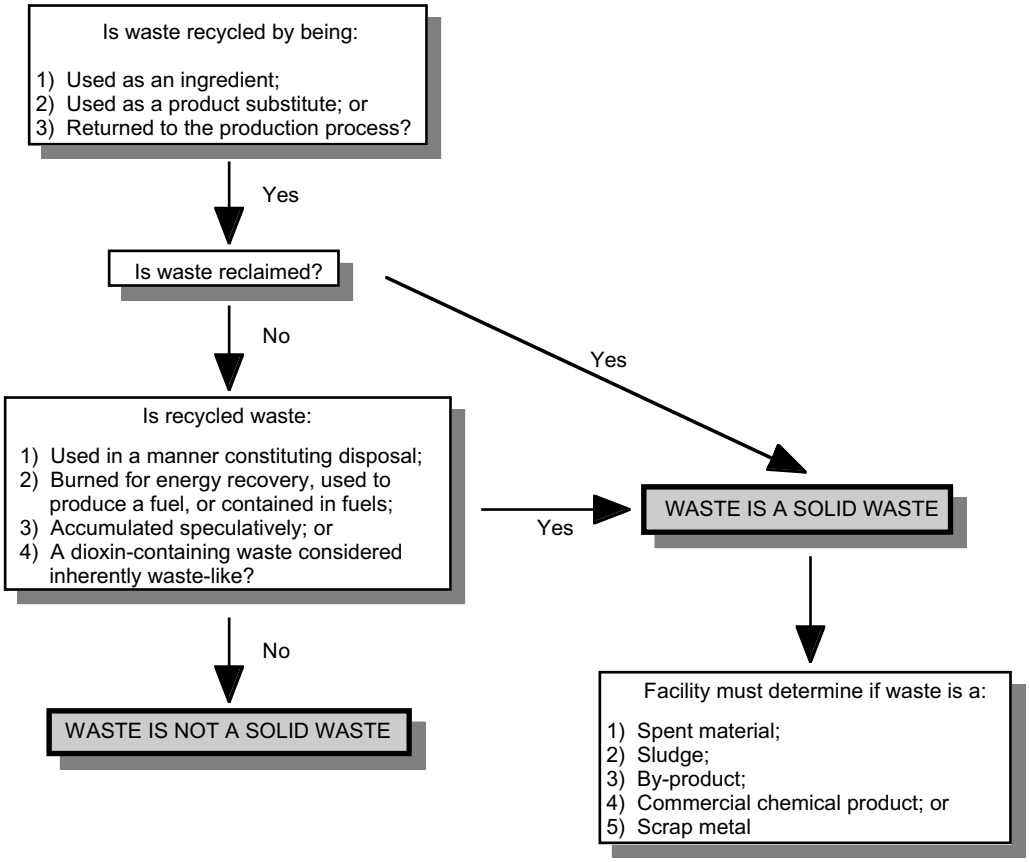
Conversely, materials are solid wastes, and are not exempt, if they are recycled in certain ways. If these materials are used in a manner constituting disposal; burned for energy recovery, used to produce a fuel, or contained in fuels; accumulated speculatively; or are dioxin-containing wastes considered inherently waste-like; then they are defined as solid wastes.

- Used in a Manner Constituting Disposal — **Use constituting disposal** is the direct placement of wastes or products containing wastes (e.g., asphalt with petroleum-refining wastes as an ingredient) on the land.

- Burned for Energy Recovery, Used to Produce a Fuel, or Contained in Fuels — Burning hazardous waste for fuel (e.g., **burning for energy recovery**) and using wastes to produce fuels are regulated activities. Conversely, commercial products intended to be burned as fuels are not considered solid wastes. For example, off-specification jet fuel (e.g., a fuel with minor chemical impurities) is not a solid waste when it is burned for energy recovery, because it is itself a fuel.

- Accumulated Speculatively — In order to encourage recycling of wastes as well as ensure that materials are actually recycled, and not simply stored to avoid regulation, EPA

Figure III-4: Are All Recycled Wastes Hazardous Wastes?



established a provision to encourage facilities to recycle sufficient amounts in a timely manner. This provision designates as solid wastes those materials that are **accumulated speculatively**. A material is accumulated speculatively (e.g., stored in lieu of expeditious recycling) if it has no viable market or if the person accumulating the material cannot demonstrate that at least 75 percent of the material is recycled in a calendar year, commencing on January 1 (see Figure III-5).

- Dioxin-Containing Wastes Considered Inherently Waste-Like — Dioxin-containing wastes are considered inherently waste-like because they pose significant threats to human health and the environment if released or mismanaged. As a result, RCRA does not exempt such wastes from the definition of solid waste even if they are recycled through direct use or reuse without prior reclamation. This is to ensure that such wastes are subject to the most protective regulatory controls.

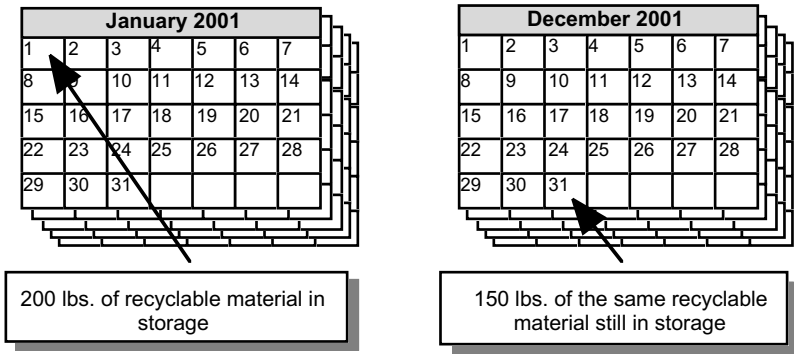
Secondary Materials

Not all materials can be directly used or reused without reclamation. A material is **reclaimed** if it is processed to recover a usable product (e.g., smelting a waste to recover valuable metal constituents), or if it is regenerated through processing to remove contaminants in a way that restores them to their useable condition (e.g., distilling dirty spent solvents to produce clean solvents). If **secondary materials** are reclaimed before use, their regulatory status depends on the type of material. For this solid waste determination process, EPA groups all materials into five categories. These secondary materials consist of spent materials, sludges, by-products, commercial chemical products (CCPs), and scrap metal.

Spent Materials

Spent materials are materials that have been used and can no longer serve the purpose for which they were produced without processing. For example, a solvent used to degrease metal parts will eventually become contaminated such that it cannot be used as a solvent until it is regenerated. If a spent material must be reclaimed, it is a solid waste and is subject to hazardous waste regulation. Spent materials are also regulated as solid wastes when used in a manner constituting disposal; burned for energy recovery, used to produce a fuel, or contained in fuels; or accumulated speculatively (see Figure III-6).

Figure III-5: Materials Accumulated Speculatively



On January 1, 2001, a facility has 200 lbs. of a material that it wants to re-insert directly into its production process. Such a material is technically exempt from the definition of solid waste because it is being recycled through direct reuse without prior reclamation. However, by the end of the calendar year (December 31, 2001), less than 75 percent (i.e., less than 150 lbs.) of the material has been reclaimed or sent off site for reclamation. Therefore, the material has been speculatively accumulated and is no longer exempt from the definition of solid waste. The material may then be regulated as a hazardous waste.

Sludges

Sludges are any solid, semisolid, or liquid wastes generated from a wastewater treatment plant, water supply treatment plant, or air pollution control device (e.g., filters, baghouse dust). Sludges from specific industrial processes or sources (known as listed sludges) are solid wastes when reclaimed; used in a manner constituting disposal; burned for energy recovery, used to produce a fuel, or contained in fuels; or accumulated speculatively. On the other hand, characteristic sludges (which are sludges that exhibit certain physical or chemical properties) are not solid wastes when reclaimed, unless they are used in a manner constituting disposal; burned for energy recovery, used to produce a fuel, or contained in fuels; or accumulated speculatively (see Figure III-6). (Listings and characteristics are fully discussed later in this chapter.)

By-Products

By-products are materials that are not one of the intended products of a production process. An example is the sediment remaining at the bottom of a distillation column. By-product is a catch-all term and includes most wastes that are not spent materials or sludges. Listed by-products are solid wastes when reclaimed; used in a manner constituting disposal; burned for energy recovery, used to produce a fuel, or contained in fuels; or accumulated speculatively. On the other hand, characteristic by-products are not solid wastes when reclaimed, unless they are used in a manner constituting disposal; burned for energy recovery, used to produce a fuel, or contained in fuels; or accumulated speculatively (see Figure III-6).

Figure III-6: Regulatory Status of Secondary Materials

	These materials are solid wastes when...			
	Reclaimed	Used in a manner constituting disposal	Burned for energy recovery, used to produce a fuel, or contained in fuels	Accumulated speculatively
Spent Materials	√	√	√	√
Listed Sludges	√	√	√	√
Characteristic Sludges		√	√	√
Listed By-products	√	√	√	√
Characteristic By-products		√	√	√
Commercial Chemical Products		√*	√*	
Scrap Metal	√	√	√	√

* If such management is consistent with the product's normal use, then commercial chemical products used in a manner constituting disposal or burned for energy recovery, used to produce a fuel, or contained in fuels are not solid wastes.

√ Material is a solid waste

Commercial Chemical Products

Commercial chemical products are unused or off-specification chemicals (e.g., chemicals that have exceeded their shelf life), spill or container residues, and other unused manufactured products that are not typically considered chemicals. CCPs are not solid wastes when reclaimed, unless they are used in a manner constituting disposal; or burned for energy recovery, used to produce a fuel, or contained in fuels (see Figure III-6).

Scrap Metal

Scrap metal is worn or extra bits and pieces of metal parts, such as scrap piping and wire, or worn metal items, such as scrap automobile parts and radiators. If scrap metal is reclaimed, it is a solid waste and is subject to hazardous waste regulation (see also Section III, Chapter 2). Scrap metal is also regulated as a solid waste when used in a manner constituting disposal; burned for energy recovery, used to produce a fuel, or contained in fuels; or accumulated speculatively. This does not apply to processed scrap metal which is excluded from hazardous waste generation entirely (as discussed later in this chapter).

■ Sham Recycling

For all recycling activities, the above rules are based on the premise that legitimate reclamation or reuse is taking place. EPA rewards facilities recycling some wastes by exempting them from regulation, or by subjecting them to lesser regulation. Some facilities, however, may claim that they are recycling a material in order to avoid being subject to RCRA regulation, when in fact the activity is not legitimate recycling. EPA has established guidelines for what constitutes legitimate recycling and has described activities it considers to be illegitimate or **sham recycling**. Considerations in making this determination include whether the secondary material is effective for the claimed use, if the secondary material is used in excess of the amount necessary, and whether or not the facility has maintained records of the recycling transactions.

SHAM RECYCLING

Sham recycling may include situations when a secondary material is:

- Ineffective or only marginally effective for the claimed use (e.g., using certain heavy metal sludges in concrete when such sludges do not contribute any significant element to the concrete's properties)
- Used in excess of the amount necessary (e.g., using materials containing chlorine as an ingredient in a process requiring chlorine, but in excess of the required chlorine levels)
- Handled in a manner inconsistent with its use as a raw material or commercial product substitute (e.g., storing materials in a leaking surface impoundment as compared to a tank in good condition that is intended for storing raw materials).

IS THE WASTE EXCLUDED?

Not all RCRA solid wastes qualify as hazardous wastes. Other factors must be considered before deciding whether a solid waste should be regulated as a hazardous waste. Regulation of certain wastes may be impractical or otherwise undesirable, regardless of the hazards that the waste might pose. For instance, household waste can contain dangerous chemicals, such as solvents and pesticides, but subjecting households to the strict RCRA waste management regulations would create a number of practical problems. As a result, Congress and EPA exempted or excluded certain wastes, such as household wastes, from the hazardous waste definition and regulations. Determining whether or not a waste is excluded or exempted from hazardous waste regulation is the second step in the RCRA hazardous waste identification process. There are five categories of exclusions:

- Exclusions from the definition of solid waste
- Exclusions from the definition of hazardous waste
- Exclusions for waste generated in raw material, product storage, or manufacturing units
- Exclusions for laboratory samples and waste treatability studies
- Exclusions for dredged material regulated under the Marine Protection Research and Sanctuaries Act or the Clean Water Act.

If the waste fits one of these categories, it is not regulated as a RCRA hazardous waste, and the hazardous waste requirements do not apply.

■ Solid Waste Exclusions

A material cannot be a hazardous waste if it does not meet the definition of a solid waste. Thus, wastes that are excluded from the definition of solid waste are not subject to RCRA Subtitle C hazardous waste regulation. There are 19 exclusions from the definition of solid waste.

Domestic Sewage and Mixtures of Domestic Sewage

Domestic sewage, or sanitary waste, comes from households, office buildings, factories, and any other place where people live and work. These wastes are carried by sewer to a municipal wastewater treatment plant (called a **publicly owned treatment works** (POTW)). The treatment of these wastes is regulated under the Clean Water Act (CWA). Mixtures of sanitary wastes and other wastes (including hazardous industrial wastes) that pass through a sewer system to a POTW are also excluded from Subtitle C regulation once they enter the sewer. In certain circumstances, this exclusion may be applied to domestic sewage and mixtures of domestic sewage that pass through a federally owned treatment works (FOTW).

Industrial Wastewater Discharges (Point Source Discharges)

Another exclusion from RCRA designed to avoid overlap with CWA regulations applies to **point source discharges**. Point source discharges are discharges of pollutants (e.g., from a pipe, sewer, or pond) directly into a lake, river, stream, or other water body. CWA regulates such discharges under the National Pollutant Discharge Elimination System (NPDES) permitting program. Under this exclusion from the definition of solid waste, wastewaters that are subject to CWA regulations are exempt from Subtitle C regulation at the point of discharge. Any hazardous waste generation, treatment, or storage prior to the discharge is subject to RCRA regulation. Many industrial facilities that treat wastewater on site utilize this point source discharge exclusion.

Irrigation Return Flows

When farmers irrigate agricultural land, water not absorbed into the ground can flow into reservoirs for reuse. This return flow often picks up pesticide or fertilizer constituents, potentially rendering it hazardous. Because this water may be reused on the fields, it is excluded from the definition of solid waste.

Radioactive Waste

Radioactive waste is regulated by either the Nuclear Regulatory Commission or the U.S. Department of Energy (DOE) under the Atomic Energy Act (AEA). To avoid duplicative regulation under RCRA and AEA, RCRA excludes certain radioactive materials from the definition of solid

waste. However, RCRA excludes only the radioactive components of the waste. If a radioactive waste is mixed with a hazardous waste, the resultant mixture is regulated by both AEA and RCRA as a **mixed waste**. Similarly, if a facility generates a hazardous waste that is also radioactive, the material is a mixed waste and is subject to regulation under both RCRA and AEA (the regulatory status of mixed waste is fully discussed later in this chapter).

In-Situ Mining Waste

In-situ (in-place) mining of certain minerals may involve the application of solvent solutions directly to a mineral deposit in the ground. The solvent passes through the ground, collecting the mineral as it moves. The mineral and solvent mixtures are then collected in underground wells where the solution is removed. Such solvent-contaminated earth, or any nonrecovered solvent, is excluded from the definition of solid waste when left in place.

Pulping Liquors

Pulping liquor, also called black liquor, is a corrosive material used to dissolve wood chips for manufacturing of paper and other materials. To promote waste minimization and recycling, EPA excluded pulping liquors from the definition of solid waste if they are reclaimed in a recovery furnace and then reused in the pulping process. If the liquors are recycled in another way, or are accumulated speculatively, they are not excluded.

Spent Sulfuric Acid

Spent sulfuric acid may be recycled to produce virgin sulfuric acid. To promote waste reduction and recycling, such recycled spent sulfuric acid is excluded from the definition of solid waste, unless the facility accumulates the material speculatively.

Closed-Loop Recycling

To further promote waste reduction and recycling, spent materials that are reclaimed and returned to the original process in an enclosed system of pipes and tanks are excluded from the definition of solid waste, provided that:

- Only tank storage is involved, and the entire process, through reclamation, is closed to the air (i.e., enclosed)
- Reclamation does not involve controlled flame combustion, such as that which occurs in boilers, industrial furnaces, or incinerators
- Waste materials are never accumulated in tanks for more than 12 months without being reclaimed
- Reclaimed materials are not used to produce a fuel, or used to produce products that are used in a manner constituting disposal.

An example of such a closed-loop system might include a closed solvent recovery system in which the dirty solvents are piped from the degreasing unit to a solvent still where the solvent is cleaned, and then piped back to the degreasing unit.

Spent Wood Preservatives

Many wood preserving plants recycle their wastewaters and spent wood preserving solutions. These materials are collected on drip pads and sumps, and are in many cases returned directly to the beginning of the wood preserving process where they are reused in the same manner. While the process resembles a closed-loop recycling process, the closed-loop recycling exclusion does not apply because drip pads are open to the air. Consistent with their objective to encourage recycling hazardous waste, EPA developed two specific exclusions for spent wood preserving solutions and wastewaters containing spent preservatives, provided that the materials have been reclaimed and are reused for their original purpose. In addition, wood preserving solutions and wastewaters are excluded from the definition of solid waste prior to reclamation. To use this exclusion, a facility is required to reuse the materials for their intended purpose and manage them in a way that prevents releases to the environment.

Coke By-Product Wastes

Coke, used in the production of iron, is made by heating coal in high temperature ovens. Throughout the production process many by-products are

created. The refinement of these coke by-products generates several listed and characteristic wastestreams. However, to promote recycling of these wastes, EPA provided an exclusion from the definition of solid waste for certain coke by-product wastes that are recycled into new products.

Splash Condenser Dross Residue

The treatment of steel production pollution control sludge generates a zinc-laden residue, called a dross. This material, generated from a splash condenser in a high temperature metal recovery process, is known as a splash condenser dross residue. Because this material contains 50 to 60 percent zinc, it is often reclaimed, reused, or processed as a valuable recyclable material. Since facilities commonly handle this material as a valuable commodity by managing it in a way that is protective of human health and the environment, EPA excluded this residue from the definition of solid waste.

Hazardous Oil-bearing Secondary Materials and Recovered Oil from Petroleum Refining Operations

Petroleum refining facilities sometimes recover oil from oily wastewaters and reuse this oil in the refining process. In order to encourage waste minimization and recycling, EPA excluded such recovered oil from the definition of solid waste when it is returned to the refinery. Oil-bearing hazardous wastes which are recycled back into the petroleum refining process are also excluded.

In 2002, EPA proposed to conditionally exclude oil-bearing secondary materials that are processed in a gasification system to produce synthesis gas fuel and other non-fuel chemical by-products.

Condensates from Kraft Mill Steam Strippers

The Kraft process, the most commonly used pulping process today, utilizes various chemicals to break down wood into pulp. This process generates overhead gases that are condensed and often recycled as fuel. To encourage the recycling of these condensates, EPA excluded them from the definition of solid waste provided the condensate is combusted at the mill that generated it.

Comparable Fuels

In order to promote the recycling of materials with high fuel values, certain materials that are burned as fuels are excluded from the definition of solid waste, provided that they meet certain specifications (i.e., are of a certain degree of purity). This is to ensure that the material does not exceed certain levels of toxic constituents and physical properties that might impede burning. Materials that meet this specification are considered comparable to pure or virgin fuels.

Processed Scrap Metal

Scrap metal includes, but is not limited to, pipes, containers, equipment, wire, and other metal items that are no longer of use. To facilitate recycling, scrap metal that has been processed to make it easier to handle or transport and is sent for metals recovery is excluded from the definition of solid waste. Unprocessed scrap metal is still eligible for an exemption from hazardous waste regulation when recycled (as discussed in Section III, Chapter 2).

Shredded Circuit Boards

Circuit boards are metal boards that hold computer chips, thermostats, batteries, and other electronic components. Circuit boards can be found in computers, televisions, radios, and other electronic equipment. When this equipment is thrown away, these boards can be removed and

recycled. Whole circuit boards meet the definition of scrap metal, and are therefore exempt from hazardous waste regulation when recycled (as discussed in Section III, Chapter 2).

On the other hand, some recycling processes involve shredding the board. Such shredded boards do not meet the exclusion for recycled scrap metal. In order to facilitate the recycling of such materials, EPA excluded recycled shredded circuit boards from the definition of solid waste, provided that they are stored in containers sufficient to prevent release to the environment, and are free of potentially dangerous components, such as mercury switches, mercury relays, nickel-cadmium batteries, and lithium batteries.

Mineral Processing Spent Materials

Mineral processing generates spent materials that may exhibit hazardous waste characteristics. Common industry practice is to recycle these mineral processing wastes back into the processing operations to recover mineral values. EPA created a conditional exclusion from the definition of solid waste for these spent materials when recycled in the mineral processing industry, provided the materials are stored in certain types of units and are not accumulated speculatively.

Petrochemical Recovered Oil

Organic chemical manufacturing facilities sometimes recover oil from their organic chemical industry operations. EPA excluded petrochemical recovered oil from the definition of solid waste when the facility inserts the material into the petroleum refining process of an associated or adjacent petroleum refinery. Only petrochemical recovered oil that is hazardous because it exhibits the characteristic of ignitability or exhibits the toxicity characteristic for benzene (or both) is eligible for the exclusion.

Spent Caustic Solutions from Petroleum Refining

Petrochemical refineries use caustics to remove acidic compounds like mercaptans from liquid petroleum streams to reduce produce odor and corrosivity as well as to meet product sulfur specifications. Spent liquid treating caustics from petroleum refineries are excluded from the definition of solid waste if they are used as a feedstock in the manufacture of napthenic and cresylic acid products. EPA believes that spent caustic, when used in this manner, is a valuable commerical feedstock in the production of these particular products, and is therefore eligible for an exclusion.

Glass Frit and Fluoride-rich Baghouse Dust Generated by the Vitrification of K088

In July 2000, EPA proposed that glass frit and fluoride-rich baghouse dust generated by the vitrification of K088 be classified as products and excluded from the definition of solid waste. Glass frit is usable as a commercial chemical product and fluoride-rich baghouse dust can be recycled back into the aluminum reduction pots as electrolyte or sold as a product for other industrial uses such as steel making.

Zinc Fertilizers Made from Recycled Hazardous Secondary Materials

EPA promulgated a conditional exclusion from the definition of solid waste for hazardous secondary materials that are recycled to make zinc fertilizers or zinc fertilizer ingredients. Zinc, an important micronutrient for plants and animals, can be removed from zinc-rich manufacturing residue and used to produce zinc micronutrient fertilizer. A second conditional exclusion applies to the zinc fertilizer products made from these secondary materials.

■ Hazardous Waste Exemptions

EPA also exempts certain solid wastes from the definition of hazardous waste. If a material meets an exemption from the definition of hazardous waste, it cannot be a hazardous waste, even if the material technically meets a listing or exhibits a characteristic. There are 17 exemptions from the definition of hazardous waste.

Household Hazardous Waste

Households often generate solid wastes that could technically be hazardous wastes (e.g., old

solvents, paints, pesticides, fertilizer, poisons). However, it would be impossible to regulate every house in the United States that occasionally threw away a can of paint thinner or a bottle of rat poison. Therefore, EPA developed the household waste exemption. Under this exemption, wastes generated by normal household activities (e.g., routine house and yard maintenance) are exempt from the definition of hazardous waste. EPA has expanded the exemption to include household-like areas, such as bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas. While household hazardous waste is exempt from Subtitle C, it is regulated under Subtitle D as a solid waste (as discussed in Section II).

Agricultural Waste

To prevent overregulation of farms and promote waste recycling, solid wastes generated by crop or animal farming are excluded from the definition of hazardous waste provided that the wastes are returned to the ground as fertilizers or soil conditioners. Examples of such wastes are crop residues and manures.

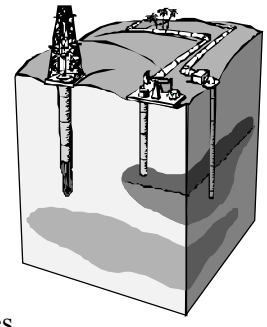
Mining Overburden

After an area of a surface mine has been depleted, it is common practice to return to the mine the earth and rocks (overburden) that were removed to gain access to ore deposits. When the material is returned to the mine site, it is not a hazardous waste under RCRA.

Bevill and Bentsen Wastes

In the Solid Waste Disposal Act Amendments of 1980, Congress amended RCRA by exempting oil, gas, and geothermal exploration, development, and production wastes (**Bentsen wastes**); fossil fuel combustion wastes; mining and mineral processing wastes; and cement kiln dust wastes (**Bevill wastes**) from the definition of hazardous waste pending further study by EPA. These wastes were temporarily exempted because they were produced in very large volumes, were thought to pose less of a hazard than other wastes, and were generally not amenable to the management practices required under RCRA. The following paragraphs describe these exemptions in detail.

Fossil Fuel Combustion Waste



In order to accommodate effective study, fossil fuel combustion wastes were divided into two categories, large-volume coal-fired utility wastes and remaining wastes. After studying these wastes, in 1993, EPA decided to permanently exempt large-volume coal-fired utility wastes, including fly ash, bottom ash, boiler slag, and flue gas emission control waste from the definition of hazardous waste. Further study by EPA, in 2000, indicated that all remaining fossil fuel combustion wastes need not be regulated under RCRA Subtitle C. However, EPA determined that national non-hazardous waste regulations under RCRA Subtitle D are appropriate for coal combustion wastes disposed in surface impoundments and landfills and used as minefill. These regulations are expected to be proposed in March of 2003.

Oil, Gas, and Geothermal Wastes

Certain wastes from the exploration and production of oil, gas, and geothermal energy are excluded from the definition of hazardous waste. These wastes include those that have been brought to the surface during oil and gas exploration and production operations, and other wastes that have come into contact with the oil and gas production stream (e.g., during removal of waters injected into the drill well to cool the drill bit).

Mining and Mineral Processing Wastes

Certain wastes from the mining, refining, and processing of ores and minerals are excluded from the definition of hazardous waste.

Cement Kiln Dust

Cement kiln dust is a fine-grained solid by-product generated during the cement manufacturing process and captured in a facility's air pollution control system. After study, EPA decided to develop

specific regulatory provisions for cement kiln dust. Until EPA promulgates these new regulatory controls, however, cement kiln dust will generally remain exempt from the definition of hazardous waste.

Trivalent Chromium Wastes

The element chromium exists in two forms, hexavalent and trivalent. EPA determined that while hexavalent chromium poses enough of a threat to merit regulation as a characteristic hazardous waste, trivalent chromium does not. Therefore, to prevent unnecessary regulation, EPA excluded, from the definition of hazardous waste, trivalent chromium-bearing hazardous wastes from certain leather tanning, shoe manufacturing, and leather manufacturing industries.

Arsenically Treated Wood

Discarded arsenically treated wood or wood products that are hazardous only because they exhibit certain toxic characteristics (e.g., contain harmful concentrations of metal or pesticide constituents), are excluded from the definition of hazardous waste. Once such treated wood is used, it may be disposed of by the user (commercial or residential) without being subject to hazardous waste regulation. This exclusion is based on the fact that the use of such wood products on the land is similar to the common disposal method, which is landfilling. This exclusion applies only to end-users and not to manufacturers.

Petroleum-Contaminated Media and Debris from Underground Storage Tanks

USTs are used to store petroleum (e.g., oil) and hazardous substances (e.g., ammonia). When these tanks leak, the UST program under RCRA Subtitle I provides requirements for cleaning up such spills (the regulatory requirements for USTs are fully discussed in Section IV). To facilitate the corrective action process under the UST regulations, contaminated media (soils and ground water) and debris (tanks and equipment) at sites undergoing UST cleanup that are hazardous only because they exhibit certain toxic characteristics (e.g., contain a harmful concentrations of leachable organic constituents) are excluded from the definition of hazardous waste.

Spent Chlorofluorocarbon Refrigerants

Chlorofluorocarbons (CFCs) released to the atmosphere damage the stratospheric ozone layer. To promote recycling and discourage the practice of venting used CFCs to the atmosphere as a means of avoiding Subtitle C regulation, EPA excluded recycled CFCs from the definition of hazardous waste since the refrigerants are generally reclaimed for reuse.

Used Oil Filters

In order to promote the recycling and recovery of metals and other products from used oil filters, EPA exempted used oil filters that have been properly drained to remove the used oil.

Used Oil Distillation Bottoms

When used oil is recycled, residues (called **distillation bottoms**) form at the bottom of the recycling unit. To promote used oil recycling and the beneficial reuse of waste materials, EPA excluded these residues from the definition of hazardous waste when the bottoms are used as ingredients in asphalt paving and roofing materials.

Landfill Leachate or Gas Condensate Derived from K169, K171, and K172 Listings

Landfill leachate and landfill gas condensate derived from previously disposed wastes that now meet the listing description of one or more of the petroleum refinery listed wastes K169, K170, K171, and K172, would be regulated as a listed hazardous waste. However, EPA temporarily deferred such landfill leachate and gas condensate from the definition of hazardous waste provided their discharge is regulated under the Clean Water Act (CWA). The exclusion will remain effective while EPA studies how the landfill leachate and landfill gas condensate are currently managed, and the effect of future CWA effluent limitation guidelines for landfill wastewaters.

Project XL Pilot Project Exclusions

EPA has provided two facilities with site-specific hazardous waste exclusions pursuant to the Project XL pilot program. The waste generated from the copper metalization process at the IBM Vermont XL project is excluded from the F006 listing. By-products resulting from the production of automobile air bag gas generants at the Autoliv ASP Inc. XL project in Utah are exempt from regulation as D003 hazardous waste. In addition to these finalized exclusions, in July of 2001, EPA proposed a site-specific exclusion for mixed wastes generated at the Ortho-McNeil Pharmaceutical, Inc. facility in Spring House, Pennsylvania, under the Project XL program.

■ Raw Material, Product Storage, and Process Unit Waste Exclusions

Hazardous wastes generated in raw material, product storage, or process (e.g., manufacturing) units are exempt from Subtitle C hazardous waste regulation while the waste remains in such units. These units include tanks, pipelines, vehicles, and vessels used either in the manufacturing process or for storing raw materials or products, but specifically do not include surface impoundments. Once the waste is removed from the unit, or when a unit temporarily or permanently ceases operation for 90 days, the waste is considered generated and is subject to regulation.

■ Sample and Treatability Study Exclusions

Hazardous waste samples are small, discrete amounts of hazardous waste that are essential to ensure accurate characterization and proper hazardous waste treatment. In order to facilitate the analysis of these materials, RCRA exempts characterization samples and treatability study samples from Subtitle C hazardous waste regulation.

Waste Characterization Samples

Samples sent to a lab to determine whether or not a waste is hazardous are exempt from regulation. Such samples (typically less than one gallon of waste) are excluded from Subtitle C regulation, provided that these samples are collected and shipped for the sole purpose of determining hazardous waste characteristics or composition.

Storage, transportation, and testing of the sample are excluded from RCRA regulation even when the lab testing is complete, provided the sample is returned to the generator, and other specific provisions are met. When shipping the sample to or from the laboratory, the sample collector must comply with certain labeling requirements, as well as any applicable U.S. Postal Service (USPS) or U.S. Department of Transportation (DOT) shipping requirements.

Treatability Study Samples

To determine if a particular treatment method will be effective on a given waste or what types of wastes remain after the treatment is complete, facilities send samples of waste to a lab for testing. EPA conditionally exempts those who generate or collect samples for the sole purpose of conducting treatability studies from the hazardous waste regulations, provided that certain requirements, including packaging, labeling, and recordkeeping provisions, are met. In addition, under specific conditions, laboratories conducting such treatability studies may also be exempt from Subtitle C regulation.

■ Dredge Materials Exclusions

Dredge materials subject to the permitting requirements of 404 of the Federal Water Pollution Control Act of Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972 are not considered hazardous wastes.

DEFINITION OF HAZARDOUS WASTE

In RCRA §1004(5), Congress defined hazardous waste as a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may:

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

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

Based on this broad definition, Congress instructed EPA to develop more specific criteria for defining solid and hazardous waste. Congress believed that EPA should define hazardous waste using two different mechanisms: by listing certain specific solid wastes as hazardous (i.e., wastes from certain industrial processes or sources), and by identifying characteristics (i.e., physical or chemical properties) which, when exhibited by a solid waste, make it hazardous. Taking Congress' lead, EPA proceeded to develop an elaborate definition of hazardous waste that included both of these mechanisms.

IS THE WASTE A LISTED HAZARDOUS WASTE?

After a facility determines that its waste is a solid waste and is not either excluded from the definitions of solid or hazardous waste or exempt from Subtitle C hazardous waste regulation, the owner and operator must determine if the waste is a hazardous waste. The first step in this process is determining if the waste is a listed hazardous waste. The hazardous waste listings consist of four lists:

- The F list
- The K list
- The P list
- The U list.

Listed wastes are wastes from generic industrial processes, wastes from certain sectors of industry, and unused pure chemical products and formulations. Because these wastes are dangerous enough to warrant full Subtitle C regulation based on their origin, any waste fitting a narrative listing description is considered a listed hazardous waste.

■ Listing Criteria

Before developing each hazardous waste listing, EPA thoroughly studies a particular wastestream and the threats that it can pose to human health and the environment. If the waste poses sufficient threat, EPA includes a precise description of that waste on one of four hazardous waste lists within the regulations.

In order to determine whether a waste should be listed in the first place, the Agency developed a set of criteria to use as a guide and a consistent frame of reference when considering listing a wastestream. These criteria were developed by EPA to use in evaluating whether a waste warrented being listed as a hazardous waste. These listing criteria cannot be use by waste handlers for waste identification purposes. Waste handlers must instead consult the actual listings to determine if their waste is regulated as a listed hazardous waste.

There are three different criteria EPA uses to decide whether or not to list a waste as hazardous. The three criteria are:

- The waste typically contains toxic chemicals at levels that could pose a threat to human health and the environment if improperly managed. Such wastes are known as toxic listed wastes.
- The waste contains such dangerous chemicals that it could pose a threat to human health and the environment even when properly managed. These wastes are fatal to humans and animals even in low doses. Such wastes are known as acute hazardous wastes.
- The waste typically exhibits one of the four characteristics of hazardous waste: ignitability, corrosivity, reactivity, and toxicity.

In addition, EPA may list a waste as hazardous, if it has cause to believe that, for some other reason, the waste typically fits within the statutory definition of hazardous waste developed by Congress.

■ Hazardous Waste Listings

EPA has applied the listing criteria to hundreds of specific industrial wastestreams. These wastes

HAZARD CODES

To indicate its reason for listing a waste, EPA assigns a hazard code to each waste listed on the F, K, P, and U lists. The last four hazard codes in the table below apply to wastes that have been listed because they typically exhibit one of the four regulatory characteristics of hazardous waste. The first two hazard codes apply to listed wastes whose constituents pose additional threats to human health and the environment. The hazard codes indicating the basis for listing a waste are:

Toxic Waste	(T)
Acute Hazardous Waste	(H)
Ignitable Waste	(I)
Corrosive Waste	(C)
Reactive Waste	(R)
Toxicity Characteristic Waste	(E)*

The hazard codes assigned to listed wastes affect the regulations that apply to handling the waste. For instance, acute hazardous wastes accompanied by the hazard code (H) are subject to stricter management standards than most other wastes.

**Currently, there are no hazardous wastes listed solely for exhibiting the toxicity characteristic.*

are grouped into the four lists located at 40 CFR Part 261, Subpart D. Listed wastes are organized as follows:

- The F list — The F list includes wastes from certain common industrial and manufacturing processes. Because the processes generating these wastes can occur in different sectors of industry, the F list wastes are known as wastes from nonspecific sources. The F list is codified in the regulations at 40 CFR §261.31.
- The K list — The K list includes wastes from specific industries. As a result, K list wastes are known as wastes from specific sources. The K list is found at 40 CFR §261.32.
- The P list and the U list — These two lists include pure or commercial grade formulations of specific unused chemicals. Chemicals are included on the P list if they are acutely toxic. A chemical is acutely toxic if it is fatal to humans in low doses, if scientific studies have shown that it has lethal effects on experimental organisms, or if it causes serious irreversible or incapacitating illness. The U list is generally comprised of chemicals that are toxic, but also includes chemicals that display other characteristics, such as ignitability or reactivity. Both the P list and U list are codified at 40 CFR §261.33.

Each list includes anywhere from 30 to a few hundred listed hazardous wastestreams. All of the wastes on these lists are assigned an identification number (i.e., a waste code) consisting of the letter associated with the list (i.e., F, K, P, or U) followed by three numbers. For example, wastes on the F list may be assigned a waste code ranging from F001 to F039, while wastes on the K list may be assigned a waste code ranging from K001 to K178. These waste codes are an important part of the RCRA regulatory system since waste code assignment has important implications for the future management standards that will apply to the waste.

The F List: Wastes From Nonspecific Sources

The F list designates hazardous wastes from common industrial and manufacturing processes. The F list wastes can be divided into seven groups, depending on the type of manufacturing or industrial operation that creates them:

- Spent solvent wastes (waste codes F001 through F005)
- Electroplating and other metal finishing wastes (F006 through F012 and F019)
- Dioxin-bearing wastes (F020 through F023 and F026 through F028)
- Chlorinated aliphatic hydrocarbons production wastes (F024 and F025)
- Wood preserving wastes (F032, F034, and F035)
- Petroleum refinery wastewater treatment sludges (F037 and F038)
- Multisource leachate (F039).

Spent Solvent Wastes

The spent solvent waste listings (F001 through F005) apply to wastestreams that are generated from

the use of certain common organic solvents. Solvents are commonly used in various industries, such as mechanical repair, dry cleaning, and electronics manufacturing, for degreasing and cleaning in addition to other functions. While solvents are chemicals with many uses, these listings only apply to solvents that are used as solvents for their solvent properties (e.g., to solubilize, dissolve, or mobilize other constituents) and are spent (e.g., cannot be used further without reprocessing). In addition, these listings only apply to solvents that contain one or more of the specific organic solvent constituents found in the F001-F005 narrative descriptions. Lastly, these listings only cover solvents that were above a certain concentration before use.

Electroplating and Other Metal Finishing Wastes

The electroplating and other metal finishing waste listings (F006 through F012 and F019) apply to wastestreams that are commonly produced during electroplating and other metal finishing operations. Diverse industries use electroplating and other methods to change the surface of metal objects in order to enhance the appearance of the objects, make them more resistant to corrosion, or impart some other desirable property to them. Industries involved in plating and metal finishing range from jewelry manufacture to automobile production.

Dioxin-Bearing Wastes

The dioxin-bearing waste listings (F020 through F023 and F026 through F028) describe a number of wastestreams that EPA believes are likely to contain dioxins, which are allegedly among the most dangerous known chemical compounds. The dioxin listings apply primarily to manufacturing process wastes from the production of specific pesticides or specific chemicals used in the production of pesticides. With the exception of F028, all of the dioxin-bearing wastes are considered acutely hazardous wastes and are designated with the hazard code (H). These wastes are therefore subject to stricter management standards than other hazardous wastes.

Chlorinated Aliphatic Hydrocarbon Production Wastes

The chlorinated aliphatic hydrocarbons production wastes (F024 and F025) list certain wastestreams produced by the manufacture of chlorinated aliphatic hydrocarbons. Chlorinated aliphatic hydrocarbons are used in the manufacture of certain pesticides and fire retardants. Many other wastestreams from the manufacture of organic chemicals are found within the K list, including two waste codes for chlorinated aliphatic wastes, K174 and K175.

Wood Preserving Wastes

The wood preserving waste listings (F032, F034, and F035) apply to certain wastes from wood preserving operations. Most wood used for construction or other nonfuel applications is chemically treated to slow the deterioration caused by decay and insects. For example, telephone poles, railroad cross ties, and other wood products are treated to withstand the rigors of outdoor use.

Wood preservation typically involves coating lumber with pentachlorophenol, creosote, or preservatives containing arsenic or chromium. The wood preserving process creates wastestreams containing these chemicals, such as excess preservative solution that drips from wood products after treatment. Waste from wood preservation using pentachlorophenol is F032, waste from use of creosote is F034, and waste from treating wood with arsenic or chromium is F035.

These listings (as well as some K list waste listings) also apply to a variety of other residues from wood preserving.

Petroleum Refinery Wastewater Treatment Sludges

The petroleum refinery wastewater treatment sludge listings (F037 and F038) apply to specific wastestreams from petroleum refineries. The petroleum refining process typically creates large quantities of contaminated wastewater. Before this wastewater can be discharged to a river or sewer, it must be treated to remove oil, solid material, and chemical pollutants.

To remove most of this oily waste from the wastewater, refineries typically use two methods. In the first step, gravity separates the pollutants from the wastewater. The solids and heavier pollutants sink to the bottom of a tank, forming a sludge, while the lighter materials (called **float**) float to the surface of the wastewater, where they can be skimmed off. This sludge is F037. The second step uses physical (stirring or agitating) and chemical means to separate remaining pollutants from the wastewater into sludge and float. This sludge and float are F038. The K list also includes wastes codes for certain petroleum wastestreams generated by the petroleum refining industry. These waste codes are K048 through K052 and K169 through K172.

Multisource Leachate

The F039 listing applies to multisource leachate, the liquid material that accumulates at the bottom of a hazardous waste landfill. The leachate that percolates through landfills, particularly hazardous waste landfills, usually contains high concentrations of chemicals, and is often collected to minimize the potential for it to enter and contaminate the soil or ground water below the unit.

The K List: Wastes From Specific Sources

The K list designates hazardous wastes from specific sectors of industry and manufacturing. Like F list wastes, K list wastes are manufacturing process wastes.

To determine whether a waste qualifies as K-listed, a facility must first determine whether the waste fits within one of the 13 different industrial or manufacturing categories on the list. Second, a facility must determine if this waste matches one of the detailed K list waste descriptions in 40 CFR §261.32. The 13 industries that generate K list wastes are:

- Wood preservation
- Organic chemicals manufacturing
- Pesticides manufacturing
- Petroleum refining
- Veterinary pharmaceuticals manufacturing
- Inorganic pigment manufacturing
- Inorganic chemicals manufacturing
- Explosives manufacturing
- Iron and steel production
- Primary aluminum production
- Secondary lead processing
- Ink formulation
- Coking (processing of coal to produce coke, a material used in iron and steel production).

Previously, the K list also included waste codes for 17 different industries. However, due to various court actions taken, EPA withdrew the K waste codes applicable to wastestreams in the primary copper, primary lead, primary zinc, and ferroalloys industries.

The P and U Lists: Discarded Commercial Chemical Products

The P and U lists designate as hazardous waste pure and commercial grade formulations of certain unused chemicals that are being disposed. Unused chemicals may become wastes for a number of reasons. For example, some unused chemicals are spilled by accident. Others are intentionally discarded because they are off-specification and cannot serve the purpose for which they were originally produced. For a waste to qualify as P- or U-listed, the waste must meet the following three criteria:

- The waste must contain one of the chemicals listed on the P or U list
- The chemical in the waste must be unused
- The chemical in the waste must be in the form of a **commercial chemical product** (CCP).

For purposes of the P and U lists, a CCP is defined as a chemical that is one of the following:

- 100 percent pure
- Technical (e.g., commercial) grade
- The sole active ingredient in a chemical formulation.

While 100 percent pure means that the chemical is the only chemical constituent in the product, **technical grade** means that the formulation is not 100 percent pure, but is of a grade of purity that is either marketed or recognized in general usage by the chemical industry. **Sole active ingredient** means

that the chemical is the only ingredient serving the function of the formulation. For instance, a pesticide made for killing insects may contain a poison such as heptachlor, as well as various solvent ingredients which act as carriers or lend other desirable properties to the poison. Although all of these chemicals may be capable of killing insects, only the heptachlor serves the primary purpose of the insecticide product. The other chemicals involved are present for other reasons, not because they are poisonous. Therefore, heptachlor is the sole active ingredient in such a formulation even though it may be present in low concentrations.

■ Wastes Listed Solely for Exhibiting the Characteristic of Ignitability, Corrosivity, and/or Reactivity

Hazardous wastes listed solely for exhibiting the characteristic of ignitability, corrosivity, and/or reactivity are not regulated the same way that other listed hazardous wastes are regulated under RCRA. When a waste meets a listing description for one of the 29 wastes listed solely for exhibiting the characteristic of ignitability, corrosivity, and/or reactivity, the waste is not hazardous if it does not exhibit that characterisitic at the point of generation. For example, F003 is listed for the characteristic of ignitability. If a waste is generated and meets the listing description for F003 but does not exhibit the characteristic of ignitability, it is not regulated as a hazardous waste.

■ Delistings

The RCRA regulations provide a form of relief for listed wastes with low concentrations of hazardous constituents. Through a site-specific process known as **delisting**, a waste handler can submit to an EPA Region or state a petition demonstrating that even though a particular wastestream generated at its facility is a listed hazardous waste, it does not pose sufficient hazard to merit RCRA regulation. For example, a waste generated at a specific facility may meet a listing description even though the process uses different raw materials than EPA assumed were used when listing the waste, thus the waste may not contain the contaminants for which it was listed. Similarly, after treatment of a listed waste, the residue may no longer pose a threat to human health and the environment.

Specifically, the petition must demonstrate that the waste does not:

- Meet the criteria for which it was listed
- Exhibit any hazardous waste characteristics (as discussed later in this chapter)
- Pose a threat to human health and the environment by being hazardous for any other reason (e.g., does not contain additional constituents that could pose a threat).

If the EPA Region or state grants a delisting petition, the particular wastestream at that facility will not be regulated as a listed hazardous waste.

IS THE WASTE A CHARACTERISTIC HAZARDOUS WASTE?

After a facility determines its waste is a solid waste and is not excluded from the definitions of solid or hazardous waste, it must determine if the waste is a hazardous waste. This entails determining if the waste is listed, and also if the waste is characteristic. Even if a waste is a listed hazardous waste, the facility must then determine if the waste exhibits a characteristic by testing or applying knowledge of the waste.

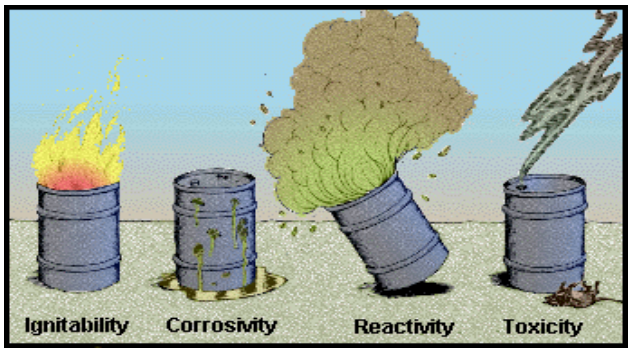
Characteristic wastes are wastes that exhibit measurable properties which indicate that a waste poses enough of a threat to deserve regulation as hazardous waste. EPA tried to identify characteristics which, when present in a waste, can cause death or illness in humans or lead to ecological damage. The characteristics are an essential supplement to the hazardous waste listings. For example, some wastes may not meet any listing description because they do not originate from specific industrial or process sources, but the waste may still pose threats to human health and the environment. As a result, a facility is also required to determine whether such a waste possesses a hazardous property (i.e., exhibits a hazardous waste

characteristic). The characteristics are applied to any RCRA solid waste from any industry.

Even if a waste does meet a hazardous waste listing description, the facility must still determine if the waste exhibits a characteristic. If such listed wastes do exhibit a characteristic, the waste poses an additional hazard to human health and the environment, and may necessitate additional regulatory precautions. For example, wastes that are both listed and characteristic may have more extensive LDR requirements, than those that are only listed (the LDR program is fully discussed in Section III, Chapter 6).

EPA decided that the characteristics of hazardous waste should be detectable by using a standardized test method or by applying general knowledge of the waste's properties. Given these criteria, EPA established four hazardous waste characteristics:

- Ignitability
- Corrosivity
- Reactivity
- Toxicity.



Ignitability

The **ignitability characteristic** identifies wastes that can readily catch fire and sustain combustion. Many paints, cleaners, and other industrial wastes pose such a hazard. Liquid and nonliquid wastes are treated differently by the ignitability characteristic.

Most ignitable wastes are liquid in physical form. EPA selected a flash point test as the method for determining whether a liquid waste is combustible enough to deserve regulation as hazardous. The flash point test determines the lowest temperature at which the fumes above a waste will ignite when exposed to flame.

Many wastes in solid or nonliquid physical form (e.g., wood, paper) can also readily catch fire and sustain combustion, but EPA did not intend to regulate most of these nonliquid materials as ignitable wastes. A nonliquid waste is considered ignitable if it can spontaneously catch fire or catch fire through friction or absorption of moisture under normal handling conditions and can burn so vigorously that it creates a hazard. Certain compressed gases are also classified as ignitable. Finally, substances meeting the Department of Transportation's definition of oxidizer are classified as ignitable wastes. Ignitable wastes carry the waste code D001 and are among the most common hazardous wastes. The regulations describing the characteristic of ignitability are codified at 40 CFR §261.21.

The ignitability characteristic identifies wastes that can readily catch fire and sustain combustion.

Corrosivity

The **corrosivity characteristic** identifies wastes that are acidic or alkaline (basic). Such wastes can readily corrode or dissolve flesh, metal, or other materials. They are also among the most common hazardous wastes. An example is waste sulfuric acid from automotive batteries. EPA uses two criteria to identify liquid and aqueous corrosive hazardous wastes. The first is a pH test. Aqueous wastes with a pH greater than or equal to 12.5 or less than or equal to 2 are corrosive. A liquid waste may also be corrosive if it has the ability to corrode steel under specific conditions. Physically solid, nonaqueous wastes are not evaluated for corrosivity. Corrosive wastes carry the waste code D002. The regulations describing the corrosivity characteristic are found at 40 CFR §261.22.

The corrosivity characteristic identifies wastes that are acidic or alkaline (basic) and can readily corrode or dissolve flesh, metal, or other materials.

Reactivity

The **reactivity characteristic** identifies wastes that readily explode or undergo violent reactions or react to release toxic gases or fumes. Common examples are discarded munitions or explosives. In many cases, there is no reliable test method to evaluate a waste's potential to explode, react violently, or release toxic gas under common handling conditions. Therefore, EPA uses narrative criteria to define most reactive wastes and requires waste generators to use their best judgment in applying the narrative definitions to determine if a waste is sufficiently reactive to be regulated. This is possible because reactive hazardous wastes are relatively uncommon and the dangers that they pose are believed to be well known to the waste handlers who deal with them.

The reactivity characteristic identifies wastes that readily explode or undergo violent reactions.

A waste is reactive if it meets any of the following criteria:

- It can explode or violently react when exposed to water or under normal handling conditions
- It can create toxic fumes or gases when exposed to water or under normal handling conditions
- It meets the criteria for classification as an explosive under DOT rules
- It generates toxic levels of sulfide or cyanide gas when exposed to a pH range of 2 through 12.5.

Wastes exhibiting the characteristic of reactivity are assigned the waste code D003. The reactivity characteristic is described in the regulations at 40 CFR §261.23.

Toxicity

When hazardous waste is disposed of in a land disposal unit, toxic compounds or elements can leach into underground drinking water supplies and expose users of the water to hazardous chemicals and constituents. EPA developed the **toxicity characteristic (TC)** to identify wastes likely to leach dangerous concentrations of toxic chemicals into ground water.

In order to predict whether any particular waste is likely to leach chemicals into ground water at dangerous levels, EPA designed a lab procedure to replicate the leaching process and other conditions that occur when wastes are buried in a typical municipal landfill. This lab procedure is known as the **Toxicity Characteristic Leaching Procedure (TCLP)**.

The TCLP requires a facility to create a liquid leachate from its hazardous waste samples. This leachate would be similar to the leachate generated

Figure III-7: TCLP Regulatory Levels

Waste Code	Contaminant	Concentration
D004	Arsenic	5.0
D005	Barium	100.0
D018	Benzene	0.5
D006	Cadmium	1.0
D019	Carbon tetrachloride	0.5
D020	Chlordane	0.03
D021	Chlorobenzene	100.0
D022	Chloroform	6.0
D007	Chromium	5.0
D023	o-Cresol*	200.0
D024	m-Cresol*	200.0
D025	p-Cresol*	200.0
D026	Total Cresols*	200.0
D016	2,4-D	10.0
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D030	2,4-Dinitrotoluene	0.13
D012	Endrin	0.02
D031	Heptachlor (and its epoxide)	0.008
D032	Hexachlorobenzene	0.1
D033	Hexachlorobutadiene	0.5
D034	Hexachloroethane	3.0
D008	Lead	5.0
D013	Lindane	0.4
D009	Mercury	0.2
D014	Methoxychlor	10.0
D035	Methyl ethyl ketone	200.0
D036	Nitrobenzene	2.0
D037	Pentachlorophenol	100.0
D038	Pyridine	5.0
D010	Selenium	1.0
D011	Silver	5.0
D039	Tetrachloroethylene	0.7
D015	Toxaphene	0.5
D040	Trichloroethylene	0.5
D041	2,4,5-Trichlorophenol	400.0
D042	2,4,6-Trichlorophenol	2.0
D017	2,4,5-TP (Silvex)	1.0
D043	Vinyl chloride	0.2

*if o-, m-, and p-cresols cannot be individually measured, the regulatory level for total cresols is used.

by a landfill containing a mixture of household and industrial wastes. Once this leachate is created via the TCLP, the waste handler must determine whether it contains any of 40 different toxic chemicals in amounts above the specified regulatory levels (see Figure III-7). These regulatory levels are based on ground water modeling studies and toxicity data that calculate the limit above which these common toxic compounds and elements will threaten human health and the environment by contaminating drinking water. If the leachate sample contains a concentration above the regulatory limit for one of the specified chemicals, the waste exhibits the toxicity characteristic and carries the waste code associated with that compound or element. The TCLP may not be used however, for determining whether remediation waste from manufactured gas plants (MGP) is hazardous under RCRA. Therefore, MGP remediation wastes are exempt from TC regulation. The regulations describing the toxicity characteristic are codified at 40 CFR §261.24, and the TC regulatory levels appear in Table 2 of that same section.

DETERMINING BOTH LISTINGS AND CHARACTERISTICS

A facility must determine both listings and characteristics. Even if a waste is a listed hazardous waste, the facility must then still determine if the waste exhibits a characteristic because waste generators are required to fully characterize their listings. While some wastes may not meet any listing description because they do not originate from specific industrial or process sources, the waste may still pose threats to human health and the environment. As a result, a facility is also required to determine whether such a waste possesses a hazardous property (i.e., exhibits a hazardous waste characteristic).

SPECIAL REGULATORY CONVENTIONS

Once a facility generates a hazardous waste, the waste may become mixed with other wastes, be treated and produce residues, or even be spilled. RCRA provides special regulatory provisions to address the regulatory status of hazardous wastes in these situations.

■ Mixture Rule

The **mixture rule** is intended to ensure that mixtures of listed wastes with nonhazardous solid wastes are regulated in a manner that minimizes threats to human health and the environment.

Listed Wastes

The mixture rule regulates a combination of any amount of a nonhazardous solid waste and any amount of a listed hazardous waste as a listed hazardous waste (see Figure III-8). Even if a small vial of listed waste is mixed with a large quantity of nonhazardous waste, the resulting mixture bears the same waste code and regulatory status as the original listed component of the mixture, unless the generator obtains a delisting. This is intended to prevent a facility from mixing a listed waste with a nonhazardous waste in order to escape having to manage the waste as hazardous.

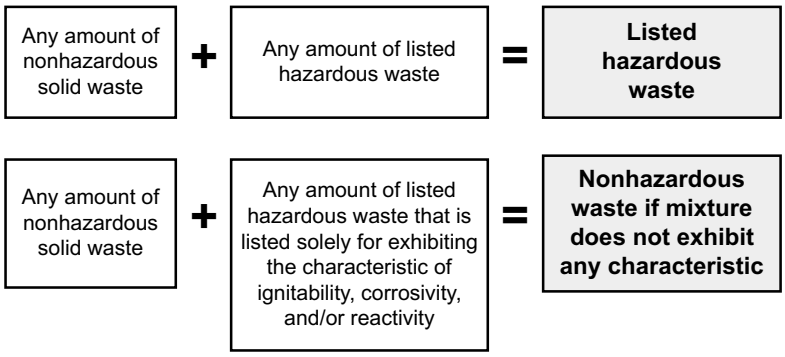
Characteristic Wastes

The mixture rule applies differently to listed and characteristic wastes. A mixture involving characteristic wastes is hazardous only if the mixture itself exhibits a characteristic. Characteristic wastes are hazardous because they possess one of four unique and measurable properties. Once a characteristic waste no longer exhibits one of these four dangerous properties, it no longer deserves regulation as hazardous. Thus, a characteristic waste can be made nonhazardous by treating it to remove its hazardous property; however EPA places certain restrictions on the manner in which a waste can be treated. (These restrictions will be discussed in Section III, Chapter 6.)

Wastes Listed Solely for Exhibiting the Characteristic of Ignitabilty, Corrosivity, and/or Reactivity

All wastes listed solely for exhibiting the characteristic of ignitability, corrosivity and/or reactivity characteristic are not regulated as hazardous wastes once they no longer exhibit a characteristic. If a hazardous waste listed only for a characteristic is mixed with a solid waste, the original listing does not carry through to the resulting mixture if that mixture does not exhibit any

Figure III-8: The Mixture Rule



hazardous waste characteristics. For example, EPA listed the F003 spent solvents as hazardous because these wastes typically display the ignitability characteristic. If F003 waste is treated by mixing it with another waste, and the resulting mixture does not exhibit a characteristic, the F003 listing no longer applies.

Exemptions

There are several exemptions from the mixture rule. One exemption applies to certain listed hazardous wastes that are discharged to wastewater treatment facilities in very small or **de minimis** amounts. Many industrial facilities produce large quantities of nonhazardous wastewaters as their primary wastestreams. These wastewaters are typically discharged to a water body or local sewer system after being treated to remove pollutants, as required by CWA. At many of these large facilities, on-site cleaning, chemical spills, or laboratory operations create relatively small amounts of hazardous waste. For example, a textile plant producing large quantities of nonhazardous wastewater can generate a secondary wastestream of listed spent solvents from cleaning equipment. Routing such secondary hazardous wastestreams to the facility's wastewater treatment system is a practical way of treating and disposing of these wastes. This management option triggers the mixture rule, since even a very small amount of a listed wastestream combined with very large volumes of nonhazardous wastewater causes the entire mixture to be listed. EPA provided an exemption from the mixture rule for situations where relatively small quantities of listed hazardous wastes are routed to large-volume wastewater treatment systems.

Other exemptions apply to mixtures of listed and characteristic wastes with mining and mineral processing that are exempt from the definition of hazardous waste under the Bevill exemption. Wastes that are hazardous via the mixture rule can also exit Subtitle C regulation through the delisting process.

■ Derived-From Rule

Hazardous waste treatment, storage, and disposal processes often generate residues that may contain high concentrations of hazardous constituents. In order to adequately protect human health and the environment from the threats posed by these potentially harmful wastes, the **derived-from rule** governs the regulatory status of such listed waste residues.

Figure III-9: The Derived-From Rule

Listed Hazardous Waste

Any residue from the treatment, storage, or disposal or a listed waste...

...is still a hazardous waste...

...unless the residue is derived-from a hazardous waste that is listed solely for exhibiting the characteristic of ignitability, corrosivity, and/or reactivity and does not exhibit a characteristic of hazardous waste

or

...unless the waste is recycled to make new products or processed to recover usable materials with economic value (provided that product is not used in a manner constituting disposal or burned for energy recovery)

Listed Wastes

Residues produced from the treatment of listed hazardous wastes may pose a significant threat to human health and the environment. If not captured by the waste's listing description, such waste could escape regulation. To close this potential regulatory gap, EPA created the derived-from rule which states that any material derived from a listed hazardous waste is also a listed hazardous waste (see Figure III-9). For example, ash created by burning a hazardous waste is considered derived-from that hazardous waste. Thus, such ash bears the same waste code and regulatory status as the original listed waste, regardless of the ash's actual properties. This principle applies regardless of the actual health threat posed by the waste residue or the residue's chemical composition.

Characteristic Wastes

Treatment residues and materials derived from characteristic wastes are hazardous only if they themselves exhibit a characteristic.

Wastes Listed Solely for Exhibiting the Characteristic of Ignitability, Corrosivity, and/or Reactivity

If a waste derived from the treatment, storage, or disposal of a hazardous waste listed for the characteristics of ignitability, corrosivity, and/or reactivity, no longer exhibits one of those characteristics, it is not a hazardous waste. For example, if a sludge is generated from the treatment of F003, and that sludge does not exhibit the characteristic of ignitability, corrosivity, or reactivity, the F003 listing will not apply to the sludge.

Exemptions

There are several regulatory exemptions from the derived-from rule. The first exemption applies to products reclaimed from hazardous wastes. Many listed hazardous wastes can be recycled to make new products or processed to recover usable materials with economic value. Such products derived-from recycled hazardous wastes are no longer solid wastes, provided that they are not used in a manner constituting disposal or burned for energy recovery (see Figure III-9). The other exemptions from the derived-from rule apply to residues from specific treatment operations. Wastes that are hazardous via the derived-from rule can also exit Subtitle C regulation through the delisting process.

■ Contained-In Policy

Sometimes listed and characteristic wastes are spilled onto soil or contaminate equipment, buildings, or other structures. The mixture and derived-from rules do not apply to such contaminated soil and materials because these materials are not actually wastes. Soil is considered **environmental media** (e.g., soil, ground water, sediment), while the equipment, buildings, and structures are considered debris (e.g., a broad category of larger manufactured and naturally occurring objects that are commonly discarded). Examples of **debris** include:

- Dismantled construction materials, such as used bricks, wood beams, and chunks of concrete
- Decommissioned industrial equipment, such as pipes, pumps, and dismantled tanks
- Other discarded manufactured objects, such as personal protective equipment (e.g., gloves, coveralls, eyewear)
- Large, naturally occurring objects, such as tree trunks and boulders.

Environmental media and debris are contaminated with hazardous waste in a number of ways. Environmental media become contaminated through accidental spills of hazardous waste or spills of product chemicals which, when spilled, become hazardous wastes. Debris can also be contaminated through spills. Most debris in the form of industrial equipment and personal protective gear becomes contaminated with waste or product chemicals during normal industrial operations.

In order to address such contaminated media and debris, EPA created the **contained-in policy** to determine when contaminated media and debris must be managed as RCRA hazardous wastes.

Environmental media are not, in and of themselves, waste, but are regulated as hazardous waste when they contain (are contaminated by) a RCRA listed hazardous waste or exhibit a characteristic. In these cases, the media and debris must be managed as if they were hazardous waste. EPA considers contaminated media or debris to no longer contain hazardous waste when it no longer exhibits a characteristic of hazardous waste. This applies when the hazardous waste contained within the media or debris is either a characteristic waste or a waste listed solely for a characteristic. Otherwise, when dealing with listed waste contamination, EPA or states can determine that media and debris no longer contain hazardous waste by determining that the media or debris no longer poses a sufficient health threat to deserve RCRA regulation. Once this contained-out determination is made, the media and debris are generally no longer regulated under RCRA Subtitle C. However, under certain circumstances, the RCRA LDR requirements might continue to apply.

MIXED WASTE

RCRA specifically exempts certain radioactive mixed materials from the definition of solid waste. However, some radioactive material may be mixed with hazardous wastes that are regulated under RCRA. In addition, a facility may generate a hazardous waste that is also radioactive. Because the material in both of these situations contains both radioactive material and RCRA hazardous waste, it is referred to as mixed waste under RCRA. RCRA and AEA regulate these mixed wastes jointly. AEA regulates the RCRA-exempt radioactive portion and RCRA regulates the hazardous waste portion. Mixed waste generators include DOE, power plants, labs, hospitals, and universities using radioactive materials.

EPA has provided increased flexibility to generators and facilities that manage low-level mixed waste (LLMW) and technologically enhanced naturally occurring and/or accelerator-produced radioactive material (NARM) containing hazardous waste. The Agency is exempting LLMW from some RCRA storage and treatment regulations, and LLMW or eligible NARM from RCRA hazardous waste transportation and disposal regulations. These wastes are exempt from RCRA Subtitle C requirements, including permitting, provided they meet specific conditions. The exempt wastes must then be managed as radioactive waste according to Nuclear Regulatory Commission (NRC) regulations.

SUMMARY

In order to determine if a facility is subject to RCRA Subtitle C, the owner and operator must determine if they have a hazardous waste. This determination must be made by using the following methodology:

- Is the material a solid waste?
- Is the waste excluded?
- Is the waste a listed hazardous waste?
- Is the waste a characteristic waste?

A waste must first be a solid waste before it can be a hazardous waste. A solid waste is a waste that is abandoned, inherently waste-like, a military munition, or recycled. On the other hand, if a material is directly reused without prior reclamation by being either used as an ingredient, used as a product substitute, or returned to the production process, then the material is not regulated as a waste at all. If such reused materials, however, are used in a manner constituting disposal; burned for energy recovery, used to produce a fuel, or contained in fuels; accumulated speculatively; or dioxin-containing wastes considered inherently waste like; then they are regulated as solid wastes. If a recycled material needs reclamation prior to direct use or reuse, its regulatory status is determined by the type of material that it is:

- Spent materials are regulated as solid wastes when reclaimed; used in a manner constituting disposal; burned for energy recovery, used to produce a fuel, or contained in fuels; or accumulated speculatively.

- Listed sludges are solid wastes when reclaimed; used in a manner constituting disposal; burned for energy recovery, used to produce a fuel, or contained in fuels; or accumulated speculatively.

- Characteristic sludges are not solid wastes when reclaimed, unless they are used in a manner constituting disposal; burned for energy recovery, used to produce a fuel, or contained in fuels; or accumulated speculatively.
- Listed by-products are solid wastes when reclaimed; used in a manner constituting disposal; burned for energy recovery, used to produce a fuel, or contained in fuels; or accumulated speculatively.
- Characteristic by-products are not solid wastes when reclaimed, unless they are used in a manner constituting disposal; burned for energy recovery, used to produce a fuel, or contained in fuels; or accumulated speculatively.
- CCPs are not solid wastes when reclaimed, unless they are used in a manner constituting disposal; or burned for energy recovery, used to produce a fuel, or contained in fuels.
- Scrap metal is a solid waste when reclaimed; used in a manner constituting disposal; burned for energy recovery, used to produce a fuel, or contained in fuels; or accumulated speculatively.

Regardless of the type of recycling that takes place, it must be legitimate and not sham recycling.

Some kinds of materials are excluded from the Subtitle C hazardous waste regulations. There are five categories of exclusions:

- Exclusions from the definition of solid waste
- Exemptions from the definition of hazardous waste
- Exclusions for waste generated in raw material, product storage, or manufacturing units
- Exclusions for laboratory samples and waste treatability studies
- Exclusion for dredged material.

If the waste fits one of these categories, it is not regulated as a RCRA hazardous waste, and the hazardous waste requirements do not apply.

If the waste is a solid waste and is not excluded, a facility must determine if it is a listed hazardous waste. The F, K, P, and U lists provide narrative descriptions of wastes from specific industrial processes and sources. Wastes meeting any of these descriptions are listed hazardous wastes. However, through the delisting process, facilities can demonstrate that their wastes does not pose sufficient hazard to warrant Subtitle C regulation as a listed hazardous waste.

Wastes may also be hazardous if they exhibit a characteristic. Even if a facility's waste is listed, the owner and operator must still determine if it exhibits a characteristic. The four characteristics are:

- Ignitability
- Corrosivity
- Reactivity
- Toxicity.

There are special regulatory conventions or provisions that apply to hazardous waste mixtures; treatment, storage, and disposal residues; and contaminated media and debris. These provisions are known as the mixture rule, the derived-from rule, and the contained-in policy.

RCRA and AEA jointly regulate mixed waste, or waste that is radioactive, and listed or characteristic. EPA provided a conditional exemption for low-level mixed waste (LLMW) storage, treatment, transportation, and disposal of mixed wastes.

CHAPTER 2

HAZARDOUS WASTE RECYCLING AND UNIVERSAL WASTES

In this chapter…

OVERVIEW

RCRA hazardous wastes do not cease to be dangerous simply because they are being reused, recycled, or reclaimed. Many hazardous waste recycling operations may pose serious health and environmental hazards and should be subject to Subtitle C regulation. Reuse, recycling, and reclamation should be viewed instead as ways of managing hazardous wastes which, if properly conducted, can avoid environmental hazards, protect scarce natural resources, and reduce the nation's reliance on raw materials and energy. Promoting reuse and recovery is certainly one of the goals of RCRA; however, this goal does not take precedence over assuring the proper management of hazardous waste.

EPA has tried, to the extent possible, to develop regulations for hazardous waste management that foster environmentally sound recycling and conservation of resources, but at the same time provide adequate protection of human health and the environment. This chapter outlines the regulations governing recycling of hazardous wastes, and describes special management standards for two commonly recycled wastestreams: used oil and universal wastes.

HAZARDOUS WASTE RECYCLING

The hazardous waste identification process (as discussed in Section III, Chapter 1) describes how to determine whether a material is a solid and hazardous waste. How a material is regulated under RCRA (i.e., whether or not it is a solid and potentially a hazardous waste) when it is recycled depends on what type of material it is, and what type of recycling is occurring. If the recycled

THE RECYCLING GOAL OF RCRA

Reuse, recycling, and reclamation are ways of managing hazardous wastes which, if properly conducted, can avoid environmental hazards, protect scarce natural resources, and reduce the nation's reliance on raw materials and energy. While promoting reuse and recovery is certainly one of the goals of RCRA, this goal does not take precedence over assuring the proper management of hazardous waste.

material is not a solid waste, then it is not a hazardous waste and is not subject to RCRA Subtitle C requirements. However, if the material qualifies as a solid and hazardous waste, it is subject to RCRA Subtitle C jurisdiction.

Many hazardous wastes can be recycled safely and effectively. To address the goal of encouraging recycling while protecting human health and the environment, EPA has tried to tailor the level of regulation to reflect the actual hazard of the recycling activity. In this approach to regulation, recycling standards range from full regulation to specialized standards to exemptions from regulation. Handlers of hazardous waste slated for recycling must determine what type of regulation they fall under based on the recycling activity being conducted and the type of material being managed.

■ Full Regulation

Most recycled hazardous wastes are subject to full hazardous waste regulation. This means that handlers of these recyclable materials (i.e., persons who generate, transport, or store prior to recycling) are subject to the same regulations as handlers who are managing hazardous wastes prior to disposal.

While management of the hazardous wastes prior to recycling is subject to regulation, the recycling process itself is exempt from RCRA (except for some air emissions standards as discussed in Section III, Chapter 5). For example, if a facility receives hazardous spent solvents from another facility for redistillation (heating a mixture to separate it into several pure components), the recycling units themselves are not subject to RCRA design and operating standards for hazardous waste units. However, the owners and operators of the recycling facility must follow all applicable Subtitle C requirements (including the requirement to obtain a permit) for container or tank storage areas used to store such wastes prior to recycling.

■ Exemptions

Not all hazardous wastes pose the same degree of hazard when recycled. EPA believes wastes that may be recycled in a protective manner, or that are addressed under other environmental regulations, warrant exemptions from RCRA Subtitle C. Consequently, handlers of these materials are not subject to any hazardous waste regulations. These exempt recyclable hazardous wastes are:

- Industrial ethyl alcohol
- Scrap metal
- Waste-derived fuels from refining processes
- Unrefined waste-derived fuels and oils from petroleum refineries.

Industrial Ethyl Alcohol

Industrial ethyl alcohol that is reclaimed is exempt from RCRA Subtitle C because the U.S. Bureau of Alcohol, Tobacco and Firearms (BATF) already regulates it from the point of generation to redistillation.

Scrap Metal

Scrap metal that is disposed of or recycled is a solid waste; however, it is exempt from Subtitle C regulation when it is reclaimed (i.e., recycled to recover metal content). This does not apply to processed scrap metal which is excluded from hazardous waste regulation entirely (as discussed in Section III, Chapter 1).

Waste-Derived Fuels from Refining Processes

Fuels produced by refining oil-bearing hazardous wastes with normal process streams at petroleum refining facilities are exempt if such wastes resulted from normal petroleum refining, production, and transportation practices. For these wastes to be considered refined, they must be inserted into a part of the process designed to remove contaminants. This would typically mean insertion prior to distillation.

Unrefined Waste-Derived Fuels and Oils

Fuels produced at a petroleum refinery from oil-bearing hazardous wastes that are introduced into the refining process after the distillation step, or that are reintroduced in a process that does not include

distillation, are exempt if the resulting fuel meets the specifications under the federal recycled used oil standards in 40 CFR §279.11 (as discussed later in this chapter). Oil that is recovered from hazardous waste at a petroleum refinery and burned as a fuel is also exempt provided it meets the used oil specifications.

■ Special Standards

While RCRA specifically exempts some wastes when recycled, some recycling processes may still pose enough of a hazard to warrant some degree of regulation. However, due to the nature of the recycling process itself or the nature of the materials being recycled, these processes may require a specialized set of standards. These processes are:

- Use constituting disposal
- Precious metals reclamation
- Spent lead-acid battery reclamation
- Burning for energy recovery.

Use Constituting Disposal

Use constituting disposal refers to the practice of recycling hazardous wastes by placing them on the land or using them as ingredients in a product that will be placed on the land. To be placed on the land, waste-derived products must: (1) be made for the general public's use; (2) have undergone a chemical reaction so as to be inseparable by physical means; and (3) meet applicable LDR treatment standards (as discussed in Section III, Chapter 6). Once these waste-derived products meet these standards, they are no longer restricted from placement on the land. Materials that do not meet these criteria remain regulated. There are also special standards for hazardous wastes used to make zinc micronutrient fertilizers.

Precious Metals Reclamation

Precious metals reclamation is the recycling and recovery of precious metals (i.e., gold, silver, platinum, palladium, iridium, osmium, rhodium, and ruthenium) from hazardous waste. Because EPA found that these materials will be handled protectively as valuable commodities with significant economic value, generators, transporters, and storers of such recyclable materials are subject to reduced requirements.

Spent Lead-Acid Battery Reclamation

Persons who generate, transport, regenerate, collect, and store spent lead-acid batteries prior to reclamation, but do not perform the actual reclamation, are not subject to hazardous waste regulation. EPA established those provisions to encourage the recycling of these batteries. However, owners and operators of facilities that store spent batteries before reclamation, other than spent batteries that are **regenerated** (processed to remove contaminants and restore the product to a useable condition), are subject to regulation in a manner similar to hazardous waste TSDFs. Handlers of lead-acid batteries may also choose to manage them under the universal waste provisions discussed later in this chapter.

Burning For Energy Recovery

The process of recycling hazardous waste by burning it for energy recovery may pose significant air emission hazards. Therefore, EPA established specific operating standards for units burning hazardous wastes for energy recovery. These units are known as boilers or industrial furnaces (BIFs) (as discussed in Section III, Chapter 7).

USED OIL

In developing a hazardous waste regulatory program to facilitate and encourage recycling, Congress felt that certain commonly recycled materials warranted a regulatory program of their own. As a result, Congress and EPA created special management standards for used oil. Under these standards, recycled used oil is not subject to the hazardous waste regulatory program applicable to

other recycled materials, but rather to its own management provisions.

Used oil has certain unique properties that make it distinct from most hazardous wastestreams. First of all, used oil is generated by a wide range of entities, including, but not limited to, large manufacturing facilities, industrial operations, service stations, quick-lube shops, and even households. Every year privately owned automobile and light trucks generate over 300 million gallons of used crank case oil. Secondly, used oil is an easily recyclable material. For example, just one gallon of used oil provides the same 2.5 quarts of lubricating oil as 42 gallons of crude oil. However, even used oil that does not exhibit any characteristics of hazardous waste can have harmful effects if spilled or released into the environment.

■ Used Oil Regulation

In an effort to encourage the recycling of used oil, and in recognition of the unique properties and potential hazards posed by used oil, Congress passed the Used Oil Recycling Act in 1980. This Act amended RCRA by requiring EPA to study the hazards posed by used oil and to develop used oil management standards to protect human health and the environment. As a result, EPA developed special recycling regulations for used oil that are completely separate from hazardous waste recycling standards. First, in November 1985, EPA promulgated restrictions on the burning of used oil for energy recovery. Second, in September 1992, EPA developed a more comprehensive used oil recycling program, codified in 40 CFR Part 279, that incorporated the existing burning restrictions, and added used oil management standards for all facilities that handle used oil.

Since EPA's used oil program is designed to encourage used oil recycling, Part 279 includes a **recycling presumption**. This is an assumption that all used oil that is generated will be recycled. The recycling presumption simplifies the used oil management system by enabling handlers to only comply with the used oil regulations, instead of the hazardous waste regulations. Only when the used oil is actually disposed of or sent for disposal must handlers determine whether or not the used oil exhibits a characteristic of hazardous waste and manage it in accordance with hazardous waste regulations.

Additional information about used oil management can be found at: www.epa.gov/epaoswer/hazwaste/usedoil/index.htm.

■ What is Used Oil?

Used oil is any oil that has been refined from crude oil or any synthetic oil that has been used and, as a result of such use, is contaminated by physical or chemical impurities. In other words, used oil must meet each of the following three criteria: origin, use, and contamination. First, the used oil must be derived from crude oil or synthetic oil (i.e., derived from coal, shale, or polymers). Second, the oil must have been used as a lubricant, hydraulic fluid, heat transfer fluid, or other similar uses. Unused oil such as cleanout tank bottoms from virgin product fuel oil storage is not used oil because it has not been used. Finally, the used oil must be contaminated by physical or chemical impurities as a result of such use. Physical impurities could include contamination by metal shavings, sawdust, or dirt. Chemical impurities could include contamination by water or benzene, or degradation of lubricating additives.

■ Used Oil Handlers

Persons who handle used oil are subject to specific management requirements depending on the extent of their used oil recycling activities. The following handlers are subject to used oil management standards:

- Generators
- Collection centers and aggregation points
- Transporters
- Transfer facilities
- Processors and rerefiners
- Marketers.

Generators

Used oil **generators** are persons whose act or process produces used oil, or first causes used oil to be subject to regulation. Examples of common generators include car repair shops, service stations, and metalworking industries. Individuals who generate used oil through the maintenance of their own personal vehicles and equipment, known as used oil **do-it-yourselfers,** are not considered used oil generators.

Collection Centers and Aggregation Points

Used oil collection centers and aggregation points are facilities that accept small amounts (less than 55 gallons) of used oil and store it until enough is collected to ship it elsewhere for recycling. Used oil **collection centers** typically accept used oil from multiple sources that include both businesses and private citizens. Used oil **aggregation points** collect oil from places run by the same owner and operator as the aggregation point, and also from private citizens.

Transporters

Used oil **transporters** are persons who haul used oil in quantities greater than 55 gallons and deliver it to transfer facilities, rerefiners, processors, or burners.

Transfer Facilities

Used oil **transfer facilities** are any structures or areas (such as loading docks or parking areas) where used oil is held for longer than 24 hours, but not longer than 35 days, during the normal course of transportation.

Processors and Rerefiners

Used oil **processors and rerefiners** are facilities that process used oil so that it can be burned for energy recovery or reused.

Burners

Used oil **burners** are handlers who burn used oil for energy recovery in boilers, industrial furnaces, or hazardous waste incinerators.

Marketers

Used oil **marketers** are handlers who either: (1) direct shipments of used oil to be burned as fuel in regulated devices (i.e., boilers, industrial furnaces, and incinerators); or (2) claim that used oil to be burned for energy recovery is on-specification. A marketer must already be a used oil generator, transporter, processor, rerefiner, or burner.

■ Used Oil Management Standards

The used oil management standards apply to a wide variety of facilities with very different business practices. These standards are designed to establish minimum regulations for all facilities, addressing such practices as proper storage, transportation, recordkeeping, and burning. These standards vary by facility type. The most stringent requirements apply to facilities that process or rerefine used oil. Used oil transporters, transfer facilities, and used oil burners are subject to a reduced set of standards. Generators have the fewest requirements.

Used Oil as a Hazardous Waste

Because used oil mixed with hazardous wastes increases risks to human health and the environment, all handlers are encouraged to keep used oil from becoming contaminated with hazardous wastes. To prevent intentional mixing, EPA subjects mixtures of used oil and listed hazardous waste to all applicable hazardous waste standards.

From an enforcement point of view, however, the Agency cannot always determine if used oil has been mixed with a listed hazardous waste. As a result, EPA decided to use an objective test that focused on the halogen level in used oil (listed spent

halogenated solvents were often found to be mixed with used oil). This objective test is known as the **rebuttable presumption**. According to this test, used oil that contains more than 1,000 parts per million (ppm) of total halogens is presumed to have been mixed with a listed hazardous waste, and is therefore subject to applicable hazardous waste regulations. A person may rebut this presumption by demonstrating, through analysis or other documentation, that the used oil has not been mixed with listed hazardous waste. Nevertheless, used oil that is known to have been mixed with a listed hazardous waste is considered a listed hazardous waste, regardless of the halogen level.

The principle for mixtures of used oil and characteristic hazardous waste is somewhat different. First, if used oil is mixed with a waste that only exhibits the characteristic of ignitability, or is listed solely for ignitability, and the resultant mixture is no longer ignitable, then the mixture can be managed as used oil, despite the inherent characteristics that the used oil may bring to the mixture. EPA believes that materials that are ignitable-only should not affect the chemical constituent or other properties of used oil when mixed, and therefore, should not add additional risks to human health and the environment when burned. However, used oil mixed with a waste that is hazardous because it exhibits one or more characteristics of hazardous waste (other than just ignitability), must no longer exhibit any characteristics if it is going to be managed as used oil.

THE REBUTTABLE PRESUMPTION

EPA presumes that used oil which contains more than 1,000 ppm of total halogens has been mixed with a listed hazardous waste, and is therefore subject to applicable hazardous waste regulations, unless the presumption can be successfully rebutted. A person may rebut this presumption by demonstrating, through analysis or other documentation, that the used oil has not been mixed with listed hazardous waste. For example, a generator has a drum of used oil containing 2,000 ppm of halogens. Even though the used oil was not mixed with a listed hazardous waste, EPA will presume that is the case. The generator, however, can rebut this presumption by demonstrating that the high halogen level is due to mixing with household hazardous wastes, which are not considered hazardous under RCRA. As a result, the drum of oil is regulated as used oil, and not as hazardous waste.

Used Oil Contaminated with PCBs

The use and disposal of PCBs are regulated by the Toxic Substances Control Act (TSCA). In addition to the RCRA used oil management standards, marketers and burners of used oil contaminated with any quantifiable level of PCBs are subject to the current TSCA requirements, which provide comprehensive management standards for such used oils.

Storage

Although different used oil handlers may have specific management requirements for their oil, all handlers must:

- Store used oil in tanks and containers. Storage of used oil in lagoons, pits, or surface impoundments is prohibited, unless these units are subject to hazardous waste TSDF standards (as discussed in Section III, Chapter 5)
- Clearly mark containers and tanks with the words “Used Oil”
- Keep containers and tanks in good condition and free of leaks
- Respond to releases of used oil from their storage units.

Transfer facilities, processors and rerefiners, and burners must also have secondary containment systems to prevent oil from reaching the environment in the event of a spill or leak. Secondary containment consists of an oil-impervious dike, berm, or retaining wall to contain releases, as well as an oil-impervious floor to prevent migration.

Burning Restrictions

Levels of contamination in used oils may vary widely, depending on different types of uses or length of use. Recognizing this fact, EPA has

established a set of criteria, called used oil specifications, to evaluate the potential hazards posed by used oil when burned for energy recovery. Used oil that is tested and is not within these set parameters is termed **off-specification used oil**.

Parameter	Allowable Level
Arsenic	5 ppm maximum
Cadmium	2 ppm maximum
Chromium	10 ppm maximum
Flash point	100° F minimum
Lead	100 ppm maximum
Total Halogens	4,000 ppm maximum

Off-specification used oil may be burned for energy recovery, but it is strictly regulated. Such used oil may only be burned in:

- Boilers
- Industrial furnaces
- Hazardous waste incinerators
- Generator space heaters that meet certain operating conditions.

Conversely, used oil that meets all specification levels, otherwise known as **on-specification used oil**, is not subject to any restrictions when burned for energy recovery. In fact, on-specification used oil is comparable to product fuel in terms of regulation. Once the specification determination is made, and certain recordkeeping requirements are complied with, the on-specification oil is no longer subject to used oil management standards.

Recordkeeping and Reporting

Used oil transporters, transfer facilities, processors and rerefiners, burners, and marketers are required to obtain an EPA identification (EPA ID) number. While generators, collection centers, aggregation points, and those who transport their own used oil in shipments of less than 55 gallons do not need an EPA ID number, they may still need a state or local permit.

Used oil transporters, processors, burners, and marketers must also track each acceptance and delivery of used oil shipments. Records can take the form of a log, invoice, or other shipping document and must be maintained for three years.

In addition, used oil processors and rerefiners must:

- File a biennial report of used oil activity
- Prepare a contingency plan detailing how releases will be addressed
- Prepare an analysis plan describing testing protocols at the facility
- Maintain records of shipment and deliveries of used oil
- Maintain an operating record at the facility.

UNIVERSAL WASTE

The special management provisions for used oil clearly eased the management burden and facilitated the recycling of such material. EPA also discovered that subjecting other commonly recycled materials to hazardous waste regulation was burdensome on many handlers of these wastes. This burden has the potential of discouraging waste recycling by facilities who are otherwise willing to engage in such activity. In response to these concerns, EPA promulgated the universal waste program, in May 1995. These requirements are codified in 40 CFR Part 273.

The universal waste program promotes the collection and recycling of certain widely generated hazardous wastes, known as **universal wastes**. Through this program, EPA intends to ease the regulatory burden on the facilities that manage universal wastes, particularly by allowing more time for accumulation of these wastes in order to facilitate appropriate recycling or disposal. Three types of waste were originally covered under the universal waste regulations: hazardous waste batteries, hazardous waste pesticides that are either recalled or collected in waste pesticide collection programs, and hazardous waste thermostats. In July 1999, EPA added hazardous waste lamps to the universal waste regulations. In June 2002, EPA proposed to add mercury-containing equipment. Other similar wastes may be added to the universal waste regulations in the future. The regulated community may also petition the Agency to include additional wastes in the universal waste program.

There are four types of regulated participants in the universal waste system: small quantity handlers of universal waste (SQHUW), large quantity handlers of universal waste (LQHUW), universal waste transporters, and universal waste destination facilities.

WHAT ARE UNIVERSAL WASTES?

Universal wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. Four types of waste are currently covered under the universal waste regulations: hazardous waste batteries, hazardous waste pesticides that are either recalled or collected in waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps. More wastes may be added to the universal waste regulations in the future, but presently only these wastes are included.

A complete overview of the universal waste regulations can be found at www.epa.gov/epaoswer/hazwaste/id/univwast.htm.

Universal Waste Handlers

There are two types of handlers of universal waste. The first type of handler is a person who generates, or creates, universal waste. For example, this may include a person who uses batteries, pesticides, thermostats, or lamps and who eventually decides that they are no longer usable. The second type of handler is a person who receives universal waste from other handlers, accumulates the waste, and then sends it on to other handlers, recyclers, or treatment or disposal facilities without performing the actual treatment, recycling, or disposal. This may include a person who collects batteries, pesticides, or thermostats from small businesses and sends the wastes to a recycling facility. The universal waste handler requirements depend on how much universal waste a handler accumulates at any one time.

Small Quantity Handlers of Universal Waste

Small quantity handlers of universal waste accumulate less than 5000 kilograms (kg) (approximately 11,000 pounds (lbs)) of all universal waste categories combined at their location at any time. Accumulation time for universal wastes at any location is limited to one year. SQHUW are required to manage universal waste in a way that prevents releases to the environment. SQHUW must also immediately respond to releases of universal waste. SQHUW must distribute basic waste handling and emergency information to their employees to ensure that their staff are aware of proper handling and emergency procedures.

Large Quantity Handlers of Universal Waste

Large quantity handlers of universal waste accumulate a total of 5000 kg or more of universal waste at any time. The designation as a LQHUW is retained for the remainder of the calendar year in which the 5000-kg threshold was exceeded, and may be reevaluated in the following calendar year. LQHUW must comply with the same requirements as SQHUW, as well as a few additional ones. LQHUW must also maintain basic records documenting shipments received at the facility and shipments sent from the facility, must obtain an EPA ID number, and must comply with stricter employee training requirements.

Universal Waste Transporters

Universal waste **transporters** are persons who transport universal waste from handlers of universal waste to other handlers, destination facilities, or foreign destinations. These wastes do not need to be accompanied by a RCRA hazardous waste manifest during transport, but transporters must comply with applicable DOT requirements.

Transporters may store universal waste for up to 10 days at a transfer facility during the course of transportation. Transfer facilities are transportation related facilities such as loading docks, parking areas, and storage areas. If a transporter keeps universal waste for more than 10 days at one location, the transporter is subject to all applicable SQHUW or LQHUW regulations.

Universal Waste Destination Facilities

Universal waste **destination facilities** are facilities that treat, dispose of, or recycle a particular

category of universal waste. These facilities are subject to the same requirements as fully regulated hazardous waste TSDFs. Full regulation includes permit requirements, general facility standards, and unit-specific standards (as discussed in Section III, Chapter 5). The universal waste program includes only two additional specific universal waste requirements for destination facilities. These requirements are procedures for rejecting shipments of universal waste and the documentation of the receipt of universal waste.

CATHODE RAY TUBES

Cathode ray tubes (CRTs) are vacuum tubes, made primarily of glass, which constitute the video display component of televisions and computer monitors. Color CRTs are generally hazardous for lead. Recent technological advances in information management and communication have greatly improved the quality of people's lives. However, our growing use of electronic products in the home and workplace has provided a new environmental challenge of managing electronic waste, including CRTs. EPA is taking steps towards meeting this new environmental challenge by proposing an exclusion from the definition of solid waste that would streamline RCRA management requirements for CRTs.

SUMMARY

EPA developed a regulatory approach to regulate different hazardous waste recycling activities in accordance with the degree of hazard they pose. The three types of regulation are: full regulation, exemptions, and special standards.

Persons who generate, transport, and store hazardous wastes prior to recycling must manage them in the same manner as persons who handle hazardous wastes prior to disposal. The recycling process itself is exempt from regulation.

Certain hazardous wastes, based on the manner in which they are recycled, or based on regulation by other environmental statutes, are exempt from hazardous waste regulation. Those wastes are:

- Industrial ethyl alcohol
- Scrap metal
- Waste-derived fuels from refining processes
- Unrefined waste-derived fuels and oils from petroleum refineries.

Some recycling processes are not fully exempt from hazardous waste regulation, but are instead subject to specialized standards. These processes are:

- Use constituting disposal
- Precious metal reclamation
- Lead-acid battery reclamation (regenerated batteries are exempt from hazardous waste regulation entirely)
- Burning for energy recovery.

Certain commonly recycled materials are subject to streamlined hazardous waste regulation. One type of material, used oil, is regulated under its own recycling program. Used oil is defined as any oil that has been refined from crude oil or any synthetic oil that has been used and as a result of such use is contaminated by physical or chemical impurities.

The used oil recycling provisions include management standards for used oil:

- Generators
- Collection centers and aggregation points
- Transporters
- Transfer facilities
- Processors and rerefiners
- Burners
- Marketers.

Another type of material, universal waste, is also subject to streamlined management provisions. The universal waste program is designed to encourage the recycling of certain widely generated hazardous wastes by easing the regulatory burden on persons who handle, transport, and collect them. Universal wastes consist of:

- Hazardous waste batteries
- Hazardous waste pesticides that are either recalled or collected in waste pesticide collection programs

- Hazardous waste thermostats
- Hazardous waste lamps.

The universal waste program includes regulatory provisions for universal waste handlers, transporters, and destination facilities.

CHAPTER 3

REGULATIONS GOVERNING HAZARDOUS WASTE GENERATORS

In this chapter…

OVERVIEW

Under RCRA, hazardous waste generators are the first link in the cradle-to-grave hazardous waste management system. All generators must determine if their waste is hazardous and must oversee the ultimate fate of the waste. RCRA Subtitle C requires generators to ensure and fully document that the hazardous waste they produce is properly identified, managed, and treated prior to recycling or disposal. The regulations applicable to generators of hazardous waste are located in 40 CFR Part 261 and Part 262. (Generators may also be subject to LDR requirements as discussed in Section III, Chapter 6.) The degree of regulation to which each generator is subject depends to a large extent on how much waste each generator produces every calendar month. This chapter summarizes who is considered a generator, and which standards apply based on waste generation rates.

WHO ARE THE REGULATED GENERATORS?

The Subtitle C regulations broadly define the term **generator** to include any person, by site, who:

- First creates or produces a hazardous waste (e.g., from an industrial process)

OR

- First brings a hazardous waste into the RCRA Subtitle C system (e.g., imports a hazardous waste into the United States).

Because generators are the first step in the RCRA Subtitle C system, it is important that they properly classify and identify their waste to ensure proper handling later in the hazardous waste management process. As a result, generators of waste must make the following determinations:

- Is the waste a solid waste?
- Is the waste excluded?
- Is the waste a listed hazardous waste?
- Is the waste a characteristic hazardous waste?

Hazardous waste generators may include various types of facilities and businesses ranging from large manufacturing operations, universities, and hospitals to small businesses and laboratories. Because these different types of facilities generate different volumes of wastes resulting in varying degrees of environmental risk, RCRA regulates generators based on the amount of waste that they generate in a calendar month. As a result, there are three categories of hazardous waste generators:

- Large quantity generators (LQGs)
- Small quantity generators (SQGs)
- Conditionally exempt small quantity generators (CESQGs).

■ Large Quantity Generators

Early in the development of the RCRA program in 1980, EPA recognized that a relatively small number of large scale hazardous waste management facilities generated the majority of the nation's hazardous waste. In order to address the facilities that posed the greatest threat to human health and the environment, EPA focused on those generators that produced the greatest volumes of hazardous waste by establishing standards for large quantity generators.

Large quantity generators are defined as those facilities that generate:

- Greater than 1,000 kg of hazardous waste per calendar month (approximately 2,200 lbs)

OR

- Greater than 1 kg of acutely hazardous waste per calendar month (approximately 2.2 lbs).

In 1999, there were approximately 20,000 LQGs.

■ Small Quantity Generators

The LQG regulations focused on generators whose volume of waste posed the greatest threat to human health and the environment. All other generators that produced less than 1,000 kg of hazardous waste per month (or less than 1 kg of acutely hazardous waste per month) were initially exempted from the RCRA generator requirements.

Because of the concern that such exempt hazardous waste could cause environmental harm, Congress (through HSWA) required that EPA also regulate those **small quantity generators** who produced more than 100 kg of hazardous waste. SQGs are defined as those facilities that:

- Generate between 100 kg (approximately 220 lbs) and 1,000 kg of hazardous waste per calendar month

AND

- Accumulate less than 6,000 kg (approximately 13,200 lbs) of hazardous waste at any time.

In 1999, there were approximately 125,000 SQGs.

Conditionally Exempt Small Quantity Generators

Until HSWA, facilities generating waste below the 100-kg cut-off point were exempt from RCRA regulatory requirements. HSWA resulted in a third category of generators, CESQGs. These generators are defined as those facilities that produce:

- Less than 100 kg of hazardous waste per calendar month

OR

- Less than 1 kg of acutely hazardous waste per calendar month.

The CESQG requirements additionally limit the facility's waste accumulation quantities to less than 1,000 kg of hazardous waste, 1 kg of acute hazardous waste, or 100 kg of any residue from the cleanup of a spill of acute hazardous waste at any time.

In 1997, there were between 400,000 and 700,000 CESQGs.

Episodic Generation

Because generator status is determined on a monthly basis, it is possible that a generator's status can change from one month to the next, depending on the amount of waste generated in a particular month. This is referred to as **episodic generation**. If a generator's status does in fact change, the generator is required to comply with the respective regulatory requirements for that class of generators for the waste generated in that particular month.

State Regulations

State classification of generator categories may be different from those outlined above. Some states regulate all generators of hazardous waste (i.e., there is no exempt category), while other states classify generators by waste type rather than by generated volume. Therefore, it is imperative that generators contact their respective state agency to determine if state generator regulations differ from these federal requirements.

LARGE AND SMALL QUANTITY GENERATOR REGULATORY REQUIREMENTS

LQGs and SQGs are subject to regulations contained in 40 CFR Part 262 that require each generator to:

- Identify and count waste
- Obtain an EPA ID number
- Comply with accumulation and storage requirements (including requirements for training, contingency planning, and emergency arrangements)

- Prepare the waste for transportation
- Track the shipment and receipt of such waste
- Meet recordkeeping and reporting requirements.

Because SQGs produce a smaller portion of the nation's hazardous waste, Congress was concerned that full regulation might be economically burdensome and inappropriate. Consequently, Congress authorized EPA to reduce the regulatory requirements applicable to SQGs provided that such requirements were still protective of human health and the environment. This chapter fully discusses

these regulatory requirements and notes the differences between LQG and SQG regulatory provisions.

Waste Identification and Counting

In order to determine which generator standards a facility must comply with, generators are required to identify each waste that they generate and determine all applicable listings and characteristics. After determining which wastes are hazardous, each month, generators are responsible for totaling (or **counting**) the weight of all hazardous wastes generated in that month in order to determine if they will be regulated as a LQG, SQG, or CESQG for that particular month.

EPA Identification Numbers

One way that EPA monitors and tracks generators is by assigning each LQG and SQG a unique **EPA ID number**. If you generate, treat, store, dispose of, transport, or offer for transportation any hazardous waste, you must have an ID number. Furthermore, the generator is forbidden from offering hazardous waste to any transporter or TSDF that does not also have an EPA ID number. ID numbers are issued to each generator for each individual site or facility property where hazardous waste is generated. Generators may request ID number application forms from their state agency.

Additional information regarding EPA ID numbers, including the forms and instructions can be found at the following URL:

www.epa.gov/epaoswer/hazwaste/data/form8700/forms.htm

Accumulation of Waste

LQGs and SQGs are also subject to facility waste management standards. A LQG may accumulate hazardous waste on site for 90 days or less. Under temporary, unforeseen, and uncontrollable circumstances, this 90-day period may be extended for up to 30 days by the state or EPA on a case-by-case basis. LQGs storing wastewater treatment sludges from electroplating operations (F006) may store that waste for 180 or 270 days if the waste is to be recycled.

LQGs must comply with the following requirements:

- Proper Management — The waste is properly accumulated in containers, tanks, drip pads, or containment buildings. Hazardous waste containers must be kept closed and marked with the date on which accumulation began. Tanks and containers are required to be marked with the words "Hazardous Waste." The generator must ensure and document that waste is shipped off site within the allowable 90-day period.
- Emergency Plan — LQGs are required to have formal written contingency plans and emergency procedures in the event of a spill or release.
- Personnel Training — Facility personnel must be trained in the proper handling of hazardous waste through an established training program.

Considering the lesser risks posed by the generation of lesser quantities of hazardous waste, SQGs are subject to less extensive facility waste management provisions. A SQG may accumulate hazardous waste on site for 180 days or less. SQGs transporting hazardous waste for off-site treatment, storage, or disposal over distances greater than 200 miles may accumulate waste for up to 270 days. SQGs must comply with the following requirements:

- Proper Management — The waste is properly accumulated in either tanks or containers marked with the words "Hazardous Waste." Containers must also be marked with the date on which accumulation began.
- Emergency Plan — The SQG requirements include specified emergency responses; however, SQGs are not required to have written contingency plans. They are required to ensure that an emergency coordinator is on the premises, or on-call at all times, and have basic facility safety information readily accessible.
- Personnel Training — SQGs are not required to have an established training program, but must

ensure that employees handling hazardous waste are familiar with proper handling and emergency procedures.

■ Preparation for Transport Regulations

Pre-transport regulations are designed to ensure safe transportation of hazardous waste from the point of origin to the ultimate disposal site. In developing hazardous waste pre-transport regulations, EPA adopted DOT's regulations for packaging, labeling, marking, and placarding. These DOT regulations can be found at 49 CFR Parts 172, 173, 178, and 179. DOT regulations require:

- Proper packaging to prevent leakage of hazardous waste during both normal transport conditions and potentially dangerous situations (e.g., if a drum falls off of a truck)
- Labeling, marking, and placarding of the packaged waste to identify the characteristics and dangers associated with its transport.

These pre-transport regulations only apply to generators shipping waste off site for treatment, storage, or disposal. Transportation on site is not subject to these pre-transport requirements.

■ The Manifest

As previously discussed, the Subtitle C program is designed to manage hazardous waste from cradle to grave. The Uniform Hazardous Waste Manifest (Form 8700-22) plays a crucial part in this management system. (A sample of the manifest can be found in Appendix A.) The **manifest** allows all parties involved in hazardous waste management (e.g., generators, transporters, TSDFs, EPA, state agencies) to track the movement of hazardous waste from the point of generation to the point of ultimate treatment, storage, or disposal. A RCRA manifest contains the following federally required information:

- Name, address, and EPA ID number of the hazardous waste generator, transporter(s), and designated facility
- DOT description of the waste's hazards
- Quantities of the wastes transported and container type.

Each manifest also contains a certification that states:

- The shipment has been accurately described and is in proper condition for transport
- The generator has a waste minimization program in place at its facility to reduce the volume and toxicity of hazardous waste to the degree economically practicable, as determined by the generator
- The treatment, storage, or disposal method chosen by the generator is the most practicable method currently available that minimizes the risk to human health and the environment.

Each time a waste is transferred (e.g., from a transporter to the **designated facility** or from a transporter to another transporter), the manifest must be signed to acknowledge receipt of the waste. A copy of the manifest is retained by each individual in the transportation chain. Once the waste is delivered to the designated facility, the owner and operator of that facility must sign and return a copy of the manifest to the generator. This system ensures that the generator has documentation that the hazardous waste has arrived at its ultimate destination. To further ensure the safe transport of hazardous waste, a generator may not offer waste for transport unless that transporter has an EPA ID number.

In May 2001, EPA proposed revisions to the manifest form and regulations. EPA expects to standardize the content and appearance of the current manifest form so that the same form could be used by waste handlers nationwide. Other anticipated changes include improved tracking procedures for problem shipments and an option to complete, send, and store the manifest information electronically. If finalized, the regulations for generators and transporters in Parts 262 and 263 will be changed to include the new manifest form.

Recordkeeping and Reporting

The recordkeeping and reporting requirements for LQGs and SQGs provide EPA and the states with a method to track the quantities of hazardous waste generated and the movement of hazardous wastes. The generator regulations in 40 CFR Part 262 contain three primary recordkeeping and reporting requirements:

- Biennial reporting
- Exception reporting
- Three-year record retention.

Biennial Reporting

The biennial reporting requirements are intended to provide EPA with reliable national data on hazardous waste management. In order to achieve this, LQGs must submit a **Biennial Report** (*EPA Form 8700-13A and B*) to the EPA Regional Administrator or state by March 1 of each even-numbered year. The report details the generator's activities during the previous calendar year and includes the:

- EPA ID number, name, and address of the generator
- EPA ID number and name of each transporter used throughout the year
- EPA ID number, name, and address of each off-site TSDF and recycler to which waste was sent during the year
- Descriptions and quantities of each hazardous waste generated.

The federal RCRA regulations do not require SQGs to file biennial reports.

The data from the 1999 Bienniel Report can be found at the following URL:

www.epa.gov/epaoswer/hazwaste/data/brs99/index.htm

Exception Reporting

The RCRA regulations ensure that the transport of hazardous waste from its point of generation to its point of treatment, storage, or disposal is documented through a manifest system. This system requires the designated facility to return a signed and dated copy of the manifest to the generator in order to acknowledge receipt of the waste. If the generator does not receive this paperwork, additional steps need to be taken in order to locate the waste. As a result, LQGs who transport waste off site, but do not receive a signed and dated copy of the manifest from the designated facility within 45 days from the date on which the initial transporter accepted the waste, must submit an **exception report** to the EPA Regional Administrator. The exception report must describe efforts made to locate the waste and the results of those efforts.

SQGs who do not receive a signed and dated copy of the manifest from the designated facility within 60 days must send a copy of the original manifest to the EPA Regional Administrator with a note indicating that they have not received a return copy.

Record Retention

Generators must keep a copy of each biennial report and any exception reports for at least three years from the due date of the report. Generators are also required to keep copies of all manifests for three years, or until a signed and dated copy of the manifest is received from the designated facility. The manifest received from the designated facility must be kept for at least three years from the date on which the hazardous waste was accepted by the initial transporter. Finally, records of waste analyses and determinations performed by the generator must be kept for at least three years from the date the waste was last sent to an on-site or off-site TSDF. These retention periods may be extended automatically during the course of any unresolved enforcement action regarding the regulated activity, or as requested by the EPA Administrator.

CONDITIONALLY EXEMPT SMALL QUANTITY GENERATORS

While CESQGs are not subject to the requirement to obtain an EPA ID number, comply with accumulation and storage requirements, follow the manifest system, or meet recordkeeping and

reporting requirements, they are subject to limited generator waste management standards. CESQGs may also be subject to DOT requirements. CESQGs must identify their hazardous waste, comply with storage limit requirements, and ensure waste treatment or disposal in an on-site or off-site:

- Permitted or interim status hazardous waste TSDF
- State hazardous waste facility
- State permitted, licensed, or registered solid waste disposal facility
- State MSWLF
- Recycling facility
- Universal waste facility.

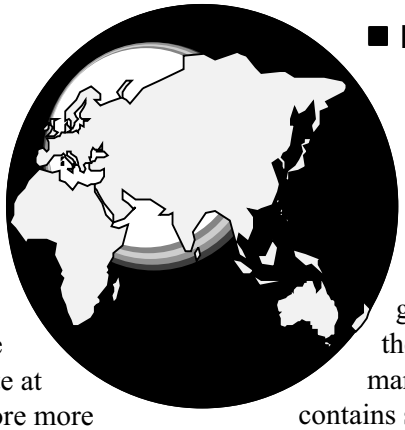
QUANTITY AND TIME LIMITS

LQGs, SQGs, and CESQGs are subject to specific quantity and time limits that restrict the amount of waste that may be stored on site at any one time, and the length of such storage. For example, SQGs may not store more than 6,000 kg of hazardous waste on site at any one time, and CESQGs may not store more than 1,000 kg of hazardous waste on site at any one time. LQGs must move all of the waste that they generate off site within 90 days, while SQGs have 180 days to move all waste off site. If SQGs or CESQGs exceed their respective storage quantity limits, or if LQGs or SQGs exceed their respective accumulation time limits, the facility becomes a storage facility subject to all applicable requirements for TSDFs (including permitting) unless they have received an accumulation time limit extension from EPA or their state.

Recently, EPA promulgated less stringent regulations for generators of F006 waste in order to promote legitimate recycling of metal-bearing electroplating sludges. As a result, large quantity generators are allowed to accumulate F006 sludges up to 180 or 270 days without a permit provided they meet certain conditions.

INTERNATIONAL SHIPMENTS

Not all hazardous wastes that are managed in the United States originate in this country. Similarly, not all wastes generated in the United States are managed exclusively in this country. To ensure that such international shipments are handled in a manner that protects human health and the environment, RCRA contains management provisions for both hazardous waste imports and exports. Because such shipments are also governed by various international treaties and agreements, the RCRA regulations include provisions which implement these treaties and agreements.



■ Hazardous Waste Imports

Under RCRA, any person importing a hazardous waste into the United States from a foreign country is subject to the hazardous waste generator standards. As a result, an importer is subject to all generator requirements, including the completion of a hazardous waste manifest. Subpart F of Part 262 contains special instructions for importers completing the manifest.

■ Hazardous Waste Exports

RCRA also contains specific requirements for hazardous waste exports. For example, there are specific notification requirements for exports of hazardous wastes that prohibit the export of hazardous waste unless the exporter obtains written consent from the receiving country prior to shipment. This written consent must be attached to the manifest accompanying each waste shipment.

To export a hazardous waste, the exporter must notify the EPA Administrator 60 days prior to when the waste is scheduled to leave the United States. This notification may cover export activities extending over a 12-month period, unless

information in the notification changes. If the importing country agrees to accept the hazardous waste, EPA will send an **Acknowledgment of Consent** to the exporter, who may then export the waste to the accepting country.

■ International Treaties

Two international treaties may affect U.S. hazardous waste import and export practices. They are the Basel Convention and the Organization for Economic Cooperation and Development (OECD) Council Decision.

Basel Convention

The **Basel Convention** establishes standards for the transboundary movement of hazardous waste, solid waste, and municipal incinerator ash, including notice to and written confirmation from the receiving country prior to export. As of 2000, approximately 155 countries were party to the Convention. Although the United States is not currently a party to the Basel Convention, the Convention still affects U.S. importers and exporters in the following manner. Parties to the Basel Convention cannot trade Basel-covered wastes with nonparties in the absence of a bilateral or multilateral agreement (in this case, a separate agreement between countries or groups of countries to govern the transboundary movement of waste). As a result, U.S. businesses, as a practical matter, can only import waste from and export waste to those Basel countries with which the U.S. government has negotiated a separate waste trade agreement. Those countries with which the United States has entered into such bilateral agreements for import and export include Canada and Mexico. Those countries with which the United States has entered into a bilateral agreement for import include Malaysia, Costa Rica, and the Phillipines.

Organization for Economic Cooperation and Development Council Decision

The **OECD Council Decision** is another multilateral agreement that establishes procedural and substantive controls for the import and export of hazardous waste recyclables between OECD member nations. The agreement is intended to ease the trade of such recyclables and minimize the possibility that such wastes will be abandoned or handled illegally. As of 2000, there were 30 member countries in the OECD. Since the United States is a member of OECD and is a party to the Decision, U.S. businesses can trade recyclables with other member OECD nations (including those that are also party to the Basel Convention). Please note, however, that transboundary movement between the United States and the countries of Canada, Mexico, Costa-Rico, Malaysia, and the Philippines is still governed by each individual bilateral agreement and not by the OECD Decision.

FARMER EXCLUSION

Although a farmer may be a generator of hazardous waste, waste pesticides disposed of on a farmer's own property in compliance with specified waste management requirements, including the disposal instructions on the pesticide label, are not subject to the generator requirements. This exclusion is intended to prevent the double regulation of farmers under both RCRA and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

SUMMARY

Hazardous waste generators regulated under RCRA fall into three categories, based on the amount of hazardous waste generated per calendar month:

- LQGs
- SQGs
- CESQGs.

LQGs and SQGs must:

- Identify and count waste
- Obtain an EPA ID number
- Comply with accumulation and storage requirements (including requirements for training, contingency planning, and emergency arrangements)
- Prepare the waste for transportation
- Track the shipment and receipt of such waste

- Meet recordkeeping and reporting requirements.

LQGs and SQGs may also be subject to LDR requirements.

CESQGs are not subject to most of the generator requirements applicable to LQGs and SQGs, but they must identify their hazardous waste, comply with storage limit requirements, and ensure waste treatment or disposal in an on-site or off-site:

- Permitted or interim status hazardous waste TSDF
- State hazardous waste facility
- State permitted, licensed, or registered solid waste disposal facility
- State MSWLF
- Recycling facility
- Universal waste facility.

Any person importing hazardous waste into the United States from a foreign country is subject to hazardous waste generator standards. RCRA also contains specific requirements for hazardous waste exports. Importers and exporters must also comply with the provisions of international trade treaties, such as the Basel Convention and the OECD Council Decision.

Because farmers disposing of certain pesticide wastes on their own land are subject to regulation under both RCRA and FIFRA, RCRA specifically excludes such farmers from the generator requirements.

ADDITIONAL RESOURCES

Additional information about hazardous waste generators can be found at www.epa.gov/epaoswer/hazwaste/gener/index.htm.

CHAPTER 4

REGULATIONS GOVERNING HAZARDOUS WASTE TRANSPORTERS

In this chapter…

OVERVIEW

Hazardous waste transporters play an integral role in the cradle-to-grave hazardous waste management system by delivering hazardous waste from its point of generation to its ultimate destination. Since such transporters are moving regulated wastes on public roads and highways, rails, and waterways, they are regulated not only by RCRA, but by DOT standards as well. To avoid regulatory discrepancies and redundant regulations, the hazardous waste transporter regulations were developed jointly by EPA and DOT. Although the regulations are integrated, they are not located in the same part of the CFR. DOT's Hazardous Materials Transportation Act regulations are found in 49 CFR Parts 171-179, while the RCRA Subtitle C transporter requirements are located in 40 CFR Part 263. This chapter summarizes only the RCRA Subtitle C transporter regulations. Please consult the DOT regulations for a complete understanding of hazardous waste transporter requirements.

WHO ARE THE REGULATED TRANSPORTERS?

A hazardous waste **transporter** under Subtitle C is any person engaged in the off-site transportation of hazardous waste within the United States, if such transportation requires a manifest. Off-site transportation of hazardous waste includes shipments from a hazardous waste generator's facility property to another facility for treatment, storage, or disposal. Regulated off-site transportation includes shipments of hazardous waste by air, rail, highway, or water.

Transporter regulations only apply to the off-site transport of hazardous waste. The transporter regulations do not apply to the on-site transportation of hazardous waste within a facility's property or boundary. On site refers to geographically contiguous properties, even if the properties are separated by a public road. Consequently, a facility may ship wastes between two properties without becoming subject to the hazardous waste transporter regulations, provided that the properties are contiguous.

Transporter requirements do apply to shipments between noncontiguous properties that require travel on public roads. Examples of such on-site transportation include generators and TSDFs transporting waste within their facilities, or on their own property.

REGULATORY REQUIREMENTS FOR TRANSPORTERS

A transporter of hazardous waste is subject to several regulations under RCRA and must:

- Obtain an EPA ID number
- Comply with the manifest system
- Properly handle hazardous waste discharges.

■ EPA Identification Number

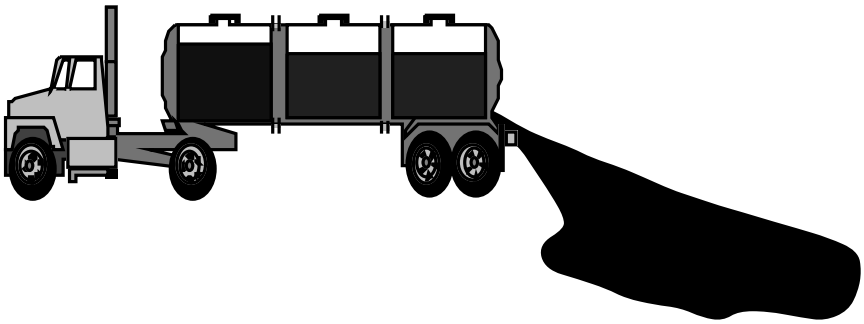
One way that EPA keeps track of hazardous waste transporters is by requiring each transportation company to obtain an EPA ID number. Without this ID number, the transporter is forbidden from transporting hazardous waste. Unlike generator EPA ID numbers, which are site-specific, transporter numbers are assigned to the transportation company as a whole. This means that each individual truck does not receive a unique number, but rather, uses the number issued to the company's headquarters location.

■ The Manifest

With the exception of water and rail shipments and the transport of certain SQG recycling wastes, a transporter may not accept hazardous waste from a generator unless the waste is accompanied by a properly prepared manifest. Upon receiving the waste, the transporter must sign and date the manifest to acknowledge receipt and return a copy to the generator before leaving the generator's property. A copy of the manifest must accompany the shipment of the waste at all times. Once a transporter has accepted a waste, the transporter is required to deliver the entire quantity of waste to the next designated transporter or to the designated facility. Upon turning the waste over to another transporter or to the designated facility, the transporter is required to have the manifest signed and dated by the recipient. All transporters are required to keep a signed copy of the manifest for three years from the date the initial transporter accepted the waste. If the waste cannot be delivered as the manifest directs, the transporter must contact the generator and receive further instructions on whether to return the waste or take it to another facility.

These manifest requirements are slightly different for water and rail transporters. Water and rail transporters must comply with the directions on the manifest, obtain an EPA ID number, and must be listed on the manifest, but the manifest is not required to physically accompany the waste shipment at all times. Instead, both water and rail transporters can use another shipping document instead of the manifest, provided that it contains the same information as the manifest (excluding the EPA ID number, generator certification, and signatures). The initial water or rail transporter must sign and date the manifest or shipping document and ensure that it reaches the designated facility, and the final water or rail transporter must ensure that the owner and operator of the designated facility signs the manifest or shipping paper. Intermediate water and rail transporters are not required to sign the manifest or shipping paper.

Because one of the primary goals of RCRA is to foster resource recovery and recycling, the transporter regulations contain a special exemption



from the manifest requirements for transporters who handle certain recycled (or reclaimed) wastes generated by SQGs. This exemption is intended to facilitate the recycling of small quantities of hazardous wastes that are transported in a protective manner. To qualify for this exemption, the waste must be reclaimed under a contractual agreement between the SQG and a recycling facility. The agreement must specify the type of waste reclaimed and the frequency of shipments. In addition, the vehicle used to transport the waste must be owned and operated by the recycling facility. Both the generator and transporter are responsible for keeping a copy of the reclamation agreement on file for three years after the agreement ends.

In May 2001, EPA proposed revisions to the manifest form and regulations. EPA expects to standardize the content and appearance of the current manifest form, Forms 8700-22 and 22a, so that the same form could be used by waste handlers nationwide. Other anticipated changes include improved tracking procedures for problem shipments and an option to complete, send, and store the manifest information electronically. If finalized, the regulations for generators and transporters in Parts 262 and 263 will be affected by this proposal.

■ Handling Hazardous Waste Discharges

Even though the regulations are designed to ensure that hazardous waste shipments are conducted safely, the transportation of hazardous waste can still be dangerous as there is always the possibility that an accident may occur. To address this possibility, the regulations require transporters to take immediate action to protect human health and the environment if a release occurs (e.g., notifying local authorities and diking the discharge area). When a serious accident or spill occurs, the transporter must notify the National Response Center (NRC) by phone. The Centers for Disease Control (CDC) must also be informed if the spill involves disease-causing agents.

The regulations also authorize certain federal, state, or local officials to handle transportation accidents. Specifically, if immediate removal of waste is necessary to protect human health or the environment, one of these officials may authorize a nonmanifested removal of the waste by a transporter without an EPA ID number.

TRANSFER FACILITIES

Transporters accepting hazardous waste from a generator or another transporter may need to hold waste temporarily during the normal course of transportation. A **transfer facility** is defined as any transportation-related facility, such as loading docks, parking areas, storage areas, and other similar areas where shipments are held during the normal course of transportation. A transporter may hold waste at a transfer facility for up to 10 days.

ADDITIONAL REGULATORY REQUIREMENTS

Even though transporters are regulated under Part 263 of the RCRA regulations and DOT provisions, there are certain situations when a transporter may be subject to additional RCRA regulatory requirements. For example, if a transporter stores waste at a transfer facility for more than 10 days, the transfer facility becomes a storage facility subject to all applicable requirements for TSDFs (including permitting).

In other situations, a transporter may be subject to RCRA hazardous waste generator requirements. For example, transporters may import hazardous waste into the United States, thus causing the waste to become subject to the RCRA regulations. Also, transporters may mix separate hazardous wastes with different DOT shipping descriptions into a single container, thus physically producing a hazardous waste. In these instances, transporters are responsible for complying with the RCRA hazardous waste generator provisions (as discussed in Section III, Chapter 3).

SUMMARY

A regulated transporter is defined under Subtitle C as any person engaged in the off-site

transportation of hazardous waste, if such transportation requires a manifest. The transporter regulations do not apply to the on-site transportation of hazardous waste within a facility's property boundary.

Transporters of hazardous waste must comply with both EPA and DOT regulations. The RCRA Subtitle C regulations require a transporter to:

- Obtain an EPA ID number
- Comply with the manifest system
- Properly handle hazardous waste discharges.

During the normal course of transportation, transporters may hold waste temporarily (for up to 10 days) at a transfer facility.

Transporters of hazardous waste may also be subject to Subtitle C generator or storage facility requirements (e.g., if the transporter stores waste at a transfer facility for more than 10 days or imports hazardous waste into the United States).

CHAPTER 5

REGULATIONS GOVERNING TREATMENT, STORAGE, AND DISPOSAL FACILITIES

In this chapter…

OVERVIEW

Treatment, storage, and disposal facilities (TSDF) are the last link in the cradle-to-grave hazardous waste management system. The requirements for TSDFs, located in 40 CFR Parts 264 and 265, are more extensive than the standards for generators and transporters. They include general facility operating standards, as well as standards for the various types of units in which hazardous waste is managed. General facility standards address good management practices for

any facility engaged in hazardous waste management. The technical standards go beyond these requirements to ensure that all elements of the TSDF are constructed and operated to prevent leaks of hazardous waste into the environment. The technical standards also address the diversity of hazardous waste operations being conducted around the country by guiding facilities in the proper design, construction, operation, maintenance, and closure of a variety of hazardous waste treatment, storage, and disposal units. These unit standards include requirements for a wide range of hazardous waste management units, from containers (e.g., 55-gallon drums) to landfills, in order to ensure that these units handle waste safely and effectively.

WHAT IS A TSDF?

With some exceptions, a TSDF is a facility engaged in one or more of the following activities:

- **Treatment** – Any method, technique, or process designed to physically, chemically, or biologically change the nature of a hazardous waste
- **Storage** – Holding hazardous waste for a temporary period, after which the hazardous waste is treated, disposed of, or stored elsewhere
- **Disposal** – The discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid or hazardous waste on or in the land or water. A disposal facility is any site where hazardous waste is intentionally placed and where the waste will remain after a TSDF stops operation.

To help owners and operators of new and existing TSDFs comply with new RCRA regulations, RCRA divides them into two categories: permitted (new) and interim status (existing).

■ Permits and Interim Status

When Congress enacted RCRA in 1976, it directed EPA to develop standards for new TSDFs (those built after the standards were established) and for facilities that were already in operation. Congress further required that the standards for both new and existing facilities differ only where absolutely necessary.

New TSDFs, those facilities constructed after the regulations were promulgated, must be designed and built to meet the standards EPA deemed necessary to protect human health and the environment. To handle hazardous waste, a new facility must obtain a permit, in accordance with provisions in 40 CFR Part 270, before it begins operation. These facilities are called **permitted facilities**. (Permitting is fully discussed in Section III, Chapter 8.) The permit lays out the standards and requirements applicable to the specific activities conducted at that facility, including both the general facility standards and the standards applicable to each type of unit at the facility. The requirements for these facilities are located in 40 CFR Part 264.

On the other hand, facilities already in existence and operating may not immediately be able to meet the design and operating standards for new facilities. For example, when RCRA was enacted, existing hazardous waste management facilities immediately became subject to regulation, while other existing facilities managing nonhazardous waste were brought into RCRA by regulatory changes that made these wastes hazardous. For both sets of TSDFs, EPA created a special category of regulations to allow these facilities to gradually come up to speed with the standards for permitted facilities. These facilities are called **interim status facilities**. While in interim status, facilities must comply with these separate standards, which are often less stringent than the standards for permitted facilities and are not tailored to individual sites, until they receive their permit. The requirements for these facilities are located in 40 CFR Part 265.

While the standards for permitted facilities are often similar to those for interim status facilities, there are circumstances where the standards for new facilities would be impracticable for existing facilities to implement immediately. This chapter will focus primarily on the standards for permitted facilities, contrasting them with the standards for interim status facilities where appropriate.

Exemptions

In order to promote certain beneficial activities or to avoid overlapping with the requirements of other parts of RCRA or other environmental laws, RCRA exempts certain types of facilities or operations from the standards for permitted and interim status TSDFs.

Permits-by-Rule

Facilities that have permits for certain activities under other environmental laws may qualify for a special form of a RCRA permit, known as a **permit-by-rule**. These activities include ocean disposal of hazardous wastes regulated under the Marine Protection, Research, and Sanctuaries Act (MPRSA); underground injection of hazardous wastes regulated under the Safe Drinking Water Act (SDWA); and treatment of hazardous wastewaters in a POTW regulated under CWA. Under this exemption, the facility's non-RCRA permit serves in place of a RCRA permit, provided the facility is in compliance with that permit and other basic RCRA administrative requirements. (Permits-by-rule are fully discussed in Section III, Chapter 8.)

Conditionally Exempt Small Quantity Generator Waste

Facilities that treat (including recycle), store, or dispose of only hazardous waste generated by CESQGs are excluded from the TSDF standards. RCRA requires that such facilities be permitted, licensed, or registered by the state to handle nonhazardous industrial or municipal solid waste, or qualify as a recycling facility. (CESQGs are fully discussed in Section III, Chapter 3.)

Recyclable Materials

RCRA provides separate, reduced regulations for TSDFs recycling certain materials. These recycling facilities are generally exempt from the TSDF standards, but may be required to comply with streamlined hazardous waste management requirements. These reduced provisions apply to facilities recycling:

- Precious metals
- Lead-acid batteries
- Used oil
- Hazardous waste burned in boilers and industrial furnaces.

For other recyclable materials, there are no special requirements. For example, facilities recycling the following materials are exempt from all TSDF standards:

- Industrial ethyl alcohol
- Used batteries returned to the manufacturer for regeneration
- Scrap metal
- Fuels produced from refining oil-bearing hazardous wastes
- Oil reclaimed from hazardous waste.

(Recyclable materials are fully discussed in Section III, Chapter 2.)

Generators

Generators accumulating waste on site in accordance with the generator regulations do not need a permit and do not have to comply with the permitted TSDF standards. They must comply with only those interim status standards specified in the generator regulations. On the other hand, if SQGs or CESQGs exceed their respective storage limits, or if LQGs or SQGs exceed their respective accumulation time limits, the facility becomes a storage facility subject to all applicable requirements for TSDFs (including permitting). (Generators are fully discussed in Section III, Chapter 3.)

Farmers

Farmers disposing of pesticide wastes on their own property in compliance with the disposal instructions on the pesticide label are also not subject to the TSDF standards. Congress did not want to regulate farmers under both RCRA and FIFRA. Therefore, farmers meeting these management conditions are exempt from the TSDF standards.

Totally Enclosed Treatment Units

Totally enclosed treatment units (TETUs) are designed and constructed to eliminate the potential for hazardous wastes to escape into the environment during treatment. If directly connected to an industrial production process, and treatment prevents the release of hazardous constituents into the environment, TETUs are exempt from the TSDF standards.

Elementary Neutralization Units

Elementary neutralization units (ENUs) are containers, tanks, tank systems, transportation vehicles, or vessels that neutralize wastes that are hazardous only for exhibiting the characteristic of corrosivity (D003). Neutralization in such units is exempt from the TSDF standards. However, neutralization in other types of units is regulated.

Wastewater Treatment Units

Wastewater treatment units (WWTUs) are tanks or tanks systems that treat hazardous wastewaters and discharge them pursuant to CWA (e.g., the discharge is sent to a POTW or to surface water under a NPDES permit). Such units are exempt from the TSDF regulations.

Emergency Response

Treatment, storage, and disposal activities that are part of an emergency response action taken to immediately contain or treat a spill of hazardous waste are exempt from TSDF standards. On the other hand, any treatment, storage, or disposal after the emergency situation has passed is subject to full regulation. Likewise, any hazardous waste generated during an emergency action must be managed in accordance with the generator standards.

Transfer Facilities

A transfer facility is a transportation-related facility, including loading docks and parking and storage areas, where shipments of hazardous waste are temporarily held during the normal course of transportation. A transfer facility temporarily storing a manifested shipment of hazardous waste for less than 10 days before transfer to the next designated facility is not subject to the TSDF standards. On the other hand, if transporter storage at a transfer facility exceeds 10 days, the transfer facility becomes a storage facility subject to all applicable requirements for TSDFs (including permitting). (Transfer facilities are fully discussed in Section III, Chapter 4.)

Adding Absorbent

Because liquid hazardous wastes are not allowed in a landfill, absorbents must be added to the container to remove the visible liquids. Adding absorbent to hazardous waste may be considered hazardous waste treatment, thus triggering the TSDF standards. However, to promote the reduction of the amount of liquid hazardous waste sent to landfills, the regulations for hazardous waste treatment do not apply to a facility adding absorbent to waste when the waste is first put into a container. Subsequent addition of absorbent is not covered under this exemption and may be considered treatment subject to the TSDF standards.

Universal Waste Handlers

Handlers and transporters of recycled batteries, pesticides, mercury thermostats, and lamps are exempt from the TSDF standards. (Universal wastes are fully discussed in Section III, Chapter 2.)

GENERAL FACILITY STANDARDS

If a TSDF is not exempt under any of these provisions, then it must comply with the standards for fully regulated TSDFs. These standards cover good management practices, including keeping track of the amount and type of wastes entering the facility, training employees to safely manage hazardous waste, and preparing to avoid hazardous waste emergencies.

■ EPA Identification Numbers

As with generators and transporters of hazardous waste, TSDF owners and operators are required to notify EPA of the types of hazardous waste they plan to treat, store, or dispose of by applying for an EPA ID number.

Waste Analysis

To keep track of the wastes being sent for treatment, storage, or disposal, TSDF owners and operators must analyze waste shipments. The TSDF's permit will list the types of hazardous waste that a facility is allowed to treat, store, or dispose. Analyzing the waste received ensures that the facility only handles wastes they are permitted to handle, and ensures that the wastes are treated, stored, or disposed properly. A **waste analysis plan** outlines the procedures necessary to ensure proper treatment, storage, or disposal. The plan must be written, kept on site, and answer six basic questions:

- How will the TSDF know if the waste received is the same as that described on the manifest?
- Which waste constituents should the TSDF analyze?
- How should the samples be taken?
- What testing and analytical methods should the facility use?
- How often should the waste be retested?
- What are the acceptance and rejection criteria for each wastestream?

The waste analysis must be repeated periodically to ensure that the information on a given waste is accurate and current. At a minimum, the waste analysis must be repeated when the TSDF is notified or has reason to believe that the process or operation generating the hazardous waste has changed, and when inspection indicates that the hazardous waste received does not match the information on the accompanying manifest.

Security

Security provisions are intended to prevent accidental or unauthorized entry into the active portion of a facility (i.e., where hazardous waste is treated, stored, or disposed). Unless the TSDF owner and operator demonstrates to the implementing agency that livestock or unauthorized persons who enter the facility will not be harmed and will not interfere with compliance with the regulations, the facility must install the following security measures:

- A 24-hour surveillance system that continuously monitors and controls entry onto the active portion of the facility (e.g., television monitoring, guards)

OR

- An artificial or natural barrier (e.g., a fence) that completely surrounds the active portion of the facility and serves as a means to control entry to the active portion of the facility at all times through gates or entrances
- A sign reading: "Danger — Unauthorized Personnel Keep Out" at each entrance to the active portion of the facility. The sign must be written in English and any other language that is predominant in the area surrounding the facility. Alternative language conveying the same message may also be used.

Inspection Requirements

To make sure that the facility is operating properly, the TSDF owner and operator must visually inspect the facility for malfunction, deterioration, operator errors, and leaks. The inspections should follow a written inspection schedule developed and followed by the owner and operator. The schedule identifies the types of problems to be checked and how often inspections should be conducted. Areas where spills are more likely to occur, such as loading and unloading areas, must be inspected daily when in use. Unit-specific inspections or requirements also must be included in the schedule. The owner and operator must record inspections in a log or summary and must remedy any problems identified during inspections.

Personnel Training

To ensure that employees at the facility understand the risks posed by management of hazardous waste and are prepared to respond in case of an emergency, TSDF owners and operators must provide training. The training program must be completed six months from the date the facility is

subject to the TSDF standards, or six months after the date a worker is newly employed. This training program must be reviewed annually.

■ Requirements For Ignitable, Reactive, or Incompatible Waste

To avoid dangerous accidents, fires, or explosions, special care must be taken in handling ignitable, reactive, or incompatible wastes. TSDF owners and operators handling ignitable and reactive wastes must be able to demonstrate that these wastes are protected from ignition sources. Such protection includes "No Smoking" signs placed where ignitable and reactive wastes are stored, designation of separate smoking areas, and additional handling requirements. Similarly, owners and operators must take precautions against the combined storage of wastes that might react dangerously with one another, or with the unit in which they are stored. Such a reaction might be a fire or explosion, or the release of toxic dusts, gases, or fumes. To determine if particular wastes or storage units are compatible, the RCRA regulations list some common potentially incompatible wastes (40 CFR Part 264, Appendix V). For compatibility of wastes not listed in the regulations, the owner or operator may need to test the waste and the unit for compatibility.

■ Location Standards

Certain types of terrain may increase the dangers associated with managing hazardous waste. To protect people and the environment around these areas, RCRA imposes restrictions on where TSDFs can be built. The location standards for building new TSDFs include restrictions on siting TSDFs in floodplains or earthquake-sensitive areas. Additionally, TSDF owners and operators may not place noncontainerized or bulk liquid hazardous waste in a salt dome, salt bed formation, or underground mine or cave. Congress has granted one exception to this rule: DOE's Waste Isolation Pilot Project (WIPP) in New Mexico.

PREPAREDNESS AND PREVENTION

The preparedness and prevention standards are intended to minimize and prevent emergency situations at TSDFs, such as a fire, an explosion, or any unplanned release of hazardous waste or hazardous waste constituents to the air, soil, or surface water. These regulations require maintenance and routine testing of emergency equipment, alarms, minimum aisle space (to accommodate movement of personnel and equipment during emergencies), and provisions for contacting local authorities (police, fire department, hospitals, and emergency response teams) involved in emergency responses at the facility.

CONTINGENCY PLANS AND EMERGENCY PROCEDURES

Because emergencies cannot always be avoided, a TSDF must be prepared to respond. Contingency plans and emergency procedures provide the owner and operator with mechanisms to respond effectively to emergencies. The goal of these requirements is to minimize hazards resulting from fires, explosions, or any unplanned release of hazardous waste or constituents to air, soil, or surface water. To help guide these activities, the owner and operator must maintain a written contingency plan at the facility, and must carry out that plan immediately in the event of an emergency.

■ Contingency Plan

The contingency plan describes emergency response arrangements with local authorities and lists the names, addresses, and telephone numbers of all facility personnel qualified to work with local authorities as emergency coordinators. Where applicable, the plan might also include a list of emergency equipment and evacuation plans. If the owner and operator has already prepared an emergency or contingency plan in accordance with other regulations (e.g., the Spill Prevention, Control, and Countermeasures (SPCC) rules as discussed in Section VI, Chapter 1), they can amend the existing

plan to incorporate hazardous waste management provisions.

The contingency plan must be reviewed and amended when the applicable regulations or facility permits are revised, if the plan fails in an emergency, or when there are changes to the facility, the list of emergency coordinators, or the list of emergency equipment. A copy of the contingency plan (and any revisions) must be maintained at the facility and provided to all local authorities who may have to respond to emergencies.

■ Emergency Coordinator

To guide emergency response activities, the TSDF owner and operator must designate an emergency coordinator. The emergency coordinator is responsible for assessing emergency situations and making decisions on how to respond. There must be at least one employee either on the facility premises or on call with the authority to commit the resources needed to carry out the contingency plan.

■ Emergency Procedures

During an emergency, measures must be taken to ensure that fires, explosions, and releases do not occur, recur, or spread. In the event of an imminent or actual emergency situation, the emergency coordinator must immediately activate internal facility alarms or communication systems and notify appropriate state and local authorities. If the coordinator determines that the emergency threatens human health or the environment outside of the facility and finds that evacuation of local areas may be advisable, the coordinator must notify appropriate authorities, and either the designated government official for the area or the National Response Center.

MANIFEST, RECORDKEEPING, AND REPORTING

To keep track of hazardous waste activities, TSDF owners and operators must keep records and make reports to EPA. The manifest system tracks each off-site shipment of hazardous waste. The operating record and biennial report detail facility and waste management over time.

■ Manifest

When a waste shipment is received from off site, the TSDF owner and operator must sign and date all copies of the manifest to verify that the waste has reached the appropriate designated facility. The TSDF must keep a copy for its records and send a copy to the generator within 30 days to verify that the waste has been accepted. If the owner and operator of a TSDF must send the waste to another TSDF for further treatment or disposal, they must initiate a new manifest.

■ Operating Record

To keep track of hazardous waste activity at the facility, the owner and operator is required to keep, until the facility closes, a written operating record on site describing all waste received; methods and dates of treatment, storage, and disposal; and the wastes' location within the facility. All information should be cross-referenced with the manifest number. Other information that the TSDF must keep in its operating record includes:

- Waste analysis results
- Details of emergencies requiring contingency plan implementation
- Inspection results (required to be kept for three years).

While most records may be kept on computer or microfiche, the TSDF owner and operator must keep original, signed copies of all manifests for inspection purposes. All records and plans must be available for inspection.

■ Biennial Report

To track hazardous waste activity nationwide, RCRA requires TSDFs to report to EPA the types and amounts of hazardous wastes generated, received, treated, stored, and disposed. TSDFs that generate hazardous waste through the course of on-site treatment, storage, or disposal must also

describe waste minimization efforts taken to reduce the volume and toxicity of wastes generated, as well as describe the changes in volume or toxicity actually achieved, compared with those achieved in previous years. Reports are due to the EPA Regional Administrator on March 1 of each even-numbered year, and must detail the waste managed during the previous (odd-numbered) year. For example, the biennial report covering 2001 activities would be due March 1, 2002. Additionally, some states may require submission of such reports annually. Each owner and operator should consult their state agency for more specific biennial reporting information.

■ Additional Reports

Other reports that must be supplied to the implementing agency include, but are not limited to, reports of releases, fires and explosions, ground water contamination and monitoring data, and facility closure information. Spills may also trigger reporting requirements under CERCLA, and the Emergency Planning and Community Right-to-Know Act (EPCRA). (CERCLA and EPCRA are fully discussed in Section VI.)

STANDARDS FOR HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL UNITS

Hazardous waste managed at TSDFs may be treated, stored, or disposed of in several different types of units. In order to ensure that hazardous wastes are managed properly and in a safe manner, RCRA imposes design, construction, operation, maintenance, closure, and financial assurance requirements on hazardous waste management units.

Some of these units treat, store, or dispose of hazardous waste in or on the ground. Because these land-based units (i.e., land treatment units, landfills, surface impoundments, and waste piles) manage waste directly on the land, they have the potential to generate hazardous leachate that can pose a serious threat to soil, surface water, ground water, and human health and the environment.

To minimize the potential for leachate to threaten human health and the environment, EPA developed design and operating standards that use a combination of different technologies and good operating practices to detect, contain, and clean up any leaks that might occur.

Waste management not only has the potential to threaten ground water, surface water, and soil, but air as well. In order to minimize the risks that hazardous waste management poses to air, RCRA includes standards to control air emissions from certain hazardous waste management operations and units.

■ Containers

Containers are one of the most commonly used and diverse forms of hazardous waste storage. A container is any portable device in which a material is stored, transported, treated, or otherwise handled. Examples of hazardous waste containers include, but are not limited to: 55-gallon drums, large tanker trucks, railroad cars, small buckets, and test tubes. When EPA promulgated the unit-specific requirements for hazardous waste containers, the Agency emphasized that although mismanagement of containers has caused severe contamination in the past, relatively few regulations would be needed to ensure proper management. As a result, the container standards consist of very streamlined and basic management requirements.

Design Standards

Containers must be in good condition. Containers that are deteriorating (e.g., cracked, rusted, or leaking) cannot be used. Waste stored in defective containers must be transferred to containers in good condition or managed in another type of unit.

Operating Requirements

To prevent containers from spilling their contents, containers holding hazardous waste must be kept closed, except when adding or removing waste. In addition, containers must not be handled, opened, or stored in a way that might cause them to leak.

Inspections

In order to ensure that containers are being managed in compliance with these regulations, owners and operators must visually inspect container storage areas at least weekly for leaking and deteriorating containers.

Release Prevention and Response

To further prevent releases of hazardous waste into the environment, containers holding liquid hazardous wastes must have a secondary containment system. Secondary containment is emergency short-term storage designed to hold leaks from hazardous waste management units. An example of a secondary containment system is a sloped concrete pad that drains leaked waste into a tank. The secondary containment system must be free of cracks, able to contain the spill, and emptied quickly. Containers at interim status facilities do not have secondary containment requirements.

Special Wastes

When handled improperly, some wastes can ignite or explode. To protect communities near the facility from these dangers, containers holding ignitable or reactive wastes must be located at least 50 feet from the facility's property line.

Other Requirements

In addition to these requirements, containers storing or treating certain hazardous wastes are subject to RCRA air emission control requirements (as discussed later in this chapter). LQGs and SQGs accumulating waste in containers are subject to the interim status TSDF standards for these units. SQGs, however, are not subject to the air emission control requirements. (Generator requirements are fully discussed in Section III, Chapter 3.)

■ Containment Buildings

A **containment building** is a completely enclosed self-supporting structure (i.e., with four walls, a roof, and a floor) used to store or treat noncontainerized waste. Containment buildings are generally used for the management of hazardous waste debris and other bulky and high volume hazardous wastes, but may be employed for the management of any nonliquid hazardous waste.

Design Standards

The design standards for containment buildings stress structural soundness and hazardous waste leak prevention. To ensure that a containment building meets these standards, a professional engineer must certify that the unit is designed and installed according to the following specifications:

- The containment building must be completely enclosed with four walls, a floor, and a roof.
- The floor, walls, and roof must be constructed of man-made materials with enough strength to withstand movement of wastes, personnel, and heavy equipment within the building.
- Dust control devices, such as air-lock doors or negative air pressure systems (that pull air into the containment building) must also be used as necessary to prevent hazardous waste dust from escaping through these building exits.
- All surfaces in the containment building that come into contact with wastes during treatment or storage must be chemically compatible with such wastes. Incompatible wastes that might cause unit failure cannot be placed in containment buildings.

If the containment building is used to manage hazardous waste with visible liquids, or if waste treatment being conducted in the building requires the addition of liquids to the waste, the owner and operator must equip the unit with the following:

- A primary barrier constructed of materials to prevent migration of the waste into the barrier
- A liquid collection system to minimize standing liquids in the containment building and to facilitate liquid removal
- A leak detection system located immediately beneath the floor to indicate any weakness in the floor and leaks of hazardous waste from the unit
- A secondary barrier, such as a liner, constructed around the unit to contain any leaks and to

facilitate cleanup before they reach nearby soils, surface water, or ground water. As with the unit floor, the secondary barrier must be structurally sound and chemically resistant to wastes and liquids managed in the containment building.

Some containment buildings designate certain areas (known as wet areas) for the management of liquid-containing wastes. Such buildings only need secondary containment for these wet areas, provided that waste liquids cannot migrate to the dry areas of the containment building.

Operating Requirements

Containment building operating requirements focus primarily on maintenance and inspection of the unit, recordkeeping requirements, and provisions for response to releases of hazardous waste. Among other requirements, owners and operators must:

- Maintain the floor so that it is free of significant cracks, corrosion, or deterioration
- Repair or replace surface coatings or liners that are subject to wear from movement of waste, personnel, or equipment as often as needed
- Limit the height of wastes piled within the unit
- Maintain dust control devices at all openings to prevent emissions from the unit
- Provide a decontamination area within the containment building (e.g., an area for washing vehicles and equipment prior to leaving the building) to prevent the tracking of waste out of the unit.

Inspections

Containment buildings must be inspected at least once every seven days, with all activities and results recorded in the operating log. During inspection, the owner and operator should evaluate the unit's integrity and assess nearby soils and surface waters to detect any signs of waste release. For purposes of these inspections, the owner and operator should also consider information from monitoring or leak detection equipment.

Release Prevention and Response

If a release is discovered during an inspection or at any time, the owner and operator must take the leaking portion of the unit out of service and take all appropriate steps to repair the leak and contain the released waste. The owner and operator must also notify the EPA Regional Administrator of the release and of the proposed schedule for repair of the unit. Upon completion of all necessary repairs and cleanup, a qualified, registered, professional engineer must verify, to the EPA Regional Administrator, that the facility complied with the plan.

Other Requirements

LQGs accumulating waste in containment buildings are subject to the interim status TSDF standards for these units. (Generator requirements are fully discussed in Section III, Chapter 3.)

■ Drip Pads

Drip pads are engineering structures consisting of a curbed, free-draining base, constructed of nonearthen materials, and designed to convey wood preservative chemical drippage from treated wood, precipitation, and surface water run-on to an associated collection system at wood preserving plants. In the wood preserving process, preservative solutions are commonly applied to wood products using a pressure treating process. Once the preservative solution has been applied to the wood, it is removed from the process unit and excess solution is allowed to drip from the wood onto drip pads. The pads collect the drippage (along with rainwater and surface water that has entered the pad) and collects it in a tank, container, or other such unit until the waste may be recycled, treated, or disposed of (see Figure III-10).

Design Standards

The various elements of a drip pad must be designed and constructed to handle the wastes managed on the unit and prevent those wastes from leaking into the environment.

Pad

The owner and operator of the drip pad must construct the pad of nonearthen materials (e.g., concrete, metal) and ensure that the pad is strong enough to prevent collapse, cracking, or other failure. The surface of the pad must have a raised barrier (called a berm) around the perimeter to prevent waste from running off the pad. It must be sloped to help the drippage flow into the collection unit, and must either be treated with impermeable sealers, coatings, or covers to prevent liquid from seeping into the base, or have a liner with a leak detection and collection system.

Liquid Collection System

The liquid collection system must be designed to prevent overflow, allow facility personnel to easily remove waste from the unit, and comply with the hazardous waste tank standards. Where applicable, the liquid collection system must also be protected from rain water running into and out of the unit.

Liner and Leak Detection System

The liners and leak detection system for drip pads do not have specific technical design criteria, but must be structurally sound and chemically compatible with the preservative drippage, and must be able to signal releases from the drip pad at the earliest practicable time.

Operating Requirements

Generally, a drip pad must be free of cracks and show no signs of corrosion or other types of deterioration. Drip pads must be cleaned frequently to allow for inspections of the entire drip pad surface without interference from accumulated wastes and residues. In addition to occasional cleaning, drippage and precipitation from the liquid collection system must be emptied as often as necessary to prevent the waste from flowing over the curb around the unit. All collection tanks must also be emptied as soon as possible after storms to ensure that they do not overflow back onto the pad. Lastly, owners and operators must minimize the tracking of hazardous waste by personnel and vehicles.

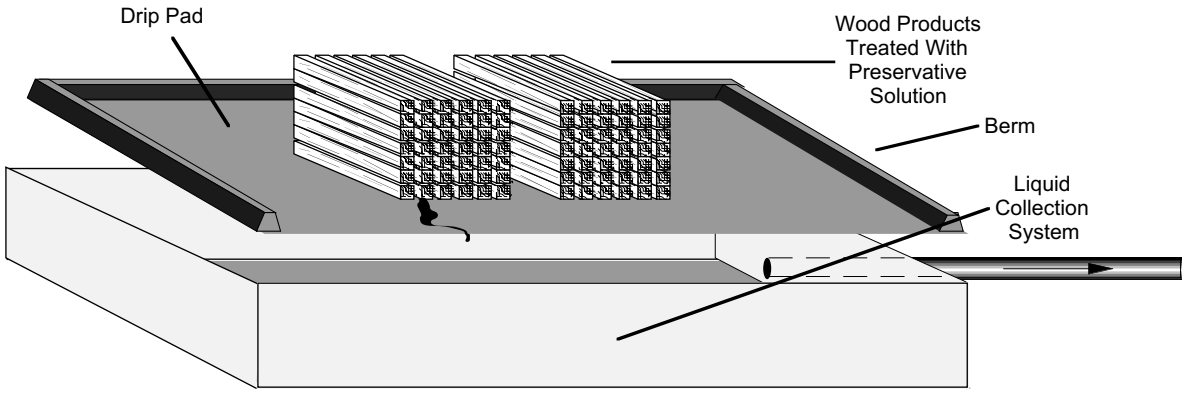
Inspections

Drip pads must be inspected weekly and after storms to ensure that the pad and the liquid collection systems are functioning properly and to check for deterioration of or leaks from the units. If, upon inspection, a drip pad shows any deterioration, the owner and operator must take the affected portion of the unit out of service for repairs before returning it to service.

Other Requirements

LQGs accumulating waste on drip pads are subject to the interim status TSDF standards for these units. (Generator requirements are fully discussed in Section III, Chapter 3).

Figure III-10: Cross-Section of a Drip Pad



Land Treatment Units

Land treatment units, or land farms, are seldom-used land disposal units. Land treatment involves the application of waste on the soil surface, or the incorporation of waste into the upper layers of the soil in order to degrade, transform, or immobilize hazardous constituents present in hazardous waste. The waste is placed in the portion of the surface soil above the water table (or the highest point of the ground water flow) to let the soil microbes and sunlight degrade the hazardous waste. Because these units utilize biodegradation as a method of hazardous waste treatment thus necessitating certain operating and waste management conditions, the design and operating requirements for land treatment units are quite different from other waste management units.

Design Standards

Land treatment units must be equipped with run-on, run-off, and wind dispersion controls. Run-on and run-off controls prevent rain water and other liquids from running onto the unit (and creating leachate) and stop this leachate from running off the unit, thus carrying contaminants into surrounding soils, surface waters, and ground water. Wind dispersal controls prevent wind gusts from blowing small particles of hazardous waste off a land treatment unit into the air and surrounding soils and surface water. To prevent wind dispersal, owners and operators of land treatment units must apply a wind dispersal control, such as a cover, to the unit.

Operating Requirements

The operating requirements for land treatment units are intended to promote and maintain the biodegradation of hazardous wastes placed in the unit. Maintenance of proper soil pH, careful management of waste application rate, and control of surface water run-off are all key to the operation of a land treatment unit. The operation requirements include:

- Controls on the rate and method of waste application
- Measures to control soil acidity
- Measures to enhance microbial and chemical reactions
- Measures to control the moisture content of the area where wastes are treated.

Treatment Program and Demonstration

In order to guarantee that these waste treatment practices will be conducted to properly degrade the waste, owners and operators of land treatment units must design a treatment program that takes into account the characteristics of the site and the wastes to be handled. The owner and operator must then demonstrate to EPA the effectiveness of this plan. A treatment demonstration may involve field testing on a sample soil plot or laboratory testing. Interim status land treatment units are not required to establish a treatment program, but owners and operators can only place hazardous waste in the land treatment unit if the waste will be rendered nonhazardous or less hazardous.

Food Chain Crops

In some cases, an owner and operator may grow food-chain crops (crops grown for human consumption) in a land treatment unit. The Agency believes that this can be done safely if the owner and operator can demonstrate that hazardous constituents are not present in the crop in abnormally high levels. Additionally, if cadmium is present in the unit, the owner and operator must comply with additional management standards.

Inspections

The owner and operator must inspect the treatment area weekly and after storms to ensure that the unit is in compliance with the operating criteria. In addition, the owner and operator must establish a soil monitoring program. If there is significant evidence that the wastes in the unit are not responding to treatment and are sinking towards the water table, the owner and operator must notify the EPA Regional Administrator within seven days, and modify the treatment program to ensure the sufficient treatment of hazardous constituents within the treatment zone.

Special Wastes

Certain types of hazardous wastes pose such a threat to human health and the environment that their management requires additional regulatory precautions. Considering the risks associated with the treatment, storage, and disposal of certain dioxin-containing hazardous wastes (F020, F021, F022, F023, F026, and F027), the RCRA regulations restrict the management of these wastes in land treatment units. As a result, owners and operators can only manage these wastes in a permitted land treatment unit in accordance with a special management plan approved by the EPA Regional Administrator. These wastes may not be handled in interim status land treatment units because these units do not meet the strict construction standards, and thus, may not be sufficiently protective.

■ Landfills

A **landfill** is a disposal unit where nonliquid hazardous waste is placed in or on the land. Landfills are the final disposal site, the ultimate grave, for a significant portion of the hazardous waste that is generated in the United States.

Design Standards

To minimize the potential for leachate to leak from a landfill, EPA developed the following design standards (see Figure III-11):

- Double liner
- Double leachate collection and removal system
- Leak detection system
- Run-on, run-off, and wind dispersal controls
- Construction quality assurance.

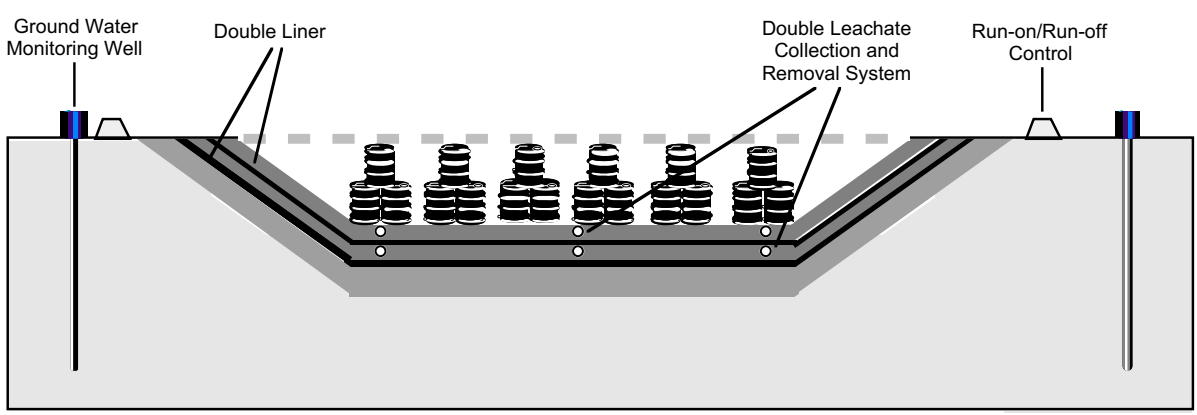
Double Liner

The double liner system has two components: a top liner and a composite bottom liner. The top liner, usually a synthetic material, keeps the liquid waste in the unit and prevents migration of hazardous leachate and waste into the liner. The composite bottom liner, consisting of a synthetic liner (made of a special kind of plastic) on top of three feet of compacted soil material, is designed to prevent any liquids that have leaked through the top liner from reaching underlying soils and ground water.

Double Leachate Collection and Removal System

Landfills must also be equipped with two leachate collection and removal systems. The first rests on the top liner, and the second between the top liner and the bottom composite liner. The top system collects any leachate that has filtered down through the waste in the unit and pumps it out to a collection tank, where it may be collected and disposed. The bottom system collects any leachate that has leaked through the top liner and similarly

Figure III-11: Cross-Section of a Landfill



pumps it out to a collection tank, where it may similarly be collected and disposed.

Leak Detection System

While the lower leachate collection and removal system will continually remove the small amounts of liquid that might seep through the top liner, it may not be capable of handling a larger leak. Larger leaks can apply strong pressure on the bottom liner, potentially causing it to fail. To avoid this problem, RCRA requires that a leak detection system be installed within the leachate collection and removal system. This system must be able to detect when the flow rate into the leachate collection and removal system is above a normal operating range, and warn the owner and operator that the top liner may be leaking.

Run-On, Run-Off, and Wind Dispersal Controls

The run-on, run-off, and wind dispersal requirements are identical to those for land treatment units.

Construction Quality Assurance

None of these technologies are effective if the landfill is installed improperly or constructed of inferior materials. To ensure that a landfill meets all the technological requirements, EPA requires a **construction quality assurance** program. The program mandates a construction quality assurance plan that identifies how construction materials and their installation will be monitored and tested and how the results will be documented. The program must be developed and implemented under the direction of a registered professional engineer, who must also certify that the construction quality assurance plan has been successfully carried out and that the unit meets all specifications before any waste is placed into the unit.

Operating Requirements

In order to prevent the formation and migration of leachate in landfills, owners and operators may not place liquid hazardous wastes in a landfill, unless the wastes are in:

- Very small containers, such as ampules
- Containers, such as batteries, that contain small amounts of liquid for purposes other than storage
- **Lab packs** which consist of drums filled with many small containers packed in nonbiodegradable absorbent materials.

Owners and operators may add nonbiodegradable absorbents to containers of liquid hazardous waste to remove any visible liquids. After all visible liquids have been removed, the owner and operator may then place the waste in a landfill.

Inspections

To ensure that the liners and leachate collection and removal systems are working properly, landfill owners and operators must:

- Inspect liners for any problems after construction or installation and continue inspections weekly and after storms to monitor for evidence of deterioration or damage
- Monitor leachate collection and removal system sumps at least weekly to measure the amount of liquid in the sumps and determine whether the upper liner might be leaking. This is designed to verify both the integrity of the liner and the efficiency of the leachate pump. If the level indicates a substantial leak, the owner and operator must notify EPA and respond in accordance with the facility's response action plan.

Release Prevention and Response

In order to prepare for a leak from a landfill, RCRA requires that owners and operators of hazardous waste landfills develop a response action plan. The response action plan outlines the short- and long-term actions to be taken in the event of a leak. A short-term action might involve shutting off the flow of hazardous waste into the landfill. A long-term action might involve emptying the unit and repairing or replacing the damaged liner or leachate collection and removal systems. As part of the plan, in the event of a leak, the owner and operator must notify the EPA Regional

Administrator, determine what short-term actions must be taken, determine the location, size, and cause of any leak, and report the findings to the EPA Regional Office.

Special Wastes

Similar to land treatment units, permitted landfills can only treat, store, or dispose of certain dioxin-containing hazardous wastes (F020, F021, F022, F023, F026, and F027) if the unit has a special management plan approved by the EPA Regional Administrator. These wastes cannot be managed in interim status landfills.

Special Requirements for Certain Containers in Landfills

Over time, the hazardous waste containers placed in a landfill will decompose and collapse, creating air pockets under the landfill cover. When the wastes surrounding the container settle to fill the void, the liner may also settle. Such settling may cause the liner to stretch or tear. To prevent significant voids that could cause collapse of final covers and tearing of liners when containers erode and to maintain and extend available capacity in hazardous waste landfills, containers placed in a landfill must either be:

- At least 90 percent full

OR

- Crushed, shredded, or in some other way reduced in volume (unless they are very small containers, such as ampules).

■ Surface Impoundments

A **surface impoundment** is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials (although it must be lined with man-made materials) that is used to treat, store, or dispose of liquid hazardous waste. Examples include holding ponds, storage pits, and settling lagoons.

Design Standards

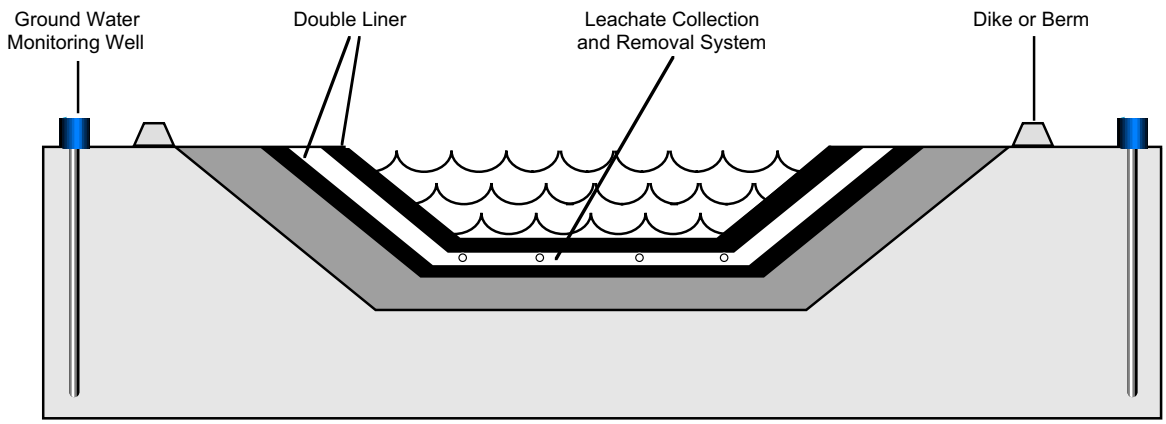
To minimize the potential for leachate to leak from a surface impoundment, EPA developed the following design standards (see Figure III-12):

- Double liner
- Leachate collection and removal system
- Leak detection system
- Dikes, berms, and freeboard
- Construction quality assurance.

Double Liner

The double liner system requirements are identical to those for hazardous waste landfills.

Figure III-12: Cross-Section of a Surface Impoundment



Leachate Collection and Removal System

The unit must be equipped with a leachate collection and removal system between the top liner and the bottom composite liner. The system collects any leachate that has leaked through the top liner and pumps it out to a collection tank. The system features a pump system and drainage layers to slow the flow of the leak. The system must be designed with a minimum bottom slope to help drainage, be made of materials that will not chemically react with the wastes placed in the unit, and be able to remove the liquids at a specified minimum rate.

Leak Detection System

The leak detection system requirements are identical to those for hazardous waste landfills.

Dikes, Berms, and Freeboard

A surface impoundment must also be designed to prevent the flow of liquids over the top of an impoundment (overtopping). This is accomplished by constructing and maintaining dikes or berms (walls or man-made hills surrounding the unit) and ensuring a minimum distance (called freeboard) between the surface of the waste and the top of the impoundment to prevent overflow during high winds or rainstorms.

Construction Quality Assurance

The construction quality assurance program requirements are identical to those for hazardous waste landfills.

Inspections

To ensure that the liners and leachate collection and removal system are working properly, owners and operators of hazardous waste surface impoundments must:

- Inspect liners and dikes or berms for any problems after construction or installation, and continue inspections weekly and after storms to monitor for evidence of deterioration, sudden drops in the level of the impoundment contents, and severe erosions of dikes and other containment devices
- Monitor leachate collection and removal system sumps at least weekly to measure the amount of liquid in the sump and determine whether the upper liner might be leaking. This is designed to verify both the integrity of the liner and the efficiency of the leachate pump. If the level indicates a substantial leak, the owner and operator must notify EPA and respond in accordance with the facility's response action plan.

Release Prevention and Response

The release prevention and response requirements are identical to those for hazardous waste landfills.

Special Wastes

Similar to land treatment units and landfills, permitted surface impoundments can only treat, store, or dispose of certain dioxin-containing hazardous wastes (F020, F021, F022, F023, F026, and F027) if the unit has a special management plan approved by the EPA Regional Administrator. These wastes cannot be managed in interim status surface impoundments.

Other Requirements

Other surface impoundment requirements include retrofitting provisions and air emissions requirements.

Surface Impoundment Retrofitting

Surface impoundments handling nonhazardous wastes are not subject to these extensive hazardous waste surface impoundment design and operating requirements. However, such impoundments may become subject to RCRA if the waste being handled in the unit becomes a hazardous waste as a result of a new hazardous waste listing or characteristic. In these cases, the owner and operator of the impoundment must retrofit the unit to meet the standards described above, or cease receipt of the hazardous waste and begin the closure process. Owners and operators have four years from the day that the listing or characteristic is finalized (in the *Federal Register*) to retrofit or close. For example, owners and operators of surface impoundments that

became subject to RCRA as the result of the promulgation of the toxicity characteristic waste codes on March 29, 1990, were required to retrofit those units to meet the design and operating standards, or cease receipt of hazardous waste and begin closure by March 29, 1994.

These retrofitting requirements may be waived by the implementing agency under special circumstances. The impoundment must be designed, operated, and located in such a manner that there will be no migration of hazardous constituents into ground water or surface water at any time. Furthermore, the impoundment may contain only characteristic TC wastes. The implementing agency will determine on a site-specific basis whether a waiver from the retrofitting requirement is protective of human health and the environment.

Air Emissions

In addition to these requirements, surface impoundments storing, treating, or disposing of certain hazardous wastes are subject to RCRA air emission control requirements (as discussed later in this chapter).

■ Tanks

Tanks are stationary devices (as opposed to portable containers) used to store or treat hazardous waste. They are widely used for storage or accumulation of hazardous waste because they can accommodate huge volumes of material, sometimes in the tens of thousands of gallons. Tanks are used for the treatment of hazardous waste because of their structural strength and versatility. In order to ensure that a tank system can hold hazardous waste for its intended lifetime, a TSDF owner and operator must ensure that the tank is properly designed. RCRA requires that the tank system or components be designed with an adequate foundation, structural support, and protection from corrosion to prevent it from collapsing or leaking. In order to ensure that a tank is properly designed, an independent, qualified, registered, professional engineer must certify that the unit meets these requirements.

Design Standards

Hazardous waste tanks must be installed properly and designed to protect against corrosion.

Installation

Because even the most flawlessly designed tanks can fail if installed improperly, new tank systems must be inspected by an independent qualified expert prior to use to ensure that the tank was not damaged during installation. The owner and operator must repair any damage before the installation is complete or the system is in use. All new tanks and ancillary equipment must be tested to make sure that there are no leaks, and any leaks discovered must be fixed before the tanks are covered, enclosed, or placed in use.

Corrosion Protection

When metal tanks are in contact with soil or water, they can corrode and leak. To prevent leaks from corroded tanks, RCRA requires tanks made wholly or partly of metal to be designed and installed with adequate corrosion protection. To ensure that a tank is properly protected, an owner and operator must develop a written design plan. The design should take into account information specific to the site, such as soil moisture and acidity, that can affect the corrosion rate of the tank. The unit must have one or more of the following corrosion protection methods:

- Construction materials that are corrosion-resistant (e.g., fiberglass)
- Corrosion-resistant coating in combination with cathodic protection (cathodic protection prevents tanks from corroding by reversing the naturally occurring electric current in the ground that can degrade tank walls)
- Electrical isolation devices.

Existing tanks do not have to meet these requirements because of the high cost of installing corrosion protection on tanks that are already in the ground. On the other hand, owners and operators of existing tanks must assess the structural integrity of the units to ensure that they are designed and maintained to contain the wastes stored or treated

within them without failing, collapsing, or rupturing. Such assessments must be certified by an independent, qualified, registered, professional engineer.

Operating Requirements

Hazardous waste tanks must be operated in a manner that minimizes or eliminates releases. Chemicals that may cause any part of the tank's system to fail may not be placed in the unit.

Because the loading or filling of tanks brings the potential for spills or releases of waste into the environment, such spills or overflows from the tank system must also be prevented by using, at a minimum:

- Spill prevention controls, such as valves designed to prevent the backflow of waste during fill-up of a tank
- Overfill prevention controls, such as alarms that sound when the waste level in the tank gets too high, and valve systems that automatically close when overfill is likely
- Sufficient room within an uncovered tank between the surface of the waste and the top of the tank (minimum freeboard).

Inspections

To verify that hazardous waste tanks and components are operated and maintained in satisfactory condition, owners and operators must inspect their tanks daily. To meet these objectives, inspections must thoroughly identify leaks, deterioration, corrosion, or structural fatigue in any portion of the tank or system components. In addition to visual inspections, owners and operators must also take into account any data received from leak detection monitors and other tests.

Release Prevention and Response

The release response requirements require leak detection systems to detect leaks, and secondary containment devices to contain any leaks that might occur from the tank or ancillary equipment (see Figure III-13). All new hazardous waste tank systems must have leak detection and secondary containment before being placed in service. Existing systems must be equipped with secondary containment by different deadlines, based on a phased-in schedule determined by the age of the tank.

Leak Detection

Hazardous waste tanks must be equipped with a leak detection system. The leak detection system must be able to detect failure in either the main tank or secondary containment system generally within 24 hours. Thermal conductivity sensors, electrical resistivity sensors, and vapor detectors are commonly used leak detection devices. Daily visual inspections may also be used where tanks and tank components are physically accessible.

Secondary Containment

To make sure the tank system will perform properly, secondary containment systems must be designed, installed, and operated to ensure that:

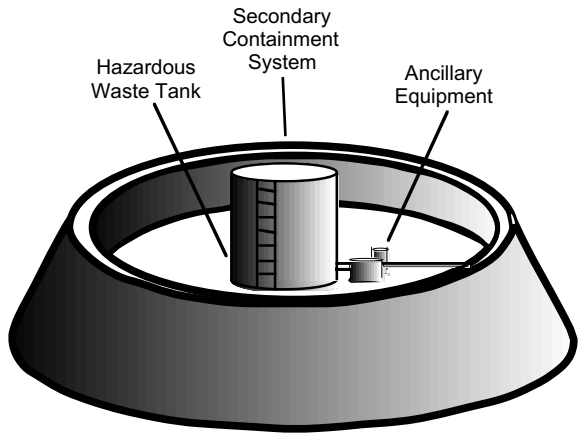
- No waste is released to the surrounding soil, ground water, or surface water
- Construction materials or liners are compatible with the waste to be stored or treated in the tank
- The tank is capable of containing accumulated material until it is promptly removed (generally within 24 hours)
- The tank has sufficient structural strength to prevent failure
- The foundation can resist failure due to normal movement of the surrounding soils (settlement, compression, or uplift).

Owners and operators must meet these requirements by using one of the following secondary containment devices:

- An external liner that completely surrounds the unit with an impermeable material
- A vault (the tank rests in an underground chamber usually constructed with concrete floors and walls and an impermeable cover)

- A double-walled tank (the tank is completely enclosed inside another tank with a leak detection monitoring system installed between the two)
- An EPA-approved alternative design.

Figure III-13: Secondary Containment for Tanks



In addition to the tank itself, all ancillary equipment (e.g., pipes, valves, trenches connected to the tank or tank system) must have full secondary containment. Examples of secondary containment for ancillary equipment include lined trenches, and jacketed or double-walled piping. When inspected daily, however, the following equipment is exempt from this requirement:

- Aboveground piping (not including flanges, joints, valves, and connections)
- Welded flanges, welded joints, and welded connections
- Seal-less or magnetic coupling pumps
- Aboveground pressurized piping systems with automatic shut-off devices.

Despite these precautions, occasionally a tank system or secondary containment system will leak or spill hazardous waste. When this happens, the owner and operator must immediately take the tank out of operation and determine the cause of the release. To prevent the spill from moving further away from the tank, the owner and operator must also remove and properly dispose of any contaminated soil, ground water, or surface water. In addition, the owner and operator must notify the EPA Regional Administrator or National Response Center, and submit a follow-up written report to the EPA Regional Administrator within 30 days. The tank must then either be repaired or closed.

Other Requirements

In addition to these requirements, tanks storing or treating certain hazardous wastes are also subject to RCRA air emission control requirements (as discussed later in this chapter). LQGs and SQGs accumulating waste on site in tanks are subject to the interim status TSDF standards for these units. (Generator requirements are fully discussed in Section III, Chapter 3.) SQGs, however, are not subject to the air emission control requirements.

■ Waste Piles

A **waste pile** is an open pile used for treating or storing nonliquid hazardous waste. The standards for these units are very similar to those for landfills, but the difference is that waste piles may be used for temporary storage and treatment only, not disposal.

Design Standards

To minimize the potential for leachate to leak from a waste pile, EPA developed the following design standards (see Figure III-14):

- Double liner
- Double leachate collection and removal system
- Leak detection system
- Run-on, run-off, and wind dispersal controls
- Construction quality assurance.

Double Liner

The double liner system requirements are identical to those for hazardous waste landfills and surface impoundments.

Double Leachate Collection and Removal System

The double leachate collection and removal system requirements are identical to those for hazardous waste landfills.

Leak Detection System

The leak detection system requirements are identical to those for hazardous waste landfills and surface impoundments.

Run-On, Run-Off, and Wind Dispersal Controls

The run-on, run-off, and wind dispersal control requirements are identical to those for hazardous waste landfills; however, interim status waste piles are not subject to the storm water controls, but are subject to wind dispersal controls.

Construction Quality Assurance

The construction quality assurance program requirements are identical to those for hazardous waste landfills and surface impoundments.

Operating Requirements

Under no circumstances can an owner and operator place liquid hazardous waste in a waste pile.

Inspections

The liner and leachate collection and removal system inspection requirements are identical to those for hazardous waste landfills.

Release Prevention and Response

The release prevention and response requirements are identical to those for hazardous waste landfills.

Special Wastes

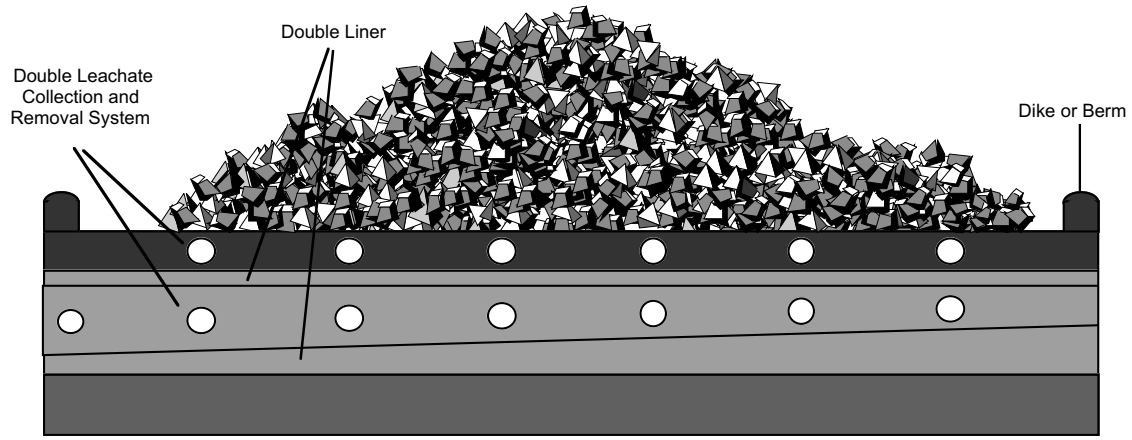
Similar to land treatment units, landfills, and surface impoundments, permitted waste piles can only treat, store, or dispose of certain dioxin-containing hazardous wastes (F020, F021, F022, F023, F026, and F027) if the unit has a special management plan approved by the EPA Regional Administrator. These wastes cannot be managed in interim status waste piles.

Other Requirements

Owners and operators of permitted waste piles that are located indoors and meet special requirements are subject to reduced regulation. Specifically, the waste pile must:

- Be located inside or under a structure
- Not receive liquid wastes
- Be protected from surface water run-on
- Be designed and operated to control dispersal of waste

Figure III-14: Cross-Section of a Waste Pile



- Be managed to prevent the generation of leachate.

If these standards are met, the owner and operator of the permitted waste pile is exempt from ground water monitoring requirements as well as the design and operation requirements for waste piles. RCRA provides this exemption because when properly designed and maintained, indoor waste piles can prevent hazardous leachate from forming or leaking into the environment.

■ Miscellaneous Units

When RCRA was enacted in 1976, there was a diverse universe of hazardous waste management units in existence. Some of these units did not fit the definition of any of the typical hazardous waste management practices described earlier in this chapter. These include physical, chemical, and biological treatment units; thermal treatment units; and underground injection control (UIC) wells. As a result, EPA established interim status standards for these units. When EPA established final permitted TSDF standards for all hazardous waste management units, the Agency did not establish final standards for physical, chemical, and biological treatment units or thermal treatment units, but rather grouped them together and permitted them as miscellaneous units. EPA did not include UIC wells in this miscellaneous unit category because such wells were later addressed under SDWA.

At present, all new hazardous waste management units that do not fit the definition of one of the types of units discussed earlier in this chapter or an incinerator or BIF (as discussed in Section III, Chapter 7) are permitted as miscellaneous units. This section of the chapter will present the management standards for such units. For historical purposes, this section of the chapter will also present the interim status standards for physical, chemical, and biological treatment units; thermal treatment units; and UIC wells.

Because the standards for miscellaneous units address treatment, storage, and disposal processes that are not addressed by other unit-specific standards, the following management standards consist of general operating requirements that may be modified and amended based on site-specific considerations.

Permitted Miscellaneous Units

Since some TSDFs treat, store, or dispose of waste in units that are different from the previously described hazardous waste management units, RCRA established broad and protective management provisions for miscellaneous units to allow for the use of new and innovative waste management technologies. The RCRA standards are designed to give the implementing agency the flexibility to tailor permit standards, on a case-by-case basis, to these unique waste management practices.

Miscellaneous units are defined as treatment, storage, or disposal units other than:

- Containers, containment buildings, drip pads, land treatment units, landfills, surface impoundments, tanks, or waste piles (as discussed in this chapter)
- Incinerators or BIFs (as discussed in Section III, Chapter 7)
- Corrective action management units (CAMUs) (as discussed in Section III, Chapter 9)
- Units permitted for research, development, and demonstration (RD&D) (as discussed in Section III, Chapter 8)
- UIC wells.

Based on this definition, miscellaneous units may include, but are not limited to:

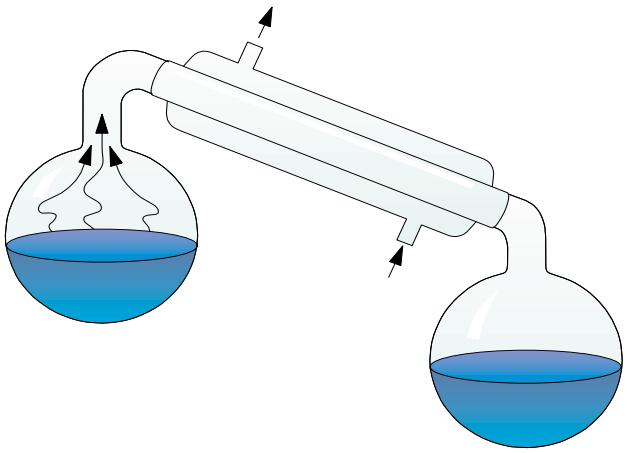
- Geologic repositories (e.g., underground caves)
- Deactivated missile silos
- Thermal treatment units
- Units for the open burning or detonation of waste explosives
- Chemical, physical, or biological treatment units.

Since miscellaneous units are subject to site-specific design and operating requirements, RCRA requires that owners and operators applying for a permit provide the implementing agency with detailed information on unit design and potential environmental impacts. The owner and operator must provide detailed plans and engineering reports describing the unit location, design, construction, operation, maintenance, monitoring plans, and inspection plans.

Owners and operators must also provide detailed information on the potential pathways of human or environmental exposure to hazardous waste or hazardous constituents. Under these provisions, owners and operators must evaluate the potential magnitude and nature of potential human and environmental exposure to air, surface water (including wetlands), ground water, and soil. Owner and operators of miscellaneous units are required to conduct monitoring, testing, data analysis, inspections, and response actions (if necessary) in order to ensure that the unit is in compliance with its general performance standards, and that waste management has not threatened any of these environmental mediums.

Interim Status Chemical, Physical, and Biological Treatment Units

When RCRA was first enacted in 1976, some of the diverse hazardous waste management units in existence were chemical, physical, and biological treatment units. Such units employed unique treatment processes, such as distillation, centrifugation, reverse osmosis, ion exchange, and filtration. The Agency established interim status standards for such units to address the safe containment of hazardous waste, hazardous waste constituents, and treatment by-products.



The operating standards for these units require that:

- Waste is compatible with treatment equipment
- Ignitable and reactive wastes are decharacterized immediately before or after placement in the treatment process or equipment
- Waste analysis and trial treatment tests verify that treatment will meet applicable requirements
- Owners and operators inspect discharge control, safety, and monitoring equipment daily; and inspect construction materials of treatment processes and confinement structures weekly.

Interim Status Thermal Treatment Units

After the enactment of RCRA, another set of diverse hazardous waste management units in existence were thermal treatment units. EPA established interim status standards for these units to allow for the development of alternative treatment processes in units that did not meet the definition of an incinerator or BIF (as discussed in Section III, Chapter 7).

Thermal treatment is defined as the treatment of hazardous waste in a device that uses elevated temperatures as the primary means to change the chemical, physical, or biological character or composition of the hazardous waste. Thermal treatment units include carbon regeneration units, and other devices employing processes, such as molten salt pyrolysis, calcination, wet-air oxidation, and microwave destruction.

The operating standards for these units require:

- The establishment of steady, normal conditions of operation or readiness
- Waste analysis to determine the heating value of the waste, and concentrations of halogens, sulfur, lead, and mercury

- Monitoring and inspections of temperature and emission-control instruments, the stack plume, and all process and ancillary equipment.

The implementing agency also has the flexibility to develop standards for these units on a case-by-case basis when considering the technology-specific data submitted by the applicant. It is probable that the regulations for specific thermal treatment units will reference the incinerator, boiler, and industrial furnace standards due to the similarities between the units.

Interim Status Underground Injection Control Wells

Underground injection control wells are units into which hazardous waste is permanently disposed of by injection 1/4 mile below an aquifer with an underground source of drinking water (as defined under SDWA). EPA originally intended to regulate UIC wells disposing of hazardous waste under SDWA. At the inception of the RCRA program, however, many states did not yet have a SDWA-approved UIC program. As a result, EPA imposed RCRA requirements on such units until states gained SDWA approval for their UIC programs. Because UIC wells were not addressed by the unit-specific hazardous waste management standards, RCRA initially regulated such UIC wells as interim status units. These standards required UIC wells to comply with interim status general facility standards, with the exception of closure and financial assurance.

After states gained SDWA approval for their UIC programs, such wells became regulated jointly by SDWA and RCRA. SDWA regulates the design, operating, and closure standards for the well itself, while RCRA regulates any other hazardous waste-related activities at that facility up until the point of injection. While such wells are no longer subject to RCRA interim status standards, they would need a RCRA permit-by-rule, requiring compliance with only certain RCRA administrative requirements.

As an alternative to receiving a SDWA UIC well permit (accompanied by a RCRA permit-by-rule), UIC well owners and operators could also choose to apply for a full RCRA permit as a miscellaneous unit.

CLOSURE

All hazardous waste TSDFs will eventually stop receiving waste for treatment, storage, or disposal. After these facilities are closed, the owner and operator must either remove all waste that has accumulated in units at the facility, or leave the waste in place while maintaining the units in a way that ensures they will not pose a future threat to human health and the environment. RCRA Subtitle C's closure and post-closure standards are designed to achieve this goal.

The closure and post-closure regulations are divided into two parts: the general standards applicable to all TSDFs, and the technical standards for specific types of hazardous waste management units. These combined requirements ensure that a specific unit or facility will not pose a future threat to human health or the environment after a TSDF closes. This discussion will focus on the general closure standards applicable to all TSDFs.

■ Closure Requirements

Closure is the period directly after a TSDF stops its normal operations. During this period, a TSDF stops accepting hazardous waste; completes treatment, storage, and disposal of any wastes left on site; and disposes or decontaminates equipment, structures, and soils. Some owners and operators will completely remove all waste that was treated, stored, or disposed in their unit. This operation is known as **clean closure**. In order to demonstrate clean closure, an owner and operator must show that levels of hazardous contaminants at the facility do not exceed EPA-recommended exposure levels.

Closure Plan

To ensure that a TSDF is closed properly, the owner and operator must prepare a closure plan that details exactly how and when facility closure will take place, and must submit the plan to their implementing agency for approval. Permitted facilities are required to submit a closure plan to their implementing agency at the time of permit application. The approved closure plan then becomes an enforceable component of their permit.

Interim status facilities must have a written closure plan on the premises six months after they become subject to RCRA. The closure plan must contain:

- A description of how the owner and operator will close each hazardous waste management unit
- A description of how and when the owner and operator will achieve final closure of the whole facility
- An estimate of the maximum amount of hazardous waste kept on site over the life of the facility
- A detailed description of closure methods, including the actions necessary to remove and manage waste and decontaminate the site
- A description of any other steps necessary to comply with the closure standards, such as ground water monitoring or leachate collection (depending on the type of unit).

When there is a change in the design or operation of the facility, a change in the expected closure date, or an unexpected event (e.g., discovering more contaminated soil than originally anticipated), the owner and operator or the implementing agency must amend the closure plan to address the additional steps necessary to safely close the facility. In such instances, permitted facilities must submit an application to modify their permit, while interim status facilities must submit the proposed modification to the implementing agency for approval.

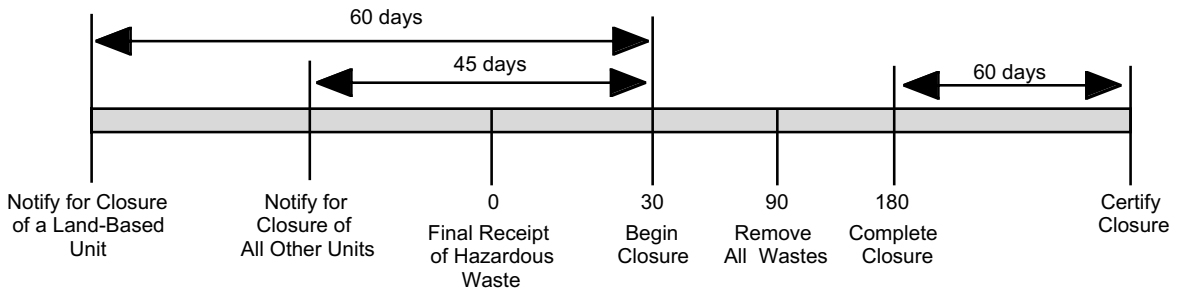
Closure Timetable

To ensure that facility closure is begun and completed in a timely manner, the closure regulations establish specific timetables for the initiation and completion of closure activities (see Figure III-15). An owner and operator of a closing TSDF must:

- Notify the implementing agency that they expect to begin closure activities (notification must take place at least 60 days before for surface impoundments, landfills, waste piles, and land treatment units, and at least 45 days before for all other units)
- Begin closure activities within 30 days of receiving the final shipment of hazardous waste
- Remove all hazardous wastes from the TSDF or dispose of the wastes on site within 90 days of beginning closure
- Complete all closure activities within 180 days of beginning closure
- Certify that closure has been completed in accordance with the specifications in the approved closure plan within 60 days of completing closure. The certification must be signed by the owner and operator and by an independent, registered, professional engineer.

The implementing agency may grant extensions, if required closure activities will take more time, or if the facility or unit has the capacity to accept more hazardous or nonhazardous waste.

Figure III-15: Timetable of Closure Activities



During closure, all contaminated equipment, structures, and soils must be properly disposed or decontaminated. During this process, an owner and operator may become a generator of hazardous waste, and must therefore comply with the generator requirements.

Delay of Closure

The closure timetable is designed to guarantee that closure is completed as soon as practicable after the final receipt of hazardous waste in order to minimize risks posed to human health and the environment. On the other hand, owners and operators of landfills, surface impoundments, and land treatment units may have room to accept nonhazardous waste at the time of closure. To enable these TSDFs to continue operation, RCRA allows these facilities to delay closure of such units. This delay is not available to any other units. Those units for which owners and operators choose to delay closure are still subject to all applicable RCRA hazardous waste requirements, and must meet special requirements designed to ensure that the disposal of both the nonhazardous and hazardous waste will in no way endanger human health and the environment.

Survey Plat

After a TSDF ceases hazardous waste activity and closes all units, it still may be important to know exactly where hazardous wastes were handled (especially for purposes of future sale of the property). To preserve this information, the owner and operator must submit to the implementing agency or local zoning authority a survey plat indicating the location and dimensions of the closed hazardous waste units. The survey plat must be submitted no later than the submission of certification of closure for each hazardous waste disposal unit.

■ Post-Closure Requirements

Some TSDFs are intended for the final disposal of hazardous waste. Land treatment units, landfills, and surface impoundments are the only units where an owner and operator may permanently dispose of hazardous waste. Because such permanent land disposal brings the potential for releases from the unit over a long-term period, these owners and operators must conduct post-closure monitoring and maintenance activities. Other TSDFs may not be able to remove all hazardous wastes and decontaminate all equipment. Since these owners and operators cannot clean close, they must close such units as landfills, and comply with the post-closure requirements for landfills.

Post-closure is the period after closure during which owners and operators conduct monitoring and maintenance activities to preserve the integrity of the disposal system and continue to prevent or control releases from the disposal units. Post-closure care consists of two primary responsibilities: ground water monitoring and maintaining the waste containment system (e.g., covers, caps, and liners). Such activities include:

- Maintaining the final cover, the leak detection system, and the ground water monitoring systems
- Providing long-term protection from liquids migrating into the closed unit, promoting drainage of liquid, accommodating settling of waste in the unit
- Making sure that the final cover, liners, or other containment or monitoring systems are not disturbed
- Monitoring ground water to detect any releases of hazardous constituents.

The post-closure period normally lasts for 30 years after closure is completed, but may be either extended or shortened by the EPA Regional Administrator.

Post-Closure Plan

In order to ensure that the post-closure care of the facility is properly carried out, the owner and operator must design and implement a post-closure plan. The owner and operator must submit the plan with the post-closure permit application. The plan must include:

- A description of planned ground water monitoring activities

- A description of planned maintenance activities
- The name, address, and telephone number of the facility contact person or office.

Post-Closure Notices

As with the survey plat for closure, owners and operators of TSDFs required to perform post-closure activities must, within 60 days after the facility originally certified closure, provide the local zoning or land use authority and the EPA Regional Administrator with a record of the type, location, and quantity of hazardous wastes in each disposal unit at the facility. Also, a notice must be placed in the property deed and recorded. This notice must state that the land was used for hazardous waste management, that the use of the land is restricted, and that the survey plat and record of closure were submitted to the local zoning authority and the EPA Regional Administrator.

Certification of Completion of Post-Closure Care

To ensure that post-closure care was performed in accordance with the post-closure plan, no later than 60 days after completion of the established post-closure care period for each hazardous waste disposal unit, the owner and operator must submit to the EPA Regional Administrator a certification that the post-closure care period was performed in accordance with the specifications established in the approved closure plan.

FINANCIAL ASSURANCE

The RCRA closure and post-closure requirements are designed to protect human health and the environment from the long-term threats associated with hazardous waste management and permanent disposal. Many of these detailed requirements come at the end of a facility's waste management operations and can be very expensive. To prevent a facility from ceasing operations and failing to provide for the potentially costly closure and post-closure care requirements, EPA promulgated regulations requiring TSDFs to demonstrate that they have the financial resources to properly conduct closure and post-closure in a manner that protects human health and the environment.

The TSDF general facility standards include precautions to prepare a facility for accidents, spills, and any resulting emergency responses. Such unexpected events could damage third parties by impacting human health or property outside the facility. In order to compensate third parties for injury or damage that might result from such events (known as **liabilities**), the RCRA regulations require TSDF owners and operators to demonstrate that they have the financial resources to pay for bodily injury or property damage that might result from waste management. The closure, post-closure, and liability financial resource requirements are called **financial assurance**.

In addition to requiring facilities to set aside funds for closure, post-closure, and liabilities, the RCRA regulations specify the financial mechanisms that TSDF owners and operators must use to ensure that the financial resources are available in the event that they are needed.

■ Financial Assurance for Closure/ Post-Closure Care

After a TSDF owner and operator prepares the required written closure and post-closure plans for their facility, they must prepare a cost estimate that reflects how much it would cost to hire a third-party contractor to close the facility. These estimates provide the base figure for the amount of financial assurance a facility must provide.

Cost Estimates

Cost estimates must reflect the cost of hiring a third party to conduct all activities outlined in the closure and post-closure plans. Closure cost estimates are based on the point in the facility's operating life when closure would be the most expensive. Post-closure cost estimates are based on projected costs for an entire post-closure period of 30 years, unless reduced or extended by the implementing agency.

Cost Adjustments

Closure and post-closure cost estimates must be adjusted annually for inflation until closure is completed. Owners and operators must also adjust

cost estimates following any changes to their closure or post-closure plans that would raise the costs involved. For example, the addition of treatment units would mean that they will require decontamination at closure. The closure and post-closure estimates must be recalculated to reflect the additional expenses.

Period of Coverage

TSDF owners and operators must maintain financial assurance until closure and post-closure are complete. Within 60 days after receiving a TSDF's certification of final closure, the implementing agency must notify the owner and operator that financial assurance for final closure is no longer required. Similarly, within 60 days after receiving a TSDF's certification of completion of post-closure care, the implementing agency must notify the owner and operator that financial assurance for post-closure is no longer required.

■ Accident Liability Requirements

TSDF owners and operators must also be able to compensate third parties for bodily injury or property damage that might result from hazardous waste management at a facility. This coverage ensures that, in the event of an accidental release of hazardous constituents, money will be available to compensate affected third parties suffering bodily injury or property damage. All TSDFs must demonstrate liability coverage for sudden accidents. In addition, TSDFs with land-based units (e.g., landfills) must also demonstrate liability coverage for nonsudden accidents.

Sudden Accidental Occurrences

The inherent risks posed by hazardous waste management at all TSDFs brings the possibility of sudden accidents. These **sudden accidental occurrences** are defined as events that are not continuous or repeated. Examples of sudden accidental occurrences are fires and explosions. The minimum financial requirements include at least $1 million per occurrence, and an annual total (known as annual aggregate) of at least $2 million.

Nonsudden Accidental Occurrences

Because land-based units are located directly on the land, they bring an increased risk of slow, long-term nonsudden leaks to soil and ground water, and exposure to human health and the environment. These **nonsudden accidental occurrences** are defined as events that take place over time and involve continuous or repeated exposure to hazardous waste. An example of a nonsudden accidental occurrence is a leaking surface impoundment that contaminates a drinking water source over time. The minimum financial requirements include at least $3 million per occurrence, and an annual aggregate of at least $6 million.

These liability financial assurance coverage amounts apply on an owner and operator basis, not on a per facility basis. Consequently, owners and operators must provide $1 million per occurrence and $2 million annual aggregate for sudden accidental occurrences, and $3 million per occurrence and $6 million annual aggregate for nonsudden accidental occurrences (if applicable), regardless of the number of facilities owned and operated.

Period of Coverage

TSDF owners and operators must maintain financial liability coverage until closure is complete. Within 60 days after receiving a TSDF's certification of final closure, the implementing agency must notify the owner and operator that liability financial assurance is no longer required. Liability coverage is not required during the post-closure period. The implementing agency may, however, require liability coverage if closure was not completed in accordance with the facility's closure plan.

■ Financial Assurance Mechanisms

Financial assurance mechanisms are the different ways an owner and operator can show that funds are available to pay for closure, post-closure, and liability requirements. An owner and operator may demonstrate financial assurance through one or more of the following financial assurance mechanisms:

- Trust fund
- Surety bond (two types)
  - Payment bond
  - Performance bond
- Letter of credit
- Insurance
- Financial test
- Corporate guarantee.

Trust Fund

A **trust fund** allows a facility to set aside money in increments, according to a phased-in schedule (known as a pay-in period). At the end of this pay-in period, the facility will have enough money set aside to cover its financial assurance costs, and will have funds specifically earmarked for closure, post-closure, and liability requirements.

Under some of the other mechanisms (surety bonds, letters of credit, and corporate guarantees), owners and operators must establish a standby trust fund into which any payments made by the mechanism will be deposited. EPA will then use this trust fund to cover the respective costs.

Surety Bonds

A **surety bond** is a guarantee by a surety company that specifies that closure, post-closure, and liability obligations will be fulfilled. If the owner and operator fails to pay the costs specified in a bond, the surety company is liable for the costs. There are two types of surety bonds:

- **Payment bond** — A payment bond will, in the event an owner and operator fails to fulfill their closure, post-closure, or liability obligations, fund a standby trust fund in the amount equal to the value of the bond.
- **Performance bond** — A performance bond guarantees that the owner and operator will comply with their closure, post-closure, and liability requirements. Performance bonds can also be paid into a standby trust fund. Interim status facilities may not use performance bonds.

Letter of Credit

A **letter of credit** is a credit document issued to a TSDF by a financial institution, covering the cost of closure, post-closure, or liability activities.

Insurance

The owner or operator of a TSDF may take out an **insurance** policy to cover the cost of closure, post-closure, and liability requirements in the event that the owner and operator is unable to satisfy these obligations.

Financial Test

Some companies are of such size and financial strength that they have the assets to absorb the costs of closure, post-closure, and liability obligations. As a result, owners and operators can demonstrate and document their financial strength by using the **financial test** to satisfy the TSDF financial assurance requirements.

Corporate Guarantee

While not all companies will be able to meet the financial test requirements, they may be owned by a company (or have a sibling company) that has the financial standing and ability to meet the financial test requirements. In these cases, a TSDF owner and operator may arrange a **corporate guarantee** by demonstrating and documenting that its corporate parent, corporate grandparent, sibling corporation, or a firm with a substantial business relationship with the owner or operator, meets the financial test requirements on its behalf.

GROUND WATER MONITORING

The treatment, storage, or disposal of hazardous waste directly on the land creates the potential to generate hazardous waste leachate that can carry hazardous contaminants into the environment. Such contaminants can pose a serious threat to ground water resources.

Ground water is water found below the land surface in the part of the earth's crust in which all voids are filled with water. This water accumulates in an aquifer, an underground rock formation, that

provides a significant amount of ground water to drinking wells and springs.

Ground water serves as a very important resource by providing drinking water and municipal water supplies for approximately 50 percent of all Americans. In some areas, ground water supplies 100 percent of the water supply for all uses. Ground water is also a very critical resource in agriculture. Farmers rely on this resource to irrigate the crops that are later sold at markets across the country.

The importance of ground water is highlighted by that fact that it is very difficult and expensive to clean once contaminated. Cleanup can take decades, and in certain cases cannot restore ground water to useable conditions.

■ General Requirements

In order to protect this valuable resource and avoid costly cleanups, RCRA requires TSDF owners and operators of land-based treatment, storage, or disposal units (i.e., land treatment units, landfills, surface impoundments, and waste piles) to monitor the ground water passing under their facilities to ensure that their hazardous waste management activities are not contaminating the ground water.

Waivers and Exemptions

Some land-based units are designed or managed in a way that does not bring the potential for ground water contamination. Such waivers or exemptions from the ground water monitoring requirements apply to:

- Man-made structures that do not receive liquid wastes, have inner and outer containment layers and a leak detection system between the containment layers, and are designed to prevent the entry of rain water
- Land treatment units that do not release hazardous constituents into the environment during the post-closure period
- Indoor waste piles
- Units that do not have the potential to leak hazardous waste into the environment
- Units that have been clean closed.

Ground Water Monitoring Provisions

The purpose of the ground water monitoring requirements is to require owners and operators of land-based units to monitor the ground water that passes beneath their TSDF in order to detect leaks of hazardous waste, and facilitate cleanup as soon as possible. As a result, owners and operators must install monitoring wells to detect contamination in the aquifer nearest the ground surface. In order to ensure that the information received from the monitoring wells is accurate, TSDF owners and operators must have:

- Enough wells installed in the right places to accurately represent the ground water activity under the facility
- Properly installed wells (poorly installed wells may give false results)
- Lined or cased wells to prevent the collapse of monitoring well bore holes
- Consistent sampling and analysis procedures
- Statistical methods to avoid false evidence of a release
- Accurate records containing any information collected.

The ground water monitoring requirements vary for permitted and interim status TSDFs. The interim status ground water monitoring requirements are designed to generate information about ground water quality for use in developing the facility's permit, as well as detect and clean up releases.

■ Permitted Facilities

Facilities with permitted land treatment units, landfills, surface impoundments, or waste piles must develop a ground water monitoring program. This ground water monitoring program consists of three phases:

- Detection monitoring, to detect if a leak has occurred
- Compliance monitoring, to determine if an established ground water protection standard has been exceeded once a leak has occurred

- Corrective action, to clean up contamination caused by the leak.

Because different TSDFs handle different types of wastes and will have units of different age and design, each TSDF's program is unique and site-specific.

Detection Monitoring Program

Detection monitoring is the first step of ground water monitoring. The goal is to detect and characterize any leaks of hazardous waste from the unit. In detection monitoring, the owner and operator monitors for indications of a leak from the unit, looking for potential changes in the ground water quality from normal (background) levels. A change from background levels might indicate a leak from the unit. The results from the sampling wells are compared to the background ground water quality levels to determine if there is any evidence of an increase (see Figure III-16). If the evidence indicates that the unit is leaking, the owner and operator must:

- Notify the EPA Regional Administrator within seven days
- Immediately sample all wells for hazardous constituents
- Determine which hazardous constituents are present and at what levels
- Submit an application to modify the facility's permit to move into the second phase of the ground water monitoring program (compliance monitoring)
- Submit a cleanup feasibility plan.

If the owner and operator can prove that the contamination did not result from their facility, they can continue detection monitoring.

Compliance Monitoring Program

Once the owner and operator has established that a release has occurred, they must develop and implement a **compliance monitoring** program (see Figure III-17). The goal of compliance monitoring is to ensure that the amount of hazardous waste that has leaked into the uppermost aquifer does not exceed acceptable levels. In order to determine what these acceptable levels are, RCRA requires the owner and operator to establish a ground water protection standard (GWPS). The GWPS has four parts: identification of hazardous constituents; identification of concentration levels for each constituent; establishment of a compliance point; and determination of a compliance period during which the GWPS applies.

Hazardous Constituents

For purposes of compliance monitoring, **hazardous constituents** are those constituents that have been detected in the uppermost aquifer and are reasonably expected to be in or derived from the waste contained in the unit.

Concentration Limits

Concentration limits are the maximum levels of hazardous waste or hazardous constituents allowed to be present in the ground water. The concentration levels can be:

- Background levels
- **Maximum contaminant levels (MCLs)** borrowed from SDWA
- **Alternative concentration limits (ACLs)** established by the EPA Regional Administrator.

Point of Compliance

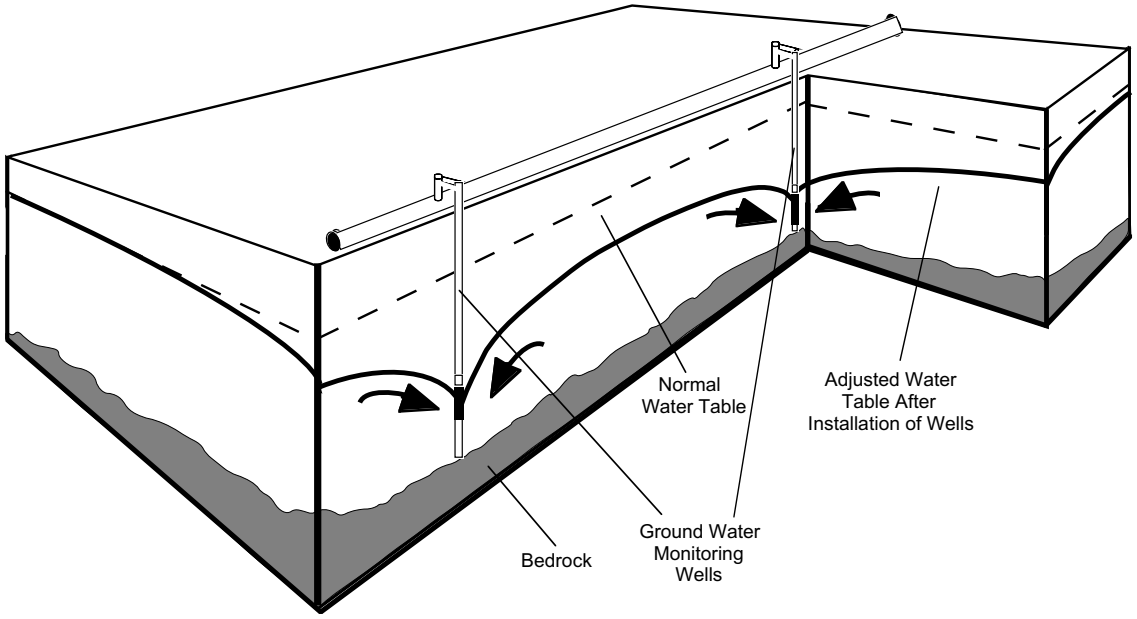
The **point of compliance** is the vertical point where the owner and operator must monitor the uppermost aquifer to determine if the leak exceeds the GWPS.

Compliance Period

The compliance period is the length of time during which an owner and operator must conduct compliance monitoring or perform cleanup. Generally, this period will cover the rest of the TSDF's operating life and may extend into the post-closure period.

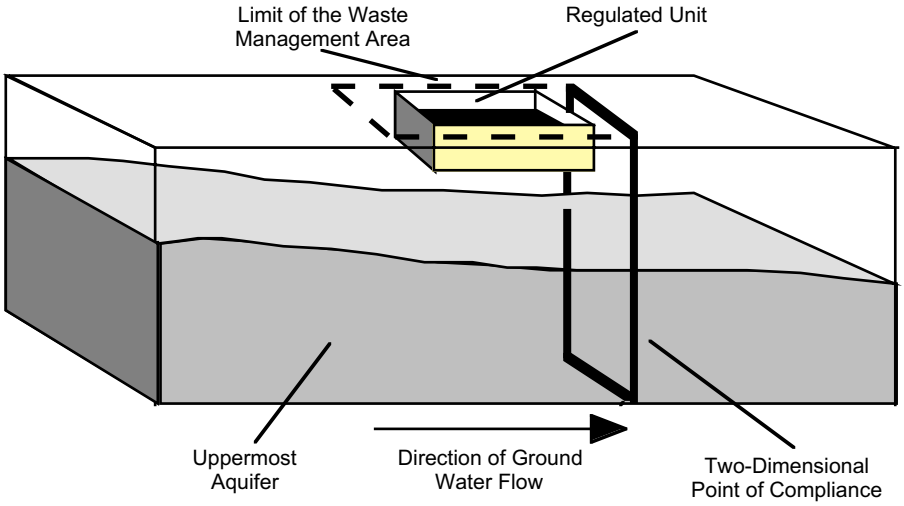
The owner and operator must monitor at least semiannually to determine if the GWPS has been

Figure III-16: Detection Monitoring



In detection monitoring, owners and operators compare the sample results from the ground water monitoring wells to the background water quality levels. A change from background levels might indicate a leak from the unit.

Figure III-17: Compliance Monitoring



During the compliance monitoring program, an owner and operator must ensure that the amount of hazardous waste that has leaked into the uppermost aquifer does not exceed acceptable levels. To achieve this, an owner and operator must establish a ground water protection standard, which includes identification of hazardous constituents, identification of concentration levels for each constituent, establishment of a point of compliance, and determination of a compliance period.

exceeded. The specifics of the GWPS will be listed in the TSDF's permit.

During the compliance period, the owner and operator must determine whether there is any evidence of increased contamination for any of the hazardous constituents specified in the GWPS. This is accomplished by comparing information collected at the point of compliance to the concentration limits set in the GWPS. The owner and operator must also analyze the samples from compliance wells for all RCRA hazardous constituents at least annually to determine if any additional constituents are present that are not specified in the GWPS. If additional constituents are found, they must be added to the list of constituents in the GWPS.

If the GWPS is exceeded, the owner and operator must:

- Notify the EPA Regional Administrator in writing within seven days
- Submit an application to modify the facility's permit to move into the third phase of the ground water monitoring program (corrective action)
- Continue to monitor in accordance with the compliance monitoring program.

If the owner and operator can prove that the increased contamination resulted from a source other than their facility, or that the increase was due to an error in analyzing the sample or natural variations in ground water, they must notify the EPA Regional Administrator in writing within seven days. On the other hand, if the contamination is found to have resulted from a unit at the TSDF, the owner and operator must initiate cleanup.

Corrective Action Program

The goal of ground water corrective action (cleanup) is to clean the ground water to meet the GWPS. To clean up the contamination, the owner and operator must either remove the hazardous constituents from the ground water or treat them in place. The specific measures undertaken to clean the ground water will vary with each facility (see Figure III-18).

Effectiveness

To make sure the owner's and operator's corrective action program is working properly, they must monitor the ground water under the TSDF, and then report semi-annually on the effectiveness of the corrective action program.

Time Period

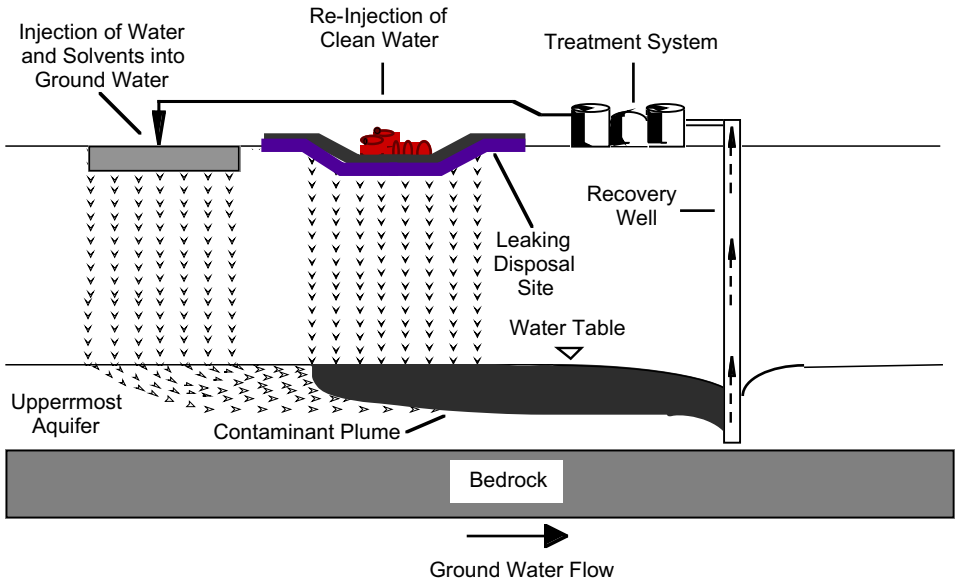
Once the ground water has been treated to meet the GWPS, the owner and operator may stop corrective action and return to compliance monitoring. During the compliance period, facilities may move between compliance monitoring and corrective action as necessary to respond to new releases from the unit.

If the compliance period ends and corrective action is still being conducted, corrective action must continue as long as necessary to achieve the GWPS. Only after the owner and operator has met the GWPS for three consecutive years may they stop corrective action. If the unit is still in the post-closure period, the owner and operator may then reinstate a detection monitoring program. If the post-closure period has elapsed, the TSDF has completed its requirements under RCRA ground water monitoring.

■ Interim Status Facilities

The requirements for interim status facilities were designed to supply background data on these facilities before permitting, and to act as a warning system to detect any releases to ground water prior to issuing a permit to the facility. The interim status program is similar to the permitted ground water monitoring program, but does not include cleanup provisions. If cleanup is required at an interim status facility, it will be addressed under RCRA §3008(h) or §7003 corrective action authorities (as discussed in Section III, Chapter 9), or in the facility permit when issued. The interim status ground water monitoring program is comprised of two phases: an indicator evaluation and a ground water quality assessment.

Figure III-18: Ground Water Corrective Action



An example of ground water corrective action is a ground water pump and treat system. In order to remediate contamination that has leaked from a disposal site into the uppermost aquifer, the owner and operator injects water and solvents into the ground. The groundwater flow carries the water and solvents to the contaminant plume, flushes the plume of the contamination, and carries the contaminants to a recovery well where the contaminated water is pumped to the surface and treated. Clean water is then re-injected into the ground water for reuse in the pump and treat process.

Indicator Evaluation

To determine if the units at a TSDF are leaking, the owner and operator must monitor the ground water under the facility. The information collected from the monitoring wells is compared to data on background water quality to determine if any contamination of the uppermost aquifer has occurred. If the information indicates that there may be a release from the facility, the owner and operator must then begin the second phase, the ground water quality assessment. If an owner and operator assumes or already knows that contamination of the uppermost aquifer has occurred, they may initiate the ground water quality assessment instead of an indicator evaluation program.

Ground Water Quality Assessment Program

Once the owner and operator has determined that there may have been a release from the unit, the ground water quality assessment helps to determine the extent of the release. If an owner and operator must perform a ground water quality assessment, they must notify the EPA Regional Administrator within seven days, and prepare and submit a plan on how to conduct a ground water quality assessment to the EPA Regional Administrator within 15 days. In the ground water quality assessment, the owner and operator must establish how fast the unit is leaking, how far the leak has spread, and the concentrations of constituents in the contamination. The owner and operator must repeat this assessment at least quarterly until final closure of the facility, and must keep records of all required analyses and evaluations on site. They must also submit an annual report to the EPA Regional Administrator detailing the status of the ground water quality assessment program.

AIR EMISSION STANDARDS

While many hazardous waste TSDF standards are designed to protect ground water, potential contamination of air resources also represents a threat to human health and the environment. During the process of hazardous waste treatment, storage, or

disposal, hazardous constituents can escape into the air.

One particular class of these constituents, volatile organics, evaporate easily and have been linked to several adverse health effects. In order to control the release of these emissions from hazardous waste management processes, RCRA imposes air emission control requirements on units that commonly manage hazardous waste with organics.

Process Vents

Certain types of hazardous waste units are commonly used to manage wastes with high levels of volatile organics. As a result, the first set of air emission requirements addresses process vents associated with the distillation, fractionation, thin-film evaporation, solvent extraction, and air and steam stripping of hazardous waste with an annual average total organic concentration of 10 parts per million by weight (ppmw). Owners and operators of TSDFs with these treatment processes must reduce organic emissions at their entire facility. To meet this standard, the owner and operator may either modify the treatment process or install a device to control organic emissions.

Equipment Leaks

Volatile organics can also escape into the air through gaps between connections of hazardous waste management equipment, or other leaks from such equipment. As a result, the second set of air emission regulations establishes specific leak detection and repair programs for equipment (e.g., valves, pumps, and compressors) that contains or contacts hazardous waste with at least 10 percent by weight organics. These programs require leak detection monitoring and inspection. In addition, once a leak has been detected, the equipment must be repaired.

Containers, Surface Impoundments, and Tanks

In order to further protect human health and the environment from the risks posed by volatile organics, the final set of RCRA air emission standards require TSDF owners and operators to control organic air emissions from hazardous waste containers, surface impoundments, and tanks. RCRA requires these controls if the units manage waste with an average volatile organic concentration above 500 ppmw. These air emission controls prevent the release of organic constituents through installation of a control device (e.g., a flare), or prevention of emissions.

Containers

TSDF owners and operators are subject to one of three different sets of requirements for containers depending on the size of the container, the organic content of hazardous waste placed in the container, and whether or not waste stabilization (as discussed in Section III, Chapter 6) occurs in the container. Small containers (between 26 and 119 gallons) and large containers (greater than 119 gallons) storing waste with a low vapor pressure (known as Level 1 containers) must either comply with DOT requirements, be equipped with a closed cover, or be fitted with a vapor suppressing barrier. Large containers storing waste with a high vapor pressure (known as Level 2 containers) may either meet DOT specifications, operate with no detectable emissions, or be vapor tight (i.e., no vapors can escape the unit). The last category of containers (Level 3 containers) are those units conducting waste stabilization. These containers must be vented through a closed-vent system to a control device.

Surface Impoundments

TSDF surface impoundment owners and operators must either install a cover (e.g., an air-supported structure or a rigid cover) over the impoundment, which must be vented through a closed-vent system to a control device, or equip the surface impoundment with a floating membrane cover.

Tanks

TSDF tank owners and operators are subject to one of two different sets of requirements depending on the vapor pressure of the waste being managed in the unit. Tanks which store hazardous waste below certain vapor pressures (known as Level 1 tanks), must be equipped with, at a minimum, a fixed roof. Those tanks that store waste with higher vapor pressures (known as Level 2 tanks), have five compliance options that range from putting the tank in an enclosure vented to a control device to using a closed-vent system that vents emissions from the unit to a control device.

■ Other Requirements

The air emission standards require owners and operators to keep certain records demonstrating compliance with these standards in the facility's operating log.

LQGs are subject to the interim status air emission control requirements for process vents, equipment leaks, containers, and tanks. SQGs, however, are not subject to these air emission control requirements.

SUMMARY

The RCRA Subtitle C TSDF standards impose requirements on units that treat, store, or dispose hazardous waste. These standards include full operation and management requirements for permitted facilities (those built after the standards were established) and less stringent provisions for interim status facilities (those that were already in operation).

The TSDF standards require facilities to comply with:

- General facility standards
- Preparedness and prevention requirements
- Contingency plans and emergency procedure provisions
- Manifest, recordkeeping, and reporting requirements.

TSDF owners and operators can treat, store, or dispose of waste in a variety of units. Each unit has its own specific standards governing unit design, construction, operation, and maintenance. Owners and operators can manage their waste in any of the following units:

- Containers
- Containment buildings
- Drip pads
- Land treatment units
- Landfills
- Surface impoundments
- Tanks
- Waste piles
- Miscellaneous units.

LQGs accumulating waste in containers, containment buildings, drips pads, and tanks are subject to the interim status TSDF standards for these units. SQGs accumulating waste in containers and tanks are subject to the interim status standards for these units.

The TSDF standards also establish requirements to ensure that hazardous waste management units are closed in a manner that protects human health and the environment. The closure provisions require the facility to stop accepting waste; remove all waste from management units; and decontaminate all soils, structures, and equipment. Some units (i.e., land treatment units, landfills, and surface impoundments) serve as places for the final disposal of hazardous waste. These land disposal units must comply with additional post-closure requirements to ensure proper long-term unit maintenance.

Because closure and post-closure activities can be very expensive, the TSDF standards require owners and operators to demonstrate financial assurance. These provisions also require all TSDFs to set aside funds in order to compensate third parties for bodily injury and property damage that might result from hazardous waste management operations.

RCRA's TSDF standards also include provisions to protect ground water and air resources from

hazardous waste contamination. RCRA requires owners and operators of land-based units (i.e., land treatment units, landfills, surface impoundments, and waste piles) to monitor the ground water below their TSDF for possible contamination, and clean up any discovered contamination.

In order to protect air resources, TSDFs are required to install unit controls to prevent organic emissions from escaping into the air. The air emissions controls apply to process vents, equipment leaks, containers, surface impoundments, and tanks.

CHAPTER 6

LAND DISPOSAL RESTRICTIONS

In this chapter…

OVERVIEW

A common hazardous waste management practice is to place hazardous waste in land-based units (i.e., land treatment units, landfills, surface impoundments, or waste piles). In 1999, approximately 69 percent of hazardous nonwastewaters generated under RCRA were permanently disposed on the land. The permanent disposal of hazardous waste in land-based units has the potential to threaten human health and the environment through ground water contamination. As a result, the RCRA program contains extensive technical requirements to ensure that land-based units prevent hazardous leachate from escaping into the environment. To complement the unit-specific standards, which alone do not fully protect human health and the environment from the potential risks of land-based hazardous waste management, RCRA includes the LDR program.

The LDR program approaches ground water protection differently from unit-specific technical standards. This program does not mandate physical barriers to protect ground water, but instead requires that hazardous wastes undergo fundamental physical or chemical changes so that they pose less of a threat to ground water, surface water, and air when disposed. The obvious advantage of such hazardous waste treatment is that it provides a longer lasting form of protection than does simple hazardous waste containment. While synthetic barriers designed to prevent the migration of leachate can break down and fail over time, physical and chemical changes to the waste itself provide a more permanent type of protection.

When directing EPA to establish the LDR program, Congress called for regulations that specified concentrations of hazardous constituents or methods of treatment that would substantially decrease the toxicity of hazardous waste or decrease the likelihood that contaminants in such wastes would leach. EPA responded to these requirements by establishing waste-specific treatment standards that dictate to what extent waste must be treated. All hazardous wastes, except under certain circumstances, must meet a specific treatment standard before they can be disposed.

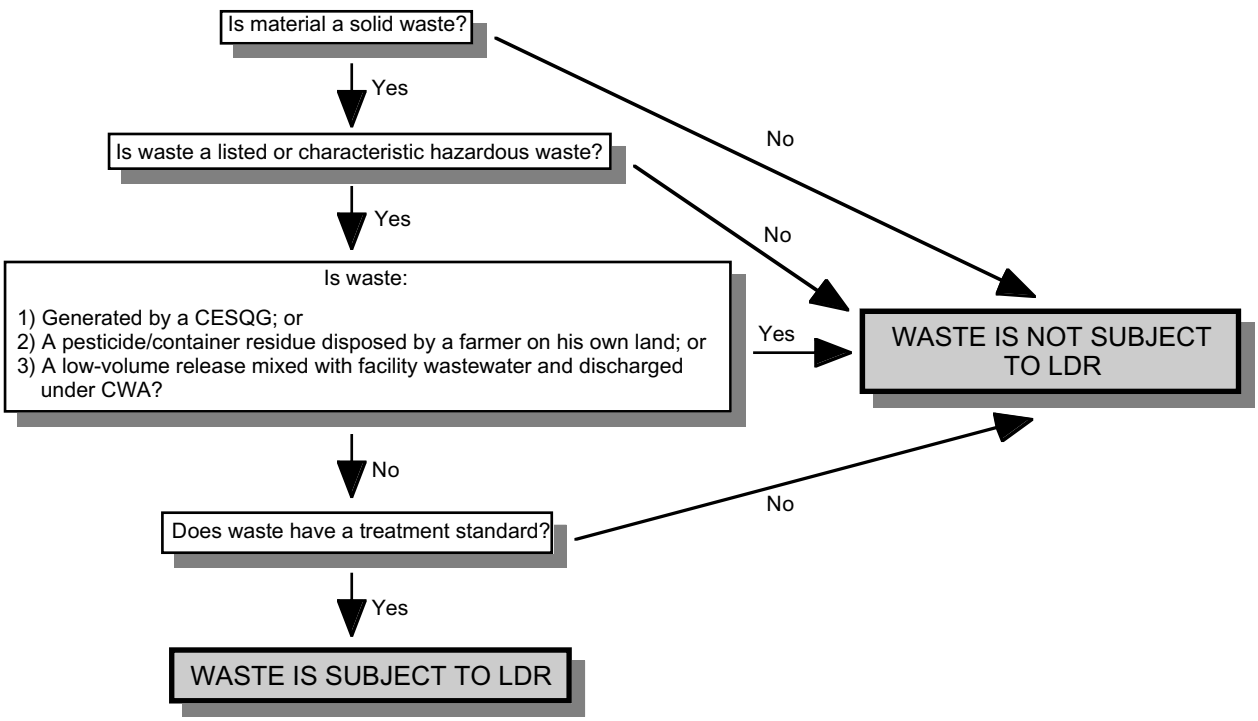
APPLICABILITY

Wastes must be a RCRA hazardous waste in order to be subject to the LDR program. In other words, unless a waste meets the definition of a solid and hazardous waste, its disposal is not regulated under the LDR program. Once a generator identifies its waste as hazardous (either listed, characteristic, or both), the waste is assigned a waste code. When EPA establishes a treatment standard for the waste code, the waste will then become restricted (i.e., subject to the LDR requirements). RCRA requires that EPA establish treatment standards for hazardous wastes within six months of promulgating a new listing or characteristic. Until EPA establishes a treatment standard for a waste, this newly identified or newly listed waste (i.e., waste for which EPA has yet to establish a treatment standard) can continue to be land disposed without treatment. When EPA promulgates a final treatment standard for a waste, handlers of the waste must manage it in accordance with all the LDR requirements and cannot dispose of it on the land until it meets all applicable treatment standards (see Figure III-19).

While the LDR program generally applies to all persons who generate, transport, treat, store, or dispose of restricted hazardous wastes, there are exclusions from the LDR requirements. The following wastes are not subject to the LDR program:

- Waste generated by CESQGs
- Waste pesticides and container residues disposed of by farmers on their own land
- Newly identified or newly listed hazardous wastes for which EPA has yet to promulgate treatment standards
- Certain waste releases that are mixed with a facility's wastewater and discharged pursuant to CWA.

Figure III-19: Land Disposal Restrictions Applicability



Wastes meeting any of these descriptions may continue to be land disposed without being subject to the LDR program.

The LDR requirements attach to a hazardous waste at its point of generation. In other words, once a waste has been generated, identified, and assigned a waste code, it must be treated in accordance with LDR requirements before being disposed. As a general principle, a hazardous waste must meet all applicable treatment standards to be eligible for land disposal. For purposes of the LDR program, a generator of a listed hazardous waste must determine if the waste also exhibits any hazardous waste characteristics. If it does, then the treatment standard for all waste codes must be met before land disposal.

LDR PROHIBITIONS

The LDR program consists of three main components: the disposal prohibition, the dilution prohibition, and the storage prohibition. This series of prohibitions restricts how wastes subject to LDR requirements are handled. The most visible aspect of the LDR program is the disposal prohibition, which includes treatment standards, variances, alternative treatment standards, and notification requirements. **Land disposal** means placement in or on the land, except in a corrective action unit, and includes, but is not limited to, placement in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, underground mine or cave, or placement in a concrete vault, or bunker intended for disposal purposes. The other two components work in tandem with the disposal prohibition to guide the regulated community in proper hazardous waste management. The dilution prohibition ensures that wastes are properly treated, and the storage prohibition ensures that waste will not be stored indefinitely to avoid treatment.

■ Disposal Prohibition

The first component of the LDR program, the **disposal prohibition**, prohibits the land disposal of hazardous waste that has not been adequately treated to reduce the threat posed by such waste. The criteria that hazardous wastes must meet before being disposed of are known as **treatment standards**. These treatment standards can be either concentration levels for hazardous constituents that the waste must meet or treatment technologies that must be performed on the waste before it can be disposed.

DISPOSAL PROHIBITION

The disposal prohibition prohibits the land disposal of hazardous waste that has not been adequately treated to reduce the threat posed by such waste.

EPA bases the LDR treatment standards on the performance of available technologies. EPA conducts extensive research into available treatment technologies to determine which proven, available technology is the best at treating the waste in question. The technology that best minimizes the mobility or toxicity (or both) of the hazardous constituents is designated as the **Best Demonstrated Available Technology (BDAT)** for that waste. The treatment standards are based on the performance of this BDAT.

When treatment standards are set as concentration levels, the regulated community may use any method or technology (except dilution, as discussed later in this chapter) to meet that concentration level. The concentration level is based on the performance of the BDAT, but the regulated community does not need to use this technology to meet the treatment standard. EPA prefers to use concentration-based standards because they stimulate innovation and the development of alternative treatment technologies. However, when EPA feels that the waste will only be effectively treated by the BDAT or when there is no way to measure hazardous constituent levels, the Agency will designate the BDAT as the treatment standard. This means that the regulated community must treat the waste with that specific technology in order to meet the treatment standard.

The treatment standards are found in the regulations in a table arranged by hazardous waste code (40 CFR §268.40). Concentration-based treatment standards appear in the table as numeric values. The few treatment standards that require the use of a specific technology are expressed as a five-

letter code representing the technology (see Figure III-20). There are 30 such codes representing specific technology-based standards. Descriptions of these codes and the technologies that they require are found in the regulations in a separate table in 40 CFR §268.42 (see Figure III-21).

Characteristic Hazardous Wastes

Both listed and characteristic hazardous wastes must meet the LDR treatment standards before they are eligible for land disposal. There are, however, some unique situations that arise when dealing with characteristic wastes under the LDR program.

The treatment standards for most characteristic hazardous wastes entail rendering the waste nonhazardous (i.e., decharacterizing the waste or removing the characteristic). However, some characteristic waste treatment standards have additional requirements. The regulated community must examine these wastes for **underlying hazardous constituents**. These constituents are not what causes the waste to exhibit a characteristic, but they can pose hazards nonetheless. The underlying hazardous constituents must be treated in order to meet contaminant-specific levels. These levels are referred to as the **universal treatment standards (UTS)**, and are listed in a table in the RCRA regulations (40 CFR §268.48). This is why some characteristic wastes that no longer exhibit a characteristic must still be treated to meet additional LDR requirements. Once such characteristic hazardous wastes have been decharacterized and treated for underlying constituents, they can be disposed of in a nonhazardous waste landfill.

Variances, Extensions, and Exemptions

If a restricted waste does not meet its applicable treatment standard, it is prohibited from land disposal. Although most wastes become eligible for disposal by meeting the treatment standards, in some instances this may not be possible. For example, there may not be enough treatment capacity to treat a waste, or the concentration level may not be achievable. To address these situations, EPA established procedures that allow wastes to be

Figure III-20: Excerpts from the 40 CFR §268.40 Treatment Standards Table

Concentration-Based Standard

TREATMENT STANDARDS FOR HAZARDOUS WASTES					
WASTE CODE	WASTE DESCRIPTION AND TREATMENT/ REGULATORY SUBCATEGORY	REGULATED HAZARDOUS CONSTITUENT		WASTEWATERS	NONWASTEWATERS
		Common Name	CAS Number	Concentration in mg/l; or Technology Code	Concentration in mg/kg unless notes as "mg/l TCLP"; or Technology Code
K009	Distillation bottoms from the production of acetaldehyde from ethylene	Chloroform	67-66-3	0.046	6.0
K026	Stripping still tails from the production of methyl ethyl pyridines	NA	NA	CMBST	CMBST

Technology-Based Standard

Figure III-21: Excerpts from the 40 CFR §268.42 Technology-Based Standards Table

Code	Technology	Description
BIODG	Biodegradation	Biodegradation uses microorganisms to break down organic compounds to make a waste less toxic.
CHRED	Chemical reduction	Chemical reduction converts metal and inorganic constituents in wastewater into insoluble precipitates that are later settled out of the wastewater, leaving a lower concentration of metals and inorganics in the wastewater.
CMBST	Combustion	Combustion destroys organic wastes or makes them less hazardous through burning in boilers, industrial furnaces, or incinerators.
DEACT	Deactivation	Deactivation is treatment of a waste to remove the characteristic of ignitability, corrosivity, or reactivity. Deactivation can be achieved using many of the treatment technologies in 40 CFR §268.42, Table 1. Part 268, Appendix VI recommends technologies that can be used to deactivate specific wastestreams.
MACRO	Macroencapsulation	Macroencapsulation is the application of a surface coating material to seal hazardous constituents in place and prevent them from leaching or escaping.
NEUTR	Neutralization	Neutralization makes certain wastes less acidic or certain substances less alkaline.
PRECP	Precipitation	Precipitation removes metal and inorganic solids from liquid wastes to allow the safe disposal of the hazardous solid portion.
REMTL	Recovery of Metals	Recovery of organics uses direct physical removal methods to extract metal or inorganic constituents from a waste.
RORGS	Recovery of Organics	Recovery of organics uses direct physical removal methods (e.g., distillation, steam stripping) to extract organic constituents from a waste.
STABL	Stabilization	Stabilization (also referred to as solidification) involves the addition of stabilizing agents (e.g., Portland cement) to a waste to reduce the leachability of metal constituents.

disposed of under special circumstances. The following exemptions, variances, and extensions allow wastes to be disposed of without meeting their respective treatment standards, or to be treated to a different standard:

- National capacity variances
- Case-by-case extensions
- No-migration variances
- Variances from a treatment standard
- Equivalent treatment method variances
- Surface impoundment treatment exemptions.

While national capacity variances, when needed, are automatically granted to all affected hazardous waste management facilities, the other five exemptions, variances, and extensions require a facility to specifically petition the Agency.

National Capacity Variances

When developing a treatment standard, EPA examines the available treatment capacity to determine whether it is sufficient to handle current and future waste management needs. If the Agency determines that nationally there is not enough capacity to treat a waste, EPA can automatically extend the effective date of the waste's treatment standard. Such an extension to the effective date is intended to give the waste treatment industry more time to develop the capacity to handle the waste. Wastes under a national capacity variance can be disposed of, without meeting the treatment standards, in landfills and surface impoundments

CASE STUDY: DECHARACTERIZED WASTES AND THE REQUIREMENT TO TREAT FOR UNDERLYING HAZARDOUS CONSTITUENTS

A facility generates an industrial nonwastewater that contains benzene, acetone, and methanol. The generator determines that their waste is not listed based on its origin, but upon testing the waste, determines that it fails the TCLP for benzene. As a result, the waste is identified as D018. According to the LDR treatment standard for D018, the benzene in the waste must be treated to a standard of 10 mg/kg, and the waste must also be treated for acetone and methanol underlying hazardous constituents. The generator decides to treat the waste in containers at the facility. After treatment, the benzene meets the 10 mg/kg standard and no longer exhibits a characteristic. Although the waste is technically no longer a hazardous waste, it must be treated for the acetone and methanol underlying hazardous constituents before it can be land disposed.

that meet minimum technical requirements (e.g., liners, leachate collection and removal systems, and leak detection systems). (These technical requirements are fully discussed in Section III, Chapter 5.)

Case-by-Case Extensions

A facility may petition EPA for a case-by-case extension to delay the effective date of a waste's treatment standard, upon showing that capacity does not exist for that particular waste. Similar to national capacity variances, wastes granted case-by-case extensions can be disposed of without meeting the treatment standards in landfills and surface impoundments that meet minimum technical requirements.

No-Migration Variances

No-migration variances differ from capacity variances in that they apply to the disposal unit instead of to the waste, and allow wastes to be disposed of in the unit without meeting the treatment standards. To obtain a no-migration variance for a disposal unit, a facility must petition EPA and demonstrate that there will be no migration of hazardous constituents from the unit (i.e., the waste will not leak or escape from the unit) for as long as the wastes remain hazardous.

Variances from a Treatment Standard

Variances from a treatment standard allow the regulated community to petition EPA and show that the required LDR treatment standard is not appropriate for their waste, or that the treatment standard is not achievable. If a variance is granted, EPA will specify an alternative standard to meet.

Equivalent Treatment Method Variances

Equivalent treatment method variances allow the regulated community to petition EPA and demonstrate that a technology different from the required LDR treatment technology can achieve the same results. If approved, the applicant can use the alternative technology in place of the required technology.

Surface Impoundment Treatment Exemptions

Surface impoundment treatment exemptions allow the regulated community to petition EPA for permission to treat hazardous waste in surface impoundments (surface impoundments are fully discussed in Section III, Chapter 5). Under normal circumstances, owners and operators cannot place untreated hazardous waste on the land, even if it is in a land-based unit for treatment. Since many facilities use surface impoundments as a means of treating waste, the surface impoundment treatment exemption allows owners and operators to conduct such treatment under certain conditions. Surface impoundments treating waste under this exemption must comply with double liner and minimum technical requirements, and provisions for the removal of sludges and treatment residues.

Alternative Treatment Standards

In establishing treatment standards, the Agency applied the BDAT methodology to the typical forms of waste generated by industry. Some forms of hazardous waste are unique and were not taken into account by the BDAT process when treatment standards were established. As a result, EPA created a number of broad, alternative treatment standards for special types of waste.

Lab Packs

Laboratories commonly generate small volumes of many different listed hazardous wastes. Rather than manage all these wastes separately, labs often consolidate these small containers into **lab packs**. Trying to meet the individual treatment standards for every waste contained in a lab pack would be impractical. To ease the compliance burden, EPA established an alternative treatment standard for lab packs that allows the whole lab pack to be incinerated, followed by treatment for any metal in the residues. Treatment using this alternative standard satisfies the LDR requirements for all individual wastes in the lab pack.

Debris

Debris can become contaminated with hazardous waste accidental releases or spills. While such contaminated debris is typically regulated under the contained-in policy (as discussed in Section III, Chapter 1), it may also be subject to LDR treatment standards. The physical characteristics of such debris may make it difficult to meet the LDR treatment standard for the waste that is contaminating it. For example, incinerating a solvent-saturated brick wall is not necessarily going to destroy the solvent constituents that are safely nestled in between the pieces of brick. Instead of requiring debris to meet these sometimes inappropriate and difficult standards, EPA established a set of alternative standards that can be used to treat hazardous debris (40 CFR §268.45, Table 1). The alternative standards range from removing all contaminants with high pressure washing, to encapsulating the debris in order to prevent hazardous constituents from leaching. Debris treated with these alternative treatment standards meets the LDR requirements, and in many cases, can be disposed of as nonhazardous waste.

Soil

Cleanup, or remediation, of hazardous waste sites will often produce contaminated soil. Contaminated soil must be handled as hazardous waste if it contains a listed hazardous waste or if it exhibits a characteristic of hazardous waste (see discussion of the contained-in policy in Section III, Chapter 1). As with hazardous waste, land disposal of hazardous soil is prohibited until the soil has been treated to meet LDR standards. These contaminated soils, due to either their large volume or unique properties, are not always amenable to the waste code-specific treatment standards found in §268.40. Because of this, EPA promulgated alternative soil treatment standards in §268.49 in May 1998.

The alternative soil treatment standards mandate reduction of hazardous constituents in the soil by 90% or ten times UTS, whichever is higher. Removal of the characteristic is also required if the soil is ignitable, corrosive, or reactive.

Notification, Certification, and Recordkeeping

In order to properly track the hazardous waste that is generated, transported, treated, stored, and disposed of, EPA imposes certain LDR notification, certification, and recordkeeping requirements on generators and TSDFs. LDR notifications inform the next waste handler how the waste must be treated to meet the treatment standard or if it can be disposed of without treatment. When wastes do not need to meet a treatment standard, or already meet the standard, EPA requires the handler to sign a statement certifying such a claim.

Generators must send a notification with the initial shipment of every waste. If the waste, process, or receiving facility changes, another notification is required. The information that the notification must include varies according to the status of the waste. For example, the notification requirements will differ slightly if the waste meets its treatment standard or is subject to a national capacity variance.

Treatment facilities have to send similar notifications along with the shipment of treated wastes to disposal facilities. A certification normally accompanies this notification stating that the waste meets its treatment standards and may be land disposed. Disposal facilities are the final link in the waste management chain. As a result, they have to test the waste residue that they receive to ensure that it meets the treatment standards.

Each hazardous waste handler must comply with certain recordkeeping requirements for LDR

notifications and paperwork. Generators, treatment facilities, and disposal facilities must keep copies of all LDR paperwork associated with the waste they ship or receive in their facility files for three years.

Characteristic wastes that are decharacterized subsequent to the point of generation (i.e., they become nonhazardous) are handled differently. Once a waste is decharacterized and has met its full LDR treatment standards, it can go to a RCRA Subtitle D nonhazardous waste facility. These LDR notifications and certifications are sent to the EPA Region or authorized state rather than to the receiving Subtitle D facility. This is intended to protect Subtitle D facilities from the burden of hazardous waste paperwork.

■ Dilution Prohibition

The second component of the LDR program is the **dilution prohibition**. When a waste's treatment standard is expressed as a numeric concentration level, it is often easier and less expensive to dilute the waste in water or soil in order to reduce the concentration of the hazardous constituents. This type of activity does not reduce the overall or mass load of toxic chemicals that could be released to the environment, and is inconsistent with the goals of the LDR program. To prevent this activity from being practiced, EPA established the dilution prohibition. The dilution prohibition states that it is impermissible to dilute hazardous waste to circumvent proper treatment. Adding water or soil to a waste to dilute it, combining wastes not amenable to the same type of treatment, and incinerating metal wastes are all examples of impermissible dilution.

DILUTION PROHIBITION

The dilution prohibition forbids dilution, such as the addition of soil or water to waste, in order to reduce the concentrations of hazardous constituents, and can prohibit treatment of a waste by ineffective or inappropriate treatment methods. Examples of ineffective or inappropriate treatment include biodegradation, combustion, or incineration of metals, and stabilization of organics. The clearest objective indication that proper treatment is being conducted is if the treatment is the same type as that on which the treatment standard is based (i.e., if the treatment method is the same as the BDAT that established the waste's treatment standard) or if the treatment process actually destroys or removes hazardous constituents.

■ Storage Prohibition

The final component of the LDR program is the **storage prohibition**. Before a waste can be treated, it is usually stored in units, such as containers and tanks. These storage units are not intended for the long-term management of waste, and therefore, are not required to provide the same level of protective measures as disposal units. To prevent indefinite storage, EPA regulations state that if waste storage exceeds one year, the facility has the burden of proving that such storage is being maintained in order to accumulate quantities necessary for effective treatment or disposal. For storage less than one year, EPA has the burden of proving that such storage is not for the purpose of accumulating quantities necessary for effective treatment or disposal. Generators accumulating waste on site within their respective accumulation time limits (as discussed in Section III, Chapter 3), and transfer facilities temporarily storing manifested shipments of hazardous waste for less than 10 days (as discussed in Section III, Chapter 4), are not subject to this burden of proof requirement.

STORAGE PROHIBITION

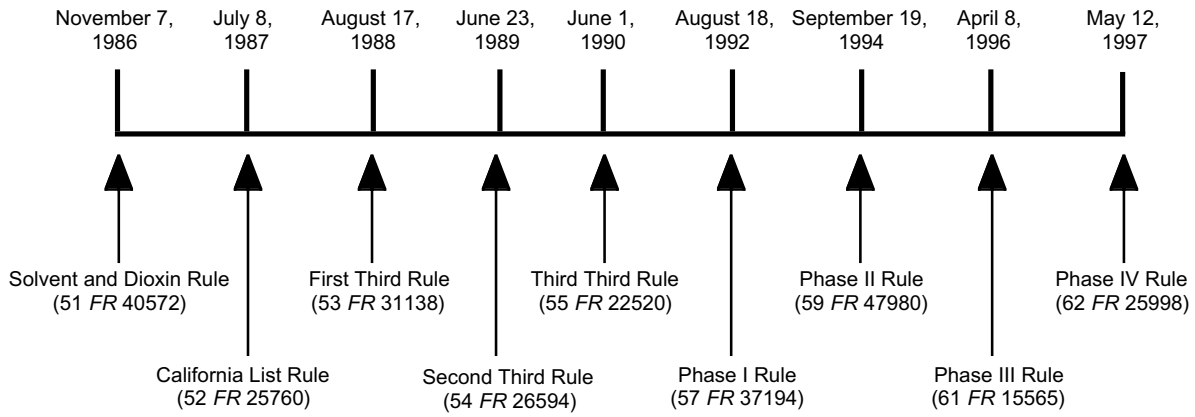
The storage prohibition prevents the indefinite storage of untreated hazardous waste for reasons other than the accumulation of quantities necessary for effective treatment or disposal.

HISTORY OF LDR

The LDR program has a complicated history. The progression of the LDR program is important in understanding how and why the LDR program operates the way it does today (see Figure III-22).

HSWA established the authority for the LDR program. When HSWA was enacted, EPA had already listed and identified a large number of hazardous wastes. As a result, the Agency had to gradually address these wastes by establishing LDR treatment standards in stages. Congress directed

Figure III-22: Significant Land Disposal Restrictions Rulemakings



EPA to address certain high-risk and high-volume wastes first, and established a three-part schedule for EPA to follow in addressing the remaining wastes. The three parts of this schedule are known as the Thirds.

Before EPA could address the wastes in the Thirds, the Agency was required to address those wastes that were high-risk (dioxins) and those wastes that were generated in large amounts (solvents). The treatment standards for these wastes were promulgated on November 7, 1986. This rulemaking also established the basic framework for the LDR program.

Because EPA's promulgation of LDR treatment standards for the large number of wastes in the Thirds would take considerable time, the Agency established interim treatment standards to ensure adequate protection of human health and the environment. These interim standards are known as the **California list**. The list, based on a program established by California's Department of Health Services, became effective on July 8, 1987. These standards did not target specific waste codes, but rather wastes containing certain toxic constituents or exhibiting certain properties. As EPA established waste-specific treatment standards in the Thirds, the California list provisions were superseded. All of the provisions on the list have now been superseded.

To address the wastes that were to be covered under the Thirds, EPA ranked the wastes according to hazard and volume generated. Those wastes that posed the greatest potential threat were addressed first through a rulemaking on August 17, 1988. These wastes are known as the First Third wastes. The treatment standards for the Second Third wastes were promulgated on June 23, 1989, and the treatment standards for the Third Third wastes were promulgated on June 1, 1990.

While EPA was addressing the solvents, dioxins, and the Thirds, other hazardous wastes were being listed and identified as part of the Agency's continuing process of hazardous waste identification. These newly listed and identified wastes, which became subject to RCRA after HSWA, were grouped in their own respective schedules. These schedules are known as the Phases. These schedules not only promulgated treatment standards for newly listed and identified wastes, but also made minor modifications and improvements to the LDR regulatory program.

On August 18, 1992, EPA promulgated Phase I, which finalized treatment standards for the first set of newly listed wastes and established alternative treatment standards for hazardous debris. On September 19, 1994, EPA promulgated Phase II, which also finalized treatment standards for additional newly listed wastes and added the UTS table (40 CFR §268.48). On April 8, 1996, EPA promulgated Phase III, which not only finalized treatment standards for a third set of newly listed wastes, but also prohibited the combustion of metals (such treatment is ineffective and thus constitutes

impermissible dilution). On May 12, 1997, EPA promulgated the first half of Phase IV, which finalized the last set of treatment standards for newly listed wastes and modified the LDR notification requirements. The second half of Phase IV, published on May 26, 1998, completed the schedule established by the Phases by finalizing treatment stndards for newly identified toxicity characteristic metal wastes and formerly exempt mineral processing wastes, and established alternative treatment standards for soil contaminated with hazardous waste.

With the completion of the four Phases, EPA has promulgated standards for all currently identified and listed hazardous wastes. EPA now promulgates the LDR treatment standards for a waste when the waste is initially identified or listed.

SUMMARY

The LDR program is designed to protect ground water from contamination by requiring hazardous wastes to be physically or chemically altered to reduce the toxicity or mobility of hazardous constituents prior to disposal. The LDR requirements apply to all hazardous wastes (with a few exceptions) once a treatment standard has been established for the waste. These requirements attach at the point of generation, at which time generators must determine both hazardous waste listings and characteristics. Based on this determination, the waste must meet all applicable treatment standards before disposal. The LDR program consists of prohibitions on:

- Disposal
- Dilution
- Storage.

The disposal prohibition requires that hazardous wastes be treated to meet waste specific treatment standards before disposal. These standards are based on the BDAT process and requires treatment to a specific concentration level or treatment by a specific technology. EPA established a series of variances, exemptions, and extensions to address those situations where the required treatment standard cannot be achieved. The LDR program also includes alternative treatment standards for unique wastestreams, such as lab packs, debris, and soil. To ensure that wastes receive proper treatment and are managed appropriately, EPA also established notification and recordkeeping requirements.

The dilution prohibition prevents treatment by ineffective or inappropriate methods. The storage prohibition is intended to require expeditious treatment.

Since 1986, when the first treatment standards were promulgated, the LDR program has continually evolved. EPA has finished establishing treatment standards for all existing, newly identified, and newly listed wastes based on two rulemaking schedules (the Thirds and Phases), and the Agency now establishes treatment standards for hazardous wastes when they are either listed or identified.

ADDITIONAL RESOURCES

Additional information about the topics covered in this chapter can be found at www.epa.gov/epaoswer/hazwaste/ldr/index.htm.

CHAPTER 7

HAZARDOUS WASTE COMBUSTION

In this chapter…

OVERVIEW

A large number of TSDFs use **combustion**, the controlled burning of substances in an enclosed area, as a means of treating and disposing of hazardous waste. Approximately 11 percent of the hazardous nonwastewater generated in the United States in 1999 was treated using combustion. As a hazardous waste management practice, combustion has several unique attributes. First, if properly conducted, it permanently destroys toxic organic compounds contained in hazardous waste by breaking their chemical bonds and reverting them to their constituent elements, thereby reducing or removing their toxicity. Second, combustion reduces the volume of hazardous waste to be disposed of on land by converting solids and liquids to ash. Land disposal of ash, as opposed to disposal of untreated hazardous waste, is in many instances both safer and more efficient.

Combustion is an intricate treatment process. During burning, organic wastes are converted from solids and liquids into gases. These gases pass through the flame, are heated further, and eventually become so hot that their organic compounds break down into the constituent atoms. These atoms combine with oxygen and form stable gases that are released to the atmosphere after passing through air pollution control devices.

The stable gases produced by combustion of organics are primarily carbon dioxide and water vapor. Depending on waste composition, however, small quantities of carbon monoxide, nitrogen oxides, hydrogen chloride, and other gases may form. These gases have the potential to cause harm to human health and the environment. The regulation of these emissions is the primary focus of the RCRA combustion unit standards.

The management or disposal of metals and ash, other by-products of the combustion process, also causes concern. Ash is an inert solid material composed primarily of carbon, salts, and metals. During combustion, most ash collects at the bottom of the combustion chamber (**bottom ash**). When this ash is removed from the combustion chamber, it may be considered hazardous waste via the derived-from rule or because it exhibits a characteristic. Small particles of ash (particulate matter that may also have metals attached), however, may be carried up the stack with the gases (**fly ash**). These particles and associated metals are also regulated by the combustion regulations, as they may carry hazardous constituents out of the unit and into the atmosphere. Since combustion will not destroy

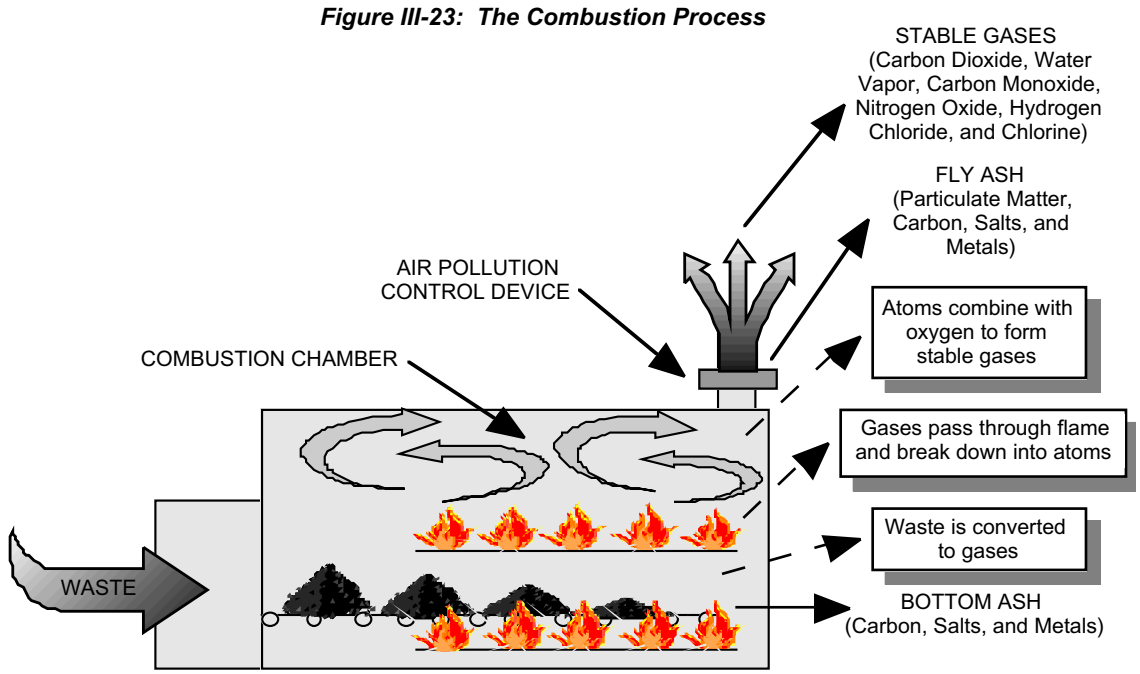
inorganic compounds present in hazardous waste, such as metals, it is possible that such compounds may also end up in bottom ash and fly ash at harmful concentrations. Ash residue is subject to applicable RCRA standards and may need to be treated for metals or other inorganic constituents prior to land disposal (see Figure III-23).

In the early years of RCRA, EPA's idea was to combust as much hazardous waste as possible and landfill the resultant ash. This process destroyed the majority of the waste, thus reducing the volume requiring disposal. However, it was determined that incomplete or improperly conducted combustion had the potential to present a major public health risk, and therefore, became the topic of much public outcry. This public concern, coupled with EPA's advancements in assessing potential risks arising from combustion, caused a shift in EPA's strategy on combustion. This shift in thinking resulted in the increasing stringency of combustion requirements over time.

In September 1999, EPA issued a joint Clean Air Act (CAA)/RCRA rule that upgraded the emission standards for hazardous waste combustors, based on the **maximum achievable control technology (MACT)** approach commonly employed under the CAA. This process develops technology-based, emission limits for individual hazardous air pollutants. Much like the BDAT concept for LDR (as discussed in Section III, Chapter 6), the MACT emission standards are based on the performance of a technology. EPA researches available pollution control technologies to determine which available technology is the best at controlling each pollutant to determine allowable emission limits. The regulated community may then use any technology to meet the numeric emission standards set by EPA.

Consistent with EPA's trend of gradually increasing the stringency of standards over time, this joint rule promulgated more stringent emissions standards for dioxins, furans, mercury, cadmium, lead, particulate matter, hydrogen chloride, chlorine gas, hydrocarbons, carbon monoxide, and several low-volatile metals. After the promulgation of this rule, a number of parties representing the interests of both industrial sources and the environmental community, requested judicial review of this rule.

Figure III-23: The Combustion Process



In July 2001, the United States Court of Appeals for the District of Columbia Circuit vacated the challenged portions of the rule. When it made its decision, the Court invited any of the parties to request, either that the current standards remain intact, or that EPA be allowed time to publish interim standards. Acting on this initiative, EPA and the other parties jointly asked the Court for additional time to develop interim standards, and the Court granted this request. On February 13, 2002, EPA published these interim standards which temporarily replace the vacated standards. The interim standards will remain in place until EPA issues final "replacement" standards that comply with the Court's opinion. EPA has also completed other actions agreed to in the joint motion, such as extending the compliance date by one year to September 30, 2003, and finalizing several amendments to the complaince and implementation provisions by February 14, 2002. The MACT standards are discussed later in this chapter.

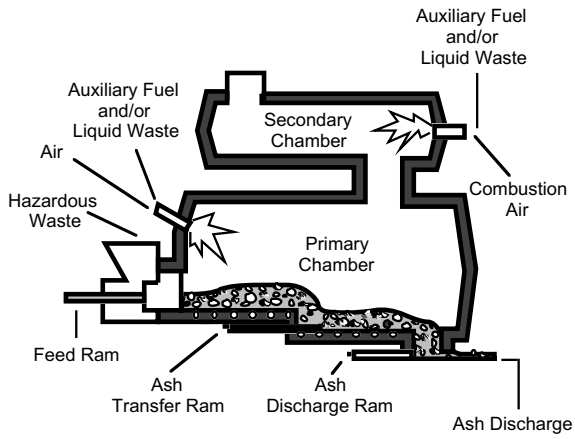
WHAT ARE THE REGULATED UNITS?

Hazardous wastes are combusted for various purposes. The purpose of combustion is directly related to the type of unit used. There are two classes of combustion units, those that burn waste for energy recovery and those that burn waste for destruction.

■ Incinerators

The first class of combustion units are hazardous waste incinerators. Incineration is the combustion of hazardous waste primarily for destruction (i.e., disposal). Incineration is a method of thermal destruction of primarily organic hazardous waste using controlled flame combustion (see Figure III-24). This process can reduce large volumes of waste materials to ash and lessen toxic gaseous emissions. An **incinerator** is an enclosed device that uses controlled flame combustion and does not meet the more specific criteria for classification as a boiler, industrial furnace, sludge dryer (a unit that dehydrates hazardous sludge), or carbon regeneration unit (a unit that regenerates spent activated carbon). Incinerators also include infrared incinerators (a unit that uses electric heat followed by a controlled flame afterburner) and plasma arc incinerators (a unit that uses electrical discharge followed by a controlled flame afterburner).

Figure III-24: Cross-Section of an Incinerator

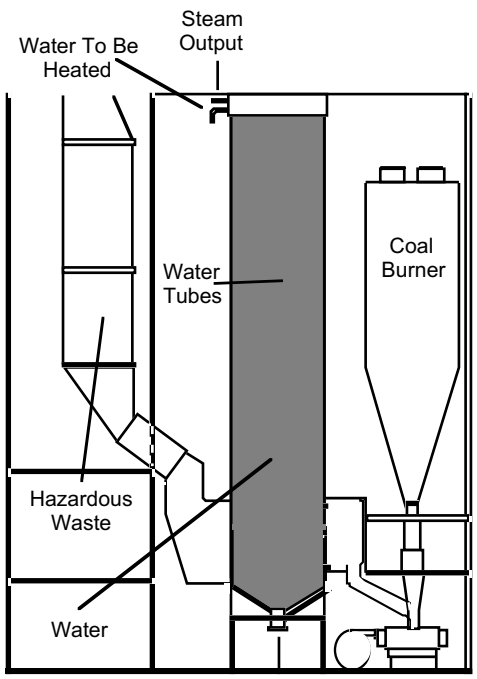


■ Boilers and Industrial Furnaces

The second class of combustion units are BIFs. Boilers are used to recover energy from hazardous waste, while industrial furnaces are used primarily to recover material values.

EPA defines **boilers** as enclosed devices that use controlled flame combustion to recover and export energy in the form of steam, heated fluid, or heated gases. A boiler is comprised of two main parts, the combustion chamber used to heat the hazardous waste and the tubes or pipes that hold the fluid used to produce energy (see Figure III-25). The regulatory definition of boiler requires that these two parts be in close proximity to one another to ensure the effectiveness of the unit's energy recovery system and to maintain a high thermal energy recovery efficiency. In addition, the unit must export or use the majority of the recovered energy for a beneficial purpose.

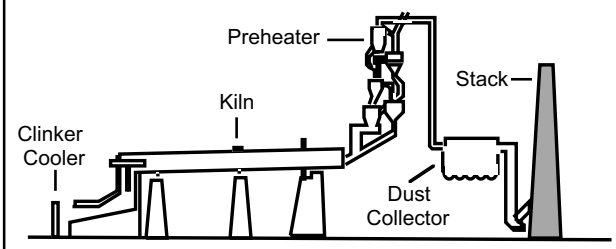
Figure III-25: Cross-Section of a Boiler



Industrial furnaces are enclosed units that are integral parts of a manufacturing process and use thermal treatment to recover materials or energy from hazardous waste (see Figure III-26). These units may use hazardous waste as a fuel to heat raw materials to make a commodity (e.g., a cement kiln making cement) or the unit may recover materials from the actual hazardous waste (e.g., a lead smelter recovering lead values). The following 12 devices meet the definition of an industrial furnace:

- Cement kiln
- Aggregate kiln
- Coke oven
- Smelting, melting, and refining furnace
- Methane reforming furnace
- Pulping liquor recovery furnace
- Lime kiln
- Phosphate kiln
- Blast furnace
- Titanium dioxide chloride process oxidation reactor
- Halogen acid furnace
- Combustion device used in the recovery of sulfur values from spent sulfuric acid.

Figure III-26: Cross-Section of an Industrial Furnace



After notice and comment, EPA may add other devices to this list of industrial furnaces upon consideration of factors related to the design and use of the unit.

Not all units that meet the definition of boiler or industrial furnace are subject to the 40 CFR Part 266, Subpart H, Boiler and Industrial Furnace (BIF) standards. Each individual unit must first be evaluated against a number of exemptions from the BIF requirements. For a variety of reasons (e.g., to avoid duplicative regulation), EPA exempted the following units from the BIF regulations:

- Units burning used oil for energy recovery
- Units burning gas recovered from hazardous or solid waste landfills for energy recovery
- Units burning hazardous wastes that are exempt from RCRA regulation, such as household hazardous wastes
- Units burning hazardous waste produced by CESQGs
- Coke ovens burning only K087 decanter tank tar sludge from coking operations
- Certain units engaged in precious metals recovery
- Certain smelting, melting, and refining furnaces processing hazardous waste solely for metals recovery
- Certain other industrial metal recovery furnaces.

REGULATORY REQUIREMENTS

Emissions from hazardous waste combustors are regulated under two statutory authorities—RCRA and the Clean Air Act (CAA). Applicable RCRA regulations include 40 CFR Part 264, Subpart O, and Part 265, Subpart O, for incinerators and 40 CFR Part 266, Subpart H, for BIFs. RCRA permitting requirements for these units are provided in 40 CFR Part 270. These units are also subject to the general TSDF facility standards under RCRA. Hazardous waste incinerators and hazardous waste burning cement kilns and lightweight aggregrate kilns (LWAKs) are also subject to the CAA MACT emission standards. The MACT standards set emission limitations for dioxins, furans, metals, particulate matter, total chlorine, hydrocarbons/ carbon monoxide, and destruction and removal efficiency (DRE) for organics. Once a facility has demonstrated complance with the MACT standards by conducting its comprehensive performance test and submitting its Notification of Compliance (NOC), it is no longer subject to the RCRA emission requirements with few exceptions. RCRA permitted facilities, however, must continue to comply with their permitted emissions requirements until they obtain modifications to remove any duplicative emissions conditions from their RCRA permits. The combustion standards under RCRA, as well as the MACT standards under the CAA, are discussed below.

■ Combustion Standards under RCRA

Emissions from combustion units may be comprised of a variety of hazardous pollutants. To minimize potential harmful effects of these pollutants, EPA developed performance standards to regulate four pollutant categories: organics, hydrogen chloride and chlorine gas, particulate matter, and metals. Boilers and most industrial furnaces have performance standards that they must meet. For each category or type of emission, the regulations establish compliance methods and alternatives.

Organics

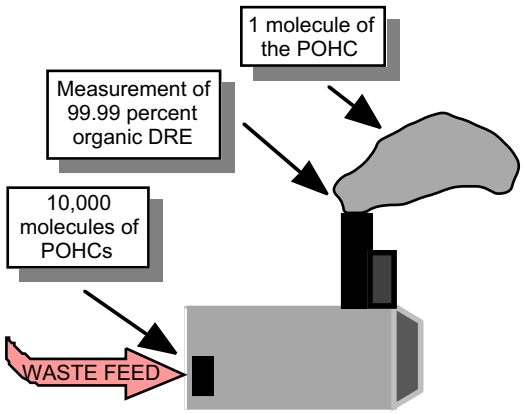
Because the primary purpose of a combustion unit is to destroy the organic components found in hazardous waste, it is essential to verify that the unit is efficiently destroying organics in the waste. This is determined based on the unit's organic **destruction and removal efficiency (DRE)** as demonstrated in a trial burn. Since it would be nearly impossible to determine the DRE results for every organic constituent in the waste, certain **principal organic hazardous constituents (POHCs)** are selected for this demonstration. These POHCs are selected for each facility based on their high concentration in the wastestream and their greater difficulty to burn. If the unit achieves the required DRE for the POHCs, then it is presumed that it will achieve the same (or better) DRE for all other easier-to-burn organics in the wastestream. At least one POHC will be selected from each wastestream that the facility manages. The facility designates the selected POHCs in their permit application (the permitting process for combustion units is fully discussed in Section III, Chapter 8).

The combustion unit must demonstrate a DRE of 99.99 percent for each POHC in the hazardous wastestream. This means that for every 10,000 molecules of the POHC entering the unit, only one molecule can be released to the atmosphere. In addition, due to an increased threat to human health and the environment posed by certain dioxin-containing wastes (F020, F021, F022, F023, F026, and F027), the required DRE for POHCs in these units has been established at 99.9999 percent, or one released molecule for every one million burned (see Figure III-27). These DRE standards must be met by both incinerators and BIFs.

Hydrogen Chloride and Chlorine Gas

Hydrogen chloride and chlorine gases form when chlorinated organic compounds in hazardous wastes are burned. If uncontrolled, this chlorine can become a human health risk and is a large component in the formation of acid rain. EPA has developed different requirements to control the emissions of chlorine from the different classes of combustion units.

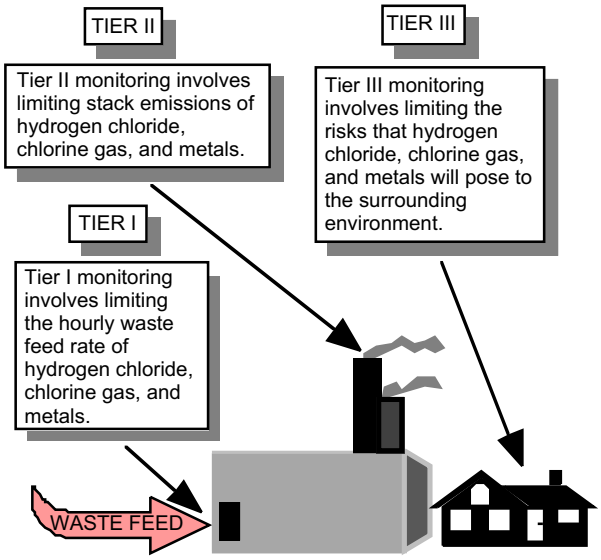
Figure III-27: Performance Standards for Organics



POHCs are chosen based on their high concentration in the wastestream and their greater difficulty to burn. If the unit demonstrates the required DRE for the POHCs, then it is presumed that it will be able to achieve the same (or better) DRE for all other easier-to-burn organics in the wastestream. For every 10,000 molecules of POHCs that enter a combustion process, the unit must destroy 9,999 of them.

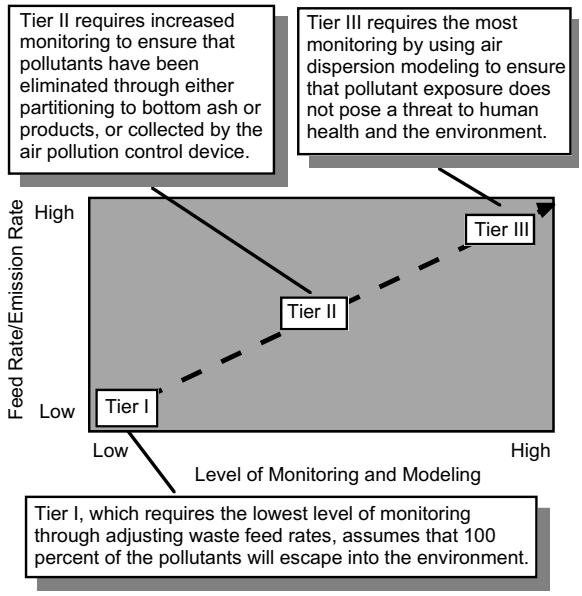
Boilers and most industrial furnaces must follow a tiered system for the regulation of both hydrogen chloride and chlorine gas. The owner and operator determines the allowable feed or emission rate of total chlorine by selecting one of three approaches, called tiers. Each tier differs in the amount of monitoring, and in some cases, air dispersion modeling (i.e., modeling the air pathways through which pollutants may travel), that the owner and operator is required to conduct (see Figure III-28).

Figure III-28: Performance Standards for Hydrogen Chloride, Chlorine Gas, and Metals



Each facility can select any of the three tiers. Factors that a facility may consider in selecting a tier include the physical characteristics of the facility and surrounding terrain, the anticipated waste compositions and feed rates, and the level of resources available for conducting the analysis. The main distinction between the tiers is the point of compliance. This is the point at which the owner and operator must ensure that chlorine concentrations will be below EPA's acceptable exposure levels. The owner and operator must determine if the cost of conducting monitoring and modeling is worth the benefit of possibly combusting waste with a higher concentration of chlorine (see Figure III-29).

Figure III-29: The Tiered System of Modeling and Monitoring



Owners and operators can choose any Tier for their hydrogen chloride, chlorine gas, and metals monitoring; however, the level of monitoring and modeling increase with each tier.

Particulate Matter

The third combustion unit performance standard is for **particulate matter**. Particulate matter consists of small dust-like particles emitted from combustion units. The particles themselves are not normally toxic, but may become caught in the lungs (causing respiratory damage) if inhaled, or may enter into the environment where they can cause either ecological damage or, via food chain intake, can reenter the human health exposure pathway. In addition, particulate matter may provide a point of attachment for toxic metals and organic compounds. To minimize these adverse conditions, RCRA combustion units may not emit more than 180 milligrams per dry standard cubic meter (dscm) of particulate matter.

Metals

The final performance standard is for toxic metals. For RCRA combustion units, both carcinogenic and noncarcinogenic metals are regulated under the same type of tiered system as chlorine. The facility determines an appropriate tier for each regulated metal and assures that the facility meets these feed rate and emission standards. A different tier may be selected for each metal pollutant (see Figure III-28).

Additional Performance Standards

EPA may require owners and operators of hazardous waste combustion units to comply with additional performance standards by virtue of the omnibus authority. This authority allows EPA to incorporate additional terms and conditions into a facility's permit as necessary to protect human health and the environment. (The omnibus authority is fully discussed in Section III, Chapter 8.)

EPA recommends that site-specific risk assessments, incorporating direct and indirect exposures, be considered during the combustion unit's permitting process. These risk assessments may be used to evaluate the unit's impact on the surrounding environment. If a site-specific risk assessment shows that additional protection should be afforded to the surrounding environment, EPA typically will use the omnibus authority to impose the necessary permit conditions (Omnibus permitting authority is fully discussed in Section III, Chapter 8).

Operating Requirements

The goal of setting operating requirements for hazardous waste combustion units is to ensure that the unit will operate in a way that meets the performance standards for organics, chlorine, particulate matter, and metal pollutants. The unit's permit will specify the operating conditions that have been shown to meet the performance standards for organics, chlorine gas, particulate matter, and metals (permit requirements for combustion units are fully discussed in Section III, Chapter 8).

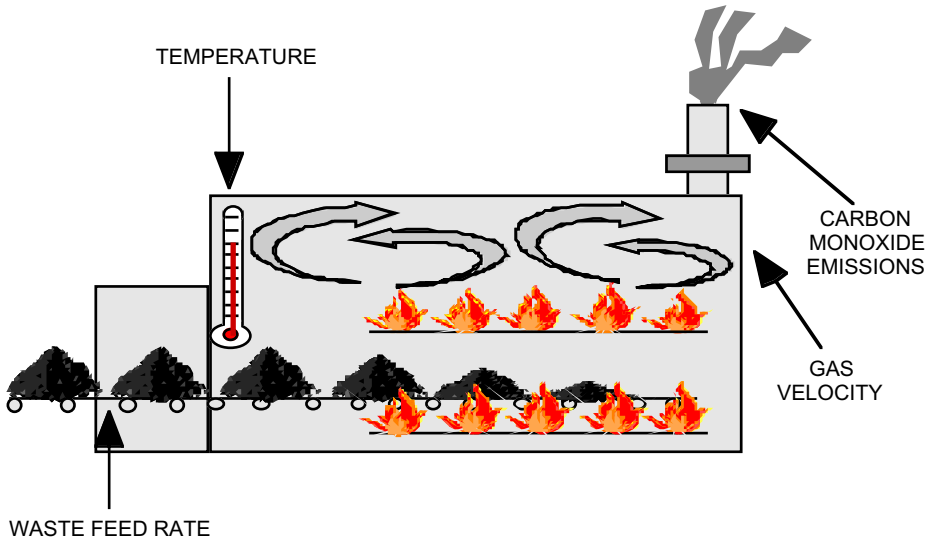
A RCRA permit for a hazardous waste combustion unit sets operating requirements that specify allowable ranges for, and requires continuous monitoring of, certain critical parameters that will ensure compliance with the performance standards. Operation within these parameters ensures that combustion is performed in the most protective manner and the performance standards are achieved (see Figure III-30). These parameters, or operating requirements, may include:

- Maximum waste feed rates
- Control of the firing system
- Allowable ranges for temperature
- Limits on variations of system design and operating procedures
- Gas flow rate.

■ MACT Standards under the CAA

Hazardous waste burning incinerators, cement kilns, and LWAKS, hereafter referred to as MACT combustion units, must also comply with emission limitations. The MACT emission standards are found under the CAA regulations, rather than the Subtitle C requirements. Instead of using operating requirements as a way of ensuring that the unit meets the performance standards, owners or operators of combustion units subject to MACT standards may use a pollution control technology to achieve the stringent numerical emission limits.

Figure III-30: Operating Requirements



Combustion facilities must operate in accordance with certain conditions that specify allowable ranges and limits for waste feed rates, temperature, gas velocity, and carbon monoxide emissions.

Organics

To control the emission of organics, these units must comply with similar DRE requirements to the other hazardous waste combustion units. Owners or operators of MACT combustion units must select POHCs and demonstrate a DRE of 99.99 percent for each POHC in the hazardous wastestream. Sources that burn hazardous waste F020-F023 or F026-F027 have a required DRE of 99.9999 percent for each POHC designated. Additionally, for dioxins and furans, EPA promulgated more stringent standards under MACT. For example, MACT incinerators and cement kilns that burn waste with dioxins and furans, must not exceed an emission limitation of either 0.2 nanograms of toxicity equivalence per dry standard cubic meter (TEQ/dscm) or 0.4 nanograms TEQ/dscm at the inlet to the dry particulate matter control device. This unit of measure is based on a method for assessing risks associated with exposures to dioxins and furans.

Hydrogen Chloride and Chlorine Gas

Rather than a tiered system to control hydrogen chloride and chlorine gas emissions, MACT combustion units must meet numerical emission limits for total chlorine. Owners and operators of these units must ensure that the total chlorine emission does not exceed specific limits, expressed in ppmv (parts per million by volume). For example, the allowable limit of total chlorine for a new incinerator is 21 ppmv. The owner or operator may choose to achieve this level by controlling the amount of chlorine entering the incinerator. By achieving the regulatory emission limit of chlorine, both hydrogen chloride and chlorine gas emissions will be reduced.

Particulate Matter

EPA developed more stringent standards for particulate matter in order to control certain metals. This surrogate is used because particulate matter may provide a point of attachment for toxic metals that can escape into the atmosphere from a combustion unit. For instance, a new LWAK cannot exceed an emission limit of 57 mg/dscm of particulate matter.

Metals

Hazardous waste burning incinerators, cement kilns, and LWAKs do not follow a tiered approach to regulate the release of toxic metals into the atmosphere. The MACT rule finalized numerical emission standards for three categories of metals:

mercury, low-volatile metals (arsenic, beryllium, and chromium), and semi-volatile metals (lead and cadmium). Units must meet emission standards for the amount of metals emitted. For example, a new cement kiln must meet an emission limit of 120 μg/dscm for mercury, 54 μg/dscm for the low-volatile metals, and 180 μg/dscm for the semi-volatile metals.

Operating Requirements

Owners or operators of MACT units must ensure that the MACT emission standards are not exceeded. To do this, the unit must operate under parameters that are demonstrated in a **comprehensive performance test (CPT)**. The unit's operating parameters, such as temperature, pressure, and waste feed are then set based on the result of the comprehensive performance test and documented in a notification of compliance. **Continuous monitoring systems** are used to monitor the operating parameters.

The facility may also choose to use an advanced type of monitoring known as **continuous emissions monitoring systems (CEMS)**. CEMS directly measure the pollutants that are exiting the combustion unit stack at all times. If a facility chooses to use a CEMS, they do not need to comply with the operating parameter that would otherwise apply.

ADDITIONAL REQUIREMENTS

Because hazardous waste combustion units are a type of TSDF, they are subject to the general TSDF standards (as discussed in Section III, Chapter 5) in addition to combustion unit performance standards and operating requirements. Combustion units are also subject to specific waste analysis, inspection and monitoring, and residue management requirements.

While combusting hazardous waste, the combustion process and equipment must be monitored and inspected to avoid potential accidents or incomplete combustion. The monitoring and inspection requirements for incinerators are detailed in the regulations, while the requirements for BIFs are determined on a site-specific basis. Possible inspection and monitoring requirements include:

- Monitoring the combustion temperature, and hazardous waste feed rate
- Sampling and analyzing the waste and exhaust emissions to verify that the operating requirements established in the permit achieve the performance standards
- Conducting visual inspections of the combustion unit and its associated equipment
- Testing the emergency waste feed cut-off system and associated alarms
- Placing monitoring and inspection data in the operating log.

Residues from the combustion of hazardous waste are also potentially subject to RCRA regulation. If a combustion unit burns a listed hazardous waste, the ash could also be considered a listed waste via the derived-from rule. The owner and operator must also determine whether this ash exhibits any hazardous waste characteristics. The same is true if a unit burns waste that only exhibits a characteristic. Ash that exhibits a characteristic must be managed as a hazardous waste.

SUMMARY

Combustion, the controlled burning of hazardous substances in an enclosed area, has the potential to adversely affect human health and the environment, and it is therefore subject to strict regulation. As a result, the burning of hazardous waste in incinerators and BIFs is regulated through stack emission limitations and unit operating requirements.

Combustion standards are comprised of two types of regulations: (1) standards under RCRA; and (2) MACT standards under the CAA.

RCRA combustion units must meet performance standards, including a demonstration of the unit's DRE for certain POHCs, and meet emission standards for hydrogen chloride, chlorine gas, metals, and particulate matter. Operating

requirements are intended to ensure that the combustion unit will operate in a way that meets the performance standards for these pollutants. Operating conditions may include:

- Maximum waste feed rate
- Control of the firing system
- Allowable ranges for temperature
- Limits on variations of system design and operating procedures
- Gas flow rate.

The MACT standards under the CAA regulate incinerators and two types of industrial furnaces that burn hazardous waste: cement kilns and LWAKS. MACT combustion units must comply with strict emission limitations for dioxins, furans, metals, particulate matter, DRE, and total chlorine. To achieve the limits, the facility owner or operator may use a single or multiple pollution control technologies for the combustion unit. The facility also uses a CMS to monitor operating parameters such as temperature, pressure, waste feed, or CEMS to monitor the pollutants exiting the unit.

In addition to operating and performance requirements, all combustion units are subject to specific waste analysis, inspection and monitoring, and residue management requirements.

ADDITIONAL RESOURCES

A complete overview of the MACT standards and additional information about hazardous waste combustion can be found at www.epa.gov/epaoswer/hazwaste/combust.htm.

CHAPTER 8

PERMITTING OF TREATMENT, STORAGE, AND DISPOSAL FACILITIES

In this chapter…

OVERVIEW

When RCRA was enacted, Congress recognized the risks posed by the treatment, storage, and disposal of large volumes of hazardous waste at TSDFs. Considering these risks, Congress felt that TSDF management activities needed to be closely regulated to prevent spills, accidents, and mechanical failures. In addition, because these activities involve different units and different waste management methods, they require tailored standards. For example, land disposal units need precautions, such as liners and ground water monitoring, to ensure protection of ground water resources. Similarly, incinerators need special provisions, such as emission control requirements, to ensure protection of air resources. In response to these concerns, EPA promulgated extensive technical standards for the design and safe operation of hazardous waste TSDFs (these regulations are fully discussed in Section III, Chapter 5). However, these design and operating standards were not enough. Congress wanted a more tangible guarantee that TSDFs would comply with their extensive management standards in a way that would adequately protect human health and the environment.

TSDFs are unique in that their owners and operators choose to enter the hazardous waste industry. Unlike generators who produce hazardous

WHAT ARE PERMITS?

Permits provide TSDF owners and operators with the legal authority to treat, store, or dispose of hazardous waste and detail how the facility must comply with the regulations. Compliance with this permit ensures that hazardous waste is handled in a controlled manner that is protective of human health and the environment. Permits also serve as an implementation mechanism, and as a means by which EPA can track waste management at facilities that choose to handle hazardous waste.

waste incidental to their normal business operations, TSDF owners and operators make it their business to manage hazardous waste. Because these facilities choose to enter the hazardous waste industry, and engage in waste management processes that pose varied and extensive risks to human health and the environment, Congress wanted to ensure that these facilities would comply with the TSDF standards.

As a result, TSDFs are required to obtain permission, in the form of an operating permit, which establishes the administrative and technical conditions under which waste at the facility must be managed. Specifically, permits provide TSDF owners and operators with the legal authority to treat, store, or dispose of hazardous waste and detail how the facility must comply with the regulations. Compliance with this permit ensures that hazardous waste is handled in a controlled manner that is protective of human health and the environment. Permits also serve as an implementation mechanism, and as a means by which EPA can track waste management at facilities that choose to handle hazardous waste.

Permits can be issued by EPA, authorized states, or both. The permitting agency has the authority to issue or deny permits and is responsible for verifying that facilities are operating in compliance with the conditions set forth in that permit. Owners and operators of facilities that do not comply with permit provisions are subject to possible RCRA enforcement actions, including financial penalties.

APPLICABILITY

All TSDF owners and operators must submit a comprehensive permit application that covers the full range of TSDF standards, including general facility provisions, unit-specific requirements, closure and financial assurance standards, and any applicable ground water monitoring and air emissions provisions. The permit application must demonstrate that the permittee's methods of handling the waste are consistent with the level of protection of human health and the environment required by RCRA.

Some facilities are not required to obtain a RCRA permit when handling hazardous waste provided that they meet certain conditions specified in the regulations. EPA has determined that the requirements of the permit process would place an unnecessary regulatory burden on these facilities because the manner in which they manage the waste does not pose a significant threat to human health and the environment. These exceptions include:

- LQGs accumulating waste on site for less than 90 days (as discussed in Section III, Chapter 3)
- SQGs accumulating waste on site for less than 180 days (as discussed in Section III, Chapter 3)
- Farmers disposing of waste pesticides and container residues on their own land
- Owners and operators of ENUs, TETUs, and WWTUs (as discussed in Section III, Chapter 5)
- Transporters storing manifested wastes at transfer facilities for a period of 10 days or less (as discussed in Section III, Chapter 4)
- Owners and operators performing containment activities during an immediate response to an emergency
- Universal waste handlers and transporters (as discussed in Section III, Chapter 2)
- Persons adding absorbent material to hazardous waste in a container and persons adding waste to absorbent material in a container.

If any of these facilities treat, store, or dispose of hazardous waste in a manner not covered by one of these exclusions, they are subject to the RCRA permit requirements for that activity. For example, if a LQG exceeds the 90-day accumulation time limit, the facility becomes a storage facility and the owner and operator must obtain RCRA operating permit.

Recycling units are also exempt from permitting requirements because the recycling process itself is exempt from RCRA (except for some air emission standards). However, recycling facility owners and operators must follow all applicable Subtitle C requirements (including the requirement to obtain a permit) for any waste management prior to recycling.

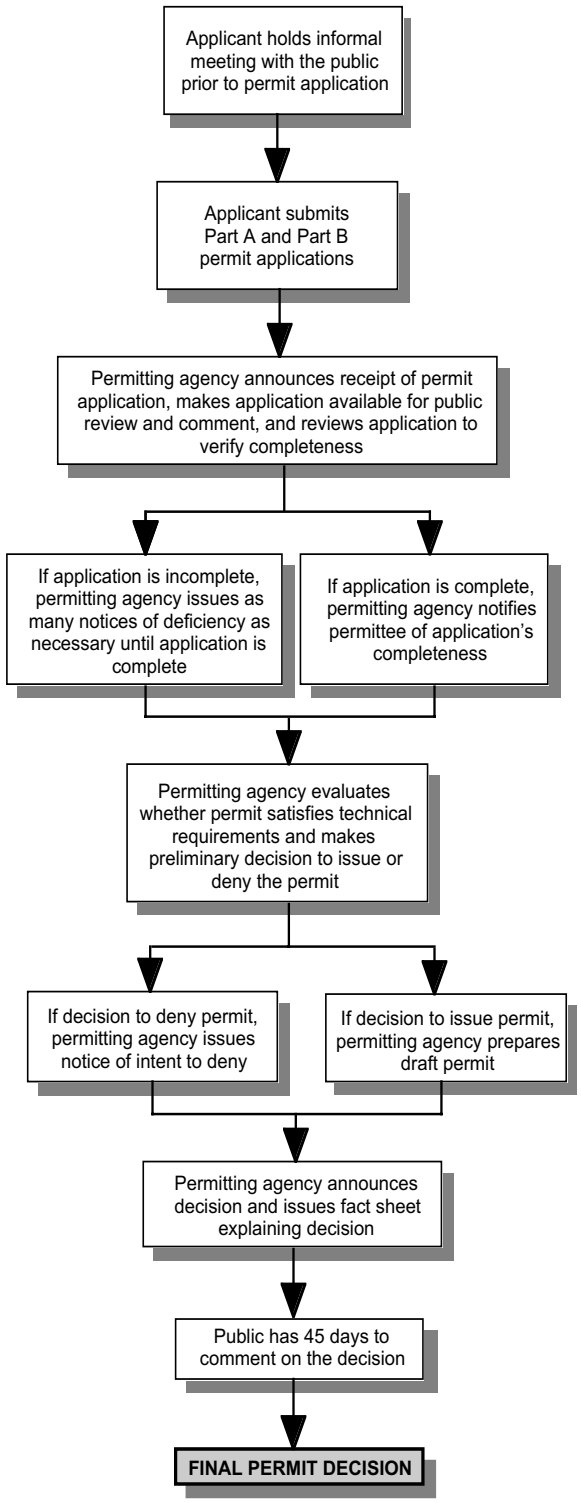
PERMITTING PROCESS

Owners and operators who are subject to the permitting requirements must submit a permit application in accordance with specific permit application procedures (see Figure III-31). While the operator has the duty to obtain the permit, both the owner and operator must sign it. Once a permit has been approved for a specified duration, changes may be necessary and permit modification procedures, which are analogous to the initial permit application, must be followed. The procedures have been established to account for facility-specific conditions by providing flexibility and ample opportunity for public involvement.

■ Informal Meeting Prior to Application

Prior to submitting a permit application, an applicant must announce and hold an informal meeting with the public. The purpose of this meeting is for the applicant to explain the operating plans for the facility to the public, including the waste the facility will handle and associated waste management processes, and for the public to pose questions and make suggestions. This informal public meeting is also intended to provide the owner and operator with issues and concerns to consider when drafting the permit. The permitting agency also uses this meeting to compile a mailing list for future public outreach.

Figure III-31: The Permitting Process



Permit Submission

After the public meeting, the applicant can submit the permit application to the permitting agency. The permit application is divided into two parts, Part A and Part B. The Part A application is submitted on a designated form, *EPA Form 8700-23*, and requires basic information about the facility, such as the name of the facility owner and operator, the facility location, the hazardous waste management processes, the design capacity of these processes, and the hazardous waste that will actually be handled at the facility. This form can be downloaded from the Internet at www.epa./epaoswer/hazwaste/data/form8700/forms.htm.

The Part B application is submitted in narrative form and provides site-specific information associated with the waste management activities that will be conducted at the facility, and includes geologic, hydrologic, and engineering data (see Figure III-32). The Part B application covers the details associated with the waste management activities that will occur at the facility, and therefore often consists of volumes of documents.

Owners and operators of new facilities must submit Parts A and B simultaneously. This submission must occur at least 180 days prior to the date on which physical construction is expected to begin. An owner and operator cannot begin construction of the facility until the application is reviewed and a final permit is issued.

Figure III-32: Examples of Part A and Part B Information Requirements

PART A
- Activities conducted that require a permit
- Facility Name, mailing address, and location
- Facility standard industrial classification (SIC) codes
- Treatment, storage, and disposal processes
- Design capacity of waste management units
- Lists of wastes to be managed at facility
- Permits received or applied for under other regulatory programs
- Topographic map.

PART B
- General facility description
- Analyses of wastes to be managed
- Facility security procedures
- Inspection schedule
- Contingency plan
- Procedures and precautions to prevent release of waste into environment
- Procedures and precautions to prevent accidental ignition or reaction of waste
- Facility location information.

Permit Review

The permitting agency announces its receipt of the permit application and makes the application available for public review and comment. Simultaneously, the agency reviews the application to verify its completeness. If the permitting agency determines that the application is incomplete, it issues a **notice of deficiency** to the permittee describing the additional information that is necessary for a complete application. Such notices can be issued numerous times during the permit review and revision process. Each time the agency receives information, it reviews the content, and if necessary, issues another notice until the application is complete.

When the application contains all of the necessary information, the permitting agency notifies the permittee of the application's completeness and will begin an evaluation to determine whether it satisfies the appropriate technical requirements. After the evaluation, the permitting agency makes a preliminary decision on whether to issue or deny the permit. If the permitting agency determines that the application is complete and satisfies all applicable requirements, the agency prepares a draft permit. If the permitting agency determines that the application does not demonstrate compliance with the RCRA standards, it will tentatively deny the permit and issue a **notice of intent to deny**.

Preparation of the Draft Permit

In preparing the draft permit, the implementing agency incorporates all applicable technical requirements and all other conditions associated with the operations to be conducted at the facility into the permit. In addition, general and administrative conditions are placed in all draft permits and require the permittee, among other things, to:

- Comply with all provisions of the permit
- Provide any relevant information that is requested by the permitting agency
- Comply with all reporting requirements
- Allow the facility to be inspected
- Take all reasonable steps to protect human health and the environment.

In addition, the draft permit includes a statement of the permitting agency's right to modify, revoke and reissue, or terminate the permit as necessary. The draft permit also includes the term of the permit.

If a facility needs to conduct corrective action, but cannot complete the cleanup before the permit is issued, the permitting agency may include a schedule of compliance in the permit. This schedule establishes interim and final dates for the completion of specific cleanup goals, as well as reporting requirements.

Taking Public Comment

Once the draft permit is complete, or the notice of intent to deny has been issued, the permitting agency announces its decision by sending a letter to everyone on the facility mailing list, placing a notice in a local paper, and broadcasting the decision over the radio. The permitting agency also issues a fact sheet to explain the decision. After the announcement, the public has 45 days or more to comment on the decision. Citizens may request a public hearing to address concerns by contacting the permitting agency. The permitting agency may also hold a hearing at its own discretion, if deemed necessary. There is at least a 30-day public notice period before the hearing is convened.

If information submitted during the initial comment period appears to raise substantial new questions concerning the permit, the permitting agency may reopen or extend the comment period. In this situation, the permitting agency may also decide to revise the draft permit or issue a notice of intent to deny.

Finalizing the Permit

After the comment period closes, the implementing agency prepares a response to all significant public comments and makes the final permit decision by either issuing or denying the permit. The owner and operator may appeal the decision to EPA's Environmental Appeals Board. When this administrative appeal is exhausted, the petitioner may seek judicial review of the final permit decision.

Duration of the Permit

RCRA permits are effective for a fixed term of a maximum of 10 years. However, EPA can issue a permit for less than the allowable term. Limiting permit duration assures that facilities are periodically reviewed and that their requirements are updated to reflect the current state-of-the-art hazardous waste management practices. Considering the increased risks posed by the management of hazardous waste on the land, land disposal unit permits are to be reviewed five years after the date of issuance or reissuance and modified as necessary. An expiring permit can be continued when the permittee has submitted a timely application for a new permit by the expiration date of the existing permit. Permits that continue remain fully effective and enforceable.

Permit Modifications

EPA views permits as living documents that can be modified to allow facilities to implement technological improvements, comply with new environmental standards, respond to changing waste streams, and generally improve waste management practices. The permitting agency cannot anticipate all of the administrative, technical, or operational changes required over the permit term for the facility to maintain a state-of-the-art operation, and therefore, permit modifications are inevitable. The regulations governing permit modifications were developed to provide owners and operators and EPA with flexibility to change permit conditions, expand public notification and participation opportunities, and allow for expedited approval if no public concerns exist regarding a proposed change. Permit

Figure III-33: Examples of Permit Modification Classifications

Class 1	Class 2	Class 3
Adminstrative and informational changes	Changes in frequency or content of inspection schedules	Addition of corrective action program
Correction of typographical errors	Changes to corrective action program	Creation of a new landfill as part of closure
Changes in names, addresses, and phone numbers of emergency coordinators	Extensions of post-closure care period	Addition of compliance monitoring to ground water monitoring program
Changes to waste sampling and analysis methods to comply with new regulations	Changes to facility training plan that affect the type or amount of employee training	Reduction in post-closure care period
Changes to analytical quality assurance and quality control plan to comply with new regulations	Changes in number, location, depth, or design of groundwater monitoring wells	Addition of temporary incinerator for closure activities

Note: Permit modifications are classified in more detail in 40 CFR §270.42, Appendix I

modifications can be requested by either the permittee or the permitting agency.

The regulations for permittee-requested modifications establish three classes of modifications. Class 1 modifications cover routine changes, such as correcting typographical errors or replacing equipment with functionally equivalent equipment. Class 2 modifications address common or frequently occurring changes needed to maintain a facility's level of safety or a facility's requirement to conform to new regulations. Class 3 modifications cover major changes that substantially alter the facility or its operations (see Figure III-33). Procedures differ among the three classes of permittee-requested modifications based on the degree of change. Class 1 modifications have minor administrative requirements and may or may not need prior Agency approval. Class 2 and 3 modifications have more substantial administrative requirements and require prior Agency approval followed by a process similar to the permitting process.

The permitting agency may request a permit modification if there are substantial alterations or additions to the facility, if new information is received by the permitting agency that was not available at the time of permit issuance, or if new regulations or judicial decisions affect the conditions of the permit. The permitting agency will request that the facility initiate the modification procedures for the type of change being requested. The permitting agency may terminate a permit if the facility fails to comply with any condition of the permit or does not disclose or misrepresents any relevant facts, or if the permitted activity endangers human health and the environment.

■ Omnibus Provision

Some hazardous waste management practices may pose threats to human health and the environment that are not specifically addressed by the RCRA regulations. To address such instances, HSWA increased the authority of EPA when writing permits by creating the **omnibus provision**. This authority allows EPA to add conditions that are not specifically described in Part 264 to an operating permit, where the permit writer demonstrates that the additional standards are necessary to protect human health and the environment. For example, EPA could invoke the omnibus authority to require a

TSDF owner and operator to conduct a site-specific risk assessment of the impact on endangered species before issuing an operating permit to the facility, even though such risk assessments are not specifically mandated by the RCRA regulations.

■ Permit-as-a-Shield

In general, compliance with a RCRA permit is considered compliance with the RCRA regulations for enforcement purposes. This gives permittees the security of knowing that if they comply with their permits, they will not be enforced against for violating new requirements that were not established in the original permit. This is referred to as the **permit-as-a-shield** provision. EPA believes that the most useful purpose of a permit is to specifically prescribe the requirements that a facility has to meet to allow that facility to plan and operate with knowledge of what rules apply.

While permit-as-a-shield protects a facility from having to comply with new regulatory requirements that were not included in the original operating permit, some regulatory requirements are of such importance to the protection of human health and the environment that EPA feels that TSDFs should have to comply with them immediately. As a result, the permit-as-a-shield provision does not apply to some types of new regulatory provisions. Examples are the LDR standards, the liner and leak detection requirements for certain land disposal units, and the organic air emissions provisions.

INTERIM STATUS

Many TSDFs were already existing and operating when they became subject to RCRA regulatory requirements as a result of a statutory or regulatory change. These owners and operators were immediately subject to the RCRA requirements, including the requirement to obtain an operating permit. Many of these facilities were not able to immediately meet the required TSDF design and operating standards in order to obtain an operating permit. Congress recognized that it would be virtually impossible for the Agency and authorized states to issue permits to all existing TSDFs before the RCRA Subtitle C program became effective in November 1980. As a result, Congress established provisions to give these facilities "interim status." Interim status allows a facility to operate without a permit as long as it complies with certain general facility and unit-specific TSDF standards until the implementing agency can make a final permit determination (interim status TSDF standards are fully discussed in Section III, Chapter 5). These interim status requirements are self-implementing until the facility submits its Part B permit application and receives its final permit.

■ Qualifying for Interim Status

In order to qualify for interim status, the facility must have:

- Existed (operating or in construction) on the effective date of the rule that brought the facility into the RCRA program
- Submitted a Part A permit application
- Notified EPA of hazardous waste activity.

HOW DOES INTERIM STATUS OPERATE?

Beginning in 1980, XYZ Corporation began treating and storing nonhazardous petroleum refinery sludges at one of its facilities. On November 2, 1990, EPA promulgated F037 and F038 hazardous waste listings for such sludges. As a result, the sludges became subject to the hazardous waste regulations and XYZ's facility became subject to the RCRA TSDF standards. However, rather than ceasing operations, the facility was allowed to operate under the interim status provisions until it received an operating permit. Under these provisions, XYZ was required to submit a Part A permit application six months after the date of publication of the regulatory change that subjected it to the RCRA standards (i.e., by May 2, 1991).

XYZ's Part B permit application must be submitted when requested by the permitting agency. The permitting agency will give the facility at least six months from the date of request to submit the Part B. If XYZ is managing these sludges in land disposal units, the owner and operator must submit their Part B within 12 months of becoming subject to the regulations (i.e., by May 2, 1992) or they will lose interim status.

■ Changes During Interim Status

Changes can be made to a facility operating under interim status provided that the owner and operator submits a revised Part A permit application that includes justification for the proposed change before any changes are made. The following changes are permissible:

- Management of hazardous wastes not previously identified in Part A of the permit application
- Increases in the design capacity of processes used at the facility
- Changes to, or additions of, hazardous waste processes
- Changes in the ownership or operational control of the facility
- Changes made in accordance with an interim status corrective action order under §3008(h) (corrective action is fully discussed in Section III, Chapter 9)
- Addition of newly regulated hazardous waste units.

Changes to an interim status facility may not be made if they amount to "reconstruction" of the facility. Any change that requires a capital expenditure exceeding 50 percent of the cost of construction of a comparable new facility is considered reconstruction. This reconstruction prohibition prevents interim status facilities from constructing entirely new facilities while operating under self-implementing standards, in order to avoid the scrutiny of the permitting process that would otherwise apply to new facilities. The reconstruction prohibition does not apply if the changes are necessary to comply with the LDR regulations, the hazardous waste tank regulations or a corrective action order, among other things.

■ Termination of Interim Status

Interim status is terminated either when the permitting agency makes a final determination on the Part B permit application (to either issue or deny a permit), or when the facility fails to furnish a Part B application on time.

An owner and operator of an interim status facility may submit the Part B voluntarily or in response to a request from the state or EPA. However, an owner and operator of a facility already in existence must submit the Part B in accordance with HSWA-mandated deadlines for specific types of units. If a permittee fails to submit the Part B before the expiration of the specified statutory time period, the facility loses interim status immediately. These deadlines were imposed because Congress wanted to ensure that hazardous waste management units that posed increased threats to human health and the environment would not operate in interim status indefinitely.

SPECIAL FORMS OF HAZARDOUS WASTE PERMITS

Some hazardous waste management operations and practices require special permit provisions. These provisions provide the permitting agency flexibility in developing permit conditions and procedures for permit administration. These special forms of permits include:

- Permits-by-rule
- Emergency permits
- RD&D permits
- Land treatment demonstration permits
- Combustion permits
- Post-closure permits
- Remedial Action Plans.

Additionally, EPA proposed another special type of permit called a "standardized permit." If finalized, the "standardized permit" would streamline the permitting process for hazardous waste generators who subsequently store or non-thermally treat hazardous waste in tanks, containers, or containment buildings.

Permits-by-Rule

EPA issues permits under different environmental statutes. In some instances, the RCRA regulations may overlap with the requirements of another statute. In order to avoid unnecessary duplicative regulation, RCRA allows these facilities' non-RCRA permit to serve in place of a RCRA permit, provided that such facilities are in compliance with that permit and other basic RCRA administrative requirements. Permits-by-rule are available for:

- Ocean disposal vessels and barges regulated under MPRSA
- UIC wells regulated under SDWA
- POTWs regulated under CWA.

Emergency Permits

In emergency situations, EPA can forego the normal permitting process for hazardous waste management activities. Specifically, when EPA or an authorized state finds there is an imminent and substantial endangerment to human health and the environment, it can issue a temporary emergency permit to allow treatment, storage, or disposal of hazardous waste by a nonpermitted facility or by a permitted facility that has not been permitted to engage in such activity. The duration of an emergency permit cannot exceed 90 days.

Research, Development, and Demonstration Permits

Owners and operators who propose to use innovative hazardous waste treatment technologies can receive a RD&D permit, provided that permit standards for such an activity have not already been established by EPA. The RD&D permit requirements specify that a facility can only receive those wastes necessary to determine the efficiency of the treatment technology. RD&D permits provide for the construction and operation of the facility for up to one year, but may be renewed up to three times with each renewal not exceeding one year. In order to expedite the issuance of RD&D permits, EPA may modify or waive the usual permit application and issuance requirements, with the exception of financial responsibility and public participation. When issuing RD&D permits, EPA must maintain consistency with its mandate to protect human health and the environment.

Land Treatment Demonstration Permits

Before a land treatment facility can obtain a final permit, the owner and operator must demonstrate that hazardous constituents in a waste can be completely degraded, transformed, or immobilized in the treatment zone. Land treatment demonstration permits allow an owner and operator to perform these required treatment demonstrations in order to obtain a final TSDF operating permit. Such demonstration permits are issued for treatment or disposal, and may include field tests or laboratory analysis conditions, unit design criteria, construction standards, operation provisions, and maintenance requirements (land treatment unit standards are fully discussed in Section III, Chapter 5).

Combustion Permits

Combustion permits specify the conditions under which a combustion facility must operate. A facility's permit specifies the operating conditions, such as waste feed rate, unit temperature, gas velocity, and carbon monoxide emissions, which guarantee that a combustion unit will meet its respective performance standards (i.e., pollutant-specific air emissions limitations). The permit also specifies combustion unit waste analysis, inspection and monitoring, and residue management requirements. (Standards for combustion units are fully discussed in Section III, Chapter 7.) Additionally, the permit sets conditions for all other hazardous waste storage, treatment, and disposal units at the facility.

Owners and operators must obtain a RCRA operating permit before beginning construction of a combustion unit. However, it is impossible to prescribe which specific operating conditions will limit air emissions without a constructed unit that the owner and operator can actually test to determine if adequate protection of human health and the environment is being achieved. As a result, the permit process for combustion units is comprised of four phases intended to test the unit's operation prior to the issuance of the final permit to ensure that the unit can operate in accordance with its operating conditions (see Figure III-34). These phases include:

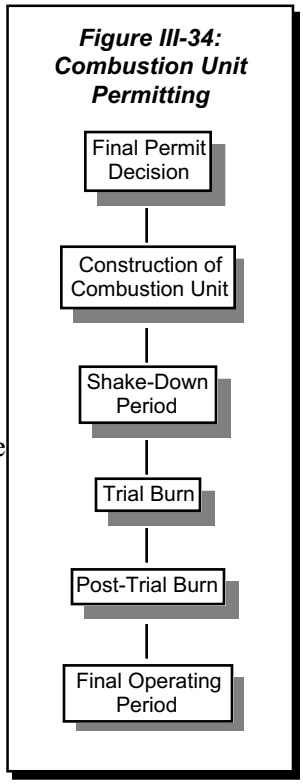


Figure III-34: Combustion Unit Permitting

- Shake-down period, during which the combustion unit is brought to the level of normal operating conditions in preparation for the trial burn
- **Trial burn**, during which burns are conducted so that performance can be tested over a range of conditions
- Post-trial burn, during which the data from the trial burn is evaluated and the facility may operate under conditions specified by the permitting agency
- Final operating period, which continues throughout the life of the permit.

The permitting agency specifies operating conditions for all phases based on a technical evaluation of the combustion unit's design, the information contained in the permit application and trial burn plan, and results of burns from other combustion units. The operating conditions are established such that the combustion unit will theoretically meet performance standards at all times. The results from the trial burn are used to verify the adequacy of the proposed operating conditions.

Interim Status Combustion Units

Owners and operators of interim status combustion units must demonstrate that their units meet all applicable performance standards by submitting performance data developed during actual burns. Performance data is used by the permitting agency to determine whether the combustion unit meets RCRA performance standards when burning a particular waste under a specific set of operating conditions.

While many hazardous waste combustion units are subject to RCRA permitting, units subject to MACT standards (cement kilns, lightweight aggregate kilns, and incinerators) must also obtain a CAA Title V permit. The CAA permitting process is different than the RCRA process because CAA permits are completed after a facility has demonstrated compliance with the emission standards, while a RCRA permit is issued prior to compliance testing.

Prior to the compliance date, hazardous waste combustion facilities that are subject to the MACT standards must comply with the Title V permit application requirements. Facilities that are currently permitted under RCRA may need to modify their RCRA permit in order to make design and operational changes to come into compliance with the MACT standards. These facilities must continue to comply with the RCRA permit conditions until these conditions either expire or are removed; they are not automatically removed upon promulgation of the MACT standards.

■ Post-Closure Permits

Owners and operators of hazardous waste disposal units, and owners and operators of hazardous waste management units that cannot clean

close and must close as landfills, must conduct post-closure care, including ground water monitoring and maintenance of an impermeable cap (post-closure is fully discussed in Section III, Chapter 5). The standards for permitted facilities incorporate post-closure care requirements into the facility's operating permit to ensure that post-closure care is performed in a protective manner. However, because interim status facilities do not yet have operating permit, the RCRA regulations require that interim status facilities needing post-closure care obtain a post-closure permit or an enforceable document containing the same regulatory requirements as a permit. This will ensure that interim status facilities meet all applicable requirements for permitted facilities, including the ground water monitoring standards.

■ Remedial Action Plans

Remedial action plans (RAPs) are a special form of RCRA permit that a facility may obtain to treat, store, or dispose of hazardous remediation waste at a remediation waste management site. Often, remedies selected for cleanup sites involve treating, storing or re-disposing of hazardous remediation waste. Before the existence of RAPs, these activities required the same type of permit as that for as-generated process waste management. Traditional RCRA permits, however, are not always well suited to cleanup activities. RAPs allow additional flexibility in public participation, provide for streamlined information requirements during permit application, and eliminate the requirement to perform facility-wide corrective action.

Additional information on RAPs is found at www.epa.gov/epaoswer/hazwaste/id/hwirmdia.htm

■ Standarized Permits

In October 2001, in order to increase the efficiency and effectiveness of the permitting process, EPA proposed the implementation of a standardized permit for facilities that generate hazardous waste and store or non-thermally treat the waste in tanks, containers, and containment buildings on site. If finalized, the standardized permit should streamline the permit process by allowing facilities to obtain and modify permits more easily while maintaining the protectiveness currently existing in the individual RCRA permit process. For example, public participation would still be required during the permitting process, but unlike the existing individual permit, public notice would not be required at the application submittal, though an informal meeting prior to the application would still be necessary. In addition, when seeking a standardized permit, the permitting agency would not need to verify completeness of the application. Also, the permit modification procedures would be less cumbersome for a standardized permit.

SUMMARY

The RCRA regulations require hazardous waste TSDFs to obtain an operating permit that establishes the administrative and technical conditions under which hazardous waste at the facility must be managed. Such permits cover the full range of TSDF standards, including general facility provisions, unit-specific requirements, closure and financial assurance standards, and any applicable ground water monitoring and air emissions provisions.

In order to obtain a permit, a TSDF owner and operator must comply with specific application procedures. The permitting process consists of the following stages:

- Informal meeting prior to application
- Permit submission
- Permit review
- Preparation of the draft permit
- Taking public comment
- Finalizing the permit.

After issuance, permits may need to be modified to allow facilities to implement technological improvements, comply with new environmental standards, respond to changing waste streams, and generally improve waste management practices. These modifications can be initiated by either the facility or the permitting agency.

Facilities that were existing and operating on the effective date of a regulation that required them to obtain an operating permit are considered interim status facilities. They are allowed to continue operating as long as they comply with certain general facility and unit-specific TSDF standards until the implementing agency makes a final permit determination.

Some waste management operations and practices require special permit provisions. These special forms of permits include:

- Permits-by-rule
- Emergency permits
- RD&D permits
- Land treatment demonstration permits
- Combustion permits
- Post-closure permits
- Remedial Action Plans.

Additionally, EPA proposed another special type of permit called a "standarized permit."

ADDITIONAL RESOURCES

Additional information about RCRA permitting can be found at www.epa.gov/epaoswer/hazwaste/permit/index.htm.

CHAPTER 9

CORRECTIVE ACTION TO CLEAN UP HAZARDOUS WASTE CONTAMINATION

In this chapter…

OVERVIEW

Past and present activities at RCRA facilities have sometimes resulted in releases of hazardous waste and hazardous constituents into soil, ground water, surface water, sediments, and air. The Statute generally mandates that EPA requires the investigation and cleanup, or remediation, of these hazardous releases at RCRA facilities. This program is known as **corrective action**. Approximately 3,700 sites are undergoing corrective action, almost three times the number of sites found on the Superfund National Priorities List (NPL) (as discussed in Section VI, Chapter 2). The degree of investigation and subsequent corrective action necessary to protect human health and the environment varies significantly among these facilities.

The corrective action program is a unique part of RCRA because there are no comprehensive cleanup regulations. Instead, EPA implements corrective action primarily through guidance, and enforces it largely through statutory authorities established by HSWA. Prior to HSWA, EPA's statutory authority to require cleanup of hazardous releases was limited to situations where the contamination presented an "imminent and substantial endangerment to health or the environment." Regulatory authority was limited to releases identified during ground water monitoring at RCRA-regulated land-based hazardous waste units, such as landfills or surface impoundments. Through HSWA, Congress substantially expanded EPA's corrective action authority, allowing the Agency to address any releases of hazardous waste or hazardous constituents to all environmental media at both RCRA permitted and nonpermitted facilities.

Rather than implementing a rigid regulatory framework for corrective action, the Agency has developed guidance and policy documents to assist facilities conducting cleanups. EPA recently developed a set of targeted administrative reforms, known as the RCRA Cleanup Reforms, to achieve faster, more efficient cleanups. The RCRA Cleanup Reforms represent a comprehensive effort to address key impediments to cleanups, maximize program flexibility, and spur progress toward a set of national cleanup goals.

CORRECTIVE ACTION IMPLEMENTATION

One of the keys to understanding the RCRA corrective action program is knowing how a facility becomes subject to corrective action. Facilities generally are brought into the RCRA corrective action process when there is an identified release of hazardous waste or hazardous constituents, or when EPA is considering a facility's RCRA permit application. Additionally, a facility owner or operator may volunteer to perform corrective action by entering an agreement with EPA in order to expedite the process.

■ Permitted Corrective Action

When a facility is seeking a permit, or when a permit is already in place, EPA can incorporate corrective action into the permit requirements. Permitted facilities are required under 40 CFR Part 264, Subpart F, to monitor ground water to detect and correct any releases from regulated land-based hazardous waste land disposal units (as discussed in Section III, Chapter 5). HSWA further expanded EPA's permit authority for corrective action to address all environmental media, as well as releases from areas other than regulated land disposal units, such as tanks or containers. Permits issued to RCRA facilities must, at a minimum, contain schedules of compliance to address these releases and include provisions for financial assurance to cover the cost of implementing those cleanup measures. The HSWA statutory provisions for addressing corrective action in permits are as follows:

- Releases from **solid waste management units** (SWMUs) – Under the authority of §3004(u) of the Act, EPA requires corrective action for releases of hazardous waste or hazardous constituents from SWMUs in a facility's permit. A SWMU is any discernible unit where solid or hazardous wastes have been placed at any time, or any area where solid wastes have been routinely and systematically released.
- Releases beyond the facility boundary – §3004(v) of the Act authorizes EPA to impose corrective action requirements for releases that have migrated beyond the facility boundary. This corrective action provision can be complementary to §3004(u), but it is not expressly limited to releases from SWMUs.
- Omnibus permitting authority – This provision, found in §3005(c)(3) of the Act, allows EPA or an authorized state to include any requirements deemed necessary in a permit, including the requirement to perform corrective action. This authority is particularly useful at permitted facilities when there is a release not associated with any particular SWMU. (Omnibus permitting authority is fully discussed in Section III, Chapter 5.)

■ Corrective Action Orders

EPA also possesses additional authorities to order corrective action that are not contingent upon a facility's permit. The statutory provisions to issue corrective action orders are:

- Releases at interim status facilities – §3008(h) of the Act authorizes EPA to require corrective action or other necessary measures through an administrative enforcement order or lawsuit, whenever there is or has been a release of hazardous waste or constituents from an interim status RCRA facility (i.e., a facility that has not yet received a RCRA permit).
- Imminent and substantial endangerment – This authority, found in §7003 of the Act, allows EPA, upon evidence of past or present handling of solid or hazardous waste, to require any action necessary when a situation may present

an imminent and substantial endangerment to health or the environment (i.e., poses significant threat or harm). This authority applies to all facilities subject to RCRA, whether or not they have a RCRA permit. EPA can waive other RCRA requirements (e.g., a permit) to expedite the cleanup process under this provision.

■ Voluntary Corrective Action

Corrective action need not always be initiated subject to permit requirements or an enforcement order. Owners and operators of RCRA-regulated facilities may also volunteer to perform corrective action. Some activities which may be necessary to achieve corrective action goals at a facility, however, may require formal approval by EPA or the state. EPA, therefore, encourages owners and operators to work closely with EPA and state agencies to obtain sufficient oversight during voluntary cleanup activities.

IMPROVING CORRECTIVE ACTION

EPA has identified several factors that inhibit the efficiency and timeliness of the cleanup program. In some instances, cleanups have suffered from an emphasis on process steps, instead of process goals. Thus, EPA seeks to reduce these hindrances by allowing more flexibility during the cleanup process. EPA has reformed the corrective action program by: addressing specific disincentives through regulatory changes; focusing on near-term goals; and stressing results-based approaches, instead of a process-based scheme.

The Agency has finalized provisions to facilitate faster, more efficient cleanups. For example, EPA has established alternative soil standards for cleanups (as discussed in Section III, Chapter 6); harmonized the sometimes duplicative closure and correction action requirements; and increased flexibility for "cleanup only" facilities by developing streamlined RCRA cleanup permits, removing the obligation for facility-wide corrective action, and introducing new units for managing cleanup wastes.

■ Special Provisions for Cleanup

Cleaning up RCRA facilities under the corrective action program may involve the management of large amounts of waste such as

Figure III-35

Potential Disincentives	Special Provisions for Cleanup
Obtaining a traditional RCRA permit for treatment, storage or disposal	Remedial Action Plan (RAP)
LDU minimum technical requirements	Remediation waste management units (i.e., CAMUs, TUs, and staging piles)
LDR treatment standards	Alternative LDR soil treatment standards

contaminated soils, water, debris, and sludges which contain a listed waste or exhibit a characteristic of hazardous waste. Such cleanup wastes are referred to as **remediation wastes**. Remediation wastes are generally subject to the same management standards as newly generated RCRA hazardous waste, including TSDF standards, permits, and land disposal restrictions (LDR). These management standards are sometimes counterproductive when applied to cleanups because they may unnecessarily slow the corrective action process and increase the cost of corrective action without providing a concomitant level of protection of human health and the environment. Figure III-35 illustrates potential disincentives to the cleanup program and EPA's remedies.

In order to mitigate the impact of these management standards on the corrective action program, EPA promulgated streamlined regulations that allow the use of alternative remediation waste permit and unit standards. These alternative standards ensure cleanups are fully protective while eliminating some of the regulatory hurdles associated with waste management. For example, the Agency promulgated a modified version of a permit, the Remedial Action Plan (RAP). Unlike the traditional RCRA permit, the RAP is tailored to the needs of a facility that manages remediation waste.

EPA also provided options for increased cleanup flexibility by establishing three types of remediation waste management units: **temporary units (TUs)**, **corrective action management units (CAMUs),** and **staging piles**.

TUs are tanks or container storage areas that EPA designated to be used solely for the treatment or storage of remediation wastes during cleanups. EPA or authorized states can modify the design, operating, and closure standards that normally apply to these units in order to facilitate prompt cleanup of contaminated waste sites.

A CAMU is an area within a facility that is used only for managing CAMU-eligible wastes for implementing corrective action or cleanup at the facility. A CAMU must be located within the contiguous property under the control of the owner or operator where wastes to be managed in the CAMU originated. By designating an area as a CAMU, EPA exempts that area from LDR and the land disposal unit (LDU) minimum technological requirements (MTR). However, waste must meet minimum treatment standards for its principal hazardous constituents (PHCs), and CAMUs must meet minimum liner and cap standards similar to the criteria for municipal solid waste landfills (MSWLFs) in Part 258 (See Section II).

A staging pile is a unit designated by EPA for the temporary accumulation of solid, non-flowing remediation waste during cleanups. Staging piles do not have to meet MTR, and LDR treatment standards do not apply to the remediation waste managed within these units. Owners and operators may not place any liquids in staging piles and cannot conduct any significant treatment within these units.

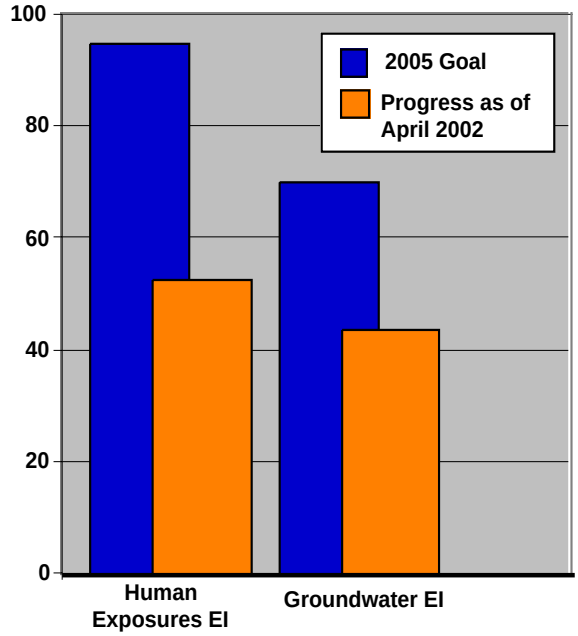
■ Environmental Indicators

Although the ultimate goal of the corrective action program is completing final site cleanup, EPA assesses the program using environmental indicators. EPA developed two environmental indicators to focus efforts on early risk reduction, risk communication, and resource protection. EPA uses the environmental indicators to measure progress toward meeting the national cleanup goals established by the Government Performance Results Act of 1993 (GPRA). To meet the GPRA objectives, EPA designated 1,714 RCRA facilities as the cleanup baseline because of the potential for unacceptable exposure to pollutants and/or for ground water contamination. EPA identified many of these facilities using the **National Corrective Action Prioritization System** (NCAPS), a computer-based ranking system that prioritizes the cleanup of the site relative to other sites. The relative ranking (i.e., high, medium, or low) assigned to each site is based on an evaluation of four pathways of actual or potential contamination (i.e., ground water, surface water, air, and soil).

The environmental indicators used are Current Human Exposures Under Control and Migration of Contaminated Groundwater Under Control. The Agency and authorized States will verify and document that by the year 2005, 95 percent of the baseline facilities have current human exposures under control and 70 percent have migration of contaminated groundwater under control. These environmental indicators will also aid site decision makers by clearly showing where risk reduction is necessary, thereby helping regulators and facility owner and operators reach agreements earlier on which stabilization measures or cleanup remedies must be implemented.

Figure III-36 illustrates the progress EPA has made thus far in meeting its 2005 goals.

Figure III-36
Environmental Indicator Progress Meeting Our 2005 Goals



RCRA Cleanup Reforms

The goals for the RCRA Corrective Action program remain challenging. To more effectively meet these goals and speed up the pace of cleanups, EPA introduced RCRA Cleanup Reforms in 1999 and additional Reforms in 2001. The 1999 and 2001 Reforms build upon actions taken by EPA and states in recent years to accelerate cleanups. The 1999 Reforms outline policies to remove obstacles to efficient cleanups, maximize program flexibility, and initiate progress toward the GPRA cleanup goals. The RCRA Cleanup Reforms of 2001 highlight those activities that EPA believes would best accelerate program progress and foster creative solutions.

RCRA Brownfields Prevention Initiative

A potential RCRA Brownfield is a RCRA facility that is not in full use, where there is redevelopment potential, and where reuse or redevelopment of that site is slowed due to real or perceived concerns about actual or potential contamination, liability, and RCRA requirements. EPA launched the RCRA Brownfields Prevention Initiative on June 11, 1998, with the goal of encouraging the reuse of potential RCRA Brownfields so that the land better serves the needs of the community either through more productive commercial or residential development or as greenspace.

TRADITIONAL CORRECTIVE ACTION COMPONENTS

Corrective action typically includes five elements common to most, though not all, cleanup activities: initial site assessment, site characterization, interim actions, evaluation of remedial alternatives, and implementation of the selected remedy. However, no one approach is likely to be appropriate for all corrective action facilities; therefore, a successful corrective action program must be procedurally flexible. These five elements should be viewed as evaluations necessary to make good cleanup decisions, not prescribed steps along a path. EPA emphasizes that it does not want studies to be undertaken simply for the purpose of completing a perceived step in a perceived process.

Initial Site Assessment

The first element in most cleanup programs is an initial site assessment. During the initial site assessment information is gathered on site conditions, releases, potential releases, and exposure pathways to determine whether a cleanup may be needed and to identify areas of potential concern. In the corrective action program, this step is commonly referred to as RCRA Facility Assessment, or RFA. Overseeing agencies may also use initial site assessments to set relative priorities between sites and allocate resources.

Site Characterization

Before cleanup decisions can be made, some level of characterization is necessary to ascertain the nature and extent of contamination of a site and to gather information necessary to support selection and implementation of appropriate remedies. This step is often referred to as the RCRA Facility Investigation, or RFI. A successful RFI will identify the presence, movement, fate, and risks associated with environmental contamination at a site and will elucidate the chemical and physical properties of the site likely to influence contamination migration and cleanup.

Interim Actions

While site characterization is underway or before a final remedy is selected, there is often need for interim actions at a corrective action site. Interim actions are used to control or abate ongoing risks to human health and the environment in advance of the final remedy selection. For example, actual or potential contamination of drinking water supplies may necessitate an interim action to provide alternative drinking water sources.

Evaluation of Remedial Alternatives

Before choosing a cleanup approach, program implementors and facility owners and operators will typically analyze a range of alternatives and evaluate their advantages and disadvantages relative to site-specific conditions. Such a study is typically called the Corrective Action Measures Study, or CMS.

Remedy Implementation

Remedy implementation typically involves detailed remedy design, remedy construction, remedy operation and maintenance, and remedy completion. In the corrective action program, this step is often referred to as Corrective Measures Implementation, or CMI.

SUMMARY

Through a process called corrective action, EPA requires RCRA-regulated facilities to investigate and clean up releases of hazardous waste or constituents to the environment.

Corrective action is included as a requirement in a facility's permit through §3004(u), §3004(v), or §3005(c)(3) statutory authorities. Corrective action can also be made through an enforcement order through §3008(h) or §7003 statutory authorities. Facilities may also voluntarily choose to clean up their contamination.

EPA implements the corrective action program primarily through guidance, and has not promulgated comprehensive cleanup regulations.

Remediation wastes are those managed for the purpose of implementing corrective action, and may include contaminated soils, water, debris and sludges that contain a listed waste or exhibit a characteristic of hazardous waste.

EPA has promulgated provisions more appropriate for managing remediation waste, including the streamlined permit, or RAP, and remediation waste management units, including the TU, CAMU, and staging pile.

EPA recently developed a set of targeted administrative reforms, known as the RCRA Cleanup Reforms, to achieve faster, more efficient cleanups. The RCRA Reforms represent a comprehensive effort to address key impediments to cleanups, maximize program flexibility, and spur progress toward a set of ambitious national cleanup goals.

ADDITIONAL RESOURCES

Additional information about corrective action can be found at www.epa.gov/correctiveaction. Further information about EPA cleanup programs can be found at www.epa.gov/epaoswer/osw/cleanup.htm.

CHAPTER 10

ENFORCEMENT OF HAZARDOUS WASTE REGULATIONS

In this chapter…

OVERVIEW

The effective implementation of the RCRA program depends on whether the people and companies regulated under RCRA comply with its various requirements. The goals of the RCRA enforcement program are to ensure that the regulatory and statutory provisions of RCRA are met, and to compel necessary action to correct violations. EPA and the states achieve these goals by closely monitoring hazardous waste handler (e.g., generator, transporter, and TSDF) activities, taking expeditious legal action when noncompliance is detected, and providing compliance incentives and assistance. Facility inspections by federal and state officials are the primary tool for monitoring compliance. When noncompliance is detected, legal action, in the form of an administrative order, a civil lawsuit, or a criminal lawsuit, may follow, depending on the nature and severity of the problem. EPA has also issued several policies to provide incentives for businesses to voluntarily evaluate their own compliance and disclose violations, and to assist small businesses in complying with the regulations. The combination of effective monitoring, expeditious legal action, and compliance incentives and assistance is intended to reduce the number of handlers operating in violation of RCRA requirements and to deter potential violations.

This chapter describes the three essential aspects of the enforcement program: compliance monitoring, enforcement actions, and compliance incentives and assistance. Almost all of the enforcement provisions detailed in this chapter are based on the Act, federal EPA policy, and Agency regulations. It is important to note that state requirements may be more stringent than those mandated by the federal government, and state enforcement authorities and procedures may differ from those of EPA.

COMPLIANCE MONITORING

One aspect of the enforcement program is monitoring facilities to verify that they comply with RCRA regulatory requirements. Monitoring serves several purposes, such as allowing EPA and the states to assess the effectiveness of specific legal actions that may have been taken already against a handler, and enabling EPA to gather data in support of a future rulemaking. In addition, the overall compliance monitoring program allows EPA to evaluate the effectiveness of state programs and to monitor nationwide compliance with RCRA. Finally, monitoring acts as a deterrent, encouraging compliance with the regulations by making acts of noncompliance susceptible to enforcement actions.

■ Inspections and Information Gathering

The primary method of collecting compliance monitoring data is through an inspection. Section 3007 of the Act provides the authority for conducting inspections. This section allows a representative of EPA or an authorized state to enter any premises where hazardous waste is handled to examine records and take samples of the wastes. In instances when criminal activity is suspected, EPA's National Enforcement Investigations Center may become involved. Similarly, DOT may participate where waste transporters are involved. While all TSDFs must be inspected at least once every two years, HSWA requires that all federal- and state-operated facilities be inspected annually. Facilities may also be inspected at any time if EPA or the state has reason to suspect that a violation has occurred. Finally, facilities are chosen for an inspection when specific information is needed to support the development of RCRA regulations and to track program progress and accomplishments.

Inspections may be conducted by EPA, an authorized state, or both. Typically, either the state or EPA has overall responsibility, or the lead, for conducting the inspection. The inspection may include a formal visit to the handler, a review of records, taking of samples, and observation of operations.

There are many types of inspections. However, the compliance evaluation inspection (CEI) is the primary mechanism for detecting and verifying RCRA violations by hazardous waste generators, transporters, and TSDFs. Types of inspections differ based upon the purpose, facility status, and the probable use of inspection results. The Office of Waste Programs Enforcement has developed, and is continuing to develop, specific guidance on performing the different types of inspections.

TYPES OF ENFORCEMENT INSPECTIONS

- Compliance Evaluation Inspection — Routine inspections to evaluate compliance with RCRA. These inspections usually encompass a file review prior to the site visit; an on-site examination of generation, treatment, storage or disposal areas; a review of records; and an evaluation of the facility's compliance with RCRA.
- Case Development Inspection — An inspection when significant RCRA violations are known, suspected, or revealed. These inspections are usually intended to gather data in support of a specific enforcement action.
- Comprehensive Ground Water Monitoring Evaluation — An inspection to ensure that ground water monitoring systems are designed and functioning properly at RCRA land disposal facilities.
- Compliance Sampling Inspection — Inspections to collect samples for laboratory analysis. This sampling inspection may be conducted in conjunction with any other inspection.
- Operations and Maintenance Inspection — Inspections to ensure that ground water monitoring and other systems at closed land disposal facilities continue to function properly. These inspections are usually conducted at facilities that have already received a thorough evaluation of the ground water monitoring system through a comprehensive ground water monitoring inspection.
- Laboratory Audit — Inspections of laboratories performing ground water monitoring analysis to ensure that these laboratories are using proper sample handling and analysis protocols.

Conducting the Inspection

Several steps are generally followed in RCRA inspections to ensure consistency and thoroughness; these steps are summarized below. The inspector prepares for the inspection by:

- Coordinating inspection activities with other regulatory or enforcement personnel as necessary
- Reviewing facility files
- Preparing an inspection plan
- Developing a checklist
- Packing appropriate safety equipment.

The first stage of the actual inspection is the facility entry. Upon entry, the inspector generally holds an opening conference with the owner and operator to discuss the nature of the inspection and to describe the information and samples to be gathered. Following the opening conference, the actual inspection takes place, which may involve:

- Reviewing facility operations and waste management practices
- Reviewing records
- Conducting a visual inspection
- Identifying sampling requirements.

Finally, the inspector holds a closing conference with the owner and operator to allow him or her to respond to questions about the inspection and to provide additional information. The inspector usually summarizes the findings.

After the visit is completed, the inspector prepares a comprehensive report that summarizes the records reviewed, any sampling results, and the handler's compliance status with respect to RCRA.

The most important result of any inspection is the determination of whether the handler is in compliance with the regulations. The inspector may also determine compliance through examination of the reports that handlers are required to submit, or are part of normal waste handler operations. Reports may contain information about the wastes being handled, the method of handling, and the ultimate disposal of wastes. Reports are submitted as required in a permit or enforcement order (e.g., corrective action schedules of compliance) and by regulation (e.g., biennial report). If the handler is not complying with all of the appropriate state or federal requirements, enforcement action may be taken.

ENFORCEMENT ACTIONS

When compliance monitoring detects a violation, enforcement actions bring handlers into compliance with applicable Subtitle C regulations. The goal of enforcement actions is to compel:

- Compliance with RCRA's waste handling standards
- Compliance with RCRA's recordkeeping and reporting requirements
- Monitoring and corrective action in response to releases of hazardous waste, and hazardous constituents.

EPA (or an authorized state) has a broad range of enforcement options including:

- Administrative actions
- Civil actions
- Criminal actions.

A decision to pursue one of these options is based on the nature and severity of the problem.

Administrative Actions

An **administrative action** is an enforcement action taken by EPA or a state under its own authority, without involving a court process. Administrative enforcement actions can take several forms, ranging from EPA or the state authority issuing informal notices of noncompliance, to orders that force facilities to take a certain action. Administrative actions tend to be resolved quickly and can often be quite effective in forcing a handler to comply with regulations or to remedy a potential

ADMINISTRATIVE ENFORCEMENT ACTIONS: A CASE STUDY

Following a routine inspection at a university, four facilities within the campus were found to be in violation of various RCRA requirements involving the management of hazardous wastes and the preparation of emergency procedures. EPA initiated an administrative action against the university to assess appropriate civil penalties. After negotiations with the university, EPA agreed to sign a consent order to set the cash penalty at $69,570 and allow the university to perform three supplemental environmental projects worth $279,205. One project was to promote pollution prevention in the school's laboratories; the second was a hazardous chemical waste management training program to promote environmental compliance; and the third was the renovation of a building for use as a lead poison resource center to promote public health within a disadvantaged community.

threat to human health or the environment. Two types of administrative actions, informal actions and formal actions, provide for enforcement response outside the court system.

Informal Actions

An **informal administrative action** is any communication from EPA or a state agency that notifies the handler of a problem. It can take many forms, such as a letter or a phone call. An informal letter to the handler may be called a **notice of violation** or a **notice of noncompliance**. For this type of action, EPA or the state notifies a handler that they are not in compliance with some provision of the regulations. This type of action is particularly appropriate when the violation is minor, such as a record maintenance requirement. If the owner and operator does not take steps to comply within a certain time period, a warning letter will be sent, setting out specific actions to be taken to move the handler into compliance. The warning letter also sets out the enforcement actions that will follow if the handler fails to remedy the violation.

Formal Actions

Alternatively, EPA or the state can take **formal action** when a more severe violation is detected, or the owner and operator does not respond to an informal action. Formal actions often take the form of an administrative order, which is issued directly under the authority of RCRA and imposes enforceable legal duties. Orders can be used to force a facility to comply with specific regulations; to take corrective action; to perform monitoring, testing, and analysis; or to address a threat to human health and the environment. An administrative order can be issued as a consent order, which documents an agreement between the Agency and the violator. EPA can issue four types of administrative orders under RCRA:

- Compliance orders — §3008(a) of RCRA allows EPA to issue an order requiring any person who is not complying with a requirement of RCRA to take steps to come into compliance. A compliance order may require immediate compliance or may set out a schedule for compliance. The order can contain a penalty of up to $27,500 per day for each day of noncompliance and can suspend or revoke the facility's permit or interim status. When EPA issues a compliance order, the person to whom the order is issued can request a hearing on any factual provisions of the order. If no hearing is requested, the order will become final 30 days after it is issued.

- Corrective action orders — §3008(h) allows EPA to issue an order requiring corrective action at an interim status facility when there is evidence of a release of a hazardous waste or a hazardous constituent into the environment. EPA can issue a §3008(h) order to require corrective action activities including investigations, repairing liners, or pumping to treat ground water contamination. In addition to requiring corrective action, these orders can suspend interim status and impose penalties of up to $27,500 for each day of noncompliance with the order (as discussed in Section III, Chapter 9).

- §3013 orders — If EPA finds that a substantial hazard to human health and the environment exists, the Agency can issue an administrative order under §3013. A §3013 order is used to evaluate the nature and extent of the problem through monitoring, analysis, and testing. These orders can be issued either to the current owner

and operator of the facility or to a past owner and operator (if the facility is not currently in operation or if the present owner and operator can not be expected to have actual knowledge of the potential release). Violation of §3013 orders can result in penalties of up to $5,500 per day.

- §7003 orders — In any situation where an imminent and substantial endangerment to health or the environment is caused by the handling of solid or hazardous wastes, EPA can order any person contributing to the problem to take steps to clean it up. This order can be used against any contributing party, including past or present generators, transporters, or owners or operators of the site. Violation of §7003 orders can result in penalties of up to $5,500 per day (as discussed in Section III, Chapter 9).

In Fiscal Year (FY) 2001, EPA issued 3,228 administrative orders and field citations.

■ Civil Actions

In addition to formal and informal administrative actions, some statutory authorities allow EPA to initiate **civil actions**, also known as judicial actions. A civil action is a formal lawsuit, filed in court, against a person who has either failed to comply with a statutory or regulatory requirement or administrative order, or against a person who has contributed to a release of hazardous waste or hazardous constituents. Civil actions are often employed in situations that present repeated or significant violations or where there are serious environmental concerns. Attorneys from the U.S. Department of Justice (DOJ) prosecute RCRA civil cases for EPA, while the state attorneys general assume this role for the states. In FY 2001, EPA submitted 327 civil case referrals to DOJ; $101.6 million in civil penalities were assessed.

CIVIL ENFORCEMENT ACTIONS: A CASE STUDY

EPA filed a complaint with a U.S. District Court against a repeat violator, alleging noncompliance with RCRA hazardous waste storage standards. The violator, subject to a prior enforcement action, had ignored a final administrative order issued by EPA. That order required immediate compliance with RCRA regulatory obligations and the payment of $74,105 in civil penalties. Since the issuance of the final order, the violator not only failed to pay any of the assessed civil penalty, but continued to violate the RCRA regulations. EPA sued the violator for collection of the past due amount under the administrative order, plus interest and costs, and a further civil penalty for continuing and additional violations. The federal judge in the case ordered the violator to pay past administrative penalties, and to pay an additional fine for violating the past order.

Civil actions are useful in several situations. When the person being sued has not complied with a previously issued administrative order, the courts may impose penalties to force the handler to comply. When a long-term solution to a problem is desired, a civil action may be helpful to ensure proper supervision of the handler's actions. Civil actions may be used when noncompliance with an administrative order presents a danger to public health or the environment. They also may provide stronger deterrence to noncompliance than an administrative order, because civil judicial cases can be costly and lengthy.

RCRA provides EPA the authority for filing four different types of civil actions:

- Compliance action — Under §3008(a), the federal government can file suit to force a person to comply with any applicable RCRA regulations. In federal actions, the court can impose a penalty of up to $27,500 per day per violation for noncompliance.
- Corrective action — In a situation where there has been a release of hazardous waste or hazardous constituents from a facility, the federal government can sue to require the facility to correct the problem and take any

necessary response measures under §3008(h). The court can also suspend or revoke a facility's interim status as a part of its order (as discussed in Section III, Chapter 9).

- Monitoring and analysis — If EPA has issued a monitoring and analysis order under §3013 of RCRA and the person to whom the order was issued fails to comply, the federal government can sue to require compliance with the order. In this type of case, the court can assess a penalty of up to $5,500 per day of noncompliance with these orders.
- Imminent and substantial endangerment — As with a §7003 administrative order, when any person has contributed or is contributing to an imminent and substantial endangerment to human health and the environment, the federal government can sue the person to require action to remove the hazard or remedy any problem. If the Agency first issued an administrative order, the court can also impose a penalty of up to $5,500 for each day of noncompliance with those orders (as discussed in Section III, Chapter 9).

In a major multi-statute enforcement case, an international business agreed to resolve charges that it violated clean air, clean water and hazardous waste laws at its Mississippi facility under a civil settlement and criminal plea agreement with EPA. This company paid a $20 million penalty and will spend up to $16 million on projects to enhance the environment.

Frequently, several of the civil action authorities will be used together in the same lawsuit. This is particularly likely to happen where a handler has been issued an administrative order for violating a regulatory requirement, has ignored that order, and is in continued noncompliance. In this circumstance, a lawsuit can be filed that seeks penalties for violating the regulations, penalties for violating the order, and a judge's order requiring future compliance with the regulations and the administrative order.

CRIMINAL ENFORCEMENT ACTIONS: A CASE STUDY

A warehouse worker employed by a chemical manufacturer was instructed by the president of the company to dispose of unwanted hazardous chemicals. The worker loaded the hazardous waste in his pickup truck and dumped it in a dumpster located in a low-income community. The president of the chemical company later paid the worker $400 for disposing of the chemicals. Upon discovery of the hazardous waste, the residents of three nearby apartment buildings had to be evacuated. The company president was sentenced by a U.S. District Court to five years probation, 200 hours of community service, and more than $5,000 restitution for the unlawful disposal of hazardous waste. The warehouse worker was sentenced to five years probation, six months of home detention, and more than $5,000 in restitution. As part of the plea agreement, the company was forced to pay $43,984 in restitution.than $5,000 in restitution. As part of the plea agreement, the company was forced to pay $43,984 in restitution.

■ Criminal Actions

In addition to administrative or civil actions, EPA may also enforce against a facility through a **criminal action**, depending on the nature and severity of the violation. Criminal actions are usually reserved for only the most serious violations. A criminal action initiated by the federal government or a state can result in the imposition of fines or imprisonment. In FY2001, EPA initiated 482 cases and 372 defendants were charged. The guilty paid nearly $95 million in fines and restitution, and were sentenced to 256 in prison–an increase of more than 100 years from 2000. Seven acts identified in §3008 of RCRA are subject to criminal action and carry criminal penalties. The penalties range from a fine of up to $50,000 per day or a prison sentence of up to five years, to a total fine up to $1 million and up to 15 years in prison.

Six of the seven criminal acts carry a penalty of up to $50,000 per day and up to five years in jail. Stated briefly, these acts are knowingly:

- Transporting waste to a nonpermitted facility
- Treating, storing, or disposing of waste without a permit or in violation of a material condition of a permit or interim status standard

- Omitting important information from, or making a false statement in a label, manifest, report, permit, or interim status standard
- Generating, storing, treating, or disposing of waste without complying with RCRA's recordkeeping and reporting requirements
- Transporting waste without a manifest
- Exporting a waste without the consent of the receiving country.

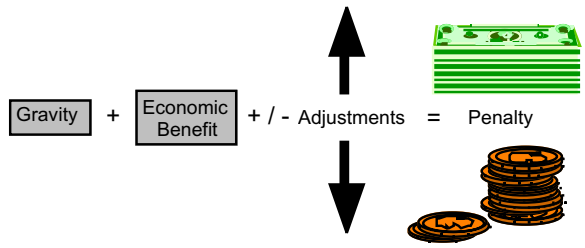
The seventh criminal act is the knowing transportation, treatment, storage, disposal, or export of any hazardous waste in such a way that another person is placed in imminent danger of death or serious bodily injury. This act carries a possible penalty of up to $250,000 or 15 years in prison for an individual, or a $1 million fine for a corporation.

CIVIL PENALTY POLICY

EPA's *Civil Penalty Policy* is designed to provide guidance and consistency in assessing noncriminal penalty amounts for both administrative actions and in settlements of civil judicial enforcement actions. The policy serves many purposes, including ensuring that:

- Penalties are assessed in a fair and consistent manner
- Penalties are appropriate for the seriousness of the violation

Figure III-36: Civil Penalty Calculation



- Economic incentives for noncompliance are eliminated
- Penalties are sufficient to deter persons from committing RCRA violations
- Compliance is expeditiously achieved and maintained.

EPA's penalty policy utilizes a calculation system to determine the amount of a penalty, based on four components. These components include: 1) the gravity (i.e., severity) of the particular violation; 2) the duration of the violation; 3) the economic benefit gained through noncompliance; and 4) any site-specific adjustments (see Figure III-36).

One type of site-specific adjustment that provides EPA with flexibility in assessing penalties is called a **supplemental environmental project** (SEP). OECA issued its *Final EPA Supplemental Environmental Projects Policy* in 1998. These are environmentally beneficial projects which a defendant or respondent agrees to undertake in the settlement of a civil or administrative enforcement action, but which the defendant is not otherwise legally required to perform. For example, a violator may agree to restore and protect a wetland or an endangered species habitat. In appropriate circumstances, EPA may adjust the final settlement penalty for a violator who agrees to perform a project so that it is lower compared to that of a violator who does not agree to perform such a project.

ENFORCEMENT AT FEDERAL FACILITIES

In the past, federal facilities have been subject to the RCRA regulations, but not to civil fines or penalties. This limited waiver of sovereign immunity made enforcement at federal facilities less effective. In 1992, however, Congress passed the Federal Facilities Compliance Act, which expressly

waived sovereign immunity against civil fines and penalties and clarified that EPA has the authority to issue administrative enforcement orders against a federal department or agency in the same manner and under the same circumstances as an action taken against another person. No EPA issued administrative order becomes final until the federal department or agency has had the opportunity to confer with the EPA Administrator.

During FY2001, EPA took 51 enforcement actions against federal facilities, an increase of five from FY2000, for violations of numerous federal environmental statutes.

Additional information about enforcement at federal facilities can be found at www.epa.gov/compliance/about/offices/ffeo.html.

COMPLIANCE ASSISTANCE AND INCENTIVES

Over the past few years, EPA has issued numerous policies to provide compliance assistance and incentives to the regulated community. By helping businesses understand the regulations, and by providing certain incentives for compliance, EPA hopes to move closer to its goal of ensuring compliance with all RCRA requirements. Two policies in achieving this goal are the *Final Policy on Compliance Incentives for Small Businesses* and *Incentives for Self-Policing: Discovery, Disclosure, Correction and Prevention of Violations* (also known as the EPA Audit Policy). Additionally, the Agency has developed audit protocols and sector notebooks to assist businesses.

■ Small Business Compliance Incentives and Assistance

The *Final Policy on Compliance Incentives for Small Businesses* is intended to promote environmental compliance among small businesses by providing incentives to participate in compliance assistance programs, conduct audits, and promptly correct violations. A small business is defined as a person, corporation, partnership, or other entity who employs 100 or fewer individuals, across all facilities and operations owned by the entity. The policy sets guidelines for EPA and the states on reducing or waiving penalties for small businesses that make good faith efforts to correct violations.

Under this policy, EPA may eliminate or mitigate its settlement penalties based on certain criteria. The small business needs to make a good faith effort to comply with applicable environmental requirements by either detecting a violation during on-site compliance assistance from a government or government-supported program, or by conducting an internal audit and promptly disclosing in writing all violations discovered as part of the audit. The violation should also be the first for the small business; this policy does not apply to businesses that have been subject to warning letters or any other type of enforcement action. The small business needs to also correct the violation within the time period allowed, which in most cases is 180 days. For the policy to apply, the violation also can neither be one that has caused actual serious harm to human health or the environment, nor one that involves criminal conduct.

To assist businesses in complying with the regulations, OECA, in conjunction with industry, academic institutions, environmental groups, and other agencies, has opened compliance assistance centers. These centers provide assistance to small businesses, in addition to providing industry-specific information to state and local government officials. The compliance centers serve members of industries such as printing, metal finishing, automotive services and repair, and agriculture.

■ Self-Audit Policy

EPA's policy regarding *Incentives for Self-Policing: Discovery, Disclosure, Correction and Prevention of Violations* encourages regulated entities to voluntarily discover, disclose, and correct violations of environmental requirements. This policy is designed not only to encourage greater compliance with the laws, but also to achieve maximum compliance through active efforts by the regulated community.

The Agency provides incentives, such as eliminating or reducing the gravity component of civil penalties by 75 percent, for companies that conduct voluntary audits. EPA also may choose not to recommend criminal prosecution of a regulated entity based on voluntary disclosure of violations that are discovered through audits and disclosed to the government before an investigation occurs.

The policy has certain limitations. As with the small business policy, companies may not be able to gain relief under this policy for repeated violations, violations that present a serious or imminent harm to human health or the environment, or violations that involve criminal activity. Also, the violation should be discovered through an environmental audit or through a documented, systematic procedure which reflects the company's due diligence in preventing, detecting, and correcting violations. To receive the penalty mitigation, the regulated entity should correct the violation within 60 days, unless written notice is provided indicating a longer time frame, and needs to certify in writing that the violations have been corrected. Finally, the regulated entity needs to take steps to prevent a recurrence of the violation. Thus far, over 318 companies have disclosed and corrected violations under the audit policy at more than 1,668 facilities. The rates of disclosing companies and corrected violations under the policy have increased every year since its effective date.

Additional information about the audit policy can be found at www.epa.gov/compliance/incentives/auditing/index.html.

■ Audit Protocols

EPA has developed audit protocols to assist and encourage businesses and organizations to perform environmental audits and disclose violations in accordance with EPA's audit policy. The audit protocols are intended to promote consistency among regulated entities when conducting environmental audits and to ensure that audits are conducted in a thorough and comprehensive manner. EPA has developed audit protocols for the following RCRA facilities:

- Hazardous waste generators
- Hazardous waste TSDFs
- Used oil and universal waste generators
- Hazardous waste storage tanks
- Federal facilities
- Subtitle D facilities.

■ Sector Notebooks

EPA has developed tools to enhance compliance with environmental laws on an industry by industry basis. Sector Notebooks are industry sector profiles, which help owners and operators of regulated industries understand their regulatory obligations through comprehensive plain-English guides. These Notebooks are available on the Internet at www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/index.html.

AGENCY FUNCTIONS

Responsibility for the various components that make up the RCRA enforcement program is divided among different EPA Headquarters offices, the EPA Regions, and state agencies. EPA Headquarters is responsible for setting nationwide policy, monitoring regional and state activities, and providing technical support. The EPA Regions take primary federal responsibility for performing inspections, issuing administrative orders, preparing civil actions, monitoring compliance with administrative and judicial orders, and providing support to DOJ for ongoing lawsuits. As with many other aspects of the RCRA program, responsibility for enforcement is largely decentralized. Authorized states take primary responsibility for enforcement in close cooperation with their respective EPA Region. EPA, however, retains its authority to take enforcement actions in authorized states if the state fails to do so, does not obtain acceptable results, or requests EPA assistance.

SUMMARY

There are three essential elements to RCRA's enforcement program: compliance monitoring, enforcement actions, and compliance assistance and incentives.

Compliance monitoring is used to determine a handler's level of compliance with RCRA's regulatory requirements. The primary method of collecting compliance monitoring data is through an inspection.

Either EPA or an authorized state may lead inspections. Inspections must be conducted annually at all federal- or state-operated facilities and at least once every two years at each TSDF. The six types of inspections conducted under the RCRA program are:

- Compliance evaluation inspection
- Case development inspection
- Comprehensive ground water monitoring evaluation
- Compliance sampling inspection
- Operations and maintenance inspection
- Laboratory audit.

The primary goal of enforcement actions is to bring facilities into compliance and ensure future compliance. The enforcement options available under RCRA are:

- Administrative actions, including informal and formal actions
- Civil actions
- Criminal actions.

EPA uses the guidelines in the *Civil Penalty Policy* for assessing penalty amounts and uses the *Final EPA Supplemental Environmental Projects Policy* to allow for flexibility in assessing penalties.

Enforcement of RCRA at federal facilities is now similar to enforcement at TSDFs, as a result of the Federal Facility Compliance Act of 1992.

To achieve greater compliance, EPA also offers compliance assistance through numerous policies, including *Final Policy on Compliance Incentives for Small Businesses* and *Incentives for Self-Policing: Discovery, Disclosure, Correction and Prevention of Violations.*

The responsibility for the various enforcement actions is divided among different EPA Headquarters offices, EPA Regions, and authorized state agencies.

ADDITIONAL RESOURCES

Additional information about RCRA enforcement can be found at www.epa.gov/compliance.

More information about SEPs is available at www.epa.gov/compliance/planning/data/multimedia/seps/sep.html.

CHAPTER 11

AUTHORIZING STATES TO IMPLEMENT RCRA

In this chapter…

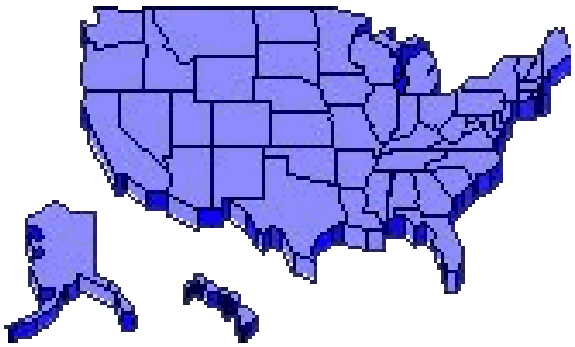
OVERVIEW

When RCRA was written, it was Congress' intent for the states to assume primary responsibility for implementing the hazardous waste regulations, with oversight from the federal government. Congress felt the states' familiarity with the regulated community, and state and local needs would allow them to administer the hazardous waste program in the most effective manner.

In order for a state to assume the regulatory lead as the implementing agency, it must be authorized by EPA to do so. RCRA requires authorization to ensure state programs are at least equivalent to and consistent with the federal rules. Through state authorization, EPA establishes minimum federal standards to prevent overlapping or duplicative state regulatory programs. A state that has received final authorization, known as an **authorized state**, implements and enforces its hazardous waste regulations. Authorized state regulations act "in lieu of" federal regulations.

DEVELOPING A STATE HAZARDOUS WASTE PROGRAM

Under RCRA, as enacted in 1976, states had two options for assuming the responsibility to administer the RCRA Subtitle C program: final or interim authorization.



Final Authorization

For a state to receive **final authorization**, it must be fully equivalent to, no less stringent than, and consistent with the federal program. However, states may impose requirements that are more stringent or broader in scope than the federal requirements. Some examples of rules that are more stringent are the decision by some states to not recognize the CESQG exemption, or to require annual (rather than biennial) reports. An example of a rule that is broader in scope is the regulation of antifreeze as a listed waste in some states. In addition, the state's program must provide adequate enforcement authority to carry out its provisions, provide for public notice and hearing in the permitting process, and provide for public availability of information in "substantially the same manner and to the same degree" as the federal program.

As an initial step toward obtaining final authorization, a state typically adopts the federal rules in some manner. Adopting the federal program means either incorporating federal rules into the state's rules, or creating state rules that are equivalent to federal rules. Many states simply incorporate the federal rules by reference (this is known as **incorporation by reference**). This is when the regulatory language in a state's regulations actually cites, or refers to, the federal regulations. A state may also choose to create an analogous set of state regulations through the state legislative process. Even though a state may have adopted the federal program and its hazardous waste program is similar or identical to the federal program, it still does not have primacy for implementing and enforcing the hazardous waste regulations. To assume this role, the state must first be granted final authorization. As of June 2002, all states, with the exception of Alaska and Iowa, are authorized to implement the RCRA hazardous waste program.

ADOPTING FEDERAL REGULATIONS

As an initial step toward obtaining final authorization, a state typically adopts the federal rules in some manner. Adopting the federal program means either incorporating federal rules into the state's rules, or creating state rules that are equivalent to federal rules.

Any state that seeks final authorization for its hazardous waste program must submit an application to the EPA Administrator containing the following elements:

- A letter from the governor requesting program authorization
- A complete description of the state hazardous waste program
- An attorney general's statement
- A memorandum of agreement (MOA)
- Copies of all applicable state statutes and regulations, including those governing state administrative procedures
- Documentation of public participation activities.

Governor's Letter

This is simply a letter, signed by the governor, formally requesting the EPA Administrator to authorize the state's hazardous waste program which will be implemented in lieu of the federal program.

Program Description

The program description describes how the state intends to administer the hazardous waste program in place of the federal program. It includes the following:

- A narrative description of the scope, structure, coverage, and processes of the state program
- A description of the state agency or agencies responsible for running the program, including a description of state-level staff who will carry out the program
- A description of applicable state procedures, including permitting procedures and any state administrative or judicial review procedures
- A description of the state's manifest tracking system

- Copies of any forms used to administer the program under state law
- A complete description of the state's compliance tracking and enforcement program.

In addition, the program description must include estimates of:

- Costs involved in running the program and an itemization of the sources and amounts of funding available to support the program's operation
- The number of generators, transporters, and on-site and off-site disposal facilities (along with a brief description of the types of facilities and an indication of the permit status of these facilities)
- The annual quantities of hazardous waste generated within the state, transported into and out of the state, and stored, treated, or disposed of within the state (if available).

If the state chooses to develop a program that is more stringent or broader in scope (or both) than the one required by federal law, the program description should address those parts of the program that go above and beyond what is required under RCRA Subtitle C.

Attorney General's Statement

The attorney general's statement identifies the legal authorities — statutes, regulations, and where appropriate, case law — upon which the state is relying to demonstrate equivalence with the federal program. The statement must include citations to specific statutes, administrative regulations, and judicial decisions which demonstrate adequate authority. When differences from federal authorities exist in the state's program, the statement provides an explanation. The statement must be signed by the attorney general or an independent legal counsel authorized to represent the state agency in court. State statutes and regulations cited in the attorney general's statement must be lawfully adopted and fully effective at the time the program is authorized.

Memorandum of Agreement

Although a state with an authorized program assumes primary responsibility for administering Subtitle C hazardous waste regulations, EPA still retains enforcement authority and oversight responsibilities. In these instances, since the authorized state and EPA both possess regulatory authority to administer the regulations, there is a potential for problems or conflicts, such as dual permitting or dual enforcement of the regulations. The **memorandum of agreement** between the state Director and the EPA Regional Administrator outlines the nature of these responsibilities and oversight powers, and defines the level of coordination between the state and the EPA in implementing the program. While each MOA will contain provisions unique to each individual state's program, several provisions are common to all MOAs. These include provisions for:

- Establishing state procedures for assigning EPA identification numbers
- Specifying the frequency and content of reports that the state must submit to EPA
- Coordinating compliance monitoring and enforcement activities between the state and EPA

SAMPLE MEMORANDUM OF AGREEMENT

This memorandum of agreement (hereinafter "Agreement") establishes policies, responsibilities, and procedures pursuant to 40 CFR §271.8 for the State of _____ Hazardous Waste Program (hereinafter "State Program") authorized under Section 3006 of the Resource Conservation and Recovery Act (hereinafter "RCRA" or "the Act") of 1976 (Public Law 94-580, 42 USC §6901 et seq.) and the United States Environmental Protection Agency (hereinafter EPA) Regional Office for Region _____. This Agreement further sets forth the manner in which the State and EPA will coordinate in the State's administration of the State program.

- Allowing EPA to conduct compliance inspections of the regulated community in the authorized state
- Joint processing of permits for those facilities that require a permit from both the state and EPA
- Specifying the types of permit applications that will be sent to the EPA Regional Administrator for review and comment
- Transferring permitting responsibilities upon authorization.

State Statutes and Regulations

The state must submit copies of its statutes and regulations that are expected to act in lieu of the federal RCRA regulations. Where states adopt the federal regulations by reference, a document may be included outlining where in the state rules the federal rules are incorporated.

Documentation of Public Participation

A state must demonstrate that the public was allowed to participate in the state's decision to seek final authorization. Prior to submitting the application to the Administrator, a state must have given public notice of its intent to apply for authorization. Public notice must take the form of publishing the announcement in major newspapers, sending information to individuals on the state agency mailing list, and allowing for a 30-day comment period. Proof of public participation may include copies of comments submitted by the public during the comment period, and transcripts, recordings, or summaries of any public hearings concerning state authorization.

■ Interim Authorization

Some states are not able to receive final authorization immediately because their programs do not meet the minimum federal requirements. As a result, these states can obtain **interim authorization**. Interim authorization is a temporary mechanism that is intended to promote continued state participation in hazardous waste management while encouraging states to develop programs that are fully equivalent to the federal program and that will qualify for final authorization. A state may receive interim authorization if its hazardous waste program is substantially equivalent to the federal program. Interim authorization is intended to allow a state with its own hazardous waste program in place to continue implementing its current program until final authorization can be achieved. Under RCRA, interim authorization expired on January 31, 1986. HSWA introduced a new interim authorization period for any requirement promulgated pursuant to HSWA authority. HSWA interim authorization expires January 1, 2003, except for the January 22, 2002, CAMU amendments rule.

INTERIM AUTHORIZATION

Interim authorization is a temporary mechanism that is intended to promote continued state participation in hazardous waste management while encouraging states to develop programs that are fully equivalent to the federal program and that will qualify for final authorization. A state may receive interim authorization if its hazardous waste program is substantially equivalent to the federal program.

REVIEW OF THE PROPOSED STATE PROGRAM

Once the state has submitted a complete application for final authorization to EPA, the EPA Regional Administrator determines whether or not the state's program should be authorized.

The EPA Regional Administrator makes this determination according to the following steps:

- Tentative determination — The EPA Regional Administrator must tentatively approve or disapprove the state's application. The tentative determination is published in the *Federal Register.*
- Public comment — The public is given an opportunity to comment on the state's application and the EPA Regional Administrator's tentative determination. The Agency places a newspaper notice to inform the public of this opportunity, and a public hearing

will be held after the notice of the tentative determination is published in the *Federal Register*.

- Final determination — After the notice of the tentative determination is published in the *Federal Register*, the EPA Regional Administrator must decide whether or not to authorize the state's program, taking into account all comments submitted. This final determination is then published in the *Federal Register*.

REVISING AUTHORIZED STATE PROGRAMS

Once a state has gained final authorization, it must continually amend and revise its program to maintain its authorized status. As RCRA continues to evolve through new federal rulemakings, an authorized state is required to revise its program to reflect the changes in the federal program. An authorized state may also have to revise its program in order to incorporate any state statutory or regulatory changes that affect the state's hazardous waste program. Most of the authorization activity now involves revisions to authorized state programs rather than the authorization of new states.

All program revisions may be initiated by either EPA or the authorized state. To revise its authorized program, a state must submit copies of its regulations and may submit a modified program description, attorney general's statement, MOA, or other documents deemed necessary by EPA. The EPA Administrator reviews the state's proposed modifications applying the same standards used to review the state's initial program application. The state's program revisions are effective once approved by EPA. Notice of all state program revisions are then published in the *Federal Register*.

A state with final authorization must modify its program on a yearly basis to reflect changes to the federal program resulting from the promulgation of new rules. New federal rules are grouped into annual clusters, and a state revises its program by adopting and becoming authorized for the entire cluster. A cluster begins on July 1 of each year and ends on June 30 of the following year. By July 1 of each year, an authorized state must adopt the cluster, which includes all changes to the federal program, that occurred during the 12 months preceding the previous July 1 (e.g., states must modify their programs by July 1, 2003, to reflect all changes made between July 1, 2001 and June 30, 2002). The deadlines for program modifications may also be extended for one year if state statutory amendments are necessary.

■ Withdrawing State Program Authorization

Authorized state programs are continually subject to review. If the EPA Administrator determines that a state's authorized program no longer complies with the appropriate regulatory requirements and the state fails to amend its program accordingly, authorization may be withdrawn. An authorized state's program may be considered out of compliance for many reasons. One reason could be failure to promulgate or enact required regulations, leaving the state without the legal authority to implement or enforce its program. Also, the state legislature could limit or strike down the state's authority to enforce its program. A state could also be out of compliance by failing to issue required permits, or by continually issuing bad permits. If an authorized state fails to enforce its authorized program properly, does not act on violations, fails to assess proper penalties or fines, or fails to inspect and monitor properly, it may also be considered out of compliance. Finally, if the state fails to comply with the requirements of the MOA, the EPA Administrator may determine the state is out of compliance and may begin program withdrawal procedures. If program authorization is withdrawn, responsibility for administering and enforcing RCRA Subtitle C reverts back to EPA.

Although EPA can withdraw hazardous waste program authorization for a state that fails to enforce its authorized program properly or take timely and appropriate action, the Agency can take other action without officially withdrawing authorization. In such instances, EPA may take independent enforcement action by **overfiling**, or enforcing a provision for which a particular state has

authorization. EPA may also overfile if the state requests EPA to do so and provides justification based on unique, case-specific circumstances, or if a case could establish a legal precedent. In order to overfile, EPA must notify the state 30 days prior to issuing a compliance order or starting a civil action within that state.

Transferring Program Responsibility Back to EPA

A state with an authorized program may voluntarily transfer the program back to EPA. To do this, the state must give the EPA Administrator 180 days notice and submit a plan for the orderly transfer to EPA of all relevant program information necessary for administering the program (e.g., permits and permit files, compliance records, permit applications, reports).

GRANTS AND OVERSIGHT

While authorized states bear the primary responsibility for implementing the RCRA Subtitle C program, federal EPA still plays a role by offering financial assistance to states to help them develop and implement their hazardous waste programs, establishing broad national priorities, and ensuring that states properly carry out the RCRA program.

State Grants

EPA offers grants to states to assist them in developing or implementing authorized hazardous waste management programs. Each EPA Regional Office receives an allotment based upon multiple factors, such as population and the amounts and types of hazardous waste generated in the EPA Region. States then submit proposed work plans that outline planned activities in the upcoming year, including permitting, enforcement, and program management. EPA Regions then negotiate with each state over the specific work to be accomplished with these grant funds.

Priority Setting

EPA also sets RCRA national goals and priority program activities on an annual basis. Each year, EPA identifies the national priorities for implementing all of its programs, including the RCRA Subtitle C and D programs. These priorities form the basis for EPA Regional and state workload negotiations for the upcoming year.

State Oversight

Ensuring that states properly implement their hazardous waste management programs is also an important EPA responsibility. As a result, EPA Regional staff have oversight responsibilities to:

- Promote national consistency in RCRA implementation
- Encourage coordination and agreement between EPA and states on technical and management issues
- Ensure proper enforcement by the state
- Ensure appropriate expenditure of federal grant funds.

INFORMATION MANAGEMENT

Several RCRA provisions require the regulated community to report hazardous waste management information to EPA and states. For example, biennial reporting provisions require large quantity generators and TSDFs to submit waste management information to EPA by March 1 of every even-numbered year. EPA and states, in turn, collect and track such information to ensure that the hazardous waste program is adequately managed at the EPA Headquarters, EPA Regional, and state levels, and to provide accurate and up-to-date information to both Congress and the general public. In order to achieve this goal, EPA compiles such data in the RCRAInfo

database. EPA also maintains the State Authorization Tracking System (StATS), which it uses to track whether states have been authorized to implement or have adopted federal hazardous waste rulemakings.

■ RCRAInfo

In September 2000, EPA began managing data supporting the Subtitle C program in its information system known as **RCRAInfo**. RCRAInfo consolidated EPA's former information systems, RCRIS and BRS, into one national system. RCRAInfo is a national program management and inventory system of RCRA hazardous waste handlers, including generators, transporters, and TSDFs. The information system captures indentification, regulatory compliance status and cleanup activity data for all handlers, and tracks the permit and closure status of TSDFs. Additionally, RCRAInfo tracks state-collected data on the generation and management of RCRA hazardous waste from LQGs and TSDFs.

■ State Authorization Tracking System

The **State Authorization Tracking System** (StATS) is a tool used by EPA to chart the states that have been authorized to implement the RCRA hazardous waste program. By looking at StATS reports, an individual can determine if a particular state has been authorized to implement a specific rule. The reports also list the *Federal Register* citations for final authorization decisions for each state and rule.

SUMMARY

Congress intended states to assume responsibility for implementing RCRA, with oversight from the federal government. In order for a state to receive authorization to implement and enforce the hazardous waste regulations in lieu of federal EPA, the state must demonstrate that its program:

- Is equivalent to, no less stringent than, and consistent with the federal program (state requirements may be more stringent or broader in scope)
- Provides adequate enforcement authority
- Provides for public availability of information in substantially the same manner and to the same degree as the federal program.

Any state that seeks final authorization for its hazardous waste program must submit an application to the EPA Administrator containing the following elements:

- A letter from the governor requesting program authorization
- A complete program description
- An attorney general's statement
- An MOA
- Copies of all applicable state statutes and regulations
- Documentation of public participation activities.

Once a state's program has been authorized, it must revise its program, on an annual basis, to reflect both changes in the federal program, and state statutory or regulatory changes. State programs are also subject to review by EPA, and a state's authorized status can be withdrawn if the program does not comply with appropriate regulatory requirements. Without officially withdrawing authorization, EPA may take independent enforcement action by overfiling, or enforcing a provision for which a particular state has authorization. States may also choose to transfer program responsibility back to EPA.

EPA works closely with states in implementing the hazardous waste management program by offering grants to states, setting national goals and priorities, and providing program oversight.

EPA Headquarters, EPA Regions, and states collect, compile, and track information on the RCRA hazardous waste program through RCRAInfo.

SECTION IV

MANAGING UNDERGROUND STORAGE TANKS
RCRA SUBTITLE I

In this section…

OVERVIEW

Across the United States, there are approximately 700,000 federally regulated **underground storage tanks** in use that store petroleum or hazardous substances. An UST system is defined as a tank and any underground piping connected to the tank that has at least 10 percent of its combined volume underground. This definition includes the tank, connected underground piping, any underground ancillary equipment, such as valves and pumps, and containment systems. Therefore, aboveground tanks with extensive underground piping may meet the definition of an UST. In order for a tank to meet the definition of an UST it must also contain a regulated substance.

A **regulated substance** is any **hazardous substance**, defined under CERCLA §101(14), and petroleum. In other words, the federal UST regulations apply only to USTs storing either petroleum or hazardous substances. Underground tanks holding nonhazardous substances, such as water, are not covered by these regulations.

The vast majority of USTs store petroleum products at retail establishments, such as gas stations, and at petroleum refining facilities. Less than three percent of USTs store hazardous substances. Placing tanks underground minimizes hazards and provides a convenient place to store liquid materials while hiding unsightly equipment. These tanks are found at a variety of locations, including convenience stores, airports, service stations, small and large manufacturing facilities, and government facilities. USTs at these sites are used primarily to store gasoline, diesel fuel, crude oil, hazardous chemicals, and heating oil. Before the regulations, many of these tanks were made of bare,

WHAT IS AN UST SYSTEM?

An UST System is defined as a tank and any underground piping connected to the tank that has at least 10 percent of its combined volume underground. This definition includes the tank, connected underground piping, any underground ancillary equipment, such as valves and pumps, and containment systems.

WHAT IS A REGULATED SUBSTANCE?

A regulated substance is defined as any hazardous substance, defined under CERCLA §101(14), and petroleum.

unprotected steel, causing them to pose a substantial threat to human health and the environment from leaking due to faulty installation, corrosion, tank or pipe rupture, or spills.

With over 50 percent of the U.S. population relying on ground water as their primary source of drinking water, Congress acted to protect this resource in 1984 by adding Subtitle I to RCRA in 1984. Under this Congressional mandate, EPA was required to develop a comprehensive regulatory program for USTs storing petroleum or regulated hazardous substances. In 1988, EPA published regulations that require owners and operators of new tanks and tanks already in the ground to prevent, detect, and clean up releases. In 1986, Congress amended Subtitle I with the passage of the Superfund Amendments Reauthorization Act (SARA) by creating a fund for corrective action for petroleum releases from USTs; this fund is referred to as the Leaking Underground Storage Tank (LUST) Trust Fund.

This section describes the UST program regulatory requirements, the role of the states in implementing the program, and the LUST Trust Fund.

SCOPE OF THE UNDERGROUND STORAGE TANK PROBLEM

Of the approximately 700,000 tanks currently in use and subject to the federal regulations, an estimated 38 percent are constructed of fiberglass, 32 percent are constructed of new steel, and 30 percent have been upgraded with cathodic protection and/or lining. Nevertheless, approximately 6,500 releases were reported between September 2000 and September 2001, allowing contaminants such as benzene and methyl tertiary-butyl ether (MTBE), to seep into the ground and cause potential harm to the environment. As of September 2001, since the beginning of the UST program, over 418,000 UST releases have been confirmed. EPA estimates that approximately 60 percent or more of these releases have affected groundwater. Consquently, leaking USTs pose a potentially widespread threat to our nation's groundwater.

Releases of regulated substances into the environment are generally attributed to corrosion, faulty installation, and spills and overfills. Corrosion occurs when bare metal, soil, and moist conditions combine to produce an underground electric current that destroys hard metal. Over time, corrosion can create holes in the body of the tank and piping, increasing the likelihood of leaks into the soil. The speed and severity of corrosion varies depending on site-specific factors.

Improper installation is also a typical cause of UST failure. Proper installation is crucial to ensure the structural integrity of both the tank and its piping. Proper installation procedures include excavating the soil, siting where the tank system should be located, determining burial depth, assembling the tank system, backfilling around the tank system, and grading the surface soil (i.e., evening out surface where the soil was replaced). Installation problems generally result from careless installation practices that do not follow standard industry codes and procedures. For example, mishandling of the tank during installation can cause cracks in fiberglass-reinforced plastic tanks or damage the protective coating on steel tanks, leading to corrosion.

RELEASES FROM USTS

6,500 new releases were reported between September 2000 and September 2001. Between the beginning of the UST program and September 2001, over 418,000 UST releases have been confirmed. EPA estimates that approximately 60 percent or more of these releases have affected groundwater.

Finally, spills and overfills, usually caused by human error during product transfers, contribute to tank leakage. Spills often occur when the tanks are filled during routine product deliveries. Although these spills are small, repeated releases of any size can have substantial environmental impacts. Overfills normally release much larger volumes than spills. Overfills occur when tanks are filled beyond their capacity and excess product is released.

Installation of spill and overfill protection, in addition to following industry standards for correct filling practices, help to prevent such releases from occurring.

THE UNDERGROUND STORAGE TANK REGULATORY PROGRAM

Congress, when developing RCRA Subtitle I, chose to subject only about one-third of the total number of UST systems that were in use when the law was enacted to the UST program. The tanks that were specifically exempted from the scope of the regulations were selected by Congress because these particular types of USTs were regulated under federal, state, or local laws.

■ Program Scope

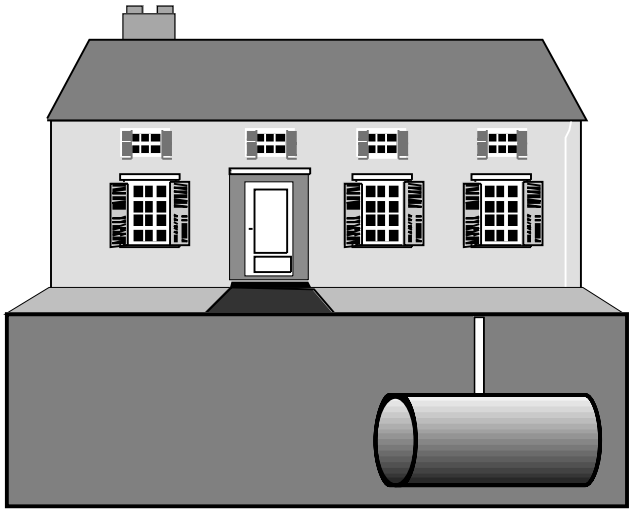
While tanks that have at least 10 percent of their combined volume underground and are used to store petroleum and hazardous substances are subject to the RCRA Subtitle I program, not all tanks meeting this definition of an UST are required to comply with the requirements. Congress specifically excluded certain tanks from the definition, including:

- Farm and residential tanks of 1,100 gallons or less capacity holding motor fuel used for noncommercial purposes
- Tanks storing heating oil used on the premises where it is stored
- Tanks on or above the floor of underground areas, such as basements or tunnels
- Septic tanks and systems for collecting wastewater and storm water
- Flow-through process tanks (i.e., tanks that are part of production processes and have a steady flow of materials through the tank during operation)
- Pipeline facilities
- Surface impoundments, pits, ponds, or lagoons
- Storm water or wastewater collection systems
- Liquid traps or associated gathering lines directly related to oil or gas production and gathering operations.

Upon examination of the UST universe, EPA determined that there were additional tanks that should not be subject to the federal regulatory program due to their size, content, location, or regulation under other programs. As a result, EPA excluded the following tanks:

- UST systems holding hazardous wastes listed or identified under RCRA Subtitle C, or a mixture of such wastes and regulated substances
- Wastewater treatment tank systems that are part of a wastewater treatment facility regulated under CWA
- Equipment or machinery that contains regulated substances for operational purposes, such as hydraulic lift tanks and electrical equipment tanks
- UST systems with a capacity of 110 gallons or less
- UST systems that contain de minimis concentrations of regulated substances
- Emergency spill or overflow containment UST systems that are expeditiously emptied after use.

EPA also identified tanks that did not warrant exclusion, but should not be subject to full

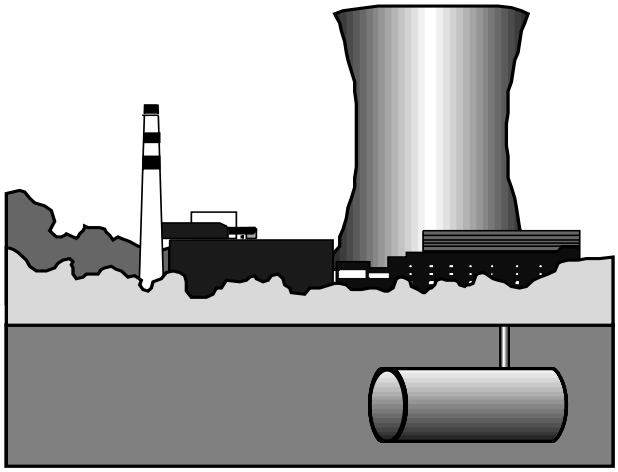


regulation. As a result, EPA deferred certain tanks from the requirements for design and installation, operation, release detection, release reporting and investigation, closure, and financial responsibility. These deferred tanks include:

- Wastewater treatment tank systems
- UST systems containing radioactive material regulated under AEA
- UST systems that are part of emergency generator systems at nuclear power generation facilities
- Airport hydrant fuel distribution systems
- UST systems with field-constructed tanks.

UST systems that store fuel solely for use by emergency power generators are deferred from the release detection requirements only.

In order to fully protect human health and the environment, these deferred tanks are still subject to release response and corrective action regulations to ensure that any leaks from a deferred UST system will be addressed and cleaned up. Additionally, all deferred tanks are subject to an interim prohibition which generally requires that such tanks installed



after May 8, 1985, comply with certain technical requirements that provide basic protection of human health and the environment.

Notification

Because of the vast number of USTs already in existence when Congress enacted RCRA Subtitle I, EPA found that developing UST regulations and classifying the number of USTs in the United States was an intensive task. EPA's first action in responding to this mandate was to establish a notification system allowing tracking of existing USTs, as well as providing a mechanism to identify when a new UST was brought into operation. As a result, owners and operators of UST systems that were in the ground on or after May 8, 1986, were required to notify the state or local agency of the tank's existence, unless the tank was taken out of operation on or before January 1, 1974. Any owner and operator who brings an UST into use after May 8, 1986, must notify the designated state or local agency of the existence of the tank system within 30 days of bringing the tank into use. In addition, any person who sells a tank intended to be used as an UST must inform the purchaser of the notification requirement.

Technical Requirements

In response to the scope of the UST problem and Congress' mandate, EPA issued technical performance standards for all USTs and regulations to require petroleum UST owners and operators to have the financial means to pay for cleanups and to compensate third parties. These standards, codified in 40 CFR Part 280, encompass provisions for UST:

- Design, construction, and installation
- Operation
- Release detection
- Release reporting, investigation, and confirmation
- Corrective action
- Closure
- Financial responsibility.

New vs. Existing Underground Storage Tank Systems

At the time EPA's technical regulations for USTs came into effect, many tanks were already being used to store regulated substances. To accommodate the thousands of USTs in existence at the time the federal regulations were established, EPA built a certain amount of flexibility into the UST program to ensure that tanks already in use were covered by the new program, yet not immediately subjected to the new, potentially costly, design standards. To address this issue, EPA made a distinction in the UST regulations between new tanks and existing tanks. **New USTs** are those that were installed or that had commenced installation after December 22, 1988. These tanks are expected to be in compliance with all of the technical standards upon installation.

Existing USTs are those that were in service or for which installation had commenced, on or before December 22, 1988. At the time the regulations went into effect, approximately two million tanks were considered existing. While EPA felt that these tanks could pose the same threat as new tanks, and thus should be subject to the same standards as new tanks, the Agency granted a period during which the existing tanks could come into compliance with the regulations. This phase-in or upgrading period expired December 22, 1998. At that time, existing tanks must have met the performance standards for new tanks, must have met the upgrading requirements for existing tanks, or have been properly closed.

While the standards for existing USTs are often identical to those for new USTs, there are limited circumstances where the standards for new USTs would be impracticable for existing USTs to implement immediately. This chapter will focus primarily on the standards for new USTs, contrasting them with the standards for existing USTs where appropriate.

NEW VS. EXISTING TANKS

New tanks are those that are installed, or that have commenced installation, after December 22, 1988. These tanks are expected to be in compliance with all of the technical standards upon installation. Existing tanks are those that were in service, or for which had commenced, on or before December 22, 1988. Existing tanks had until December 22, 1998 to have met the performance standards for new tanks, have met the upgrading requirements for existing tanks, or be taken out of service.

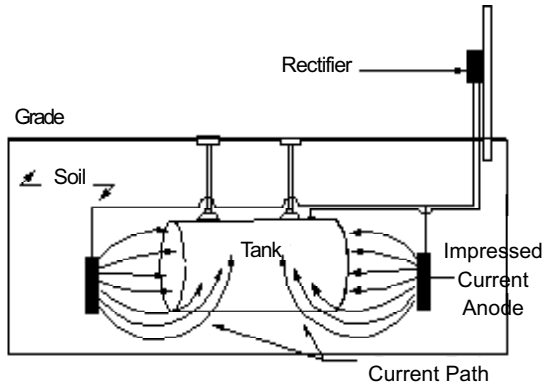
Design, Construction, and Installation

Proper installation is crucial to ensuring the structural integrity of both the tank and its piping. Therefore, owners and operators of tank systems must certify on their UST notification form that the tank system was installed in accordance with the manufacturer's instructions and in accordance with practices developed by nationally recognized associations, such as the Petroleum Equipment Institute (PEI).

Tanks are also required to be designed and constructed in such a way as to protect them from corrosion. This can be accomplished by constructing the tank of materials that do not corrode, such as fiberglass-reinforced plastic, or outfitting a steel tank with a thick layer of noncorrodible material. A third option, known as **cathodic protection**, uses sacrificial anodes or a direct current source to protect steel by halting the naturally occurring electrochemical process that causes corrosion (see Figure IV-1). Piping that routinely contains product, and that is in contact with soils, must meet similar corrosion protection standards.

Owners and operators of USTs must also ensure that any substance stored in the UST does not react in such a way that it threatens the integrity of the tank. For this reason, the tank and piping must be made of, or lined with, a material that is compatible with the substance stored in the tank.

Figure IV-1: Cathodic Protection



UST corrosion is caused by an electric current that is created when bare metal is placed in soil. Cathodic protection prevents such corrosion. The above impressed current system sends electric current from anodes, through the soil to the UST system to protect the tank by overcoming the corrosion-causing current normally flowing from the tank.

In order to remain in service after December 22, 1998, existing tanks that are not constructed with noncorrodible materials were required to install corrosion protection as part of the upgrading requirements. This could have been in the form of cathodic protection, an interior lining of noncorrodible material, or a combination of the two. Corrosion protection in the form of cathodic protection was also required for metal piping.

In addition to these design standards, tank systems are subject to general requirements to ensure proper operation and maintenance.

Operation

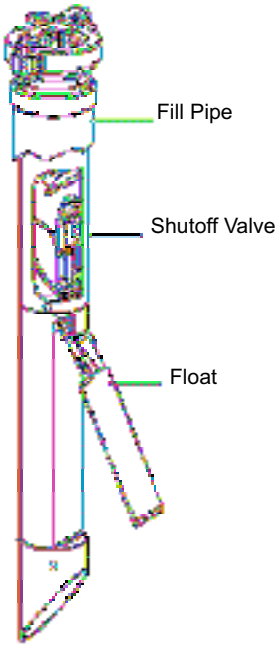
The general operating requirements provide owners and operators with a set of standards to ensure that routine daily operations are conducted safely. Theses requirements are geared primarily toward the prevention of spills, overfills, and corrosion.

Spill and Overfill Protection

Spill and overfill protection requirements include common-sense procedures, such as ensuring that there is enough room in the tank to receive a delivery of gasoline before the delivery is made, and watching the entire delivery to prevent spilling or overfilling. In addition, spills and overfills must be eliminated or minimized by installing certain equipment. For example, catchment basins can contain small amounts of product that are spilled when the delivery hose is disconnected from the fill pipe. Overfill protection devices either shut off delivery once the product has reached a certain level in the tank, or sound an alarm that notifies the delivery driver that the tank is almost full (see Figure IV-2). As with design and installation requirements, standards for product transfer are based on standards developed by nationally recognized associations.

All tank systems, both new and existing, are subject to the general operating standards for spill and overfill control. The only exception to these

Figure IV-2: Overfill Protection



An UST owner and operator can meet overfill protection requirements by using an overfill protection device. Such devices either shut off delivery once the product has reached a certain level in the tank, or sound an alarm that notifies the delivery driver that the tank is almost full. For example, an automatic shut off device (or fill pipe device) has one or two valves that are operated by a float mechanism. When the product reaches a certain level in the tank (i.e., when the float mechanism reaches a certain level), the device will shut off the flow of product into the tank.

requirements is that USTs which never receive product transfers of more than 25 gallons at a time, do not have to meet the spill and overfill design standards.

Corrosion Protection

Both new UST systems and existing UST systems that have been upgraded with corrosion protection must follow guidelines for the operation and maintenance of the corrosion protection equipment. The regulations require that corrosion protection systems be properly operated and maintained to ensure that no releases occur. In addition, UST systems with cathodic protection must be periodically inspected and tested to ensure that the equipment is operating properly. Finally, the owner and operator must keep records documenting compliance with these operation, maintenance, and inspection requirements.

Release Detection

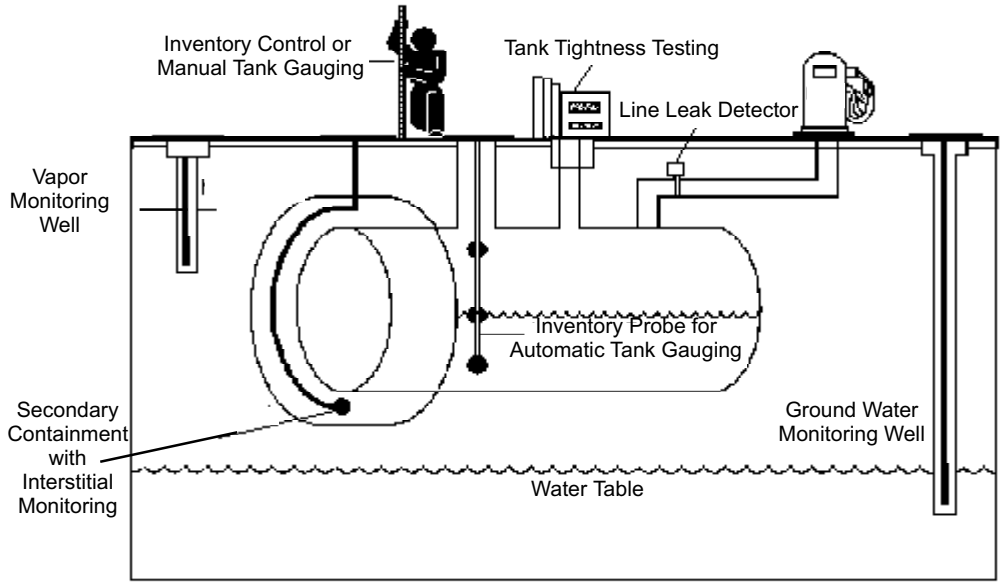
EPA included release detection requirements in the UST regulations to detect releases from leaking tanks before they pose threats to or damage human health and the environment. All new USTs are required to have release detection (also referred to as leak detection) for tanks and piping when they are installed. Existing USTs were required to meet release detection requirements for tanks and piping no later than December 1993.

There is no single release detection system that is best for all sites, nor is there a particular type of release detection that is consistently the least expensive. Identifying the best leak detection choice for an UST depends on a number of factors, including cost (both initial installation cost and long-term operation and maintenance cost), facility configuration (such as the complexity of piping runs and tank systems), ground water depth, soil type, seasonal rainfall and temperature ranges, availability of experienced installers, and other variables best evaluated by professionals.

Based on these and other factors, petroleum UST owners and operators can choose any of these seven release detection methods (see Figure IV-3):

- Interstitial monitoring
- Automatic tank gauging systems
- Vapor monitoring
- Ground water monitoring

Figure IV-3: Release Detection Methods



UST owners and operators can provide release detection for their tanks using several different methods. These include secondary containment with interstitial monitoring, automatic tank gauging, vapor monitoring, ground water monitoring, and SIR (not pictured). In some cases, owners and operators can combine either inventory control or manual tank gauging with tank tightness testing. Owners and operators must also provide release detection for piping, including automatic line leak detectors for pressurized piping.

- Statistical inventory reconciliation (SIR)
- Manual tank gauging for small USTs
- Other methods meeting performance standards.

The federal UST program also includes different release detection requirements for hazardous substance tanks as well as for underground piping for all USTs. Lastly, the federal regulations contain recordkeeping provisions requiring owners and operators to document compliance with the release detection standards.

Interstitial monitoring involves the use of secondary containment, such as a barrier, outer wall, or liner around the UST or piping to prevent leaking product from escaping into the environment. Alternatively, tanks can be equipped with inner bladders to provide secondary containment. If product escapes from the inner tank or piping, it will then be directed towards an interstitial monitor located between the walls.

Automatic tank gauging systems use a probe in the tank that is wired to a monitor to provide information on product level and temperature. These systems automatically calculate the changes in product volume that can indicate a leaking tank.

Vapor monitoring measures product fumes in the soil around the UST to check for leaks. This method requires installation of carefully placed monitoring wells. Owners and operators can perform vapor monitoring on a periodic basis, or continuously, using permanently installed equipment.

Ground water monitoring senses the presence of liquid product floating in ground water. This method requires installation of monitoring wells at strategic locations in the ground near the tank and along the piping runs. To discover if leaked product has reached ground water, owners and operators can periodically check these wells by hand, or monitor them continuously with permanently installed equipment. This method cannot be used at sites where ground water is more than 20 feet below the surface, and may not be appropriate for soluble materials, such as MTBE.

With **statistical inventory reconciliation**, owners and operators use sophisticated computer software to conduct a statistical analysis of inventory, delivery, and dispensing data. These data are then analyzed to determine if any product has been released.

Owners and operators of USTs with a capacity of 1,000 gallons or less can use **manual tank gauging** as the sole method of release detection for the life of the tank. Manual tank gauging requires owners and operators to keep the tank undisturbed for at least 36 hours each week, during which time the contents of the tank are measured. At the end of each week, owners and operators analyze the test results to determine if the tank is leaking.

Any other release detection technology can be used if it either (1) meets a performance standard of detecting a leak of 0.2 gallons per hour with a probability of detection of at least 95 percent and a probability of false alarm of no more than five percent, or (2) is approved by the implementing agency after demonstrating it is capable of detecting a release as effectively as one of the six stated methods.

These release detection methods are monthly monitoring methods, and eventually, all UST owners and operators will have to use at least one of them. It may, in some cases, require a significant investment of time and resources for owners and operators to get these release detection methods in place. In the interim, UST owners and operators can combine either inventory control or manual tank gauging with tank tightness testing. The length of time that owners and operators can use these temporary methods depends on whether their UST meets the standards for new or upgraded tanks, when the UST was upgraded to meet corrosion protection requirements and, in some cases, the size of the tanks.

- Inventory control with tank tightness testing — This method combines monthly inventory control with periodic tank tightness testing. **Inventory control** involves taking measurements of tank contents, recording the amount of product pumped each operating day and reconciling these data at least once a month.

Tank tightness testing describes a variety of methods used to determine if a tank is leaking; most of these methods involve monitoring changes in product level or volume in a tank over a period of several hours.

- Manual tank gauging with tank tightness testing — Owners and operators of tanks with a capacity of 2,000 gallons or less can temporarily use monthly manual tank gauging with periodic tank tightness testing.

Hazardous Substance USTs

All hazardous substance USTs, both new and existing, must meet different release detection requirements. Hazardous substance USTs must employ secondary containment with interstitial monitoring. By enclosing such tanks with a second wall, leaks can be detected quickly and contained before harming the environment.

Piping

Underground piping for all USTs (both new and existing petroleum and hazardous substance tanks) that routinely contains a regulated substance is also subject to release detection standards. Pressurized piping requires automatic line leak detectors and an additional monitoring method, such as an annual line tightness test or certain previously mentioned monthly monitoring methods for tanks. Suction piping may or may not require release detection, depending on how such piping is designed. For example, suction piping that has enough slope to allow product to drain back into the tank does not require release detection. However, suction piping that is subject to release detection requirements must use a periodic line tightness test or certain monthly monitoring methods for tanks.

Recordkeeping

The release detection recordkeeping requirements include maintaining results of any sampling, testing, or monitoring, as well as maintaining documentation of all calibration, maintenance, and repair of release detection equipment. These record retention provisions are applicable to new and existing petroleum and hazardous substance tanks and piping.

Release Reporting, Investigation, and Confirmation

UST release detection requirements are intended to prevent petroleum and hazardous substances from leaking into the environment. Unfortunately, many releases have already occurred and may occur in the future. As a result, the UST regulations stipulate procedures for investigating and confirming suspected releases from petroleum and hazardous substance USTs, and reporting such releases to the implementing agency. All UST owners and operators must be attentive to a variety of warning signals that indicate an UST may be leaking. These include evaluation of results of release detection monitoring and testing, observation of any unusual operating conditions at the pump (such as erratic or overly slow product flow), and evidence of product leakage into the environment (e.g., the presence of petroleum in nearby surface water or wells). Upon observing such warning signals, the owner and operator must immediately report the suspected release to the implementing agency. The owner and operator must then determine if the suspected release is an actual release by conducting tightness testing of the entire UST system to determine a possible source. The owner and operator must also measure for the presence of contaminants in soil or ground water, and determine the source of the release if such contamination has been discovered.

If the results of tank tightness testing or the site inspection (or both) indicate that no release has occurred, then no further investigation is required. If, however, the results of these investigations indicate that a release has occurred, the owner and operator must respond by immediately stopping the release and repairing or replacing any damaged equipment. If an owner and operator chooses to repair rather than replace a damaged pipe or tank, EPA requires the repair person to follow standard industry codes, such as codes established by the American Petroleum Institute (API), for correct repair practices. In addition, the owner and operator must take steps to clean up the release through the UST corrective action program.

Corrective Action

Corrective action for UST systems is designed to ensure that releases of regulated substances do not threaten human health and the environment. While corrective action procedures are comprised of a series of steps, the exact action to be taken and the level of response required vary depending on the severity of the release and the nature of the containment.

Response to confirmed releases consists of short-term and long-term stages. The initial stage of the response consists of short-term actions to stop and contain the leak or spill and steps to ensure that the leak or spill poses no immediate hazard to human health and safety, such as removing explosive vapors and other fire hazards. The owner and operator must also remove as much product from the UST system as necessary to prevent any further release; begin to recover any free (released) product; and provide a report to the implementing agency that includes a description of the initial actions taken, an assessment of the extent of contamination, and a plan on how they will clean up the release.

Based on data collected during the initial site characterization, the implementing agency will decide whether further action is warranted. Some leaks and spills will require additional long-term attention to correct the problem. In these cases, the implementing agency will request a corrective action plan from the owner and operator that describes how they will clean up contaminated soil and ground water. The implementing agency will then evaluate the plan to determine if it will adequately protect human health and the environment, taking into account such factors as the type of substance released, potential impacts on drinking water, and other site-specific concerns. Once the corrective action plan is approved, the owner and operator must implement the plan and report the results of the cleanup to the implementing agency.

One methodology that helps implementing agencies address UST sites requiring corrective action is **risk-based decision-making** (RBDM). EPA encourages states to incorporate RBDM into the implementation of their corrective action programs. RBDM is a process that uses risk and exposure assessment concepts to help UST implementing agencies establish enforcement priorities. Because of the vast number of leaking USTs and the limited financial and human resources available to implement corrective action at these sites, RBDM is an important tool in expediting assessments and cleanups at contaminated sites. It is also used to tailor the cleanup response to the level of risk posed by a particular site. For example, implementing agencies may use RBDM to categorize or classify sites, to aid in establishing cleanup goals, and to decide on the necessary level of oversight.

Closure

If an UST is taken out of service for any period of time, the owner and operator must close the UST system according to certain procedures in order to ensure adequate protection of human health and the environment. Closure can be done on either a temporary or permanent basis.

Temporary Closure

If the owner and operator plan to bring the tank system back into service at a later date (within a year or other time period approved by the implementing agency), they may close the tank temporarily. **Temporary closure** requires the owner and operator to continue to operate and maintain the corrosion protection system and, if any product remains in the tank, to maintain the leak detection system. During temporary closure, the tank remains subject to release response and corrective action requirements. If the owner and operator take the UST out of service for longer than three months, they must leave the vent lines open and functioning, and cap and secure all other lines attached to the tank. Provided no extension has been granted by the implementing agency, after 12 months in temporary closure, an UST system must be permanently closed in accordance with §§280.71 through 280.74.

Permanent Closure

If the owner and operator decide to permanently discontinue using the tank altogether, they must permanently close the UST system. **Permanent closure** involves a number of steps designed to ensure that the tank will pose no threats to human health or the environment after it is closed. These steps include notifying the implementing agency of the intent to close the tank, assessing the tank and surrounding area to determine if any releases have occurred, initiating corrective action to clean up any such releases, removing all liquids and accumulated sludges from the tank, and either removing the tank from the ground or filling it with an inert solid material, such as concrete or sand (if state and local regulations allow it).

Changes In Service

In some cases, an owner and operator may decide to use a formerly regulated UST system to store a nonregulated substance. This is considered a **change in service**. Before making this change, the owner and operator must notify the implementing agency, empty and clean the tank, conduct a site assessment to determine if a release has occurred, and initiate corrective action if appropriate.

For both tank closures and changes in service, the owner and operator must maintain results of the site assessment for at least three years, or mail the results to the implementing agency.

Financial Responsibility

When Congress amended RCRA Subtitle I in 1986, it recognized that UST corrective action could be very expensive, and as a result, some UST owners and operators might not be able to pay for such cleanups. Similarly, Congress discovered that releases from USTs had the potential both to inflict severe damage on neighboring property and threaten human health. In response to these concerns, Congress directed EPA to establish UST financial responsibility requirements to ensure that owners and operators would have the financial resources to pay for any necessary corrective action, as well as compensate third parties for bodily injury and property damage (known as third-party damages) resulting from leaking USTs.

The UST financial responsibility regulations apply only to petroleum UST owners and operators. State and federally owned and operated USTs are exempt from these requirements because it is assumed that such entities already have the financial resources to pay for corrective action and liability expenses.

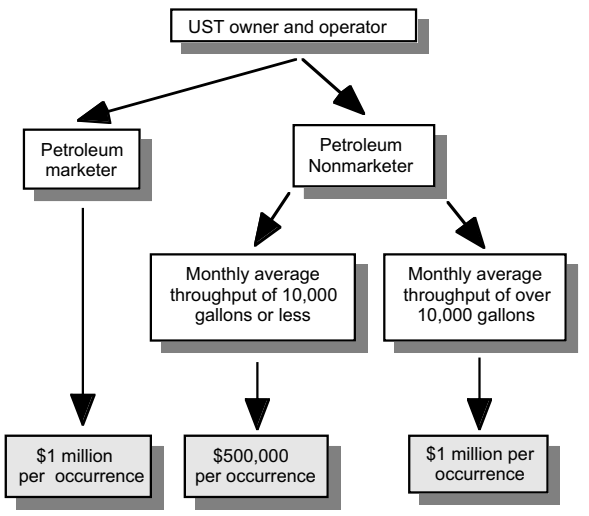
The UST financial responsibility requirements require coverage in both per occurrence and annual aggregate amounts.

Per Occurrence Coverage

Per occurrence means the amount of money that must be available to pay for the costs from one leak. These requirements are based on whether a facility markets (i.e., sells) petroleum to the public and the volume of petroleum handled at a facility. All petroleum marketers, and facilities that handle an average of 10,000 gallons of petroleum per month, are required to demonstrate at least $1 million in per occurrence coverage. Petroleum nonmarketers are required to demonstrate at least $500,000 in per occurrence coverage (see Figure IV-4). For example, owners and operators of gas stations, which are considered marketers because they sell petroleum to the public, would need to demonstrate

$1 million in per occurrence coverage for their USTs. On the other hand, owners and operators of USTs used to fuel vehicles that are rented to the public, which are considered nonmarketers, would need to demonstrate $500,000 in per occurrence coverage if their average monthly throughput was less than 10,000 gallons.

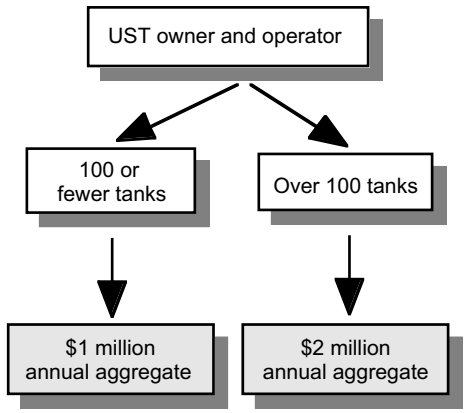
Figure IV-4: Per Occurrence Coverage



Annual Aggregate Coverage

Annual aggregate is the total amount of financial responsibility coverage required to pay for the costs of all leaks that might occur in one year. These requirements are based on the number of USTs owned and operated at all locations. Owners and operators of over 100 USTs are required to demonstrate at least $2 million in annual aggregate coverage. Owners and operators of 100 or less tanks are required to demonstrate at least $1 million in annual aggregate coverage (see Figure IV-5).

Figure IV-5: Annual Aggregate Coverage



Mechanisms

Financial responsibility mechanisms are the different ways an UST owner and operator can show that funds are available to pay for corrective action and liability requirements. An owner and operator must demonstrate financial responsibility through one or more of the following mechanisms:

- State assurance funds — Most states have established programs that can help pay for cleanup and third-party liability costs resulting from leaking USTs. Generally, the **state assurance funds** are funded by gasoline taxes, tank fees, or a combination of both. The terms and conditions of the state assurance funds vary greatly, and participation can either be mandatory or voluntary. Participating UST owners and operators, in good standing with their state assurance fund, can use that fund to demonstrate financial responsibility.
- Financial test of self-insurance — Some companies are of such size and financial strength that they have the assets to absorb the costs incurred by UST corrective action and liability. As a result, such owners and operators can demonstrate their financial strength by using the **financial test** of self-insurance to satisfy the UST financial responsibility requirements.
- Corporate guarantee — While not all companies will be able to meet the financial test requirements, they may be owned by a company (either corporate parent or grandparent), may have a sibling company, or may have a "substantial business relationship" with another company that has the financial standing and ability to meet the financial test requirements. In these cases, an UST owner and operator may arrange to have their corporate parent, corporate grandparent, sibling corporation, or firm with a substantial business relationship meet the UST

financial responsibility requirements on their behalf and provide them with a **corporate guarantee**.

- Insurance or risk retention group coverage — An UST owner and operator can take out an **insurance** policy to cover the corrective action and liability coverage requirements. Owner and operators can also use **risk retention groups**, which are entities formed by businesses or individuals with similar risks to provide insurance coverage for those risks.
- Surety bond — A **surety bond** is a guarantee by a surety company that it will meet the obligations of the UST owner and operator in the event of a failure to satisfy corrective action or liability requirements. If the owner and operator fails to pay the costs specified in a bond, the surety company is liable for the costs, but the owner and operator must then repay the surety company. The owner and operator must also establish a standby trust fund into which any payments made by the surety company will be deposited. EPA or the states then use this trust fund to cover the respective costs.
- Letter of credit — A **letter of credit**, issued by a financial institution (such as a bank), is a contract between the UST owner and operator, the issuer, and the implementing agency. Under the terms of this agreement, if the UST owner and operator fails to pay for corrective action or liability, the implementing agency will direct the issuer to deposit such payments into a standby trust fund.
- Trust fund — Under a **trust fund**, aggregate funds for UST corrective action and liability are held and administered by an impartial third party (usually a bank). By placing such money in an independent fund, the funds will not be commingled with the owner's and operator's other assets, and will always be available on the event that a release occurs, or a claim is made.

These financial responsibility mechanisms were developed to meet the needs of the private sector. Many local government UST owners and operators had difficulty demonstrating compliance with these mechanisms because of slight differences in their financial management and accounting practices. As a result, EPA promulgated four additional options that local governments could choose to demonstrate UST financial responsibility. These mechanisms are:

- Bond rating test
- Financial test
- Guarantee
- Dedicated fund.

While the bond rating and financial tests are modeled after the UST financial test of self-insurance, the guarantee is similar to the corporate guarantee, and the dedicated fund is similar to the trust fund, these mechanisms were all tailored to meet the special needs of local governments.

LENDER LIABILITY

Many UST owners and operators must secure loans from financial and other institutions to comply with environmental regulations, such as UST upgrading and maintenance requirements. These owners and operators often use the property on which the UST is located as collateral in order to secure the loan. Financial institutions have historically been reluctant to extend loans to UST owners and operators for fear of later incurring UST cleanup liability. For example, if a bank held property as collateral for a service station that later became bankrupt, the lender would take possession of the property, becoming the owner of the property and the tanks on it. Financial institutions feared that they would then be subject to the UST regulations, including financial responsibility for corrective action and third-party liability. Until recently, this potential for lending institutions to be held liable for releases from USTs, known as lender liability, greatly hampered the ability of UST owners and operators to secure the capital necessary to make tank improvements, upgrade the UST, or comply with other requirements.

EPA published the lender liability regulations in 1995. The rule provides lenders with an exemption from all federal UST regulatory requirements provided that the lender, or secured creditor, does

not participate in the management or operation of the UST system. This means that the lender is exempt from corrective action requirements and liability for cleanup costs of contaminated property, both prior to and after foreclosure, as long as the lender does not engage in petroleum production, refining, or marketing, does not manage or operate the UST, and does not store petroleum in the UST after foreclosure.

HOW DO STATE UST PROGRAMS OPERATE?

Because state programs operate in lieu of the federal program, owners and operators in states that have an approved UST program do not have to comply with two sets of statutes and regulations. Once their programs are approved, states have the lead role in UST program enforcement; therefore, owners and operators need only comply with their state regulations to be in full compliance with all requirements.

STATE UNDERGROUND STORAGE TANK PROGRAMS

States play a central role in the administration of the UST program. Because of the size and diversity of the UST regulated community, states and local governments are in the best position to oversee the regulation of USTs. Congress intended for states to take over the day-to-day administration of the UST program from the federal government; therefore, RCRA Subtitle I allows EPA to approve state UST programs to operate in lieu of the federal UST program provided they are at least as stringent as the federal program and ensure adequate enforcement.

In order to be approved, a state program must meet three requirements. First, the state program must set standards for eight performance criteria that are no less stringent than federal standards. These include the standards for:

- New UST system design
- General operating requirements
- Release detection
- Upgrading
- Release reporting
- Corrective action
- Financial responsibility
- Closure.

Second, the program must contain provisions that ensure adequate enforcement of the UST regulations. This means that the state must have adequate legal authority to implement and enforce the regulations, including the authority to inspect records and sites, require monitoring and testing, and assess penalties. In some cases, states will have to enact additional laws in order to have adequate authority. The state program must also include opportunities for public participation in the state enforcement process.

Finally, the state program must regulate at least the same universe of USTs covered by the federal program, although many states may choose to implement programs that are broader in scope than the federal program. For example, a state may regulate all heating oil tanks, even though the federal UST program excludes tanks used for storing heating oil for consumptive use on the premises where stored. In such cases, EPA does not review or approve the portion of the program that is broader in scope than the federal program. EPA can, however, approve requirements that are more stringent than the federal program. For example, a state may receive approval from EPA to implement release detection requirements that are more stringent than those contained in the federal regulations.

Because state programs operate in lieu of the federal program, owners and operators in states that have an approved UST program do not have to comply with two sets of statutes and regulations. Once their programs are approved, states have the lead role in UST program enforcement; therefore, owners and operators need only comply with their state regulations to be in full compliance with all requirements.

INSPECTIONS AND ENFORCEMENT

RCRA Subtitle I provides authority for federal and state personnel to request pertinent information from tank owners and operators; inspect and sample tanks; monitor and test tanks and surrounding soils, air, surface water, and ground water; respond to

violations of tank standards through civil or administrative actions; and seek injunctive relief when human health or the environment are endangered.

EPA may issue compliance orders for any violation of the Statute or regulations. A violator who fails to comply with the order may be subject to a civil penalty of up to $27,500 per tank per day of noncompliance. In addition, any owner and operator who knowingly fails to notify or submits false information may be subject to civil penalties of up to $11,000 for each tank for which notification is not given or false information is submitted. Furthermore, any owner and operator who fails to comply with any regulatory requirement under Subtitle I, may be subject to civil penalties of up to $11,000 per tank, for each day of violation. Criminal penalties are not authorized under Subtitle I.

At all levels of government, regulatory agencies are granted some discretion in determining when to impose penalties. In the UST program, inspectors often issue a notice of violation or a warning letter to first-time violators when a facility is inspected, provided that the violations are not egregious. These informal enforcement actions are less resource-intensive for the states and are usually effective in promoting compliance. States and EPA generally reserve their strongest enforcement tools for use on facilities whose owners and operators have not been responsive to informal enforcement actions, facilities whose violations pose significant threats to human health and the environment, or facilities who have a history of noncompliance. Federal enforcement authorities include the use of field citations and administrative or judicial (or both) enforcement actions.

LEAKING UNDERGROUND STORAGE TANK TRUST FUND

The LUST Trust Fund provides money to states to oversee corrective action by a responsible party and to clean up sites where the owner and operator is unknown, unwilling, or unable to respond, or which require emergency action.

UST inspectors issue field citations at the time they identify violations. Field citations are not issued for serious violations. They are issued in cases where the violation is a first-time violation and is clear-cut, easily verifiable, and easily correctable. A field citation couples a fine with a requirement to correct the violation within 30 days. If a facility does not address the violation within 30 days, however, follow-up enforcement actions can assess additional penalties.

Apart from inspections, outreach and education are among of the most commonly used ways to familiarize UST owners and operators with the UST regulations and promote compliance. EPA and states produce and distribute a wide variety of informational materials, including booklets, leaflets, videos, and slide shows, designed to assist owners and operators in complying with the UST requirements. EPA and states also conduct seminars and workshops and use inspections as opportunities to explain the requirements and offer assistance. In addition, EPA works closely with trade associations representing tank owners and operators to provide compliance assistance information to their members.

LEAKING UNDERGROUND STORAGE TANK TRUST FUND

As part of SARA, Congress also created the **Leaking Underground Storage Tank Trust Fund**. The LUST Trust Fund has two purposes. First, it provides money for overseeing corrective action taken by a responsible party, usually a contractor hired by an owner and operator of the leaking UST. Second, the LUST Trust Fund provides money for cleanups at UST sites where the owner and operator is unknown, unwilling or unable to respond, or which require emergency action.

The LUST Trust Fund is financed through a user tax on motor fuel sold in the United States. The taxing authority ends March 31, 2005 (see Tax Payer's Relief Act of 1997, and Section 1033 of H.R. 20410). As of September 2001, about $2.6 billion had been collected, $945 million of which has been given to EPA. About $794 million has been dispersed to state programs for state officials to use for administration, oversight, and cleanup work.

The remaining LUST Trust Fund money has been used by EPA for negotiating and overseeing cooperative agreements, implementing programs on Native American lands, and technical assistance and training for EPA Regional and state offices.

To receive money from the LUST Trust Fund, states enter into a **cooperative agreement** with the federal government to spend the money for its intended purpose. Every state has a cooperative agreement with EPA. LUST Trust Fund money is divided among EPA Regional Offices based on a formula that uses state data. In fiscal year 2002, each state received a base allocation with additional funds for states and territories with approved state programs, plus additional money depending on the following: the number of confirmed releases in the state; the number of notified petroleum tanks; the number of residents relying on ground water for drinking water; and the number of cleanups initiated and completed as a percentage of total confirmed releases.

The LUST Trust Fund provides money to states to oversee corrective action by a responsible party and to clean up sites where the owner and operator is unknown, unwilling, or unable to respond, or which require emergency action.

USTFIELDS FOR ABANDONED TANKS

USTfields are abandoned or underutilized industrial and commercial properties where redevelopment is complicated by real or perceived environmental petroleum contamination from federally-regulated USTs. Sites contaminated by a substance other than petroleum, and sites contaminated by petroleum as a result of releases from non-federally registered USTs, are not covered under the federal program, and are not considered USTfields.

Under the USTfields Initiative, EPA developed an USTfield Pilot program, in part to address high priority petroleum releases from federally-regulated underground storage tanks. Selected USTfields pilots are large areas identified by state/local or EPA/tribal partnerships containing two or more USTfields properties in need of an assessment or cleanup support. Each pilot is awarded up to $100,000 from the LUST Trust Fund. Site managers can use the funding for the following activities: to assess the site for the existence of chemicals of concern (e.g., MTBE), clean up petroleum contamination, monitor soil and groundwater to evaluate whether chemicals of concern have been removed, and maintain public/community participation during the assessment and/or cleanup activities of community sites. Award money cannot be used for redevelopment activities, general education or job training activities, lobbying efforts, matching any other federal funds without specific statutory authority, or paying any outstanding fines or penalties. The new Brownfields legislation, Small Busniess Liability Relief and Brownfields Revitalization Act, PL 107-118, will give communities across the country the tools they need to reclaim and restore thousands of petroleum-contaminated Brownfields sites.

SUMMARY

Across the United States, a wide range of persons, from large and small businesses to private entities, store regulated substances (petroleum and CERCLA hazardous substances) in USTs. An UST is defined as a tank and any underground piping connected to that tank that has at least 10 percent of its combined volume underground.

Not all tanks storing regulated substances are subject to the UST regulations, as some tanks are specifically exempted from the regulations due to their regulation under other laws.

In an effort to protect human health and the environment from releases from regulated USTs, EPA promulgated technical performance standards designed to ensure safe design, operation, maintenance, and closure. These standards, codified in 40 CFR Part 280, encompass provisions for UST:

- Design, construction, and installation
- Operation
- Release detection
- Release reporting, investigation, and confirmation
- Corrective action

- Closure
- Financial responsibility.

When the UST regulatory program came into existence, there were over two million tanks already in the ground. To accommodate these USTs, EPA built flexibility into the regulatory program to allow such tanks to upgrade during a phase-in period. As of December 22, 1998, such existing tanks must either meet the performance standards for new tanks, meet the upgrading requirements for existing tanks, or be taken out of service.

The UST technical requirements may be expensive to comply with. As a result, many owners and operators secure loans from private lending institutions. However, if owners and operators default on such loans, banks may foreclose on property containing such USTs. By default, the bank may become responsible and liable for compliance with the federal UST requirements, including the cleanup of all releases. In order to shield lending institutions from such requirements, and remove the disincentive for issuing such loans in the first place, EPA promulgated a lender liability provision to exempt lending institutions from the UST requirements provided they do not manage or operate the UST.

The UST program also includes state program approval provisions that are designed to help facilitate the delegation of UST program implementation to the states. This provides states the authority to ensure proper compliance with the federal standards, and allows states with approved programs to have primary enforcement responsibility. In order for a state to receive approval, its program must be no less stringent than the federal program, cover the same universe of tanks covered by the federal program, and provide for adequate enforcement of the state UST program. The UST program also includes provisions regarding inspections and enforcement.

Finally, the UST program includes a LUST Trust Fund. Under the LUST Trust Fund, EPA disperses money to states that have cooperative agreements with the Agency to provide money for overseeing corrective action taken by a responsible party and to provide money for cleanups at UST sites where the owner and operator is unknown, unwilling or unable to respond, or which require emergency action.

ADDITIONAL RESOURCES

Additional information about the topics covered in this chapter can be found at www.epa.gov/oust.

SECTION V

MISCELLANEOUS STATUTORY REQUIREMENTS

In this section…

OVERVIEW

All RCRA provisions do not fit neatly into the solid waste, hazardous waste, and UST regulatory frameworks. The Statute established additional miscellaneous provisions to further the goals of the waste management program, and to address materials that were not covered by Subtitles C, D, or I.

The first set of these miscellaneous statutory provisions focuses on promoting recycling and developing a market for products with recycled content: the federal procurement requirements.

The second set of miscellaneous statutory provisions focuses on certain materials that were not covered by Subtitles C, D, or I: namely, medical wastes. These requirements imposed a tracking system to ensure the safe and protective management of potentially harmful wastes.

This section consists of two chapters:

- Federal Procurement Requirements — To promote recycling, encourage the development of recycling technologies, and develop the market for products with recycled content, RCRA contains specific federal procurement requirements.
- Medical Waste Regulations — To ensure the tracking and safe management of medical waste, RCRA established a medical waste demonstration program.

Both of these aspects of the RCRA program are carefully detailed in separate chapters in this section.

CHAPTER 1

FEDERAL PROCUREMENT REQUIREMENTS

In this chapter…

OVERVIEW

The purpose of RCRA is not merely to control waste generation, waste management, or waste disposal. The title of the Act itself clearly reveals a major focus and intent of the regulatory program – resource conservation and recovery. As discussed in Section I, a major goal of RCRA is energy and natural resource conservation through reducing the depletion of our natural resources and to protect those resources from hazardous constituents. Another major goal of RCRA is resource recovery through extracting usable resources from materials that are unintentionally created (i.e., wastes).

Resource recovery or recycling requires separating and correcting wastes for their subsequent transformation or remanufacture into usable products and materials. Resource recovery is a major component of the RCRA program because it diverts large amounts of solid waste from landfills and incinerators, conserves space in landfills, recovers the precious raw materials that are often found in solid waste, and preserves natural resources that would otherwise be used to produce virgin products and materials.

To further this waste management approach, RCRA established specific provisions to promote the development of recycling capabilities and technologies, and develop a market for recyclable materials. As a result, the Statute contains provisions for technology and market development activities, as well as federal procurement requirements intended to bolster the demand for products containing recycled materials.

PROMOTION OF RECYCLING

When the Statute was enacted, the waste management and recycling industries were unable to maintain and promote substantial resource conservation and recovery of a wide range of materials. While specific industries, such as metals and glass recycling, were mature and developed, recycling of other commodities, such as old newspapers was not as advanced. While recycling was a major component of the regulatory program, there was neither the technology to recycle nor a market in which to sell and purchase such commodities. Without a market to sell or a demand to purchase recycled products, there was no incentive to perform recycling activities in the first place.

Congress recognized this opportunity within the recycling industry and sought ways to promote both recycling activities and market development. As a result, RCRA includes provisions requiring EPA to take steps to identify markets for recovered materials, identify economic and technical barriers to the use of recovered materials, encourage the development of new uses for recovered materials, and promote recycling technologies. In addition, RCRA requires the National Institutes of Standards and Technology to develop specifications for recycled materials to facilitate their reuse in replacing virgin materials in various industrial and commercial products.

FEDERAL PROCUREMENT REQUIREMENTS

Realizing that recycling is not only the collection of materials for remanufacture, but also the purchase of products with recovered content by consumers, Congress sought ways to stimulate market demand for recycled materials. Congress realized that the purchasing power of the federal government, if focused on procuring materials with recovered content, could create a significant demand for recycled materials thus stimulating the market. Increased demand by the federal government for products with recovered content would boost manufacturing of such items and encourage the private sector to purchase such goods as well. As a result, RCRA §6002 established the federal government's buy-recycled program, formally referred to as the federal procurement program.

The **federal procurement program** sets minimum **recovered materials content standards** for certain designated items and requires procuring agencies to purchase those items composed of the highest percentage of recovered materials practicable. Minimum content standards specify the minimum amount of recovered materials that designated items should contain.

Procuring agencies are defined as:

- Federal government departments or agencies
- State government agencies that use appropriated federal funds for procurement of a designated item
- Local government agencies that use appropriated federal funds for procurement of a designated item
- Government contractors that work on a project funded by appropriated federal funds, with respect to work performed under the contract.

Only procuring agencies that purchase $10,000 or more worth of a designated item during the course of their fiscal year, or that purchased at least $10,000 worth of a procurement item during the preceding fiscal year, are subject to these procurement requirements.

The Statute requires EPA to identify products that are or can be made from recovered materials, and to make recommendations concerning the procurement of items containing recovered materials. Procuring agencies can use these guidelines to meet these statutory requirements.

■ Comprehensive Procurement Guidelines

EPA designates items in a **Comprehensive Procurement Guideline** (CPG), which is updated annually. Currently, there are 54 items designated within 8 product categories (see Figure V-1). These product categories are:

- Paper and Paper Products
- Vehicular Products
- Construction Products
- Transportation Products
- Park and Recreation Products
- Landscaping Products

- Nonpaper Office Products
- Miscellaneous Products.

Figure V-1: Designated Procurement Items

Paper and Paper Products
- Printing and Writing Papers
- Bristols
- Newsprint
- Commercial/Industrial Sanitary Tissue Products
- Miscellaneous Paper Products

Vehicular Products
- Engine Coolants
- Rerefined Lubricating Oils
- Retread Tires
- Rebuilt vehicular parts*
- Tires*

Construction Products
- Building Insulation Products
- Polyester Carpet
- Carpet Cushion
- Cement and Concrete Containing Coal Fly Ash and Ground Granulated Blast Furnace Slag
- Consolidated and Reprocessed Latex Paint
- Flowable Fill
- Floor Tiles and Patio Blocks
- Railroad Grade Crossing Surfaces
- Shower and Restroom Dividers and Partitions
- Structural Fiberboard and Laminated Paperboard
- Cement and Concrete Containing Cenospheres*
- Cement and Concrete Containing Silica Fume*
- Nylon Carpet and Nylon Carpet Backing*
- Modular Threshold Ramps*
- Non-pressure Pipe*
- Roofing Materials*

Transportation Products
- Channelizers
- Delineators
- Flexible Delineators
- Parking Stops
- Temporary Traffic Control Devices

Parks and Recreation Products
- Park Benches and Picnic Tables
- Plastic Fencing
- Playground Equipment
- Playground Surfaces
- Running Tracks

Landscaping Products
- Food Waste Compost
- Garden and Soaker Hoses
- Hydraulic Mulch
- Lawn and Garden Edging
- Plastic Lumber Landscaping Timbers and Pots
- Yard Trimmings Compost

Non-paper Office Products
- Binders
- Office Recycling Containers
- Office Waste Receptacles
- Plastic Clipboards
- Plastic Clip Portfolios
- Plastic Desktop Accessories
- Plastic Envelopes
- Plastic File Folders
- Plastic Presentation Folders
- Plastic Trash Bags
- Printer Ribbons
- Solid Plastic Binders
- Toner Cartridges
- Office furniture*

Miscellaneous Products
- Awards and Plaques
- Industrial Drums
- Manual-grade Strapping
- Mats
- Pallets
- Signage, including Sign Supports and Posts
- Sorbents
- Bike racks*
- Blasting grit*

** On August 28, 2001, EPA published a proposed update to the CPG. The 11 proposed items, which were not finalized at the time of publication, are designated with an asterisk.*

■ Recovered Materials Advisory Notice

For each item designated in the CPG, EPA also publishes a corresponding recovered content level (see Figure V-2). These recovered material levels are published in a **Recovered Materials Advisory Notice** (RMAN). Procuring agencies can use these levels as guidelines, but are encouraged to exceed EPA's recommendations. EPA also provides information on specifications for purchasing a particular item and other pertinent purchasing information.

■ Procurement Program

If an agency meets the definition of a procuring agency and is purchasing a certain dollar amount of a designated item, that agency is required to purchase items with recovered content to the maximum extent possible. Within one year after EPA designates an item, procuring agencies must revise their product specifications to require the use of recovered materials and to eliminate administrative barriers to the use of materials with recovered content, such as removing purchasing provisions that prohibit the use of recovered materials or require the exclusive use of virgin materials.

Executive Orders and the Federal Procurement Program

When RCRA established the federal procurement program, EPA was required to follow the formal rulemaking process in order to designate an item and establish minimum content levels. Because of the length of this rulemaking process, from 1980 to 1993, EPA had only designated five items. Executive Order 12873, signed in 1993, requires EPA to change the process to allow more items to be designated faster. This change lead to the CPG and RMAN.

Executive Order 13101, signed in 1998, supersedes Executive Order 12873. This Order retains the provisions of Executive Order 12873 and more clearly defined the roles of the oversight agency, namely the Office of the Federal Environmental Executive.

Figure V-2: Sample Recovered Materials Advisory Notice Content Level Specification

Postconsumer materials are materials or finished products that have served their intended uses and have been discarded for disposal or recovery, having completed their lives as consumer items. For example, EPA recommends that 60-100%, of the 90-100% recovered plastic that EPA recommends for plastic fencing, should originate from the recycling of postconsumer plastic.

Total recovered materials content refers to the total percentage of recovered materials that EPA recommends for a designated item. For example, EPA recommends that procuring agencies purchase plastic fencing that contains 90-100% recovered plastic.

Recommended Recovered Materials Content Levels for Fencing Containing Recovered Plastic

Material	Postconsumer content (%)	Total recovered materials content (%)
Plastic	60-100	90-100

EPA's recommendation does not preclude a procuring agency from purchasing fencing that is manufactured from another material, such as wood. The procurement guidelines simply require that a procuring agency, when purchasing plastic fencing, purchase this item made with recovered materials to the extent possible.

Not all procuring agencies will be able to purchase the designated items with recovered content. In some instances, such agencies will need to purchase items that do not contain the minimum recovered content. The Statute provides, however, that procuring agencies need not purchase designated items if the designated items will not be available within a reasonable period of time, will not meet the agency's reasonable performance standards, or will not be available at a reasonable price. EPA, however, encourages such agencies to purchase designated items with recovered content to the extent practicable.

Each procuring agency must develop an affirmative procurement program for each designated item, setting forth the agency's policies and procedures for implementing the requirements.

The affirmative procurement program consists of four parts:

- Preference program
- Promotion program
- Estimation, certification, and verification program
- Monitoring and review program.

Preference Program

The preference program is a means by which an agency can show its preference for products made with recovered materials. It may consist of established minimum content standards, a case-by-case approach when the minimum content standard is inappropriate, or an equivalent alternative. Minimum content standards specify the minimum amount of recovered materials that designated items should contain. Agencies can adopt these standards on an agency-wide basis for all procurement actions. Case-by-case policy development allows the

procuring agency to establish a separate recovered materials content requirement for a specific procurement action, while still enabling the agency to procure other designated products with the highest amount of recovered materials practicable. The procuring agency can also choose an alternative that is equivalent to either of these options, such as contracting for recycling of spent engine coolant.

Promotion Program

Through the promotion program, the agency must actively promote its desire to buy recycled products, both internally within the agency and externally to product vendors. Internal promotion usually is a broad-based employee education program that affirms an agency's procurement policy through advertising, workshops, agency newsletters, and technical and staff manuals. Examples of external promotion include publishing articles in trade journals, participating in vendor shows or trade fairs, placing statements in bid solicitations, and discussing an agency's procurement policy at bidders' conferences.

Estimation, Certification, and Verification Program

The estimation, certification, and verification program establishes procedures for obtaining estimates and certifications, and where appropriate, reasonably verifying the amount of recovered materials content utilized in the performance of a contract.

Monitoring and Review Program

The monitoring and review program requires agencies to monitor affirmative procurement programs to ensure that they are fulfilling their requirements to purchase items composed of recovered materials.

■ Compliance

Once EPA designates an item in the CPG, the responsibility for complying with the procurement program rests with the procuring agency. There are no provisions in the Statute for federal enforcement of the guidelines. On the other hand, RCRA §7002 citizen suit provisions allow citizens to sue in U.S. District Court to seek relief against any person alleged to be in violation of the requirements of the Act, including the procurement requirements. (Citizen suit provisions are fully discussed in Section III, Chapter 10.)

SUMMARY

In order to further RCRA's resource, conservation, and recovery goals, EPA established provisions to promote recycling and market development. RCRA created federal procurement requirements to create a significant demand for products with recovered content, boost manufacturing of such products, and encourage the private sector to purchase such goods as well.

The procurement requirements apply to procuring agencies that purchase $10,000 or more worth of a designated item during the course of their fiscal year, or that purchased at least $10,000 worth of a procurement item during the preceding fiscal year.

Procuring agencies are defined as:

- Federal government departments or agencies
- State government agencies that use appropriated federal funds for procurement of a designated item
- Local government agencies that use appropriated federal funds for procurement of a designated item
- Government contractors that work on a project funded by appropriated federal funds, with respect to work performed under the contract.

The federal procurement program sets minimum recovered materials content standards for certain designated items and requires procuring agencies to purchase those items composed of the highest percentage of recovered materials practicable. EPA designates these items in the CPG and specifies minimum recovered content levels in an RMAN.

Each procuring agency must develop an affirmative procurement program for each designated item, setting forth the agency's policies and procedures for implementing the requirements. This program consists of four parts:

- Preference program
- Promotion program
- Estimation, certification, and verification program
- Monitoring and review program.

ADDITIONAL RESOURCES

Additional information about the topics covered in this chapter can be found at www.epa.gov/cpg. Further information about the Office of the Environmental Executive can be found at www.ofee.gov.

CHAPTER 2

MEDICAL WASTE REGULATIONS

In this chapter…

OVERVIEW

During the summer of 1988, syringes and other used medical materials washed up on beaches along the Atlantic seaboard. In response to public concern about this problem, Congress enacted the Medical Waste Tracking Act in November 1988, which added medical waste tracking provisions in RCRA Subtitle J. The Medical Waste Tracking Act directed EPA to establish a two-year demonstration program for the tracking and management of medical waste. Under this statutory authority, EPA codified regulations in 40 CFR Part 259 identifying the medical wastes to be tracked and creating management standards for handlers of medical waste. The States of Connecticut, New Jersey, New York, Rhode Island, and the Commonwealth of Puerto Rico all participated in the two-year tracking program. For purposes of this program, they were known as **covered states**. This demonstration program began June 22, 1989, and ended June 22, 1991. Currently, the program is expired and no federal medical waste tracking and management regulations are in effect. As a result, the provisions in Part 259 have been removed from the CFR. States, however, have become active in managing medical waste and a majority have developed programs similar to the federal model. This chapter will discuss what was considered medical waste under the two-year demonstration program.

WHAT WAS MEDICAL WASTE?

Medical waste included:

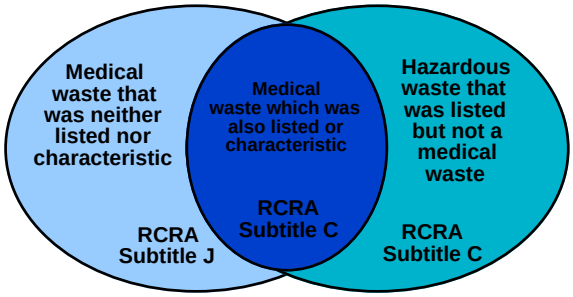
- Cultures and stocks of infectious agents
- Human pathological wastes (e.g., tissues, body parts)
- Human blood and blood products
- Used sharps (e.g., hypodermic needles and syringes used in animal or human patient care)
- Certain animal wastes
- Certain isolation wastes (e.g., wastes from patients with highly communicable diseases)
- Unused sharps (e.g., suture needles, scalpel blades, hypodermic needles).

For purposes of the demonstration program, the definition of medical waste excluded household waste. In addition, residues from treatment and destruction processes, or from the incineration of regulated medical wastes, were not considered medical waste, nor were human remains intended to be buried or cremated. Etiologic agents (i.e., infectious substances) being shipped pursuant to other federal regulations, and samples of medical waste that were shipped for enforcement purposes were exempt from the 40 CFR Part 259 requirements.

MEDICAL WASTE VS. HAZARDOUS WASTE

Because medical wastes met the RCRA regulatory definition of solid waste, these wastes were also subject to the Subtitle C hazardous waste characterization. In other words, once a facility identified a waste as a medical waste, it then had to determine if this waste was also listed or characteristic. (The hazardous waste identification process is fully discussed in Section III, Chapter 1.) If medical waste was a hazardous waste, it was subject to the Subtitle C hazardous waste requirements. When the Subtitle J medical waste tracking standards were in place, such hazardous medical wastes were excluded from the tracking requirements and were subject to those requirements in RCRA Subtitle C (see Figure V-3).

Figure V-3: Medical Waste vs. Hazardous Waste



If medical waste was neither listed nor characteristic, it was subject to regulation as medical waste under RCRA Subtitle J. If medical waste was also listed or characteristic, it was subject to regulation as hazardous waste under RCRA Subtitle C.

THE DEMONSTRATION PROGRAM

The medical waste tracking demonstration program set up provisions for tracking medical waste from the generator to the disposal site, similar to Subtitle C's hazardous waste manifest system. The program was designed to ensure proper handling, tracking, and disposal of medical waste. The system required that a tracking form accompany the waste and a signed copy be retained by the generator, each transporter, transfer station, and the treatment, destruction, and disposal facility that handled the waste. When the final disposal facility accepted the waste, a copy of the signed tracking form was returned to the generator. Through this process, the generator was assured that the waste was actually received for disposal. The tracking program also included exception and discrepancy reporting to alert EPA and the states if wastes were not being handled properly.

To minimize contact with medical wastes by workers, handlers, and the public, the program also included specific requirements for segregation, packaging, labeling, marking, and storing of medical wastes before they were shipped to another site for treatment, destruction, or disposal.

The demonstration program focused on three groups of medical waste handlers:

- Generators
- Transporters
- Treatment, destruction, and disposal facilities.

■ Generators

A medical waste **generator** was any person whose act or processes produced medical waste or caused medical waste to become subject to regulation. These tracking provisions applied to persons or facilities that generated 50 pounds or more of medical waste in a month and shipped such waste off site. These generators were required to separate, package, label, mark, and track medical wastes according to the regulations. Generators

producing and shipping less than 50 pounds a month were required to prepare their wastes properly for shipment, but could use a log to account for wastes instead of a tracking form.

With the exception of medical waste burned in on-site incinerators, generators who disposed of medical wastes on site or in a sewer system were not covered by the requirements of this program. Similarly, wastes that were treated and destroyed or disposed of on site or in sewers were not counted as part of the 50-pound monthly total. Generators burning waste in on-site incinerators were required to report the volume of waste burned. All medical wastes, even those that were to be treated, destroyed, and disposed of on site, were required to be stored properly.

These provisions applied to medical wastes generated by federal facilities in covered states. These provisions also applied to ships and ocean vessels that brought medical wastes to shore by docking in a covered state.

■ Transporters

A medical waste **transporter** was any person engaged in the off-site transportation of medical waste by air, rail, highway, or water. Transporters were required to notify EPA of their intent to comply with the tracking program before they could accept medical waste for transport. Transporters were required to follow rules governing the transport, tracking, recordkeeping, and reporting of waste shipments. They were also required to make sure that the wastes they accepted for transport had been properly prepared for shipping and that the tracking form was accurate.

■ Treatment, Destruction, and Disposal Facilities

Treatment facilities were facilities that changed the biological character or composition of medical waste to substantially reduce or eliminate its potential for causing disease. Destruction facilities were facilities that destroyed medical waste by mutilating it, or tearing it apart to render it less infectious and unrecognizable as medical waste. Once medical waste was properly treated and destroyed, it no longer needed to be tracked. These treatment and destruction facilities included incinerators and treatment operations that ground, steam-sterilized, or treated the waste with disinfectants, heat, or radiation. Disposal facilities were facilities where medical waste was placed in or on the land (e.g., landfills).

The demonstration program did not regulate the operation of these treatment, destruction, and disposal processes, but rather required tracking from generation to disposal and recordkeeping. When the wastes were accepted for disposal, these facilities had to send a signed copy of the tracking form back to the generator or initiator of the tracking form. The facility owners and operators were required to investigate any discrepancies between the accompanying papers and the shipments they received. If after investigation there was still a discrepancy, they were required to report to EPA and the generator's state agency. Once treated and destroyed, however, such wastes were no longer subject to the tracking requirements.

INTERSTATE SHIPMENTS

While only the States of Connecticut, New Jersey, New York, Rhode Island, and the Commonwealth of Puerto Rico participated in the tracking program, the medical waste tracking provisions also applied when shipments originating in these covered states were transported to states that did not participate in the program.

According to the provisions of the tracking program, if medical waste was generated in a covered state, any subsequent handling by a transporter or treatment, destruction, and disposal

SHIPMENTS TO STATES NOT PARTICIPATING IN THE DEMONSTRATION PROGRAM

While only the Commonwealth of Puerto Rico and the States of Connecticut, New Jersey, New York, and Rhode Island participated in the tracking program, the medical waste tracking provisions also applied when shipments originating in these covered states were transported to states that did not participate in the program.

facility in that state, another covered state, or a noncovered state was subject to the tracking provisions. For example, if a medical waste was generated in New Jersey (a covered state) and transported by truck to Pennsylvania (a noncovered state) for treatment and disposal, the waste would still be subject to the medical waste tracking provisions since the waste was originally generated in a covered state.

REPORTS TO CONGRESS

The Medical Waste Tracking Act also required EPA to submit two interim reports and a final report on medical waste management and the demonstration program to Congress. The information gathered during the demonstration program was used to determine whether such a program should be extended nationwide and what other options are available for medical waste management. The first and second interim reports were released in 1990; the final report is still under development.

CURRENT REQUIREMENTS

While medical waste is not regulated under the current federal RCRA regulations, there are federal requirements for medical waste under CAA and FIFRA.

In 1997, under CAA, EPA established new source performance standards (NSPS) and emissions guidelines to reduce air emissions from new and existing hospital, infectious, and medical waste incinerators. These guidelines also established standards for incinerator operator training and qualification, equipment inspections, and siting. EPA estimates that there are approximately 2,400 such incinerators in operation in the United States that combust medical and infectious waste annually.

Under FIFRA, antimicrobial pesticides and disinfectants used in medical waste treatment technologies must be registered with EPA.

SUMMARY

Congress enacted the Medical Waste Tracking Act in November 1988, which added medical waste tracking provisions to RCRA Subtitle J. The Act directed EPA to establish a two-year demonstration program for the tracking of medical waste. The States of Connecticut, New Jersey, New York, Rhode Island, and the Commonwealth of Puerto Rico all participated in the tracking program. This demonstration program began June 22, 1989, and ended June 22, 1991. Currently, the program is expired and no federal tracking regulations are in effect. States, however, have become active in managing medical waste and many have developed programs similar to the federal model.

Medical wastes included:

- Cultures and stocks of infectious agents
- Human pathological wastes (e.g., tissues, body parts)
- Human blood and blood products
- Used sharps (e.g., hypodermic needles and syringes used in animal or human patient care)
- Certain animal wastes
- Certain isolation wastes (e.g., wastes from patients with highly communicable diseases)
- Unused sharps (e.g., suture needles, scalpel blades, hypodermic needles).

The medical waste demonstration program set up provisions for tracking the waste from the generator to the disposal site, similar to Subtitle C's hazardous waste manifest system.

The demonstration program focused on three groups of medical waste handlers:

- Generators
- Transporters
- Treatment, destruction, and disposal facilities.

The medical waste tracking provisions also applied when shipments originating in states covered by the program were transported to states that did not participate in the program.

The Medical Waste Tracking Act also required EPA to submit two interim reports and a final report on medical waste management and the demonstration program to Congress. The first and second interim reports were released in 1990, the final report is still under development.

While medical waste is not regulated under the current federal RCRA regulations, there are federal requirements for medical waste under CAA for medical waste incinerators and under FIFRA for pesticides and disinfectants used in medical waste treatment technologies.

ADDITIONAL RESOURCES

Additional information about medial waste regulations can be found at www.epa.gov/epaoswer/other/medical/index.htm.

SECTION VI

RCRA AND ITS RELATIONSHIP TO OTHER ENVIRONMENTAL STATUTES

In this section…

OVERVIEW

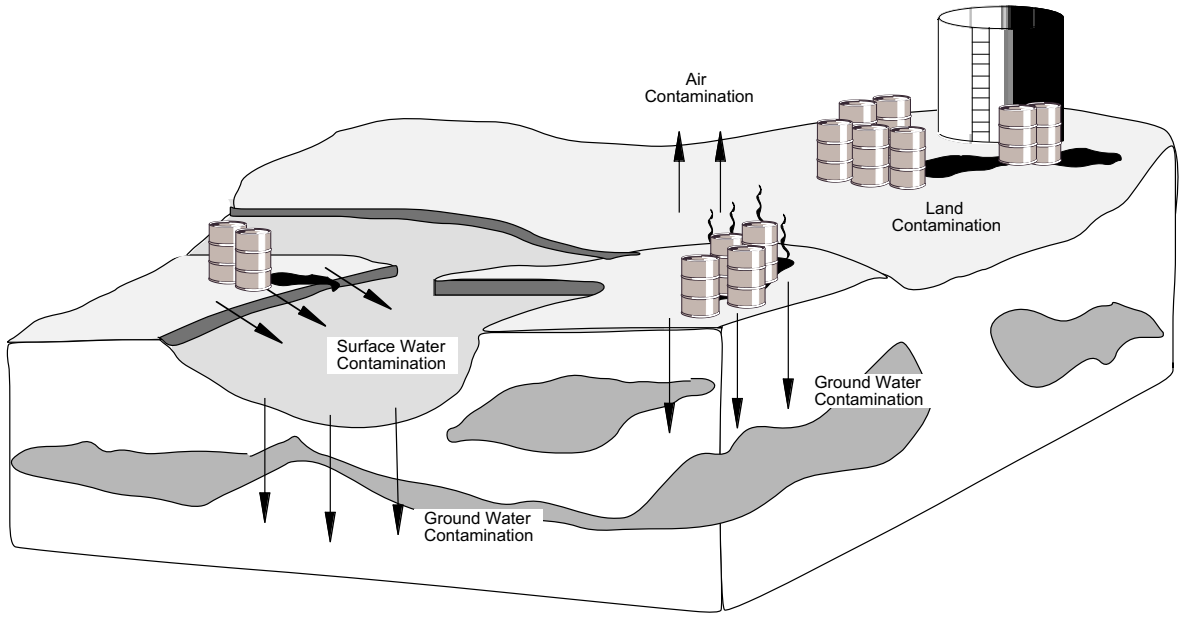
EPA's mission is to protect human health and the environment. In order to further this mission, Congress has enacted many environmental laws to address releases, or threats of releases, of hazardous constituents. An understanding of these laws is necessary to determine where RCRA fits into the national environmental protection program established by Congress and implemented by EPA. Each environmental statute has its own particular focus, whether it is controlling the levels of pollutants introduced into a single environmental medium (i.e., air, soil, or water) or addressing a specific area of concern, such as pesticides or waste cleanup.

While the segmentation of environmental issues simplifies the drafting of legislation, it complicates the implementation of environmental protection regulations. The media-, practice-, and chemical-specific boundaries established in the nation's environmental statutes are often artificial. Many different types of practices may be responsible for the release into the environment of the same contaminant. Moreover, individual contaminants are not confined to specific media (see Figure VI-1). Volatile organic compounds, such as benzene or toluene can be released into and contaminate the air, soil, and water. Additionally, uncontrolled pollutants may travel long distances by natural means and change physically, affecting multiple media. Therefore, a media- or contaminant-specific approach cannot fully address the magnitude and complexities of the waste management problem. This section introduces each of these environmental protection statutes and highlights their differences from RCRA.

Many of these statutes interact closely and even overlap with RCRA. In order to avoid overregulation of industry and coordinate environmental protection laws, Congress required that EPA, when promulgating RCRA regulations, ensure consistency with and avoid duplication of regulatory provisions promulgated under other environmental statutes.

One statute in particular, CERCLA or Superfund, has a close-fitting relationship with RCRA. Both programs are similar in that their primary purpose is to protect human health and the environment from the dangers of hazardous waste. However, these statutes address the hazardous waste problem from two fundamentally different approaches:

Figure VI-1: Multi-Exposure Pathways



- RCRA has a regulatory focus and authorizes control over the management of wastes from the moment of generation until final disposal.
- CERCLA has a response focus. Whenever there has been a breakdown in the waste management system (e.g., a release or a potential threat of a release of a hazardous substance, pollutant, or contaminant), CERCLA authorizes cleanup actions.

Considering the close relationship and similarities between RCRA and CERCLA, this section will closely examine the CERCLA regulatory program and its interaction with RCRA.

This section consists of two chapters:

- Legislative Framework for Addressing Hazardous Waste Problems — Outlines the environmental statutes designed to protect human health and the environment from exposure to hazardous waste and contaminants and highlights their major interactions with RCRA
- Superfund: The Hazardous Waste Cleanup Program — Focuses on one crucial aspect of this legislative framework, the CERCLA hazardous waste cleanup program and its interactions with RCRA.

CHAPTER 1

LEGISLATIVE FRAMEWORK FOR ADDRESSING HAZARDOUS WASTE PROBLEMS

In this chapter…

OVERVIEW

The legislation that serves as the basis for managing hazardous wastes can be divided into two categories:

- Media-specific statutes that limit and monitor the amount of wastes introduced into the air, waterways, oceans, and drinking water
- Other statutes that directly limit the production, rather than the release, of chemical substances and products that may contribute to the nation's wastes.

This chapter summarizes each statute and highlights its interaction with RCRA (see Figure VI-2).

ENVIRONMENTAL STATUTES

In order to adequately protect human health and the environment from exposure to hazardous waste and contaminants, Congress enacted several regulatory programs to protect the nation's air and water resources, as well as ensure the safety of public health.

■ Clean Air Act

The **Clean Air Act** limits the emission of pollutants into the atmosphere in order to protect human health and the environment from the effects of airborne pollution. For six criteria pollutants (sulfur dioxide, particulate matter, nitrogen dioxide, carbon monoxide, ozone, and lead), EPA established **National Ambient Air Quality Standards** (NAAQS). Regulation of these criteria pollutants affords the public some protection from toxic air pollutants. Congress also mandated that CAA control emissions from specific industrial sources. Using this statutory authority, EPA designated hazardous air pollutants and set **National Emission Standards for Hazardous Air Pollutants** (NESHAPs). Primary responsibility for implementing both the NAAQS and NESHAP requirements rests with states.

Figure VI-2: Major RCRA Interactions with Other Environmental Laws

CAA	• RCRA hazardous waste combustion facilities are subject to CAA permit requirements • Air emissions from RCRA incinerators and other TSDFs must comply with applicable CAA NAAQS and emission limitations • Pollutants and sludges extracted from CAA air emissions control devices are subject to RCRA hazardous waste regulations if hazardous • Hospital, infectious, and medical waste incinerators are subject to NSPS and emissions guidelines under CAA
CWA	• Sludges resulting from CWA wastewater treatment and pretreatment are subject to RCRA hazardous waste regulations if hazardous • Discharges from RCRA-permitted facilities must comply with the limitations set forth in NPDES permits • RCRA-regulated USTs may also be subject to CWA SPCC requirements
EPCRA	• Some RCRA TSDFs must submit annual reports to EPA detailing releases of chemicals to air, land, and water
FIFRA	• FIFRA controls limit the level of toxic pesticides that are produced, and thereby reduce the amount of waste that needs to be managed as hazardous under RCRA • FIFRA requires the registration of pesticides and disinfectants used in medical waste treatment technologies
MPRSA	• MPRSA prevents waste from a RCRA generator or TSDF from being deposited into the ocean, except in accordance with a separate MPRSA permit
OSHA	• RCRA hazardous waste generators and TSDFs may need to comply with OSHA training and planning standards • RCRA cleanup activities and hazardous waste operations at generator facilities and TSDFs may need to comply with HAZWOPER regulations
SDWA	• MCLs may be adopted by the RCRA program as cleanup standards for corrective action • RCRA contains provisions parallel to SDWA that prohibit the underground injection of hazardous wastes, unless such wastes have been treated to meet their respective LDR treatment standards
TSCA	• TSCA controls on the disposal methods of certain chemicals, such as PCBs, reduce the amount of waste that needs to be managed as hazardous under RCRA • TSCA controls on the manufacture and use of certain chemical substances also reduce the amount of waste that needs to be managed as hazardous under RCRA

The major interactions between RCRA and CAA include the following:

- On September 1999, EPA finalized a rule that establish coordinated CAA and RCRA requirements for incinerators, cement kilns, and LWAKs, commonly known as the MACT rule. This rule ensures that these facilities will avoid potentially will avoid two potentially different regulatory compliance schemes by integrating the monitoring, compliance testing, recordkeeping, and permitting requirements of CAA and RCRA (see Section III, Chapter 7 for more information, including regulatory developments).
- EPA has also developed organic air emission regulations for TSDFs and LQGs under RCRA (40 CFR Parts 264/265, Subparts AA, BB, and CC) (as discussed in Section III, Chapter 5). However, these RCRA regulations have been designed to minimize, to the extent possible, any overlap with CAA regulations.
- While medical waste is not subject to federal RCRA regulation (as discussed in Section V, Chapter 2), air emissions from new and existing hospital, infectious, and medical waste incinerators are subject to NSPS and emissions guidelines under CAA.
- Extraction of pollutants from air emissions using CAA controls (e.g., scrubbers) can create hazardous wastes or sludges containing such wastes. Disposal of these materials must comply with RCRA.

■ Clean Water Act

The **Clean Water Act** imposes pollutant limitations for all discharges of wastewater from identifiable ("point") sources into the nation's

waterways. These discharges are defined as either direct discharges, indirect discharges, or zero discharges.

Direct discharges are discharges from "point sources" into surface water pursuant to a NPDES permit. NPDES permits are granted on a case-by-case basis and limit the permissible concentration of toxic constituents or conventional pollutants in effluents discharged to a waterway. These limits are generally established on the basis of the best available treatment technology and, where necessary, to protect surface water quality standards.

Under **indirect discharges**, the wastewater is first sent to a POTW, and then after treatment by the POTW, discharged pursuant to an NPDES permit. Under these requirements, the generator of the wastes cannot simply transfer the waste materials to a POTW. Rather, the wastes must satisfy applicable treatment and toxic control requirements known as pretreatment standards, where they exist. POTWs that receive hazardous wastes for treatment are also subject to certain RCRA permit-by-rule requirements (as discussed in Section III, Chapter 8), and remain subject to RCRA corrective action.

Zero discharges mean that the wastewater is not being discharged to a navigable water, but rather is being land disposed (e.g., through spray irrigation) or are disposed by underground injection. Zero discharge facilities are subject to federal or state regulatory limitations that are as strict as those that apply to direct and indirect dischargers.

CWA also includes provisions intended to prevent oil spills into the navigable waters of the United States. These **Spill Prevention, Control, and Countermeasures** (SPCC) regulations establish spill prevention procedures and equipment requirements for nontransportation-related facilities with certain aboveground or underground oil storage capacities that could reasonably be expected to discharge oil into or upon the navigable waters of the United States or adjoining shorelines. The SPCC regulations provide a basic framework for operational procedures, containment requirements, and spill response procedures.

The major interactions between RCRA and CWA include the following:

- Sludge resulting from wastewater treatment and pretreatment under CWA must be handled as a RCRA waste under Subtitle C, if hazardous.
- Discharges to surface waters from a RCRA-permitted facility must comply with the limitations set forth in a NPDES permit. This means that either the facility itself has obtained an NPDES permit, or the wastes meet CWA pretreatment standards and have been transported to a POTW.
- Dredged materials subject to the requirement of a CWA §404 permit are not considered hazardous wastes under RCRA.
- USTs that are subject to the technical requirements of RCRA's UST program may also be subject to CWA SPCC requirements.

■ Emergency Planning and Community Right-to-Know Act

Congress amended CERCLA in 1986 with the enactment of the **Superfund Amendments and Reauthorization Act**. These amendments improved the Superfund program and added an important section that focused on strengthening the rights of citizens and communities in the face of potential hazardous substance emergencies. This section, SARA Title III, or the **Emergency Planning and Community Right-to-Know Act** (EPCRA), was enacted in response to the more than 2,000 deaths caused by the release of a toxic chemical in Bhopal, India.

EPCRA is intended to help communities prepare to respond in the event of a chemical emergency, and to increase the public's knowledge of the presence and threat of hazardous chemicals. To this end, EPCRA requires the establishment of state and local committees to prepare communities for potential chemical emergencies. The focus of the preparation is a community emergency response plan that must: 1) identify the sources of potential emergencies; 2) develop procedures for responding

to emergencies; and 3) designate who will coordinate the emergency response.

EPCRA also requires facilities to notify the appropriate state and local authorities if releases of certain chemicals occur. Facilities must also compile specific information about hazardous chemicals they have on site and the threats posed by those substances. Some of this information must be provided to state and local authorities. More specific data must be made available upon request from those authorities or from the general public.

The primary interaction between RCRA and EPCRA is that some RCRA TSDFs treating hazardous waste are required to submit annual reports to EPA of their releases of chemicals to air, land, and water.

Federal Insecticide, Fungicide, and Rodenticide Act

The **Federal Insecticide, Fungicide, and Rodenticide Act** (FIFRA) provides procedures for the registration of pesticide products to control their introduction into the marketplace. As such, its regulatory focus is different from most of the statutes discussed in this chapter. While the other statutes attempt to minimize and manage waste by-products at the end of the industrial process, FIFRA controls whether (and how) certain products are manufactured or sold in the first place.

FIFRA imposes a system of pesticide product registrations. Such requirements include pre-market review of potential health and environmental effects before a pesticide can be introduced in the United States, reregistration of products introduced prior to the enactment of FIFRA to assess their safety in light of current standards, and classification of pesticides for restricted or general use. Restricted products can be used only by those whose competence has been certified by a state program.

The major interactions between RCRA and FIFRA include the following:

- FIFRA controls limit the level of toxic pesticides that are produced, and thereby reduce the amount of waste that needs to be managed under RCRA.
- FIFRA requires the registration of pesticides and disinfectants used in medical waste treatment technologies (as discussed in Section V, Chapter 2).

Marine Protection, Research, and Sanctuaries Act

The **Marine Protection, Research, and Sanctuaries Act** (MPRSA) requires a permit for any material that is transported from a U.S. port or by a U.S. vessel for deposition at sea.

There are two major areas of overlap between MPRSA and RCRA. MPRSA prevents waste from a RCRA generator or TSDF from being deposited into the ocean, except in accordance with a separate MPRSA permit. In addition, dredged materials subject to the requirement of a MPRSA §103 permit are not considered hazardous wastes under RCRA.

Occupational Safety and Health Act

The mission of the **Occupational Safety and Health Act** (OSHA) is to save lives, prevent injuries, and protect the health of employees in the workplace. OSHA accomplishes these goals through several regulatory requirements including the **Hazard Communication Standard** (HCS), and the **Hazardous Waste Operations and Emergency Response Worker Protection Standard** (HAZWOPER).

The HCS was promulgated to provide workers with access to information about the hazards and identities of the chemicals they are exposed to while working, as well as the measures they can take to protect themselves. OSHA's **Hazard Communication Standard** requires employers to establish hazard communication programs to

transmit information on the hazards of chemicals to their employees by means of labels on containers, material safety data sheets, and training programs.

The HAZWOPER was developed to protect the health and safety of workers engaged in operations at hazardous waste sites, hazardous waste treatment facilities, and emergency response locations. HAZWOPER covers issues such as training, medical surveillance, and maximum exposure limits.

The major interactions between RCRA and OSHA include the following:

- Hazardous waste generators and TSDFs may need to comply with OSHA training and planning standards, in addition to RCRA requirements.
- HAZWOPER regulations may be applicable to RCRA corrective action cleanup activities, and to hazardous waste operations at generator facilities and TSDFs.

Safe Drinking Water Act

The **Safe Drinking Water Act** (SDWA) protects the nation's drinking water supply by establishing national drinking water standards (MCLs or specific treatment techniques), and by regulating UIC wells. The UIC program bans some types of underground disposal of RCRA hazardous wastes. With some exceptions, other materials cannot be injected underground without a UIC permit.

The major interactions between RCRA and SDWA include the following:

- MCLs may be adopted by the RCRA program as cleanup standards for corrective action. Selected MCLs are also used under the RCRA ground water monitoring program for land disposal units.
- RCRA also contains provisions parallel to SDWA that prohibit the underground injection of hazardous wastes, unless such wastes have been treated to meet their respective LDR treatment standards (as discussed in Section III, Chapter 6). RCRA also contains a ban on any injection of hazardous waste into "shallow" wells.

Toxic Substances Control Act

The primary focus of the **Toxic Substances Control Act** (TSCA) is similar to that of FIFRA in that the statute provides authorities to control the manufacture and sale of certain chemical substances. These requirements include testing of chemicals that are currently in commercial production or use, pre-market screening and regulatory tracking of new chemical products, and controlling unreasonable risks once a chemical substance is determined to have an adverse effect on health or the environment. TSCA controls on such unreasonable risks includes prohibiting the manufacture or certain uses of the chemical, requiring labeling, limiting volume of production or concentration, requiring replacement or repurchase of products, and controlling disposal methods.

The major interactions between RCRA and TSCA include the following:

- TSCA has a direct effect on RCRA through controls on the disposal methods of certain chemicals, such as PCBs. For example, while TSCA regulates PCB disposal, RCRA also regulates PCB disposal when the PCBs are mixed with hazardous waste.
- TSCA also regulates used oil that contains quantifiable levels of PCBs.
- TSCA's indirect effect on RCRA is the same as FIFRA's. TSCA controls the manufacture and use of certain chemical substances, which limits the amount of waste that needs to be managed under RCRA.
- EPA has proposed TSCA standards for the disposal of lead-based paint (LBP) debris to replace RCRA regulations. The new standards would establish disposal standards for LBP

debris and identify recycling and incineration activities that would be controlled or prohibited. To avoid duplicative regulation, the waste that is subject to these new standards would not be subject to RCRA hazardous waste determination.

SUMMARY

Several major environmental statutes work together to address hazardous waste problems. These include media-specific statutes that limit the amount of waste released into a particular environmental medium, and other statutes that directly control the production of certain products, and protect workers managing hazardous wastes. These statutes are:

- Clean Air Act
- Clean Water Act
- Emergency Planning and Community Right-to-Know Act
- Federal Insecticide, Fungicide, and Rodenticide Act
- Marine Protection, Research, and Sanctuaries Act
- Occupational Safety and Health Act
- Safe Drinking Water Act
- Toxic Substances Control Act.

ADDITIONAL RESOURCES

Full-text versions of the major environmental laws administered by EPA can be found at www.epa.gov/epahome/laws.htm.

CHAPTER 2

SUPERFUND: THE HAZARDOUS WASTE CLEANUP PROGRAM

In this chapter…

OVERVIEW

This chapter focuses on the **Comprehensive Environmental Response, Compensation, and Liability Act**, which is a central part of the legislative framework for environmental protection. CERCLA is also known as **Superfund**.

CERCLA is designed to remedy the mistakes in hazardous waste management made in the past, while the RCRA waste management standards are concerned with avoiding such mistakes through proper management in the present and future. RCRA mainly regulates how wastes should be managed to avoid potential threats to human health and the environment. CERCLA, on the other hand, is relevant primarily when mismanagement occurs or has occurred (i.e., when there has been a release or a substantial threat of a release in the environment of a hazardous substance, or of a pollutant or contaminant, that presents an imminent and substantial threat to human health). More specifically, RCRA authorizes a general regulatory program to manage all hazardous wastes from cradle to grave (i.e., from generation to ultimate disposal), while CERCLA authorizes a number of government actions to remedy the conditions that could result in a release or the effects of a release itself. While the two programs use parallel, but not identical, procedures, both RCRA and CERCLA authorize EPA to act in the event of an imminent hazard.

This chapter discusses why CERCLA was enacted, summarizes some of the Statute's authorities, and examines the major areas where the CERCLA and RCRA programs interact.

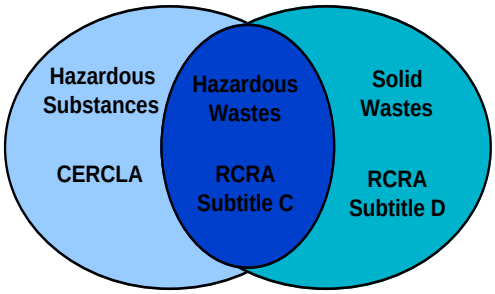
RCRA VS. CERCLA

RCRA mainly regulates how wastes should be managed to avoid potential threats to human health and the environment. CERCLA, on the other hand, comes into play primarily when mismanagement occurs or has occurred (i.e., when there has been a release or a substantial threat of a release in the environment of a hazardous substance or of a pollutant or contaminant that presents an imminent and substantial threat to human health).

DEFINITIONS

RCRA and CERCLA both address hazards to the environment. However, CERCLA is the more comprehensive statute. CERCLA hazardous substances encompass RCRA hazardous wastes, as well as other toxic pollutants regulated by CAA, CWA, and TSCA. Thus, all RCRA hazardous wastes may trigger CERCLA response actions when released into the environment. RCRA nonhazardous solid wastes, on the other hand, do not trigger CERCLA response actions unless they present an imminent and substantial danger as pollutants or contaminants (see Figure VI-3).

Figure VI-3: Relationship Between CERCLA Hazardous Substances and RCRA Hazardous Wastes



CERCLA hazardous substances encompass RCRA hazardous wastes as well as other toxic pollutants regulated by CAA, CWA, and TSCA. RCRA nonhazardous solid wastes do not trigger CERCLA response actions unless they present an imminent and substantial danger to human health and the environment as pollutants or contaminants.

In addition to hazardous substances, CERCLA addresses **pollutants and contaminants**, which are broadly defined to include any substance that is reasonably anticipated to cause illness or deformation in any organism. All three definitions specifically exclude petroleum and natural gas.

HISTORY AND PURPOSE OF CERCLA

CERCLA was established in response to the discovery, in the late 1970s, of a large number of abandoned, leaking, hazardous waste dumps that were threatening human health and contaminating the environment. One of the best known dumps was Love Canal in Niagara Falls, New York, where a chemical company had buried large amounts of hazardous waste in a canal originally designed to transport water. After the canal was capped with clay and soil, an elementary school was built over the site, and the city of Niagara Falls grew rapidly around it.

In the 1970s, an unusual number of community residents (especially those who attended the elementary school) developed serious health problems. Moreover, the residents complained of noxious fumes and of chemicals oozing out of the ground. Subsequent government investigations found extensive contamination of the area, including ground water supplies. In 1978, President Carter declared Love Canal a federal disaster area, and most of the residents in the area around the site were relocated.

At the time, declaring the site a federal disaster area was the only viable option available to the federal government. RCRA did not provide relief because the problem did not involve the current or future management of wastes. Legal actions against the responsible parties did not offer a solution because such action was too time consuming and costly. Unfortunately, subsequent investigations indicated that the scope of the waste dump problem went far beyond Love Canal, making the federal disaster relief option impractical. In late 1980, Congress passed CERCLA to address other uncontrollable hazardous waste sites similar to Love Canal throughout the country.

CERCLA, as originally enacted in 1980, authorized a five-year program by the federal government to perform the following primary tasks:

- Identify those sites where releases of hazardous substances had already occurred or might occur and posed a serious threat to human health, welfare, or the environment
- Take appropriate action to remedy those releases
- Force those parties responsible for the release to pay for the cleanup actions.

SUPERFUND REAUTHORIZATION AND TAXING AUTHORITY

SARA not only extended CERCLA for another five years, but increased the Fund from $1.6 billion to $8.5 billion. The taxing authority of SARA was to expire on December 31, 1991; however, the Omnibus Reconciliation Act of 1990 extended the taxes without modification for four years, through December 31, 1995. Separately, the Superfund program was reauthorized, without changes to the text of the Statute, until September 30, 1994, a three-year extension from the expiration date of the SARA authorization in 1991. Congress failed to reauthorize the Superfund program before September 30, 1994 (the end of the fiscal year), however, the program is still operating because funding continues to be appropriated to the Superfund program. In the future, the Superfund program may be reauthorized and the taxing authority may be extended.

To accomplish these tasks, CERCLA gave new cleanup authority to the federal government, created a $1.6 billion trust fund to pay for government cleanup, and imposed cleanup liability on those responsible. This "Super Fund" consisted primarily of tax assessments on oil and designated chemicals.

During the five-year period of the original CERCLA program, two facts became increasingly clear: the problem of abandoned hazardous waste sites was more extensive than originally thought, and its solution would be more complex and time consuming. Unlike RCRA response actions where the owner and operator of a site are known, CERCLA may deal with environmental threats due to activities conducted long ago, thus the responsible party may be unknown, no longer in existence (e.g., a defunct company), or unable to pay. To address these additional concerns, SARA not only extended CERCLA for another five years, but increased the fund from a total of $1.6 billion to $8.5 billion. SARA also established new standards and schedules for site cleanup and also created new programs for informing the public of risks from hazardous substances in their community and preparing communities for hazardous substance emergencies.

TRIGGER FOR STATUTORY RESPONSE

CERCLA response authorities are triggered by a release or a substantial threat of release of dangerous substances into the environment (e.g., a chemical spill from a tank truck accident or a leak from a damaged drum). The release must involve either:

- A hazardous substance, as defined in the Statute

OR

- A pollutant or contaminant that may present an imminent or substantial danger to public health or welfare.

TYPES OF RESPONSE ACTIONS

Once a potential release has been discovered, the information is entered into the **Comprehensive Environmental Response, Compensation, and Liability Information System** (CERCLIS), a computerized database used to track hazardous substance sites. After being entered into CERCLIS, each site undergoes a **preliminary assessment** (PA) to determine if the site poses a potential hazard and whether further action is necessary. If the threat is immediate, a **removal action** may be conducted.

Removal actions are short-term cleanup actions that usually address problems only at the surface of a site. They are conducted in response to an emergency situation (e.g., to avert an explosion, to cleanup a hazardous waste spill, or to stabilize a site until a permanent remedy can be found). Removal actions are limited to 12 months duration or $2 million in expenditures, although in certain cases these limits may be extended. Removals may occur at any point in time after the PA has been conducted.

Remedial actions are longer-term response actions that ultimately represent the final remedy for a site and generally are more expensive and of a longer duration than removals. This is because the remedial actions are intended to provide permanent

solutions to hazardous substance threats. It is possible that both removal and remedial actions may be taken at the same site. In the event that longer-term cleanup is necessary, the site is referred to the remedial program for further investigation and assessment.

If the PA reveals a contamination problem exists, but does not pose an immediate threat that warrants a removal, EPA will continue to study the site during a **site inspection** (SI). Based on data collected during the PA and the SI, EPA will evaluate the site using the **Hazard Ranking System** (HRS), a model and scoring system that determines the relative risk to public health and the environment posed by hazardous substances in ground water, surface water, air, and soil. Only those sites with a score of 28.5 (on a scale from 0 to 100) are eligible for placement on the **National Priorities List**, EPA's priority hazardous substance sites for cleanup. EPA only funds remedial actions at hazardous waste sites on the NPL. As of May 2002, there are over 1,200 sites either on the NPL or proposed for inclusion. The majority of sites are placed on the NPL based on their HRS score. Under some circumstances, sites may also be placed on the NPL by the state in which the site is located or by the Agency for Toxic Substances and Disease Registry (ATSDR).

Once a site is placed on the NPL, the remedial process begins. The remedial process requires EPA to design a community involvement plan that will inform citizens of all remedial activities and provide opportunities for public comment. A remedial response has two main phases. The first phase, the **remedial investigation/feasibility study** (RI/FS), involves evaluating site conditions at the site, defining any problems, and comparing alternative site cleanup methods. After the remedy has been selected, the decision is documented in the **record of decision** (ROD). The second phase, the **remedial design/remedial action** (RD/RA), involves designing the chosen cleanup and beginning construction.

Following the implementation of the remedy, the state or the **potentially responsible party** (PRP) assumes responsibility for the **operation and maintenance** (O&M) of the site, which may include such activities as ground water pump and treat, and cap maintenance. Once EPA has determined that all appropriate response actions have been taken and cleanup goals have been achieved, the site is deleted from the NPL through a formal rulemaking process.

RCRA AND REMEDY SELECTION UNDER CERCLA

CERCLA assures that remedies are based on the cleanup standards and criteria that have been established by other laws, such as CAA, CWA, and RCRA. CERCLA specifically requires that on-site remedies attain any legally **applicable or relevant and appropriate requirements** (ARARs), standards, criteria, or limitations under federal or more stringent state environmental laws, including RCRA, unless site-specific waivers are obtained. This means, for example, that whenever a remedial action involves on-site treatment, storage, or disposal of hazardous waste, the action must meet RCRA's technical standards for such treatment, storage, or disposal (as discussed in Section III, Chapter 5). The **National Oil and Hazardous Substances Pollution Contingency Plan** (NCP), which is the regulatory blueprint for the CERCLA program, addresses the application of ARARs to CERCLA remedial actions (40 CFR Part 300).

Once hazardous wastes are transported from a CERCLA site, they are subject to full RCRA regulation. Therefore, all transportation and TSD requirements under RCRA must be followed. This means that off-site shipments must be accompanied by a manifest. In particular, the off-site disposal of hazardous wastes can occur only at a RCRA facility in a unit in full compliance with the Subtitle C requirements. Agency policy requires that the

WHAT ARE ARARS?

CERCLA on-site remedies must attain any ARARs standards, criteria, or limitations under federal or more stringent state environmental laws, including RCRA, unless site-specific waivers are obtained. This means, for example, that whenever a remedial action involves on-site treatment, storage, or disposal of hazardous waste, the action must meet RCRA's technical standards for such treatment, storage, or disposal. The NCP details the application of ARARs to Superfund remedial actions.

disposal facility be inspected by EPA six months prior to receiving the waste.

For off-site land disposal of wastes resulting from a CERCLA activity, the program contains two additional requirements. First, the unit in which the wastes are to be disposed must not be releasing hazardous wastes or constituents into ground water, surface water, or soil. Second, any releases from other units of the facility must be under an approved RCRA corrective action program. This policy assures that wastes shipped off site from CERCLA sites are sent to environmentally sound waste management facilities.

Finally, EPA may not take or fund remedial actions in a state unless the state ensures the availability of hazardous waste treatment and disposal capacity by submitting a **capacity assurance plan** (CAP) to EPA. This capacity must be for facilities that are in compliance with RCRA Subtitle C requirements, and must be adequate to manage hazardous wastes projected to be generated within the state over 20 years. This requirement limits and manages the amount of hazardous waste generated in the United States by encouraging waste minimization and recycling, interstate agreements, and efficient and realistic hazardous waste management systems. Currently, every state in the nation had submitted a CAP to EPA.

RCRA CORRECTIVE ACTION VS. CERCLA RESPONSE

The cleanup of a site with hazardous waste contamination may be handled under either CERCLA, as described above, or RCRA. RCRA authorizes EPA to require corrective action (under an enforcement order or as part of a permit) whenever there is, or has been, a release of hazardous waste or constituents at TSDFs. The RCRA statute also provides similar corrective action authority in response to releases at interim status facilities. Further, RCRA allows EPA to require corrective action beyond the facility boundary. EPA interprets the term corrective action (as discussed in Section III, Chapter 9) to cover the full range of possible actions, from studies and interim measures to full cleanups. Anyone who violates a corrective action order can be fined up to $27,500 per day of noncompliance and runs the risk of having their permit or interim status suspended or revoked.

RCRA and CERCLA cleanup programs follow roughly the same approach to cleanups. In both, examinations of available data are made after discovery of a release to determine if an emergency action is warranted. Both programs authorize short-term measures to abate immediate adverse effects of a release. Once an emergency has been addressed, both programs provide for appropriate investigation and more investigation as needed to establish long-term cleanup options. One major difference between the two programs involves funding. CERCLA requires that site conditions be analyzed according to HRS and that only NPL sites receive any remedial action funding. There is no comparable requirement under the RCRA corrective action program because the owner or operator of the site is responsible for the cost of the cleanup.

The facility owner or operator implements RCRA corrective action. On the other hand, a number of different parties can implement a CERCLA remedial action in a number of different ways. For example, agreements may be reached that allow PRPs, the State, or the Federal government, to assume that the lead for certain portions of a response action.

Generally, cleanups under RCRA corrective action or CERCLA will substantively satisfy the requirements of both programs. It is EPA's general policy for facilities subject to both CERCLA and RCRA to be deferred to RCRA authority. In some cases, however, it may be more appropriate to use both RCRA and CERCLA authorities. EPA has many procedures in place to facilitate coordination between RCRA and CERCLA programs.

IMMINENT HAZARDS UNDER RCRA AND CERCLA

Both RCRA and CERCLA contain provisions that allow EPA to require persons contributing to an imminent hazard to take the necessary actions to clean up releases. RCRA's §7003 imminent and substantial endangerment provision addresses

nonhazardous as well as hazardous solid waste releases. The authority under CERCLA §106 is essentially the same, except that CERCLA's authority to abate an imminent or substantial danger to public health or the environment is limited to hazardous substance releases. In an enforcement action, the RCRA and CERCLA imminent hazard provisions may be used in tandem to ensure adequate protection of human health and the environment.

SUMMARY

CERCLA authorizes cleanup responses whenever there is a release, or a substantial threat of a release, of a hazardous substance, a pollutant, or a contaminant, that presents an imminent and substantial danger to public health. After a potential release has been discovered, the site is entered into CERCLIS, and undergoes a PA. If the hazard is immediate, EPA may require a removal action. If a contamination problem still exists, but is not an immediate threat, EPA will conduct an SI, evaluate the site using the HRS, and possibly place the site on the NPL for remedial action. Such longer-term remedial actions involve additional remediation steps and larger expenditure of time and resources because they provide permanent solutions to hazardous substance problems. These additional steps include an RI/FS. After a remedy has been selected, the decision is documented in the ROD, the RD/RA is implemented, and the state or PRP is responsible for O & M of the site. When all appropriate remedial actions have been taken and the cleanup goals have been achieved, the site is deleted from the NPL.

The RCRA program differs from the CERCLA waste management approach. The general distinction between the two programs is that RCRA authorizes the safe and protective management of wastes, while CERCLA authorizes cleanup responses whenever there is a release of wastes. However, the two programs do overlap. For example, RCRA standards may be considered ARARs and can be important in selecting remedies under CERCLA. Moreover, RCRA's corrective action and CERCLA's remedial action use parallel, but not identical, procedures. Finally, both Statutes authorize EPA to act in the event of an imminent hazard.

ADDITIONAL RESOURCES

Additional information about the topics covered in this chapter can be found at www.epa.gov/superfund. Further information about EPA cleanup programs can be found at www.epa.gov/epaoswer/osw/cleanup.htm.

SECTION VII

PUBLIC PARTICIPATION

In this section…

OVERVIEW

EPA is committed to involving the public in the development and implementation of the solid waste, hazardous waste, and UST environmental decision-making. One of the Agency's central goals is to provide equal access to information and an equal opportunity to participate. EPA regards public participation as an important activity that empowers communities to become involved in local RCRA-related activities.

Through RCRA, Congress gave EPA broad authority to provide for public participation in the regulatory program. RCRA §7004(b) directs EPA to provide for, encourage, and assist public participation in the development, revision, implementation, and enforcement of any regulation, guideline, information, or program under the Act.

The RCRA public participation requirements bring government, private industry, public interest groups, and citizens together to make important decisions about hazardous waste, solid waste, and UST facilities. Specifically, these groups and individuals have a stake in RCRA's hazardous waste management program, such as TSDF permitting, corrective action, and state authorization. On a broader level, the public also has tremendous interest in EPA's rulemaking process and environmental justice.

Public involvement in the RCRA program presents unique needs and opportunities. While the Agency is firmly committed to promoting broad and equitable public participation, EPA also seeks to

ensure the flexibility for individual permit writers, facilities, and communities to adopt the most appropriate, site-specific approach consistent with the principles of fairness and openness. As a result, in many instances, EPA references guidance, instead of codified regulatory language, to encourage all stakeholders, such as facilities, permitting agencies, and the public, to strive toward public involvement goals, while at the same time maintaining the flexibility consistent with a national regulatory approach.

EPA views public outreach as an essential element of public participation. Public outreach educates people about hazardous waste issues and the RCRA decision-making process. Public outreach also creates informal opportunities for public input and dialogue. To expand public participation, the Agency actively engages in extensive public outreach activities.

PERMITTING

A focus of RCRA public participation is the involvement of the public in the hazardous waste TSDF permitting process. (Permitting is fully discussed in Section III, Chapter 8.) TSDF owners and operators handle large quantities of waste that present potential risk to human health and the environment. Public participation informs the public of the types of wastes and management methods that the TSDF owner and operator intends to employ and allows the public an opportunity to discuss the facility's anticipated waste management activities with the owner and operator. Communities may provide information that facility owners and operators may not otherwise have access to, and which may impact some of the facility plans (e.g., information on day care locations that might impact transportation routes to and from the facility). Public participation also benefits the TSDF owner and operator because it fosters community relations and can help to avoid delays and future litigation by addressing public concerns up front.

From the permitting agency's point of view, the public can contribute valuable information and ideas that can improve the quality of agency decisions and permit applications. With public input, permitting decisions are influenced by local circumstances that technical staff alone cannot provide.

THE IMPORTANCE OF PUBLIC PARTICIPATION

Public participation informs the public of the types of wastes and management methods that a TSDF owner and operator intends to employ and allows the public an opportunity to voice its concerns about these risks. Public participation also benefits the TSDF owner and operator because it fosters community relations and can help to avoid delays and future litigation by addressing public concerns up front.

The permitting process serves as an appropriate mechanism for public participation requirements because the permit serves as the set of requirements against which compliance will be measured. Public interaction in the process serves both to educate the public and to allow the public to express concerns to the facility and the permitting agency. Each step in the RCRA permit decision process is accompanied by public participation requirements (see Figure VII-1). EPA promulgated regulations in 40 CFR Parts 25, 124, and 270 to create opportunities for the public to learn about RCRA activities and provide input during the permitting process. These requirements may not be sufficient in all cases. Permitting agencies and facilities should consider going beyond the regulatory requirements, as necessary, to provide for meaningful and equitable public participation.

Public interaction occurs during pre-application meetings, public comment and response periods, and public hearings. Through all of these steps, the public can engage facility owners and operators and regulators in a dialogue. This dialogue is crucial because a successful public participation program requires the flow of information among all stakeholders.

EPA encourages public participation activities that occur outside the formal permitting process. Citizens can contact environmental, public interest, civic, and community groups that have an interest in the facility and become involved in their activities. The permit applicant may also create informal opportunities for public input and dialogue.

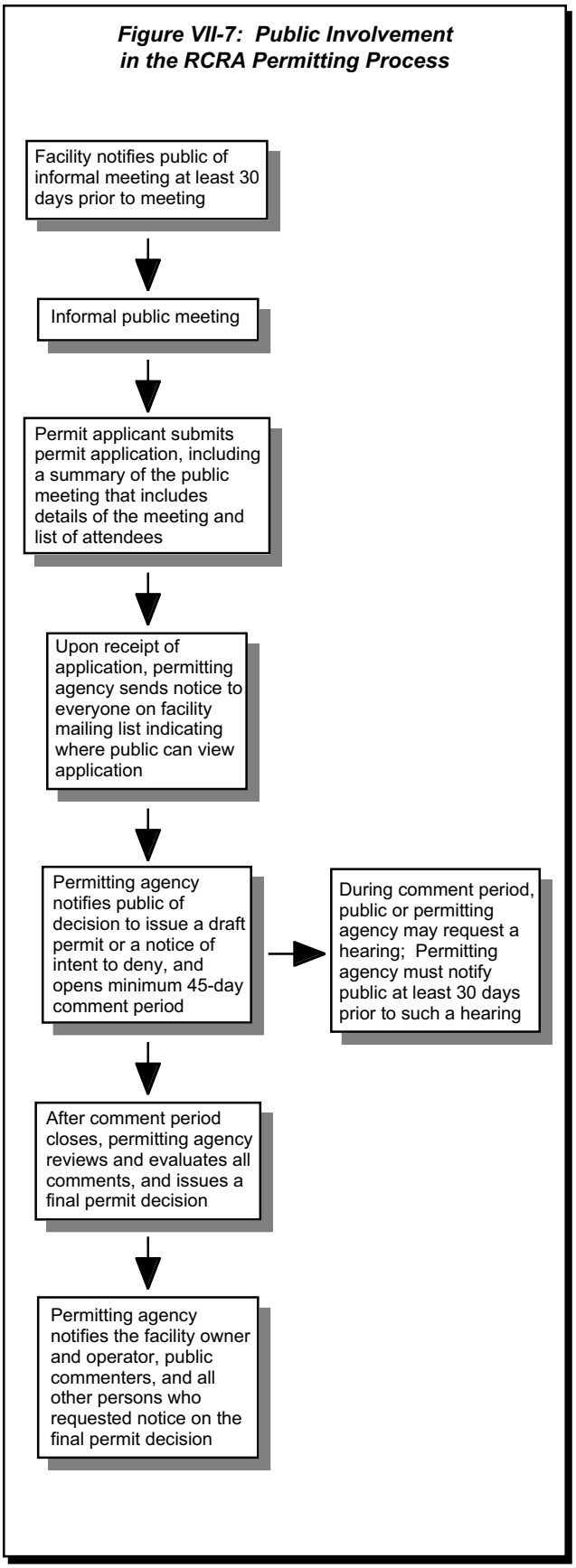


Figure VII-7: Public Involvement in the RCRA Permitting Process

■ Pre-Application Meeting

The public participation provisions require prospective applicants to hold an informal public meeting before submitting an application for a RCRA permit. The permit applicant should select a meeting time, date, and place that are convenient to the public. The permit applicant must provide notice of the pre-application meeting at least 30 days prior to the meeting in a manner that is likely to reach all members of the affected community. The applicant must advertise the meeting in the newspaper, through a broadcast announcement, and on a sign posted at or near the property. The meeting will provide a chance for the community to interact with and provide input to an owner and operator before the submission of the permit application. At the meeting, the owner and operator should describe the facility in the level of detail that is practical at the time of the meeting to give the public enough information to understand the facility operations and potential impacts to human health and the environment. The permit applicant must submit with the permit application a summary of the meeting and a list of all attendees. Upon receipt of the permit application, the permitting agency must send a notice to everyone on the facility mailing list specifying where the public can examine the application. Thus, the public may begin reviewing the application at the same time as the permitting agency.

■ The Draft Permit, Public Comment Period, and Public Hearing

Once the permit application is complete, the permitting agency will decide whether to issue a draft permit or a notice of intent to deny. In either case, the permitting agency notifies the public of its decision and announces the opening of a minimum 45-day public comment period. The permitting agency prints the notice in a local paper, broadcasts the notice over a local radio station, and sends a copy to the mailing list recipients and relevant agencies. The permitting agency also prepares a fact sheet or statement of basis regarding its decision. The fact sheet (or statement of basis) explains the factual, legal, methodological, and policy questions considered in making the decision to issue or deny the permit.

Any person may request a public hearing during the comment period. The permitting agency holds a hearing if someone submits a written notice of opposition to the draft permit and a request for a hearing, or if the permitting agency finds a significant degree of interest in the draft permit. The permitting agency may also hold a public hearing at its own discretion. The permitting agency must notify the public at least 30 days prior to the hearing.

The comment period on the draft permit allows public submission of written concerns and suggestions to the permitting agency in writing. The permitting agency describes and responds to all significant comments raised during the comment period.

After the public comment period closes, the permitting agency will review and evaluate all comments and issue a final permit decision. The agency sends a notice of decision to the facility and any person who submitted comments or requested notice on the final permit decision.

■ Permit Modifications

As with the initial permit process, permit modifications can raise public concerns that must be addressed through public participation. Public participation responsibilities and activities vary depending on who initiated the modification and the degree to which the modification changes the facility permit. When a modification is proposed, only the permit conditions subject to modification are reopened for public comment.

Permitting agencies may initiate a permit modification if there are substantial alterations or additions to the facility, if new information is received by the permitting agency that was not available at the time of permit issuance, or if new regulations or judicial decisions affect the conditions of the permit. Agency-requested permit modifications are subject to the same public participation requirements that are required during the permitting process.

Permit modifications initiated by the facility owner and operator are categorized as Class 1, 2, or 3 according to how substantively they change the original permit. The only public involvement requirement for Class 1 modifications is that within 90 days of implementing a change the facility must send a notice to all parties on the mailing list compiled by the permitting agency.

PUBLIC PARTICIPATION DURING PERMIT MODIFICATIONS

Public participation requirements during permit modifications vary depending on the extent of the modification. Class 1 permit modifications require that within 90 days of implementing a change, the facility must send a notice to all parties on the mailing list compiled by the permitting agency. Class 2 permit modifications involve public notice in a local newspaper, a 60-day comment period, and a public meeting held no earlier than 15 days into the comment period and no later than 15 days before it ends. While Class 3 modifications are subject to the same requirements as Class 2 modifcations, such modifications require the permitting agency to provide the public with additional opportunities to participate in the process.

The Class 2 modifications are more stringent than Class 1 modifications, and involve public notice in a local newspaper, a 60-day comment period, and a public meeting held no earlier than 15 days into the comment period and no later than 15 days before it ends. At any time during the Class 2 procedures, the permitting agency may reclassify the request as a Class 3 modification if there is significant public concern or if the agency determines the modification is too complex for the Class 2 procedures.

Class 3 modifications address changes that substantially alter a facility or its operations, and often raise significant public concern. While these modifications are subject to the same public participation provisions as Class 2 modifications, Class 3 modifications require the permitting agency to provide the public with additional opportunities to participate in the process. For example, the permitting agency must issue a public notice of the agency's draft permit decision, allow for a 45-day public comment period on the decision, develop a fact sheet or statement of basis, and hold a public meeting (if requested) with 30-day advance notice.

Permit Renewals

A facility owner and operator who makes a significant change during the renewal of their permit is also subject to the pre-application meeting and notice requirements. A significant change in facility operations is a change that is equivalent to a Class 3 modification. This requirement ensures that if during permit renewal a facility makes significant changes to an already publicly reviewed and approved permit, the public will have an opportunity to participate in the permit review and approval process.

Trial Burn Notices

Owners and operators of new hazardous waste combustion facilities may not commence a trial burn until after the permitting agency has issued the required notice. EPA anticipates that permitting agencies will typically notify the public at least 30 days prior to the trial burn. The notice requirement applies only to the initial trial burn, and not to subsequent burns that may be conducted as part of a permit modification. For interim status combustion units, the permitting agency must also provide public notice of the intent to approve a trial burn plan.

Interim Status Facilities

In general, interim status facilities are not required to follow any standardized public participation procedures until the facility owner and operator applies for a permit. Implementing agencies may need to use innovative techniques to communicate with the public about interim status facilities. EPA acknowledges that each situation will require a different type and level of community involvement in order to address public concerns.

Post-Closure Permits

Owners and operators who submit a permit application for the purpose of conducting post-closure activities are not subject to the pre-application meeting and notice requirements. EPA's experience is that the public has usually been concerned with permit decisions related to active hazardous waste management operations rather than closed facilities. Post-closure activities are subject to the public notice and comment period at the draft permit stage.

Post-Closure Alternatives to Permits

Owners and operators who are conducting post-closure activities using non-permit alternatives, such as enforceable documents, are also subject to public participation requirements. The public participation provisions for these alternatives include public notice and comment.

EPA encourages early, meaningful, and continuous involvement of the public, including regularly updating the community on the progress made at the facility. Meaningful public participation is achieved when all impacted and affected parties have ample time to participate in the facility cleanup decisions.

Information Repositories

In certain instances, RCRA permits can be the subject of intense debate. When public interest is strong, the demand for information increases. The public participation requirements allow the permitting agency to require a permit applicant to set up an information repository at any time after submittal of the permit application and during the life of the permit. The repository will hold all information and documents that the permitting agency decides are necessary to adequately inform and educate the public. EPA intended for permitting agencies to use the information repository requirement sparingly on a case-by-case basis when a significant amount of public concern has surfaced or where the community has unique information needs.

CORRECTIVE ACTION

Corrective action investigations and remedial actions at hazardous waste facilities also create strong community interest because contamination can directly affect and impact communities.

(Corrective action is fully discussed in Section III, Chapter 9.) The community may seek information related to current or potential contamination, including levels of contamination, the extent of health and environmental risks, and the potential for future risks. The public may also seek additional opportunities to provide input to the overseeing agency or the facility about the cleanup of the contamination.

More than 6,000 facilities are subject to RCRA corrective action. The necessary degree of cleanup at these sites varies significantly. Program implementors are granted latitude in structuring the corrective action process, developing cleanup objectives, and selecting remedies appropriate to site-specific circumstances. Similar latitude is allowed in determining the best approach to public participation, in order to provide opportunities appropriate for the level of interest of the community.

Public participation requirements during corrective action are established in regulations; further recommendations are set out in guidance. The regulations set requirements that facilities and implementing agencies must meet when a permit is issued or modified to incorporate corrective action provisions.

In the absence of final regulations specifically addressing public participation during corrective action, program implementors and facility owners and operators should develop public participation strategies on a site-specific basis, consistent with existing public participation requirements and the program goal of full, fair, and equitable public participation. Permitting agencies and facilities should make all reasonable efforts to provide for early public participation because important corrective action decisions are made during the site investigation and characterization. At a minimum, information regarding corrective action activities should be available to the public and the public should be given an opportunity to review and comment on proposed corrective action remedies.

PUBLIC PARTICIPATION DURING CORRECTIVE ACTION

When corrective action is part of the RCRA permitting process, it follows the public participation requirements associated with permitting. While EPA regulations do not require public participation for corrective action activities that are imposed or overseen through an order, EPA's policy is that the same level of public participation requirements imposed under a permit should generally apply under a corrective action order.

■ Corrective Action Permits

When corrective action is part of the RCRA permitting process, it follows the public participation requirements associated with permitting. Thus, the corrective action provisions in any permit application are available for public review throughout the permitting process and the public can comment on them at the draft permit stage.

■ Corrective Action Orders

EPA regulations do not require that corrective action activities that are imposed or overseen through an order include public participation. However, EPA's policy is that the same level of public participation requirements imposed under a permit should generally apply under a corrective action order. There may be limitations on the implementing agency's ability to release or discuss certain information when using an order, but if public interest in the facility is high, the agency should address concerns without breaching the confidentiality of the owner's and operator's case by at least discussing why limitations are necessary, and if and when they will be lifted.

EPA has clarified various issues in reference to public participation activities during RCRA §7003 imminent hazard cleanups. Specifically, §7003 orders should involve public participation to the maximum extent possible. During these cleanups, EPA should provide public notice and an opportunity to comment when the Agency issues the order, during the remedy selection process, and upon Agency determination that the cleanup has been

completed. When situations prevent public participation from occurring, the Agency should involve the public at the earliest opportunity. The Agency may also consider holding public meetings to address concerns if the site has attracted significant attention.

■ Remedial Action Plans

Public participation for Remedial Action Plans (RAPs) includes public notice and comment of the draft RAP or the notice of intent to deny. An informal public hearing may also be requested under the public participation provisions for RAPs.

■ Voluntary Corrective Action

Although EPA typically has less control over public participation during voluntary corrective action, the Agency encourages the use of public participation and will generally take into account the level of public participation conducted by the facility owner and operator when evaluating the acceptability of voluntary actions.

STATE AUTHORIZATION

RCRA also requires public involvement when EPA authorizes states to implement the hazardous waste regulations. Such public involvement is intended to allow the public to voice their concerns regarding the change in implementing agency. Specifically, during the state authorization process, a state must provide public notice and an opportunity for public hearing before submitting its application for final authorization. The Statute also requires that EPA provide opportunity for public hearing before it decides to grant or deny a state's authorization and before EPA withdraws a state's authorization. (State authorization is fully discussed in Section III, Chapter 11.)

THE RULEMAKING PROCESS

Besides facilitating public participation during hazardous waste TSDF permitting, corrective action, and state authorization under the RCRA Subtitle C program, EPA proactively initiates public involvement activities as part of all formal RCRA rulemakings. Congress, through the **Administrative Procedures Act** (APA) (5 U.S.C. Sections 551-559), established the legal requirement that federal agencies provide the public with notice and an opportunity to comment on rulemakings. The Act addresses rulemaking procedures as well as site-specific licensing procedures, access to agency information, and procedures and standards for judicial review of agency actions. All environmental rulemakings proposed and finalized by EPA include public participation throughout the process (see Figure VII-2).

■ Proposed Rulemakings

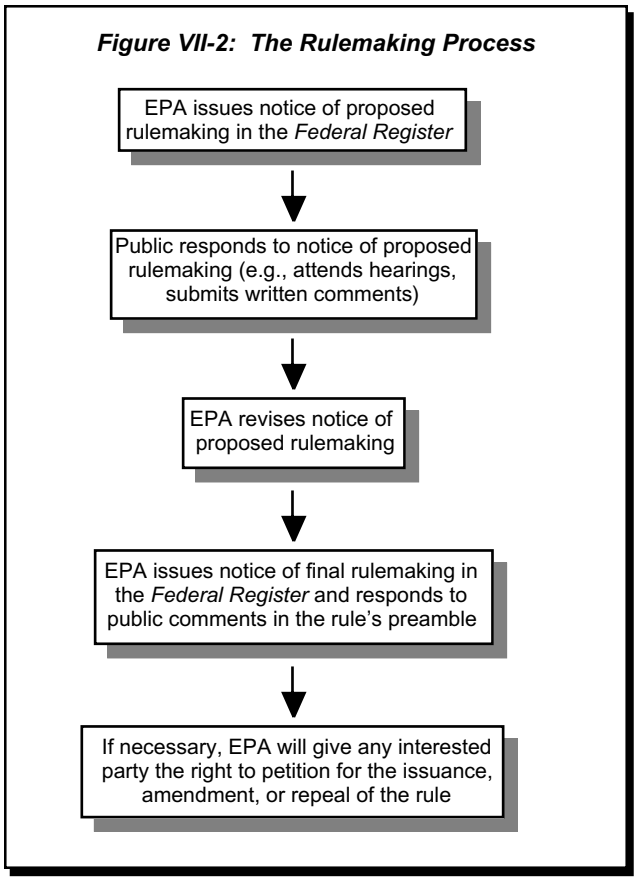
The first step in the rulemaking process is the issuance of the notice of proposed rulemaking by EPA. The forum for providing the public with notice of a proposed rule is the *Federal Register*. The notice must include a statement of the time, place, and nature of the rulemaking, a reference to the legal authority under which the rule is proposed, and the terms of the proposed rule.

■ Public Comment

After notice is given, EPA must provide interested persons an opportunity to participate in the rulemaking through submission of written data, views, or arguments. This process not only educates the public, but also provides valuable information to EPA during the regulatory development process. Up-front participation reduces the likelihood of litigation challenging subsequent regulations. Public participation can take many forms, including opportunity for a hearing, opportunity for access to EPA materials, and opportunity for written comments on proposals.

■ Final Rulemakings

Once public comments are considered, EPA will revise the proposed rulemaking. The rule will often change between its proposal and finalization as a result of public comments. The final rule is published in the *Federal Register*, and EPA will respond to public comments in the rule's preamble.



After final promulgation, EPA must give any interested party the right to petition for the issuance, amendment, or repeal of the rule.

■ Rulemaking Information

EPA evaluates a variety of background information, as well as public comments, in the development of a particular rulemaking. Each *Federal Register* lists a background docket that is available for public viewing. This docket contains all the background documents, including scientific studies, risk assessments, public comments, and EPA responses, that were used for that particular rulemaking.

In addition to the background docket, the *Federal Register* also contains regulatory impact analyses. These are analyses of a particular rulemaking's effects on other environmental regulations and economic impact on the regulated community.

In these analyses, EPA evaluates the effects a rule will have on other environmental regulations, such as CERCLA and CWA, and publishes the expected impacts in the *Federal Register*. In addition, EPA studies the economic effects of a particular rule on the regulated community to determine compliance costs. As required by the Regulatory Flexibility Act of 1980, the Agency also evaluates the impacts of the rulemaking on small businesses, small organizations, and small governmental jurisdictions.

ENVIRONMENTAL JUSTICE

Environmental justice refers to the fair distribution of environmental risks across socioeconomic and racial groups. On February 11, 1994, President Clinton issued Executive Order 12898, directing federal agencies to identify and address environmental concerns and issues of minority and low-income communities. EPA is committed to equal protection in the implementation and enforcement of the nation's environmental laws. EPA believes that environmental justice issues should be addressed on a local level and on a site-specific basis. EPA encourages permitting agencies and facilities to use all reasonable means to ensure that all segments of the population have an equal opportunity to participate in the permitting process and have equal access to information in the process. These means may include, but are not limited to, multilingual notices and fact sheets, as well as translators, in areas where the affected community contains significant numbers of people who do not speak English as a first language.

OUTREACH AND PUBLIC ASSISTANCE

A number of opportunities exist for the public to obtain RCRA program information and assistance. These include grants, the Freedom of Information Act, EPA Office of Ombudsman, the RCRA Information Center, and the RCRA, Superfund & EPCRA Call Center.

Grants

Under RCRA §7007, EPA has the authority to provide grants to states, municipalities, educational institutions, or any other organization to help these groups effectively implement training programs that demonstrate solid waste management and resource recovery operations. Such grants provide governments and nonprofit organizations with the opportunity to further the goals of Act through public outreach.

Freedom of Information Act

The **Freedom of Information Act** (FOIA) provides private parties with the right to obtain information in the possession of the government. Unless materials are promptly published and copies are offered for sale, each agency must make information available for public inspection and copying. FOIA requires each agency to establish procedures for handling requests regarding government statutes, regulations, standards, permit conditions, requirements, orders, and policies.

There are certain materials which are not subject to FOIA. These include:

- Draft materials
- Matters of national defense or foreign policy
- Material related solely to internal personnel rules and practices
- Trade secrets and privileged commercial or financial information
- Investigation material collected for enforcement purposes
- Geological and geophysical information and data.

EPA has pursued a policy of fully disclosing its records to the public, consistent with the rights of individuals to privacy, the rights of persons entitled to protection under confidential business information (CBI) provisions, and the need for EPA to promote internal policy deliberations. EPA will disclose information to any requester to the fullest extent possible without unjustifiable expense or unnecessary delay.

EPA's Office of Ombudsman

In order to create a central clearinghouse for public concerns on matters relating to the implementation and enforcement of RCRA, EPA established the Office of Ombudsman and appointed a Hazardous Waste Ombudsman at EPA Headquarters and each EPA Region. The primary responsibilities of the Ombudsman are to respond to questions and complaints regarding implementation of the RCRA program. Additionally, the Ombudsman makes recommendations to the EPA Administrator based on inquiries received. The EPA Headquarters Ombudsman may be reached by contacting:

Office of Ombudsman
U.S. Environmental Protection Agency
Office of Solid Waste and Emergency Response
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460
(800) 262-7937

EPA Docket Center

Each time a rulemaking process is announced, a docket is established to store materials (e.g., Federal Registers, supporting documentation, and public comments) throughout the rulemaking process. Paper dockets, electronic dockets, and information centers serve as the respository for this information. In September 2002, EPA consolidated many of the docket facilities located in the Metropolitan Washington area into one combined docket facility. The new docket facility, the EPA Docket Center, supports several EPA programs, including the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Oil Pollution Act (OPA), the Clean Air Act (CAA), the Toxic Substances Control Act (TSCA), the Toxic Release Inventory (TRI), the Safe Drinking Water

Act (SDWA), and the Clean Water Act (CWA). The EPA Docket Center is located at:

EPA West
Room B102
1301 Constitution Avenue, NW
Washington, DC 20014

Hours of operation are 8:30 a.m. to 4:30 p.m., EST, Monday through Friday, excluding federal holidays.

In addition to the EPA Docket Center, EPA maintains an electronic public docket system, known as EPA Dockets (EDOCKET). EDOCKET allows an individual to search, download, and print the documents in a docket, as well as submit comments online. This docket is available at www.epa.gov/edocket

■ RCRA, Superfund & EPCRA Call Center

The RCRA, Superfund & EPCRA Call Center is a publicly accessible service which provides up-to-date regulatory information. The Call Center responds to factual questions on federal EPA regulations developed under RCRA, CERCLA, EPCRA, the Oil Pollution Act (OPA), and SPCC. The Call Center is staffed by professionals who are completely familiar with the latest issues and regulations affecting the hazardous waste program. The Call Center is open Monday through Friday from 9:00 a.m. to 5:00 p.m., EST, and may be contacted at either (703) 412-9810, or toll-free, (800) 424-9346.

SUMMARY

EPA is committed to involving the public in the development and implementation of the solid waste, hazardous waste, and UST regulations and seeks to empower communities to become involved in local RCRA-related activities. To achieve these goals, the RCRA public participation requirements bring government, private industry, public interest groups, and citizens together to make important decisions about hazardous waste management facilities.

A focus of RCRA public participation is the involvement of the public in the hazardous waste TSDF permitting process. The public interaction occurs during pre-application meetings, public comment and response periods, and public hearings. RCRA includes specific provisions to involve the public in all stages of the hazardous waste TSDF permitting process: prior to the initial permit application; after draft permit issuance; and during permit modifications, permit renewals, post-closure permits, and trial burns.

In addition, RCRA requires public involvement during Subtitle C corrective action, whether such cleanups are instituted through a permit or order, or conducted voluntarily. RCRA also requires public involvement when EPA authorizes states to implement the hazardous waste regulations.

While RCRA's initiatives to facilitate public participation during hazardous waste TSDF permitting, corrective action, and state authorization are limited to the RCRA Subtitle C program, EPA is required to comply with the public involvement provisions under APA for all formal rulemakings under all RCRA subtitles.

Consistent with Executive Order 12898, directing federal agencies to identify and address environmental concerns and issues of minority and low-income communities, EPA encourages allowing all segments of the population equal access to information pertaining to the RCRA program.

To assist in disseminating information and promoting public education about the RCRA program, EPA engages in several outreach and public assistance mechanisms. The Agency provides training grants, allows access to information through the Freedom of Information Act, and provides program information through the EPA Office of Ombudsman, the RCRA Information Center, and the RCRA, Superfund & EPCRA Call Center.

ADDITIONAL RESOURCES

Additional information about the topics covered in this chapter can be found at: www.epa.gov/epaoswer/hazwaste/permit/pubpart/index.htm.

APPENDIX A

HAZARDOUS WASTE MANIFEST

Please print or type *(Form designed for use on elite (12 - pitch) typewriter)* *Form Approved. OMB No. 2050 - 0039 Expires 9 - 30 - 91*

UNIFORM HAZARDOUS WASTE MANIFEST

1 Generator's US EPA ID No. | Manifest Document No.

2. Page 1 of

Information in the shaded areas is not required by Federal law

GENERATOR

3. Generator's Name and Mailing Address

4. Generator's Phone ( )

A. State Manifest Document Number

B. State Generator's ID

5. Transporter 1 Company Name

6. US EPA ID Number

C. State Transporter's ID

D. Transporter's Phone

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address

10. US EPA ID Number

G. State Facility's ID

H. Facility's Phone

11. US DOT Description *(Including Proper Shipping Name, Hazard Class, and ID Number)*	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.					
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; **OR,** if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name | Signature | *Month* *Day* *Year*

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | *Month* *Day* *Year*

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | *Month* *Day* *Year*

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.

Printed/Typed Name | Signature | *Month* *Day* *Year*

EPA Form 8700 - 22 (Rev. 9 - 88) Previous editions are obsolete.

APPENDIX B

LAND DISPOSAL RESTRICTIONS NOTIFICATION REQUIREMENTS

Generators: Generators must send a notification with the initial shipment of every waste to a TSDF. If the waste, process, or receiving facility changes, another notification is required. The information that the notification must include varies according to the status of the waste. Waste that needs treatment before it can be disposed of will have different information than waste that can be disposed of without treatment. Below is a table that details the required elements for LDR notifications.

Required Notification Information	Waste Needs to Meet Treatment Standard	Waste Meets Treatment Standard	Waste Is Not Subject to Treatment Standard	Waste Is In Lab Packs
1. EPA hazardous waste and manifest numbers of first shipment	X	X	X	X
2. Statement: This waste is subject to LDR	X	X		
3. Statement: This waste is not prohibited from land disposal			X	
4. The constituents of concern and any underlying hazardous constituents (if applicable)	X	X		
5. Indication whether it is wastewater or nonwastewater	X	X		
6. Waste analysis data (when available)	X	X	X	
7. Date the waste will be prohibited from land disposal			X	
8. For hazardous debris, when treating with the alternative treatment technologies, list the contaminants subject to treatment	X		X	
9. For contaminated soil, list the constituents subject to treatment and state whether the soil contains hazardous waste and meets the treatment standard	X	X		
10. A certification is needed (see applicable section for exact wording)		X		X

Treatment Facilities: Treatment facilities have to send similar notifications along with the shipment of treated wastes to disposal facilities. A certification must be included stating that the waste meets the treatment standards and may be land disposed. Below is a table detailing the information required for treatment facility notifications.

Required Notification Information	Waste Is Treated and Sent for Disposal
1. EPA hazardous waste and manifest number of first shipment	X
2. Statement that the waste is subject to LDR	X
3. The constituents of concern and any underlying hazardous constituents (if applicable)	X
4. Indication whether it is wastewater or nonwastewater	X
5. Waste analysis data (when available)	X
6. For contaminated soil, list the constituents subject to treatment and state whether the soil contains hazardous waste and meets the treatment standard	X
10. A certification statement is needed (see applicable section for exact wording)	X

APPENDIX C

UNDERGROUND STORAGE TANK NOTIFICATION FORM

United States
Environmental Protection Agency
Washington, DC 20460

Form Approved.
OMB No.2050-0068

Notification for Underground Storage Tanks

State Agency Name and Address:

STATE USE ONLY
ID NUMBER:
DATE RECEIVED:
DATE ENTERED INTO COMPUTER:
DATA ENTRY CLERK INITIALS:
OWNER WAS CONTACTED TO CLARIFY RESPONSES, COMMENTS:

TYPE OF NOTIFICATION

☐ A. NEW FACILITY ☐ B. AMENDED ☐ C. CLOSURE

_____ Number of tanks at facility _____ Number of continuation sheets attached

INSTRUCTIONS AND GENERAL INFORMATION

Please type or print in ink. Also, be sure you have signatures in ink for sections VIII and XI. Complete a notification form for each location containing underground storage tanks. If more than 5 tanks are owned at this location, you may photocopy pages 3 through 5 and use them for additional tanks.

The primary purpose of this notification program is to locate and evaluate underground storage tank systems (USTs) that store or have stored petroleum or hazardous substances. The information you provide will be based on reasonably available records, or in the absence of such records, your knowledge or recollection.

Federal law requires UST owners to use this notification form for all USTs storing regulated substances that are brought into use after May 8, 1986, or USTs in the ground as of May 8, 1986 that have stored regulated substances at any time since January 1, 1974. The information requested is required by Section 9002 of the Resource Conservation and Recovery Act (RCRA), as amended.

Who Must Notify? Section 9002 of RCRA, as amended, requires owners of USTs that store regulated substances (unless exempted) to notify designated State or local agencies of the existence of their USTs. "Owner" is defined as:

- In the case of an UST in use on November 8, 1984, or brought into use after that date, any person who owns an UST used for storage, use, or dispensing of regulated substances; or
- In the case of an UST in use before November 8, 1984, but no longer in use on that date, any person who owned the UST immediately before its discontinuation.

Also, if the State so requires, any facility that has made any changes to facility information or UST system status, must submit a notification form (only amended information needs to be included).

What USTs Are Included? An UST system is defined as any one or combination of tanks that (1) is used to contain an accumulation of regulated substances, and (2) whose volume (including connected underground piping) is 10% or more beneath the ground. Regulated USTs store petroleum or hazardous substances (see the following "What Substances Are Covered").

What Tanks Are Excluded From Notification?

- Tanks removed from the ground before May 8, 1986;
- Farm or residential tanks of 1,100 gallons or less capacity storing motor fuel for noncommercial purposes;
- Tanks storing heating oil for use on the premises where stored;
- Septic tanks;
- Pipeline facilities (including gathering lines) regulated under the Natural Gas Pipeline Safety Act of 1968, or the Hazardous Liquid Pipeline Safety Act of 1979, or which is an intrastate pipeline facility regulated under State laws;
- Surface impoundments, pits, ponds, or lagoons;
- Storm water or waste water collection systems;
- Flow-through process tanks;
- Liquid traps or associated gathering lines directly related to oil or gas production and gathering operations;
- Tanks on or above the floor of underground areas, such as basements or tunnels;
- Tanks with a capacity of 110 gallons or less.

What Substances Are Covered? The notification requirements apply to USTs containing petroleum or certain hazardous substances. Petroleum includes gasoline, used oil, diesel fuel, crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute). Hazardous substances are those found in Section 101 (14) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), with the exception of those substances regulated as hazardous waste under Subtitle C of RCRA.

Where To Notify? Send completed forms to:

When To Notify? 1. Owners of USTs in use or that have been taken out of operation after January 1, 1974, but still in the ground, must notify by May 8, 1986. 2. Owners who bring USTs into use after May 8, 1986, must notify within 30 days of bringing the UST into use. 3. If the State requires notification of any amendments to facility, send information to State agency immediately.

Penalties: Any owner who knowingly fails to notify or submits false information shall be subject to a civil penalty not to exceed $11,000 for each tank for which notification is not given or for which false information is given.

I. OWNERSHIP OF UST(s)

Owner Name (Corporation, Individual, Public Agency, or Other Entity)

Street Address

County

City	State	Zip Code

Phone Number (Include Area Code)

II. LOCATION OF UST(s)

If required by State, give the geographic location of USTs by degrees, minutes, and seconds. Example: Latitude 42° 36' 12" N, Longitude 85° 24' 17" W

Latitude _____ **Longitude** _____

Facility Name or Company Site Identifier, as applicable

Q If address is the same as in Section I, check the box and proceed to section III.
If address is different, enter address below:

Street Address

County

City	State	Zip Code

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III. TYPE OF OWNER

- ☐ Federal Government
- ☐ State Government ☐ Commercial
- ☐ Local Government ☐ Private

IV. INDIAN COUNTRY

USTs are located on land within an Indian Reservation or on trust lands outside reservation boundaries. ☐

USTs are owned by a Native American nation or tribe. ☐

Tribe or Nation where USTs are located:

V. TYPE OF FACILITY

- ☐ Gas Station
- ☐ Petroleum Distributor
- ☐ Air Taxi (Airline)
- ☐ Aircraft Owner
- ☐ Auto Dealership
- ☐ Railroad
- ☐ Federal - Non-Military
- ☐ Federal - Military
- ☐ Industrial
- ☐ Contractor
- ☐ Trucking/Transport
- ☐ Utilities
- ☐ Residential
- ☐ Farm
- ☐ Other (Explain) _____

VI. CONTACT PERSON IN CHARGE OF TANKS

Name:	Job Title:	Address:	Phone Number (Include Area Code):

VII. FINANCIAL RESPONSIBILITY

☐ I have met the financial responsibility requirements (in accordance with 40 CFR Subpart H) by using the following mechanisms:

Check All that Apply

- ☐ Self Insurance
- ☐ Commercial Insurance
- ☐ Risk Retention Group
- ☐ Local Government Financial Test
- ☐ Guarantee
- ☐ Surety Bond
- ☐ Letter of Credit
- ☐ Bond Rating Test
- ☐ State Funds
- ☐ Trust Fund
- ☐ Other Method (describe here)

_____

VIII. CERTIFICATION (Read and sign after completing ALL SECTIONS of this notification form)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in Sections I through XI of this notification form and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Name and official title of owner or owner's authorized representative (Print)	Signature	Date Signed

Paperwork Reduction Act Notice

EPA estimates public reporting burden for this form to average 30 minutes per response including time for reviewing instructions, gathering and maintaining the data needed and completing and reviewing the form. Send comments regarding this burden estimate to Director, OP, Regulatory Information Division (2137), U.S. Environmental Protection Agency, 401 M Street Washington D.C. 20460, marked "Attention Desk Officer for EPA." This form amends the previous notification form as printed in 40 CFR Part 280, Appendix I. Previous editions of this notification form may be used while supplies last.

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IX. DESCRIPTION OF UNDERGROUND STORAGE TANKS (Complete for all tanks and piping at this location.)

Tank Identification Number	Tank No. _____	Tank No. _____	Tank No. _____	Tank No. _____	Tank No. _____
1. Status of Tank (check only one) Currently In Use	☐	☐	☐	☐	☐
Temporarily Closed	☐	☐	☐	☐	☐
Permanently Closed	☐	☐	☐	☐	☐
2. Date of Installation (month/year)					
3. Estimated Total Capacity (gallons)					
4. Material of Construction (check all that apply)					
Asphalt Coated or Bare Steel	☐	☐	☐	☐	☐
Cathodically Protected Steel	☐	☐	☐	☐	☐
Coated and Cathodically Protected Steel	☐	☐	☐	☐	☐
Composite (Steel Clad with Fiberglass)	☐	☐	☐	☐	☐
Fiberglass Reinforced Plastic	☐	☐	☐	☐	☐
Lined Interior	☐	☐	☐	☐	☐
Excavation Liner	☐	☐	☐	☐	☐
Double Walled	☐	☐	☐	☐	☐
Polyethylene Tank Jacket	☐	☐	☐	☐	☐
Concrete	☐	☐	☐	☐	☐
Unknown	☐	☐	☐	☐	☐
If Other, please specify here	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____
Check box if tank has ever been repaired	☐	☐	☐	☐	☐
5. Piping Material (check all that apply) Bare Steel	☐	☐	☐	☐	☐
Galvanized Steel	☐	☐	☐	☐	☐
Fiberglass Reinforced Plastic	☐	☐	☐	☐	☐
Copper	☐	☐	☐	☐	☐
Cathodically Protected	☐	☐	☐	☐	☐
Double Walled	☐	☐	☐	☐	☐
Secondary Containment	☐	☐	☐	☐	☐
Unknown	☐	☐	☐	☐	☐
Other, please specify	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____
6. Piping Type (Check all that apply) "Safe" Suction (no valve at tank)	☐	☐	☐	☐	☐
"U.S." Suction (valve at tank)	☐	☐	☐	☐	☐
Pressure	☐	☐	☐	☐	☐
Gravity Feed	☐	☐	☐	☐	☐
Check box if piping has ever been repaired	☐	☐	☐	☐	☐

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Tank Identification Number	Tank No. _____	Tank No. _____	Tank No. _____	Tank No. _____	Tank No. _____
7. Substance Currently Stored (or last stored in the case of closed tanks) (Check all that apply) — Gasoline	☐	☐	☐	☐	☐
Diesel	☐	☐	☐	☐	☐
Gasohol	☐	☐	☐	☐	☐
Kerosene	☐	☐	☐	☐	☐
Heating Oil	☐	☐	☐	☐	☐
Used Oil	☐	☐	☐	☐	☐
If Other, please specify here	_____	_____	_____	_____	_____
Hazardous Substance	☐	☐	☐	☐	☐
CERCLA name and/or	_____	_____	_____	_____	_____
CAS number	_____	_____	_____	_____	_____
Mixture of Substances	☐	☐	☐	☐	☐
Please specify here	_____	_____	_____	_____	_____

8. **Release Detection** (check all that apply)	TANK	PIPE	TANK	PIPE	TANK	PIPE	TANK	PIPE	TANK	PIPE
Manual tank gauging	☐		☐		☐		☐		☐	
Tank tightness testing	☐		☐		☐		☐		☐	
Inventory Control	☐		☐		☐		☐		☐	
Automatic tank gauging	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Vapor monitoring	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Groundwater monitoring	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Interstitial monitoring	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Automatic line leak detectors		☐		☐		☐		☐		☐
Line tightness testing		☐		☐		☐		☐		☐
No release detection required (such as some types of suction piping, emergency generator tanks or field constructed tanks)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other method allowed by implementing agency (such as SIR)	☐		☐		☐		☐		☐	
Please specify other method here	_____		_____		_____		_____		_____	

9. Spill and Overfill Protection					
Overfill device installed	☐	☐	☐	☐	☐
Spill device installed	☐	☐	☐	☐	☐

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Tank Identification Number	Tank No. _____	Tank No. _____	Tank No. _____	Tank No. _____	Tank No. _____
X. CLOSURE OR CHANGE IN SERVICE					
1. **Closure or Change in Service**					
Estimated date the UST was last used for storing regulated substances (month/day/year)	_____	_____	_____	_____	_____
Check box if this is a change in service	☐	☐	☐	☐	☐
2. **Tank Closure**					
Estimated date tank closed (month/day/year)	_____	_____	_____	_____	_____
(check all that apply below)					
Tank was removed from ground	☐	☐	☐	☐	☐
Tank was closed in ground	☐	☐	☐	☐	☐
Tank filled with inert material	☐	☐	☐	☐	☐
Describe the inert fill material here	_____	_____	_____	_____	_____
3. **Site Assessment**					
Check box if the site assessment was completed	☐	☐	☐	☐	☐
Check box if evidence of a leak was detected	☐	☐	☐	☐	☐
XI. CERTIFICATION OF INSTALLATION (COMPLETE FOR UST SYSTEMS INSTALLED AFTER DECEMBER 22, 1988)					
Installer Of Tank And Piping Must Check All That Apply:					
Installer certified by tank and piping manufacturers	☐	☐	☐	☐	☐
Installer certified or licensed by the implementing agency	☐	☐	☐	☐	☐
Installation inspected by a registered engineer	☐	☐	☐	☐	☐
Installation inspected and approved by implementing agency	☐	☐	☐	☐	☐
Manufacturer's installation checklists have been completed	☐	☐	☐	☐	☐
Another method allowed by State agency If so, please specify here	☐	☐	☐	☐	☐
	_____	_____	_____	_____	_____

Signature of UST Installer Certifying Proper Installation of UST System

Name	Signature	Date
Position	Company	

APPENDIX D

GLOSSARY

The terms below are defined as they pertain to the Resource Conservation and Recovery Act.

Abandoned For purposes of defining a material as a solid waste under RCRA Subtitle C, a material that is disposed of, burned, or incinerated.

Accumulated Speculatively Storage of a material in lieu of expeditious recycling. Materials are usually accumulated speculatively if the waste being stored has no viable market or if a facility cannot demonstrate that at least 75 percent of the material has been recycled in a calendar year.

Acknowledgment of Consent Notice sent by EPA to an exporter of hazardous waste, indicating that the importing country has agreed to accept such waste.

Action Levels For purposes of Subtitle C corrective action, risk-based concentrations of hazardous constituents in ground water, soil, or sediment that may trigger further investigation into possible contamination at a particular site.

Administrative Action Enforcement action taken by EPA or a state under its own authority, without involving a judicial court process.

Administrative Procedures Act The Act that establishes rulemaking procedures as well as site-specific licensing procedures, access to agency information, and procedures and standards for judicial review of agency actions. All environmental rulemakings proposed and finalized by EPA include public participation throughout the process.

Aggregation Points Centers that accept used oil only from places owned by the same owner and operator as the aggregation point, or from do-it-yourselfers.

Alternative Concentration Limits For purposes of TSDF ground water monitoring, hazardous constituent limits established by the EPA Regional Administrator that are allowed to be present in ground water.

Annual Aggregate For purposes of UST financial responsibility, the total amount of UST financial responsibility coverage required to cover all leaks that might occur in one year.

Applicable or Relevant and Appropriate Requirements Standards, criteria, or limitations under federal or more stringent state environmental laws, including RCRA, that may be required during a Superfund remedial action, unless site-specific waivers are obtained.

Authorized State A state that has been delegated the authority by EPA to implement and enforce its own regulations for hazardous waste management under RCRA. The state program must be at least as stringent as the federal standards.

Automatic Tank Gauging A release detection method for USTs that uses a probe in the tank that is wired to a monitor to provide information on product level and temperature.

Basel Convention The international treaty that establishes standards for global trade of hazardous waste, municipal waste, and municipal incinerator ash. Because the United States is not a party to the convention, U.S. businesses can only export waste to those countries with which the U.S. government has negotiated a separate waste trade agreement.

Bentsen Wastes Geothermal exploration, development, and production waste exempt from RCRA Subtitle C regulation.

Best Demonstrated Available Technology The technology that best minimizes the mobility or toxicity (or both) of the hazardous constituents for a particular waste.

Bevill Wastes Fossil fuel combustion wastes, mining and mineral processing wastes, and cement kiln dust wastes exempt from RCRA Subtitle C regulation.

Biennial Report A report submitted by hazardous waste LQGs and TSDFs to enable EPA and the states to track the quantities of hazardous waste generated and the movements of those hazardous wastes.

Boiler An enclosed device that uses controlled flame combustion to recover and deliver energy in the form of steam, heated fluid, or heated gases.

Bottom Ash Ash that collects at the bottom of a combustion chamber.

Burners Handlers who burn used oil for energy recovery in boilers, industrial furnaces, or hazardous waste incinerators.

Burning for Energy Recovery Burning hazardous waste for its heating value as a fuel, and using wastes to produce fuels or as ingredients in fuels.

By-Products Materials that are not one of the intended products of a production process and includes most wastes that are not spent materials or sludges.

California List Interim LDR treatment standards that ensured adequate protection of human health and the environment during the time EPA was promulgating final LDR treatment standards.

Capacity Assurance Plan A written statement which ensures that a state has hazardous waste treatment and disposal capacity. This capacity must be for facilities that are in compliance with RCRA Subtitle C requirements and must be adequate to manage hazardous wastes projected to be generated within the state over 20 years.

Cathode Ray Tubes Vacuum tubes, made primarily of glass, which constitute the video display component of televisions and comptuer monitors. These tubes are generally hazardous for lead.

Cathodic Protection A form of corrosion protection for USTs that uses sacrificial anodes or a direct current source to protect steel by halting the naturally occurring electrochemical process that causes corrosion.

Cement Kiln Type of industrial furnace that receives hazardous waste to burn as fuel to run its cement process. Cement is produced by heating mixtures of limestone and other minerals or additives at high temperatures in a rotary kiln, followed by cooling, grinding, and finish mixing.

Change in Service Using a formerly regulated UST system to store a nonregulated substance.

Characteristic Waste Waste that is considered hazardous under RCRA because it exhibits any of four different properties: ignitability, corrosivity, reactivity, and toxicity.

Civil Action A formal lawsuit, filed in court, against a person who has either failed to comply with a statutory or regulatory requirement or an administrative order, or against a person who has contributed to a release of hazardous waste or hazardous constituents.

Clean Air Act The Act that regulates air emissions from area, stationary, and mobile sources. CAA limits the emission of pollutants into the atmosphere in order to protect human health and the environment from the effects of airborne pollution.

Clean Closure The process of completely removing all waste that was treated, stored, or disposed in a hazardous waste unit.

Clean Water Act The Act that sets the basic structure for regulating discharges of pollutants to surface waters of the United States. CWA imposes contaminant limitations or guidelines for all discharges of wastewater into the nation's waterways.

Closure The procedure that a solid or hazardous waste management facility undergoes to cease operations and ensure protection of human health and the environment in the future.

Codification The process by which final regulations are incorporated into the CFR, which is published annually.

Collection Centers Centers that accept used oil from multiple sources, including both businesses and private citizens.

Combustion The controlled burning in an enclosed area as a means of treating or disposing of hazardous waste.

Commercial Chemical Products Unused or off-specification chemicals, spill or container residues, and other unused manufactured products that are not typically considered chemicals. For the purposes of hazardous waste listings, CCPs include only unused, pure chemical products and formulations.

Compliance Monitoring For purposes of RCRA TSDF ground water monitoring, a program that seeks to ensure that the amount of hazardous waste that has leaked into the uppermost aquifer does not exceed acceptable levels.

Composting Processes designed to optimize the natural decomposition or decay of organic matter, such as leaves and food. The end product of composting is a humus-like material that can be added to soils to increase soil fertility, aeration, and nutrient retention.

Comprehensive Environmental Response, Compensation, and Liability Act The Act that authorizes EPA to clean up uncontrolled or abandoned hazardous waste sites and respond to accidents, spills and other emergency releases of hazardous substances. CERCLA provides EPA with enforcement authority to ensure that responsible parties pay the cleanup costs of remediating a site contaminated with hazardous substances.

Comprehensive Environmental Response, Compensation, and Liability Information System A computerized database used to track hazardous substance sites.

Comprehensive Performance Testing The initial and periodic evaluation procedure for demonstrating compliance with the national emission standards for hazardous air pollutants and establishes revised operating limits for hazardous waste combustors.

Comprehensive Procurement Guidelines A list, updated every two years, which designates items with recycled content that procuring agencies should aim to purchase. This list currently contains 54 items within 8 product categories.

Concentration Limits For purposes of TSDF ground water monitoring, the maximum levels of hazardous constituents allowed to be present in the ground water.

Conditionally Exempt Small Quantity Generators Facilities that produce less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste, per calendar month. A CESQG may only accumulate less than 1,000 kg of hazardous waste, 1 kg of acutely hazardous waste, or 100 kg of spill residue from acutely hazardous waste at any one time.

Construction Quality Assurance A program required by EPA to ensure that a landfill, surface impoundment, or waste pile meets all of the technological requirements.

Contained-In Policy An EPA policy that determines the health threats posed by contaminated environmental media and debris, and whether such materials must be managed as RCRA hazardous wastes.

Containers Portable devices in which a material is stored, transported, treated, or otherwise handled.

Containment Building A completely enclosed structure used to store or treat noncontainerized waste.

Continuous Emission Monitoring Systems A system that directly and continuously measures one or more pollutants exiting a combustion unit.

Continuous Monitoring Systems A device which continuously samples the regulated parameter without interruption, evaluates the detector response at least once every 15 seconds, and computes and records the average value at least every 60 seconds.

Cooperative Agreement An agreement between a state and EPA which ensures that the state will spend money from the LUST Trust Fund for its intended purpose.

Corporate Guarantee The demonstration that a corporate grandparent, corporate parent, or sibling corporation can meet financial assurance requirements on behalf of a TSDF owner and operator, or the financial responsibility requirements on behalf of an UST owner and operator. Firms with a "substantial business relationship" with an UST owner and operator can also make this demonstration.

Corrective Action An EPA program to address the investigation and cleanup of contamination from solid waste facilities, hazardous waste facilities, and USTs.

Corrective Action Management Unit A physical, geographical area designated by EPA or states for managing remediation wastes during corrective action.

Corrosivity Characteristic The characteristic which identifies wastes that are acidic or alkaline (basic) and can readily corrode or dissolve flesh, metal, or other materials.

Counting Totaling the hazardous wastes at a given facility for a particular month in order to determine hazardous waste generator status.

Covered States States that participated in EPA's medical waste tracking program from June 22, 1989 to June 22, 1991, which included Connecticut, New Jersey, New York, Rhode Island, and the Commonwealth of Puerto Rico.

Cradle to Grave The time period referring to the initial generation of hazardous waste to its ultimate disposal.

Criminal Action Enforcement action reserved for the most serious violations, which can result in fines or imprisonment.

De minimis Very small amounts of hazardous waste that are discharged to wastewater treatment facilities and thus, are exempt from the mixture rule. De minimis also refers to small concentrations of regulated substances in an UST.

Debris A broad category of large manufactured and naturally occurring objects that are commonly discarded (e.g., construction materials, decommissioned industrial equipment, discarded manufactured objects, tree trunks, boulders).

Delisting A site-specific petition process whereby a handler can demonstrate to EPA that a particular wastestream generated at its facility that meets a listing description does not pose sufficient hazard to warrant RCRA regulation. Owners and operators can also use the delisting process for wastes that are hazardous under the mixture and derived-from rules that pose minimal hazard to human health and the environment.

Derived-From Rule A rule that regulates residues from the treatment of listed hazardous wastes.

Designated Facility A hazardous waste treatment, storage, or disposal facility which has received a RCRA permit (or interim status), or is a recycling facility regulated under 40 CFR Section 261.2(c)(2) or Subpart F, of Section 266, and has been designated on the manifest by the generator.

Destination Facilities Facilities that treat, dispose of, or recycle a particular category of universal waste.

Destruction and Removal Efficiency Standard which verifies that a combustion unit is destroying the organic components found in hazardous waste.

Detection Monitoring For purposes of RCRA TSDF ground water monitoring, the first step of monitoring at land disposal units, where the owner and operator monitors for indication of a leak from the unit, looking for potential changes in the ground water quality from normal (background) levels.

Dilution Prohibition The LDR requirement that prohibits the addition of soil or water to waste in order to reduce the concentrations of hazardous constituents instead of treatment by the appropriate LDR treatment standards.

Direct Discharges Discharges from point sources into surface water pursuant to a CWA NPDES permit.

Disposal The discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid or hazardous waste on or in the land or water.

Disposal Prohibition The LDR requirement that prohibits the land disposal of hazardous waste that has not been adequately treated to reduce the threat posed by such waste.

Distillation Bottoms Residues that form at the bottom of a distillation unit.

Do-it-Yourselfers Individuals who generate used oil through the maintenance of their own personal vehicles and equipment and are not considered used oil generators.

Drip Pads Engineering structures consisting of a curbed, free-draining base, constructed of non-earthen materials, and designed to convey wood preservative chemical drippage from treated wood, precipitation, and surface water run-on to an associated collection system at wood preserving plants.

Elementary Neutralization Units Containers, tanks, tank systems, transportation vehicles, or vessels which neutralize wastes that are hazardous only for exhibiting the characteristic of corrosivity.

Emergency Planning and Community Right-to-Know Act The Act designed to help communities prepare to respond in the event of a chemical emergency and to increase the public's knowledge of the presence and threat of hazardous chemicals.

Environmental Justice The fair distribution of environmental risks across socioeconomic and racial groups.

Environmental Media Materials such as soil, surface water, ground water, and sediment.

EPA Identification Number A unique number assigned by EPA to each hazardous waste generator, transporter, or treatment, storage, and disposal facility.

Episodic Generation The situation in which a generator's status changes from one month to the next, as determined by the amount of waste generated in a particular month. If a generator's status does in fact change, the generator is required to comply with the respective regulatory requirements for that class of generators for the waste generated in that particular month.

Equipment Each valve, pump, compressor, pressure relief device, sampling connection system, open-ended valve or line, or flange or other connector, and any other control devices or systems.

Exception Report A report, submitted by LQGs and SQGs, detailing efforts to locate wastes when a signed copy of the manifest has not been received.

Existing USTs USTs that were in service, or for which installation had commenced on or before December 22, 1988.

Extended Product Responsibility An approach to environmental protection that strives to reduce the environmental impacts of products.

Federal Insecticide, Fungicide, and Rodenticide Act The Act that provides procedures for the registration of pesticide products to control their introduction into the marketplace.

Federal Procurement Program A program that sets minimum recycled content standards for certain designated items and requires procuring agencies to purchase those items composed of the highest percentage of recovered materials practicable.

Final Authorization Authorization by EPA that indicates that a state's program is equivalent to, or no less stringent than, as well as consistent with, federal hazardous waste regulations.

Financial Assurance Under RCRA Subtitle C, the requirements designed to ensure that TSDF owners and operators will have the financial resources to pay for closure, post-closure, and liability costs. Under RCRA Subtitle D, the requirements designed to ensure that MSWLF owners and operators will have the financial resources to pay for closure, post-closure, and corrective action costs.

Financial Test A test of self-insurance which demonstrates that an owner and operator has sufficient financial strength to satisfy TSDF financial assurance or UST financial responsibility requirements.

Float The lighter materials present in petroleum refinery wastewater. As components of oily waste, float rises to the surface in the first step of wastewater treatment.

Fly Ash Particles of ash, such as particulate matter which may also have metals attached them, that are carried up the stack of a combustion unit with gases during combustion.

Formal Action An enforcement action, frequently in the form of an administrative order, that is taken when a serious violation is detected, or when the owner and operator does not respond to an informal administrative action.

Freedom of Information Act The Act that grants private parties the right to obtain information in the government's possession. FOIA requires each federal agency to establish procedures for handling requests regarding government statutes, regulations, standards, permit conditions, requirements, orders, and policies.

Full Cost Accounting An accounting approach that helps local governments identify all direct and indirect costs, as well as the past and future costs, of a municipal solid waste management program.

Generator Any person whose act first creates or produces a hazardous waste, used oil, or medical waste, or first brings such materials into RCRA regulation.

Green Buildings Buildings that are designed, constructed, operated, and ultimately removed in such a way as to minimize their environmental impact.

Ground Water Monitoring Sampling and analysis of ground water for the purpose of detecting the release of contamination from a solid or hazardous waste land-based unit. Ground water monitoring is also a method of UST release detection which senses the presence of liquid product floating in ground water.

Hammer Provisions Requirements written directly into RCRA by Congress, as in the case of the Hazardous and Solid Waste Amendments of 1984, that would automatically become regulations if EPA failed to issue its own regulations by certain dates.

Hazard Communication Standard The OSHA standard that provides workers with access to information about the hazards and identities of the chemicals they are exposed to while working, as well as the measures they can take to protect themselves.

Hazard Ranking System A model devised under CERCLA that determines the relative risk to public health and the environment posed by hazardous substances in ground water, surface water, air, and soil. Only those sites with a score of 28.5 (on a scale of 0 to 100) are eligible for placement on the NPL.

Hazardous Constituents For purposes of RCRA TSDF ground water monitoring, those constituents that have been detected in the uppermost aquifer and are reasonably expected to be in or derived from the waste contained in the unit.

Hazardous Substance A comprehensive designation under CERCLA for RCRA hazardous wastes as well as other toxic pollutants regulated by CAA, CWA, and TSCA. EPA has the authority under CERCLA to designate any additional element, compound, mixture, or solution as a hazardous substance. The definition of hazardous substance specifically excludes petroleum and natural gas.

Hazardous Waste A waste with properties that make it dangerous, or capable of having a harmful effect on human health and the environment. Under the RCRA program, hazardous wastes are specifically defined as wastes that meet a particular listing description or that exhibit a characteristic of hazardous waste.

Hazardous Waste Operations and Emergency Response Worker Protection Standard The OSHA standard that protects the health and safety of workers engaged in operations at hazardous waste sites, hazardous waste treatment facilities, and emergency response locations.

Ignitability characteristic The characteristic which identifies wastes that can readily catch fire and sustain combustion.

Incinerator An enclosed device that uses controlled flame combustion and does not meet the criteria for classification as a boiler, industrial furnace, sludge dryer (a unit that dehydrates hazardous sludge), or carbon regeneration unit (a unit that regenerates spent activated carbon). Incinerators also include infrared incinerators (units that use electric heat followed by a controlled flame afterburner) and plasma arc incinerators (units that use electrical discharge followed by a controlled flame afterburner).

Incorporation by Reference This occurs when the regulatory language in a state's regulation actually cite, or refer to, the federal regulations.

Indirect Discharges Wastewater that is first sent to a POTW, and then after treatment by the POTW, discharged pursuant to a NPDES permit.

Industrial Ecology The study of material and energy flows and their transformations into products, byproducts, and wastes throughout industrial and ecological systems.

Industrial Furnace An enclosed unit that is an integral part of a manufacturing process and uses thermal treatment to recover materials or energy from hazardous waste.

Informal Administrative Action Any communication from EPA or a state agency that notifies the handler of a problem.

Inherently Waste-Like For purposes of defining a material as a solid waste under RCRA Subtitle C, a material, such as dioxin-containing wastes, that is always considered a solid waste because of its intrinsic threat to human health and the environment.

Insurance A policy to cover the TSDF financial assurance or UST financial responsibility requirements.

Interim Authorization A temporary mechanism that is intended to promote continued state participation in hazardous waste management while encouraging states to develop programs that are fully equivalent to the federal program and will qualify for final authorization.

Interim Measures Under RCRA Subtitle C corrective action, short-term actions to control ongoing risks while site characterization is underway or before a final remedy is selected.

Interim Status Facilities TSDFs that were already in operation when the RCRA standards were established and that are operating under less stringent standards until they receive a permit.

Interstitial Monitoring UST release detection method that involves the use of secondary containment, such as a barrier, outer wall, vault, or liner around the UST or piping to prevent leaking product from escaping into the environment. If product escapes from the inner tank or piping, it will then be directed towards an interstitial monitor located between the walls.

Inventory Control An UST release detection method that involves taking measurements of tank contents, recording the amount of product pumped each operating day, and reconciling this data at least once a month to determine if a tank is leaking.

Jobs through Recycling A program EPA launched in 1994 to support recycling markets. The goal of the program is to foster markets for recycled goods by promoting and assisting the development of businesses using recovered materials, creating new recycling jobs, and spurring innovative technologies.

Lab Packs Drums filled with many small containers packed in nonbiodegradable absorbent materials.

Land Disposal For purposes of RCRA Subtitle C regulation, placement in or on the land, except in a corrective action unit of hazardous waste, and includes, but is not limited to, placement in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, underground mine or cave, or placement in a concrete vault, or bunker intended for disposal purposes.

Land Treatment Units Also known as land farms, land treatment units involve the application of hazardous waste on the soil surface, or the incorporation of waste into the upper layers of the soil in order to degrade, transform, or immobilize hazardous constituents present in hazardous waste.

Landfill For purposes of RCRA Subtitle C, a disposal unit where nonliquid hazardous waste is placed in or on the land.

Large Quantity Generators Facilities that generate more than 1,000 kg of hazardous waste per calendar month, or more than 1 kg of acutely hazardous waste per calendar month.

Large Quantity Handlers of Universal Waste Handlers that accumulate a total of 5000 kg or more of universal waste at any one time.

Leachate Any liquid, including any suspended components in the liquid, that has percolated through or drained from waste.

Leaking Underground Storage Tank Trust Fund A fund created by SARA that provides money for overseeing corrective action taken by a responsible party, and provides money for cleanups at UST sites where the owner and operator is unknown, unwilling, or unable to respond.

Letter of Credit A credit document issued to an owner and operator to cover TSDF financial assurance or UST financial responsibility requirements.

Liabilities Damages that may result from an unexpected release of contaminants into the environment.

Lightweight Aggregate Kiln Type of industrial furnace that produces lightweight aggregate and burns liquid hazardous waste as fuel to run its process. Lightweight aggregate refers to a wide variety of raw materials (such as clay, shale, or slate) which, after thermal processing, can be combined with cement to form concrete products. Lightweight aggregate is produced either for structural or thermal insulation purposes.

Listed Wastes Wastes that are considered hazardous under RCRA because they meet specific listing descriptions.

Manifest Paperwork that accompanies hazardous waste from the point of generation to the point of ultimate treatment, storage, or disposal. Each party involved in the waste's management retains a copy of the RCRA manifest, which contains specific information about the waste.

Manual Tank Gauging A method of UST leak detection that requires keeping the tank undisturbed for at least 36 hours per week, during which time the contents of the tank are measured to determine if the tank is leaking.

Marine Protection, Research, and Sanctuaries Act This Act requires a permit for any material that is transported from a U.S. port or by a U.S. vessel for disposition at sea.

Marketers Used oil handlers who either 1) direct shipments of used oil to be burned as fuel in regulated devices, or 2) claim that used oil to be burned for energy recovery is on-specification.

Maximum Achievable Control Technology Process Technology-based concentration limits developed under CAA to limit emissions of individual constituents from hazardous waste combustion units.

Maximum Contaminant Levels For purposes of RCRA ground water monitoring, contaminant-specific levels borrowed from SDWA that are the maximum levels of hazardous waste or hazardous constituents allowed to be present in the groundwater.

Medical Waste Culture and stocks of infectious agents, human pathological wastes, human blood and blood products, used sharps, certain animal wastes, certain isolation wastes, and unused sharps.

Memorandum of Agreement An agreement between a state's director and its EPA Regional Administrator outlining the nature of the responsibilities to enforce a regulatory program and defining the level of coordination and oversight between EPA and the state agency.

Military Munitions For purposes of defining a material as a solid waste under RCRA Subtitle C, ammunition products and components produced for or used by the military for national defense and security.

Miscellaneous Units Hazardous waste treatment, storage, or disposal units regulated under RCRA that do not meet any of the other definitions of regulated units.

Mixed Waste Radioactive waste that is also a hazardous waste under RCRA. Such wastes are jointly regulated by RCRA and Atomic Energy Act.

Mixture Rule A rule that is intended to ensure the regulation of mixtures of listed wastes with nonhazardous solid wastes.

Municipal Solid Waste Durable goods (e.g., appliances, tires, batteries), nondurable goods (e.g., newspapers, books, magazines), containers and packaging, food wastes, yard trimmings, and miscellaneous organic wastes from residential, commercial, and industrial nonprocess sources.

Municipal Solid Waste Landfill A discrete area of land or excavation that receives municipal solid waste.

National Ambient Air Quality Standards Regulations promulgated by EPA under the Clean Air Act for six criteria pollutants — sulfur dioxide, particulate matter, nitrogen dioxide, carbon monoxide, ozone, and lead — in order to protect the public from toxic emissions to the atmosphere.

National Corrective Action Prioritization System A resource management tool by which EPA sets priorities for the Subtitle C corrective action program.

National Emission Standards for Hazardous Air Pollutants Standards set by EPA under the Clean Air Act to control emissions from specific industrial sources.

National Oil and Hazardous Substances Pollution Contingency Plan The NCP contains the regulations that implement the CERCLA response process. The NCP also provides information about the roles and responsibilities of EPA, other federal agencies, states, and private parties regarding releases of hazardous substances.

National Priorities List EPA's priority hazardous substance sites for cleanup. EPA only funds remedial actions at hazardous waste sites on the NPL.

New USTs USTs that are installed, or for which installation has commenced, after December 22, 1988. New USTs must be installed in compliance with all of the applicable technical standards.

Nonsudden Accidental Occurrences For purposes of TSDF financial assurance, events that take place over time and involve continuous or repeated exposure to hazardous waste.

Notice of Deficiency A notice requiring that a TSDF permit applicant supply more information for a complete permit application.

Notice of Intent to Deny A notice issued by a permitting agency which tells a TSDF permit applicant that the application does not demonstrate compliance with the RCRA standards.

Notice of Noncompliance An informal letter to a handler written as part of an informal administrative action.

Notice of Violation An informal letter to a handler written as part of an informal administrative action.

Occupational Safety and Health Act The Act that is designed to save lives, prevent injuries, and protect the health of employees in the workplace. OSHA accomplishes these goals through several regulatory requirements including the HCS and HAZWOPER standards.

OECD Council Decision A multilateral agreement by the Organization for Economic Cooperation and Development that establishes procedural and substantive controls for the import and export of recyclables between member nations. Because the United States is a member of the OECD, U.S. businesses can trade recyclables with other member nations.

Off-Specification Used Oil Used oil that is tested and does not meet given parameters for arsenic, cadmium, chromium, flash point, lead, and total halogens.

Omnibus Provision The authority which allows EPA to add conditions to a TSDF permit that are not specifically addressed by the RCRA regulations.

On-Specification Used Oil Used oil that meets all the given parameters for arsenic, cadmium, chromium, flash point, lead, and total halogens.

Open Dumps Solid waste disposal facilities that fail to comply with the Subtitle D criteria.

Operating Requirements Parameters established by a facility and written into a permit that will ensure a combustion unit meets numerical performance standards.

Operation and Maintenance The operation and maintenance phase of the CERCLA response process. Operation and maintenance may include activities such as ground water pump and treat, and cap maintenance. EPA conducts review of operation and maintenance activities to ensure that the remedy selected is still protective of human health and the environment.

Overfiling When a state fails to enforce its hazardous waste program properly, EPA can overfile, or enforce a provision for which a particular state has authorization.

Particulate Matter Small dust-like particles emitted from hazardous waste combustion units.

Payment Bond For purposes of TSDF financial assurance, a type of surety bond that will fund a standby trust fund in the amount equal to the value of the bond.

Per Occurrence For purposes of UST financial responsibility, the amount of money that must be available to pay for the costs from one leak.

Performance Bond For purposes of TSDF financial assurance, a type of surety bond that guarantees that an owner and operator will comply with their closure, post-closure, and liability requirements.

Performance Standards The numerical pollutant emission limits for hazardous waste combustion units developed by EPA.

Permanent Closure Closure of an UST that involves a number of steps designed to ensure that the tank will pose no threat to human health or the environment after it is closed.

Permit-as-a-Shield The provision which ensures that TSDF permittees will not be enforced against for violating new requirements that were not established in the original permit.

Permit-by-Rule A special form of a RCRA permit that is sometimes granted to facilities with permits for activities under other environmental laws.

Permitted Facilities Facilities that have obtained a TSDF permit from EPA or the state agency to engage in the treatment, storage, or disposal of hazardous waste.

Point of Compliance For purposes of RCRA TSDF ground water monitoring, the vertical point where a TSDF owner and operator must monitor the uppermost aquifer to determine if the leak exceeds the ground water protection standard.

Point Source Discharges Discharges of treated wastewater directly into a lake, river, stream, or other water body. Point source discharges are regulated under CWA.

Pollutants or Contaminants Any element, substance, compound, or mixture that, after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, will or may reasonably be anticipated to cause illness, death, or deformation in any organism. The definition of pollutant or contaminant specifically excludes petroleum and natural gas.

Post-Closure Period after closure during which owners and operators of solid or hazardous waste disposal units conduct monitoring and maintenance activities in order to preserve the integrity of the disposal system.

Potentially Responsible Party The person or persons who may be held liable for hazardous substance contamination under CERCLA. PRPs may include the owners and operators, generators, transporters, and disposers of the hazardous substances.

Precious Metals Reclamation The recycling and recovery of precious metals (i.e., gold, silver, platinum, palladium, iridium, osmium, rhodium, and ruthenium) from hazardous waste.

Preliminary Assessment A review of all readily available site information such as maps, deeds, and other records to determine if further CERCLA response action is necessary. During the PA, EPA tries to determine what type of substances may have been released and the potential impacts to human health and the environment.

Principal Organic Hazardous Constituents Selected organic constituents, which are high in concentration and difficult to burn, that are monitored to ensure a hazardous waste combustion unit's destruction and removal efficiency.

Process Vent Any open-ended pipe or stack that is vented to the atmosphere either directly, through a vacuum-producing system, or through a tank associated with hazardous waste distillation, fractionation, thin-film evaporation solvent extraction, or air or steam stripping operations.

Processors and Rerefiners Facilities that process used oil so that it can be burned for energy recovery or reused.

Procuring Agency Agencies that purchase $10,000 or more worth of an item designated under the federal procurement program during the course of a fiscal year. Procuring agencies include: federal government departments or agencies; state government agencies that use appropriated federal funds for procurement of a designated item; local government agencies that use appropriated federal funds for procurement of a designated item, and government contractors that work on a project funded by appropriated federal funds with respect to work performed under the contract.

Publicly Owned Treatment Works A municipal wastewater treatment plant that receives domestic sewage from households, office buildings, factories, and other places where people live and work. Treatment at a POTW is regulated by the CWA.

RCRAInfo A database that tracks RCRA Subtitle C facility-specific data (i.e., events and activities related to hazardous waste generators, transporters, and TSDFs), and hazardous waste activity reports, known as biennial reports, that are submitted by LQGs and TSDFs.

Reactivity Characteristic The characteristic which identifies wastes that readily explode or undergo violent reactions.

Rebuttable Presumption For purposes of RCRA, an objective test that focuses on the halogen level in used oil to determine whether the used oil has been mixed with a listed hazardous waste.

Reclaimed For purposes of defining a material as a solid waste under RCRA Subtitle C, a material is reclaimed if it is processed to recover a usable product, or regenerated by processing it in a way that restores it to usable condition.

Record of Decision A remedial action plan document that describes the remedy selected for a Superfund site.

Recovered Materials Advisory Notice A notice that provides suggested recycled content levels and other purchasing information for each item designated in the CPG. Procuring agencies can use these levels as guidelines, but are encouraged to exceed EPA's recommendations.

Recovered Materials Content Levels The minimum amount of recovered material that designated items under the federal procurement program should contain.

Recycled For purposes of defining a material as a solid waste under RCRA Subtitle C, a material is recycled if it is used or reused, or reclaimed.

Recycling The separation and collection of wastes, their subsequent transformation or remanufacture into usable or marketable products or materials, and the purchase of products made from recyclable materials.

Recycling Presumption The assumption that all used oil that is generated will be recycled.

Regulated Community The group of organizations, people, industries, businesses, and agencies that, because they perform certain activities, fall under the purview of RCRA.

Regulated Substance For purposes of UST regulation, any hazardous substance defined under CERCLA §101(14) and petroleum.

Regulations Rules issued by an agency, such as EPA, that translate the general mandate of a statute into a set of requirements that the regulated community and the agency must work within.

Remedial Action Longer-term CERCLA response actions that ultimately represent the final remedy for a site and generally are more expensive and of a longer duration than removals.

Remedial Action Plans Special form of RCRA permit that a facility may obtain to treat, store, or dispose of hazardous remediation waste at a remediation waste management site.

Remedial Design/Remedial Action Remedial design is a phase in the CERCLA response process in which technical drawings are developed for the chosen remedy, costs for implementing the remedy are estimated, and roles and responsibilities of EPA, states and contractors are determined. During the remedial action phase, the remedy is implemented generally by a contractor, with oversight and inspection conducted by EPA or the state (or both).

Remedial Investigation/Feasibility Study A remedial investigation is a phase in the CERCLA response process that entails an in-depth examination of the nature and extent of contamination at a site and the associated risks to human health and the environment. The feasibility study entails an analysis of remedial action alternatives comparing the advantages and disadvantages of each.

Remediation Waste All solid and hazardous wastes, and all media (including ground water, surface water, soils, and sediments) and debris that are managed for implementing cleanup.

Removal Action Short-term cleanup action taken under CERCLA that usually addresses problems only at the surface of a site. A removal is conducted in response to an emergency, and generally is limited to 12 months duration or $2 million in expenditures.

Risk Retention Groups For purposes of UST financial responsibility, entities formed by businesses or individuals with similar risks to provide insurance coverage for those risks.

Risk-Based Decision-Making A process that uses risk and exposure assessment concepts to help UST implementing agencies establish enforcement priorities.

Rulemakings Rules issued by an agency, such as EPA, that translate the general mandate of a statute into a set of requirements that the regulated community and the agency must work within.

Safe Drinking Water Act The Act designed to protect the nation's drinking water supply by establishing national drinking water standards (MCLs or specific treatment techniques), and by regulating UIC wells.

Scrap Metal Worn or extra bits and pieces of metal parts, such as scrap piping and wire, or worn metal items, such as scrap automobiles and radiators.

Secondary Materials The five categories of solid wastes regulated under Subtitle C, which include: spent materials, by-products, sludges, commercial chemical products, and scrap metal.

Sham Recycling Illegitimate activities executed under the guise of recycling in order to be exempt from or subject to lesser regulation.

Site Inspection An in-depth assessment of on-site conditions, conducted as part of the CERCLA response process, to rank the site's hazard potential by determining the site's hazard ranking system score. Activities to assess the site may include sampling, field reconnaissance, and examination of site records (e.g., topographical maps, logs).

Sludges Any solid, semisolid, or liquid wastes generated from a wastewater treatment plant, water supply treatment plant, or air pollution control device.

Small Quantity Generators Facilities that generate between 100 kg and 1,000 kg of hazardous waste per calendar month.

Small Quantity Handlers of Universal Waste Handlers that do not accumulate 5000 kg of all universal waste categories combined at their location at any one time.

Sole Active Ingredient For purposes of determining if a waste is P or U listed, the only chemical ingredient serving the function of a commercial product formulation.

Solid Waste Any garbage, refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility, and other discarded material, including solid, liquid, semisolid, or contained gaseous material, resulting from industrial, commercial, mining, and agricultural operations and from community activities. For the purposes of hazardous waste regulation, a solid waste is a material that is discarded by being either abandoned, inherently waste-like, a certain waste military munition, or recycled.

Solid Waste Management Units For purposes of Subtitle C corrective action, discernible units where solid or hazardous wastes have been placed at any times, or any area where solid wastes have been routinely and systematically released.

Source Reduction Maximizing or reducing the use of natural resources at the beginning of an industrial process, thereby eliminating the amount of waste produced by the process. Source reduction is EPA's preferred method of waste management.

Spent Materials Materials that have been used and can no longer serve the purpose for which they were produced without processing.

Spill Prevention Control and Countermeasures Regulations establishing spill prevention procedures and equipment requirements for nontransportation-related facilities with certain aboveground or underground storage capacities that could reasonably be expected to discharge oil into or upon the navigable waters of the United States or adjoining shorelines.

Staging Pile An accumulation of solid, non-flowing remediation waste that is not a containment building and that is used only during remedial operations for temporary storage at a facility.

State Assurance Funds For purposes of UST financial responsibility, state funds that are used to help pay for cleanup and third-party liability costs resulting from leaking USTs.

State Authorization Tracking System A tool used by EPA to chart those states that have been authorized to implement the RCRA hazardous waste program.

Statistical Inventory Reconciliation An UST release detection method that involves using sophisticated computer software to conduct a statistical analysis of inventory, delivery, and dispensing data in order to determine if a tank is leaking.

Storage Holding hazardous waste for a temporary period, after which the hazardous waste is treated, disposed of, or stored elsewhere.

Storage Prohibition LDR provision that prevents the indefinite storage of untreated hazardous waste for reasons other than the accumulation of quantities necessary for effective treatment or disposal.

Sudden Accidental Occurrences For purposes of TSDF financial assurance, events that are not continuous or repeated.

Superfund The common name for CERCLA. Superfund refers to the entire CERCLA program as well as the trust fund established to fund cleanup of contaminated sites where potentially responsible parties cannot be identified, or are unwilling or unable to pay.

Superfund Amendments and Reauthorization Act SARA, enacted in 1986, reauthorized and amended CERCLA to include additional enforcement authorities, technical requirements, community involvement requirements, and various clarifications. SARA Title III authorized EPCRA.

Supplemental Environmental Projects Environmentally beneficial projects which a defendant or respondent agrees to undertake in the settlement of a civil or administrative enforcement action, but which the defendant is not otherwise legally required to perform.

Surety Bond A guarantee which certifies that a surety company will cover TSDF financial assurance or UST financial responsibility requirements on behalf of the owner and operator.

Surface Impoundment A natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials that is used to treat, store, or dispose of hazardous waste.

Tank Tightness Testing A variety of UST release detection methods used to determine if a tank is leaking; most of these methods involve monitoring changes in product level or volume in a tank over a period of several hours.

Tanks Stationary devices used to store or treat hazardous waste.

Technical Grade For purposes of determining if a waste is P or U listed, a commercial chemical product that is not 100 percent pure, but is of a grade of purity that is either marketed or recognized in general usage by the chemical industry.

Temporary Closure A method by which an UST owner and operator can close a tank temporarily and bring it back into service at a later date. The owner and operator must continue to operate and maintain the corrosion protection system and the leak detection system if any product remains in the tank.

Temporary Units Containers or tanks that are designed to manage remediation wastes during corrective action at permitted or interim status facilities.

Thermal Treatment The treatment of hazardous waste in a device that uses elevated temperatures as the primary means to change the chemical, physical, or biological character or composition of the waste.

Totally Enclosed Treatment Units Units that are designed and constructed to practically eliminate the potential for hazardous wastes to escape into the environment during treatment.

Toxic Substances Control Act The Act that controls the manufacture and sale of certain chemical substances.

Toxicity Characteristic The characteristic which identifies wastes that are likely to leach dangerous concentrations of toxic chemicals into ground water.

Toxicity Characteristic Leaching Procedure A lab procedure designed to predict whether a particular waste is likely to leach chemicals into ground water at dangerous levels.

Transfer Facilities Any transportation-related facility such as loading docks, parking areas, storage areas, or other similar areas where shipments of hazardous waste, used oil, or universal waste are held temporarily during the normal course of transportation.

Transporter Any person engaged in the off-site transportation of hazardous waste, used oil, universal waste, or medical waste.

Treatment Any method, technique, or process designed to physically, chemically, or biologically change the nature of a hazardous waste.

Treatment Standards LDR criteria that hazardous waste must meet before it is disposed.

Treatment, Storage, and Disposal Facilities Facilities engaged in the treatment, storage, or disposal of hazardous waste. These facilities are the last link in the cradle-to-grave hazardous waste management system.

Trial Burn Burn conducted to test the performance of a hazardous waste combustion unit over a range of conditions.

Trust Fund A financial mechanism by which a facility can set aside money in order to cover the TSDF financial assurance or UST financial responsibility requirements.

Underground Injection Control Well Units into which hazardous waste is permanently disposed of by injection 1/4 mile below an aquifer with an underground source of drinking water (as defined under SDWA).

Underground Storage Tanks A tank and any underground piping connected to the tank that is used to contain an accumulation of regulated substances and that has at least 10 percent of its combined volume underground.

Underlying Hazardous Constituents Constituents that must be treated in order to meet contaminant-specific levels for purposes of the LDR program.

Unit Pricing An economic incentive program used to achieve source reduction and recycling, also called variable rate refuse collection, where customers who dispose of more waste pay more for the collection and disposal services.

Universal Treatment Standards Contaminant-specific hazardous waste LDR treatment levels.

Universal Wastes Commonly recycled wastes with special management provisions intended to facilitate recycling. There are four categories of universal wastes: hazardous waste batteries, hazardous waste pesticides that have been recalled or collected in waste pesticide collection programs, hazardous waste lamps, and hazardous waste thermostats.

Upgrading Retrofitting existing USTs to come into compliance with the UST regulations. The upgrading period expires on December 22, 1998.

Use Constituting Disposal The direct placement of wastes or waste-derived products (e.g., asphalt with petroleum refining wastes as an ingredient) on the land.

Used Oil Any oil that has been refined from crude or synthetic oil that has been used and, as a result of such use, is contaminated by physical or chemical impurities.

USTfield Abandoned or underutilized industrial and commercial properties where redevelopment is complicated by real or perceived environmental petroleum contamination from federally-regulated USTs.

Vapor Monitoring An UST release detection method in which the equipment measures product fumes in the soil around the UST to check for leaks.

Violation The act or an instance of breaking or disregarding the law.

Waste Analysis Plan A plan that outlines the procedures necessary to ensure proper treatment, storage, or disposal of hazardous waste.

Waste Minimization The reduction, to the extent feasible, in the amount of hazardous waste generated prior to any treatment, storage, or disposal of the waste. Because waste minimization efforts eliminate waste before it is generated, disposal costs may be reduced, and the impact on the environment may be lessened.

Waste Pile An open pile used for treating or storing nonliquid hazardous waste.

Wastewater Treatment Units Tanks or tank systems that treat hazardous wastewaters and discharge them pursuant to CWA.

WasteWi$e A program designed to assist companies, states, local governments, Native American tribes, and other institutions in developing cost-effective practices to reduce solid waste.

Zero Discharges Wastewater that is not directly or indirectly discharged to a navigable water (e.g., wastewater that is land disposed through spray irrigation) under CWA. Zero discharge facilities are subject to federal or state regulatory limitations that are as strict as those that apply to direct and indirect dischargers under CWA.

APPENDIX E

ACRONYMS AND ABBREVIATIONS

ACL - Alternative Concentration Limit
AEA - Atomic Energy Act
APA - Administrative Procedures Act
API - American Petroleum Institute
ARAR - Applicable or Relevant and Appropriate Requirement
ATSDR - Agency for Toxic Substances and Disease Registry

BATF - Bureau of Alcohol, Tobacco, and Firearms
BDAT - Best Demonstrated Available Technology
BIF - Boiler and Industrial Furnace
BRS - Biennial Reporting System

CAA - Clean Air Act
CAMU - Corrective Action Management Unit
CAP - Capacity Assurance Plan
CBI - Confidential Business Information
CCP - Commercial Chemical Product
CDC - Centers for Disease Control
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS - Comprehensive Environmental Response, Compensation, and Liability Act Information System
CESQG - Conditionally Exempt Small Quantity Generator
CFC - Chlorofluorocarbon
CFR - Code of Federal Regulations
CMI - Corrective Measures Implementation (see Section III, Chapter 9)
CMS - Corrective Measures Study
CPG - Comprehensive Procurement Guideline
CWA - Clean Water Act

DOD - Department of Defense
DOE - Department of Energy
DOJ - Department of Justice
DOT - Department of Transportation
DRE - Destruction and Removal Efficiency
DSCM - Dry Standard Cubic Meter

ENU - Elementary Neutralization Unit
EPA ID - EPA Identification
EPCRA - Emergency Planning and Community Right-to-Know Act

FIFRA - Federal Insecticide, Fungicide, and Rodenticide Act
FOIA - Freedom of Information Act

GPRA - Government Performance and Results Act
GWPS - Ground water Protection Standard

H - Hazard Code
HAZWOPER - Hazardous Waste Operations and Emergency Response Worker Protection Standard

HCS - Hazard Communication Standard
HRS - Hazard Ranking System
HSWA - Hazardous and Solid Waste Amendments

kg - kilogram

lb - pound
LDR - Land Disposal Restrictions
LQG - Large Quantity Generator

LQHUW - Large Quantity Handler of Universal Waste
LUST - Leaking Underground Storage Tank

MACT - Maximum Achievable Control Technology
MCL - Maximum Contaminant Level
MOA - Memorandum of Agreement
MPRSA - Marine Protection, Research, and Sanctuaries Act
MSWLF - Municipal Solid Waste Landfill

NAAQS - National Ambient Air Quality Standards
NCAPS - National Corrective Action Prioritization System
NCP - National Oil and Hazardous Substances Pollution Contingency Plan
NESHAP - National Emission Standards for Hazardous Air Pollutants
NPDES - National Pollutant Discharge Elimination System
NPL - National Priorities List
NSPS - New Source Performance Standards

O&M - Operation and Maintenance
OECA - Office of Enforcement and Compliance Assurance
OECD - Organization for Economic Cooperation and Development
OPA - Oil Pollution Act
OSHA - Occupational Safety and Health Act
OSWER - Office of Solid Waste and Emergency Response

PA - Preliminary Assessment
PCB - Polychlorinated Biphenyl
PEI - Petroleum Equipment Institute
POHC - Principal Organic Hazardous Constituent
POTW - Publicly Owned Treatment Works
ppm - parts per million
ppmw - parts per million by weight
PRP - Potentially Responsible Party

RBAC - Recycling and Reuse Business Assistance Center
RBDM - Risk-Based Decision-Making
RCRA - Resource Conservation and Recovery Act
RCRIS - Resource Conservation and Recovery Act Information System
RD&D - Research, Development, and Demonstration
RD/RA - Remedial Design/Remedial Action
REDA - Recycling Economic Development Advocate
RFA - RCRA Facility Assessment
RFI - RCRA Facility Inspection
RI/FS - Remedial Investigation/Feasibility Study
RIC - RCRA Information Center
RMAN - Recovered Materials Advisory Notice
ROD - Record of Decision

SARA - Superfund Amendments and Reauthorization Act
SDWA - Safe Drinking Water Act
SIC - Standard Industrial Classification
SI - Site Inspection
SIR - Statistical Inventory Reconciliation
SPCC - Spill Prevention, Control, and Countermeasures
SQG - Small Quantity Generator
SQHUW - Small Quantity Handler of Universal Waste
StATS - State Authorized Tracking System
SWMU - Solid Waste Management Unit

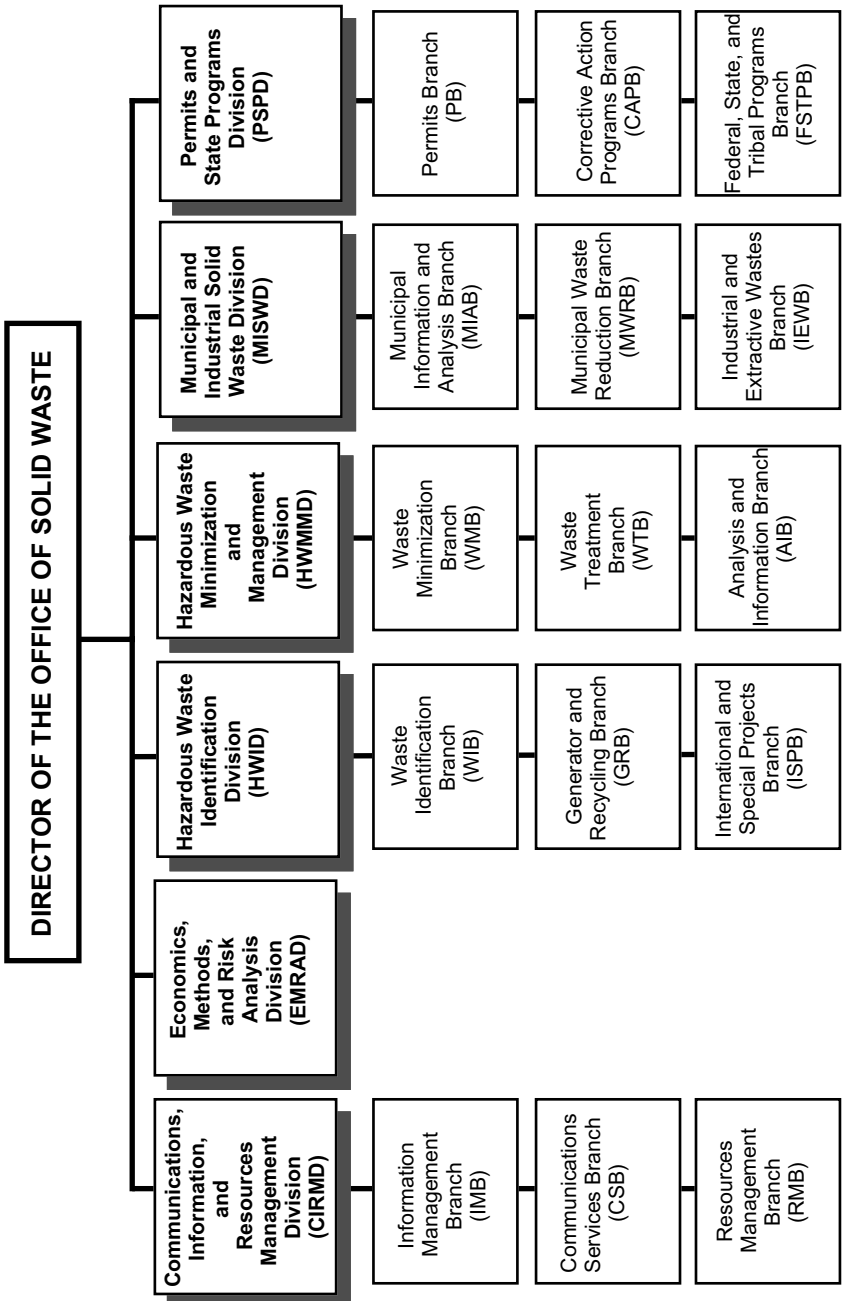
TC - Toxicity Characteristic
TCLP - Toxicity Characteristic Leaching Procedure
TETU - Totally Enclosed Treatment Unit
TSCA - Toxic Substances Control Act
TSDF - Treatment, Storage, and Disposal Facility

UIC - Underground Injection Control
USPS - United States Postal Service
UST - Underground Storage Tank
UTS - Universal Treatment Standard

WIPP - Waste Isolation Pilot Project
WWTU - Wastewater Treatment Unit

APPENDIX F

OSW ORGANIZATION CHART



The **Office of Solid Waste** (OSW) contributes to the Agency's goal of protecting human health and the environment. Its principal responsibility is to build a national waste management program, implemented through EPA Regional Offices and state programs, to manage solid and hazardous waste in the United States. There are six divisions which follow:

The **Communications, Information, and Resources Management Division** (CIRMD) is responsible for managing an outreach and communications program to increase public awareness about solid and hazardous waste programs, managing the national RCRA information systems, and providing administrative, budget, and contract management support to the Office of Solid Waste.

The **Economics, Methods, and Risk Analysis Division** (EMRAD) is responsible for evaluating toxicological and exposure data; developing health and ecological risk assessment support; and applying multimedia fate to transport models to assist in the evaluation of the ecological and human health impacts of solid waste management systems. It prepares regulatory assessments, which include societal costs and benefits of options for regulation development, policy analysis, and legislative initiatives under consideration within OSW. The Division also develops and evaluates sampling, statistical, and analytical methods to support RCRA regulations and policies, and implements the RCRA quality assurance program.

The **Hazardous Waste Identification Division** (HWID) is responsible for conducting industry studies to determine which wastes should be listed as hazardous, and identifying the hazardous waste characteristics. It also develops Agency policies related to delisting, and develops regulations and guidance regarding medical wastes, used oil, generators and transporters of hazardous waste, hazardous waste recycling, and the definition of solid waste. The Division also develops policies related to international hazardous waste management and is the lead on issues related to the import and export of hazardous waste, such as the Basel Convention.

The **Hazardous Waste Minimization and Management Division** (HWMMD) is responsible for encouraging hazardous waste minimization, establishing standards that assure safe treatment of hazardous waste, and identifying data that must be reported on waste generation, treatment, storage, and disposal. HWMMD's responsibilities include the Waste Minimization National Plan, the LDR program, the EPA Combustion Strategy, and the Waste Information Needs Project.

The **Municipal and Industrial Solid Waste Division** (MISWD) is responsible for ensuring safe management of municipal, industrial, and extractive solid wastes by providing technical guidance, regulations, policy, and information related to waste prevention, recycling, and disposal to industry, EPA Regional, state and tribal officials, and the general public.

The **Permits and State Programs Division** (PSPD) is responsible for the nationwide implementation of a program to control hazardous wastes including the permitting of facilities and the authorization of states to operate their programs in lieu of the federal program. The Division develops regulations and guidance for the national corrective action program which oversees site cleanups at facilities that store, treat, or dispose of hazardous waste. PSPD also provides technical support for EPA Regions and states that are implementing the programs.

APPENDIX G

ENVIRONMENTAL CONTACTS

EPA INFORMATION SERVICES

Center for Environmental Research and Information (CERI),
Office of Research and Development (ORD) ..... (513) 569-7562
www.epa.gov/ORD/publications

Clean Air Technology Center ..... (919) 541-0800
www.epa.gov/ttn/catc

Environmental Appeals Board (EAB) ..... (201) 501-7060
www.epa.gov/eab

Environmental Justice Hotline ..... (800) 962-6215
www.epa.gov/compliance/environmentaljustice/index.html

Environmental Recycling Hotline/Earth's 911 ..... (800) 253-2687
www.earth911.org

Human Resources ..... (202) 564-4606
www.epa.gov/epahrist

Indoor Air Quality Clearinghouse ..... (800) 438-4318
www.epa.gov/iaq

Information Resource Center (IRC) ..... (202) 260-5922
www.epa.gov/natlibra/hqirc

Methods Information Communication Exchange
(MICE or Test Methods Hotline) ..... (703) 676-4690
www.epa.gov/epaoswer/hazwaste/test/mice.htm

National Lead Information Center ..... (800) 424-5323
www.epa.gov/lead/nlic.htm

National Radon Hotline ..... (800) 767-7236
www.epa.gov/iaq/radon/

National Service Center for Environmental Publications ..... (800) 490-9198
www.epa.gov/ncepihom/

National Pesticides Information Center;
Federal Insecticide, Fungicide, and Rodenticide Act ..... (800) 858-7378
npic.orst.edu/
Office of Atmospheric Programs ..... (202) 564-9140
www.epa.gov/ozone
Office of Congressional & Intergovernmental Relations ..... (202) 564-5200
www.epa.gov/ocir
Pay-As-You-Throw Helpline ..... (888) 372-7298
www.epa.gov/payt
RCRA, Superfund & EPCRA Call Center ..... (800) 424-9346
www.epa.gov/epaoswer/hotline
Safe Drinking Water Hotline ..... (800) 426-4791
www.epa.gov/safewater
Toxic Substances Control Act Hotline ..... (202) 554-1404
WasteWise ..... (800) 372-9473
www.epa.gov/wastewise
Wetlands Protection Hotline ..... (800) 832-7828
www.epa.gov/owow/wetlands/wetline.html

EPA DOCKETS

Office of Air and Radiation ..... (202) 566-1742
Office of Enforcement and Compliance Assurance ..... (202) 566-1514
Office of Solid Waste and Emergency Response
RCRA/UST ..... (202) 566-0270
Superfund/Oil ..... (202) 566-0276
Office of Environmental Information (Toxics Release Inventory) ..... (202) 566-1752
Office of Pollution, Prevention, and Toxics ..... (202) 566-0280
Office of Water ..... (202) 566-2426

FEDERAL GOVERNMENT INFORMATION SERVICES

Agency for Toxic Substances and Disease Registry (ATSDR) ..... (888) 422-8737
www.atsdr.cdc.gov/
Council for Environmental Quality; National Environmental Policy Act ..... (202) 395-5750
www.whitehouse.gov/ceq

Federal Consumer Information Center ..... (800) 333-4636
www.pueblo.gsa.gov
Federal Information Center ..... (800) 688-9889
www.info.gov
Government Printing Office ..... (202) 512-1800
www.access.gpo.gov
Hazardous Materials Information Center ..... (800) 467-4922
hazmat.dot.gov
National Technical Information Service ..... (800) 553-6847
www.ntis.gov
National Institute for Occupational Safety and Health (NIOSH) ..... (800) 356-4647
www.cdc.gov/niosh
National Response Center ..... (800) 424-8802
www.nrc.uscg.mil
Nuclear Regulatory Commission ..... (301) 415-8200
www.nrc.gov
Occupational Safety and Health Administration (OSHA)
Compliance Guidance Group ..... (301) 515-6796
www.osha.gov

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Environmental Protection Agency
Solid Waste and Emergency Response (5305W)
Washington, DC 20460

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