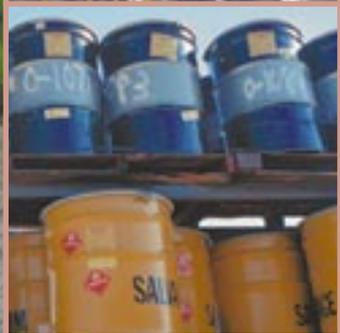
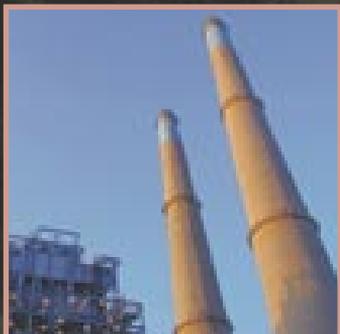




RCRA: Reducing Risk From Waste



Acronyms

These acronyms appear throughout the document. See the Glossary at the end of this document for full definitions.

CESQG	Conditionally Exempt Small Quantity Generator
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
HHW	Household Hazardous Waste
LDR	Land Disposal Restrictions
LQG	Large Quantity Generator
MSW	Municipal Solid Waste
RCRA	Resource Conservation and Recovery Act
SQG	Small Quantity Generator
TRI	Toxics Release Inventory
TSDf	Treatment, Storage, and Disposal Facility
UST	Underground Storage Tank

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What Is RCRA?

As our society has changed over time, so have the amount and types of wastes we produce. Not only do households discard trash and garbage, but industrial and manufacturing processes create many different types of wastes as well. As technology has advanced, we have continually updated and improved our methods of waste treatment and management. Today, although many individuals, organizations, and businesses take steps to prevent or reduce the amount of waste they generate, it is inevitable that some materials still must be discarded. Environmental controls and sound management practices allow us to balance industrial growth with ecological and human health needs.

In 1965, to encourage environmentally sound methods for disposal of household, municipal, commercial, and industrial refuse, Congress passed the first federal law to require safeguards on these activities, the Solid Waste Disposal Act. Congress amended this law in 1976 by passing the Resource Conservation and Recovery Act (RCRA) (pronounced “Ric-ra”). The primary goals of RCRA are to:

- Protect human health and the environment from the potential hazards of waste disposal.
- Conserve energy and natural resources.
- Reduce the amount of waste generated.
- Ensure that wastes are managed in an environmentally sound manner.

As more information about the health and environmental impacts of waste disposal became available, Congress revised

RCRA in 1980 and in 1984. The 1984 amendments are referred to as the Hazardous and Solid Waste Amendments.

RCRA is divided into sections called Subtitles. Subtitles C and D set forth a framework for the U.S. Environmental Protection Agency's (EPA's) comprehensive waste management program:

- EPA's Subtitle C program establishes a regulatory framework for managing *hazardous waste* from generation until ultimate disposal.
- EPA's Subtitle D program establishes a system for managing *solid (primarily nonhazardous) waste*, such as household waste.

RCRA also regulates underground storage tanks (USTs) that store petroleum or certain chemical products under Subtitle I. Requirements exist for the design and operation of these tanks and the development of systems to prevent accidental spills. Examples of facilities using these tanks include petroleum refineries, chemical plants, and commercial gas stations.

The Medical Waste Tracking Act of 1988 was a 2-year demonstration program that expired in June 1991. It created a Subtitle J program designed to track *medical waste* from generation to disposal. At present, no federal EPA tracking regulations are in effect for medical waste, but many states have adopted their own programs.

The Comprehensive Environmental Response, Compensation, and Liability Act (known as Superfund or CERCLA) is a related statute that deals with cleaning up inactive and abandoned hazardous waste sites. RCRA, on the other hand, deals with materials that are currently destined for disposal or recycling.

The term "RCRA" is often used interchangeably to refer to the law, regulations, and EPA

The Role of the States

In a given state, the hazardous waste regulatory program described in this document may be run by either EPA or a state hazardous waste agency. Both of these entities can be referred to as the "regulatory agency," depending on the state.

RCRA encourages states to assume primary responsibility for implementing the RCRA program, instead of EPA. States that want to adopt and implement the RCRA Subtitle C program must develop a program for the management of hazardous waste that is at least as stringent as the EPA program. State programs can be more stringent or broader in scope, however. This process ensures that minimum standards are met nationwide, while providing flexibility to states in implementing rules.

policy and guidance. The *law* describes the waste management program mandated by Congress that gave EPA authority to develop the RCRA program. EPA *regulations* carry out the Congressional intent by providing explicit, legally enforceable requirements for waste management. These regulations can be found in Title 40 of the *Code of Federal Regulations (CFR)*, Parts 238 through 282. EPA *guidance documents* and *policy directives* clarify issues related to the implementation of the regulations. These three elements are the primary parts of the RCRA program.

This booklet is intended to provide an overall perspective on how RCRA works, including the roles of EPA, states, tribes, the public, and the regulated community. It focuses primarily on Subtitle C and presents some information on Subtitle D as well. Additional information and publications can be obtained by calling the RCRA Hotline at 800 424-9346 or TDD (hearing impaired) 800 553-7672. From within the Washington, DC, area, call 703 412-9810 or TDD 703 412-3323.

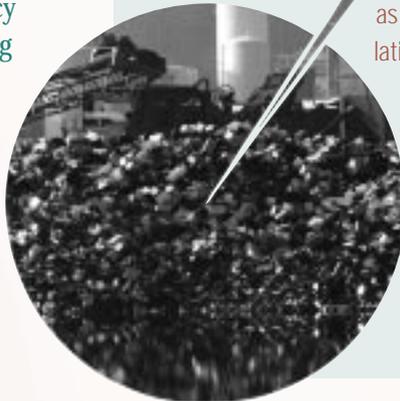


Subtitle C: What Is a Hazardous Waste?

Hazardous wastes come in many shapes and forms. They can be liquids, solids, contained gases, or sludges. They can be the byproducts of manufacturing processes or simply discarded commercial products, like cleaning fluids or pesticides. Whatever their form, proper management and disposal are essential to protect human health and the environment.

RCRA provides a general definition of the term “hazardous waste.” EPA has defined by regulation which specific materials are considered hazardous waste under Subtitle C. Under this definition, the universe of potential hazardous wastes is extremely large and diverse. The regulatory definition evolves and changes as new information becomes available. EPA works closely with industry and the public to determine which of these wastes should be subject to the RCRA hazardous waste regulations. The Agency developed four defining characteristics of hazardous waste and four lists of specific hazardous wastes.

According to EPA estimates, of the 13 billion tons of industrial, agricultural, commercial, and household wastes generated annually, more than 279 million tons (2 percent) are “hazardous,” as defined by RCRA regulations.



Characteristic Wastes

A waste is hazardous if it exhibits one or more of the following characteristics:

- **Ignitability.** Ignitable wastes can create fires under certain conditions or are spontaneously combustible. *Examples include waste oils and used solvents.*
- **Corrosivity.** Corrosive wastes are acids or bases that are capable of corroding metal, such as storage tanks, containers, drums, and barrels. *Battery acid is a good example.*
- **Reactivity.** Reactive wastes are unstable under “normal” conditions. They can cause explosions, toxic fumes, gases, or vapors when mixed with water. *Examples include lithium-sulfur batteries and explosives.*
- **Toxicity.** Toxic wastes are harmful or fatal when ingested or absorbed. When toxic wastes are disposed of on land, contaminated liquid may drain (leach) from the waste and pollute ground water. Toxicity is defined through a laboratory procedure called the Toxicity Characteristic Leaching Procedure (TCLP). The TCLP helps identify wastes likely to leach concentrations of contaminants that may be harmful to human health or the environment. *Certain chemical wastes and heavy metals are examples of potential toxic wastes.*

Listed Wastes

By definition, EPA determined that some specific wastes are hazardous. These wastes are incorporated into lists published by the Agency. These lists are organized into three categories:

- **Source-specific wastes.** This list includes certain wastes from specific industries, such as petroleum refining or pesticide manufacturing. *Certain sludges and wastewaters from treatment and production processes in these industries are examples of source-specific wastes.*
- **Nonspecific source wastes.** This list identifies wastes from common manufacturing and industrial processes. *These include solvents that have been used in cleaning or degreasing operations.*
- **Commercial chemical products.** This list includes specific commercial chemical products in an unused form. *Some pesticides and some pharmaceutical products become hazardous waste when discarded.*

What Is a Hazardous Waste?



To be considered “hazardous waste,” materials must first meet the legal definition of “solid waste.” Solid waste is discarded material, including garbage, refuse, and sludge (solids, semisolids, liquids, or contained gaseous materials).

Solid wastes that meet any of the following criteria are considered hazardous and subject to EPA regulations. Hazardous wastes are those that:

- Possess one or more of the four characteristics of hazardous waste.
- Are included on an EPA list of hazardous waste.
- Are a mixture of nonhazardous and hazardous waste listed solely for a characteristic (e.g., dirty water mixed with spent solvents).
- Derive from the treatment, storage, or disposal of a hazardous waste (e.g., incineration ash or emission control dust).
- Are soil, ground water, or sediment (environmental media) contaminated with hazardous waste.
- Are either manufactured objects, plant or animal matter, or natural geological material (debris) containing hazardous waste that are intended for disposal (e.g., concrete, bricks, industrial equipment, rocks, and grass).

What Is not a Regulated Hazardous Waste?

The following are some of the wastes that have been excluded from RCRA hazardous waste regulations:

- Domestic sewage.
- Irrigation waters or industrial discharges allowed under the Clean Water Act.
- Nuclear material regulated by the Atomic Energy Act.
- Household wastes, even when they include hazardous materials, such as paints and pesticides.
- Certain mining and mineral processing wastes.

Typical Hazardous Wastes Generated by Selected Industries

Waste Generators	Waste Type
Chemical manufacturers	<ul style="list-style-type: none"> Strong acids and bases Reactive wastes Ignitable wastes Discarded commercial chemical products
Vehicle maintenance shops	<ul style="list-style-type: none"> Paint wastes Ignitable wastes Spent solvents Acids and bases
Printing industry	<ul style="list-style-type: none"> Photography waste with heavy metals Heavy metal solutions Waste inks Spent solvents
Paper industry	<ul style="list-style-type: none"> Ignitable wastes Corrosive wastes Ink wastes, including solvents and metals
Construction industry	<ul style="list-style-type: none"> Ignitable wastes Paint wastes Spent solvents Strong acids and bases
Cleaning agents and cosmetic manufacturing	<ul style="list-style-type: none"> Heavy metal dusts and sludges Ignitable wastes Solvents Strong acids and bases
Furniture and wood manufacturing and refinishing	<ul style="list-style-type: none"> Ignitable wastes Spent solvents Paint wastes
Metal Manufacturing	<ul style="list-style-type: none"> Paint wastes containing heavy metals Strong acids and bases Cyanide wastes Sludges containing heavy metals

All listed wastes are presumed to be hazardous regardless of the concentrations of their constituents. They must be handled according to EPA's Subtitle C hazardous waste regulations. If, however, a company can demonstrate that its specific waste is not hazardous, the waste may be "delisted." Delisted wastes are no longer subject to Subtitle C regulations.

Expanding Definitions

RCRA regulations were written so that all characteristic and listed hazardous wastes are regulated under Subtitle C. As newer technologies have become available and new multimedia (land, air, and water) modeling tools have emerged, EPA has been able to better evaluate the risks posed by different hazardous constituent concentration levels. Consequently, RCRA regulations can be refined to more closely match the risk of a waste with the appropriate management approaches. The Agency is altering its current approach to managing hazardous wastes so that some wastes will not be subject to full regulation as hazardous wastes. Some may fall out of the realm of Subtitle C requirements and will be managed as nonhazardous solid waste instead.



Subtitle C: Controlling Hazardous Waste from Generation to Disposal

EPA designed the RCRA regulations to ensure proper management of hazardous waste from the moment the waste is generated until its ultimate disposal—“cradle to grave.” This step-by-step approach monitors and controls hazardous waste at every point in the waste cycle, thereby protecting human health and the environment from the dangers of mismanagement. This approach has two key elements:

- *Tracking.* A tracking system requires each facility handling waste to obtain an identification number. Generators must prepare a uniform manifest document to accompany any transported hazardous waste from the point of generation to the point of final disposal.
- *Permitting.* EPA or the states must issue a permit to facilities before they can treat, store, and dispose of hazardous waste. The permit prescribes enforceable management standards for the wastes.

The regulated community in this system includes those who generate, recycle, transport, treat, store, and dispose of hazardous wastes.

The Regulated Community

Generators

The hazardous waste management cycle begins with a generator—any person or business that produces hazardous waste or first causes hazardous waste to become subject to RCRA regulations.

Examples of generators include owners and operators of large manufacturing facilities, small businesses, universities, and laboratories.

Under the RCRA regulations, generators are responsible for determining whether their waste is hazardous and accounting for the final disposal of their waste. Generators are regulated according to the amount of waste they produce and are categorized into three groups:

- *Large Quantity Generators (LQGs)* are those that generate the largest amount of hazardous waste—more than 2,200 pounds (1,000 kilograms) per calendar month, which is about five full 55-gallon drums. Since this category includes about 20,000 companies that produce the majority of the nation's waste, these generators are regulated more stringently than their counterparts who generate less waste. *Examples of LQGs include pharmaceutical companies and chemical manufacturers.*
- *Small Quantity Generators (SQGs)* are those that generate between 220 pounds (100 kilograms) and 2,200 pounds (1,000 kilograms) of hazardous waste per calendar month. *Examples of SQGs include laboratories, printers, and dry cleaners.*
- *Conditionally Exempt Small Quantity Generators (CESQGs)* are those that generate less than 220 pounds (100 kilograms) of hazardous waste per calendar month. Because these generators produce a small amount of hazardous waste and because full regulation would present an economic burden on businesses, CESQGs are subject to very minimal requirements. *Examples of CESQGs include 1-hour photo labs and dental offices.*

RCRA regulations apply to facilities that manage waste on site, as well as to those that ship waste off site. About 98 percent of the nation's hazardous waste is treated or disposed of by generators on site. These generators are typically large businesses that can afford treatment equipment and possess the necessary space for storage and disposal. Smaller firms, and those in crowded urban locations, are likely to transport their waste off site where it is managed by a commercial firm or a publicly owned and operated facility.

Generators that send their waste off site are required to package, mark, and label their waste properly for transportation. Proper packaging ensures that no hazardous waste will escape from containers during transport. Marking and labeling enables transporters and public officials, including those who respond to emergencies, to rapidly identify the waste and its hazards.

Hazardous Waste Minimization

Proper hazardous waste management requires a waste minimization plan. To reduce the amount or toxicity of hazardous waste that must be managed (and therefore the amount of waste subject to regulation), many generators reduce, reuse, or recycle as part of their everyday practices. The most environmentally sound and economically efficient way of managing any waste is not to generate it in the first place (source reduction). Facilities can avoid creating hazardous wastes, or limit the amount created, by not mixing hazardous and nonhazardous wastes, by changing some materials or processes, and by safely storing hazardous products and containers to avoid spills and leaks.

If hazardous wastes are generated, they often can be recycled in an environmentally sound manner. In the context of hazardous waste management, there are certain practices or activities that are defined as recycling. A recycled material is one that is used, reused, or reclaimed. For example, cleaning solvents that become dirty through use can be filtered (reclaimed) and used again instead of being disposed of. The term “waste minimization” includes source reduction and environmentally sound recycling.

Wastes that cannot be recycled must be treated to reduce the toxicity of the hazardous constituents and the ability of the constituents to move throughout the environment. Treatment residues must be disposed of in an environmentally sound manner.

Transporters

Transporters pick up properly packaged and labeled hazardous waste from generators and transport it to designated facilities that recycle, treat, store, or dispose of the waste. They must put proper symbols on the transport vehicle to identify the type of waste being transported. The U.S. Department of Transportation (DOT) jointly regulates the transportation of hazardous waste. DOT specifies the markings, labels, and packaging required to ship hazardous waste. These symbols, like the labels on the hazardous waste containers, enable firefighters, police, and other officials to identify the potential hazards immediately in case of an emergency. Because an accident involving hazardous waste could create very serious problems, EPA regulations also require transporters to comply with procedures for hazardous waste spill cleanup.

Treatment, Storage, and Disposal Facilities

Treatment, storage, and disposal facilities (TSDFs) receive hazardous waste from generators or other TSDFs. *Treatment facilities* use various processes to

Approaches to Waste Minimization

- Substitution of raw materials might offer the greatest opportunity for waste minimization. By replacing a raw material that generates a large amount of hazardous waste during its processing with one that generates little or none, manufacturers can substantially reduce their waste volume.
- Manufacturing process changes consist of either eliminating a process that produces a hazardous waste or altering a process so that it no longer produces the waste.
- Substitution of products can also be effective. For example, citrus-based solvents often can be used instead of chlorinated solvents for cleaning or coating.
- Recycling (also referred to as recovery and reuse) is the process of removing reusable elements from a waste and returning them to productive use. Generators commonly recycle solvents, acids, and metals.
- Source separation (or segregation) keeps hazardous waste from contaminating nonhazardous waste through management practices that prevent the wastes from coming into contact with each other. This is the cheapest and easiest method of reducing the volume of hazardous waste to be disposed of and is widely used by industry. In addition to reducing disposal costs, source separation reduces handling and transportation costs.

alter the character or composition of a hazardous waste. Some treatment processes enable waste to be recovered and reused in manufacturing settings, while other treatment processes reduce the volume or hazard of waste to facilitate further storage or disposal. *Storage facilities* hold hazardous waste temporarily until it is treated or disposed of. Treatment and storage activities take place in various units such as tanks, containers, incinerators, surface impoundments, containment buildings, and waste piles. *Disposal facilities* usually place hazardous waste in landfills or surface impoundments after it has been treated properly (see page 14 for more information).

One common method of treatment (and disposal) of hazardous waste is incineration, or combustion. In the United States, almost 300 facilities burn almost 4 million tons of hazardous waste in incinerators each year. Another 1 million is disposed of in other types of combustion facilities, known as boilers and industrial furnaces. These units offer an effective technology for managing much hazardous waste. The RCRA program specifically subjects these units to strict emissions controls and other requirements. In addition, all new units must receive a permit from the state or federal permitting agency to operate

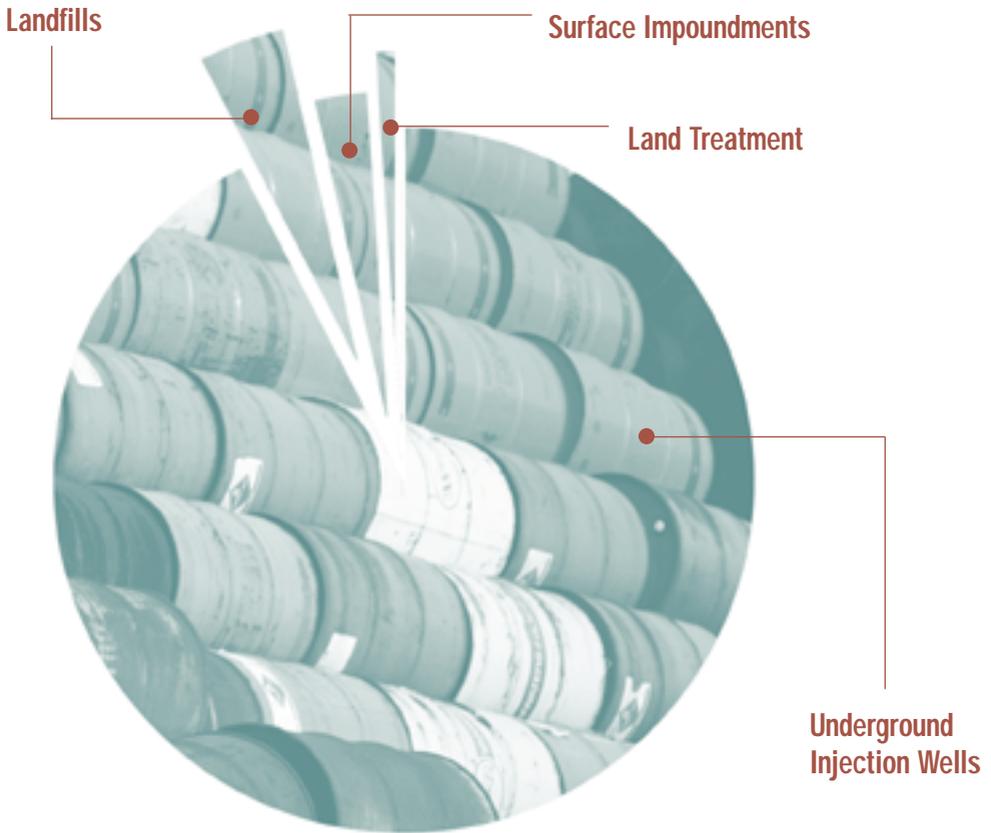
and must pass a test known as a trial burn, before operation begins to ensure that these units will not endanger human health or the environment (see page 19 on permitting). EPA continually evaluates the safety of hazardous waste combustion by examining and revising emissions standards.

Land Disposal Restrictions

About 23 million tons of hazardous waste are land disposed annually. This widespread disposal of hazardous waste in units located directly on the land has the potential to contaminate soil and ground water. To adequately protect

Types of Land Disposal

- *Landfills* are disposal facilities where hazardous waste is placed in or on land. Properly designed and operated landfills are double-lined to prevent leakage. They also are equipped with systems that collect surface water runoff (like rain) that can come in contact with waste and become contaminated.
- *Surface impoundments* are double-lined natural or fabricated depressions or diked areas that can be used to treat, store, or dispose of hazardous waste. Surface impoundments may be any shape and any size (from a few hundred square feet to hundreds of acres in area). Surface impoundments are often referred to as pits, ponds, lagoons, and basins.
- *Underground injection wells* are steel- and concrete-encased shafts into which hazardous wastes are deposited by force and under pressure. Liquid hazardous wastes are commonly disposed of in underground injection wells. Injecting wastes into encased wells deep in underground land formations protects ground-water aquifers from risk of contamination.
- *Waste piles* are noncontainerized, lined accumulations of solid, nonflowing hazardous waste. While some are used for final disposal, many waste piles are used for temporary storage until the waste is transferred to its final disposal site.
- *Land treatment* is a disposal process in which hazardous waste is applied onto or incorporated into the soil surface. Natural microbes in the soil break down or immobilize the hazardous constituents. Land treatment facilities are also called land application or land farming facilities.



In 1995, of all hazardous waste disposed of in or on the land, about 21 million tons were disposed of in underground injection wells, 1 million tons were disposed of in landfills, 575,000 tons were disposed of in surface impoundments, and 10,000 tons were disposed of by land treatment practices.

public health and safety, hazardous wastes must be treated to minimize any risks before they can be disposed of in land disposal units.

RCRA's Land Disposal Restriction (LDR) program sets treatment standards and requires that hazardous wastes be treated before they are land disposed to destroy or immobilize hazardous constituents. All hazardous waste must be

Common Hazardous Waste Treatment Technologies

Several processes exist for making hazardous wastes less hazardous:

- *Biological treatment* uses micro-organisms to break down hazardous organic compounds in a waste stream and make the waste less toxic.
- *Carbon adsorption* is a chemical process that removes hazardous substances from the waste using specially treated carbon. This method is particularly effective in removing organic compounds from liquid waste.
- *Dechlorination* removes chlorine from a substance to make it less toxic.
- *Glycolate dehalogenation* uses chemical substances to react with hazardous contaminants to change their structure and toxicity.
- *Incineration (or combustion)* destroys waste or makes it less hazardous through burning. Incineration is frequently used to destroy organic wastes.
- *Thermal treatment* uses elevated temperatures as the primary means of changing the chemical, physical, or biological character of a waste. (Examples include wet air oxidation, molten salt pyrolysis, and calcination.)
- *Neutralization* makes certain substances less acidic and other substances less alkaline.
- *Oxidation* makes a waste less toxic by combining it with oxygen.
- *Precipitation* removes solids from a liquid waste so that the hazardous solid portion can be disposed of safely.
- *Soil washing* uses water or a washing solution in mechanical processes to scrub soils and remove hazardous contaminants.
- *Solidification and stabilization* removes wastewater from a waste or changes it chemically, making it less likely to be transported by water.
- *Solvent extraction* separates hazardous constituents from oily wastes, oils, sludges, and sediments to reduce the volume of waste that must be disposed of.



treated so that the concentration of hazardous constituents is below a certain level established for each waste. There are numerous treatment technologies available and new ones continually being developed (see box on page 16).

Used Oil Management Standards

EPA has established a set of required practices, or management standards, for recycling used oil and burning it for energy recovery. These are common-sense, good-business practices designed to maximize recycling and minimize disposal of used oil, as well as to ensure its safe handling. Used oil comes from automotive crankcases, machine lubricants, and industrial processes. During normal use, impurities, such as dirt, metal scrapings, water, or chemicals, can get mixed in with the oil so that in time the oil no longer performs well. Eventually, this oil must be replaced with virgin or re-refined oil to do the job at hand. Then, used oil must be either disposed of, recycled, or burned for energy recovery.

Used oil can be treated to remove hazardous contaminants and reused as a new lubricating oil or as a fuel. An estimated 380 million gallons of used oil are recycled each year. It takes 42 gallons of crude oil, but only 1 gallon of used oil, to produce 2-1/2 quarts of new, high-quality lubricating oil.

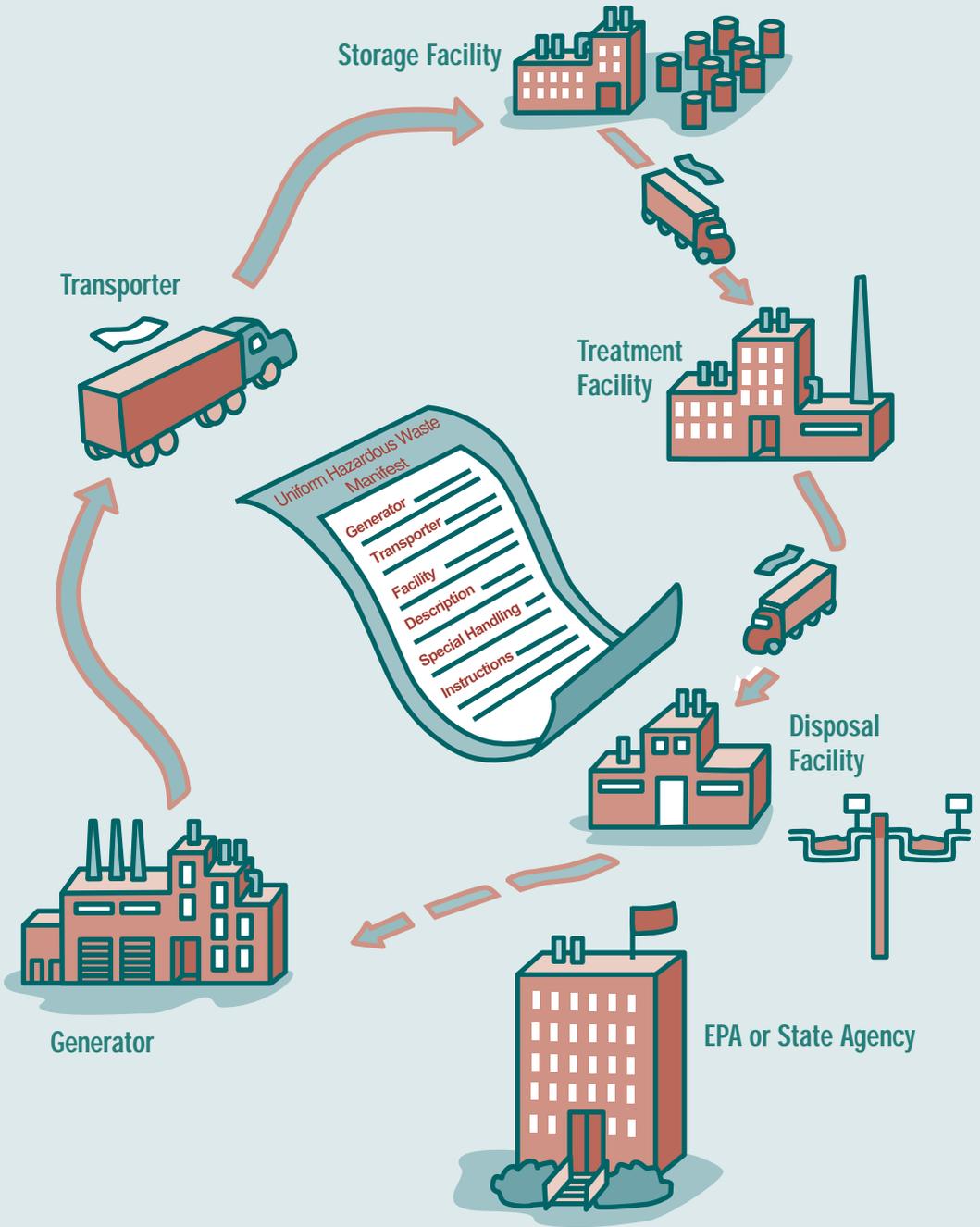
The used oil management system is designed to minimize the potential risks associated with used oil. These standards impose requirements on used oil generators, collection centers, transporters, and processors. The used oil program also imposes standards on used oil burners and marketers to ensure that the burning of used oil for energy recovery is conducted in a manner that is protective of the environment. For example, used oil destined for burning must be tested for hazardous contaminants and burned in units that can control hazardous air emissions. Used oil generators also can burn used oil in space heaters used at their place of business.

The RCRA Structure

The Tracking System

To assist in tracking shipments of waste, EPA requires LQGs, SQGs, transporters, and TSDFs to obtain EPA identification numbers. LQGs and SQGs must also prepare Uniform Hazardous Waste Manifests for each shipment of hazardous waste. A manifest is a form containing copies for all participants involved in the waste shipment. It identifies the type and quantity of waste and the gener-

A manifest must accompany every waste shipment. The resulting paper trail documents the waste's progress through treatment, storage, and disposal. A missing form alerts the generator to investigate, which may mean calling in the state agency or EPA.



ator, transporter, and facility to which the waste is being shipped. Generators must also certify on the manifest that they are minimizing the amount and toxicity of their waste and that the method of treatment, storage, or disposal they have chosen will minimize the risk to human health and the environment. When the waste reaches its final destination, the owner of that facility returns a copy of the manifest to the generator to confirm that the waste has arrived.

A hazardous waste manifest must accompany every waste shipment. The resulting documentation tracks the waste's progress to TSDFs. A missing form alerts the generator to investigate, which may mean calling the state agency or EPA.

If the waste does not arrive as scheduled, generators must immediately notify EPA or the authorized state agency so that it can investigate and take appropriate action. Generators, transporters, and TSDFs must retain copies of the manifest for 3 years. Every other year, generators also must provide information on their activities to their authorized state agency or EPA.

The Permitting System

Owners or operators of TSDFs must obtain a permit in order to operate. A permit specifically allows a facility to treat, store, or dispose of hazardous waste and outlines the precautions that must be taken to manage the waste in a manner that adequately protects human health and the environment.

New TSDFs must receive a permit before they begin construction. *Operating TSDFs* with expiring permits must submit new permit applications 6 months before their existing permits run out. *TSDFs operating under interim status* must also apply for a permit. Congress granted interim status to facilities that already existed when RCRA was enacted or that were already operating when new wastes were listed. Interim status allows facilities to continue operating while their permit applications are being reviewed by the federal or state permitting agency. While both permitted and interim status TSDFs are subject to similar standards, the interim status standards are designed to be self-implementing. Generally, permitted and interim status TSDFs must:

- Analyze and identify wastes prior to treatment, storage, and disposal.
- Prevent the entry of unauthorized personnel into the facility by installing fences and surveillance systems, and by posting warning signs.
- Inspect the facility on a periodic basis to determine if there are any problems.
- Train employees in safe use of equipment and emergency response procedures.

- Prepare a contingency plan for emergencies and establish other emergency response procedures.
- Comply with the manifest system and with various reporting and record-keeping requirements.
- Comply with facility-specific standards as dictated in the permit.

In addition to these general requirements, all TSDFs must comply with specific design and operating standards for their hazardous waste treatment, storage, and disposal units. These standards are especially important for disposal units, which must ensure that disposed waste will not leach or otherwise escape into soil or ground water. Disposal unit standards:

- Ban liquids from landfills.
- Ban underground injection of hazardous waste within 1/4-mile of a drinking water well.
- Require stringent structural and design conditions, such as double liners, leachate collection systems, and ground-water monitoring.
- Limit facility sitings in unstable hydrogeologic areas.

EPA also established regulations to address air emissions from hazardous waste disposal since some hazardous waste compounds can evaporate into the air. To prevent such escapes into the atmosphere, EPA requires certain equipment to be used for recycling, treatment, storage, and disposal of some hazardous wastes.

Closure and Financial Assurance

RCRA regulations and permits set forth certain procedures that are designed to protect the environment and surrounding communities when owners and operators of hazardous waste facilities close their sites. In addition, RCRA sets standards for ground-water monitoring, disposal unit maintenance, and security measures that some owners and operators of hazardous waste facilities will need to follow for up to 30 years after the facility closes (known as postclosure care).

Closure activities can be expensive, and some facilities might not be able to cover these costs at the time of closure. For example, if a company undergoes bankruptcy and has little money left at the time of the closure of its TSDF, it might not be able to provide the required closure and postclosure care. To address this situation, RCRA regulations require owners and operators to:

- Establish separate, secure financial assurance mechanisms (such as trust funds, surety bonds, and letters of credit) to pay for completion of all closure and postclosure operations.
- Be prepared to pay for 30 years of ground-water monitoring, disposal unit maintenance, and security measures after the facility closes.
- Demonstrate financial assurance for third-party liability to cover any accidents or mismanagement that results in the release of hazardous waste. Such funds can be used to compensate citizens or other third parties for any damage to neighboring property or injury to human health.

State Authorization

The hazardous waste regulatory program described in this document may be run by EPA or a state hazardous waste agency. Currently 47 states and two territories have been granted authority to run Subtitle C RCRA programs. As EPA continues to promulgate new or revised rules, states must become authorized to implement those rules. Thus, state authorization is an ongoing process.

EPA's regional offices implement and enforce RCRA in states and territories that do not have authorized programs. In states that are authorized, EPA can step in to assist states in enforcing the law, if needed. Otherwise, states that are authorized to operate RCRA programs oversee the hazardous waste tracking system in their state, operate the permitting system for hazardous waste facilities, ensure public participation requirements are met, act as the enforcement arm in cases where individuals or companies practice illegal hazardous waste management, and implement all other aspects of the RCRA program.

In terms of permitting hazardous waste facilities, authorized states are generally considered to be the "permitting agency."

Citizen Action and Public Participation

The public plays an important role in the permitting process for both hazardous and municipal solid waste facilities. Facilities applying for a permit must involve the public in some aspects of the process. Businesses and the state or federal permitting agency also must make information available to the public. The public has opportunities to submit comments and request public hearings. The following are some of the ways in which the public can stay involved:

- When a business submits a permit application, it must hold an informal meeting with the public and advertise the meeting with signs and/or advertisements in the paper or radio. The business must explain the plans for the facility, including information about the proposed processes it will use and wastes it will handle. Members of the public can sign up on the facility's mailing list.
- When the permitting agency receives a permit application from the business, it sends a notice to everyone on the mailing list. The application is then available for public review.
- The permitting agency may require the business to set up a library for the public with available relevant documents, such as the permit application and reports.
- The permitting agency announces its decision about granting or denying the permit by sending a letter to everyone on the mailing list and placing a notice in a newspaper or broadcasting over the radio. It also issues a fact sheet to explain the decision. Once the notice is issued, the public has 45 days to comment on the decision. Citizens may request a public hearing by contacting the permitting agency.
- The permitting agency must consider and respond to all public comments when making its decision.
- The public has the right to appeal the final permit decision.

- The permitting agency must notify the public prior to a trial burn at a combustion facility by sending a notice to everyone on the facility mailing list.

Cleaning up hazardous waste facilities, known as corrective action, is also of concern to citizens and local communities. Since spills from TSDFs can affect entire municipalities, RCRA guarantees that the public will have a role in the facility cleanup process. For example, the corrective action process gives the public access to facility inspection information, requires public notice of remediation proceedings, and allows the opportunity for public comment and participation in the remedy selection process.

Public participation initiatives are also used to remedy the disproportionate effects of environmental pollution on particular groups, such as minority and low-income populations. For example, through efforts to ensure environmental justice, EPA is analyzing how to incorporate public participation into decisions concerning the siting of hazardous waste facilities and the prioritization of corrective action cleanups.

More Ways to Participate

Many avenues exist for citizens to learn about and participate in what is happening around them, in addition to those offered under the RCRA program. A related law, known as the Emergency Planning and Community Right-to-Know Act, establishes a citizen's right to obtain information about toxic and hazardous chemicals handled at facilities in the community. One such avenue is the Toxics Release Inventory (TRI). Through this program, facilities across the country are required to report the quantities of 643 different toxic chemicals that are released into the environment each year. Facilities must report whether these toxic chemicals were released into the air or water or disposed of in underground injection wells or landfills. Facilities also have to indicate which releases were sent to a commercial Subtitle C landfill.

