

CHAPTER 2

HAZARDOUS WASTE RECYCLING AND UNIVERSAL WASTES

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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

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.

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.

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 TSD 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**.

<u>Parameter</u>	<u>Allowable Level</u>
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

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- Hazardous waste thermostats
- Hazardous waste lamps.

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