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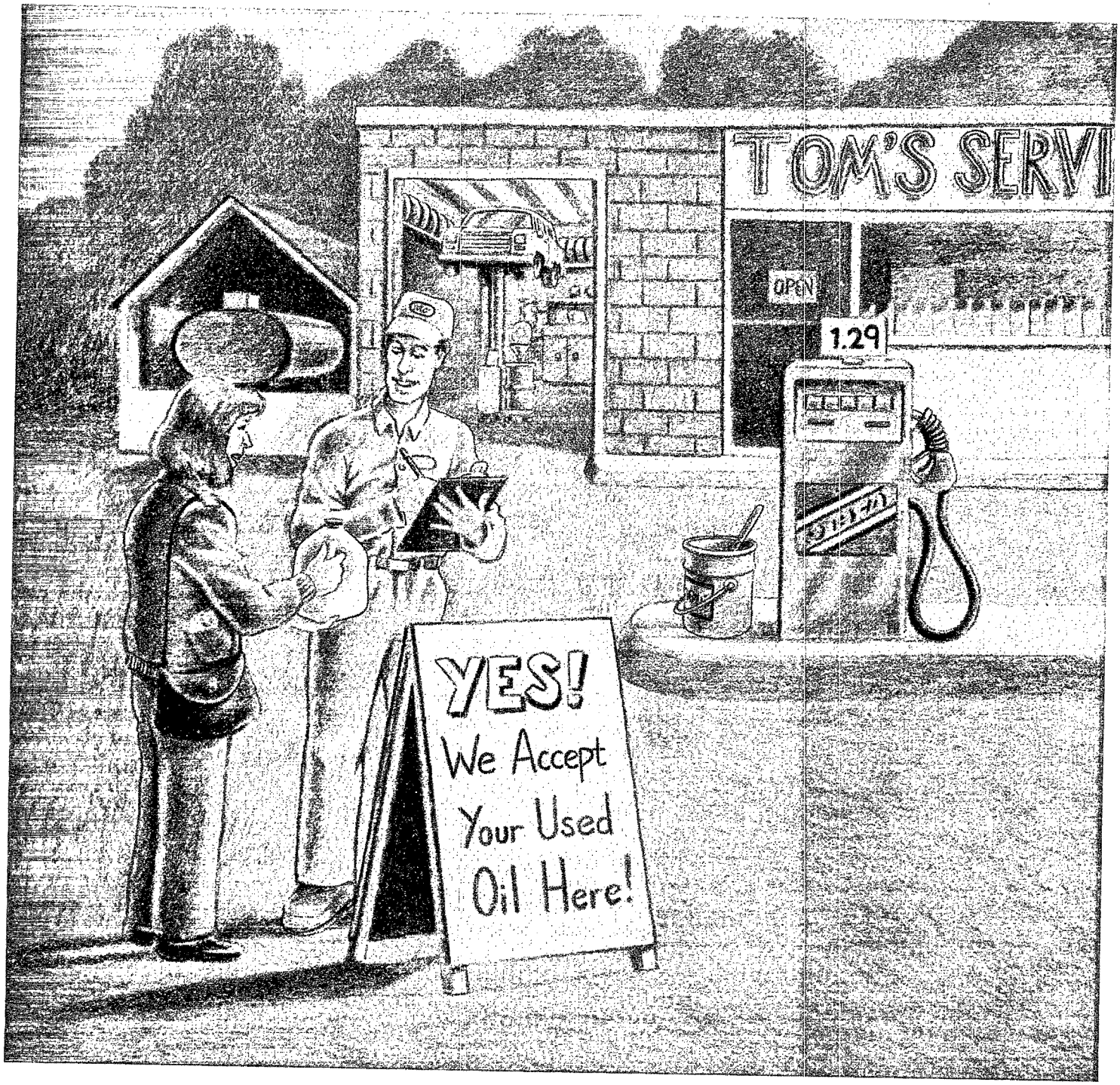
Environmental Regulations and Technology

Managing Used Motor Oil



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Managing Used Motor Oil

Center for Environmental Research Information
Office of Research and Development
U.S. Environmental Protection Agency
Cincinnati, OH 45268

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Notice

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Author

Anne Donovan of Eastern Research Group, Inc., Lexington, MA, was the principal author of this document.

Technical Contributors

The following individuals provided invaluable technical assistance during the development of this document:

Rob Arner, Private Consultant, Edinburg, VA

Mike Barrette, U.S. EPA, Office of Compliance, Washington, DC

Diane Bartosh, U.S. EPA, Office of Solid Waste, Washington, DC

Janet Graham, Private Consultant, Tuscaloosa, AL

Don Grant, U.S. EPA, Region I, Lexington, MA

Bill Lienesch, U.S. EPA, Office of Compliance, Washington, DC

Mike Petruska, U.S. EPA, Office of Solid Waste, Washington, DC

Eydie Pines, U.S. EPA, Office of Solid Waste, Washington, DC

Michaelle Wilson, U.S. EPA, Office of Solid Waste, Washington, DC

Peer Reviewers

The following individuals peer reviewed this document:

Raoul Clarke and Rick Neves, Florida Department of Environmental Protection, Tallahassee, FL

Tony Puckett, Valvoline Environmental Services, Lexington, KY

Bernie Snyder, Eastern Oil Company, Alexandria, VA

Editorial Reviewer and Document Production

Heidi Schultz, Eastern Research Group, Inc., Lexington, MA, directed the editorial review and production of this document.

Technical Direction and Coordination

Daniel Murray, U.S. EPA, Office of Research and Development, Center for Environmental Research Information, Cincinnati, OH, coordinated the preparation of this document and provided technical direction throughout its development.

Chapter 1

Introduction

If managed properly, used oil is a valuable resource that can be reused as a base stock for new lubricating oil or as a fuel. If managed improperly, however, used oil can threaten people's health, damage the environment, and cause the generator and subsequent handlers of the used oil to be held liable for the costs of environmental cleanup. When managing used oil, therefore, knowing the responsibilities involved and the proper management practices to use is important.

This document provides information on how to manage used oil properly. In each chapter, a different aspect of used oil management is considered. This chapter discusses the purpose of this document, defines and describes used oil, and emphasizes the importance of proper used oil management practices. In addition, a chapter-by-chapter overview of the rest of the document is given.

Who Is This Document Written For?

This document is written for people who own or work at businesses or other facilities that generate used oil by changing the motor oil from automobile or truck crankcases, or by collecting used motor oil from do-it-yourselfers (DIYs). These businesses and facilities include:

- **Service Stations**–Businesses that both sell gasoline and other car maintenance products (such as oil, anti-freeze, and windshield wiper blades) and repair and service automobiles and trucks for their customers. Service stations generate used oil from the oil changes they perform for their customers. Some service stations also collect used oil from DIYs. Although service stations generate other fluids, such as hydraulic oils, that are considered used oil by federal used oil regulations, used motor oil from car and truck crankcases is the focus of this document.

- **Quick-Lube Shops**–Businesses that only change oil and other automotive fluids for their customers. Quick-lube shops generate used oil from these oil changes and, like service stations, some quick-lube shops collect used oil from DIYs. Quick-lube shops also generate other fluids that are considered used oil by federal used oil regulations, but these oils are not the focus of this document.

- **Fleet Operations**–Businesses or government agencies that own or operate fleets of automobiles or trucks. Fleet operations generate used oil when they change the oil in their own vehicles. Fleet operations also generate other used oils besides used oil from car and truck crankcases.

- **DIY Used Oil Collection Centers**–Places that collect used oil only from DIYs so that it can be properly managed. These collection centers are usually owned and operated by state or local governments or volunteer groups, and are not involved with vehicle maintenance. Although some DIY used oil collection centers collect other used oils, such as lawn mower oil and hydraulic oil, they focus on collecting used oil from car and truck crankcases.

- **Retailers**–Businesses that sell motor oil and accept DIY used oil for recycling. In some states, retailers of motor oil

Key Terms

Do-It-Yourselfer (DIY)	Also called a household do-it-yourselfer used oil generator in the federal used oil regulations, this is a person who changes the motor oil in his/her cars, trucks, or other vehicles and equipment, such as tractors and lawn mowers. For the purpose of this document, however, only DIY used oil from car and truck crankcases is discussed.
Engine Blowby	The leaking of exhaust gases from engine combustion through the piston rings and into the motor oil. Engine blowby causes the oil to be contaminated with gasoline and gasoline combustion products, such as benzene and lead.
Parts per Million (ppm)	A unit of measure that shows the concentration of a particular substance in a mixture. It gives the ratio of the number of parts of the substance being measured to every million parts of the mixture the substance is in.
Used Oil	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. For the purpose of this document, however, the term "used oil" means motor oil that has been removed from the crankcase of an automobile or truck (unless otherwise indicated).
Used Oil Generator	Any person, business, or facility that conducts activities that produce used oil. The definition of generator in federal used oil regulations does not include farmers that generate 25 gallons or less of used oil per month and DIYs. When the term generator is used in a discussion of federal regulations in this document, therefore, farmers that generate 25 gallons or less of used oil each month and DIYs are not included in the definition.

are required to accept used oil from people who buy motor oil at their establishments. Many retailers also voluntarily provide this service to their customers. Retailers focus on collecting DIY used oil that has been drained from car and truck crankcases.

What Is the Purpose of This Document?

The purpose of this document is to help used motor oil generators properly manage their used oil. The document gives detailed information on how to meet regulatory requirements, particularly those in the Used Oil Management Standards, which were finalized by the U.S. Environmental Protection Agency (EPA) in September, 1992 (U.S. EPA, 1992c). The first step to ensuring that used oil is managed properly is to follow these regulatory requirements. The document also gives specific advice on how generators of used motor oil can best protect human health and the environment from the time the used oil is generated to the time it is recycled.

What Is Used Oil?

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" (U.S. EPA, 1992c). This includes oils that are used as hydraulic fluid as well as oils that are used to lubricate automobiles and other machinery, cool engines, or suspend materials in industrial processes. Oils used for these purposes can become contaminated with physical materials (such as metal particles from engine wear) or chemical contaminants (such as gasoline combustion products, like toluene).

The type of used oil most commonly managed by service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers is lubricating oil that is removed from the crankcases of automobiles and trucks. When the term "used oil" is used in this document, it refers to motor oil that has been contaminated through use and has consequently been removed from a car or truck crankcase, unless otherwise noted.

The properties of motor oil change during use for four main reasons (Byrne, et al., 1989; Mueller Associates, 1989; U.S. EPA, 1984b):

- Engine heat can break down additives and other constituents in the oil. This process can produce acids and other substances that contaminate the oil.
- Dirt, dust, and rust can get into the crankcase and into the oil. Particles of metal dust from the engine also can contaminate oil directly.

- Exhaust gases from combustion in the engine can leak through the engine's piston rings and into the oil. This "engine blowby" contaminates the oil with gasoline and gasoline combustion products.
- Fluids, such as water and antifreeze, can leak into the oil during engine operation.

Because of the changes that occur through use, used motor oil tends to differ from virgin motor oil in several ways. Most importantly, used motor oil has (Mueller Associates, 1989):

- Much higher water and sediment levels than virgin oil.
- Relatively high levels of polynuclear aromatics, such as benzo(a)pyrene.
- Relatively high levels of metals, such as aluminum and lead.

Table 1-1 compares some of the constituents found in used motor oil from automobile and diesel truck crankcases to the constituents in virgin oil. The table shows the levels and types of contaminants that can enter motor oil through use.

On May 20, 1992, EPA published its decision that used oil destined for disposal is not a listed hazardous waste, which means that used oil is not automatically considered a hazardous waste when it is disposed. EPA based this decision on the fact that federal regulations protect human health and the environment from disposal of used oil. Federal regulations mandate that used oil must be tested, or other procedures must be used, to determine if the used oil is hazardous before it is disposed. If testing or other procedures determine that the oil is hazardous, it must be disposed of as a hazardous waste under Subtitle C of the Resource Conservation and Recovery Act (RCRA), which governs the disposal of hazardous wastes. If the used oil is not hazardous, it must be disposed of under other federal regulations, such as RCRA Subtitle D. In either case, the regulatory requirements are designed to prevent used oil from endangering human health and the environment through disposal.

In addition, on September 10, 1992, EPA published its decision not to list used oils destined for recycling as a hazardous waste. EPA determined that used oils that are properly managed and recycled do not significantly threaten human health or the environment. Because EPA's Used Oil Management Standards require used oil to be managed in an environmentally safe manner, listing used oil that is to be recycled as a hazardous waste is unnecessary (U.S. EPA, 1992c).

As a result of these EPA decisions, used motor oil that is to be recycled generally is not considered a hazardous waste by the federal government unless the oil has been mixed with a listed hazardous waste, such as tetrachloroethylene and other degreasing solvents, or has been mixed with a characteristic hazardous waste, and the resultant mixture exhibits the characteristics of a hazardous waste. The used oils handled by service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers, therefore, generally must only be treated as hazardous wastes if they have been managed improperly. Because used oil mixed with hazardous waste increases risks to human health and the environment, and costs significantly more to manage properly than normal used oil, keeping used oil from becoming contaminated with hazardous wastes is very important. As

Table 1-1. **Potentially Harmful Constituents in Used Oil Vs. Virgin Motor Oil**

Constituent	Used Oil from Automobile Crankcases (range in parts per million or ppm)[a]	Used Oil from Diesel Truck Crankcases (range in ppm)[a]	Virgin Lubricating Oils (range in ppm)[b]
Cadmium	0.5-3.4	0.7-3	0
Chromium	0.8-23	1.8-7.1	0
Lead	5.5-150	2.9-19	0-3
Benzo(a)pyrene	25-86	2.0	0.03-0.28

[a]U.S. EPA, 1991
[b]U.S. EPA, 1984b

is discussed throughout this document, to help prevent used oil from becoming a hazardous waste—the safest practice is to *never* mix any other wastes with used oil.

It is important to note that even though federal regulations do not list used oil as a hazardous waste, many *states* regulate used oil as a hazardous waste and, therefore, have more stringent requirements for management and disposal of used oil than the federal government. State regulations pertaining to used oil are discussed in Chapter 3.

Why Must Used Oil Be Managed Properly?

Properly managing used oil is important for four main reasons:

- To protect the environment.
- To protect human health.
- To protect against liability for environmental damages.
- To reuse, rather than waste, a valuable resource.

Protecting the Environment

Even used oil that is not classified as a hazardous waste under RCRA can have harmful effects if it is released into the environment. Consequently, used oil must be managed properly to ensure that it is not released into the water, air, or soil.

The Truth About the Consequences of Releasing Used Oil to the Environment

- Just one gallon of used oil (the oil from a single oil change) can make a million gallons of fresh water undrinkable. A million gallons of fresh water could supply the water needs of 50 people for an entire year!
- When used oil is dumped down the drain and enters a sewage treatment plant, very small concentrations of oil in the wastewater (just 50 to 100 ppm) can foul sewage treatment processes.
- A film of used oil on a water surface prevents oxygen from entering the water and blocks sunlight. This makes it difficult for plants to photosynthesize and reduces plant and animal life in a water body.
- Significant long-term effects have been caused in freshwater fish species in water with concentrations of oil of 310 ppm, and in marine life forms at concentrations of oil of only 1 ppm!

Source: U.S. EPA, 1989b

Water, air, and soil are all connected—and substances, such as used oil, that are released to any of these environmental media can make their way to the others. This is why improper management of used oil is such a major environmental concern (Mueller Associates, 1989). Used oil that is dumped onto soil can be washed into surface water by rain or snow, or can seep through the soil into ground water. Used oil in the soil can also evaporate into the air. Contaminants in used oil that enter the air through evaporation or improper burning can settle, or be washed by rain or melting snow, into surface water or onto soil. Clearly, the only way to be sure that used oil will not contaminate water, air, or soil is to make sure that it is not released to the environment at all.

Protecting Human Health

People's health can be affected if used oil is handled improperly. Most used oil contains small amounts of materials that can cause cancer and other health problems if these materials are inhaled or ingested (Mueller Associates, 1989). Contaminants in used oil can be inhaled when the oil is burned without using proper management practices or environmental protection devices. For example, burning used oil in a space heater that is not vented to the outdoors can expose people directly to toxic contaminants released during burning (U.S. EPA, 1984a). In addition, toxic contaminants can be released if the used oil is burned in devices that do not burn hot enough or consistently enough to destroy organic chemicals.

Used oil, or contaminants in the oil, can be ingested if they get into drinking water sources and are not detected and removed. Common ways used oil or its contaminants get into drinking water sources are when the oil is dumped down storm drains and runs into surface water or is poured on the ground and washes into ground water or surface water.

Protecting Against Liability

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) was passed in 1980 (and amended in 1986) to help finance the cleanup of sites contaminated with hazardous wastes. CERCLA, also known as Superfund, allows the federal government to hold any party that created or contributed to the creation of a hazardous waste site financially responsible for cleanup costs. Under CERCLA, service stations, quick-lube shops, fleet operations, DIY collection centers, or retailers, that manage used oil improperly, or give their used oil to a

transporter or recycler that manages it improperly, can be forced to pay large sums to clean up the resulting environmental damage.

CERCLA has very strong enforcement provisions, and allows the federal government to use strict liability on a "joint and several" basis. This means that any generator that sends a hazardous substance to a facility that ultimately becomes a hazardous waste site can be forced to pay the entire cost of cleaning up that site, even if other generators are responsible for sending most of the hazardous waste to that site. In most cases, the generator is only required to pay a portion of the cleanup cost that is consistent with the amount of material the generator has contributed to the site (Nolan et al., 1990). Partial costs of cleaning up a hazardous waste site can still be staggering, however, and being forced to pay the entire cleanup costs is always a possibility.

Also under CERCLA, the generator can be held liable for cleanup costs even if the substance generated is not considered a hazardous waste, as long as that substance contains materials that are listed as hazardous substances under CERCLA. As discussed above, even though used oil generally is not considered a hazardous waste by the federal government, most used oils contain constituents that are considered hazardous (Nolan et al., 1990). Consequently, used oil generators are not guaranteed to be exempt from CERCLA liability simply because EPA has decided not to list used oil as a hazardous waste.

Finally, the generator cannot avoid CERCLA liability by claiming that a contract was made with another party to properly manage the substance. Unless the release of the hazardous substance was caused by "an act of war, an act of God, or an act of omission of a third party who is not directly or indirectly involved in a contractual relationship" with the generator, the generator can be held liable for cleanup costs under CERCLA (Nolan et al., 1990). Again, used oil generators cannot simply escape CERCLA liability by hiring someone to transport and recycle their used oil.

Along with CERCLA liability, waste generators can be held liable under RCRA for costs of cleaning up a spill that poses "imminent and substantial endangerments to health or the environment" (Nolan et al., 1990). RCRA liability is likely to apply to used oil, unless courts rule that used oil is not a waste but a valuable product that can be recycled. As with CERCLA liability, because RCRA liability costs are so high, extreme care should be taken to manage used oil properly to reduce any chances of being held liable for environmental cleanup costs.

To avoid the risk of liability, service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers should be sure to manage used oil in a way that will not harm the environment. In addition, CERCLA contains a "service station dealers" exemption, which is discussed in detail in Chapter 3. Through this exemption, service stations, quick-lube shops, and government-run DIY collection centers that accept DIY used oil for recycling and comply with EPA's Used Oil Management Standards, cannot be held liable under CERCLA if transporters or recyclers mishandle their used oil. The service station dealers exemption gives service stations and quick-lube shops an important economic incentive to accept DIY used oil. As a result of the exemption, more collection sites will be available for DIY used oil, which should help reduce the problem of improper DIY used oil management.

Reusing a Valuable Resource

Used oil is a valuable resource because it has *lubrication value* and *heat value*. Although motor oil becomes contaminated during use with materials that reduce its ability to adequately lubricate engine parts, it still maintains its basic lubricating properties. When specially treated to remove contaminants, the used oil can be used as a base stock to produce new lubricating oil. This keeps the lubricating value of the used oil from being wasted. In addition, reusing the used oil as a base stock for lubricating oil saves the virgin oil that would otherwise be used as the lubricating oil base stock.

Because used oil has heat value, it can be burned as fuel. Burning the used oil keeps its heat value from being wasted and saves the virgin heating oil that would be burned instead. Proper burning procedures and equipment must be used, however, to reduce risks to people's health and the environment. Because virgin oil is a limited resource, properly managing used oil so that its lubrication and heat value is not wasted is very important.

Chapter-by-Chapter Overview of the Document

The rest of this document gives specific information to help service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers properly handle the used oil that they generate. *Chapter 2* is an overview of the entire used oil management system. The chapter defines the key groups in the used oil management system, and describes in detail each group's typical management practices. The

quantity of used oil generated and handled by each major group in the management system, and the flow of used oil among these groups, also is considered. The chapter briefly discusses acceptable ways that used oil can be recycled within the used oil management system. Finally, the effect that the price of virgin oil has on the used oil management system is considered.

Federal regulations, particularly EPA's Used Oil Management Standards, are discussed in detail in *Chapter 3*. The chapter also discusses federal regulations concerning the rest of the used oil management system. In addition, state regulations are briefly considered.

Chapter 4 presents advice on how to select a recycling option for used oil. The chapter explains in detail the different recycling options within the used oil management system, and gives tips on how to choose a reputable recycling operation. Information on how to properly dispose of used oils that cannot be recycled also is provided.

Chapter 5 includes information on transporting used oil to recycling facilities or disposal sites. It describes typical used oil transportation operations. Finally, the chapter gives tips on how to select and work with a used oil transporter.

Chapter 6 is a guide to properly managing used oil on site. It describes procedures for collecting used oil from DIYs and determining if this oil has been mixed with hazardous wastes. The chapter also provides guidelines for storing used oil on site and burning used oil in space heaters. Finally, the chapter describes proper procedures for responding to releases of used oil to the environment and developing emergency plans.

Chapter 7 provides information on the management of used oil filters. It describes proper methods for draining, storing, recycling, and disposing of used oil filters. *Chapter 8* lists references on used oil management.

Appendix A provides sources of additional information. The section describes telephone hotlines on subjects related to used oil management and provides their telephone numbers. Trade associations working on used-oil related topics are also described, and their telephone numbers and addresses are given. The section lists state and EPA contacts that can provide more information on regulations and used oil management. Finally, Appendix A describes useful publications on used oil management, and gives information on how these publications can be obtained.

Appendix B summarizes the Resource Conservation and Recovery Act (RCRA) regulations that apply to the disposal of used oil, materials containing or otherwise contaminated with used oil, and used oil filters. The disposal of both hazardous and nonhazardous wastes is considered.

The Underground Storage Tank Regulations, from Subtitle I of RCRA, are summarized in *Appendix C*. These regulatory requirements apply to service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers that own or operate certain underground storage tanks.

Appendix D covers the Spill Prevention Control and Countermeasures requirements from the Oil Pollution Act, which is part of the Clean Water Act. Under these regulatory requirements, most used oil generators must develop a plan to prevent the release of used oil into surface water bodies.

Appendix E includes the requirements that must be met by used oil generators and transporters under the U.S. Department of Transportation's Hazardous Materials Transportation Act regulations. Special packaging and transportation requirements apply to used oil that is considered a hazardous material under these regulations.

Chapter 2

The Used Oil Management System

The used oil management system is composed of the individuals, businesses, and government entities that participate in the recycling of used oil. This includes those who generate, transport, or recycle used oil, as well as those who burn recycled used oil for fuel. This chapter defines and describes the key groups in the used oil management system. The quantity of used oil generated and handled and the typical management practices used by each group are discussed. In addition, the flow of used oil from one key group to another is outlined. This chapter also addresses the most common ways that used oil can be properly recycled within the used oil management system and the effect that the price of virgin oil has on used oil management.

Because this document is targeted toward service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers, the term "used oil" generally refers to motor oil that has been drained from automobile or truck crankcases. In this chapter, however, the broader definition from EPA's Used Oil Management Standards is used, so that the entire used oil management system can be characterized. So, throughout this chapter, 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 Key Groups in the Used Oil Management System

In the past, the participants in the used oil management system have not always been clearly defined, largely because of the overlap that exists among generators, transporters, and recyclers of used oil. For instance, many businesses that process used oil for use as fuel also transport used oil from the generator to the processing facility. This lack of clear definition can cause confusion, because different terms are used to mean the same thing—and sometimes, the same term can have different meanings, depending on who is using it.

This publication attempts to avoid confusion by defining the key groups in the used oil management system based on definitions given in the Used Oil Management Standards, which were published by the U.S. Environmental Protection Agency in 1992 (U.S. EPA, 1992c).

- **Generator**—Any person, business, or facility that conducts activities that produce used oil. Generators of used oil can be broken down into DIYs, automotive sources, and industrial sources. The definition of generator used in EPA's Used Oil Management Standards does not include farmers that generate 25 gallons or less of used oil per month and DIYs. Data given in this chapter for generators, however, include these DIYs and farmers, unless otherwise noted.

- **Collection Center**—A site or facility that is recognized by the state or local government and that accepts used oil from DIYs or other used oil generators in quantities of less than 55 gallons.

- **DIY Collection Center**—A site or facility that only accepts used oil from DIYs.

Key Terms

Automotive Sources of Used Oil	Businesses or facilities that generate used oil from changing the oil in automobiles and trucks, such as service stations, quick-lube shops, and fleet operations.
Halogens	Organic compounds that contain chlorine, fluorine, bromine, and/or iodine.
Industrial Sources of Used Oil	Facilities that generate used oil through manufacturing, production, or other industrial processes.
Road Oiling	The practice of spreading used oil on dirt roads to suppress dust.
Specification Used Oil	Used oil that has less than or equal to 5 ppm arsenic, 2 ppm cadmium, 10 ppm chromium, 100 ppm lead, 4,000 ppm total halogens, and that has a flash point of 100°F or more. Under EPA's Used Oil Management Standards, the burning of used oil that does not meet these specifications (i.e., off-specification used oil) is restricted.

• **Transporter**–Any person, business, or government agency that hauls used oil in quantities greater than 55 gallons. Most used oil transporters collect used oil from generators and haul it to burners, processors, or rerefiners.

• **Transfer Facility**–Any transportation-related site (such as a loading dock or parking lot) where shipments of used oil are held for more than 24 hours and less than 35 days.

• **Processor**–A facility that uses chemical or physical operations (such as blending different quality used oils, filtering out solid contaminants, or heating used oil to evaporate water) to produce fuel oil from used oil.

• **Rerefiner**–A facility that uses chemical or physical operations to remove impurities from used oil so that it can be used as a base stock for lubricating oil.

• **Burner**–An individual or facility that burns used oil for fuel, or to dispose of the used oil. Under EPA's Used Oil Management Standards, burners are defined as facilities that burn off-specification used oil in industrial furnaces, industrial boilers, utility boilers, or hazardous waste incinerators. This definition of burner does not include people or facilities that burn specification used oils. In addition, generators who burn used oil in used-oil fired space heaters are not covered by the burner requirements in the management standards, as long as they meet certain other requirements, such as generating the used oil themselves or collecting it from DIYs. Data given for burners in this chapter, however, include burners of specification used oils, as well as generators who burn used oil in used-oil fired space heaters.

• **Marketer**–Any person or business that either: (1) first determines that used oil meets EPA's burning specifications, or (2) directs a shipment of off-specification used oil from their facility to a used oil burner.

Clearly, a large number of different groups participate in the used oil management system. In general, these groups can be broken down into the following four categories:

- Those that introduce used oil into the used oil management system, which includes automotive generators, industrial generators, and DIY collection centers.
- Those that carry used oil from those that introduce the used oil into the management system to those who recycle the used oil, which includes transporters and transfer facilities.
- Those that treat used oil so that it can be used again, which includes processors and rerefiners.
- Those that burn used oil.

DIYS and Used Oil Management

DIYs are considered household waste generators, and as such, are not covered under federal regulations, such as EPA's Used Oil Management Standards and RCRA. Consequently, DIY used oil is only introduced into the used oil management system when it is brought to a used oil collection center, a service station, a quick-lube shop, or a retailer.

Even though each individual DIY generates only a small quantity of oil, the total quantity of used oil generated by all DIYs is large. In 1991, for instance, DIYs generated an estimated 210 million gallons of used oil (Vorhees, 1992). Bringing DIY used oil into the system, therefore, is an important goal. The efforts of DIY collection centers, service stations, quick-lube shops, and retailers are necessary to help make this goal a reality.

The Flow of Used Oil Through the Used Oil Management System

In 1991, an estimated 1.378 billion gallons of used oil were generated in the United States (Vorhees, 1992). Figure 2-1 shows the quantity of used oil that was generated by DIYs, other automotive sources, and industrial sources. As Figure 2-1 illustrates, automotive sources of used oil are the primary used oil generators. Clearly, service stations, quick-lube shops, fleet operations, and similar automotive establishments play an important role in the used oil management system. When the used oil that could be collected from DIYs is considered as well, the quantity of used oil that automotive operations and DIY collection centers can ensure is managed properly is even more significant.

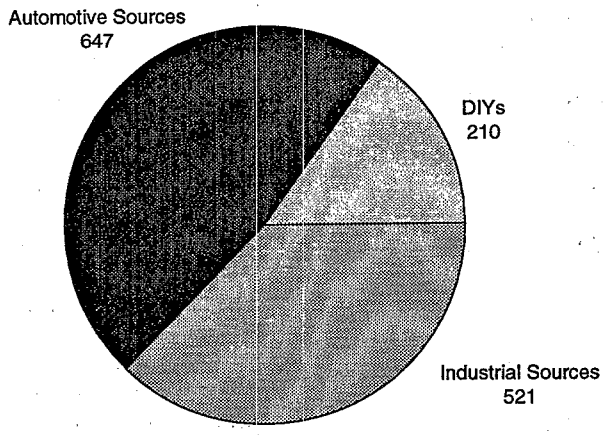

Figure 2-1. Quantity of used oil generated in the United States in 1991 (in millions of gallons) (source: adapted from Vorhees, 1992).

Figure 2-2 shows the pathways that used oil follows through the used oil management system. Figure 2-2 does not include the used oil that does not enter (or escapes from) the system and is improperly managed. Figure 2-3 gives information on used oil handled both inside and outside of the used oil management system. In this figure, used oil collection centers are combined with automotive sources of used oil. Figure 2-3 shows the methods used by each used oil generator to recycle or dispose of their oil, and how much used oil is recycled or disposed of using each of these methods.

In Figure 2-3, improper disposal includes dumping used oil down storm drains or household drains, pouring used oil on the ground, landfilling used oil in poorly designed landfills, road oiling, preserving wood with used oil, and storing used oil for extended periods of time. According to the 1991 estimates, 142 million gallons of the used oil generated by DIYs each year are disposed of improperly. In addition, a great deal of used oil generated by automotive sources is improperly disposed. Industrial sources properly dispose of nearly all of the used oil they generate. The bulk of the one million gallons of used oil disposed of improperly by industrial sources in 1991 was road oiled (Vorhees, 1992), a practice that was legal at the time. Now that road oiling has been banned under EPA's Used Oil Management Standards, industrial sources will most likely divert used oil from road oiling into proper management practices.

Figure 2-4 shows how much used oil was recycled and disposed of in 1991, and which recycling or disposal methods were used. Clearly, the vast majority of used oil generated in the United States is recycled by being burned for heat. Although much less used oil is rerefined and used as a base stock for lubricating oil, the 56 million gallons of

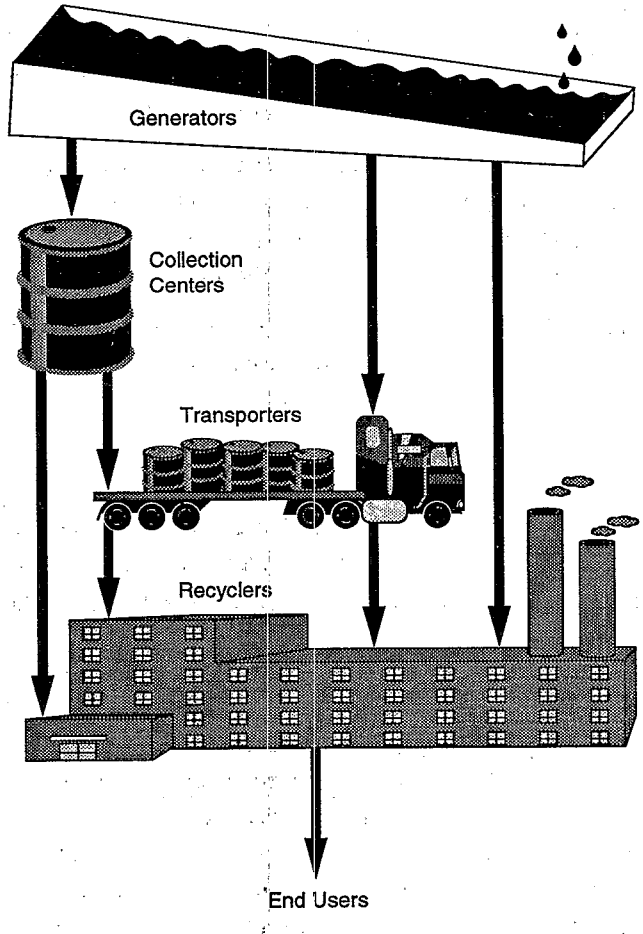

Figure 2-2. The flow of used oil through the used oil management system (source: adapted from American Petroleum Institute, 1991).

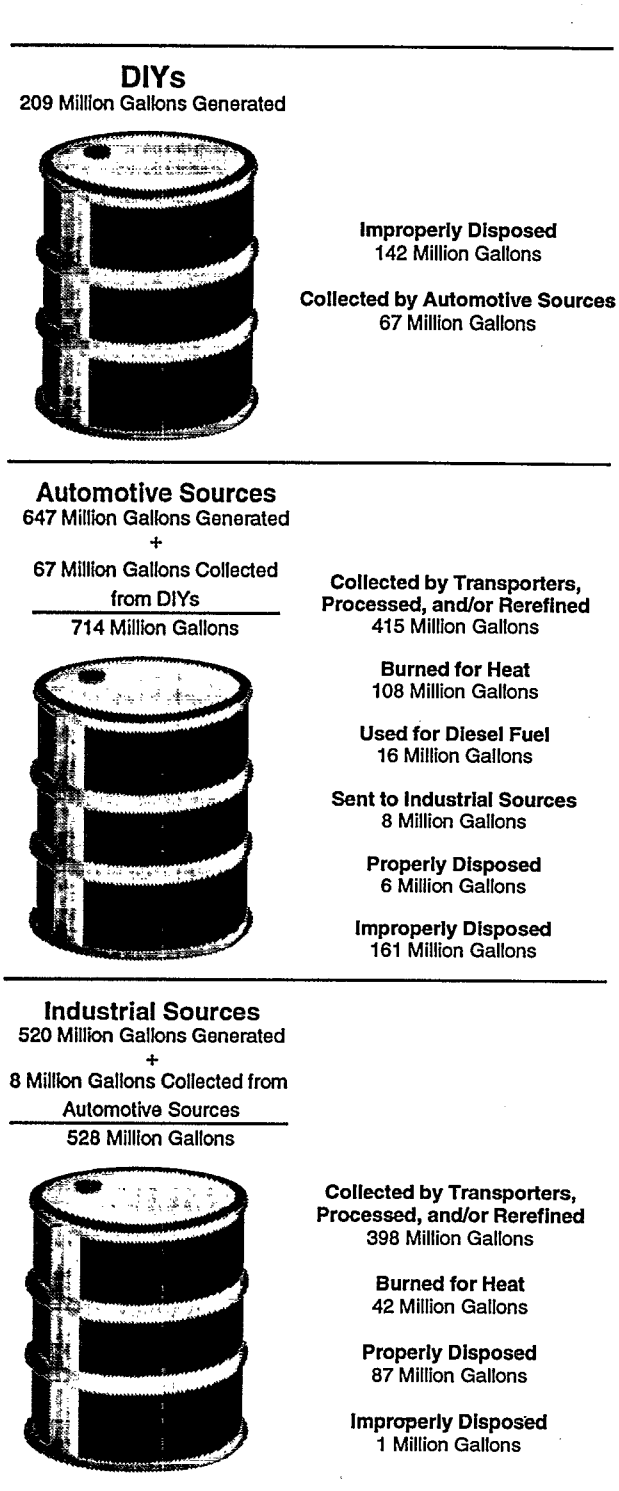

Figure 2-3. The used oil recycling and disposal methods used in the United States in 1991 (source: adapted from Vorhees, 1992).

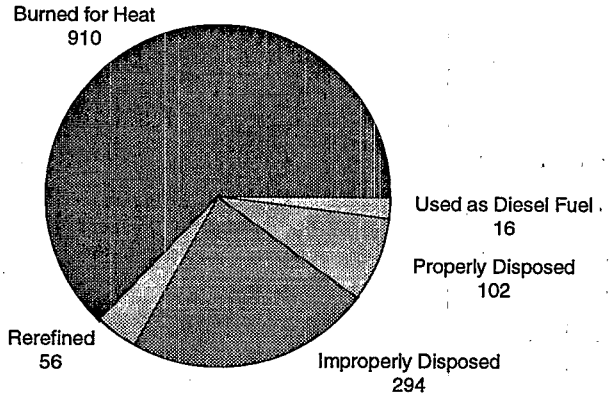

Figure 2-4. Methods used to recycle and dispose of used oil in the United States in 1991 (in millions of gallons) (source: adapted from Vorhees, 1992).

used oil that were rerefined in 1991 represent a significant increase from the 31 million gallons of used oil that were rerefined in 1988 (Arner, 1992).

Recycling utilizes either the heat or lubrication value of the used oil and protects human health and the environment. In addition, recycling generally is easier and more cost effective than properly disposing of used oil, and almost all used oil can be recycled (U.S. EPA, 1992c). Consequently, the emphasis in EPA's Used Oil Management Standards is on recycling, and very few used oil generators are expected to opt for disposing of used oil instead of recycling it.

The five most common options for properly recycling used oil are:

- **Direct Burning**—Used oil is burned to generate heat or to power industrial operations. The used oil is not processed before burning, either because it is specification used oil and can be safely burned without special equipment, or because it is burned in facilities that use pollution control devices or operations that limit air emissions (Arner, 1992).

- **Processing**—Used oil is treated to remove contaminants so it can be used for fuel without endangering human health and the environment or damaging equipment. Generally, off-specification used oil is processed so that it will meet the burning specifications in EPA's Used Oil Management Standards. The most common processing methods are gravity settling, screening, centrifuging, and filtering to remove solid contaminants; chemical treatment to reduce chemical impurities; heat separation/dehydration to remove liquid impurities; distillation to remove water;

and blending different quality used oils to improve lower quality used oils (Energy and Environmental Research Corporation, 1988).

- **Rerefining**—Used oil is treated to remove impurities so that it can be used as a base stock for new lubricating oil. Rerefining methods are more advanced, complicated, and effective than processing methods, and rerefined lubricating oil is virtually indistinguishable from virgin lubricating oil (Energy and Environmental Research Corporation, 1988). A variety of different technologies and processes can be used to rerefine used oil, but all rerefining operations remove water, additives, sludge, dissolved hydrocarbons and solvents, and impurities from the used oil.

- **Slipstreaming**—Used oil is introduced in small amounts into the refining process. No preprocessing is performed because only very small quantities of used oil are inserted into the refining process. Through slipstreaming, used oil can be converted into gasoline, heating oil, or feedstocks for other petrochemical products (Arner, 1992).

- **Supplementing Diesel Fuel**—Used oil is filtered to remove solid particles and then mixed with diesel fuel. Generally, one part of used oil is mixed with nine parts of diesel fuel to produce a mixture that can be used satisfactorily to fuel diesel engines (Nolan et al., 1990). (Although this recycling method has been common in the past, new air regulations have begun to limit its use.)

Although recycling is the best used oil management option, recycling is not always feasible. Some used oils are too contaminated, generated too far away from recycling facilities, or generated in quantities too small to be economically recycled. In certain cases, therefore, disposal is an appropriate option, as long as the used oil is disposed of in a way that does not harm human health or the environment. For used oil that is not deemed a hazardous waste, appropriate disposal options include incineration by a facility that accepts industrial liquids or placement of the used oil in a properly designed and constructed landfill that accepts industrial wastes and meets RCRA Subtitle D requirements. For used oil that is deemed a hazardous waste, disposal practices include placing the used oil in a landfill that meets RCRA Subtitle C requirements or burning the used oil in a permitted hazardous waste incinerator.

How the Price of Virgin Oil Affects the Used Oil Management System

The price of virgin oil dramatically affects the used oil management system because used oil competes with virgin oil as a source of fuel and as a base stock for lubricating oil. Like all recycling markets, in order to compete, recycled oil products must be sold at a lower price than virgin oil products (Nolan et al., 1990). The higher the price of virgin oil, the higher the price charged for products made from virgin oil, and the higher the price that can be charged for products made from used oil.

Used oil recyclers must cover the costs of collecting and recycling used oil, and must maintain a profit to stay in business. When the price of virgin oil is high, used oil recyclers make large enough profits that they can pay generators for the used oil they produce, or pay transporters for the used oil they collect (Nolan et al., 1990). As virgin oil prices drop, however, used oil recyclers cannot pay generators as much for the oil since the profit margin for the recyclers is reduced. When virgin oil prices drop below a "break even" level, the recyclers or transporters can no longer pay (or must charge) for the used oil collected from generators.

Figure 2-5 shows how the price of virgin fuel oil affects used oil generators. In the early 1990s, generators had to pay to have their used oil collected by transporters or recyclers when the price of virgin oil fell below approximately 40 cents a gallon. When the price of virgin oil rose above 53 cents a gallon, generators were paid for the used oil that was collected (Arner, 1992). As the figure shows, the price of virgin oil has fluctuated dramatically in recent years. These dramatic fluctuations have caused substantial uncertainty in used oil markets.

When recyclers and transporters pay for used oil, service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers have an economic incentive to have their used oil recycled off site. As a result, high virgin oil prices encourage used oil processing and rerefining. Conversely, low virgin oil prices encourage onsite burning of used oil in space heaters and supplementing diesel fuel with used oil. Clearly, the projected price of virgin oil is a consideration when deciding how to manage used oil. Choosing a cost-effective recycling option will allow service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers to increase the profits (or reduce the costs) of properly managing their used oil.

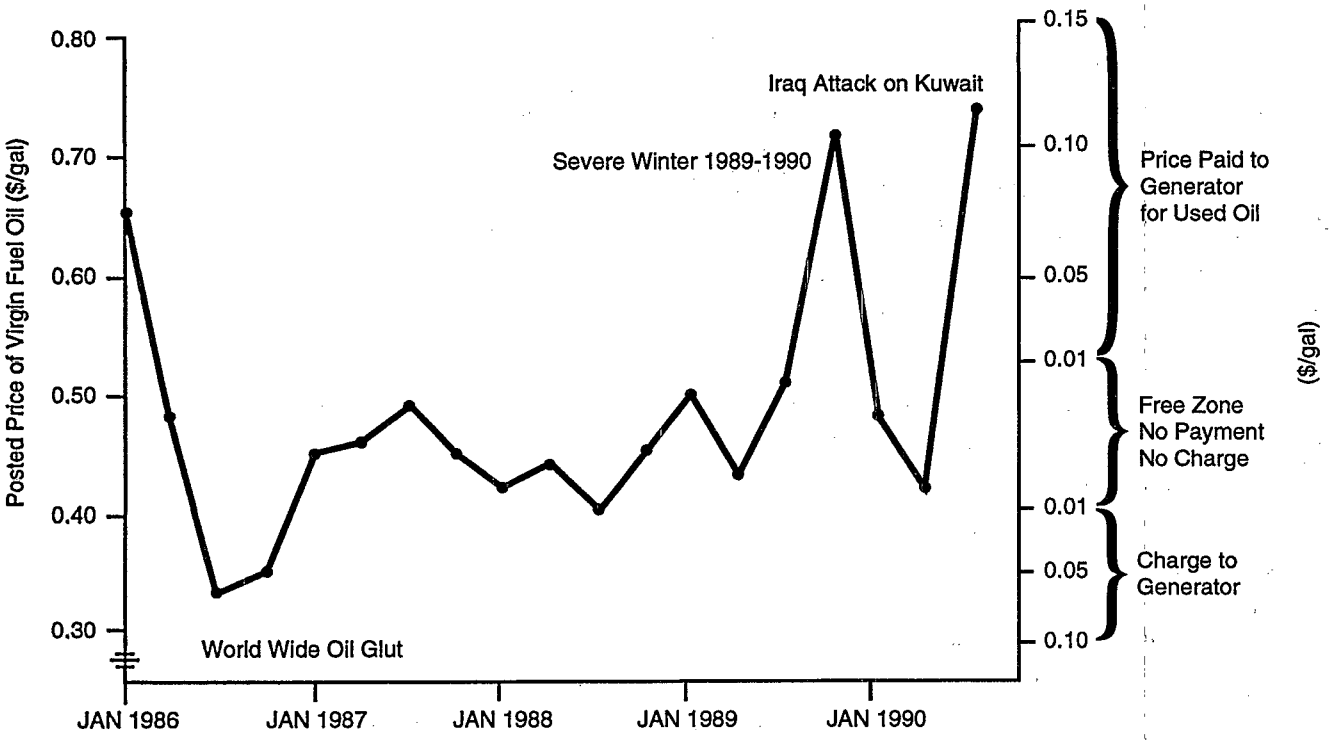

Figure 2-5. The effect of virgin oil prices on payments made to generators for used oil (source: adapted from Nolan et al., 1990).

Although cost-effectiveness is an important consideration when choosing a used oil management option, protecting human health and the environment must always be the primary concern. In addition, service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers have an economic incentive to manage their used oil in the most environmentally sound way possible. Choosing the most environmentally sound used oil management method will minimize potential liability costs and eliminate fines and other costs associated with enforcement actions for violating environmental regulations.

Chapter 3

The Regulations

EPA's Used Oil Management Standards form the core of the federal regulatory requirements that apply to the participants in the used oil management system. Other federal regulations govern specific aspects of managing used oil, such as storing used oil in underground storage tanks, responding to releases of used oil into the environment, or disposing of used oil that is determined to be a hazardous waste. This chapter discusses the federal regulatory requirements concerning used oil management, and gives special emphasis to regulations that are likely to apply to service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers. In addition, a brief overview of state regulations is presented.

EPA's Used Oil Management Standards

EPA published its Used Oil Management Standards in the *Federal Register* on September 10, 1992. The management standards are part of the RCRA regulations and are codified in Part 279 of Title 40 of the *Code of Federal Regulations* (CFR). The regulatory requirements in the management standards, along with other federal regulations referred to in the management standards, mandate practices that must be followed by generators, transporters, processors, rerefiners, marketers, and burners of used oil.

The Used Oil Management Standards are meant to encourage recycling and prevent mismanagement of used oil, without placing unnecessary regulatory burdens on participants in the used oil management system. The management standards also specifically prohibit the used oil management practices that have posed the greatest risks to human health and the environment in the past. The practices that are prohibited are improper storage of used oil, road oiling, use of the oil as a dust suppressant, and the mixing of used oil with hazardous wastes. The management standards also require that proper methods be used to transport, process, rerefine, burn, market, and dispose of used oil.

The Recycling Presumption

The Used Oil Management Standards include a recycling presumption, which is an assumption that all used oil that is generated will be recycled. The recycling presumption is based on the fact that almost all used oil *can* be recycled.

The purpose of the recycling presumption is to make it easier for used oil handlers to comply with federal regulations on used oil management, while still properly handling their used oil. Without the recycling presumption, used oil generators and others that handle used oil would have to decide whether the used oil would ultimately be recycled or disposed. This decision would affect what federal regulations the used oil was regulated under. Used oil destined for recycling would be subject to the Used Oil Management Standards and used oil destined for disposal would be subject to other federal regulations, such as the hazardous waste requirements in RCRA Subtitle C and the nonhazardous waste requirements in RCRA Subtitle D. The recycling presumption allows the generation and handling of all used oil (whether it will ultimately be recycled or disposed of) to

Key Terms

Aggregation Point	A site or facility where a used oil generator accumulates and/or stores used oil that the generator has produced or has collected from DIYs.
Btu or British Thermal Unit	A unit used to express energy output. It represents the amount of energy required to raise the temperature of 1 pound of water by 1°F.
Closure	The procedures that must be followed to prevent any future release of contaminants into the environment when a facility or storage tank is removed from operation (i.e., when the facility or tank is closed).
Container	A portable device in which a material is stored, transported, treated, disposed of, or otherwise handled.
Flash Point	The lowest temperature at which a flame or spark will cause the vapors above the surface of a liquid to ignite.
Hazardous Waste	As defined in the RCRA regulations, a waste that is listed as hazardous, or that exhibits a hazardous characteristic (ignitability, corrosivity, reactivity, or toxicity).
Impermeable	Capable of preventing liquids from flowing through.
Secondary Containment	A wall, lining, or other type of material that provides a barrier between a tank or other container and the environment so that leaks from the tank can be contained.
State Regulatory Authority	The state agency or department that is responsible for implementing RCRA requirements in authorized states.
Tank	A stationary device used to store a material.
Tolling Arrangement	A contractual agreement between a used oil generator and a processor or rerefiner that treats the used oil. The processed or rerefined oil is returned to the generator to be used as a lubricant, cutting oil, or coolant.

be regulated under the management standards, until the used oil is actually disposed of or sent for disposal.

The Rebuttable Presumption for Used Oil

Some halogenated solvents are considered hazardous wastes under RCRA. Because high levels of halogens generally indicate the presence of halogenated solvents, used oil that contains 1,000 ppm or more of total halogens is presumed to be mixed with a hazardous waste under the Used Oil Management Standards. Used oil with 1,000 ppm or more of total halogens, therefore, must be handled as a hazardous waste, meeting all RCRA Subtitle C requirements, unless this presumption is rebutted.

One way the hazardous waste presumption may be rebutted is by analyzing the used oil and determining that it does not contain significant concentrations of individual halogenated constituents, despite the high halogen content. In the management standards, EPA recommends that an analytical method from a publication entitled Test Methods for Evaluating Solid Waste (EPA/SW-846), Third Edition, be used to rebut the hazardous waste presumption if the used oil handler believes that the used oil has not been mixed with a hazardous waste. This document contains test methods approved by EPA and is available from the Government Printing Office for $319. To obtain a copy, call 202-783-3238 and ask for document number 955-001-00000-1. Used oil generators and other handlers that wish to rebut the presumption that their used oil is hazardous can either test the used oil themselves or send the used oil to a laboratory that will conduct the test.

Used Oil Burning Specifications

Under the Used Oil Management Standards, burning used oil that does not meet specification requirements for certain metals, flash point, and total halogens is strictly regulated. The specification limits are given in Table 3-1.

Used oil that meets all allowable levels in Table 3-1 is called specification used oil, and can be burned anywhere. Used oil that does not meet one or more of the allowable levels listed in Table 3-1 is called off-specification used oil. The burning requirements in the Used Oil Management Standards, which are discussed later in this chapter, apply to burners of off-specification used oil.

Table 3-1. **Used Oil Specification Limits**

Contaminant or Property	Allowable Level
Arsenic	Maximum of 5 ppm
Cadmium	Maximum of 2 ppm
Chromium	Maximum of 10 ppm
Lead	Maximum of 100 ppm
Flash Point	Minimum of 100°F
Total Halogens	Maximum of 4,000 ppm

Requirements for Used Oil Generators

A used oil generator is "any person, by site, whose act or process produces used oil or whose act first causes used oil to become subject to regulation." Under this definition, service stations, quick-lube shops, and fleet operations are all considered generators of used oil. DIYs are not regulated under the management standards (because of their status as household waste generators), but DIY collection centers and retailers that collect DIY used oil are considered generators because the act of collecting DIY used oil "causes the used oil to become subject to regulation."

The generator requirements under EPA's Used Oil Management Standards are meant to ensure that used oil generators use good housekeeping practices when handling used oil. Although these requirements are the only ones in the management standards written specifically for generators, generators using other management practices (such as processing used oil, burning off-specification used oil in something other than a space heater, or disposing of used oil) must comply with the used oil management standards governing those practices. (The management standards do not apply, however, to used oil that has been mixed with diesel fuel, as long as the mixture will be used in vehicles owned by the used oil generator.) The specific requirements that used oil generators must follow under the management standards are listed below.

- Except under the specific and limited circumstances given in §279.10(b) of the Used Oil Management Standards, used oil mixed with a hazardous waste must be handled as a hazardous waste, as discussed in more detail in Appendix B. The costs associated with handling used oil as a hazardous waste are high, and generators consequently should avoid contaminating an entire batch of used oil by mixing it with a hazardous waste. In addition, mixing a RCRA hazardous waste with used oil is considered hazardous waste treatment, unless this treatment is performed in accumulation tanks or containers. Finally, mixing used oil with a hazardous waste prevents the generator from being eligible for the service station dealers exemption from CERCLA liability, which is discussed in greater detail later in this chapter.
- In addition, the rebuttable presumption, which is discussed earlier in this chapter, applies to used oil generators. As a result, used oil containing 1,000 ppm or more of total halogens is presumed hazardous and must be handled as a hazardous waste, unless the presumption is rebutted.
- Generators must store used oil in tanks, containers, or other RCRA regulated storage units (such as permitted lagoons or pits). Tanks and containers must be kept in good operating condition, free of any visible spills or leaks, structural damage, or deterioration. All aboveground tanks and fill pipes to underground tanks must be clearly labeled with the term "used oil." Generators also are subject to requirements under the Spill Prevention Control and Countermeasures regulations and the Underground Storage Tank (UST) regulations, which are described later in this chapter and in Appendix C.
- Generators can burn used oil in oil-fired space heaters as long as they follow the requirements set forth in Chapter 4.
- Any leaks or spills from aboveground storage tanks that are released to the environment must be stopped as soon as possible, and the released used oil must be contained and cleaned up. The used oil that has been cleaned up must be managed according to the management standards. Any soil or other materials that have been contaminated with the released used oil must be properly managed (see next paragraph). The leaking tank must be repaired or replaced. These requirements do not apply to leaks or spills that are not released to the environment, such as those that occur on concrete floors within a storage building. Releases to the environment are also regulated under CERCLA and the Clean Water Act, as discussed later in the chapter.
- Materials containing or otherwise contaminated with used oil (for example, rags, wipes, and absorbent materials) are considered used oil, and must therefore be handled under the used oil management standards, unless they show no signs of any free-flowing oil. (In addition, materials contaminated with used oil are considered used oil under the management standards if they

are burned for energy recovery.) Contaminated materials that no longer contain free-flowing used oil are not considered used oil under the management standards (unless they will be burned for energy) and are subject to RCRA requirements. These materials must be tested to determine if they exhibit the characteristics of a hazardous waste. Alternatively, a generator may use his or her knowledge of the materials or processes used to produce the waste in order to determine whether the waste exhibits one of these hazard characteristics. If the contaminated materials are deemed hazardous, they must be handled as a hazardous waste under RCRA Subtitle C. If they are not hazardous, they can be handled as a solid waste under RCRA Subtitle D. Any used oil drained or otherwise removed from these contaminated materials must be handled as used oil.

- Generators must use transporters that have obtained identification numbers from EPA (in accordance with the management standards) to ship any used oil off site, when the used oil is in quantities greater 55 gallons. A generator that transports used oil generated on site or collected from DIYs to an aggregation point or to a used oil collection center is not required to obtain an EPA identification number as long as the used oil is transported in vehicles owned by the generator in quantities of 55 gallons or less.

Requirements for Used Oil Transporters and Transfer Facilities

A used oil transporter is defined as "any person who transports used oil, any person who collects used oil from more than one generator and transports the collected oil, and owners and operators of used oil transfer facilities." A used oil transfer facility is defined as "any transportation-related facility including loading docks, parking areas, storage areas, and other areas where shipments of used oil are held for more than 24 hours and not longer than 35 days during the normal course of transportation" or prior to certain processing activities (U.S. EPA, 1994). As discussed earlier in this chapter, transporter requirements do not apply to generators who transport used oil on site or transport 55 gallons or less of used oil to offsite collection centers or aggregation points.

Because the normal risks involved with transporting used oil are greater than the risks involved with generating used oil, used oil transporters are required to meet more stringent requirements than generators. As with generators, transporters that use other management practices (such as processing used oil to meet burning specifications) must also meet other applicable requirements under the management standards. The requirements that apply solely to transporters are briefly described below.

- Transporters must obtain an EPA identification number.
- Transporters can only deliver used oil to facilities with EPA identification numbers (i.e., other transporters, used oil processing facilities, off-specification used oil burners, or rerefining facilities), or to specification used oil burners.
- If a release to the environment occurs during transportation, transporters must take immediate actions to protect human health and the environment. For example, transporters should immediately notify local authorities and institute emergency response measures, such as constructing a dike around the discharge area.
- Transporters must determine if the used oil contains 1,000 ppm or more of total halogens. Transporters can determine halogen content by testing the used oil or by using their knowledge of the materials and processes that generated the used oil. If the oil contains 1,000 ppm or more of total halogens, the used oil is considered a hazardous waste under the rebuttable presumption in the management standards. This used oil must be handled under RCRA Subtitle C, unless the transporter successfully rebuts the presumption. Transporters must keep records for at least 3 years of any tests conducted or information used to make the determination of the halogen content of the used oil.
- Transporters must track used oil shipments by keeping records of each shipment of used oil collected and delivered. These records must be maintained for at least 3 years. When accepting a shipment for delivery or delivering a shipment, the transporter must record the following information: name, address, and EPA identification number (if applicable) of the person or facility the oil is being collected from or delivered to; dated signature of the person or a representative of the facility; quantity of used oil collected or delivered; and the date of collection or delivery.

In addition, used oil transporters must comply with all applicable U.S. Department of Transportation regulations concerning used oil shipping and the release of used oil to the environment. These regulations are discussed later in this chapter and in Appendix E.

Under the management standards, transfer facilities must meet the following storage requirements:

- Transfer facilities must meet the same storage tank, labeling, and response to release requirements as used oil generators.
- Both aboveground tanks and containers used to store used oil must be equipped with secondary containment systems. The secondary containment systems must be impermeable so that any release of used oil into soil, ground water, or surface water is prevented.

Requirements for Used Oil Processors and Rerefiners

A processor/rerefiner is a facility that uses "chemical or physical operations designed to produce from used oil, or to make used oil more amenable for production of, fuel oils, lubricants, or other used oil-derived products. Processing includes, but is not limited to: blending used oil with virgin petroleum products, blending used oils to meet the fuel specification, filtration, simple distillation, chemical or physical separation, and rerefining." Used oil processors and rerefiners manage large quantities of used oil using a wide variety of procedures. The management options used at processing and rerefining facilities, therefore, tend to require stricter controls than are necessary for generators or even transporters. In addition, mismanagement of used oil at processing and rerefining facilities in the past has caused damage to the environment. Consequently, under the management standards, stricter requirements are placed on processors and rerefiners than on other participants in the used oil management system (U.S. EPA, 1992a). The requirements that apply only to processors and rerefiners are listed below.

- Processors and rerefiners must obtain an EPA identification number.
- Processing and rerefining facilities must be maintained and operated in a manner that reduces the possibility of fire, explosion, or release of used oil to air, soil, or water.
- Processing and rerefining facilities must be equipped with a communications or alarm system and emergency response equipment such as portable fire extinguishers and spill control equipment. All equipment must be properly maintained and regularly tested.
- The aisle space within processing and rerefining facilities must be wide enough to allow personnel and emergency equipment to move around without being obstructed.
- Processing and rerefining facilities must make necessary arrangements to ensure that local authorities are prepared for an emergency at their facility.
- Processing and rerefining facilities must develop a contingency plan to minimize hazards to human health and the environment from emergencies. In the case of an emergency, this plan must immediately be carried out by facility personnel.
- All processing and rerefining facilities are required to have an emergency coordinator, someone who is on site or on call and is responsible for coordinating emergency response measures. If used oil is released to the environment during the emergency, the emergency coordinator must notify local authorities and appropriate federal authorities.
- Facilities that process or rerefine used oil must follow the same procedures as transporters to determine the halogen content of the used oil. If the halogen level exceeds 1,000 ppm, the processor or rerefiner must handle the used oil as a hazardous waste unless the presumption is rebutted.
- Processors and rerefiners must develop an analysis plan that describes in detail the procedures that will be followed to determine the halogen content of the used oil and whether the used oil meets burning specifications.
- Processors and rerefiners must keep operating records until the facility is closed. These records must include: results of analyses conducted on the halogen levels; results of analyses conducted to determine if used oil meets burning specifications; and summary reports of any incidents that required the contingency plan to be used.
- Processors and rerefiners must keep records of each shipment of used oil they receive, and each shipment of processed or rerefined used oil they send to another facility for use. These records must be maintained for at least 3 years.
- Processors and rerefiners must follow the same storage requirements as used oil transporters and transfer facilities.
- Processors and rerefiners must follow the same requirements for responding to releases of used oil to the environment as generators.
- When tank systems are to be closed, processors and rerefiners must decontaminate tanks, tank components, and surrounding soils of used oil. In addition, all containers that stored used oil must be decontaminated and removed from the site when the site is being closed.

Processors and rerefiners that generate, transport, burn, or dispose of used oil must meet the applicable requirements for these activities under the management standards. In addition, processors and rerefiners that first claim that used oil meets specifications for burning, or that send off-specification used oil directly to a burner, must meet the marketing requirements of the management standards.

Requirements for Burners of Off-Specification Used Oil

Used oil that meets the burning specifications under EPA's Used Oil Management Standards can be burned without being subject to regulatory requirements. Off-specification used oil, however, should only be burned with equipment or procedures that limit emissions into the air. The burning requirements in the management standards, therefore, only apply to burners of off-specification used oil. A burner is defined in the management standards as "a facility where used oil not meeting the specification requirement . . . is burned for energy recovery" in the following devices: industrial furnaces, industrial boilers, utility boilers, hazardous waste incinerators, or used oil-fired space heaters. (Generators who burn used oil in used-oil fired space heaters, however, are not covered by the burner requirements in the management standards, as long as they meet certain other requirements discussed in this chapter, such as only burning used oil they have generated or collected from DIYs.) These devices are all defined in RCRA and are subject to appropriate RCRA requirements. In addition, burners who generate, transport, process, rerefine, market, or dispose of used oil, must comply with other applicable requirements under the management standards. The burner requirements under the management standards are as follows:

- Burners must obtain an EPA identification number.
- Burners must use the same procedures as transporters to determine the halogen content of the used oil. If the halogen content is greater than 1,000 ppm, then the used oil must be handled as a hazardous waste, unless the burner rebuts the presumption.
- Burners must follow the same storage requirements as used oil transporters.
- Burners must follow the same procedures as used oil generators to respond to releases of used oil to the environment.
- Burners must keep records about each batch of used oil received for burning. These records must be kept for at least 3 years and must contain the following information: the name, address, and EPA identification number of the transporter; the name, address, and EPA identification number (if applicable) of the generator, processor, or rerefiner from which the used oil was collected; the quantity of used oil accepted; and the date the used oil was accepted.
- Before the burner accepts the first shipment of off-specification used oil from a generator, processor, or rerefiner, the burner must give the generator, processor, or rerefiner a signed statement that certifies that the burner has notified EPA of its used oil management activities and will only burn the used oil in an appropriate device. A record of the certification must be maintained for at least 3 years after the last shipment of used oil is received from the generator, processor, or rerefiner.

Requirements for Marketers of Used Oil

A marketer is defined as "any person who conducts either of the following activities: (1) directs a shipment of off-specification used oil from their facility to a used oil burner; or (2) first claims that used oil that is to be burned for energy recovery meets the used oil fuel specifications [in the management standards]." According to the management standards, all marketers of used oil must also either be generators, transporters, processors, rerefiners, or burners of used oil. Consequently, all marketers must comply with other applicable requirements under the management standards, as well as the requirements listed below.

- Marketers must obtain an EPA identification number.
- Marketers can determine that the used oil meets burning specifications by performing analyses or obtaining analyses that have previously been performed that show all specification levels are met.
- Marketers must keep copies of these analyses for at least 3 years.
- Marketers can only send off-specification used oil to a burner who has an EPA identification number and burns the used oil in an appropriate device.
- For off-specification used oil, marketers must keep records for at least 3 years of each shipment of used oil to a burner. The records must include: the name, address, and EPA identification number of the used oil transporter and the burner who received the oil; the quantity of used oil shipped; and the date of shipment.
- For specification used oil, marketers must keep records for at least 3 years of each shipment of used oil, and the record must include: the name and address of the facility

receiving the shipment; the quantity of used oil shipped; and the date of shipment. The record must also cross-reference the analyses that were used to determine that the used oil met burning specifications.

- Before a marketer sends the first batch of off-specification used oil to a burner, the marketer must obtain a signed statement from the burner that certifies that the burner has notified EPA of its used oil management activities and that the burner will only burn the used oil in appropriate devices. This certification must be kept for at least 3 years after the last shipment of used oil is sent to the burner.

Requirements for Disposing of Used Oil

Used oil that will be disposed of because it cannot feasibly or economically be recycled must be tested, or knowledge of the materials and processes used to generate the waste must be applied, to determine if it is considered a hazardous waste under RCRA. If the used oil is determined to be a hazardous waste, it must be disposed of in compliance with Subtitle C of RCRA. If the used oil is not hazardous, it can be disposed of in compliance with Subtitle D of RCRA. Because used oil is a liquid, however, service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers only can dispose of used oil in Subtitle D disposal facilities that accept industrial liquid wastes. State regulations regarding disposal of used oil may differ from the federal regulations, so be sure to check with the state environmental agency prior to disposing of used oil.

Requirements for Using Used Oil as a Dust Suppressant

The use of used oil as a dust suppressant (which includes road oiling) is banned, except in states that petition EPA to allow road oiling within their jurisdictions. States can petition EPA to allow road oiling of used oils that do not contain hazardous wastes. Any states petitioning EPA must show that road oiling will not adversely affect human health and the environment.

State Regulations on Used Oil Management

Under RCRA, states can become authorized by EPA to implement and enforce federal regulatory requirements. As of 1994, all states except Wyoming, Iowa, Alaska, and Hawaii have become authorized by EPA. In addition, Guam has become authorized by EPA, but Washington, DC, the Commonwealth of Puerto Rico, the Virgin Islands, American Samoa, and the Commonwealth of Northern Mariana Islands have not. In states and territories that are not authorized, EPA Regional Offices implement and enforce the management standards.

In the unauthorized states (and territories), the Used Oil Management Standards went into effect on March 8, 1993. In the authorized states, the management standards do not go into effect until those states amend their programs to incorporate the standards. According to the Used Oil Management Standards, this should have been done by July 1, 1994, unless implementing the standards requires the state to change a law. In states where a legislative change is required, the management standards should go into effect by July 1, 1995.

In order for a state to become authorized under RCRA, its standards must be at least as stringent as the federal standards. Consequently, service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers in authorized states that have not yet implemented the management standards should be prepared to at least meet the federal requirements. In addition, the state environmental agency should be contacted to determine if any additional state requirements are currently in effect and if the state requirements implementing the Used Oil Management Standards will be more stringent than the federal requirements.

Many states have regulatory requirements that go beyond those in EPA's Used Oil Management Standards and the supporting federal regulations. In addition, many states developed a regulatory structure for used oil before the federal management standards were finalized. As a result, states vary widely in their approaches to regulating used oil (American Petroleum Institute, 1991).

One of the major differences between state and federal regulations is that several states list used oil as a hazardous waste. These states include California, Massachusetts, New Hampshire, New Jersey, Rhode Island, and Wyoming (Convenient Automotive Services Institute, 1992). In states that list used oil as a hazardous waste, the management of used oil must meet the states' hazardous waste regulations.

Many states also have more stringent regulations for the management and disposal of used oil filters than the federal government. States such as California, Massachusetts, Oregon, and Rhode Island, list used oil filters as a hazardous waste (Convenient Automotive Services Institute, 1992). In these states, the handling, recycling, and disposal of used oil filters must be in compliance with the states' hazardous waste regulations. Other states, including California, Colorado, Florida, Minnesota, Missouri, New Mexico, New

York, Rhode Island, South Carolina, and Texas require that used oil filters be recycled (Convenient Automotive Services Institute, 1992). Some states also do not allow used oil filters to be disposed of in municipal solid waste landfills (Convenient Automotive Services Institute, 1992).

In some states, used oil is banned from being disposed of in municipal solid waste landfills. These states include Florida, Iowa, Minnesota, Missouri, North Carolina, North Dakota, Oregon, South Carolina, Texas, Vermont, Washington, and Wisconsin (BioCycle, May 1992). In these states, used oil must either be recycled, disposed of in a municipal incinerator, or disposed of in a hazardous waste disposal facility.

Finally, many states actively encourage the recycling of DIY used oil. Some of these states, including Arizona, California, and Texas, have instituted a deposit or fee system (Convenient Automotive Services Institute, 1992). When lubricating oil is purchased, the customer pays a deposit. To retrieve the deposit, the customer must return the used oil. Other states, such as Alabama, California, Maryland, Michigan, Minnesota, New Hampshire, New York, Rhode Island, Vermont, and Washington, have state-wide DIY used oil collection programs to give DIYs a convenient place to bring their used oil (American Petroleum Institute, 1991).

The Western Michigan Environmental Action Council and Alabama's Project R.O.S.E. (Recycled Oil Saves Energy) are two very successful state-wide DIY used oil collection programs (Arner, 1988). Both of these programs use public outreach materials, such as service announcements, pamphlets, and newsletters, to inform DIYs about how improper disposal of used oil harms human health and the environment. These public outreach materials also stress the need for recycling and tell DIYs where they can bring their used oil. In Michigan and Alabama, DIYs can bring used oil to collection centers that are run by public agencies or volunteer groups, as well as to service stations and quick-lube shops that voluntarily collect DIY used oil.

Information on state regulations concerning used oil management, as well as other state used oil programs, can be obtained from state environmental agencies. A list of state agencies that can be contacted for more information is provided in Appendix A of this document.

RCRA Requirements That Apply to the Disposal of Used Oil

Subtitle C of RCRA regulates the handling and disposal of hazardous wastes, while Subtitle D regulates non-hazardous solid waste disposal facilities. As discussed above, used oil that is to be disposed of is regulated under either Subtitle C (40 *CFR* Parts 260 to 266, 268, 270, and 124) or Subtitle D (40 *CFR* Parts 257 and 258) of RCRA, depending on whether the oil exhibits characteristics of a hazardous waste. In addition, any solids contaminated with used oil (such as absorbent materials used to clean up a used oil spill) that contain no free-flowing used oil are regulated under Subtitle C or Subtitle D of RCRA, depending on whether they exhibit characteristics of a hazardous waste. Solid materials that contain free-flowing used oil must be disposed of as used oil.

Consequently, before disposing of used oil or solid materials that have been contaminated with used oil, these materials must be tested, or another approved method must be used, to determine if they meet the characteristics of a hazardous waste under RCRA. These characteristics, along with a summary of Subtitle C and Subtitle D regulations, are given in Appendix B.

The Exemption From CERCLA Liability

As discussed in Chapter 1, CERCLA liability is a very important issue for individuals and facilities that handle used oil. The strict liability language of CERCLA allows individuals and businesses to be held liable for the mismanagement of materials containing hazardous substances, even if another individual or business was contracted to manage the substance. In order to encourage service stations, quick-lube shops, and government DIY collection centers to accept DIY used oil, however, CERCLA contains a "service station dealers" exemption from liability. To meet the CERCLA definition of a service station dealer, a business or facility must meet the following criteria (42 U.S.C. § 9601 Section 101 (37)):

- The facility must be a "motor vehicle service station, filling station, garage, or similar retail establishment" that generates a significant percentage of its revenues from "fueling, repairing, or servicing motor vehicles." A facility run by a government agency for the sole purpose of collecting DIY used oil is also considered a "service station dealer" under the CERCLA definition.
- The facility must accept DIY used oil for recycling.

Service stations, quick-lube shops, and government-run DIY collection centers, therefore, can all meet the CERCLA definition of "service station dealer" if they accept DIY used oil for recycling. Along with meeting this definition, however, "service station dealers" must comply with EPA's Used

Oil Management Standards to receive the exemption from CERCLA liability. In addition, any used oil that has been mixed with a hazardous waste is not exempt from CERCLA liability.

Used oil generators that do not meet the requirements for the service station dealer exemption and that contract with a transporter or recycler to handle their used oil can be held liable for cleanup costs if the transporter or recycler mismanages the oil. Used oil generators that do meet the requirements for the service station dealer exemption, including being in compliance with the Used Oil Management Standards, cannot be held liable under CERCLA for transporter or recycler mismanagement. The service station dealer exemption, however, does not apply to any onsite used oil mismanagement by the generator.

Overall, the service station dealer exemption makes accepting DIY used oil for recycling a more attractive option for service stations and quick-lube shops. The exemption from potentially staggering liability costs is a very positive economic incentive to bring DIY used oil into the management system.

Underground Storage Tank Regulations

An underground storage tank (UST) is a tank (or combination of tanks) that is used to contain substances and that has at least 10 percent of its volume underground (U.S. EPA, 1990). Most USTs that hold used oil, virgin petroleum, and certain hazardous chemicals are regulated under Subtitle I of RCRA (40 *CFR* Part 280). The goals of the UST regulations are to prevent, find, and clean up leaks and spills from USTs, and to ensure that owners and operators of USTs can pay for correcting any problems caused by leaks and spills. The UST requirements are summarized in Appendix C.

Spill Prevention Control and Countermeasures Requirements

The Spill Prevention Control and Countermeasures (SPCC) requirements implement Section 311 of the Clean Water Act and can be found in 40 *CFR* Parts 110 to 112. The SPCC requirements have been in place since 1973 and were strengthened by the Oil Pollution Act of 1990. The purpose of the Clean Water Act is to prevent the discharge of pollutants into navigable waterways in the United States. ("Navigable waterways" include almost all surface water bodies.) The Oil Pollution Act was passed to deal with the special problems associated with oil being released into surface waters. The SPCC regulations (40 *CFR* Part 112) require facilities that handle oil (and used oil) to develop a plan to prevent discharges into surface water.

All facilities handling oil must comply with the SPCC regulations, except facilities that:

- Are located in areas where a release of oil could not be expected to enter a navigable waterway.
- Are subject to the control and authority of the U.S. Department of Transportation, as defined in a Memorandum of Understanding between the Secretary of Transportation and the Administer of EPA, dated November 24, 1971.
- Have an underground storage capacity of 42,000 gallons or less and have an aboveground storage capacity of 1,320 gallons or less (with no single aboveground container having a capacity of more than 660 gallons).

The SPCC requirements that are likely to apply to service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers that store used oil are given in Appendix D.

The Department of Transportation's Hazardous Materials Transportation Act Requirements

The Hazardous Materials Transportation Act (HMTA), which is administered by the U.S. Department of Transportation (DOT) and codified in 49 *CFR* Parts 171 to 199, regulates the transportation of used oil that meets the DOT definition of a hazardous material. Under these regulations, used oil is considered hazardous if it is a "combustible liquid" (i.e., has a flash point between 100°F and 200°F) or a "flammable liquid" (i.e., has a flash point of 100°F or less). In addition, any used oil that is destined for disposal must be transported as a hazardous material. In 1994, these regulations were being updated by DOT, and transporters of used oil should contact DOT to determine the final outcome of that effort. HMTA requirements are discussed in Appendix E.

Chapter 4

Options for Recycling Used Oil

Used oil can be recycled in a variety of ways to utilize its lubrication or heat value. For example, used oil can be used to lubricate engine parts or burned for heat. This chapter describes the major used oil recycling options that are currently available and presents the advantages and disadvantages of each of these recycling options. Information also is provided for service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers on how to choose a recycler. Finally, this chapter includes disposal options for used oil that cannot feasibly or economically be recycled.

Although some of these recycling options are appropriate for many types of used oil, this chapter is directed toward the recycling of oil drained from automobile and truck crankcases.

The Major Used Oil Recycling Methods

Recycling is reusing a substance or material in a beneficial way. In the past, used oil was reused for a wide range of different purposes. Unfortunately, many of the ways used oil was reused caused environmental problems. For example, used oil was sometimes used to kill weeds or keep dust down on dirt roads (U.S. EPA, 1984b). As a result, the used oil contaminated soils, ground water, and surface water in the area. In recognition of these problems, EPA's Used Oil Management Standards have banned options, such as road oiling, that cause significant risks to human health and the environment.

The most common used oil recycling methods that are approved by the management standards are:

- Rerefining to use as a base stock for lubricating oil.
- Slipstreaming to use as a base stock for other petroleum products.
- Processing to burn for heat.
- Direct burning for heat.

Rerefining

With rerefining, used oil undergoes extensive physical and chemical treatment to remove impurities so that the resulting rerefined oil product is of as high a quality as a virgin oil product (Arner, 1992). Rerefined oil is sold to lubricating oil producers who use the rerefined oil as a base stock and blend it with additives (and sometimes virgin oil) to produce new lubricating oil.

Until about 10 years ago, an acid-clay process was widely used to rerefine used oil (Bryant, 1989). The acid-clay process is simple to design and operate, but it produces large quantities of acid and clay waste products. This causes a disposal problem because these waste products exhibit hazardous characteristics and must be handled as a hazardous waste (Nolan et al., 1990). The expense of disposing of these materials, along with the environmental problems associated with generating large amounts of hazardous waste, has caused the used oil rerefining industry to shift to new rerefining methods.

Key Terms

Aromatics	A class of chemical compounds that all have a similar, special chemical structure. Aromatics are known for their strong odors and their hazardous properties.
Bottom Sediment	Solid materials that form a sludge-like layer, usually at the bottom of a settling tank.
Distillation	A process that uses heat to purify a liquid by separating out solid materials and other liquids.

Today, the rerefining companies in existence in the United States use a vacuum distillation/hydrotreating process (Arner, 1992). Figure 4-1 diagrams this process. With vacuum distillation/hydrotreating rerefining systems, filtering, heating, and settling are first used to remove water and larger solid particles from the used oil. Then vacuum stripping and vacuum distillation are used to remove additional contaminants (Bryant, 1989). With these methods, a vacuum is created within a column of used oil and contaminants within the used oil are stripped away or broken down by the vacuum. Then, the used oil is treated with hydrogen, which bonds with certain contaminants that then settle and are removed. Finally the heavier lubricating oil is separated from the lighter fuel oil. With this rerefining process, the production of hazardous waste can be minimized or eliminated and residuals from the process can be burned as a fuel or used to produce asphalt (Energy and Environmental Research Corporation, 1988).

Rerefining has a couple of major advantages. First, unlike any other used oil recycling option, rerefining allows used oil to be reused over and over again. In addition, rerefining saves energy. It takes from 50 to 85 percent less energy to rerefine used oil than it takes to refine virgin oil into lubricating oil (Byrne et al., 1989).

One disadvantage of rerefining is that it is more complicated and expensive than other recycling options. However, rerefining used oil into lubricating oil is easier and less expensive than rerefining crude oil into lubricating oil. In addition, the costs associated with rerefining used oil into lubricating oil usually can be recaptured when the lubricating oil is sold. Another disadvantage of rerefining is that only a few rerefiners are currently in operation in the United States. This means that unless the generator is located close to one of the few rerefining plants, the costs of transporting used oil to a rerefiner will be large.

Slipstreaming

With slipstreaming, very small amounts of used oil (approximately 1 percent of the feed-stock material) are introduced into the virgin oil refining process (Arner,

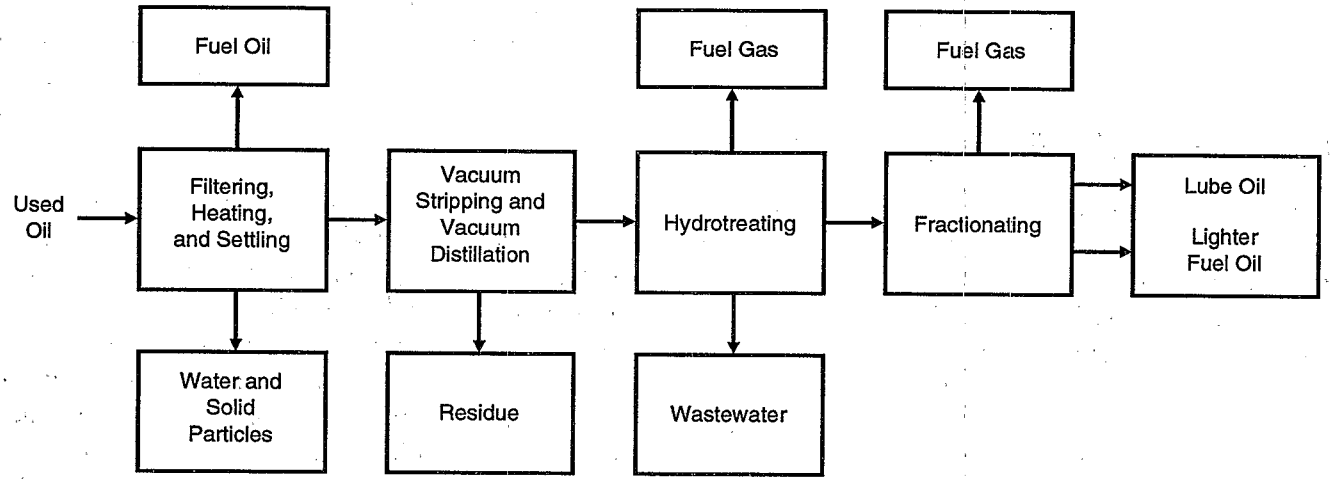

Figure 4-1. A simplified vacuum distillation/hydrotreating rerefining system (source: adapted from Energy and Environmental Research Corporation, 1988).

1992). The used oil does not require any pretreatment before it is added to the virgin oil, because the refining process removes any contaminants in the used oil that will affect the quality of the resulting petroleum product.

The major advantage of slipstreaming is that the heat or lubrication value of the used oil can be utilized without complicated processing methods. The slipstreamed used oil could be a base stock for any number of petroleum products including fuel oil, gasoline, and lubricating oil. In addition, slipstreaming poses no greater environmental risk than refining virgin oil.

The only disadvantage to slipstreaming is that it currently is not a readily available used oil recycling option. Because of the advantages of slipstreaming, however, it may become more widely available over time. Furthermore, used oil inserted in the refining process after distillation or catalytic cracking is exempt from EPA's used oil management standards provided that it is specification used oil (U.S. EPA, 1994). This exemption will have the effect of making slipstreaming a more desirable, and therefore more available, option.

Processing

Processing involves treating the used oil so it will make a better fuel. Simple processing methods are used to remove water from most used oil that is burned for heat in the United States (Arner, 1992). Other contaminants that are commonly removed from used oil during processing are bottom sediment, other sediment particles, and ash. Once these materials have been removed through processing, the quality of the used oil can be very similar to that of virgin fuel oil (Mueller, 1989).

Physical treatment methods, such as settling, filtering, and centrifuging, are used to remove water or solid contaminants (such as metal pieces from engine wear) from the used oil (Mueller, 1989). Settling is a process where used oil is held in large tanks for relatively long periods of time so that gravity causes heavy contaminants to sink to the bottom and light contaminants to rise to the top. Filtering is used to screen out solid particles and is particularly useful for smaller, lighter particles that do not settle to the bottom in settling tanks. With centrifuging, the oil is spun at high speeds and the resulting centrifugal force causes the oil to be separated from substances with different densities, such as water and solid contaminants. Processing can also include chemical treatment of the used oil to remove chemical contaminants and improve burning characteristics. For example, chemicals can be added to used oil to neutralize acids. During processing, used oil can also be blended with virgin oil to adjust its viscosity or improve its fuel quality.

Figure 4-2 is a diagram of a used oil processing system. Processing can be as simple as filtering out large particles and allowing the other contaminants to settle out from the oil, or it can include more complicated steps, such as centrifuging and chemically treating the used oil.

The major advantage of processing is that it improves the burning quality of used oil. Processing also can allow off-specification used oil to be upgraded to specification used oil so that it can be burned by a greater number of burning facilities. In addition, processing used oil is a widespread industry in the United States, with nearly 200 processors around the country (Arner, 1992), most of which are small operations that service local markets (Nolan et al., 1990). Processing is consequently a much more readily available recycling option for used oil generators than rerefining.

Direct Burning

Direct burning means burning used oil without processing it first to remove water, solid particles, and other contaminants. Under the Used Oil Management Standards, generators can burn used oil without meeting the burner requirements, as long as:

- The used oil is generated on site or collected from DIYs.
- Space heaters with a maximum capacity of 0.5 million Btu per hour or less are used to burn the used oil.
- The gases from the space heaters are vented outside.

Generators may also burn used oil in other types of burners, such as industrial boilers, but they must meet the burner requirements in the management standards.

In addition, specification used oil can be burned for fuel in space heaters, boilers, and industrial furnaces without being subject to special burning requirements under EPA's Used Oil Management Standards. The contaminant levels that cannot be exceeded for used oil to meet burning specifications are given in Chapter 3 of this document. Because burning specification used oil does not pose any greater risk to human health and the environment than burning virgin fuel oil, special burning requirements for specification used oils are unnecessary (U.S. EPA, 1991).

Burning used oil in small heaters, either on site or off site, is a common method of recycling. Approximately 70,000 small heaters are used every year in the United States to burn more than 120 million gallons of used oil (Arner, 1992).

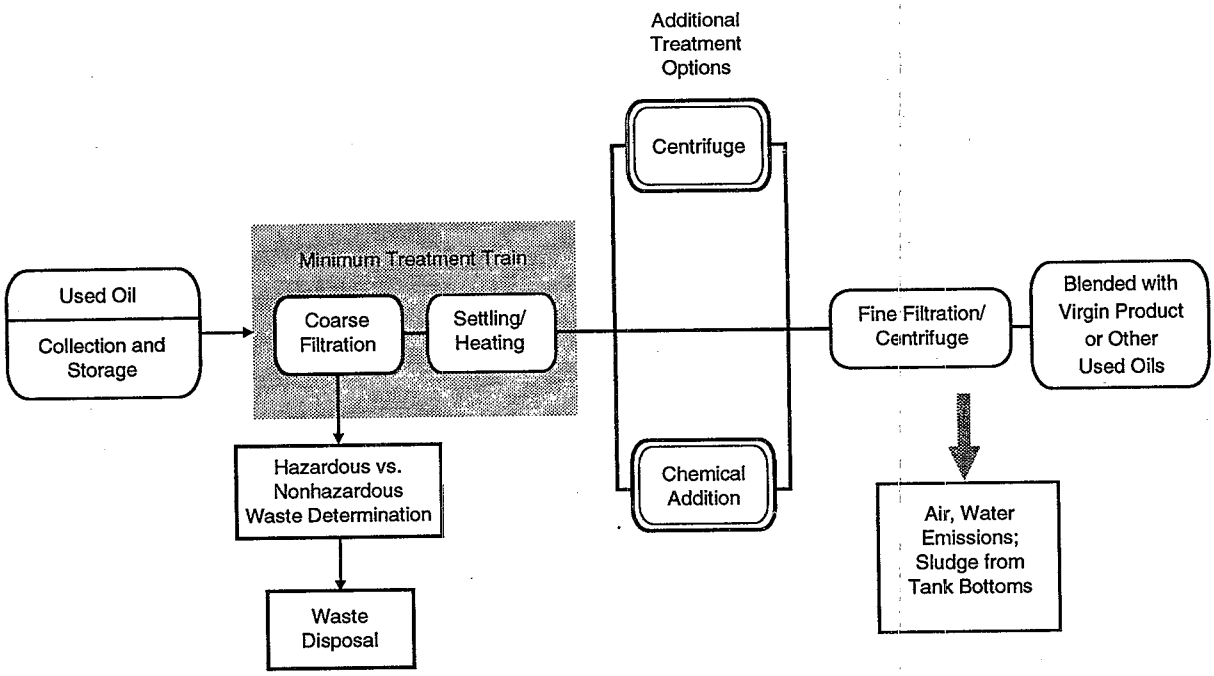

Figure 4-2. A simplified used oil processing system (source: Arner, 1992).

Burning off-specification used oil for fuel in large boilers and furnaces is another acceptable direct burning method. Under the Used Oil Management Standards, off-specification used oil can only be burned: for fuel in industrial furnaces or boilers (such as asphalt plants and cement kilns), for fuel in utility boilers that generate electricity or other types of energy, and in hazardous waste incinerators (U.S. EPA, 1992c). Off-specification used oil can safely be burned in these large burners because they burn much hotter than space heaters and other small heaters. The heat generated causes the used oil and its contaminants to be burned almost completely, reducing the quantity of contaminants that are released to the air. In addition, these large burners usually have pollution control equipment that further reduces emissions (Nolan et al., 1990). Therefore, as long as the burning of off-specification used oil meets the management standards, it is an effective way to recycle used oil.

The major advantage of direct burning is that it allows the heat value of used oil to be utilized without the expense of processing the used oil before burning. When used oil is directly burned on site this advantage is even greater. Not only is the cost required to process the used oil eliminated, but costs of transporting the used oil are eliminated as well. Another advantage of direct burning is that a large number of facilities around the country are capable of directly burning used oil. Unlike rerefining, therefore, direct burning is a readily available recycling option for generators who are also off-specification burners.

For service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers, the major advantage of directly burning used oil on site comes from using the used oil they have generated for heating fuel. As discussed in Chapter 2, generators of used oil sometimes have to pay to have their used oil removed. In these cases, the generators do not directly benefit from the value of their used oil. When generators use the used oil as a source of heating fuel, however, they can heat their establishments with used oil and buy less heating fuel. Burning used oil on site for heat, therefore, guarantees that the generator will receive an economic benefit from its used oil.

The advantage of using used oil on site as a heating fuel can only be gained in climates and during seasons that heating is required. During seasons when heating is not required, used oil will still have to be removed from the site by transporters or recyclers, unless the generator stores the used oil for use in colder months. Generators that choose to store used oil will have increased storage costs.

One disadvantage of direct burning results from generators burning off-specification used oil. Under EPA's Used Oil Management Standards, generators who burn used oil in space heaters do not have to test the oil to see if it meets burning specifications, as long as the used oil is generated

on site or collected from DIYs. Consequently, these generators potentially could burn off-specification used oil. Emissions from burning off-specification used oil would be higher than emissions from burning specification used oil.

In addition to this disadvantage, there are several factors that should be considered when deciding whether to directly burn used oil. First, onsite direct burning requires an initial investment to purchase a space heater. A typical space heater costs $5,250, including installation and the 250 gallon storage tank used to feed the heater (Arner, 1992). In addition to an investment of cash, space heaters require an investment of time. Periodic maintenance of space heaters is necessary, and the ash from space heaters must be removed and disposed of properly. Prior to disposal, a generator must determine whether the ash is regulated as a hazardous waste (see Appendix B), and if so, must dispose of it in a permitted facility.

Finally, in many areas of the country, facilities must obtain local or state air pollution control permits before they can burn used oil in a space heater. Consequently, service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers that wish to directly burn used oil should first check with their state and local governments to determine if a permit is needed before they purchase a space heater and begin direct burning.

Choosing a Recycling Option

When choosing a recycling option for used oil, the generator must first decide whether the used oil will be recycled on site or off site. As discussed earlier in this chapter, burning used oil in space heaters is a readily available onsite recycling option for service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers. If the generator decides the advantages to onsite recycling are greater than the advantages of the other recycling options, and the generator decides that *all* of the used oil generated on site can be recycled on site, then the generator does not have to choose a recycling facility.

Used oil generators that decide not to recycle used oil on site, or that decide to use an offsite recycling method for some of the used oil they generate, must either:

- Choose a used oil transporter that will collect the used oil and bring it to a recycling facility of the transporter's choice.
- Choose a used oil recycling facility that arranges for transportation of the used oil.
- First choose a recycling facility and then choose a transporter that will haul the used oil to that recycling facility.

Choosing a used oil transporter is discussed in Chapter 5.

As discussed in Chapter 3 and Appendix E, a used oil generator *must* choose a used oil recycling facility itself (rather than allow the transporter to choose the facility) when the used oil is considered hazardous under DOT's Hazardous Materials Transportation Act (HMTA). If the generator does not choose a recycling facility (and an alternate) the manifest requirements in the HMTA regulations will not be met. If the generator is not exempt from CERCLA liability through the service station dealers exemption, the generator should strongly consider choosing its own used oil recycler. This allows the generator to select the most reputable recycler possible to help ensure that the oil will be managed properly and to limit the potential for liability claims against the generator. Finally, a used oil generator that is exempt from CERCLA liability but is interested in the type of recycling option that is used (i.e., prefers rerefining to processing) might still wish to select a particular recycler.

Many sources of information exist on used oil recycling operations. State environmental agencies and trade associations can be contacted for lists of used oil recyclers. Appendix A of this document gives lists of state contacts and trade associations that would have such information. The yellow pages can also be used to identify used oil recyclers in the local area. Used oil recycling facilities are sometimes listed under "oil," "petroleum," "used," "waste," or "recycle." In addition, other service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers can be contacted for information about the used oil recyclers they are using. A used oil generator should identify at least three or four recycling operations to choose from (Nolan et al., 1990).

Once a list of potential used oil recyclers has been developed, a primary recycling facility (as well as an alternate) can be chosen. The most important goal when choosing a used oil recycling facility is to select a reliable recycling operation that will recycle the used oil in an environmentally sound manner. The secondary goal when choosing a recycling facility is to maximize the used oil generator's profits (or minimize the costs) from having the used oil recycled.

The first thing to do to determine if a recycling operation is reliable and environmentally sound is to visit the facility. Appointments should be made at the potential recycling facilities to inspect their operations. When inspecting a used oil recycling facility, the following things should be

looked for to show that the facility is reliable (Nolan et al., 1990; Arner, 1992):

- Neatly kept appearance.
- No evidence of oil leaks or spills.
- Containment structures, such as walls and berms, that would prevent spills or leaks from being released to the environment.
- No strong odors in the area.
- No evidence of oil in surface water near the facility.
- The facility has or uses an adequate laboratory that follows appropriate quality assurance/quality control procedures.

If there is any visible evidence that the recycling facility is not reliable, the facility should be eliminated from consideration. Used oil recycling facilities that look substandard probably are substandard (U.S. EPA, 1989b). If the recycling facility looks acceptable, however, an interview should be conducted with a representative of the facility to get more information about facility operations and procedures. The first question that should be asked is: Does the facility have an EPA identification number? *If the answer is "no," the recycling facility is not in compliance with EPA's Used Oil Management Standards and should not be used!*

Table 4-1 gives a list of other questions that should be asked to recycling facility representatives when trying to choose the best facility. The table also gives the answers that indicate the facility is reliable. Obviously, the more "desirable answers" that are given by the facility representative during the interview, the more reliable the used oil recycling facility is likely to be. The facility for which the most "desirable answers" are given during the interview should be considered as the top candidate for the used oil recycling facility.

Once reliability has been assessed, costs can be considered. As discussed in Chapter 2, generators of used oil either get paid by recyclers for their oil, or must pay recyclers to remove and recycle the used oil, depending on the price of virgin oil. Another factor that affects the price generators are paid by (or must pay to) recyclers is the differences in operational costs of the recyclers. For example, a processor that has lower operational costs than another processor can pay more for used oil and still generate a profit. (This assumes, of course, that both processors produce a fuel of the same quality that sells for the same price.) As a result, different recyclers are likely to offer different prices for used oil.

Consequently, when choosing the recycling facility to use, the generator should consider how much the recycler is willing to pay for the oil (or how little the recycler must be paid to take the oil). If the generator is trying to choose between reliable recycling facilities, costs can be the deciding factor. Because of the need to keep any liability costs to a minimum and to ensure that used oil is managed properly, however, an unreliable recycling facility should never be chosen over a reliable one because of cost (Arner, 1992).

The Option of Last Resort–Disposal

Disposing of used oil wastes its heat and lubrication value and should be avoided whenever possible. Circumstances exist, however, when the costs of recycling used oil are so high that recycling is not a practical option. For example, the technology exists to recycle highly contaminated used oil. The costs of recycling this highly contaminated used oil can be much higher than the value of the oil, making recycling impractical for the generator. In addition, in some cases, the used oil is generated in such small quantities and so far away from a recycling facility that more fuel would be used to transport the used oil for recycling than would be saved by recycling the used oil. In cases such as these, the used oil generator must consider disposing of the used oil.

The first step the generator must take when disposing of used oil is to determine if it is hazardous. The generator must test the used oil, use his or her knowledge of how the used oil was generated, or use another acceptable method, to determine if the used oil has been mixed with a hazardous waste or if it exhibits the characteristics of a hazardous waste. As discussed in the section on the rebuttable presumption in Chapter 3 and Appendix B, the generator must use his or her knowledge or conduct a halogen test (or send the used oil to a laboratory that will conduct the test) to see if the used oil contains more than 1,000 ppm of total halogens. The used oil must be disposed of as a hazardous waste under Subtitle C if it:

- Contains 1,000 ppm or more of total halogens, and the generator cannot rebut the presumption that the used oil is a hazardous waste by testing the oil again (as discussed in Chapter 3).
- Exhibits the characteristics of a hazardous waste.

The used oil can be disposed of as a solid waste under Subtitle D if it:

- Contains less than 1,000 ppm total halogens and does not exhibit the characteristics of a hazardous waste.
- Contains 1,000 ppm or more of total halogens, but the generator can rebut the presumption that the used oil

Table 4-1. **Questions for Recycling Facilities**

Questions	Desirable Answers
1. Is there a specific, documented procedure for accepting used oil from generators?	Yes
2. Are specific laboratory tests used to test the used oil before it is accepted? Does the laboratory follow appropriate QA/QC procedures?	Yes
3. Is the used oil collected regularly from the same group of generators?	Yes
4. Is the used oil from each generator stored in separate tanks or containers until is has been tested?	Yes
5. Is the used oil recycled in a closed process system that minimizes emissions to the air?	Yes
6. Does the facility have provisions for proper treatment and disposal of wastewater and contaminated stormwater, including proper permits?	Yes
7. Does changing the type of oil being recycled interfere with facility operations?	No
8. Are the residuals from recycling processes (e.g., sediment that has been removed from the used oil) disposed of properly (e.g., used to make asphalt, burned in a cement kiln, or tested and landfilled)?	Yes
9. Are the facility's tanks cleaned often to prevent the buildup of sediment?	Yes
10. Does the facility have a Spill Prevention Control and Countermeasures Plan?	Yes
11. Has the facility recently been visited by state or federal environmental inspectors?	Yes
12. Can a copy of the inspection be reviewed?	Yes
13. Were any problems found during the inspection?	No
14. Has the local fire department inspected the facility?	Yes
15. Can a copy of the inspection be reviewed?	Yes
16. Were any problems found during the inspection?	No
17. Have releases of used oil to the environment occurred at the facility?	No
18. Have any environmental lawsuits been brought against the facility?	No
19. Does the facility have insurance that covers liability claims?	Yes

Adapted from: Arner, 1992

has been mixed with a hazardous waste by testing the oil again (as discussed in Chapter 3).

If the used oil is to be disposed of as a solid waste under Subtitle D, then the generator must identify a solid waste facility that will accept the used oil. In general, this will either be a Subtitle D industrial landfill or incinerator. As discussed in Chapter 3, different states have different regulations concerning whether or not solid waste facilities can accept used oil. In addition, different solid waste facilities within the same state can have different requirements about what types of waste they will accept. State contacts listed in Appendix A can give generators information about the solid waste disposal options that are available.

If the used oil is determined to be a hazardous waste, or if no Subtitle D facilities can be identified that will accept the used oil, then the generator must find a hazardous waste facility to dispose of the used oil. State contacts or EPA Regional contacts listed in Appendix A can provide information on permitted hazardous waste disposal facilities.

Whether or not the used oil has a halogen content of 1,000 ppm or more or exhibits other hazardous characteristics, it is considered a hazardous substance under DOT's HMTA regulations whenever it is transported. Consequently, the used oil generator must meet all the HMTA requirements discussed in Appendix E for a hazardous waste generator. Basically, this includes preparing a proper manifest for the used oil, properly labelling the used oil, using DOT- approved packaging for the used oil, and selecting a transporter that meets DOT requirements.

Chapter 5

Choosing a Used Oil Transporter

As discussed in Chapter 4, some used oil is recycled at the site where it is generated. Much of the time, however, used oil must be transported to another site for recycling. The transporter's role in the used oil management network is to collect used oil from generators and transport it to processors, rerefiners, or burners using collection, storage, and transport methods that protect human health and the environment. This chapter describes the activities and responsibilities of used oil transporters. In addition, the chapter gives advice to service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers on how to choose and work with a transporter.

General Information About Transporters

EPA's Used Oil Management Standards define a used oil transporter as "any person who transports used oil, any person who collects used oil from more than one generator and transports the collected oil, and owners and operators of used oil transfer facilities." Under the management standards, as well as earlier used oil regulations, used oil transporters are required to inform EPA of their used oil activities. Once EPA has been notified, the transporter is assigned a unique, 12-digit number (U.S. EPA, 1992c). Approximately 400 used oil transporters in the United States have obtained identification numbers from EPA (Arner, 1992).

Transporters normally collect and transport used oil in tanker trucks. These trucks are equipped with a pump or vacuum mechanism to remove the used oil from the generator's storage containers and transfer it into the truck's tank (Washington Citizens for Recycling Foundation, 1992). Usually, each truck collects used oil from several generators in one run, mixing the collected used oil together in the truck's tank. The practice of mixing the used oil into one holding tank, however, is not advisable unless the used oil is tested before it is pumped into the tank. If the used oil is not tested and it is contaminated with a hazardous waste, the entire batch of used oil in the tanker truck can become contaminated.

Once the truck is full, the transporter either delivers the used oil directly to a recycling facility or to a transfer station. At the transfer station, the used oil is stored so that larger loads can be accumulated before the used oil is sent to a recycling facility. Some transporters do not use tanker trucks, but instead collect entire drums of used oil (Energy and Environmental Research Corporation, 1988).

How To Choose a Transporter

As mentioned in Chapter 4, generators that decide not to recycle their used oil on site must have their used oil transported to a recycling facility. These generators can choose a used oil recycling operation that also transports used oil or arranges with a transporter to collect the used oil. In these cases, the generator does not have to select a used oil

Key Terms

Tanker Trucks	Trucks that are specially designed to hold liquids. The liquids are stored in large, tank-like compartments on the bed of the truck.
Vacuum Mechanism	Equipment that uses the force of a vacuum to remove oil from a storage tank and then release it into a tanker truck or another storage tank.

transporter. Generators also have the option, however, to choose a transporter that transports the used oil to a recycling facility of the transporter's choice, or to choose a recycling facility *and* a transporter.

The first step in choosing a used oil transporter is to identify several transporters in the local area. State used oil contacts can provide information on transporters with EPA identification numbers. Trade associations also might have listings of transporters. Information on trade associations and state used oil contacts is provided in Appendix A of this document. In addition, recommendations from service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers in the area, as well as listings in the yellow pages of the telephone book, can be good sources of information for identifying local transporters.

Once several transporters have been identified, generators should obtain information about each transporter's operations before choosing a transporter and entering into a contract. The primary concern when choosing a transporter is that the transporter properly handles used oil and is in compliance with all applicable regulations. A secondary consideration is how much the transporter will pay for the used oil that is collected (or in depressed markets, how little the transporter must be paid for collecting the used oil).

To be in compliance with EPA's Used Oil Management Standards, generators must select a transporter with an EPA identification number. As mentioned above, this unique 12-digit number indicates that a transporter has given the required notice to EPA concerning its used oil activities (U.S. EPA, 1992c).

Transporters' operations should be visited and representatives of these operations interviewed before a transporter is selected. With larger transporters, appointments can be made to inspect the transfer facility, and the trucks can be inspected. Very small transporters, however, might not have transfer facilities, and only the trucks can be inspected. The same type of things as are discussed in Chapter 4 for determining that a used oil recycling facility is reliable should be looked for when inspecting the trucks or the transfer facility of a used oil transporter. For example, the transfer facility, trucks, and storage tanks should be neatly kept, with no evidence of oil leaks or spills.

Just as with recycling facilities, the transporter should be eliminated from consideration if there are any signs that the transporter is unreliable, such as a leaking valve on a tanker truck or spilled oil around a storage tank. If the transporter's operations appear reliable, a representative can be interviewed for more information about the operation. As with choosing a recycling facility, the first question that should be asked is: Does the transporter have an EPA identification number? Another question that should be asked at the start of the interview is: Does the transporter keep tracking records of where the used oil is collected and where it will be transported to? *If the answer is "no" to either of these questions, the transporter is not in compliance with EPA's Used Oil Management Standards and should not be used!*

Transporter Testing of Used Oil

Under EPA's Used Oil Management Standards, transporters must test (or use their knowledge of the materials or processes used to generate) used oil to determine the total halogen content before they deliver it to a used oil recycling facility, another transporter, or a disposal facility. If the halogen level exceeds 1,000 ppm, the used oil is presumed to be mixed with a hazardous waste. The transporter or generator can rebut this presumption, as described in Chapter 3, by demonstrating that the halogens come from a nonhazardous source. If the presumption is not successfully rebutted, or no attempt is made to rebut the presumption, the used oil must be managed as a hazardous waste (U.S. EPA, 1992c).

Managing used oil as a hazardous waste dramatically increases handling and liability costs. In order to avoid the risk of these increased costs, it is in the best interests of the transporter to test the used oil before collecting it and taking it off site. If the halogen level is greater than 1,000 ppm, the transporter is likely to refuse to accept the used oil, leaving the generator with the responsibility for managing the used oil as a hazardous waste. Consequently, generators should do everything possible to ensure that their used oil is not mixed with a hazardous waste.

A number of additional questions can be asked about a prospective transporter's operations to help generators make informed decisions about the ability of transporters to protect human health and the environment. Table 5-1 gives a list of questions, along with the answers that show the transporter is reliable.

Costs are another factor in choosing a transporter, but should be of lesser importance. As discussed in Chapter 2, the price of virgin oil affects the economic value of used oil. Table 5-2 is an example of a used oil transporter payment schedule, which is based on the price of virgin oil. Again, because of the importance of properly managing used oil and the potential for liability, costs should not be considered more important than reliability when choosing a transporter (Nolan et al., 1990).

Transporter Receipts and DIY Collection Center Records

Public DIY collection centers are established with the goal of collecting as much used oil for recycling as possible to prevent used oil from being managed improperly. Consequently, the success of a collection center can be measured by the quantity of used oil collected. An easy way to record this quantity is to keep receipts that indicate the amount of used oil picked up by the transporter.

Information on the quantity of used oil collected can be used to determine the success of specific aspects of a collection program. For example, if a program changes its collection days from Tuesday and Saturday to Friday and Sunday, a simple check of the transporter receipts would show whether the change resulted in an increase in the amount of used oil collected. The receipts also could be used to quantify the success of a public education program to promote used oil recycling.

Table 5-1. **Questions for Transporters**

	Questions	Desirable Answers
1.	Is there a specific, documented procedure for accepting used oil from generators?	Yes
2.	Does the transporter keep samples of all out bound loads for at least 3 years?	Yes
3.	Are specific laboratory tests used to test the used oil before it is accepted?	Yes
4.	Does the transporter provide documentation of the laboratory analysis of the used oil to the used oil generators?	Yes
5.	If the used oil is not tested before it is accepted, is the used oil from different generators stored separately (in separate containers or in a separate compartment within the tanker truck) until it has been tested?	Yes
6.	Is the used oil collected from a standard group of generators?	Yes
7.	Is the used oil transported to recycling facilities with EPA identification numbers?	Yes
8.	Are specific procedures used to minimize spills when the used oil is collected?	Yes
9.	If the transporter operates a transfer facility, does the transfer facility have a Spill Prevention Control and Countermeasures Plan?	Yes
10.	Are specific procedures used to clean up spills that occur during collection or transportation?	Yes
11.	Does the transporter properly maintain all vehicles used to transport used oil? Are there sufficient vehicles available?	Yes
12.	Does the transporter keep records of truck maintenance and storage tank maintenance and inspection?	Yes
13.	Have releases of used oil to the environment occurred during transportation operations?	No
14.	Have any environmental lawsuits been brought against the transporter?	No
15.	Does the transporter have insurance that covers liability claims?	Yes
16.	Does the transporter meet all DOT requirements?	Yes

Table 5-2. **Sample Price Schedule**

Price of Virgin Fuel Oil per Gallon in the *Journal of Commerce*	Price Paid or Charged to Generators for Collecting Each Gallon of Used Oil
55¢ to 64¢	paid from 1¢ to 10¢
48¢ to 54¢	FREE COLLECTION
37¢ to 47¢	charged from 1¢ to 11¢

Source: Nolan et al., 1990

Working With a Transporter

Certain steps should be taken by used oil generators to ensure that the used oil is properly managed during the transportation process. Following these steps can help the generator to be sure that the used oil transporter is careful, accurate, and in compliance with EPA's Used Oil Management Standards.

- As discussed earlier in this chapter, transporters are required under EPA's Used Oil Management Standards to keep a tracking sheet for the used oil they collect. As part of the tracking procedure, the transporter is required to have a representative of the generator sign and date the tracking sheet (U.S. EPA, 1992c). The generator should be sure that the transporter asks that the tracking sheet be signed.
- The generator should measure the level of used oil in the storage container before and after the transporter makes a pick up. These measurements should be compared to the quantity of used oil the transporter reports collecting (U.S. EPA, 1989c). Correct measurements ensure that the generator is not underpaid or overcharged for the used oil. In addition, a transporter that does not accurately record the quantity of used oil collected might not be reliable.
- The generator should ask for a receipt from the transporter that states how much used oil was collected from the generator and where the used oil is to be taken. Although the used oil generator is not required to maintain records under the Used Oil Management Standards, these receipts can be used as backup records if the transporter's records are ever lost or destroyed. The receipts also can be used to show that the generator used a transporter with an EPA identification number, and is therefore in compliance with the management standards. Finally, these receipts can be used as a record of how much used oil is produced by the generator.

Chapter 6

Onsite Management for Used Oil Generators

Although used oil transportation and recycling is a concern for service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers, the primary responsibility for these generators is properly managing used oil on site. This chapter discusses onsite management procedures in detail, including collecting used oil from DIYs, storing used oil, burning used oil in space heaters, and responding to releases of used oil to the environment. Information is given on how to properly manage used oil throughout all of these phases of onsite management. In addition, this chapter includes recommendations for planning for emergencies.

Collecting Used Oil From DIYs

DIY collection centers (including service stations, quick-lube shops, and retailers that collect used oil from DIYs) are responsible for properly collecting used oil from DIYs. Collecting used oil from DIYs includes accepting used oil from these individuals, in some way promoting this service, and storing the DIY used oil until it is recycled on site or transported off site for recycling.

Advantages of Collecting DIY Used Oil

The main advantage of collecting DIY used oil is protecting the environment. As discussed in Chapter 2, much of the used oil generated by DIYs never enters the used oil management system and is never recycled. Some of this oil is dumped on the ground or poured down storm drains, where it contaminates water and soil. Offering DIYs a place to bring their used oil so that it can be properly recycled helps to cut down on improper disposal.

As emphasized throughout this document, another important advantage of collecting DIY used oil is the exemption from CERCLA liability. The only way service stations and quick-lube shops can be eligible for the service station dealers exemption is to collect DIY used oil. Another advantage to service stations and quick-lube shops, as well as to retailers, is the positive publicity they can receive for providing this valuable community service (Convenient Automotive Services Institute, circa 1992a).

Disadvantages of Collecting DIY Used Oil

One potential disadvantage of collecting used oil from DIYs is that the used oil might be contaminated with products such as solvents, pesticides, and paint thinners (Convenient Automotive Services Institute, circa 1992a). Fortunately, however, DIY used oil is rarely contaminated with hazardous materials (Hegberg et al., 1991). Educating DIYs about how to properly handle their used oil before they bring it in for recycling can also reduce this problem. In addition,

Key Terms

Fill Sink	An opening in a storage tank or container where used oil or other liquids are poured before they flow into the tank or container.
Sorbent	A material that is spread over a spilled liquid to absorb the liquid so it can be cleaned up.
Stratified	Layered.
Vacuum-Assisted Wand	A device with a long, thin tube attached to a hose. Vacuum pressure through the hose causes used oil or other liquids to be drawn from a storage tank or container into the container used for transportation.
Vacuum Hose	A device with a hose attachment that can be connected to an opening in a storage tank. Vacuum pressure through the hose causes used oil or other liquids to be drawn from the storage tank into the container used for transportation.

following the proper procedures for collecting DIY used oil discussed later in this chapter will allow facility personnel to identify almost all contaminated used oil.

Collecting DIY used oil requires staff time and often, money. In some states and localities personnel must be on hand to receive the used oil and to assist the DIYs, which takes time. If separate storage containers are used for DIY used oil, costs for these containers must be considered. In addition, when transporters or recyclers charge for collecting used oil from generators, the used oil collected from DIYs will cause direct costs to be incurred by the service station, quick-lube shop, DIY collection center, or retailer. When transporters and recyclers pay for used oil, however, the DIY used oil will bring added revenues (Convenient Automotive Services Institute, circa 1992a).

Proper Procedures for Collecting DIY Used Oil

Like all onsite used oil management practices, the basis for all proper procedures for collecting DIY used oil is good housekeeping. The main emphasis should be to reduce spills. In addition, facility personnel (rather than DIYs) should always handle the used oil. Below is a list of specific tips for properly collecting DIY used oil.

- Used oil should be handled as little as possible. The more the used oil is transferred from one storage container to another, or transported around the facility, the greater the potential for spills (Arner, 1992).
- Used oil should only be accepted if the DIY has brought it in a clean, leak-proof container, such as a milk jug (Convenient Automotive Services Institute, circa 1992a).
- A collection log should be kept and DIYs should be asked to sign the log when they bring in the used oil. This log can be used to prove that DIY used oil is collected at the facility, in order to satisfy the requirements for the service station dealers exemption from CERCLA liability (Convenient Automotive Services Institute, circa 1992a). This log can also be used to evaluate the success of the DIY collection operation by gauging how much DIY used oil is collected (Massachusetts Water Resources Authority, 1992). In addition, the log can help reduce the chance of accepting contaminated used oil if DIYs are asked to certify that the used oil has not been mixed with other materials when they sign the log (Barrett and Nightingale, 1992). Figure 6-1 gives an example of a DIY used oil collection log.
- Trash cans should be available for DIYs to dispose of the containers they brought the used oil in (Arner, 1992). These trash cans must be serviced regularly and containers should be disposed of in a secure Subtitle D disposal facility. Containers should not be reused for carrying other substances, although DIY collection centers certainly can encourage DIYs to reuse the containers the next time they change their oil.
- The area should be kept neat and clean to encourage DIY participation and to set a good example for DIYs on how to handle used oil (Massachusetts Water Resources Authority, 1992).
- A large, easily readable sign should be displayed to inform the public that DIY used oil is accepted at the site and to give the hours when DIY used oil can be brought in for recycling (Arner, 1992). The sign also should indicate what materials are not accepted.

I hereby certify that the used motor oil I am depositing at this site was drained from the engine of a passenger car or light truck and that it is free of contamination by solvents, gasoline, degreasers, paints, paint thinners, pesticides, or any other substances not arising from normal use in a motor vehicle.

Date	Name/Signature	Address	Amount Deposited

Figure 6-1. Collection log for DIY used oil (source: Convenient Automotive Services Institute, circa 1992a).

- All storage tanks and containers should be locked, except when they are being filled or emptied, and only facility personnel should have access to the tanks and containers (State of Connecticut, no date).
- The facility should be attended at all times, or should have adequate security after hours, to reduce the threat of vandalism and to keep individuals from leaving used oil and other materials at the site (Arner, 1992).
- Road access should be convenient when the facility is open, but inaccessible when the facility is closed (Arner, 1992).

To help eliminate the problems of collecting DIY used oil that has been mixed with hazardous substances, service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers should educate DIYs on the importance of *never mixing anything with used oil.* In addition, the following steps should be taken to identify DIY used oil that has been contaminated with household hazardous wastes and other substances:

- DIYs should be asked if their used oil has been mixed with any other substances (Convenient Automotive Services Institute, circa 1992a).
- The type of container the used oil is brought in should be inspected so that used oil in bleach bottles, anti-freeze jugs, paint thinner cans, or other chemical containers can be identified (Convenient Automotive Services Institute, circa 1992a). Even small amounts of paint thinner,

Community DIY Collection Programs

Types of community DIY used oil collection programs vary widely. Some communities encourage service stations, quick-lube shops, and retailers to collect DIY used oil. With these programs, the communities' role is to publicize the need to properly recycle used oil and to let DIYs know which service stations, quick-lube shops, and retailers provide a collection service. Other communities run their own collection centers, where DIYs bring their used oil. Still other communities provide curbside collection of used oil (U.S. EPA, 1989b).

The key to a successful public DIY collection programs is to educate DIYs on the need to manage used oil properly, as well as to give them a convenient way to do it. Another element of success is flexibility. Every community is different—so each community DIY collection program should be tailored to meet the specific community needs and to use the available community resources (Washington Citizens for Recycling Foundation, 1992).

bleach, or other substances remaining in these containers could cause the used oil to be off-specification for burning (Massachusetts Water Resources Authority, 1992).

- The used oil should be visually inspected for contamination. If the used oil is stratified, it is probably contaminated with water, antifreeze, or other liquids (Massachusetts Water Resources Authority, 1992).

- Although used oil should never be sniffed to detect unusual odors, if an unusual odor is detected when the used oil is being poured into the storage tank or container, the facility employee should stop pouring the used oil. Unusual odors can be a sign of contamination (Massachusetts Water Resources Authority, 1992).

- The used oil can be tested for halogen content, by using a chemical test or a halogen leak detector (Washington Citizens for Recycling Foundation, 1992). If the used oil has 1,000 ppm or more of total halogens, it is presumed hazardous, unless the presumption can be successfully rebutted (for example, by documenting that the source is household hazardous waste).

Whenever signs of contamination are detected, the used oil should either be stored separately or tested for contamination before it is introduced into a storage tank or container holding other used oil. In addition, all DIY used oil that is collected can be stored in an intermediate storage container until it is tested. This will prevent any contaminated DIY used oil from contaminating all the used oil in the primary storage tank (Washington Citizens for Recycling Foundation, 1992).

Costs of Setting Up a DIY Collection Program

DIY collection center costs include the start-up costs for buying equipment and preparing the site, and the continued operational costs for personnel, publicity, and transporting the used oil for recycling. These costs vary depending on the type of equipment chosen, the level of personnel involvement, the extent of publicity, and the price paid to or by transporters for the used oil collected. Some typical costs are discussed below (Washington Citizens for Recycling Foundation, 1992):

- **Tanks**—Tanks are discussed in more detail later in this chapter. Typically, however, DIY collection programs will use double-walled, steel tanks that cost from $500 to $2,000.

- **Preparing the Site**—This includes the costs to lay a concrete pad (to reduce the possibility that used oil spills will be released to the environment), build a barrier around storage tanks or containers (to prevent vehicles from colliding into them), and build a rain shed (to keep water off the storage containers). Costs to prepare a site in this way will generally be less than $2,500.

- **Signs**—Signs describing the purpose of the facility and giving hours of operation will cost approximately $100.

- **Spill Kits**—Sorbent materials that can be used to clean up used oil spills must be kept at the site. Types of materials include booms, kitty litter, saw dust, etc. Spill kits should cost less than $250 a year.

- **Testing Kits**—Chemical test kits run between $6 and $10 each. Halogen leak detectors (or "sniffers") cost approximately $100.

- **Costs of Having Used Oil Removed by Transporters or Recyclers**—As discussed throughout this document, these costs vary widely. Some typical costs reported for public DIY collection programs range from paying 25¢ a gallon to have the used oil collected to being paid 2¢ a gallon for the used oil.

- **Personnel**—Again, these costs vary widely. If the DIY collection center is sited at a location where full-time staff currently work, like at a solid waste transfer facility or landfill, these costs are nominal. If personnel are hired to specifically staff the DIY collection center, however, costs will depend on the wages given and the number of hours worked.

- **Publicity/Education**—These costs also vary, depending on the level of the public education campaign. Press releases

and public service messages can have nominal costs, while flyers, brochures, and posters have higher costs, including printing and development charges. One Florida DIY collection program spent $3,000 for 40,000 flyers, $3,300 for 500 brochures, $999 for 100 pennants, and $1,170 for 500 posters.

Storing Used Oil

Whether planning to transport used oil off site or reuse it on site, all automotive service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers must have a way to store the used oil that they generate or collect. The device used to store used oil must be easy to use, reduce the potential for spills or leaks, and meet local, state, and federal regulations.

According to EPA's Used Oil Management Standards, used oil may be stored in either containers or tanks. Containers are portable devices, such as 55-gallon drums, while tanks are stationary devices that are designed to contain an accumulation of used oil. Tanks provide structural support and are generally constructed out of non-earthen materials, such as steel, concrete, and plastic.

Tanks have been divided into two categories: aboveground and underground storage tanks. While underground tanks have been widely used at service stations and other automotive facilities in the past, the current trend is toward using aboveground storage tanks because of the increasingly stringent regulation of underground storage tanks (Stitzel, 1991; Washington Citizens for Recycling Foundation, 1992). In addition, aboveground storage tanks cost less to buy and install than underground storage tanks.

Aboveground storage tanks, underground storage tanks, and containers are discussed below. In addition, advantages and disadvantages of the most common types of storage devices are given in Table 6-1.

Aboveground Storage Tanks

Aboveground storage tanks (ASTs) are the most frequently used devices for storing used oil. Technically, an AST is a tank that holds at least 90 percent of its volume aboveground. In practice, however, most ASTs are completely aboveground. Figure 6-2 gives the basic design of an AST used to store used oil.

The two major types of ASTs are fiberglass tanks and steel tanks. Steel and fiberglass ASTs are available in sizes that can hold between 200 and 600 gallons. These sizes are appropriate for most service stations, quick-lube shops, fleet operations, DIY collection programs, and retailers. Fiberglass tanks frequently come in 220 and 330 gallon capacities, while steel tanks come in a wider range of sizes (Stitzel, 1991). Among the options for aboveground storage, steel tanks are often preferred for reasons of cost and durability (State of Connecticut, no date; Washington Citizens for Recycling Foundation, 1992).

Underground Storage Tanks

Underground storage tanks (USTs) are another storage option for used oil. Figure 6-3 shows a typical UST, with a double wall, leak detection, and spill overfill protection. Several million USTs currently are used in the United States (U.S. EPA, 1990). USTs have been popular in the past because they have more storage capacity than the other storage options and do not take up valuable aboveground space. The major drawback associated with USTs is the difficulty in detecting releases of used oil. Because USTs cannot be visually inspected, leaks in the tanks often are not detected until long after the used oil releases have begun. As discussed in Appendix C, federal regulations for USTs require corrosion protection and leak detection, among other things, to help prevent used oil releases.

Containers

Containers are appropriate for storing smaller quantities of used oil. They are also used to transport used oil. A wide range of containers are commercially available for storing used oil. One of the most common containers used for storing used oil, however, is the standard 55-gallon steel drum. The 55-gallon drum is popular because it is convenient for storing small quantities of used oil, particularly if the used oil from different sources will be stored in separate containers until it is tested for contamination. Because of their small size and vulnerability to spills, however, steel drums are not recommended for generators that anticipate collecting more than 200 gallons of used oil per month (Stitzel, 1991). In addition, local fire marshals often prohibit the use of steel drums for used oil collection and storage.

Factors That Should Be Considered When Choosing a Tank or Container

The storage needs of different service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers vary widely. Consequently, different storage tanks or containers are more appropriate for different used oil generators. The following factors should be considered by used oil generators before choosing a storage option:

Table 6-1. **Comparison of Storage Devices**

Type of Device	Advantages	Disadvantages	Typical Costs
Fiberglass Aboveground Tanks	• More resistant to corrosion than steel tanks. • Attractive, recognizable design. • Double-walled construction provides secondary containment, reducing the possibility of leaks. • Equipped with fill sinks that are pressed into the mold of the tanks' outer shells and allow used oil to easily be poured into the tanks. • Fill gauges and fire prevention accessories can easily be used.	• Structural integrity is sufficiently in question that many local fire marshals have prohibited their use. • Only available in 220 to 330 gallon capacities. • The fill sink design is vulnerable to overflows. • Fiberglass shells are vulnerable to damage from vehicle collision, possibly resulting in spills. • Sink covers and face plates are attached to the fiberglass shells with relatively weak hardware and can be easily vandalized. • Drips and splatters often occur when the used oil is removed.	Approximately $2,000 per tank. This generally includes some equipment, such as a fill gauge and an internal fire extinguisher.
Steel Aboveground Tanks	• Available in a wide range of designs and sizes which meet most regulations and collection needs. • Double-walled models are available that provide both secondary containment and protection against vehicle collision. • Less expensive than fiberglass tanks of comparable sizes. • Can be designed for easy access and effective security. • Large size, often over 300 gallons, reduces the frequency with which used oil must be collected. • Drips and splatters are minimized because vacuum hoses, rather than vacuum-assisted wands, can be used to collect used oil from the tank.	• Large sizes make tanks unwieldy and more difficult to relocate if a site change is required. • Some tank fill-hole designs used are vulnerable to overflows. • Vulnerable to rust and corrosion over the long term. • The large volumes of used oil that can be stored can result in higher disposal costs if the entire batch of used oil becomes contaminated with hazardous waste.	From $500 to $6,000 per tank, depending on whether the tank is single-walled or double-walled, the capacity of the tank, and associated equipment (Massachusetts Water Resources Authority, 1992; Washington Citizens for Recycling Foundation, 1992).
Underground Storage Tanks	• Conserve aboveground space. • Large size, often over 1,000 gallons, allows larger quantities of used oil to be stored. For generators that produce used oil at a relatively fast rate, this larger storage capacity reduces storage and collection costs by reducing the number of pickups and/or storage containers needed. • Drips are minimized during used oil collection because the oil removal ports allow vacuum hoses, rather than vacuum assisted wands to be used to collect used oil from the tank.	• Spills and leaks are difficult to detect. • Frequent and careful monitoring is required. • The large volumes of used oil that can be stored can result in higher disposal costs if the entire batch of used oil becomes contaminated with hazardous waste. • Tank and installation costs are much higher than for aboveground storage tanks. In addition, the required leak detection is costly. • Vulnerable to corrosion, especially when located in areas with high moisture levels in the soil. • Difficult to relocate if a site change is required. • The costs of cleaning up releases are very high.	Highest of the storage options.
Steel Drums	• Low cost. • Wide availability. • Convenient for storing small quantities of used oil. • Little or no maintenance is required once drums are painted and labeled for holding used oil. • Easily moved. • Easily inspected for leaks. • Small size allows drums to be located indoors. • The relatively small quantities of used oil stored reduce the chance of accidentally contaminating large quantities of used oil.	• Small size is inappropriate for collecting large volumes of used oil. • Weather protection is needed. • If stored indoors, ventilation is needed. • Vulnerable to spills caused by tipping or overturning. • Drips and splatters often occur when the used oil is removed. • Collecting used oil for transportation is more expensive and labor intensive than collecting used oil from other containers. • Local fire codes often prevent the use of steel drums for used oil collection and storage.	55-gallon drums can often be obtained free-of-charge from scrap metal dealers and industrial liquid transporters. These tanks must be cleaned before use, though, to prevent contamination of the used oil. Even when purchased, steel drums are the least expensive storage option. Associated costs for drums include painting and labeling.

Source: Stitzel, 1991 for aboveground tanks and steel drums (unless otherwise noted); Nolan et al., 1990 and Stitzel, 1991 for underground storage tanks.

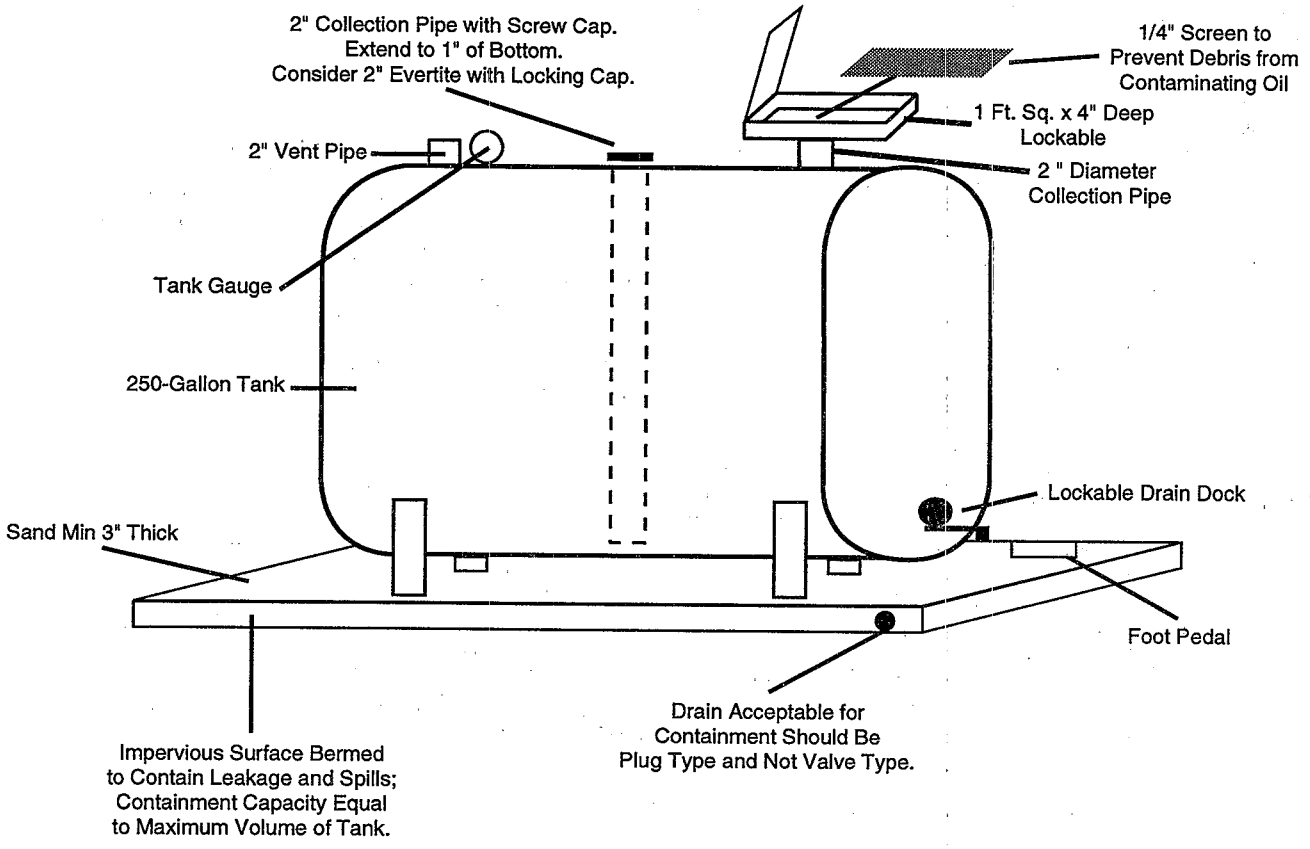

Figure 6-2. Sample design for an aboveground used oil storage tank (adapted from: U.S. EPA, 1989b).

• **Size and Storage Capacity**—The specific storage needs of the generator must be considered when choosing a storage device. Choosing a storage device that is too small will require the transporter or recycler to make very frequent pick ups, which is an inefficient process. In addition, a tank or container that is too small can negatively affect the recycling option chosen. For example, a tank that can store 250 gallons or more of used oil is recommended for generators that burn used oil on site in space heaters. A tank of this size allows solid contaminants to settle out before the used oil is burned (Clean Burn, 1992). Choosing a tank that is too large will waste money because larger tanks tend to cost more to purchase and install. It is a good idea to contact the used oil transporter to determine whether any other collection tank factors (for example, special tank fittings) apply. In addition, generators using ASTs with a capacity of 660 gallons or more should familiarize themselves with the Spill Prevention and Countermeasures (SPCC) regulations described in Appendix D.

• **Material**—Only tanks and containers made of materials that meet American Petroleum Institute (API) standards for devices holding flammable and combustible liquids should be selected (Hegberg et al., 1991). In addition, climates and site conditions that lead to corrosion affect the type of material that should be chosen.

• **Safety**—The risk factors at the site, such as susceptibility to flooding or vehicle collision, should be assessed before a storage tank or container is selected. A storage option that minimizes these risks should be chosen.

• **Durability**—As can be seen from Table 6-1, some tanks and containers are more durable than others. Durability affects both the potential for leaks, as well as the ultimate cost of the storage option chosen. To reduce the need to repair and replace storage devices, as well as the resources put into leak detection and secondary containment, the most durable tank or container possible should be chosen.

• **Cost**—The cost of the storage device itself, as well as associated costs, such as installation, spill and leak detection,

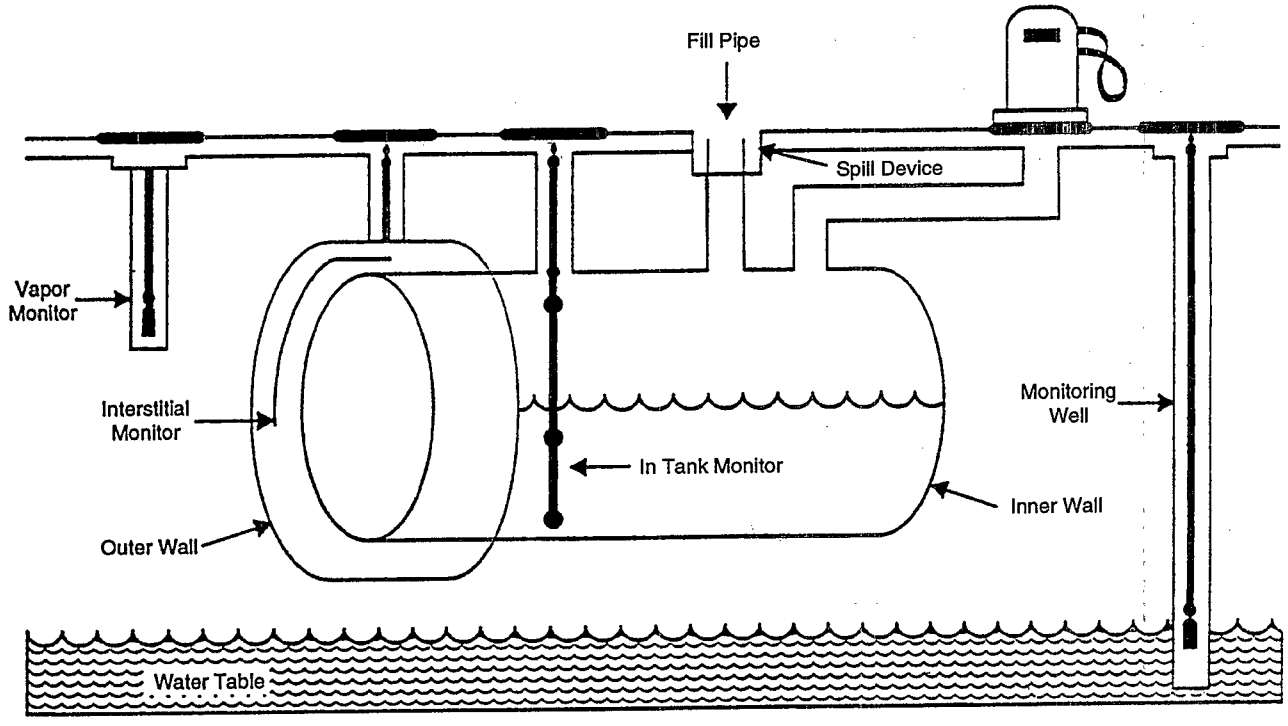

Figure 6-3. A typical UST (source: U.S. General Accounting Office, 1992).

secondary containment, maintenance, repair, replacement, and frequency of required pickups, should be considered. Quite often, choosing a tank or container with lower initial costs does not minimize storage costs over the long term because maintenance, repair, and replacement costs are higher.

Proper Storage Practices

Regardless of the type of storage device chosen, every generator should follow the same good housekeeping practices when storing used oil. The following is a list of good housekeeping practices.

- Other materials should never be mixed with used oil. Substances commonly used by automotive used oil generators, such as anti-freeze, chlorinated solvents, hazardous solvents, and degreasing agents, can contain hazardous materials. When these substances are mixed with used oil they can make the used oil a hazardous waste, which significantly increases management costs and risks to human health and the environment (Nolan et al., 1990). Consequently, separate storage tanks should be kept for solvents, anti-freeze, or any other liquids that are used on site and could accidentally be mixed with used oil. In addition, used oil mixed with nonhazardous substances, such as water and sand, is more difficult and expensive to recycle. Consequently, personnel at the facility should be educated on the need to keep all other materials from being mixed with used oil.

- All aboveground tanks, fill pipes leading to underground tanks, and containers should be clearly labeled with the words "used oil." The label also can carry a warning not to add solvents, anti-freeze, paint thinners, pesticides, or any other substances to the used oil (Clean Burn, 1993). Figure 6-4 is an example of the type of warning label that can be used for tanks and fill pipes.

- Leaks and spills must be detected as soon as possible to prevent used oil from being released into the environment. Facilities using ASTs and containers should frequently conduct routine visual inspections for tank/container decay, severe rusting, other damage, or evidence of oil in surrounding areas. In addition, the tanks/containers should be kept high enough off the ground to allow them to be inspected easily (Hegberg et al., 1991). With USTs, the leak detection and prevention methods described in Appendix C must be used.

- The amount of used oil placed into and removed from the storage device should be carefully recorded. Recordkeeping

Figure 6-4. Label for used oil storage tanks and fill lines (source: adapted from Clean Burn, 1992).

plays an important role in leak detection for ASTs, USTs, and containers. If the records of how much used oil is put into the tank or container do not match the records of how much is removed, this is a sign that the storage device is leaking (U.S. EPA, 1989a).

- Each storage device should have secondary containment, or the area around the device should provide enough secondary containment to hold at least 100% of the contents of the largest tank or container (with some extra holding capacity for rain water if the storage area is not covered). The containment walls should be high enough and far enough away from the storage devices to catch spurting leaks from punctures. The base of the containment area should be sloped so any released used oil can be easily collected and removed (Hegberg et al., 1991). Figure 6-5 shows some secondary containment options. For containment areas that are not covered, a drain or some other kind of discharge mechanism is needed to release water that is collected in the containment area when it rains or snows. Whenever used oil leaks or is spilled in the containment area, therefore, it must be properly cleaned up so that it is not released with the rain (or melted snow) water. If the water looks like it has oil in it (i.e., the water is shiny at the surface), the water should not be discharged without being treated.
- Storage devices should be equipped with a wide-mouthed, long-necked funnel, which will reduce spills during filling (Hegberg et al., 1991).
- Storage devices should be equipped with a pressure relief valve to reduce a build up of pressure, which could cause leaks (Hegberg et al., 1991).
- Sorbent materials, such as kitty litter and sawdust, should be kept near the storage device for cleaning up any spills that occur (Hegberg et al., 1991).
- Either regular used oil pickups can be scheduled with the transporter or recycler, or a representative of the facility can call for pickups when necessary (Washington Citizens for Recycling Foundation, 1992). If the used oil is not picked up regularly, the transporter should be called to pick up the oil when the tank or container is 75 percent full, so room will still be available to collect more used oil in the storage device if the transporter cannot make the pickup right away (Massachusetts Water Resources Authority, June 1992).
- The area around storage devices should be kept neat and clean (Massachusetts Water Resources Authority, 1992). A clean appearance emphasizes to personnel and DIYs visiting the facility that proper handling practices are important.

Steps To Take If Used Oil Being Stored Has Been Mixed With a Hazardous Waste

As mentioned throughout this chapter, all possible measures should be taken to prevent used oil from being contaminated with hazardous wastes and to keep any contaminated used oil from being introduced into a storage device with other used oil. If such contamination occurs, however, proper steps must be taken to have the used oil removed for disposal or recycling and to decontaminate the storage device.

A generator that produces 100 kilograms (220 pounds) or less of hazardous waste a month (or produces or accumulates 1 kilogram [2.2 pounds] or less of an acute hazardous waste) is considered a conditionally exempt small quantity generator under RCRA. Consequently, as long as a used oil

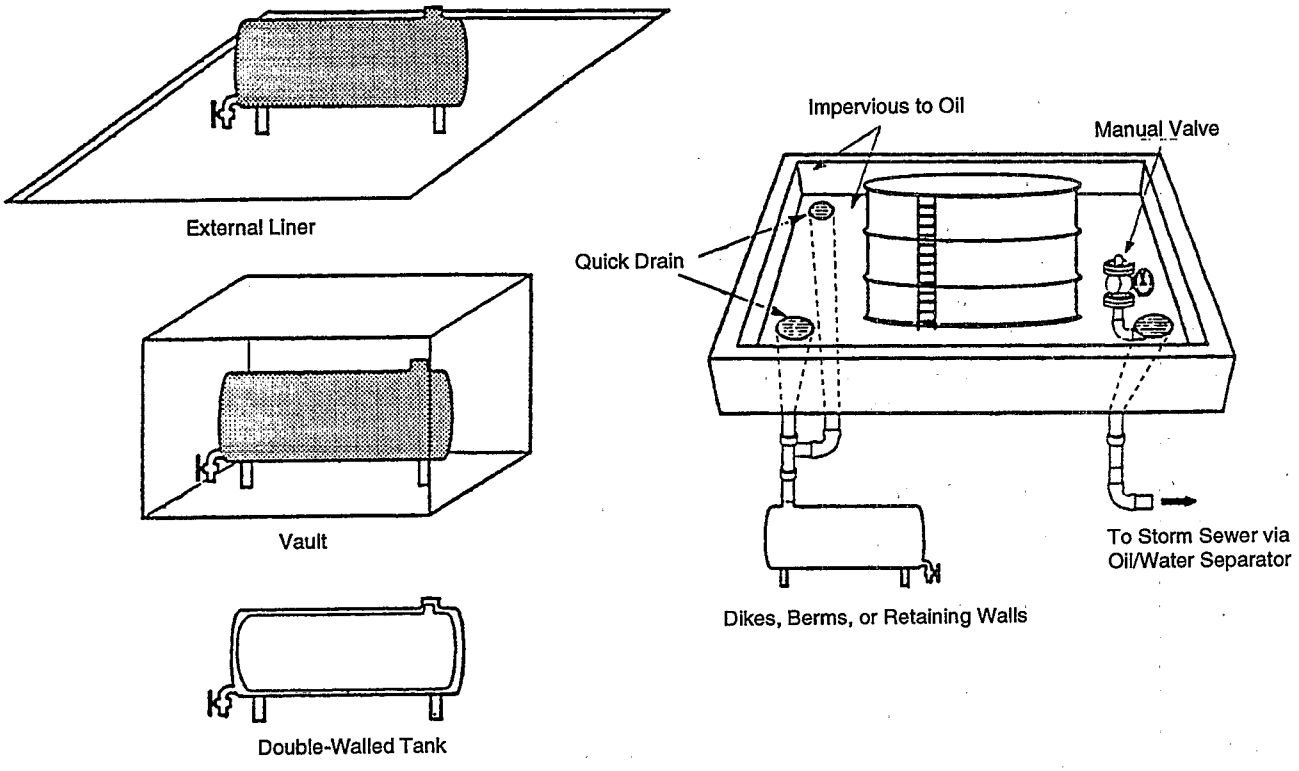

Figure 6-5. Options for secondary containment (source: *Federal Register*, September 23, 1991).

generator produces less than 100 kilograms each month of characteristically hazardous used oil, solid materials contaminated with hazardous used oil, and other hazardous substances that are not acute hazardous wastes, the generator is considered a conditionally exempt small quantity generator under RCRA.

As a conditionally exempt small quantity generator, the generator:

- Cannot accumulate more than 1,000 kilograms of hazardous wastes (or 1 kilogram of an acute hazardous waste) without losing its status as a conditionally exempt small quantity generator.
- May either treat or dispose of the hazardous waste in an onsite facility, or ensure that the waste is delivered to an offsite facility. (Offsite facilities must be in the United States.) Onsite and offsite facilities must satisfy one of the following criteria:
  - The facility is regulated under RCRA and meets all relevant RCRA requirements.
  - The facility beneficially uses or reuses the waste, or legitimately recycles or reclaims the waste.
  - The facility treats the waste before its is beneficially used or reused, or recycled or reclaimed.
- Must contract an EPA-licensed hauler to transport their hazardous wastes to an appropriate Subtitle C facility, if the waste will be shipped off site.

If the generator produces more than 100 kilograms of hazardous waste or 1 kilogram of acute hazardous waste a month, however, the generator must meet additional RCRA requirements for handling and disposing of the hazardous wastes, as discussed in Appendix B. Whether or not the used oil generator is considered a conditionally exempt small quantity generator under RCRA, the generator must still meet the DOT Hazardous Materials Transportation Act regulations, which are discussed in Appendix E.

Used oil generators can be held liable under CERCLA for environmental damages caused by onsite mismanagement of used oil that has been mixed with a hazardous waste. Because of the hazardous wastes in this used oil, the service station dealers exemption to CERCLA liability does not apply. Consequently, the used oil generator also can be held liable for mismanagement of the used oil by a transporter,

recycler, or disposal facility. Whenever used oil has been mixed with a hazardous waste, therefore, *the used oil generator should take all possible precautions when choosing a transporter, recycler, or disposal facility.* Choosing an unreliable outfit could result in staggering liability costs.

To prevent previous contamination from affecting new batches of used oil, the storage tank or container that was holding the contaminated used oil must be decontaminated. No set procedures exist for decontaminating storage devices, so determinations on how to decontaminate a storage device should be done on a case-by-case basis. The basic purpose of decontamination is to ensure that the storage device no longer contains the hazardous waste.

Burning Used Oil in Space Heaters

Space heater technology has greatly advanced over the last 10 years. Traditionally, most used oil space heaters were vaporizing units, where the used oil was boiled into a vapor and the vapor was then burned. Vaporizing units tended to be messy and to release more emissions to the air than the new generation of space heaters. Today, most space heaters are atomizing units (Arner, 1992), which mix the used oil and air into a fine mist and ignite the mist using a volt transformer. These units generally burn hotter and cleaner than the vaporizing units ("The Clean Burn Story: Turning Waste Oil from an Environmental Liability into a Cost-Saving Resource").

The largest manufacturer of atomizing space heaters in the United States sells small space heaters that would be appropriate for service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers. These space heaters are designed to burn 100% used oil. They burn an average of 1,750 gallons of used oil a year and sell for $4,500, including installation. In addition, a tank used to store used oil and feed it into the space heater can be purchased for $750 (Arner, 1992).

Space heaters require regular maintenance. In general, a space heater should be cleaned once in the middle of the heating season and once at the end of the heating season. Because used oil can have different contaminant levels, however, heaters burning highly contaminated used oil might need more frequent cleaning. Any time 1/4 of an inch of ash has accumulated in the combustion chamber of the space heater, cleaning is necessary (Clean Burn, 1992). When cleaning the space heater, ash should be removed from wherever it has accumulated, including the combustion chamber and the vent stack. In addition, the manufacturer's instructions for cleaning the space heater should be carefully followed.

Before disposal, ash from used-oil fired space heaters must be tested to determine if it exhibits the characteristics of a hazardous waste. If the ash tests hazardous, it must be disposed of in a RCRA Subtitle C facility. If it does not test hazardous, it can be disposed of in a RCRA Subtitle D facility.

In addition, storage tanks used to hold used oil for burning in space heaters should be regularly maintained. At least once a year, water and sludge should be pumped from the tank and properly disposed of (Clean Burn, 1992). Without regular maintenance, water and sludge will interfere with the burning process and could damage the space heater.

Finally, burning used oil that has been mixed with a hazardous waste can damage the space heater and cause emissions of hazardous materials into the environment (Clean Burn, 1992). Generators should test the used oil or use their knowledge of how the used oil was generated to determine if the used oil has been mixed with a hazardous waste before burning the used oil in a space heater. *If there is any doubt about whether the used oil has been mixed with hazardous waste, it should be tested before burning!*

Responding to Releases of Used Oil to the Environment

A release of used oil to the environment occurs when a leak or spill enters soil or water surrounding the storage site. Spills and leaks that remain on concrete floors in a shop are not considered releases to the environment (U.S. EPA, 1992c). As has been emphasized throughout this document, *all possible steps should be taken to **prevent** releases of used oil to the environment!* Even when proper precautions are taken, however, accidents sometimes happen, and spills or leaks of used oil can make their way into soil or water.

Under the Used Oil Management Standards, used oil generators must follow the steps listed below any time a release occurs.

- **Stop the Release**—All possible actions should be taken to prevent more used oil from being released to the environment. The actions that are necessary will vary depending on why the leak or spill is occurring. For example, if the spill occurs because a 55-gallon drum has been knocked over, the drum should be righted to stop the used oil from being released. If the spill occurs because a valve on the storage device has been left open, the valve should be closed. If the

leak is a result of a puncture in the tank or container, rags or similar materials should be used to plug the leak. Finally, if nothing can be done to stop the release, the used oil should be transferred into another holding device. All used oil generators should have a plan to remove used oil from a leaking tank or container and transfer it to another storage device when necessary (Hegberg et al., 1991).

- **Contain the Release**—Next, efforts should be made to prevent the used oil that has been released from spreading. A sorbent, such as sawdust, kitty litter, or foam, should be spread over the spilled used oil. Only sorbent materials that will not react with used oil should be used (U.S. EPA, 1988).

- **Clean Up the Release**—Depending on the extent of the release, cleaning up the used oil can be a simple or a complicated task. For small spills on the ground, the soil can be dug up and disposed of. (The soil must be tested to determine if it exhibits hazardous characteristics, as discussed in Appendix B.) For larger spills, where puddles of used oil have formed, vacuum-type machinery can be used to collect the used oil before the soil is dug up for disposal. Releases that result in a great deal of soil contamination, or that contaminate ground water or surface water, are very complicated to clean up. In these cases, professionals should be contracted to conduct the cleanup (U.S. EPA, 1988). State contacts listed in Appendix A have information on professionals who clean up used oil spills. Once several contractors have been identified, they should be evaluated to determine which one can give the best service. Other work performed by the contractors should be examined, including site reports for other cleanup jobs. In addition, clients of each contractor can be contacted to see if they were satisfied with the contractor's work.

- **Properly Manage the Used Oil That Has Been Cleaned Up**—All leaked or spilled used oil that can be collected during the cleanup must be managed under the Used Oil Management Standards, just like any other used oil that has been generated.

- **Properly Manage the Solid Materials Generated During the Cleanup**—Used oil should first be removed from all sorbent materials, soils, or other solids that have been contaminated with used oil. The solid materials can be placed in sieve-like containers to allow the used oil to drip from the solid materials into a storage device. In addition, the materials can be compacted to remove the used oil. The removal of used oil from these solid materials is not complete until there are no signs of free-flowing used oil. The used oil that is removed must be managed under the management standards. In addition, materials contaminated with used oil that are going to be burned for energy can be managed in the same manner as the used oil. Contaminated materials that no longer contain free-flowing used oil and will not be burned for energy must be tested to determine if they exhibit the characteristics of a hazardous waste, as discussed in Appendix B. If they do not test hazardous, they can be disposed of in a RCRA Subtitle D facility. If they test hazardous, they must be disposed of in a RCRA Subtitle C facility.

- **Remove the Storage Device From Service and Repair or Replace It**—Once a leak has occurred, the remaining used oil should be removed from the storage device and the device should be examined to determine if the leak can be repaired. If the leak cannot be repaired, the tank or container must be replaced. If repair is possible, the repairs should be carefully conducted so that leaks do not occur from that spot in the future.

In many cases, generators must also adhere to the Spill Prevention Control and Countermeasures requirements, which are discussed in Appendix D, when releases occur. Releases that occur from most underground storage tanks are also regulated under Subtitle I of RCRA (40 CFR Part 280), which is discussed in Appendix C.

Finally, as discussed in detail in Chapter 3 and Appendix C, the used oil generator must follow UST, Clean Water Act, CERCLA, and TSCA regulatory requirements for reporting releases of used oil to the environment, as appropriate. These requirements are outlined below.

- Under the UST requirements in Subtitle I of RCRA (40 CFR Part 280), the state regulatory authority (or EPA Regional personnel in unauthorized states) must be notified within 24 hours of any leak or spill from an UST that occurs underground, leaves a visible sheen on a water surface, or releases 25 gallons or more of used oil.
- Under the Clean Water Act (40 CFR Part 110), any release of used oil must be reported to the National Response Center if the release causes a sheen on the surface of the water, violates any water quality standards, or results in a sludge being deposited beneath the surface of the water or on the shorelines. The National Response Center can be contacted at 800-424-8802. (In the Washington, DC metropolitan area, the number is 202-426-2675.)
- Under CERCLA (40 CFR Parts 300 to 399), releases to the environment of used oil that contains reportable

quantities of CERCLA hazardous wastes (such as lead) also must be reported to the National Response Center immediately. In addition, the release of used oil containing 1 pound or more of PCBs must immediately be reported to the National Response Center.

- Under the Toxic Substances Control Act (40 CFR Parts 761), any release of used oil containing 50 ppm or more of PCBs into sewers, drinking water, surface water, grazing land, or vegetable gardens must be reported to the National Response Center.

If the generator is unsure if a release of used oil should be reported, *the generator should always call the National Response Center and/or the state regulatory authority to be sure.* The most important message with reporting is: *if in doubt, report it!*

Planning for Emergencies

Although it is not required under EPA's Used Oil Management Standards, service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers should consider developing emergency plans. Even when the requirements in the management standards are carefully followed, accidents can occur that cause releases of used oil to the environment. In addition, emergency procedures would be needed if fires or floods were to occur on site. Finally, many used oil generators are required under the SPCC regulations to develop emergency plans.

When a used oil generator develops an emergency plan, the specific aspects of the generator's operations and site conditions must be considered. Each emergency plan will therefore be unique. All plans, however, should give step-by-step procedures that personnel should follow in case of a fire, flood, explosion, or release of used oil to the environment (Arner, 1992). The plan should take into account risks to personnel, potential impacts on surrounding homes or businesses, the potential for a release to enter ground water or surface water, the equipment available at the facility, and the assistance that can be provided by local police departments, fire departments, and emergency response teams.

Emergency plans should include the telephone numbers of local police departments, fire departments, emergency response teams, ambulance services, and hospitals. Personnel should be informed about the telephones and/or radios that are available on site for use in an emergency. In addition, personnel should know about other telephones that can be used in the area if the site telephone or radio is out of operation.

Once the emergency plan has been developed, it should be periodically reviewed with employees (Convenient Automotive Services Institute, circa 1992a). In addition, employees should be informed immediately whenever the plan is changed. Finally, the plan should be kept in a central location so that it can easily be referred to in case of emergency.

Chapter 7

Managing and Disposing of Used Oil Filters

Proper management of used oil from automobile and truck crankcases includes the proper handling of used oil filters. Oil filters are used to remove solid contaminants from motor oil, before the oil is used to lubricate engine parts. The oil is pumped from the crankcase of an automobile or truck and into the filter, where it is filtered through a fibrous material (usually paper). The fibers in the filter pick up and hold pieces of dust, rust, metal, and other contaminants. The oil then flows through the engine and back into the crankcase. Filtering out solid contaminants improves the lubricating quality of the oil.

Every time the oil in an automobile or truck crankcase is changed, the oil filter must be replaced so that the solid contaminants from the old oil do not get into the new oil. When an oil filter is removed, it can contain from 10 to 16 ounces of used oil (Arner, 1992). Considering that over 400 million oil filters are used in the United States every year (Arner, 1992), a great deal of used oil could be released to the environment if used oil filters are not managed properly.

As a result of the decision published in the *Federal Register* on May 20, 1992, used oil filters are categorically excluded from the definition of a hazardous waste under RCRA, as long as the filters:

- Are not terne-plated. (Terne is an alloy of tin and lead. The lead in the terne-plating makes the filters hazardous.)
- Have been properly drained of used oil.

Removing Used Oil From Used Oil Filters

Federal regulations require that used oil filters must be hot-drained to remove residual used oil (U.S. EPA, 1992b). This means that no matter what draining option is used, the filter should be removed from a warm engine and drained immediately. Four distinct methods of hot-draining can be used:

- **Gravity Draining**—When the filter is removed from the engine, it should be placed with its gasket side down in a drain pan. If the filter has an anti-drain valve, the "dome end" of the filter should be punctured with a screwdriver (or similar device) so that the oil can flow freely. The filter should then be allowed to drain for 12 to 24 hours (Arner, 1992).

- **Crushing**—The filter is crushed by a mechanical, pneumatic, or hydraulic device to squeeze out the used oil and compact the remaining filter materials (Convenient Automotive Services Institute, circa 1992b).

- **Disassembly**—The filter is separated into its different parts using a mechanical device. This allows most of the used oil to be removed from the filter, and the metal, rubber, and

paper parts of the filter to be recycled separately (Fleischaker and Saunders, 1991).

- **Air Pressure**—The filter is placed into a device where air pressure forces the used oil out of the filter (Hua, 1992).

The used oil that is drained from the filters should then be managed properly along with the oil that was drained directly from the crankcase of the automobile or truck. The used oil filters themselves can be handled as a solid waste. The preferred management option for used oil filters is recycling. As with all of the federal regulations governing used oil management, states might have more stringent regulations than the federal government for the management and disposal of used oil filters.

Storing Used Oil Filters

Filters should be stored in a covered, rainproof container so that used oil is not washed from the filters into the surrounding environment. In addition, the container should be capable of holding any used oil that seeps from the filters (Convenient Automotive Services Institute, circa 1992b).

Recycling Used Oil Filters

Oil filters are generally made from paper, metal, and rubber. Two general recycling options exist for used oil filters. Either the entire filter can be burned for fuel, or the different components of the used oil filter can be separated and the scrap metal can be recycled in a metal recycling operation and the remaining paper and rubber can be burned as fuel (MacLean, 1991; Smoot, 1991).

Currently, the used oil filter recycling industry is not very well established in most areas of the country (MacLean, 1991). Consequently, many used oil filter generators might not have the option of recycling filters at this time. These used oil filter generators should still remove as much used oil from the filters as possible, and recycle the used oil.

Used oil filters have value because they can be burned for fuel and/or the metal components can be recycled (MacLean, 1991). Three types of facilities can recycle used oil filters. Scrap steel processing or recycling facilities, as well as steel smelters, can recycle the metal components of the filter. Although some scrap steel recyclers and steel smelters will accept whole or crushed used oil filters for recycling, others will only accept the metal components (Fleischaker and Saunders, 1991). Finally, used oil filters can be sent to industrial burners (such as cement kilns) where the entire filter, or just the paper and/or rubber components, can be burned for fuel (Convenient Automotive Services Institute, circa 1992b).

Some of the trade associations and state contacts listed in Appendix A of this document have information on used oil filter recycling options in different areas of the country. When a used oil filter recycling option is identified, the type of materials the recycler accepts should be determined. If the recycler has a preference for separated, crushed, or whole filters, this will affect the decision on which draining method should be used.

Disposing of Filters

If a recycling option for the used oil filters cannot be identified, the used oil filters must be disposed of. Although federal regulations allow non-terne plated filters that do not exhibit hazardous waste characteristics to be disposed of in Subtitle D facilities, some states have more stringent regulations. The state contacts listed in Appendix A can give information on state regulations on used oil filter disposal. In addition, they can provide information on the facilities that are available to accept used oil filters.

If landfilling used oil filters is acceptable in the state where the generator is located, the generator must identify a landfill that is designed and permitted to accept used oil filters. An alternative would be to identify a properly permitted solid waste incinerator. If these alternatives are not available, the used oil filters must be sent to a hazardous waste disposal facility (Convenient Automotive Services Institute, circa 1992b).

Chapter 8

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Appendix A

Where To Get More Information

Several resources are available for more information about used oil management, including hotlines, trade associations, EPA Regional offices, state used oil contacts, and publications. Many of these resources are referred to throughout this document. In this appendix, some of the most useful of these sources of information are described in detail. In addition, telephone numbers and/or addresses are given for the hotlines and trade associations, as well as EPA Regional Offices and state contacts. Finally, information is provided on how the publications can be obtained.

This appendix is meant to give a variety of sources of additional information on the spectrum of topics covered throughout this document, rather than be an exhaustive list of all available materials on used oil management.

Hotlines

The federal government runs a variety of hotlines to assist the regulated community and the general public in understanding environmental regulations. These hotlines can answer questions about regulations and the associated environmental issues, as well as distribute written materials.

EPA's RCRA/Superfund/UST Hotline

EPA's RCRA/Superfund/UST Hotline (commonly referred to as the RCRA Hotline) was established by EPA to provide information on all aspects of the Resource Conservation and Recovery Act (RCRA) regulations. The RCRA Hotline provides information and distributes publications on solid and hazardous waste issues. The hotline serves federal, state, and local government offices; private industry; consultants; and the general public.

The RCRA Hotline is an excellent source of information on EPA's Used Oil Management Standards, as well as solid waste requirements under Subtitle D of RCRA, and hazardous waste requirements under Subtitle C. In addition, the hotline can be called for information on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements and the Underground Storage Tank (UST) requirements under Subtitle I of RCRA. Hotline personnel are prepared to answer questions on these subject areas, as well as to take requests for EPA, Office of Solid Waste publications and make referrals for obtaining other EPA publications.

The RCRA Hotline can be called on Monday through Friday, from 8:30 a.m. to 7:30 p.m. (Eastern Standard Time), except holidays. The national toll-free number is 800-424-9346, or for the hearing impaired, TDD 800-553-7672. In Washington, DC, the number is 703-412-9810; or TDD 703-412-3323. Information also can be requested by writing to the following address:

RCRA Information Center
U.S. Environmental Protection Agency
Office of Solid Waste (5305)
401 M Street, SW
Washington, DC 20460

EPA's TSCA Assistance Information Service

Open Monday through Friday, 8:30 a.m. to 5:00 p.m. (Eastern Standard Time), the TSCA Assistance Information Service provides information on all aspects of the Toxic Substances Control Act (TSCA) regulations. Representatives from service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers can call this information service with questions about the polychlorinated biphenyls (PCBs) regulations or other TSCA provisions. The number is 202-554-1404.

EPA'S ERD Information Line

The Emergency Response Division (ERD) Information Line provides information on appropriate ways to respond to releases of potentially hazardous materials to the environment. In particular, this information line can answer questions on the Spill Control and Countermeasures (SPCC) regulations and other Oil Pollution Act provisions under the Clean Water Act. The number is 202-260-2342.

DOT's Hazardous Materials Hotline

The U.S. Department of Transportation's Hazardous Materials Hotline has information on the Hazardous Materials Transportation Act regulations, as well as other aspects of transporting hazardous materials. The hotline can be reached at 202-366-4488.

National Response Center

The National Response Center was established to record releases of hazardous substances and other materials that can harm human health and the environment. As discussed in Chapter 3 and Chapter 6 of this document, different requirements must be met under the Clean Water Act, CERCLA, and TSCA for reporting releases of used oil to the environment. When a release of used oil occurs that must be reported under these regulatory requirements, the National Response Center should be called immediately. The National Response Center can be reached 24 hours a day at 800-424-8802 (or 202-426-2675 in the Washington, DC metropolitan area).

EPA's Small Business Hotline

The Small Business Hotline helps small businesses comply with environmental laws and EPA regulations. Representatives are available to answer questions, as well as to refer callers to other sources of information within EPA and the rest of the federal government. The telephone numbers for the hotline are 800-368-5888 or 703-557-1938 in the metropolitan Washington, DC area. Hours are Monday through Friday, 8:30 a.m. to 5:00 p.m. (Eastern Standard Time).

Trade Associations

Trade associations are made up of member-companies that are all involved in the same industry. These member-companies pay dues to finance the trade association's activities. The purposes of trade associations are to provide their membership with information, lobby the government on issues that are important to their members, and promote the industry their members are part of. Trade associations are a good source of information on environmental and other issues that apply to their members.

American Petroleum Institute

The American Petroleum Institute (API) is made up of companies in the development, production, and sales of petroleum products. API can be contacted for information on used oil management, as well as information on the petroleum industry. In addition, API can provide information and technical assistance for the development and promotion of used oil recycling programs. API's telephone number is 202-682-8000, and its address is:

American Petroleum Institute
1220 L Street, NW
Washington, DC 20005

Association of Petroleum Rerefiners

The Association of Petroleum Rerefiners (APR) is an international association of used oil rerefiners and processors, as well as suppliers of rerefined and processed used oil products. APR maintains information on used oil rerefining and processing and can be reached by calling 202-639-4490, or writing:

Association of Petroleum Rerefiners
1915 Eye Street, NW
Suite 600
Washington, DC 20006

Convenient Automotive Services Institute

The Convenient Automotive Services Institute (CASI) represents businesses in the fast oil change and lubrication industry. CASI has information on used oil regulations, proper procedures for managing used oil and used oil filters, and other aspects of operating quick-lube shops.

CASI's telephone number is 301-897-3191, and its address is:

Convenient Automotive Services Institute
P.O. Box 34595
Bethesda, MD 20827

Filter Manufacturers Council

The Filter Manufacturers Council operates a hotline for generators of used vehicle filters. Hotline operators offer information concerning state and federal regulations regarding used oil filter management and recycling, as well as referrals to used oil filter transporters, processors, and recyclers in your area. The toll-free number is 800-993-4583, and the address is:

Filter Manufacturers Council
P.O. Box 13966
Research Triangle Park, NC 27709-3966

Independent Lubricant Manufacturers Association

Members of the Independent Lubricant Manufacturers Association (ILMA) include blenders of motor oils and lubricants, base stock suppliers, oil additive manufacturers, and manufacturers of oil blending equipment. ILMA conducts research programs on motor oil and can be contacted by calling 202-337-3470, or writing:

Independent Lubricant Manufacturers Association
1055 Thomas Jefferson Street, NW
Suite 302
Washington, DC 20007

National Automotive Dealers Association

The National Automotive Dealers Association (NADA) is made up of members in the automobile and truck sales industry. NADA can provide information to automotive dealers, fleet operators, and others, on the subject of used oil management. The telephone number for NADA is 703-821-7040, and the address is:

National Automotive Dealers Association
8400 Westpark Drive
McLean, VA 22102

National Oil Recyclers Association

The National Oil Recyclers Association (NORA) membership includes businesses involved in the processing and rerefining of used oil. NORA provides information and technical assistance, handles litigation, and sponsors conferences for its members. NORA is also a source of information on the issues involved with used oil recycling. NORA can be contacted at 216-791-7316, or by writing:

National Oil Recyclers Association
129429 Cedar Road
Suite 26
Cleveland, OH 44106-3172

Service Station Dealers Association

The Service Station Dealers Association (SSDA) is a trade association specifically for service station owners and operators. SSDA can provide information and technical assistance to service stations on used oil management, and other aspects of service station operations. SSDA can be reached at 703-548-4736, or by writing:

Service Station Dealers Association
499 South Capitol Street, SW
Suite 407
Washington, DC 20003

Waste Oil Heating Manufacturers Association

Manufacturers and distributors of used oil-fired heaters make up the membership of the Waste Oil Heating Manufacturers Association (WOHMA). WOHMA maintains information on used oil-fired heaters available from their members, and how to properly use these heaters. The telephone number for WOHMA is 202-457-6074, and the address is:

Waste Oil Heating Manufacturers Association
2550 M Street, NW
Suite 800
Washington, DC 20037

EPA Regional Contacts

EPA operates 10 Regional Offices throughout the country. The purposes of the EPA Regional Offices are to provide information and technical assistance to the states within the Region, as well as to assist with the implementation of federal environmental programs and regulations. EPA Regional Offices maintain information on environmental issues and can be consulted on federal environmental regulations. Specifically, the EPA Regional Offices can answer questions on the Used Oil Management Standards, other federal regulations concerning used oil management practices, and specific used oil management activities within the Region. Table A-1 provides a list of EPA Regional Offices with their telephone numbers and addresses, along with the telephone number and address for EPA Headquarters in Washington, DC.

Table A-1. **EPA Offices**

EPA Headquarters
401 M Street, SW
Washington, DC 20460
202-260-2090

EPA Region 1
(Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, and Vermont)
JFK Federal Building
One Congress Street
Boston, MA 02203
617-565-3420

EPA Region 2
(New Jersey, New York, Puerto Rico, and the Virgin Islands)
Jacob J. Javitz Federal Building
26 Federal Plaza
New York, NY 10278
212-264-2657

EPA Region 3
(Delaware, the District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia)
841 Chestnut Street
Philadelphia, PA 19107
215-597-9800

EPA Region 4
(Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee)
345 Courtland Street, NE
Atlanta, GA 30365
404-347-4727

EPA Region 5
(Illinois, Indiana, Ohio, Michigan, Minnesota, and Wisconsin)
77 West Jackson Boulevard
Chicago, IL 60604-3507
312-353-2000

EPA Region 6
(Arkansas, Louisiana, New Mexico, Oklahoma, and Texas)
1445 Ross Avenue
Suite 1200
Dallas, TX 75202-2733
214-655-6444

EPA Region 7
(Iowa, Kansas, Missouri, and Nebraska)
726 Minnesota Avenue
Kansas City, KS 66101
913-551-7000

EPA Region 8
(Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming)
999 18th Street
Suite 500
Denver, CO 80202-2405
303-293-1603

EPA Region 9
(Arizona, California, Hawaii, Nevada, American Samoa, Guam, and the Trust Territories of the Pacific)
75 Hawthorne Street
San Francisco, CA 94105
415-744-1305

EPA Region 10
(Alaska, Idaho, Oregon, and Washington)
1200 Sixth Avenue
Seattle, WA 98101
206-553-4973

State Used Oil Contacts

As mentioned throughout this document, most states are responsible for implementing EPA's Used Oil Management Standards within their jurisdiction. States have the authority to implement more stringent requirements than the federal government. As a result, the regulation of used oil management varies from state to state.

The state agencies that can be contacted for more information about regulatory requirements for used oil management are given in Table A-2. These state contacts can also provide general information about used oil management and can usually provide listings of used oil transporters and recyclers within the area.

Publications

Throughout this document, publications are referenced that can provide additional information on used oil management. Some of the most useful of these and other publications, along with information about how they can be obtained, are given below.

EPA Publications

EPA has published a variety of documents on used oil management. In addition, EPA contractors have prepared publications on used oil, and EPA has cooperated with states and other organizations to develop used oil documents. Documents published by the EPA Office of Solid

Table A-2. **State Used Oil Recycling Contacts**

ALABAMA
Land Division
Department of Environmental Management
1751 Congressman W.L. Dickinson Drive
Montgomery, AL 36130
205-271-7726

ALASKA
Solid and Hazardous Waste
Department of Environmental Conservation
410 Willoughby Avenue
Juneau, AK 99801-1795
907-465-5161

ARIZONA
Waste and Water Quality
Department of Environmental Quality
2005 North Central Avenue
Phoenix, AZ 85004
602-207-4140

ARKANSAS
Hazardous Waste Division
Department of Pollution Control and Ecology
P.O. Box 8913
Little Rock, AR 72219
501-570-2888

CALIFORNIA
Alternative Technology
Department of Toxic Substances Control
P.O. Box 806
Sacramento, CA 95812-0806
916-322-1005

Inquiries on used oil recycling depositories:
Integrated Waste Management Board
8800 Cal Center Drive
Sacramento, CA 95826
916-342-1781 or
800-553-2962 (California only)

COLORADO
Public Assistance Hotline
Hazardous Materials and Waste Management
Department of Health
4300 Cherry Creek Drive South
Denver, CO 80222
303-692-3320

CONNECTICUT
Waste Management Bureau
Department of Environmental Protection
165 Capitol Avenue
Hartford, CT 06106
203-566-4869

DELAWARE
Hazardous Waste Management Branch
Department of Natural Resources and Environmental Control
P.O. Box 1401
Dover, DE 19903
302-739-3689

Inquiries from households:
Delaware Solid Waste Authority
P.O. Box 445
Dover, DE 19901
302-739-5361 or
800-404-7080 (Delaware only)

DISTRICT OF COLUMBIA
DC Energy Office
Department of Public Works
613 G Street, NW
Washington, DC 20001
202-727-1800

FLORIDA
Hazardous Waste Management Division
Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400
904-488-0300

GEORGIA
Generator Compliance
Hazardous Waste Management Branch
Department of Natural Resources
Floyd Towers East
205 Butler Street, SE
Atlanta, GA 30334
404-362-2684

HAWAII
Solid and Hazardous Waste Branch
Department of Health
5 Waterfront Plaza, Suite 250
500 Ala Moana Boulevard
Honolulu, HI 96813
808-586-8143 (recycling) or
808-586-4227 (disposal)

IDAHO
Permits and Enforcement
Department of Environmental Quality
1410 North Hilton Street
Boise, ID 83720
208-334-5879

ILLINOIS
Disposal Alternatives Unit
Illinois Environmental Protection Agency
2200 Churchill Road
P.O. Box 19276
Springfield, IL 62794-9276
217-524-3300

INDIANA
Hazardous Waste Branch
Department of Environmental Management
105 South Meridian Street
Indianapolis, IN 46206-6015
317-232-4535

IOWA
Waste Management Division
Department of Natural Resources
Wallace State Office Building
Des Moines, IA 50319
515-281-8263

KANSAS
Solid Waste Section
Department of Health and the Environment
Forbes Field, Building 740
Topeka, KS 66620
913-296-1667

KENTUCKY
Division of Waste Management
Department of Environmental Protection
14 Reilly Road
Frankfort, KY 40601
502-564-6716

LOUISIANA
Division of Solid Waste
Department of Environmental Quality
P.O. Box 82178
Baton Rouge, LA 70884-2178
504-765-0249

MAINE
Hazardous Material and Solid Waste Control
Environmental Protection Department
State House Station 17
Augusta, ME 04333
207-287-2651

MARYLAND
Oil Control Program
Department of the Environment
2500 Broening Highway
Baltimore, MD 21224
410-631-3442

Inquiries on used oil recycling:
Maryland Environmental Services
2011 Commerce Park Drive
Annapolis, MD 21401
410-974-7282 or 800-473-2925

Table A-2. **State Used Oil Recycling Contacts (continued)**

MASSACHUSETTS
Division of Hazardous Waste
Department of Environmental Protection
One Winter Street, Seventh Floor
Boston, MA 02108
617-556-1022

MICHIGAN
Waste Management Division
Department of Natural Resources
P.O. Box 30241
Lansing, MI 48909
517-373-4735 or 517-373-2730

MINNESOTA
Hazardous Waste Program Development
Pollution Control Agency
520 Lafayette Road
St. Paul, MN 55155-3898
612-297-8319

MISSISSIPPI
Office of Pollution Control
Department of Environmental Quality
P.O. Box 10385
Jackson, MS 39285-0385
601-961-5377 (disposal) or 601-961-5321 (recycling)

MISSOURI
Hazardous Waste Program
Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102
314-751-3176 or 800-334-6946

MONTANA
Department of Health &
Environmental Science
Solid and Hazardous Waste Bureau
Cogswell Building,
Helena, MT 59620
406-444-1430

NEBRASKA
Hazardous Waste Section
Department of Environmental Quality
P.O. Box 98922
Lincoln, NE 68509-8922
402-471-4210

NEVADA
Hazardous Waste Hotline
University of Nevada at Reno
702-784-1717 or
800-882-3233 (Nevada only)

Waste Management Bureau
Department of Conservation and
Natural Resources
333 West Nye Lane
Carson City, NV 89710
702-687-5872

NEW HAMPSHIRE
Waste Management Division
Department of Environmental Services
6 Hazen Drive
Concord, NH 03301-6509
603-271-2942

NEW JERSEY
Office of Communications
Solid Waste Management
Department of Environmental Protection
and Energy
CN-414
Trenton, NJ 08625-0414
609-530-8593

NEW MEXICO
Solid Waste Bureau
Environment Department
1190 Saint Francis Drive
P.O. Box 26110
Santa Fe, NM 87502
505-827-2780

NEW YORK
Division of Solid Waste
Department of Environmental
Conservation
50 Wolfe Road, Room 200
Albany, NY 12233-4015
518-457-8829

NORTH CAROLINA
Hazardous Waste Section
Department of Environment, Health, and
Natural Resources
P.O. Box 27687
Raleigh, NC 27611
919-733-2178

NORTH DAKOTA
Waste Management Division
Department of Health
1200 Missouri Avenue
P.O. Box 5520
Bismarck, ND 58502-5520
701-221-5166

OHIO
Division of Hazardous Waste Management
Ohio Environmental Protection Agency
1800 Water Mark Drive
Columbus, OH 43266-0149
614-644-2968 or 614-644-2917

OKLAHOMA
Solid Waste Management
Department of Health
1000 Northeast 10th Street
Oklahoma City, OK 73117
405-271-7160 (recycling) or
405-271-7114 (disposal)

OREGON
Hazardous and Solid Waste
Quality Division
Department of Environmental Quality
811 Southwest Sixth Avenue
Portland, OR 97204
503-229-5253 (households) or
503-229-6590 (regulations)

PENNSYLVANIA
Waste Minimization and Planning
Department of Environmental Resources
400 Market Street
P.O. Box 8472
Harrisburg, PA 17105-8472
717-783-6004

RHODE ISLAND
Department of Environmental
Management
83 Park Street
Providence, RI 02903
401-277-3434 (households) or
401-277-2797 (regulations)

SOUTH CAROLINA
Solid Waste, Reduction, and Recycling
Department of Health and
Environmental Control
2600 Bull Street
Columbia, SC 29201
803-734-5195

SOUTH DAKOTA
Office of Waste Management
Department of Environment and
Natural Resources
319 South Coteau
500 East Capitol Avenue
Pierre, SD 57501-5070
605-773-3153

Table A-2. **State Used Oil Recycling Contacts (continued)**

TENNESSEE
Waste Management Division
Department of Environment and Conservation
L & C Tower, Fifth Floor
401 Church Street
Nashville, TN 37243-1535
615-532-0838

TEXAS
Recycling and Waste Minimization Division
Natural Resource Conservation Commission
P.O. Box 13087
Austin, TX 78711
512-239-6750

UTAH
Division of Solid and Hazardous Waste
Department of Environmental Quality
288 North, 1460 West
P.O. Box 144880
Salt Lake City, UT 84114
801-538-6170

VERMONT
Solid Waste Management Division
Department of Environmental Conservation
Laundry Building
103 South Main Street
Waterbury, VT 05671-0407
802-224-7831

VIRGINIA
Waste Division
Department of Environmental Quality
Monroe Building, 11th Floor
101 North 14th Street
Richmond, VA 23219
804-225-2667 or
800-552-3831 (Virginia only)

WASHINGTON
Solid Waste Services
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600
206-459-6286 or 206-438-7541

WEST VIRGINIA
Hazardous Waste Management Section
Department of Commerce, Labor, and Environmental Resources
1356 Hansford Street
Charleston, WV 25301
304-558-3370

Inquiries from households:
800-472-8286 (West Virginia only)

WISCONSIN
Solid and Hazardous Waste
Department of Natural Resources
P.O. Box 7921 (SW-3)
Madison, WI 53707-7921
608-266-2111

WYOMING
Solid and Hazardous Waste
Department of Environmental Quality
Herschler Building
122 West 25th Street
Cheyenne, WY 82002
307-777-7162

Waste and Emergency Response can be obtained from the RCRA Hotline (unless otherwise noted), as discussed earlier in this appendix. Other EPA publications can be ordered by calling the National Technical Information Service (NTIS) at 800-553-6847, or the Government Printing Office (GPO) at 202-783-3238.

- Energy and Environmental Research Corporation and Robert H. Salvesen Associates, Evergreen Oil, Inc. April 1988. *Guide to Oil Waste Management Alternatives for Used Oil, Oily Wastewater, Oily Sludge, and Other Wastes Resulting from the Use of Oil Products.* Final Report. Prepared for Alternative Technology Section, Toxic Substances Control Division, California Department of Health Services, in cooperation with the U.S. Environmental Protection Agency. Available through NTIS (request report No. PB89-224810).

  This report presents the results of a study on used oil management alternatives. The study was conducted for the California Department of Health Services in cooperation with the U.S. EPA. The report covers used oil regulations, established and emerging technologies, current management practices, economics of used oil, and environmental impacts of used oil mismanagement. The report focuses on methods of improving the recyclability of used oil. The report also includes recommendations for industrial generators on how to best manage used oil.

- U.S. EPA, Office of Solid Waste and Emergency Response. August 1992. *Environmental Fact Sheet: Management Standards Issued to Control Potential Risks from Recycled Used Oil—No Hazardous Waste Listing.* EPA/530-F-92-018. Washington, DC.

  This 3-page fact sheet provides general background information on EPA's Used Oil Management Standards and explains the specific requirements for service stations and other generators; processors and rerefiners; transporters, collectors, and burners; and used oil marketers. In addition, EPA's decision not to list used oil destined for recycling as a hazardous waste is discussed.

- U.S. EPA, Office of Solid Waste and Emergency Response. June 1992. *Catalogue of Hazardous and Solid Waste Publications.* 6th Edition. EPA/530-B-92-001. Washington, DC.

  This 240-page catalogue gives detailed listings of documents published by EPA on hazardous and solid waste issues. The catalogue includes information on how to obtain these publications, along with order forms.

- U.S. EPA, Office of Solid Waste and Emergency Response. May 1992. *Environmental Fact Sheet: No Hazardous Waste Listing for Used Oil that Is Being Disposed.* EPA/530-F-92-006. Washington, DC.

  This 2-page fact sheet provides the background on EPA's decision not to list used oil destined for disposal as a hazardous waste.

- U.S. EPA, Office of Solid Waste and Emergency Response. February 1991. *Recycling Used Oil: 10 Steps to Change Your Oil.* EPA/530-SW-89-039C. Washington, DC.

  This pamphlet explains how recycling used oil protects the environment and saves energy. The pamphlet also provides instructions to DIYs on how to safely change motor oil.

- U.S. EPA, Office of Solid Waste and Emergency Response. June 1989. *Recycling Used Oil: For Service Stations and Other Vehicle-Service Facilities.* EPA/530-SW-89-039D. Washington, DC.

  This pamphlet provides suggestions for businesses on how to properly manage the used oil they collect and recycle.

- U.S. EPA, Office of Solid Waste and Emergency Response. May 1989. *How to Set Up a Local Program to Recycle Used Oil.* EPA/530-SW-89-039A. Washington, DC.

  Designed for local communities, this 41-page document describes how to set up a program for collecting and recycling used oil. It explains the importance of local action and organization and provides specific information on how to design and implement a local DIY collection program.

- U.S. EPA, Office of Solid Waste and Emergency Response. November 1984. *Composition and Management of Used Oil Generated in the United States.* EPA/530-SW-84-013. Washington, DC.

  This report characterizes used oil management practices within the U.S. used oil management system. The report also discusses the composition of used oil and the types of contaminants found in different types of used oils. Possible health and environmental implications of various used oil management practices are also assessed. This report is available from NTIS and the order number is PB85-180297.

- U.S. EPA, Office of Underground Storage Tanks. August 1990. *Straight Talk On Tanks.* EPA/530/UST-90/012. Washington, DC.

  This 30-page booklet provides an overview of the regulatory requirements for leak detection for underground storage tanks (USTs). It also explains specific leak detection methods and describes special requirements for tank piping.

- U.S. EPA, Office of Underground Storage Tanks. July 1990. *Musts for USTs.* EPA/530/UST-88/008. Washington, DC.

  This 41-page publication is a summary of the regulations for USTs. In addition, it provides specific information on the requirements for maintaining new and existing petroleum USTs, correcting problems caused by leaks, closing USTs, reporting and recordkeeping, and maintaining chemical USTs.

- U.S. EPA, Office of Underground Storage Tanks. November 1989. *Detecting Leaks: Successful Methods Step-by-Step.* EPA/530/UST-89/012. Washington, DC.

  This 215-page handbook provides basic information on detecting releases from USTs. The handbook contains information on methods of UST release detection, inventory control, manual tank gauging, tank tightness testing, automatic tank gauging, vapor monitoring, ground water monitoring, secondary containment with interstitial monitoring, and piping release detection methods.

- U.S. EPA, Office of Underground Storage Tanks. December 1988. *Oh No!* EPA/530/UST-88/004. Washington, DC.

  Designed for service-station owners, this 24-page brochure describes what to do in the event of a petroleum leak, spill, or overfill from aboveground or underground storage tanks.

Other Federal Government Publications

Other agencies and departments within the federal government have published documents relating to used oil management. In addition, some of the agencies and departments have cooperated with outside organizations, or hired contracting firms, to develop materials on used oil. All of these publications can be obtained through NTIS at 703-487-4650, or GPO at 202-783-3238.

- National Institute for Petroleum and Energy Research and Robert H. Salvesen Associates. August 1989. *Used Oil and Solvent Recycling Technology Transfer Manual.* Prepared for the Department of the Navy, Naval Energy and Environmental Support Activity.

This manual was prepared to give guidance to Navy personnel on proper used oil management and recycling practices. This 216-page manual is divided into two areas: one on planning and developing used oil recycling programs and one on the recycling options that are available for oils and solvents.

- U.S. General Accounting Office. May 1992. *Hazardous Materials: Upgrading of Underground Storage Tanks Can Be Improved to Avoid Costly Cleanups.* GAO/NSIAD-92-117. Washington, DC.

  This report examines the Department of Defense's (DOD) handling of its underground storage tanks. The report describes the type and number of tanks owned by DOD and evaluates DOD's efforts to comply with both federal and state requirements, including efforts to identify and prevent leaks and spills and to correct environmental damage from leaking tanks.

Trade Association Publications

Many of the trade associations listed above develop and distribute written materials on used oil management. To obtain a copy of one of the publications listed below, contact the trade association mentioned in the listing.

- American Petroleum Institute. January 1991. *Used Oil Management in Selected Industrialized Countries.* Discussion Paper #064. Washington, DC.

  This 123-page report examines the national used oil management systems that have been established in Austria, Canada, Denmark, Finland, France, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Spain, the United Kingdom, the United States, and West Germany. The report examines the various features of these systems, including taxes and subsidies, restrictions on over-the-counter sales of lubricants, regional transportation franchises, collection sites and curbside pickup, public procurement, and public education. In addition, the report also includes a discussion of the economics of used oil.

- Convenient Automotive Services Institute. (no date.) *Do-It-Yourself Oil Collection Kit: Model Policies and Procedures for Quick Oil Change Centers.* Bethesda, MD.

  This booklet was designed to assist owners and operators of quick-lube shops to establish DIY collection programs at their centers. It gives specific guidelines on how to properly collect, store, and transport used oil.

- Convenient Automotive Services Institute. (no date.) *Used Oil Filter Generators: Model Management Standards for Use by State and Local Regulatory Agencies.* Bethesda, MD.

  This 5-page document describes the standards proposed by CASI for the management of used oil filters by generators. Topics covered include collection, storage, recycling, and disposal of used oil filters.

- Vorhees, P.H. November 1992. *Perspectives on the Generation and Management of Used Oil in the U.S. in 1991.* Presented at the 1992 NORA Annual Meeting. November 5, 1992. Scottsdale, AZ.

  This 14-page paper updates 1988 EPA estimates of the flow of used oil through the used oil management system. The paper also explores the factors that have affected the changes in the used oil management system since 1988.

- Washington Citizens for Recycling Foundation. February 1992. *A Guidebook for Implementing Curbside and Drop-Off Used Motor Oil Collection Programs.* Prepared for the American Petroleum Institute.

  This 48-page guidebook is based upon a national survey of nearly 60 existing curbside and drop-off DIY used oil collection programs. The guidebook gives information on how to establish a DIY collection program. Topics covered include the information required to initiate a collection program, the different elements involved in drop-off and curbside collection programs, and roles the private sector can play. The document also provides an overview of successful public education strategies, highlights model curbside and drop-off programs, and summarizes existing private sector activity.

Other Publications

- Arner, R. October 1992. *Used Oil Recycling Markets and Best Management Practices in the United States.* Presented to the National Recycling Congress. September 15, 1992. Boston, MA.

  This paper explores the used oil management system within the United States, provides information on used oil recycling technologies, and discusses the environmental impacts of improper used oil management. The paper also presents best management practices for used oil generators and collection centers. A copy of this paper can be obtained from the Northern Virginia Planning District Commission, 7535 Little River Turnpike, Suite 100, Annandale, VA 22003; telephone: 703-642-0700.

- Mueller Associates, Inc. 1989. *Waste Oil: Reclaiming Technology, Utilization and Disposal.* Park Ridge, NJ: Noyes Data Corporation.

  This 193-page book describes and assesses the current status of the used oil industry. The generation, collection, disposal, and recycling of used oil, and the technology involved, are discussed in detail. The book also assesses the problems associated with used oil handling and the health and safety implications of used oil management. A copy can be obtained through Noyes Data Corporation, Mill Road, Park Ridge, NJ 07656.

- Nolan, J.J., C. Harris, and P.O. Cavanaugh. December 1990. *Used Oil: Disposal Options, Management Practices and Potential Liability.* 3rd Edition. Rockville, MD: Government Institutes, Inc.

  This 186-page book explains the market forces affecting used oil and describes how the recycling system operates. The book also contains an extensive section on CERCLA liability and steps that can be taken to avoid liability. Finally, a summary of the history of the federal government's involvement with the used oil issue is provided. A copy of this book can be obtained by calling Government Institutes, Inc., at 301-921-2300.

Federal Register

The *Federal Register* is published daily and includes proposed regulations, responses to comments on proposed regulations, supporting information on regulatory decisions, and final regulations. The *Federal Register* is distributed by GPO, and copies can be obtained by calling 202-783-3238. In addition, *Federal Registers* relating to used oil management are available through the RCRA Hotline, and are listed below.

- EPA's Used Oil Management Standards were published in the *Federal Register* on September 10, 1992, on pages 41566-41626. The citation for this *Federal Register* is 57 *FR* 176. These standards were amended in the *Federal Register* on March 4, 1994, on pages 10550-10560. The citation is 59 *FR* 43.

- EPA has published two technical corrections to the Used Oil Management Standards in the *Federal Register*. The first was published on May 3, 1993, and contains the no free-flowing used oil requirements for managing solid materials contaminated with used oil, along with other topics. The technical correction is on pages 26420-26426 and the citation is 58 *FR* 83. The second technical correction was published on June 17, 1993, and corrects an error made in the May 3, 1993 technical correction. The error inadvertently amended the notification requirements for used oil handlers. This technical correction is on pages 33341-33342 and the citation is 58 *FR* 115.

- The *Federal Register* from May 20, 1992 contains EPA's decision not to list used oil that is destined for disposal and most used oil filters as hazardous wastes. The rationale behind these decisions, along with the actual regulatory language, are presented on pages 21524-21534. The citation is 57 *FR* 98.

- EPA's proposed used oil management standards were published in the *Federal Register* on September 23, 1991, on pages 48000-48074. The citation for this *Federal Register* is 56 *FR* 184.

Code of Federal Regulations

After the final version of a regulation is published in the *Federal Register*, the regulation is compiled with regulations on similar subjects and published in the *Code of Federal Regulations* (CFR). EPA's Used Oil Management Standards are published in 40 CFR Part 260. The CFR is published annually and distributed by GPO. Copies can be ordered by calling 202-783-3238.

Other CFR citations that relate to used oil management are listed below.

- 40 CFR Parts 100 to 149 (*The Clean Water Act Regulations*).
- 40 CFR Parts 190 to 259 (*The Resource Conservation and Recovery Act, Subtitle D, Regulations*).
- 40 CFR Parts 260 to 299 (*The Resource Conservation and Recovery Act, Subtitle C, Regulations*).
- 40 CFR Parts 300 to 399 (*The Comprehensive Environmental Response, Compensation, and Liability Act Regulations*).
- 40 CFR Parts 700 to 789 (*The Toxic Substance Control Act Regulations*).
- 49 CFR Parts 178 to 199 (*The Hazardous Materials Transportation Act Regulations*).

Appendix B

Summary of Resource Conservation and Recovery Act Disposal Requirements

Before used oil or solid materials contaminated with used oil can be disposed of, they must be tested to determine if they are a hazardous waste. The characteristics of a hazardous waste under RCRA are:

- **Ignitability**—Used oil is considered ignitable if it has a flash point of 140°F or less. Solid materials that have been mixed with used oil are considered ignitable if they can spontaneously catch fire at normal temperatures and pressures, or friction or the absorption of water causes them to catch fire, and if this fire burns vigorously enough to be dangerous.

- **Corrosivity**—Used oil is considered corrosive if it corrodes (or eats away at) steel at a rate of 0.25 inches per year or greater at a test temperature of 130°F.

- **Reactivity**—Used oil or solid materials that have been contaminated with used oil are considered reactive if they are unstable; react violently, are capable of exploding, or emit toxic gasses when mixed with water; or are explosive.

- **Toxicity**—Used oil or solid materials contaminated with used oil exhibit the toxicity characteristic if they exceed the allowable limits for the toxic chemicals given in Table B-1. A test method called the Toxicity Characteristic Leaching Procedure is used to determine the levels and types of toxic constituents that are present. Because used oil rarely exhibits the characteristics of ignitability, corrosivity, or reactivity, the toxicity characteristic is the most important measure of whether used oil or solids that have been contaminated with used oil are hazardous wastes.

If used oil or solids that have been contaminated with used oil are determined to be hazardous under RCRA standards, they must be handled and disposed of as Subtitle C wastes. Different standards apply, however, depending on the quantity of hazardous waste produced by the generator. The specific requirements for these different generator types are listed below. These lists of requirements assume that the generator will send the wastes off site for treatment or disposal. Although the RCRA regulations allow generators to treat or dispose of the hazardous waste in onsite facilities, those facilities are subject to a variety of Subtitle C requirements, such as permitting. Most service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers are therefore likely to send their hazardous wastes off site.

Conditionally exempt small quantity generators are facilities that produce 100 kilograms (220 pounds) or less of hazardous waste a month (or produce or accumulate 1 kilogram [2.2 pounds] or less of an acute hazardous waste. Acute

Table B-1. **Levels of Contaminants That Cause a Material to Exhibit the Toxicity Characteristic Under RCRA**

Contaminant	Maximum Allowable Level (mg/L)	Contaminant	Maximum Allowable Level (mg/L)	Contaminant	Maximum Allowable Level (mg/L)
Arsenic	5.0	1,4-Dichlorobenzene	7.5	Methyl ethyl ketone	200.0
Barium	100.0	1,2-Dichlorethane	0.5	Nitrobenzene	2.0
Benzene	0.5	1,1-Dichloroethylene	0.7	Pentachlorophenol	100.0
Cadmium	1.0	2,4-Dinitrotoluene	0.13	Pyridine	5.0
Carbon tetrachloride	0.5	Endrin	0.02	Selenium	1.0
Chlordane	0.03	Heptachlor (and its epoxide)	0.008	Silver	5.0
Chlorobenzene	100.0	Hexachlorobenzene	0.13	Tetrachloroethylene	0.7
Chloroform	6.0	Hexachlorobutadiene	0.5	Toxaphene	0.5
Chromium	5.0	Hexachloroethane	3.0	Trichloroethylene	0.5
o-Cresol	200.0[a]	Lead	5.0	2,4,5-Trichlorophenol	400.0
m-Cresol	200.0[a]	Lindane	0.4	2,4,6-Trichlorophenol	2.0
p-Cresol	200.0[a]	Mercury	0.2	2,4,5-TP (Silvex)	1.0
Cresol	200.0[a]	Methoxychlor	10.0	Vinyl Chloride	0.2
2,4-D	10.0				

[a]If o-, m-, and p-Cresol concentrations cannot be differentiated, the total cresol concentration is used. The regulatory limit for total cresol is 200 mg/L.

hazardous wastes are fatal to humans in very low doses). Conditionally exempt small quantity generators must meet the following requirements:

- The generator cannot accumulate more than 1,000 kilograms of hazardous wastes (or 1 kilogram of an acute hazardous waste) without losing its status as a conditionally exempt small quantity generator.
- The generator must ensure that the waste is delivered to an offsite facility (within the United States) that satisfies one of the following criteria:
  - The facility is regulated under RCRA and meets all relevant RCRA requirements.
  - The facility beneficially uses or reuses the waste, or legitimately recycles or reclaims the waste.
  - The facility treats the waste before it is beneficially used or reused, or recycled or reclaimed.
- The generator must contract an EPA-licensed hauler to transport their hazardous wastes to an appropriate Subtitle C facility.

Large quantity generators are facilities that produce more than 1,000 kilograms (2,200 pounds) of hazardous waste or more than 1 kilogram (2.2 pounds) of acute hazardous waste each month. Large quantity generators must meet the following requirements:

- The generator must obtain an EPA identification number, and must use a transporter with an EPA identification number.
- The generator must prepare a manifest that indicates a facility (and an alternate) to manage the waste. If the transporter cannot ship the waste to one of those facilities, the generator must choose another facility and put it on the manifest. A representative from the generator, any transporters handling the waste, and the disposal facility must sign and keep a copy of the manifest for at least 3 years. Transporters and disposal facilities cannot accept wastes without proper manifests.
- The generator, as well as the transporter, must meet the U.S. Department of Transportation's Hazardous Materials Transportation Act packaging and labeling requirements (discussed in Appendix E).

- The waste must be properly removed from the generator site within 90 days.
- The generator must prepare a Biennial Report and submit it to EPA by March 1 of every even numbered year. This report must include the generator's EPA identification number, the EPA identification numbers for all transporters used, and a detailed description of management activities. A copy of this report must be kept for at least 3 years.
- Any generator that exports the waste to another country for disposal must meet special recordkeeping and reporting requirements.
- The generator must keep copies of the results of any tests or analyses conducted.
- The waste can only be disposed of in a facility that meets the stringent Subtitle C requirements.

Small quantity generators are facilities that produce between 100 and 1,000 kilograms (220 to 2,200 pounds) of hazardous waste each month. Small quantity generators must meet most of the same requirements that are listed above for large quantity generators. The following requirements, however, differ for small quantity generators:

- The waste must be properly removed from the generator site within 180 days (or within 270 days if the waste must be transported for more than 200 miles).
- The generator is not required to prepare and submit a Biennial Report.

Used oil and solid materials that have been contaminated with used oil that do not test hazardous can be disposed of as nonhazardous waste under RCRA Subtitle D. Used oil can be disposed of in a Subtitle D incinerator, while solid materials contaminated with used oil (with no free-flowing used oil) can be disposed of in either a Subtitle D landfill or incinerator. Certain disposal facilities that meet RCRA Subtitle D requirements, however, do not accept used oil or materials contaminated with used oil.

Representatives from service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers that would like more information on RCRA regulations, including the Used Oil Management Standards, should call the RCRA Hotline. In addition, state contacts and EPA Regional contacts will have information about RCRA requirements that apply in individual states. The number for the RCRA Hotline, along with lists of state and EPA Regional contacts, is given in Appendix A.

Appendix C

Summary of Underground Storage Tank Regulations

Although the Underground Storage Tank (UST) regulations include additional requirements for tanks holding hazardous substances, only the requirements that apply to USTs holding used oil are discussed here. State and local governments can have different or additional requirements. Owners and operators of USTs should contact their state regulatory authority to learn the details of their state UST regulations.

All USTs that store used oil must be in compliance with the UST requirements, except:

- Tanks storing used oil that is burned on site in space heaters.
- Aboveground tanks that are located in underground areas, such as basements and tunnels, where it is possible to physically inspect the tank for leaks.
- Tanks holding 110 gallons or less.
- Emergency spill and overfill tanks.

In order to be in compliance with the UST regulations, service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers that store used oil in USTs must meet the following requirements:

- USTs must be installed by properly trained professionals who follow industry codes. The owner or operator of the tank must submit a notification form to the state regulatory authority to certify that a qualified professional installed the tank. Notification forms are available from the state.
- New USTs (those installed after December 1988) must be equipped with devices that prevent spills and overfills, such as spill catchment basins and overfill alarms. Existing USTs (those installed before December 1988) must have spill and overfill protection by December 1998.
- New tanks and piping must be protected from corrosion. Existing USTs must have corrosion protection by December 1998.
- All USTs must use leak detection methods and be checked at least once a month to see if they are leaking. Except for alternate acceptable leak detection methods described below, one (or a combination) of the following monthly monitoring methods must be used:
  - Automatic tank gauging.
  - Monitoring vapors in the soil.
  - Monitoring between the layers of double walled tanks and pipes.
  - Ground-water monitoring.
  - Other methods approved by EPA.

- The following are a list of exceptions when alternative leak detection methods are allowed:
  - With new tanks, a combination of monthly inventory control and tank tightness testing every 5 years can be used instead of the monthly monitoring methods listed above. This alternate leak detection method can be used for only 10 years after the UST is installed, after which time one of the monthly monitoring methods must be used.
  - Some small tanks may be able to use manual tank gauging as a leak detection method, either by itself or in combination with tank tightness testing.
  - For existing USTs that have corrosion protection or internal tank lining and have devices that prevent spills or overfills, monthly inventory control combined with tank tightness testing every 5 years can be used. This method can only be used, however, for 10 years after adding corrosion protection or an internal lining (or until December 1998, whichever is later). After 10 years, one of the monthly monitoring methods must be used.
  - For existing USTs that do not have corrosion protection or internal tank lining and do not have devices that prevent spills or overfills, monthly inventory control combined with tank tightness testing every year can be used. This method is only allowed until December 1998. After December 1998, the UST (which, by that time, must have corrosion protection or an internal tank lining and devices that prevent spills and overfills) must use either automatic tank gauging or monitoring for vapors in the soil.
- Pressurized pipes must be equipped with devices to automatically shut off or restrict flow, or alarms that indicate leaks. Pressurized pipes must also be tightness tested for leaks annually or monitored using one of the following methods listed for tanks: vapor monitoring, groundwater monitoring, interstitial monitoring, or other approved monitoring methods.
- The most common suction pipes must either be monitored monthly using one of the monitoring methods listed above for pressurized piping, or tightness tested for leaks every 3 years.
- A less common but safer suction piping method uses below-grade piping that is sloped so that the contents of the pipes will drain into the storage tank if the suction is released. This suction piping method also has only one check valve in each suction line that is located directly below the suction pipe. This suction piping does not require leak detection.
- Owners/operators of USTs must demonstrate their ability to pay for any environmental damage that could be caused if their tanks leak. These payments must cover the costs of cleaning up a site and compensating other people for bodily injury and property damage.

Owners and operators of USTs must follow proper procedures for reporting and correcting leaks and spills of used oil. When a spill or leak occurs, the owner/operator of the UST should:

- Stop or contain the leak or spill immediately.
- Notify the state regulatory authority of the leak or spill within 24 hours. All underground leaks, any leaks or spills that leave a visible sheen on a water surface, and spills and overfills of 25 gallons or more must be reported.
- Identify and mitigate fire, explosion, and vapor hazards. The local fire department can test for explosive conditions and can help decide how to deal with any dangerous vapors or flammable liquids.
- Consult state or local government agencies on how to go about cleaning up a leak or spill. In addition, it may be useful to contact professional contractors to help determine the extent of contamination, prepare a cleanup plan, and clean up the site.
- Report all progress and any information collected to the state regulatory authority no later than 20 days after the leak or spill.
- Investigate damage that has occurred to the environment and report results of the investigation to the state regulatory authority within 45 days of the leak or spill. If ground-water contamination has occurred, submit a plan for cleaning up the ground water to the state regulatory authority.

If repairs are necessary, owners and operators of the tanks must follow these standards.

- Leaking tanks and piping can be repaired by a person who carefully follows the standard industry codes for UST repairs. Within 30 days of the repair, the tank must be tested or inspected to ensure that the repair was successful. Repaired USTs with cathodic protection must be tested within 6 months of repair to show that the cathodic protection is working properly. Records must be kept for each repair for as long as the UST is kept in service.

- Damaged metal piping cannot be repaired and must be replaced. Loose fittings can simply be tightened, however, if the piping itself is not damaged. Fiberglass piping can be repaired in accordance with the manufacturer's instructions or national codes of practice. Within 30 days of the repair, fiberglass piping must be tested to ensure that the repair was successful.

Owners and operators who decide to discontinue operating their tanks must follow the proper procedures for UST closure. USTs can be closed permanently or temporarily. If a decision has been made to close an UST permanently, these requirements must be followed:

- The state regulatory authority must be notified at least 30 days before closure.
- An evaluation must be conducted to determine if leaks from the UST have damaged the surrounding environment. If damage has occurred, proper corrective action for leaks and spills must be taken.
- The UST can either be removed or left in the ground. In either case, the tank must be emptied and cleaned by removing all liquids, dangerous vapors, and accumulated sludge. If the UST is left in the ground, it must be filled with a harmless, chemically inactive solid (like sand) to prevent it from collapsing.

USTs that will not be used for 3 to 12 months must meet requirements for temporary closure. In addition, certain USTs that will not be used for over 12 months can be temporarily, rather than permanently, closed. These tanks are:

- USTs that meet the requirements for new or upgraded USTs.
- USTs that are granted an extension beyond the 12-month limit by the state regulatory authority.
- USTs that are emptied, cleaned, and filled with an unregulated substance, such as water. The state regulatory authority must be notified of this change. An evaluation must be conducted to determine if any damage to the environment was caused while the UST held regulated substances. If so, proper corrective action for leaks and spills must be taken.

The requirements for temporary closure are:

- For USTs with corrosion protection and leak detection, continued operation of these systems is required if the tank still contains used oil. If a leak is found, proper corrective action must be taken. If the UST is empty, continued leak detection is not required.
- All lines attached to the UST must be capped, except the vent line, which must remain open and functioning.

Finally, the following materials must be kept as records to prove that the UST requirements have been met:

- The previous year's monitoring results for leaks, and the most recent tightness test.
- Copies of performance claims provided by leak detection manufacturers.
- Records of recent maintenance, repair, and calibration of leak detection equipment.
- Records showing that the inspections of the corrosion protection system were carried out by properly trained professionals.
- Records showing that a repaired or upgraded UST was properly repaired or upgraded.
- For at least 3 years after closing an UST, records of the site assessment results required for permanent closure.

State regulatory authorities responsible for implementing the UST regulations have additional information about particular recordkeeping requirements for each state. The general rule of thumb for recordkeeping is: *When in doubt, keep it.*

Additional information about the UST regulations is available from the RCRA Hotline, state contacts, and EPA Regional contacts, which are listed in Appendix A.

Appendix D

Summary of Spill Prevention Control and Countermeasures Requirements

The Spill Prevention Control and Countermeasures (SPCC) regulations require facilities that handle oil (and used oil) to develop a plan to prevent discharges into surface water. All facilities handling oil must comply with the SPCC regulations, except facilities that:

- Are located in areas where a release of oil could not be expected to enter a navigable waterway.
- Are subject to the control and authority of the U.S. Department of Transportation, as defined in the Memorandum of Understanding between the Secretary of Transportation and the Administer of EPA, from November 24, 1971.
- Have an underground storage capacity of 42,000 gallons or less and have an aboveground storage capacity of 1,320 gallons or less (with no single aboveground container having a capacity of more than 660 gallons).

The SPCC requirements that are likely to apply to service stations, quick-lube shops, fleet operations, DIY collection centers, and retailers that store used oil are as follows:

- The facility must develop a written Spill Prevention Control and Countermeasures Plan (SPCC Plan).
- The SPCC Plan must be reviewed and certified by a Registered Professional Engineer.
- The facility must keep a copy of the SPCC Plan on site (or at the nearest field office if the facility is not regularly staffed). The plan must also be available to be reviewed by EPA Regional Personnel during inspections.
- If a release of 1,000 gallons of oil into a navigable waterway occurs, or if two harmful releases to a navigable waterway occur in the same year, the facility must submit a detailed report to the EPA Regional Office and the appropriate state environmental agency. This report must include the SPCC Plan, any changes that have been made to the plan because of the release, general information about operations at the facility, and detailed reasons why the release occurred. The EPA Regional Office will review the SPCC Plan and might require revisions to the plan.
- If equipment at the facility has failed in the past (such as tank overflows or leaks), the SPCC Plan should include an estimate of the quantity of oil that could be released from such a failure in the future, the direction and rate the used oil would flow, and the potential effects of the release.
- The facility must amend the SPCC Plan whenever a change in facility design, construction, operation, or maintenance practices affects the facility's potential to

release oil into a navigable waterway. The amended plan must be reviewed and certified by a Registered Professional Engineer.

- The facility must be equipped with a system to contain any releases of oil to prevent their release into a navigable waterway. Such a containment system could include dikes, berms, curbing, gutters or other drainage systems, weirs, booms or other barriers, spill diversion ponds, retention ponds, and sorbent materials.
- Facilities that cannot reasonably prevent a release of oil into a navigable waterway with containment systems alone must develop a strong oil spill contingency plan under 40 *CFR* Part 109 of the Clean Water Act.
- Facilities must use appropriate equipment and procedures to drain diked areas or catchment basins of stormwater so that any used oil contained in those areas is not released to a navigable waterway.
- Storage tanks must be made of materials that cannot be deteriorated by oil and will not be affected by the pressure and temperature the used oil is stored under.
- All aboveground storage tanks must be equipped with secondary containment that is capable of holding more than the contents of the largest tank in the containment area.
- Buried metallic storage tanks should have corrosion protection, such as coatings, cathodic protection, or other effective means. At a minimum, regular pressure testing should be used to detect leaks.
- Partially buried tanks should be avoided unless the buried portion of the tank is equipped with corrosion protection.
- The condition of aboveground tanks should be periodically tested using hydrostatic testing, visual inspection, or other means.
- As much as possible, tanks should be engineered with fail-safe methods that avoid spills by preventing overfilling. Such methods could include alarms that signal when the tank has reached a certain level, or a pump cutoff device that prevents oil from being pumped into the tank once the tank has reached a certain level.
- If a tank leaks visible quantities of oil, the leak should be promptly repaired.
- Containers storing oil should be located in an area where leaks or spills will not reach navigable waters and that provides secondary containment. In addition, the containers should not be kept in an area that can be flooded.
- Buried piping should be coated or cathodically protected to minimize corrosion. Any exposed sections of buried piping should be routinely inspected for deterioration. If deterioration is found in the piping, it should be repaired as necessary.
- Any piping that is not in service should be capped.
- Pipe supports should be properly designed to account for expansion and contraction of the pipes and to minimize pipe abrasion and corrosion.
- Aboveground piping should be periodically inspected for deterioration, corrosion, or leaks.
- Vehicles entering the facility should be warned so that they do not damage aboveground piping.
- The collection of used oil from storage tanks by transporters should follow U.S. Department of Transportation requirements, as discussed in Appendix E.
- Filling or draining of storage tanks should only occur in areas with secondary containment capable of holding the used oil held in the largest compartment of the transportation vehicle.
- Some kind of locking or warning system should be provided to prevent a transportation truck from driving away without disconnecting from the piping or storage tank.
- The lowest drain and all outlets of the transportation truck should be inspected for leaks before the truck collects the used oil, and again before the truck leaves the site.
- The area where used oil is stored or handled should be fenced in, and entrance gates should be locked or guarded when the facility is unattended.
- Any valves should be locked when the tank is not being filled or drained.
- When it is not in operation, the starter control for all oil pumps should be locked in the "off" position, or the starter pump should be kept in a location that is only accessible to facility personnel.
- The facility should have enough lighting to allow a spill to be detected at night and to minimize the threat of vandalism.

- Personnel must be properly trained on how to minimize the risk of spills when using equipment, and how to meet applicable pollution control laws, rules, and regulations.
- One person should be given the responsibility for spill prevention at the facility, and this person should periodically report to the facility management.
- Management must periodically be briefed by personnel on SPCC issues, including how any releases that have occurred have been handled.

EPA ERD Information Line, described in Appendix A of this document, has additional information on the SPCC regulations.

Appendix E

Summary of U.S. DOT Hazardous Materials Transportation Act Requirements

DOT's Hazardous Materials Transportation Act (HMTA) regulations govern the transportation of all hazardous materials. As of 1994, DOT was in the process of updating these regulations, which may affect used oil generators in the future. According to the 1994 DOT requirements, used oil must be handled as a hazardous material if it is a "combustible liquid" (i.e., has a flash point between 100°F and 200°F), a "flammable liquid" (i.e., has a flash point of 100°F or less), or is destined for disposal. When transporting used oil that is considered a hazardous material under DOT's HMTA, the following requirements must be met:

- The generator of the used oil must prepare shipping papers that describe the contents of the shipment, give the name of the transporter, and give an emergency response telephone number. The generator must also certify that the material to be shipped and the shipping papers meet the regulatory requirements.
- A manifest must accompany the shipment. This manifest must be in compliance with RCRA regulations under 40 CFR Part 262, as discussed in Chapter 3. The manifest must be signed and dated by a person representing the generator and the original transporter. A copy must also be given to and signed by any other transporters that handle the materials, as well as the recycling or disposal facility that ultimately receives the used oil.
- Each shipment of used oil must be accurately labeled using a system specified in HMTA. The label must give the proper shipping name for the substance, the identification number that corresponds with the shipping name, information about the hazardous nature of the substances, and any warnings or special requirements that apply to shipping the substance.
- The vehicle containing the used oil must be marked so as to indicate the contents of the shipment.
- Information on the actions that should be taken in case of an emergency should be carried with the shipment.
- If a release to the environment occurs and local, state, or federal authorities determine that the release endangers public health or the environment, these authorities can require that the release be cleaned up by the transporter.

- If a release of used oil to the environment is so extreme that it causes someone to be killed or hospitalized, results in damages of $50,000 or more, results in an evacuation of the area, or causes a major roadway to be shut down, it should be reported as soon as possible to DOT by calling 800-424-8802.
- If any release of used oil occurs during transportation, this should be reported in writing to DOT within 30 days. Reports should include an estimate of the quantity of used oil released and a copy of the hazardous waste manifest. Reports should be sent in duplicate to: Information Systems Manager, DHM-63, Research and Special Programs Administration, Department of Transportation, Washington, DC 29590-0001. (In addition, used oil transporters must follow Clean Water Act, CERCLA, and TSCA regulatory requirements for reporting releases of used oil to the environment, as discussed in Chapter 3, Chapter 6, and Appendix D.)
- If an accident occurs, people (other than qualified personnel) should be kept away from the accident, the used oil should be contained, and the vehicle should be removed from service if it continues to leak.
- Transporters must be trained as to the requirements of HMTA and proper procedures for safely handling the used oil that is considered hazardous. Drivers must also be trained in safe driving skills.
- The used oil must be packaged in a container approved by DOT under this regulation. The container must also be kept under appropriate conditions (for example, it must be kept at cool enough temperatures and kept cushioned to avoid breakage).
- Proper loading and unloading procedures must be used. (For example, personnel should not smoke during loading and unloading, and the hand brake on the vehicle should be set.)

DOT's Hazardous Materials Hotline, listed in Appendix A of this document, can be contacted for additional information on these regulations, as well as information about DOT's progress in updating the regulations.

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