Waste Management Practices for Petroleum Marketing Facilities

API PUBLICATION 1638
FIRST EDITION, OCTOBER 1994

STEP
Strategies for Today's Environmental Partnership

American Petroleum Institute
1220 L Street, Northwest
Washington, D.C. 20005

STEP

One of the most significant long-term trends affecting the future vitality of the petroleum industry is the public's concerns about the environment. Recognizing this trend, API member companies have developed a positive, forward looking strategy called STEP: Strategies for Today's Environmental Partnership. This program aims to address public concerns by improving industry's environmental, health and safety performance; documenting performance improvements; and communicating them to the public. The foundation of STEP is the API Environmental Mission and Guiding Environmental Principles. API standards, by promoting the use of sound engineering and operational practices, are an important means of implementing API's STEP program.

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The members of the American Petroleum Institute are dedicated to continuous efforts to improve the compatibility of our operations with the environment while economically developing energy resources and supplying high quality products and services to consumers. The members recognize the importance of efficiently meeting society's needs and our responsibility to work with the public, the government, and others to develop and to use natural resources in an environmentally sound manner while protecting the health and safety of our employees and the public. To meet these responsibilities, API members pledge to manage our businesses according to these principles:

- To recognize and to respond to community concerns about our raw materials, products and operations.
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- To make safety, health and environmental considerations a priority in our planning, and our development of new products and processes.
- To advise promptly appropriate officials, employees, customers and the public of information on significant industry-related safety, health and environmental hazards, and to recommend protective measures.
- To counsel customers, transporters and others in the safe use, transportation and disposal of our raw materials, products and waste materials.
- To economically develop and produce natural resources and to conserve those resources by using energy efficiently.
- To extend knowledge by conducting or supporting research on the safety, health and environmental effects of our raw materials, products, processes and waste materials.
- To commit to reduce overall emissions and waste generation.
- To work with others to resolve problems created by handling and disposal of hazardous substances from our operations.
- To participate with government and others in creating responsible laws, regulations and standards to safeguard the community, workplace and environment.
- To promote these principles and practices by sharing experiences and offering assistance to others who produce, handle, use, transport or dispose of similar raw materials, petroleum products and wastes.

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Manufacturing, Distribution, and Marketing Department

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FOREWORD

Petroleum marketing facility operations, which range from retail fuel convenience stores to terminals and lube plants, present a great variety of waste streams and a challenge to manage them properly. Few waste streams associated with petroleum marketing facilities are process streams with opportunities for changes in processes, raw materials, or large source reductions. Most of the waste stream quantities are directly related to sales and/or service volume. These factors present the unique challenge for waste management at petroleum marketing facilities, which this publication addresses.

Waste management opportunities with source reduction, recycling/re-use, treatment, or disposal as appropriate to the waste stream and the facility are present in many areas of petroleum marketing facilities. The volume of many individual waste streams may not appear impressive; however, significant and worthwhile opportunities exist for sound waste management and source reduction.

The term, "waste minimization," is used within this publication to encompass both the concepts of waste management and source reduction.

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Suggested revisions are invited and should be submitted to the director of the Manufacturing, Distribution, and Marketing Department, American Petroleum Institute, 1220 L Street, N.W., Washington, D.C. 20005.

CONTENTS

Waste Management Practices for Petroleum Marketing Facilities

SECTION 1—INTRODUCTION

1.1 Purpose and Scope

Petroleum marketing facilities are subject to increasingly complex and restrictive requirements governing waste management. Regulations at the federal, state, and local level mandate strict control over the handling, treatment, and disposal of waste generated from marketing facilities. This situation can lead to confusion about which waste management practices are acceptable and which should be discontinued.

This document provides specific guidance for managing typical waste streams at petroleum marketing facilities. The waste management options discussed in this document reflect currently acceptable industry practices and are based upon information gathered from representative API member facilities and compliance with applicable environmental regulations. Additional complimentary discussions of marketing waste minimization practices are presented in Chapter 5 of API Publication 302.

1.2 Organization

This introductory section provides readers with a summary of federal environmental regulations that oblige facilities to utilize sound waste management practices. State and local regulations may be more restrictive and impose additional requirements on some facilities. This section also introduces readers to the concept of the waste management hierarchy and the benefits of pollution prevention.

Following this introduction are two additional sections. Section 2 identifies the types of petroleum marketing facilities covered by this document. Section 3 identifies typical waste streams generated at each type of facility covered and discusses waste management options on a waste stream-specific basis. Finally, Appendixes A, B, and C contain guidance on implementing a facility waste management program that is based on continuous environmental improvement and pollution prevention.

1.3 Regulatory Driving Forces

Every petroleum marketing facility covered by this guidance document is directly or indirectly impacted by the ever-growing number of local, state, and federal environmental requirements. Operators should keep current on the regulations that impact their facility. These regulations represent a growing force in encouraging pollution prevention and waste minimization. Some regulations encourage waste minimization directly, while others do so indirectly by limiting the range of disposal options that are available to facility operators.

The following summaries of regulations are intended to provide information highlighting waste management requirements. It is suggested that the reader consult with legal counsel before undertaking activities which may be imposed by these regulations.

1.3.1 THE RESOURCE CONSERVATION AND RECOVERY ACT OF 1976 AND THE HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984

1.3.1.1 General

The Resource Conservation and Recovery Act of 1976 (RCRA) and the Hazardous and Solid Waste Amendments of 1984 (HSWA) require generators of hazardous wastes to implement programs to reduce the volume and toxicity of wastes. In addition, land disposal restrictions make landfilling and land application more costly waste management options.

1.3.1.2 Waste Manifest

A hazardous waste manifest must be prepared any time hazardous waste is sent from the site of generation over a public road for treatment, storage, or disposal. In the manifest, a description of the waste and the name of the transporter and of the Treatment, Storage, & Disposal (TSD) site are needed. The manifest also includes a section whereby the generator certifies that a program is in place to reduce the volume and/or toxicity of the waste generated, to the degree economically practicable. Large and small quantity waste generators must read, sign, and date this certification statement every time a hazardous waste leaves the site.

1.3.1.3 Future Requirements for Nonhazardous Waste

Future EPA regulations will likely affect the operation of non-hazardous solid waste landfills and incinerators. EPA is expected to set a national goal of source reduction and recycling. In addition, the regulations will set uniform standards with regard to landfill construction, corrective action, and New Source Performance Standards for municipal waste incinerators. These regulations may result in further restrictions on solid waste disposal options.

1.3.1.4 Land Disposal Restrictions

In the Hazardous and Solid Waste Act (HSWA), Congress mandated restrictions on the land disposal of hazardous waste. Subsequently, EPA developed strict treatment standards that must be met before a hazardous waste can be placed in or on the land for disposal. The land disposal restrictions require generators of hazardous waste to include with each manifest a notification to the disposal/treatment facility that land disposal of the waste is restricted. The notification must specify the type of treatment required before the waste can be disposed in or on the land. If the waste has been pretreated to meet the applicable treatment standard, the manifest for that waste must be accompanied by written certification that land disposal is allowed. Land disposal restrictions have increased the cost of treatment and disposal for most hazardous waste streams. As a result of these notification and disposal requirements, waste minimization has become a more attractive management option.

1.3.2 SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA) TITLE III FORM R REPORTS

Some petroleum marketing facilities are subject to the toxic release inventory reporting requirements of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). Every July 1, affected facilities must complete a Form R for each listed toxic chemical on site that exceeds the threshold quantity. The Form R report requires detailed information on facility emissions and off-site transfers of toxic chemicals. Waste minimization information also is required on the Form R report. The information becomes part of a national database that is available for public review. As a result, an unprecedented amount of information on facility emissions and waste generation is now subject to public scrutiny. Regulators also use this information to target enforcement and regulatory initiatives.

1.3.3 CLEAN WATER ACT

1.3.3.1 General

The Clean Water Act controls the discharge of pollutants into the waters of the United States. These controls are implemented through the National Pollutant Discharge Elimination System (NPDES) regulations and pretreatment regulations. Under the NPDES program, direct dischargers of pollutants to surface water must obtain a permit. Under the pretreatment regulations, significant industrial users discharging to Publicly Owned Treatment Works (POTW) must obtain permits. Some stormwater discharges are also regulated.

1.3.3.2 Stormwater

Certain industries that discharge stormwater runoff into surface water systems or into municipal stormwater systems must obtain a NPDES permit. Some marketing facilities are subject to these requirements. These facilities must reduce the levels for each toxic compound in the stormwater through the use of Best Available Technology (BAT).

1.3.3.3 POTW Discharges

Under the pretreatment regulations, Publicly Owned Treatment Works (POTWs) that accept industrial sources of wastewater must set local effluent limits. These local limits have come under closer scrutiny, as have the amount of toxics being received by POTWs. Stricter pretreatment standards have been set as a result. Significant industrial users (SIUs) must have a permit. SIUs are facilities that meet any one of the following descriptions:

a. A facility subject to categorical pretreatment standards.
b. A discharger of 25,000 gallons per day or more.
c. A user that contributes more than 5 percent of the dry weather hydraulic capacity or organic capacity of the POTW.
d. A facility designated by the POTW due to past facility violations.

In addition, facilities that discharge hazardous waste to the POTW are now subject to certain notification and reporting requirements.

1.3.4 STATE AND LOCAL TRENDS

Many states and localities have programs to encourage industries to emphasize waste minimization. These programs vary considerably in scope and intensity, and are continually evolving.

1.4 The Waste Management Hierarchy

EPA policy encourages industry and the public "to fully utilize source reduction techniques in order to reduce risks to public health, safety, and well-being and the environment and, as a secondary preference, to use environmentally sound recycling to achieve these goals" (Federal Register, Vol. 54, No. 16, 26 January 1989). The preferences for waste minimization opportunities can be considered in the context of what is referenced as the waste management hierarchy. Options at the top of the hierarchy are considered to be more desirable than those at the bottom. Waste management options in order of preference are as follows:

a. Source reduction.
b. Recycling/reuse.
c. Treatment.
d. Disposal.

The waste management hierarchy is further discussed and implemented in "Section 3—Waste Management Options." API endorses the hierarchy concept and encourages facilities to use it.

1.5 Pollution Prevention

Pollution prevention is considered to include source reduction and some types of recycling. A commitment to pollution prevention can result in many benefits. These benefits include the following:

a. Reduced potential exposure to workers and the community.
b. Lower costs of waste disposal.
c. Reduced risk to the environment.
d. Reduced regulatory reporting.
e. Lower materials cost.
f. Reduced long-term liabilities.
g. Improved image and public relations.

To realize these benefits, API encourages member facilities to review the framework for developing a site-specific waste management program illustrated in the Appendixes to this document. This framework is built on the principles of pollution prevention and continuous environmental improvement as they apply to petroleum marketing activities.

1.6 Referenced Publications

API

Publ 302 *Waste Minimization in the Petroleum Industry: A Compendium of Practices,* 1991

Std 650 *Welded Steel Tanks for Oil Storage*

RP 652 *Lining of Aboveground Petroleum Storage Tank Bottoms*

RP 1604 *Removal and Disposal of Used Underground Petroleum Storage Tanks*

Publ 1621 *Bulk Liquid Stock Control at Retail Outlets*

Publ 1628 *A Guide to the Assessment and Remediation of Underground Petroleum Releases*

Publ 1629 *Guide for Assessing and Remediating Petroleum Hydrocarbons in Soil*

RP 1633 *Handling Water Discharges from Automotive Service Facilities Located at Petroleum Marketing Operations*

Publ 2202 *Dismantling and Disposing of Steel from Aboveground Leaded Gasoline Storage Tanks*

USEPA[1]

Potential Reuse of Petroleum Contaminated Soil: A Directory of Permitted Recycling Facilities, Contract No. 68-C9-0033

[1]U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, DC 20460.

SECTION 2—FACILITIES ADDRESSED BY THIS DOCUMENT

2.1 Overview

Section 2 describes the petroleum marketing facilities addressed by this document.

The petroleum marketing industry is engaged in the receipt, storage, blending, distribution, and ultimate sale of refined products to the consumer. Individual marketing facilities may perform one or more of these functions. This document specifically addresses waste management practices at the following types of marketing facilities and at sites where remediation is required:

a. Marketing Terminals.
b. Bulk Plants.
c. Lube Blending and Packaging Facilities.
d. Asphalt Plants.
e. Aviation Servicing Facilities.
f. Full Automotive Service Facilities.
g. Retail Fuel Car Wash/Convenience Stores.
h. Remediation Sites.

The following subsections describe typical operations at each of these facilities.

2.2 Marketing Terminals

Marketing distribution terminals consist of tank farms, loading/unloading areas, storage areas, and warehouse and office buildings. Products are generally received by pipeline or marine transport and distributed by truck, rail, or marine transport. Bulk quantities of refined products are stored in aboveground tanks for distribution by tank truck to retail or wholesale marketing facilities. Marketing terminals may also store an inventory of petroleum products in drums, pails, and cases.

Some marketing terminals may support a truck fleet. Marketing terminals that use marine transport to receive and ship products may accept and treat ballast water from marine vessels. Some marketing terminals and asphalt plants have on-site laboratories capable of performing quality control testing of products.

2.3 Bulk Plants

Although bulk plants typically handle smaller quantities of products, operations at these plants are similar to those at marketing terminals. Product receipt is most often by truck, although some are serviced by rail or marine transport. Bulk plants may also support a truck fleet, and may store and distribute other products in bulk or container quantities.

2.4 Lube Blending and Packaging Facilities

Lube oil or grease blending and packaging facilities blend refined products with additives, and package them in drums

or other consumer-sized containers. The additives, may be received and stored either in tanks or drums. Some facilities also manufacture plastic containers for the packaging operation. Lube blending and packaging facilities have on-site laboratories for routine quality control testing of products received and distributed.

2.5 Asphalt Plants

Asphalt plants receive asphaltic materials from petroleum refineries and process it with additives to produce paving, roofing, and industrial grade asphalt products. Facilities typically consist of a rail siding or ship dock, an above ground tank farm, a warehouse, one or more unloading areas for raw materials and products, a manufacturing area, a package steam boiler, a truck scale and loading rack, a laboratory for quality control, and an office.

2.6 Aviation Servicing Facilities

Aviation servicing facilities store jet fuel and aviation gasoline in aboveground or underground storage tanks. Services provided include refueling, de-icing, washing, maintenance, and repair of aircraft. Aircraft fuel is loaded into refueling trucks which service the aircraft. Jet fuel additives are pumped from drums into holding tanks on refueling trucks where the additives are blended into the fuel supply. De-icing is performed by spraying propylene glycol or a similar material directly onto the aircraft from a service truck.

2.7 Full Automotive Service Facilities

Full automotive service facilities (that is, conventional service stations) provide retail sales of motor fuels, motor oil, antifreeze, tires, and other automobile maintenance products, and provide automotive servicing and repair. Used oil generated from automotive servicing is generally stored in drums or tanks and periodically removed for processing by a recycler. Some facilities may also accept used oil from do-it-yourselfers. Used lead/acid batteries, tires, coolants, and cleaning solvents are also generated by automotive service work.

2.8 Retail Fuel Car Wash/Convenience Stores

Retail fuel car wash and convenience stores provide retail sales of motor fuel, as well as providing car washing facilities, a convenience store, or both. Car wash facilities require the storage and use of detergents, surfactants, and dispersants. Car wash facilities may be equipped with a solids/oil reclaim pit or other pretreatment system for car-washing wastewater. Some facilities recycle wastewater. Convenience stores typically sell packaged and prepared food, sundries, and automotive supplies.

2.9 Remediation Sites

Some marketing facilities may be involved in soil and/or ground water remediation projects. Remediation activities will depend upon the site conditions and regulatory requirements.

SECTION 3—WASTE MANAGEMENT OPTIONS

3.1 Overview

This section identifies and describes waste streams typically found at petroleum marketing facilities and waste management options for those waste streams.

Waste streams from facilities addressed in this document have been grouped into the following four categories:

a. Handling and Storage Area Wastes.
b. Facility Wastes.
c. Automotive Wastes.
d. Miscellaneous Wastes.

Table 1, the "Marketing Facilities Waste Stream Matrix," identifies the waste streams found in each of these four categories. The Matrix also indicates which wastes may be generated at each type of petroleum marketing facility.

Waste management options can be evaluated in consideration of the waste management hierarchy shown below. Options at the top of the hierarchy are considered to be more desirable and more protective of the environment than those at the bottom, and should be considered before selecting treatment or disposal:

a. *Source Reduction*—changes in operations which reduce, avoid, or prevent the generation of waste, or reduce the toxicity of waste that is generated (waste minimization may be considered a form of source reduction).
b. *Recycling/Reuse*—resource recovery and other practices which reclaim or reprocess materials.
c. *Treatment*—any physical, chemical, biological, or thermal process that reduces the volume and/or toxicity of wastes.
d. *Disposal*—the discharge of waste into air or water, or onto land.

It is recommended that recycling facilities be visited to ensure that recyclable material is being handled properly.

3.2 Handling and Storage Area Wastes

Wastes in this category include those wastes that are generated as a normal result of product storage and handling.

3.2.1 TANK BOTTOMS

Over a period of time, sludge may accumulate on the bottoms of tanks used for storing petroleum products. The

Table 1—Marketing Facilities Waste Stream Matrix (page 1 of 3)

Name of Waste Stream	Marketing Terminal Plants Bulk Plants	Lube Blending/ Packaging	Asphalt Plants	Aviation	Retail Full Service	Retail Car Wash C-Store	Remediation Sites
Storage Area Handling and Wastes							
Leaded gasoline tank bottoms	X				X	X	
Unleaded gasoline tank bottoms	X			X	X	X	
Aviation gasoline tank bottoms	X			X			
Bunker fuel tank bottoms	X						
Lube oil tank bottoms	X	X					
Diesel fuel tank bottoms	X				X	X	
Furnace oil tank bottoms	X						
Jet fuel tank bottoms	X			X			
Asphalt bottoms	X		X				
Additives tank bottoms	X	X	X				
Ballast water	X						
Solvent tank bottoms	X		X				
Drums (used)	X	X	X	X	X		
Bottles, pails, and cans (used)	X	X	X	X	X	X	
Grease containers (used)	X	X		X	X		
Herbicide/Pesticide containers (used)	X	X	X	X	X	X	
Pipeline interface	X			X			
Contaminated absorbents/soils	X	X	X	X	X	X	X
Hydrostatic test water	X	X	X	X	X	X	
Tank water draws	X			X	X	X	
Facility Wastes							
Aboveground tanks, lines and valves (scrap)	X	X	X	X	X	X	
Underground tanks and lines (scrap)	X	X		X	X	X	
Aircraft, car or truck washing waste (waste water and silt)	X			X		X	
Oil/water separator sediment & skimmings	X	X	X	X	X	X	X
Septic tank sludges and liquids-sanitary waste	X	X	X	X	X	X	

Table 1—Marketing Facilities Waste Stream Matrix (page 2 of 3)

Name of Waste Stream	Marketing Terminal Plants Bulk Plants	Lube Blending/ Packaging	Asphalt Plants	Aviation	Retail Full Service	Retail Car Wash C-Store	Remediation Sites
Facility Wastes							
Waste clay from filters	X	X		X			
Product filters	X			X	X	X	
Used activated carbon from vapor recovery units	X						X
Used refrigerants from vapor recovery units	X						
Scrap grease	X	X					
Asphalt wastes			X				
Degreasers/solvents	X	X	X	X	X	X	
Construction debris	X	X	X	X	X	X	
Automotive Wastes							
Motor oils (used)	X			X	X	X	
Transmission oil (used)	X			X	X		
Brake fluids (used)	X			X	X		
Anti-freeze (used)	X			X	X		
Radiator flush	X			X	X		
Batteries (used)	X			X	X		
Brake shoes (used)	X			X	X		
Auto/truck parts (used)	X			X	X		
Catalytic converters and mufflers (used)	X			X	X		
Tires (used)	X			X	X		
Used filters (oil, air, fuels)	X			X	X		
Grease (used)	X	X			X		
Miscellaneous Wastes							
Oily rags	X	X	X	X	X	X	
Food wastes from convenience stores						X	
General refuse	X	X	X	X	X	X	
Asbestos	X	X	X	X	X	X	X
PCBs	X	X	X	X	X	X	X
Scrap metal	X	X	X	X	X	X	X
Waste packaging material		X				X	
Laboratory wastes	X	X	X				

Table 1—Marketing Facilities Waste Stream Matrix (page 3 of 3)

Name of Waste Stream	Marketing Terminal Plants Bulk Plants	Lube Blending/ Packaging	Asphalt Plants	Aviation	Retail Full Service	Retail Car Wash C-Store	Remediation Sites
Miscellaneous Wastes							
Compressor condensate	X	X		X	X	X	
Internal heating coils condensate	X		X				
Boiler blowdown	X	X	X	X			
Groundwater remediation/prod. recovery							X
Sand blasting	X	X	X	X			
Lead	X	X	X	X	X	X	X

Note: prod. = product

sludge may include hydrocarbons, water, scale, or rust. This material is collectively referenced as tank bottoms. Since tank bottoms may exhibit a hazardous waste characteristic, the material should be analyzed to determine appropriate disposal options.

Source reduction techniques for aboveground tanks include the following:

a. Where tanks are empty and have been cleaned, coat tank floors and walls with fiberglass or epoxy material to reduce scaling or rust (refer to API RP 652).
b. Cover floating roof tanks with dome (geodesic) covers (refer to API addendum I to API Std. 650).
c. Use internal tank drains on open floating roof tanks to minimize water intrusion into the tanks.
d. Use the following techniques to substantially reduce the amount of waste generated during tank cleaning:

1. Prior to cleaning a tank, every effort should be made to extract all recoverable product and return it to storage.
2. If water is used to remove the bottom sludge, the amount of wash water can be reduced by using a recycle loop that contains a gravity separator to remove entrained product before the water is reused.
3. Many service companies that clean tanks and remove sludge offer an assortment of portable waste minimization equipment that recovers oil from the sludge for recycling and minimizes the amount of solids generated. Methods used include centrifugal separation and pressure filtration.

It is important to note that tank bottom sludge may exhibit a hazardous waste characteristic. This material should therefore be tested prior to disposal. If the tank bottom sludge is classified as hazardous waste, then treatment or stabilization may be necessary to reduce the toxicity of the material prior to disposal. Incineration is another option if the tank bottom sludge has adequate thermal characteristics.

Tank cleaning wash water may be handled as follows:

a. Processed for discharge under a NPDES permit.
b. Processed for permitted discharge to a POTW.
c. Transported to an off-site reclaimer/recycler.
d. Disposed as a waste.

3.2.2 USED CONTAINERS

Many different types of containers (for example, 5-gallon pails; 30- or 55-gallon drums of fibre, plastic, or steel; and small plastic, glass, or metal cans) are used to store products, such as lubricating oils, greases, re-agents, additives, solvents, cleaners, herbicides, and pesticides.

Non-reusable or non-returnable containers or both are a solid waste that may contain residual hazardous materials. Source reduction can be realized by purchasing as many materials as possible in bulk quantities, thus reducing the number of used containers that require disposal. Recycling or reuse of containers is possible by using manufacturers who offer their products in reusable drums or other containers.

For materials that cannot be purchased in bulk or in reusable containers, special precautions should be taken on the disposal of any such containers. Empty drums can be sold to a reliable drum reconditioner and should not be accumulated on site. However, note the following precautions.

Landfill disposal and the sale of drums as scrap metal present potential liabilities to the disposer. Consequently, the following precautionary measures should be considered prior to sending containers to an off-site location other than the supplier's facility:

a. Remove as much material from the container as possible.
b. Call the local environmental agency to determine that the drum disposal or recycling facility is meeting its regulatory responsibilities.
c. Visit the drum disposal or recycling facility to assure that the operation is being managed in a legal and environmentally sound manner. Facilities with poor housekeeping practices should be avoided.

While the empty containers are being stored prior to transport off-site, all drum openings should be securely capped. The drums should be stored with tops up, and under cover where possible. The use of containment curbs, run-off diversions, and canopies should be considered for container storage areas to prevent contact with stormwater.

Used pesticide and herbicide containers may contain residuals that are regulated as hazardous waste. Strict inventory control measures should be in place to ensure that pesticides and herbicides are not purchased or stored in excessive quantities. The use of outside lawn maintenance and pest control contractors is another alternative for eliminating on-site accumulation of pesticides, herbicides, and their containers. In addition, some commercially-available pesticides and herbicides do not contain regulated hazardous constituents.

3.2.3 PIPELINE INTERFACE

This material consists of the mixture of product that occurs between different products as they are sent through the pipeline.

Interface material is sent to tankage prior to blending back into product or returning to a refinery for reprocessing.

3.2.4 ABSORBENTS

Absorbents, such as clay or commercially-available materials, are used to absorb spills of liquid product. Used absorbents should be kept separate from other waste for appropriate handling or disposal.

Small quantities of contaminated absorbent materials may typically be disposed at an authorized landfill. Check with landfill operators about their requirements for these wastes.

Off-site incineration also is an option, especially for larger quantities of waste. In some states, used oil and wastes

containing oil, including absorbents, are regulated as hazardous wastes and must be handled accordingly.

3.2.5 CONTAMINATED SOIL

The most prudent approach to managing this waste stream is to establish policies and procedures that prevent spills and leaks from occurring. Good housekeeping practices, including visual inspection of equipment (when feasible), should be utilized. If soil contamination occurs, the cleanup of the site may be strictly regulated and controlled by federal, state, or local authorities.

Soils with petroleum hydrocarbons may be used as an aggregate in asphaltic concrete. Soils may also be utilized by cement and brick manufacturing facilities. Refer to USEPA report entitled *Potential Reuse of Petroleum Contaminated Soil: A Directory of Permitted Recycling Facilities*. Contaminated soil may be excavated and sent to a landfill if permitted by state and local regulations.

There are several alternatives for on-site treatment of contaminated soil, such as bio-remediation, vapor extraction, bio-venting, thermal treatment, and soils washing. If one of these management options is feasible from a technical and regulatory standpoint, it may be more practical and cost-effective than excavation and disposal or incineration, since the soil can remain on site, or even in place (see API Publication 1628 and API Publication 1629 for further guidance for remediation of sites).

3.2.6 SPILLS AND LEAKS

Minor spills and leaks may occur during facility operations. They can be minimized with the implementation of an inspection and maintenance program and by maintaining sound operating practices reinforced through periodic employee training sessions.

The following good housekeeping and maintenance practices can help prevent spills and leaks:

a. Perform periodic inventory checks to assure storage system integrity.
b. Construct and install aboveground and underground storage tanks and piping in accordance with current API standards and recommended practices and with federal, state, and local regulations.
c. Utilize inventory control and/or leak detection methods.
d. Inspect dispensers, pumps, fill manholes, and piping regularly for signs of leakage. Repair defective equipment promptly.
e. Keep truck loading overfill protection equipment in good working order. Review truck loading rules; keep them current; and require drivers to follow those rules every time the drivers load.
f. Automatic overfill protection and/or high-level alarms may be used to help prevent spills which result from overfilling storage tanks.
g. Maintain impervious pavement and containment areas in good condition to prevent petroleum products from contacting soil and ground water.
h. Install concrete containment slabs or drip pans where pumps, valves, and fittings are concentrated to maximize product recovery if spills or leaks occur and to minimize the usage of absorbents.

3.2.7 HYDROSTATIC TEST WATER

Pipelines and storage tanks may be periodically hydrostatically tested to ensure their integrity and in some cases to comply with federal, state, and local regulations.

Hydrostatic tank tests should be performed following tank cleaning when possible in order to minimize contamination of the hydrostatic test waters. Contaminated hydrostatic test water can either be treated at the facility's on-site wastewater treatment plant or collected and sent off-site for treatment.

3.3 Facility Wastes

Wastes in this category are generated as a result of routine operation and maintenance of the facility.

3.3.1 TANKS , PIPING , VALVES , FITTINGS, AND ACCESSORIES—SCRAP

Tanks, piping, valves, and fittings which are no longer serviceable or have reached the end of their useful life have several management options available before being discarded. This waste stream is composed of ferrous and non-ferrous metals, fiberglass, plastic, and rubber.

Reusable items may be utilized by used equipment dealers. Metal parts may be sent to a scrap recycler or smelter. Those parts which cannot be scrapped can be disposed of as general refuse. Steel tanks should be managed in accordance with API Recommended Practice 1604 and Publication 2202. Fiberglass tanks may be recertified and reused as a viable option to landfilling. Gasoline fueling nozzles are typically recycled through the manufacturer or a rebuilding service.

3.3.2 AIRCRAFT, CAR, OR TRUCK WASHING WASTE

Aircraft, car, and truck washing wastes consist of aqueous silt, are typically high in detergents and suspended solids, and may contain trace amounts of oil. Source reduction can be achieved by installing treatment equipment which recycles wash water. At some facilities, this option is so effective that no water effluent is generated. Facilities with truck fleets should consider using an off-site washing service with discharge permits for proper wastewater treatment.

Washing effluent should be segregated from other facility effluent. Oil/water separators have limited effectiveness for removing the soluble organics and emulsified oils that contribute to oil and grease content in the effluent.

Discharging wash water into the oil/water separator which processes other waste water streams could cause the effluent to fail discharge standards. The isolated wash water effluent should be discharged to the sanitary sewer if permitted by the local Publicly Owned Treatment Works (POTW). The wash water may also be collected and treated to remove Chemical Oxygen Demand (COD) and suspended solids. Following treatment, the liquid can be discharged to the sanitary sewer or surface water via a permitted National Pollutant Discharge Elimination System (NPDES) outfall. The solid residue, usually nonhazardous, can be disposed of at a landfill authorized to accept industrial wastes. Testing may be necessary to determine that the solids are nonhazardous.

3.3.3 OIL/WATER SEPARATOR SEDIMENTS AND SKIMMINGS

Oil/water separator sediment is formed when suspended solids are separated by gravity from oily wastewater and storm water. The accumulation of sediment reduces the efficiency of a separator and necessitates periodic separator cleaning. The sediment may contain hydrocarbons and small amounts of heavy metals. If the separator also is used for storm water, the sediment will typically contain larger amounts of sand, grit or other solids.

The formation of emulsions that cannot be treated by oil/water separation equipment should be prevented. Thus, drainage areas for loading racks, dispensers, pumps, and other areas where leaks and spills of petroleum products may occur should be segregated from the drainage for cleaning areas, such as truck washing stations, where detergents and other cleaners are used. Also, areas in which spills and drips occur can be covered and equipped with separate sumps to collect product and minimize the amount of stormwater and solids that enter the oil/water separator. Recovered oil from oil/water separators and product recovered from dedicated containment sumps can be blended back into the refined products. Alternatively, recovered product may be sold to a permitted oil recycler, sent to a refinery, or burned in a boiler if federal, state, and local regulatory requirements have been met.

During cleaning, water in separator skimmings typically is removed by a service company. The recovered water may be discharged through the oil/water separator if permitted, or hauled off-site for treatment and disposal. Recovered oil may be recycled back to product storage. The recovered solids may be landfilled or incinerated, depending on its waste characterization. Cleaning of oil/water separators can be scheduled with tank cleaning to economize on treatment costs.

3.3.4 SEPTIC TANK SLUDGE

Septic tank sludge should periodically be removed by a septic disposal service. All drains that connect to the septic tank or field should be identified to assure that no process or surface water drainage goes into the septic system. Only domestic waste sources should be connected.

Service bay drains must not be connected to septic tanks, leach fields, or dry wells. Discharge of automotive maintenance wastes from service bay drains is prohibited and may render the septic tank sludge hazardous, and may also require soil or ground water remediation. For more information refer to API Recommended Practice 1633.

3.3.5 PRODUCT FILTERS

The two types of filters are clay and cartridges. Clay filters are used for removal of suspended solids from fuel at terminals and must be periodically replaced and discarded. The waste stream consists of clay contaminated with hydrocarbons. Product filter cartridges may be used at terminals and refueling facilities, and may contain similar contaminants.

Similar to absorbents, clay filters and filter cartridges can generally be disposed of at an authorized landfill after draining and/or drying, and with proper authorization from the operator. Reclaiming and recycling of filters should also be considered. Note that in some states these wastes may be regulated as hazardous waste due to hydrocarbon content.

3.3.6 USED ACTIVATED CARBON FROM VAPOR RECOVERY UNITS

Periodically, the activated carbon from vapor recovery units may be replaced with new activated carbon. This waste stream consists of spent carbon, containing adsorbed hydrocarbons.

Used activated carbon from vapor recovery units is most effectively managed by sending it back to the manufacturer for regeneration. If the carbon cannot be regenerated, it may meet the definition of hazardous waste and have to be managed and disposed as such.

3.3.7 USED REFRIGERANTS FROM VAPOR RECOVERY UNITS

Refrigerants may be replaced periodically during maintenance of vapor recovery units.

Chlorinated fluorocarbon (CFC) refrigerants must be captured and not allowed to vent into the atmosphere when maintenance is performed on a refrigeration unit. CFCs can either be recycled on site or at a remote location. Any CFC leaks in the system should be repaired promptly to minimize the loss of refrigerant.

3.3.8 SCRAP GREASE

Scrap grease may be generated in the grease manufacturing process and cannot be reblended as an on-specification product.

Scrap grease can be collected and sent off-site for alternative use or recycle/reclamation. To make recycling easier, grease should not be mixed with other wastes. An alternative management option is to dispose of scrap grease by incineration.

3.3.9 ASPHALT

Off-specification asphalt that is unsuitable for sale and has not been contaminated with dirt and debris can be recycled back into the manufacturing process. Avoid leaks by keeping equipment in good condition. Drips from process equipment can be caught in containers, heated, and introduced back into the manufacturing process.

3.3.10 DEGREASERS AND SOLVENTS

Degreasers and solvents are used for cleaning and servicing parts. This waste stream is typically composed of mineral spirits, petroleum distillates, or chlorinated hydrocarbon solvents.

During use, solvents become contaminated with dissolved oils, grease, and dirt.

Whenever possible, reduce or eliminate the use of chlorinated solvents. If their use cannot be eliminated, they should be segregated from other solvents and oily wastes in order to allow recycling and lower treatment and disposal costs.

Packaged solvent distillation units are available to purify solvents for reuse, but they do generate small amounts of waste which may be hazardous and require special handling for disposal. Another economical and convenient waste management option is use of a solvent recycling service. Used solvents being disposed of may be regulated as hazardous waste, depending upon the type of solvent and applicable regulations.

3.3.11 TANK WATER DRAWS

Tank water draws are waste streams consisting of water that accumulates at the bottom of storage tanks. Sources of tank water include entrainment in delivered product, condensate, and stormwater intrusion. This water, which contains dissolved petroleum hydrocarbon components, is periodically withdrawn from the tank.

The following measures will help prevent entry of storm water into above ground tanks:

a. Construct new gasoline tanks employing floating roofs with fixed covers.
b. Equip existing open floating roof tanks with internal drains piped to the water draw valve.
c. Retrofit open floating roof tanks with geodesic domes.

Measures to help prevent entry of stormwater into underground storage tanks include the following:

a. Grade the yard area away from fill boxes and manholes.
b. Maintain and replace worn or missing fill box covers, gaskets, and seals.
c. Maintain and replace worn or missing fill and vapor caps and gaskets.
d. Ensure that caps are replaced tightly after gauging and product deliveries.
e. Remove water in containment manholes rather than draining water into the underground storage tank.

Refer to API Publication 1621 for recommended removal and disposal options for tank water.

Tank product-and-water draws normally contain recoverable petroleum product. When the product/water mixture is handled as an off-specification commercial product, without intentional mixing or purposeful non-segregation of product to avoid hazardous waste regulation, this mixture can be excluded from the RCRA definition of a solid/hazardous waste. This determination, under federal regulations, is based on facility management practices. Water and product may be separated immediately prior to a NPDES/POTW-permitted water discharge with recovered product return to product storage. Off-site product recovery may be a viable alternative if the mixture is properly handled. State or local regulation may impose different or more stringent requirements.

3.3.12 CONSTRUCTION DEBRIS

Construction and demolition debris may include, but are not limited to, wood, concrete, insulation, aluminum, steel, bricks, glass, and asbestos.

Industrial recyclers are available to recycle/reclaim construction and demolition debris.

If there is no salvage value to construction or demolition debris, it can be disposed of at a landfill. Proper care must be taken to insure that no asbestos, significant residual product, or hazardous waste is present in the construction debris (see 3.5.4).

3.4 Automotive Wastes

This category includes wastes generated by facilities that service or maintain motor vehicles. Wastes from general aviation repair facilities are very similar to those generated during maintenance of motor vehicles.

3.4.1 USED MOTOR OIL

Used motor oil is composed of crankcase oil from cars, trucks, and other mechanized equipment. Due to the presence of impurities or the loss of original properties, the oil is no longer suitable for its original purpose.

Whenever possible, used oil should be sent off-site for recycle/reclamation. Only properly licensed and permitted recycling facilities and transporters holding USEPA identification numbers should be used. In addition, used oil must be kept segregated from antifreeze, solvents, water, and detergents while on site.

If recycling is not practical, an option is available for on-site burning of used oils. However, only oil generated from on-site activities and do-it-yourselfers can be burned. State and local agencies may impose additional and possibly more stringent on-site burning restrictions. Facilities with boilers may be able to obtain a permit from state and local agencies to burn used oil on site in the boiler.

Used oil that is not recycled or reclaimed will be regulated as a hazardous waste if it exhibits a hazardous characteristic.

It is important to note that several states regulate used oil as a hazardous waste. In some states, used oil is typically handled as a special waste subject to specific management requirements. Avoid spilling used oil onto the ground by good housekeeping and by using containment in areas where used oil transfers take place. Do not use used oil as a dust suppressant.

3.4.2 TRANSMISSION OIL

In most cases, automatic transmission oil may be accumulated with other compatible oils (for example, other hydraulic fluid and used motor oil) for recycling or fuel blending. Refer to 3.4.1 for waste management information.

3.4.3 USED BRAKE FLUIDS

Used brake fluid should be kept separate from other waste streams and be sent off site for reclaiming.

3.4.4 USED ANTI-FREEZE AND RADIATOR FLUSHINGS

Used anti-freeze and radiator flushings contain water, ethylene glycol, diethylene glycol, metals, and additives such as rust inhibitors and dyes. Anti-freeze is replaced at regular intervals.

Used antifreeze collectors and recyclers are now operating in many areas. They can provide containers for collecting used antifreeze and provide a service to make collections periodically. Some collectors can also provide recycled antifreeze in reusable bulk containers which can help reduce the volume of a facility's solid waste stream. If recycling is not available, antifreeze handlers should segregate antifreeze in a separate storage container and have it collected periodically by a disposal contractor.

Antifreeze is water-soluble and therefore not suitable for discharge to an oil/water separator. However, because it is biodegradable, most municipal sewage treatment facilities can handle antifreeze water solutions in small quantities. Before discharging antifreeze to the sewer, obtain permission from the local POTW.

Since used antifreeze may contain toxic compounds or impurities, it should not be allowed to enter storm drains or surface water. Likewise, antifreeze should not be discharged to an on-site septic tank since it could interfere with and perhaps be detrimental to the system's operation.

3.4.5 USED BATTERIES

Used batteries, primarily lead/acid batteries, require periodic replacement.

Used automobile and truck batteries are not suitable for landfilling or disposal, and must instead be collected by a reclaimer. Reclaimers recover acid and lead from the batteries. Some batteries also can be sent to a battery rebuilding company.

New and used batteries should be stored in a dry, secure location. Before shipping used batteries off site, confirm that the battery collector and reclamation facility are operating in accordance with all applicable environmental regulations.

3.4.6 USED BRAKE SHOES

Disc and drum brake linings on trucks and automobiles must be replaced periodically. Used brake linings may contain asbestos fiber, which is encapsulated by various polymers and resins. Metal particles are used to reduce brake lining wear and may be present in some used linings.

Used brake shoes and clutch disks are normally returned to the supplier. If the supplier will not accept them, they can be landfilled. Brake linings that contain asbestos should be packaged in plastic bags and sent to a landfill permitted to handle asbestos.

3.4.7 USED AUTO AND TRUCK PARTS

Rebuildable auto and truck parts typically can be returned to the supplier or can be sold to an automotive recycling and scrap dealer. Rubber hoses can be managed with used tires or included in general trash. Parts that cannot be reused or sold as scrap can be landfilled. Care should be taken to remove residual oils and other materials from the parts so that the materials will not contaminate the landfill or scrap yard.

3.4.8 USED TIRES

Contractors usually are available to pick up tires for retreading, recycling, or disposal for a fee. Check with your local disposal company because tires are generally unacceptable for disposal with normal trash.

3.4.9 USED FILTERS

Filters changed at regular intervals include oil, air, and fuel filters. Drained used oil filters consist of a metal canister, a filter element, residual oil, and solids. Fuel filters will contain a residue of the product filtered. Air filters may contain a residue of airborne particulates and products of incomplete engine combustion.

Used oil filters can be drained and sent to a recycler or a scrap metal dealer. When this method is not utilized, used oil filters may be subject to hazardous waste regulations, which include a determination if the used oil filter is a hazardous waste and subject to disposal requirements. In some states, used oil and wastes contaminated with used oil are regulated as hazardous wastes and must be handled accordingly.

3.4.10 USED GREASE

As a result of automotive servicing, facilities may generate small quantities of used grease.

Prior to disposal, used grease should be tightly wrapped, preferably in plastic, to reduce the chance of causing ground water contamination at the landfill.

3.5 Miscellaneous Wastes

Miscellaneous wastes do not fit into any of the above categories. These wastes are generated from ancillary operations at the facility (e.g., laboratory, remediation, heating/ electrical systems) and include general refuse, food waste, unused chemicals, and soils.

3.5.1 OILY RAGS

Oily rags originate from maintenance and clean-up operations at all facilities.

Oily rags can be cleaned for reuse by an industrial laundry service. Use of such a service could result in savings over the purchase of new rags and disposal of contaminated rags. If reuse is not feasible, oily rags can also be handled with other used absorbent materials. This waste can usually be sent to an authorized landfill. In some states, used oil and wastes contaminated with used oil are regulated as hazardous wastes and must be handled accordingly.

Note that rags contaminated with spent solvents used for degreasing may be regulated as hazardous waste. Rags of this type should be segregated from rags contaminated only with oil. A good management practice is to use different color rags for oil and solvent. Check with your industrial laundry service for management guidelines.

3.5.2 FOOD WASTES FROM CONVENIENCE STORES

This waste stream includes general food wastes from the operation of a convenience store, and may be the result of outdated or spoiled food, food residues, and damaged food containers. This waste stream may be a significant contributor to the quantity of general refuse generated by the facility.

Organic food wastes, such as outdated or spoiled food, can be reduced by careful inventory control. Used cooking oil, fats, meats, and cooking grease can be sent off site for disposal as a nonhazardous waste at rendering plants. Some cooking oil systems use filters to extend the useful life of the cooking oil.

3.5.3 GENERAL REFUSE

General refuse includes waste from convenience stores, lunch rooms, and offices, and may include waste paper, food, plastic, and aluminum containers and all other unwanted material. Segregation of paper, plastic, glass, and aluminum waste for recycling should be implemented if recycling services are available in your area. Those components that are not recyclable can be disposed of in a sanitary landfill.

3.5.4 ASBESTOS

Asbestos is largely a component of demolition debris. It may be found in pipe and building insulation; in ceiling, floor, and roof tiles manufactured prior to 1975; and in some automotive friction materials such as brake pads and clutch disks. Asbestos that is in good condition and non-friable may be left in place indefinitely as long as it is inspected regularly. However, even non-friable asbestos should be removed prior to any demolition work. A trained asbestos inspector should be used to identify the locations and quantities of asbestos present. Friable asbestos must either be removed or encapsulated to prevent exposure.

Certified experts should be used to remove asbestos. After being removed, asbestos must be packaged and labeled properly, and disposed of at a landfill authorized to accept asbestos. Records of the removal and disposal should be kept on file.

3.5.5 PCBs

Polychlorinated Biphenyls (PCBs) may be present in the dielectric fluid in electrical transformers and capacitors manufactured prior to 1976. Oil-filled electrical equipment manufactured prior to this date should be sampled to determine if PCBs are present. Equipment containing PCBs can in most cases be left in place for the remainder of its useful life. Certain inspection, labeling, and recordkeeping requirements must be met, depending on the concentration of PCBs in the dielectric fluid.

PCB transformers can be retrofilled or retrofitted to remove the PCB-containing dielectric fluid. The required method for disposal of PCB-containing transformers is to drain the fluid for incineration and to landfill the cleaned electrical equipment. Draining can be performed by a service contractor or at the disposal facility. PCB wastes can be disposed of only at facilities permitted under the Toxic Substances Control Act (TSCA). Capacitors should also be incinerated, although small capacitors may still be disposed of at a landfill.

Outdoor PCB transformers installed at ground level should be situated on a concrete pad so that any leaks which might occur will not contaminate soil. Curbs of sufficient height to contain the volume of fluid in the transformer should be considered for additional protection. Indoor PCB transformers could be eliminated as a precaution due to the hazard they present in the event of a fire in the building.

PCBs were also used extensively in fluorescent lighting ballasts. Lighting ballasts which do not contain PCBs are usually labeled to indicate this. PCB lighting ballasts can be disposed of with general refuse at a landfill.

3.5.6 WASTE PACKAGING MATERIAL

This waste stream consists of plastic wrapping, styrofoam, wood, paper and cardboard used to package products and purchased materials. Opportunities to reduce packaging materials and, hence, waste should be investigated. Bulk purchases can reduce the number of containers. Some suppliers may be willing to retrieve packaging with each shipment. Segregated, used or scrap packaging materials can be collected for off-site recycling.

3.5.7 LABORATORY WASTES

Laboratory wastes consist of plastic disposable pipettes, gloves, wipes, filter papers, and other disposable laboratory wastes contaminated with reagents and products. Typical laboratory chemicals include acids, bases, alcohols, and reagents containing metallic compounds.

Unused laboratory chemicals and reagents that have become contaminated should be packed in a lab pack by a qualified waste contractor for disposal. Other laboratory wastes (such as plastic disposable pipettes, gloves, wipes, filter paper) and other disposable laboratory wastes contaminated with reagents and products can sometimes be included in the lab pack.

Unused or partially used samples of new products from vendors can be reduced or eliminated by accepting the sample only if the unused portion can be returned to the vendor.

Product samples taken for quality assurance purposes can be segregated and returned to product storage if product quality is not compromised.

3.5.8 BOILER BLOWDOWN

Boiler blowdown, composed primarily of wastewater, contains water softening chemicals and has a high pH. Boiler blowdown may also contain trace amounts of other chemicals.

Boiler blowdown is also likely to contain oil in emulsified form. For these reasons, boiler blowdown cannot be effectively treated by an oil/water separator.

Blowdown can be recycled if treatment is included in the recycling loop, although this option frequently is not practical. If recycling is not feasible, boiler blowdown should be discharged to the sanitary sewer or to a NPDES outfall permitted to accept it.

3.5.9 COMPRESSOR CONDENSATE

Compressed air systems are equipped with drain valves to remove moisture from the compressed air storage tank. Condensate from this process may contain small amounts of oil from compressed air contact with compressor machine parts.

Compressor condensate that contains emulsified oil cannot be treated by an oil/water separator. The condensate should instead be discharged to the sanitary sewer or to a NPDES outfall permitted to accept it.

3.5.10 INTERNAL HEATING COILS CONDENSATE

Tanks that store highly viscous materials may be equipped with internal heating coils, which help keep the materials fluid. The coils may be heated with steam or thermally stable heat transfer oil. After flowing through the coils, the steam condenses to water, which is discharged from the exhaust lines or piped back to the boiler. Heat transfer oil is circulated between the oil heater and the coils in a tank and is not discarded. Defective internal heating coils may allow stored materials to leak into the heating coils.

Internal heating condensate should be returned to the boiler or heater for continued recirculation.

3.5.11 GROUNDWATER REMEDIATION/ PRODUCT RECOVERY

In the case of a site that is undergoing groundwater remediation, a volume of groundwater will be pumped that will require treatment. This waste stream of produced groundwater is typically composed of water and dissolved petroleum hydrocarbons. In some cases, free product will be recovered during groundwater remediation.

Free product can be removed from the recovered ground water by gravity separation. The recovered product may be returned to the product stream or handled by a permitted petroleum recycler or burned as fuel.

When groundwater contains dissolved petroleum hydrocarbons, it may require further
treatment before it can be discharged to the sanitary sewer or to a NPDES outfall permitted to accept it. Further guidance on the management of remediation discharges is available in API Publication 1628.

3.5.12 SAND BLASTING

Sand blasting may be used to remove old paint from pipes, valves, tanks and other surfaces. Sand blasting may also be used to remove scale from the above ground storage tank floor prior to an internal inspection. The waste stream will primarily consist of blast material, and may include lead or other metals from the paint.

Coatings of structures to be sand blasted should be analyzed to determine if the sandblast residue may be hazardous. Sand blasting waste should be tested prior to disposal to determine if the waste must be handled as a regulated hazardous waste. If nonhazardous, it may be disposed at an authorized landfill. Blasting may be accomplished by using alternative materials other than sand.

3.5.13 LEAD

Lead balancing weights from auto and truck wheels, as well as lead seals from meters, may be accumulated and sent with lead acid battery waste to off-site reclaimers. Lead containing materials should not be disposed in the trash.

APPENDIX A—WASTE MANAGEMENT PROGRAM FRAMEWORK

A.1 Overview

This Appendix provides facilities with a framework for organizing and implementing a site-specific waste management program. The framework is based upon the concepts of pollution prevention and continuous environmental improvement. Elements of the framework should be used as applicable.

Pollution prevention is a multimedia concept that reduces or eliminates discharge to air, water, or land and that encourages the development of more environmentally acceptable products, changes in processes and practices, source reduction, beneficial use, and environmentally sound recycling.

Continuous environmental improvement refers to an operating strategy that is based on close observation and measurement of performance deviations. If environmental performance is viewed as a component of overall performance, then emissions to the environment can be viewed as a quality defect, or nonconformance to requirements, similar to a deviation in product specifications. In both cases, materials and manpower are spent and revenues are lost on the production of something that is not saleable. In either case, the aim of continuous improvement is to minimize deviations or nonconformances to an acceptable level in a cost-effective manner.

Petroleum marketing facilities face a particular challenge when developing and implementing waste minimization or pollution prevention programs. The consumer-based operations of retail marketing generate a number of wastes whose volumes are based directly or indirectly on the volume of business. The manager, mechanic, or technician cannot directly control the volume of these wastes without affecting the amount of profitable business at that location. For example, the number of used tires to be disposed of by a service station is directly dependent on the number of new tires being sold to customers, in other words, on the volume of profitable business. Other examples include used oil filters and waste coolant (antifreeze). From an economic perspective, decreasing the number of used tires or oil filters is not desirable, because they represent business volume.

Thus, waste management—properly, adequately, and economically managing the wastes that are generated—is an important and desirable activity in the overall strategy for business-volume related wastes.

A.2 Waste Mangement Program Steps

The framework presented here is an ongoing, cyclical process requiring several steps, which are listed here and explained in the rest of Appendix A:

a. Organization.
b. Tracking waste streams.
c. Generating, prioritizing, and implementing alternatives.
d. Setting goals.
e. Measuring achievements.
f. Reviewing goals.

A.2.1 ORGANIZING

Each step in the continuous environmental improvement process depends on every employee's awareness of the importance of waste minimization and the benefits that can be gained. Employee awareness can be achieved through employee meetings, postings on bulletin boards, and articles for employee newsletters. Maintaining employee awareness should be an ongoing effort. In addition, an incentive program can provide a direct benefit to employees who develop and implement waste minimization opportunities.

The first step in organizing an environmental improvement effort is to designate a facility coordinator. The facility coordinator is responsible for managing the implementation of the program, and will report to the facility manager. The facility coordinator should organize a pollution prevention work group. Since pollution reduction efforts will have an impact on many functional groups at the facility, a representative from all functional groups who have an interest in the outcome of the program should be represented in the work group. At larger facilities, functional groups that may have an interest include maintenance, quality control, and purchasing. It is important that everyone at the facility understand the impact their actions have on the generation of waste. Responsibility for waste minimization and accountability should be assigned to each employee in the organization.

A.2.2 TRACKING WASTE STREAMS

A comprehensive waste inventory is essential to the development of a successful environmental improvement program. A waste inventory serves two purposes. First, it describes baseline conditions prior to starting the program. Second, it provides for regular monitoring of the program's effectiveness by measuring waste generation rates.

To begin taking the waste inventory, an individual or a team of individuals analyze waste streams throughout the facility. This analysis may require a series of brainstorming sessions, facility tours, interviews with operators, and the accumulation of other relevant information. It is important to realize that an exhaustive quantitative inventory is not necessary in order to proceed to other steps. Instead, increased accuracy and refinement will occur over time. The inventory should include the following information:

a. The waste stream name.
b. The generating process.
c. The current method of disposal/treatment.

d. The generation rate.
e. The production rate or throughput of the process which generates the waste.

A sample format for collecting the inventory information is shown in Appendix B.

A.2.3 GENERATING, PRIORITIZING, AND IMPLEMENTING ALTERNATIVES

Once the waste tracking process has been initiated, the work group can begin to establish priorities for waste minimization by ranking waste streams based on the following criteria:

a. Hazardous properties.
b. Current and future regulatory requirements.
c. Quantity of the waste.
d. Management costs.
e. Potential for minimization.

Waste minimization options can consist of procedural changes, technology changes, input changes, and/or product changes. The most promising options should be studied further based on technical, economic, and regulatory feasibility. Employees who work with the process that generates the waste may be good sources of ideas and insight, and those employees' contributions should be sought by the work group.

Once evaluations are underway, the work group will have sufficient information to determine which options to implement. The work group should then determine the resources that will be necessary to implement the changes. Resources could consist of employee training, new or modified equipment, and/or materials and funding. Once the required resources have been identified, they should be made available.

The work group should document resource costs versus facility savings due to waste minimization. Clearly showing a cost savings should make it easier to obtain funding to implement waste minimization options.

Feasible solutions may not be readily identifiable for some priority waste streams. For this reason, reprioritization may be necessary, and some options may have to be reanalyzed at a later date as more information and operating data become available.

A sample format for generating and prioritizing waste management alternatives is shown in Appendix C.

A.2.4 SETTING GOALS

For options that will be implemented, the work groups should establish numerical goals and time frames for minimizing each targeted waste stream. For example, the group might set an annual goal for reduction of a particular hazardous waste stream or in overall waste disposal costs. The goals should be realistic, but also high enough to be challenging.

Since continuous environmental improvement is an ongoing process, the group also should set long-term goals that are ambitious and reflect the ultimate objective of the improvement effort. Consistent with the pollution prevention concept, facilities should aim at reducing waste streams which are not volume related to zero. Reappraising and setting goals should be made part of the facility's planning cycle.

A.2.5 MEASURING ACHIEVEMENTS

Regular measurement of waste generation rates, production or throughput rates, and disposal/management costs is essential in order to measure progress. It is important to remember that waste should be evaluated, if appropriate, on the basis of production/throughput rates. Basing waste reductions on production/throughput rates avoids the mistake of relating fluctuations in total facility wastes to good or bad performance.

Once a specific waste stream has been eliminated or reduced to an acceptable level, the improvement process focus shifts to the next high-priority waste reduction opportunity. Throughout the process, the waste inventory provides the basis for the decision making.

A.2.6 REVIEWING GOALS: CONTINUOUS ENVIRONMENTAL IMPROVEMENT

The work group must review the improvement process regularly. Once the reduction techniques have been in place for a period of time, they can be refined based on operating experience. The work group should re-examine the prioritization of options on a periodic basis. The group may be able to return to options which were identified earlier and not addressed and which have become more attractive due to changing operating conditions. New techniques also may become apparent.

At the end of each review period, some goals may not have been met. At this time, the group can use information it has gained in order to reprioritize waste streams and management options and to establish new goals for the next review period.

APPENDIX B—INVENTORY INFORMATION WORKSHEET

Inventory Information Summary Worksheet (part 1 of 2)

Source ID# (1)	Emission Type (2)	Emission PointSource (3)	Pollutant(s) (4)	Current Treatment or Disposal Method (5)

Instructions: Add the following information to the corresponding columns on the worksheet.
(1) Identify the emission source with a facility identification number.
(2) Identify the type of emission (air, water, solid waste).
(3) Identify the source of the emission.
(4) Record the specific pollutants involved.
(5) Record the current handling method: disposal, treatment, or uncontrolled.

Inventory Information Summary Worksheet (part 2 of 2)

Source/ID # (5)	Emissions Rate (6) (Pounds per hour)	Emissions Rate (6) (Tons per day)	Production Rate (units/units of time) (7)	Emissions Factor (lbs/unit) (8)	Test Method and Date of Last Test (9)
TOTALS					

(5) Identify the emission source with the same facility identification number used in (1).
(6) (7) (8) Establish the rate of emissions or waste generation vs. time or by unit. Use whichever measurement is appropriate for the waste stream.
(9) Record how the rate of waste generation was established and on what date the rate was determined.

APPENDIX C—WASTE REDUCTION OPPORTUNITIES WORKSHEET

Waste Reduction Opportunities Worksheet (part 1 of 2)

Opportunity Number (1)	Emission Source ID # (2)	Emission Type (3)	Proposed Activity (4)	Estimated Reduction (5)

Instructions: Add the following information to the corresponding columns on the worksheet.
(1) Assign an internal number to the waste reduction opportunity or utilize as a priority number.
(2) Insert the emission source ID# designated in Appendix B.
(3) Identify the type of emission (air, water, solid waste).
(4) Describe waste reduction opportunity or activity.
(5) Estimate the practical, achievable reduction in the terms established in items (6), (7), (8) of Appendix B, Worksheet Part 2.

Waste Reduction Opportunities Worksheet (part 2 of 2)

Opportunity # (5)	Advantages (6)	Disadvantages (7)	Evaluation Criteria (a) (8)				
			EF	ERP	TF	RDF	Total

(a) Evaluation Criteria—assign a value of 0–4 for each criteria. 0 is low/little value. 4 is highest value.
EF = Economic Feasibility
ERP = Emissions Reduction Potential
TF = Technical Feasibility
RDF = Regulatory Driving Force
Total = Cumulative Total = EF+ERP+TF+RDF

(5) Opportunity number is same as (1) from Part 1.
(6) (7) Note relative advantages/disadvantages to proposed activity(s)
(8) Evaluate each opportunity (5) (1) and utilize the "total" (8) to establish waste reduction priorities.

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