

Preventing Nonpoint Source Pollution
A Guide to
Pollution Prevention
for Small Businesses

Galveston County Health District

Texas Natural Resource Conservation Commission
Galveston Bay Estuary Program
GI-241/GBEP T-2



Barry R. McBee, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*

Dan Pearson, *Executive Director*

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Galveston County Health District
P.O. Box 939
La Marque, TX 77568
(409)938-2251

Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, TX 78711-3087
Publications Office: (512)239-0028

Galveston Bay Estuary Program
711 W. Bay Area Blvd., Ste. 210
Webster, TX 77598
(281)332-9937

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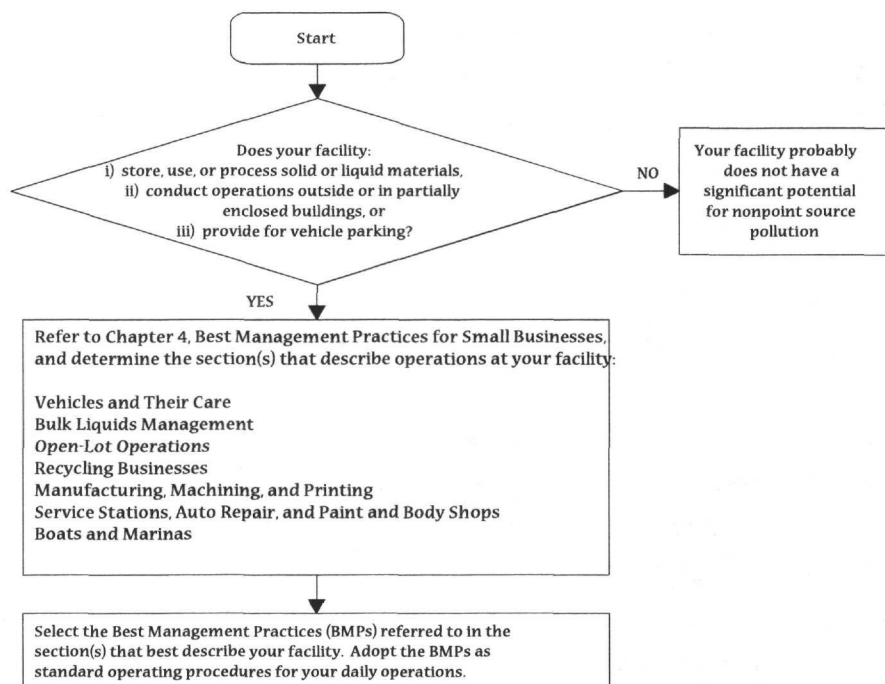
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Purpose

This manual is designed to help small businesses improve the quality of their operations and to reduce nonpoint source pollution. This manual is also designed to be used by local governmental agencies, trade associations, nonprofits or other entities that interact with small businesses and are interested in promoting pollution prevention. GCHD encourages such entities to share the information contained in this manual as often as possible and if additional technical assistance is needed in promoting pollution prevention, to contact GCHD or the TNRCC's Office of Pollution Prevention and Recycling (see Appendix 1 for contact information).

How to Use This Manual

There are three parts to this manual: 1) introductory information including information on regulations and recycling, 2) information on general and specific operations that can cause nonpoint source pollution at small businesses, and 3) appendices of best management practices (BMPs) recommended for the ordinary daily tasks conducted by small businesses. The diagram below indicates how to use this manual to find specific guidance for many small businesses.



The Galveston Bay Estuary Program

Galveston Bay ranks high among the nation's great bay systems, providing huge economic benefits to both the region and state. Remarkably, the bay's natural resources are self-renewing as long as the bay remains healthy and productive. However, Galveston Bay, like many other U.S. bays, faces significant issues related to habitat loss and species decline, conflicting human uses, and pollution. Congress recognized the national significance of Galveston Bay, and in 1989 agreed to Texas' request to include our bay in the National Estuary Program. Federal funding was provided for state administration of the program. This was followed by a five-year effort to produce *The Galveston Bay Plan (The Plan)*—a strategy for assuring that Galveston Bay will remain healthy and productive for future generations.

Developing *The Plan* involved a consensus-building effort among all Galveston Bay user groups. Federal and state agencies, local governments, industry and business, research and academia, recreational and commercial interests, and the public all helped to build *The Plan*. In 1995, the *Plan* was complete, and implementation began. With the onset of implementation, the word "National" was omitted from the Galveston Bay National Estuary Program's name, to reflect the ending of the federally funded base program. State funding for the Galveston Bay Estuary Program (GBEP) is currently provided through an agreement between the Texas Natural Resource Conservation Commission (TNRCC) and the Texas General Land Office (GLO), as directed by the Texas Legislature.

Issue-Driven GBEP Initiatives

Among the issues being addressed by *The Galveston Bay Plan* are:

- habitat destruction and its effect on fish and wildlife populations,
- competing human uses of the bay, and
- water and sediment quality.

The Galveston Bay Plan links a set of specific initiatives to identified issues. The Galveston Bay Estuary Program has the responsibility to see that these initiatives are carried out by the many agencies and organizations who are partners under *The Plan*.

One role of the Galveston Bay Estuary Program is to acquire and disperse funds to implement plan initiatives. The *Preventing Nonpoint Source Pollution: A Guide to Pollution Prevention for Small Businesses* is a product of a project funded by the U.S. EPA through the GBEP. Locally implemented in the Dickinson Bayou watershed, Galveston County Health District personnel make on-site environmental assessments of small businesses to identify areas of operation contributing to nonpoint source pollution. The business owners, operators, and managers are given a pollution prevention report, detailing the field investigator's observations and

recommended nonregulatory best management practices. Many businesses are modifying their sites to improve their operations based on these recommendations. Activities are being carried out through a joint effort between the Small Business Technical Assistance and Pollution Prevention and Recycling Divisions of the TNRCC.

The GBEP Publication Series

The GBEP publication series is published periodically by GBEP with the support of the TNRCC. The purpose of the series is the transfer of information gathered during this phase of the program. The *Preventing Nonpoint Source Pollution: A Guide to Pollution Prevention for Small Businesses* is the second in the new series and has GBEP Technical publication series number, GBEP T-2 and a TNRCC identification number as well.

The first GBEP Technical publication was published in June 1997, the *Proceedings, The State of the Bay Symposium, III, January 10-11, 1997*. TNRCC document number CTF-07.

This publication series was first established by the Galveston Bay National Estuary Program (GBNEP), which operated from 1990 to 1995 during the planning phase of the program. The initial publication series ran from GBNEP 1 through GBNEP 50.

For additional information contact:

Galveston Bay Estuary Program
711 W. Bay Area Blvd., Ste. 210
Webster, TX 77598
(281)332-9937

or

Galveston Bay Information Center
Texas A&M University at Galveston
(409)740-4703
Cathy L.P. Palmer, Coordinator

Your Role in Reducing Nonpoint Source Pollution

In the past, waste management choices were limited to comparing the costs of disposal or treatment, without regard to long-term costs or environmental effects. The traditional order of waste management methods selected was:

1. *Disposal*—dispose of it properly
2. *Treatment*—treat it to make it less hazardous or to reduce its volume
3. *Energy Recovery*—use it as fuel
4. *Recycling and Reuse*—recycle or reuse it
5. *Source Reduction*—avoid producing it in the first place

Disposal and treatment may have been the most convenient and cheapest methods in the past, but improved technologies are making the three methods of waste minimization—energy recovery, recycling and reuse, and source reduction—more efficient. Emphasizing these methods reverses the historical approach and gives us a new order of waste management:

1. *Source Reduction*
2. *Recycling and Reuse*
3. *Energy Recovery*
4. *Treatment*
5. *Disposal*

This modern approach to managing wastes is similar to the approach used by business in controlling costs: eliminate costs where possible, and minimize all other costs.

Why is Pollution Prevention Important for Small Businesses?

There are at least four reasons why pollution prevention is important for small businesses:

1. *Economic*—it pays to reduce waste.
2. *Regulatory*—it may be required by law.
3. *Liability*—it's your responsibility.
4. *Public Concern*—it's the right thing to do.

It Pays to Reduce Waste

The biggest incentive for small businesses to reduce waste is economic. Pollution costs. Preventing pollution pays.

The cost of managing waste is increasing 10 percent per year. Waste disposal is becoming more expensive as older landfills close. The remaining landfills face more stringent restrictions on the kinds of materials they can accept. Some wastes that once could be sent to landfills now must be incinerated. It can cost between \$300 and \$2,000 to incinerate a drum of hazardous waste today, depending upon the characteristics of the waste.

Disposal costs reflect only part of the cost of waste. Generating and managing waste involves potential liability. There are costs associated with that liability. Waste regulations change. Often there are costs involved in complying with new regulations—costs of modifying facilities, managing new activities, or even just keeping new records.

In spite of these rising costs, you can take steps to control your waste management expenses. Reduce the amount of waste you produce. Find out whether it is possible to reuse or recycle wastes you can't avoid producing. Chapter 3, "Recycling and Recycling Businesses," gives you more information about finding ways to reuse rather than dispose of difficult wastes. By following these steps, you can make waste reduction pay off in your business's bottom line.

It May Be Required by Law

Since the 1980s, both Congress and the Texas Legislature have enacted laws that call for waste minimization. Congress specifically mandated waste minimization in the 1984 Hazardous and Solid Waste Amendments to the Resource Conservation and Recovery Act (RCRA). In the Texas Waste Reduction Policy Act, the Legislature has required any person or business that generates more than 2,200 pounds of hazardous waste in any year to plan for pollution prevention. For more information on these state requirements, get a copy of *Does the Waste Reduction Policy Act Apply to You?*, TNRCC publication RG-209.¹

Other new federal and state laws and regulations have placed restrictions on the kind of waste

¹There are four ways you can request a free copy of this or any other TNRCC publication mentioned in this manual:

- Access the TNRCC Web site (www.tnrcc.state.tx.us).
- Fax your request to 512/239-4488.
- Telephone 512/239-0028.
- Mail your request to Publications Unit MC-195, TNRCC, PO Box 13087, Austin TX 78711.

that can be put into landfills and other land-based disposal facilities. Because of these regulations, your business may have to find other ways to deal with some or all of its waste. Of course, the most effective way to avoid the impact of these rules is to avoid generating waste when possible.

It's Your Responsibility

Every business is responsible for the proper management of its waste. Even if you have a reputable contractor treat, store, or dispose of your waste, that does not release you from liability for its improper management. If waste from the treatment, storage, or disposal facility contaminates the local soil or groundwater, who is liable? Of course, the owner of that facility is first in line. If the owner cannot or will not pay the cost of cleaning up the contamination or restoring the site, you and the other waste generators could be held liable under common law for the harm caused—absolutely, strictly, jointly, and severally liable. In other words, the waste is still yours. A single waste generator thus could be held financially responsible for the entire cleanup or restoration. Even when the facility owner is reputable, your risk is not reduced to zero. But reducing the amount of waste your business generates can reduce your potential for long-term liability.

It's the Right Thing to Do

The public today is more informed about environmental issues. They are aware of the potential effects that hazardous waste and the release of pollutants can have on human health and the environment. Therefore, companies that are environmentally aware and work towards waste reduction can improve their working relationship with the public—their neighbors and their customers.

The Galveston Bay Region: One Example of a Watershed

As Figure 1-1 shows, the body of water many people refer to as “Galveston Bay” is actually a large bay system. This system includes four larger bays—Galveston Bay, Trinity Bay, East Bay, and West Bay—and a number of smaller bays—Clear Lake, Dickinson Bay, Chocolate Bay, Bastrop Bay, Christmas Bay, Dollar Bay, Jones Bay, Tabbs Bay, San Jacinto Bay, Moses Lake, and Drum Bay.

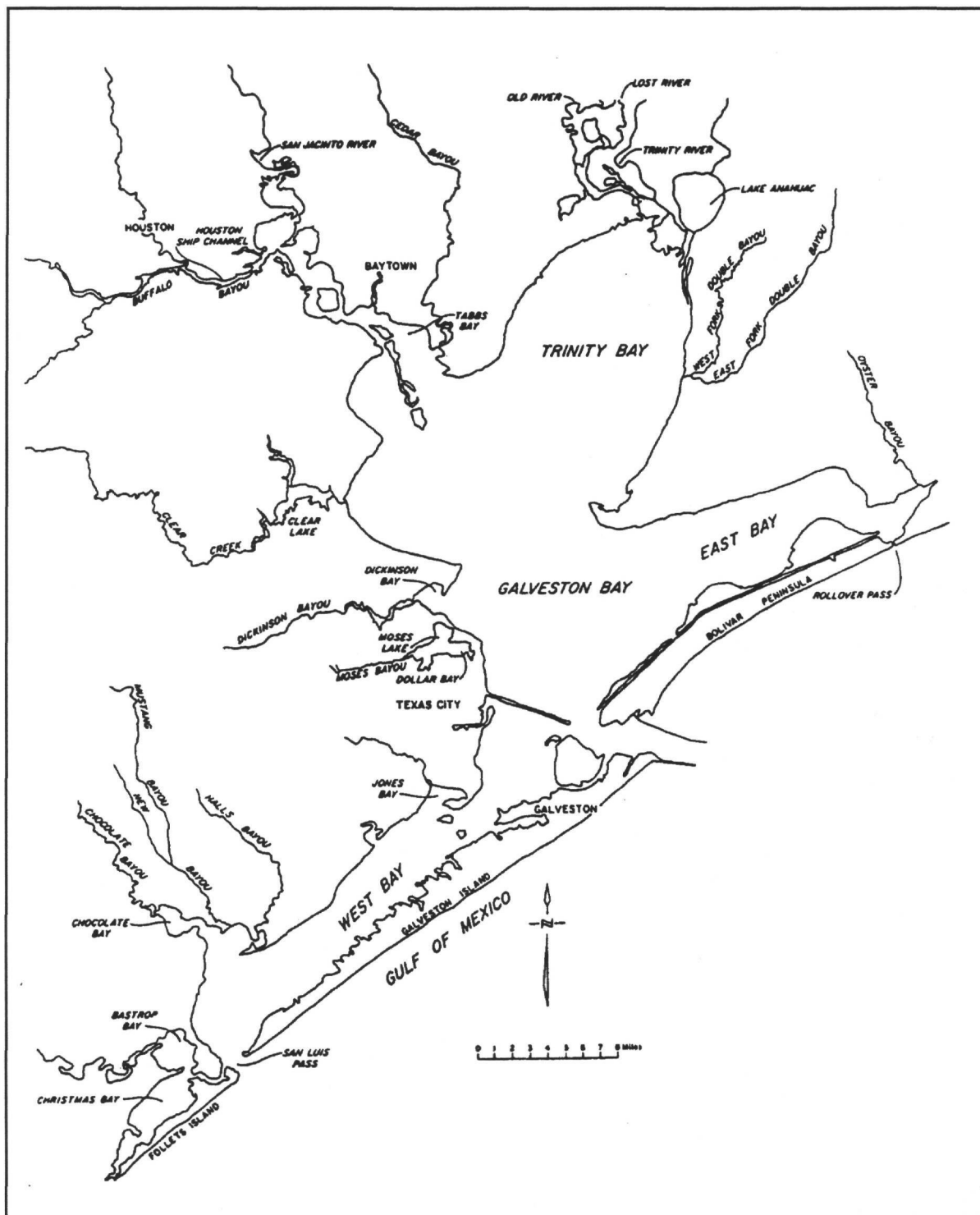


Figure 1-1 Map of Galveston Bay.

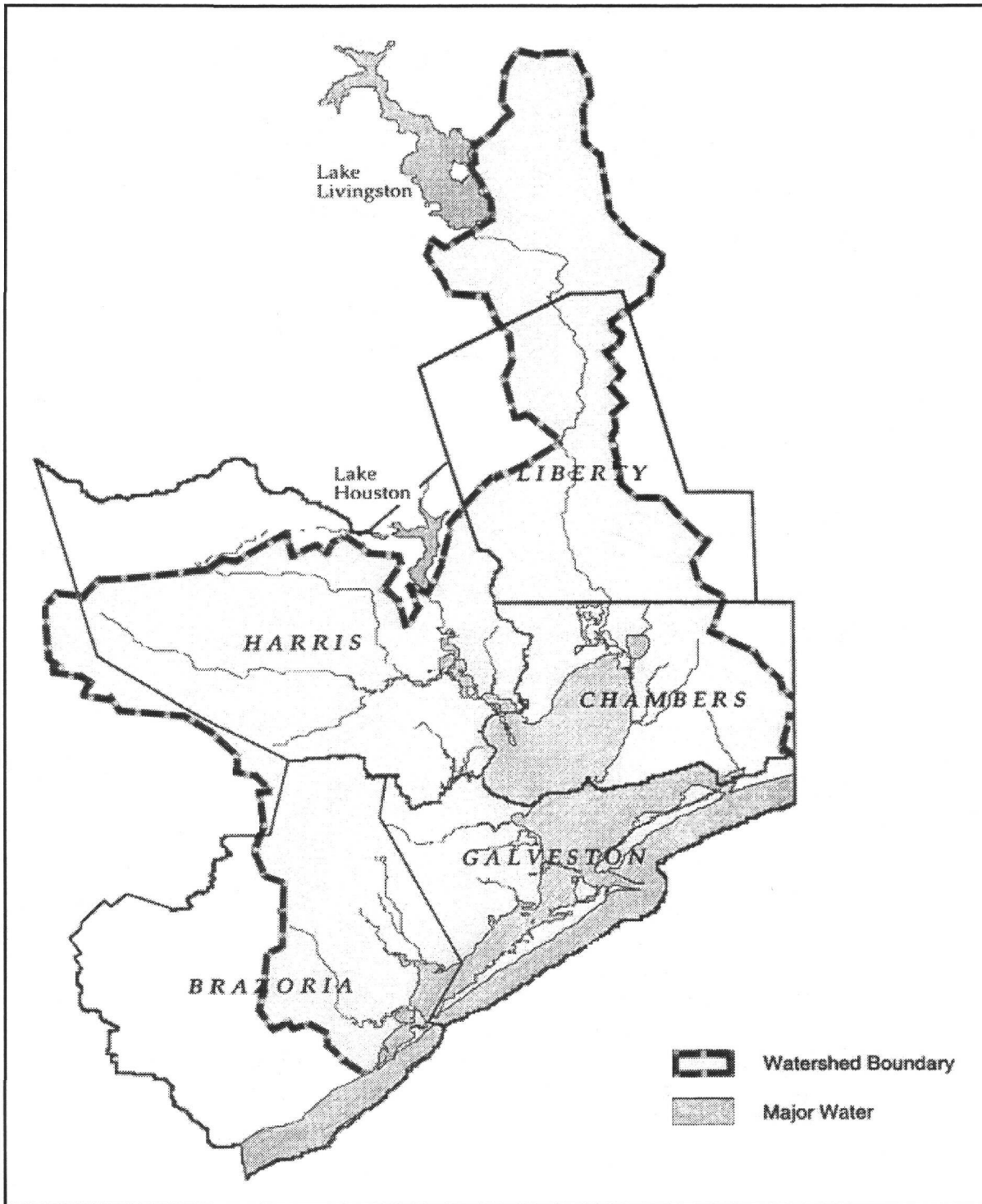


Figure 1-2 Map of Galveston Bay Region.

Many rivers and other major tributaries discharge into this bay system. Among them are the Trinity River, San Jacinto River, Bastrop Bayou, Chocolate Bayou, Halls Bayou, Dickinson Bayou, Clear Creek, Buffalo Bayou, Cedar Bayou, and Double Bayou. Scores of smaller creeks and streams feed into these major tributaries of the bay system.

The shaded area in Figure 1-2 represents land drained by these creeks and streams. This land area is one example of a watershed: runoff from anywhere within it will end up in the Galveston Bay system. We call this watershed and the five counties that encompass most of it—Brazoria, Harris, Liberty, Chambers, and Galveston—the Galveston Bay region. If your business is in this region, you can help protect Galveston Bay by following the steps in this manual.

Why Is Galveston Bay Valuable?

Many Texans immediately recognize the economic value that Galveston Bay provides by supporting commercial fishing, recreation, and tourism. One-third of the state's commercial fishing income—some \$200 million a year—is tied to Galveston Bay. Over half of the money spent on recreational fishing in Texas—\$500 million a year—is related to Galveston Bay.

Other Texans would point to the value the bay system provides in terms of shipping and the industrial use of its water. For example, the port of Houston is the second largest in the United States and the eight largest in the world in terms of tonnage. With its \$5.5 billion in annual revenues, the port of Houston is just one of three seaports that call the bay home. Texas City and Galveston also have bustling ports. Countless industries rely on these ports for commerce and on the bay for water used in industrial processes.

Galveston Bay is valuable to the region in still another way—it can absorb the wastewater discharges of many local cities, towns, other localities, and industries. The combined watershed (see “Other Watersheds That Affect Galveston Bay” on page 9) that discharges into Galveston Bay receives about 60 percent of this state's wastewater discharges. The value of absorbing these discharges is difficult to estimate, but it is even more difficult to imagine how we would live without it.

Galveston Bay is also valuable as a major estuary. An estuary is a coastal area where fresh water from rivers and streams mixes with salt water from the ocean. Sabine Lake and Corpus Christi Bay are two of the many other estuaries along the Texas coast. An estuary includes portions of the rivers and streams connected to its main body.

Estuaries are significant to both marine life and people. Because estuaries provide safe spawning grounds and nurseries, they are critical for the survival of fish, birds, and other wildlife. Marshes

and other vegetation in the estuaries protect marine life and water quality by filtering sediment and pollution. They also provide barriers against damaging storm waves and floods.

Other Watersheds That Affect Galveston Bay

If you look carefully at Figure 1-2, you may notice that two major reservoirs—Lake Livingston on the Trinity River; Lake Houston on the San Jacinto River—form part of the northern boundary of the Galveston Bay region. Each of these reservoirs has its own watershed. For example, Dallas, Fort Worth, and many other communities are in an area that drains into Lake Livingston through the upper Trinity River.

Like other reservoirs, Lake Livingston can remove some, but not all, nonpoint source pollution from the water that drains into it. So, if your business is in or near Dallas–Fort Worth, you can help protect the Trinity River, Lake Livingston, and, to some extent, Galveston Bay by reducing your contribution to nonpoint source pollution.

Find your community on a map of Texas. If it is in the watershed of any stream that drains into the Trinity River, the San Jacinto River, or any other tributary of Galveston Bay, you are in a watershed that drains into Galveston Bay. Over half of the people in Texas live in the many smaller watersheds that together form the combined Galveston Bay watershed. If you are one of those Texans, you can make a difference for Galveston Bay, too.

For All of Texas

Each of us lives and works in a watershed. Each of us can protect a valuable resource by preventing pollution. This manual presents many steps—“best management practices,” or BMPs—that small businesses can take to reduce nonpoint source pollution. Many of these practices are so simple that almost anyone can use them. For example, every driver can reduce nonpoint source pollution by making sure that his or her car doesn’t leak motor oil, antifreeze, or other automotive fluids. Any citizen who improperly disposes of used motor oil can make an even bigger contribution by recycling that used oil instead.

Look through this manual for best management practices that are related to the activities of your business. Make these practices standard operating procedures for your employees.

ENVIRONMENTAL REGULATIONS AND REQUIREMENTS

For many years, Americans believed that we could control pollution by focusing on large, easily identifiable sources, or point sources, of pollution. Most of these point sources were large businesses or public facilities. Over the last half of the twentieth century, we have made a great deal of progress in getting these sources to pollute less. Still, recent history has shown that we will not reach our goal of reducing pollution to acceptable levels by continuing to deal with only large businesses and other point sources. As a result, many small businesses now are or soon will be required to comply with federal, state, or local environmental regulations.

Environmental Regulatory Agencies and Programs

When Congress passes federal environmental laws, it authorizes the EPA to administer the programs that enforce those laws. The EPA often will delegate that responsibility to the state environmental agency—in Texas, the TNRCC. Businesses can then deal with a single agency—the TNRCC—on all matters of permitting and compliance, state and federal, in those programs. There is one federal program of note that the EPA has not delegated to the TNRCC: the wastewater treatment and discharge program. For wastewater treatment and discharge in Texas, the EPA administers the federal program, and the TNRCC administers the state program. Each agency issues its own wastewater permits, separate from the other agency's permitting program.

Your business may also be subject to county, city, or other local environmental regulations. This chapter provides a brief overview of the environmental regulatory programs that might apply to a small business in Texas, with specific concern for nonpoint source pollution. The major environmental programs that small business may be subject to involve these activities:

- (1) discharges to sanitary sewers,
- (2) on-site stormwater management, and
- (3) management and disposal of solid and hazardous waste.

If you have specific questions about regulations that may affect your business, check Appendix 1. There you will find lists of agency contacts, information resources, trade associations, TNRCC regional offices, and other sources of information on nonpoint source pollution. One program of the TNRCC that can help small businesses understand and comply with environmental regulations is the Small Business Assistance Program (1-800-447-2827). You can also find a

great deal of information at the TNRCC's Web site: <http://www.tnrcc.state.tx.us>.

Discharges to Sanitary Sewers

Most small businesses are not subject to point source wastewater discharge permitting. Such permits are usually required only if you operate a wastewater treatment plant at your facility and discharge the effluent to a receiving stream. Even so, you should be aware that there are certain restrictions on what your business can discharge to a sanitary sewer. Every sanitary sewer ultimately connects to a wastewater treatment plant that is regulated by state and federal permits.

These types of liquid wastes may be subject to sanitary sewer discharge regulations:

- *Oils and greases from any source, including restaurants.* Oils and greases that solidify when cooled can stop up sewer systems. In large amounts, oils that remain liquid can coat and inactivate biological components of wastewater treatment systems.

- *Water used to wash equipment and vehicles.* This wastewater often carries with it large amounts of sand and grit, which can settle out in the sewer system.

- *Wastes that contain toxic substances.* These wastes can kill the bacteria that break down organic wastes as part of the wastewater treatment process.

The amount of these substances that your business can discharge depends in part on the design of the wastewater treatment facility that ultimately receives the waste. Restrictions based on that design are written into the facility's permits. Consult the operator of your local wastewater treatment facility (usually a city or municipal utility district) to find out what restrictions apply to the waste your business discharges into the sanitary sewer.

Stormwater Management

Some small businesses may need to apply for a permit under the federal Clean Water Act's National Pollutant Discharge Elimination System (NPDES) stormwater discharge regulations. Your business may need to obtain an individual site permit if it is in one of these categories:

- certain manufacturing industries with Standard Industrial Classification² (SIC) codes of 20-39, if the site is operated such that there is potential exposure to storm water
- recycling facilities (including automobile salvage yards)
- construction sites that involve five or more acres of land

There are other kinds of facilities that might require permits under these regulations—for example, steam-driven electricity generators, hazardous waste treatment facilities, and landfills—but these other facilities are usually not owned or operated by small businesses. Special exemptions apply to small businesses with annual sales below a threshold dollar amount specified in the regulation. If you think your business fits into any category that requires one of these permits, contact the EPA Region 6 office at the address shown in Appendix 1.

Managing and Disposing of Waste

Almost every business generates waste³ in its normal daily operations. The regulations that apply to your waste depend first upon the types of waste you have. So the first step to follow in successfully managing your wastes is to determine what different types of waste you have. Figure 2-1 shows the various types of waste to consider according to state and federal regulations.

A complete explanation of how to classify wastes is beyond the scope of this guide. However, help is available. For specific information about classifying your waste and about regulations which might apply to your business, call the Small Business Assistance Program at 1-800-447-2827. The TNRCC publication *Guidelines for the Classification and Coding of Industrial Wastes and Hazardous Wastes* (RG-22) has a thorough discussion of this topic. Appendix 3 provides an overview of the types of hazardous wastes typically generated at different small businesses.

Once you have classified your waste, remember that disposal is not necessarily your only option. Energy recovery, reuse, or even recycling may be an option for your wastes—even for certain hazardous wastes.

² Beginning in 1998, the equivalent North American Industry Classification System (NAICS) will replace the SIC coding system.

³ The laws and regulations define the term “solid waste” to include not only waste solids, but also waste liquids, sludges, and contained waste gases. For simplicity in this discussion, we use the term “waste” in place of “solid waste.”

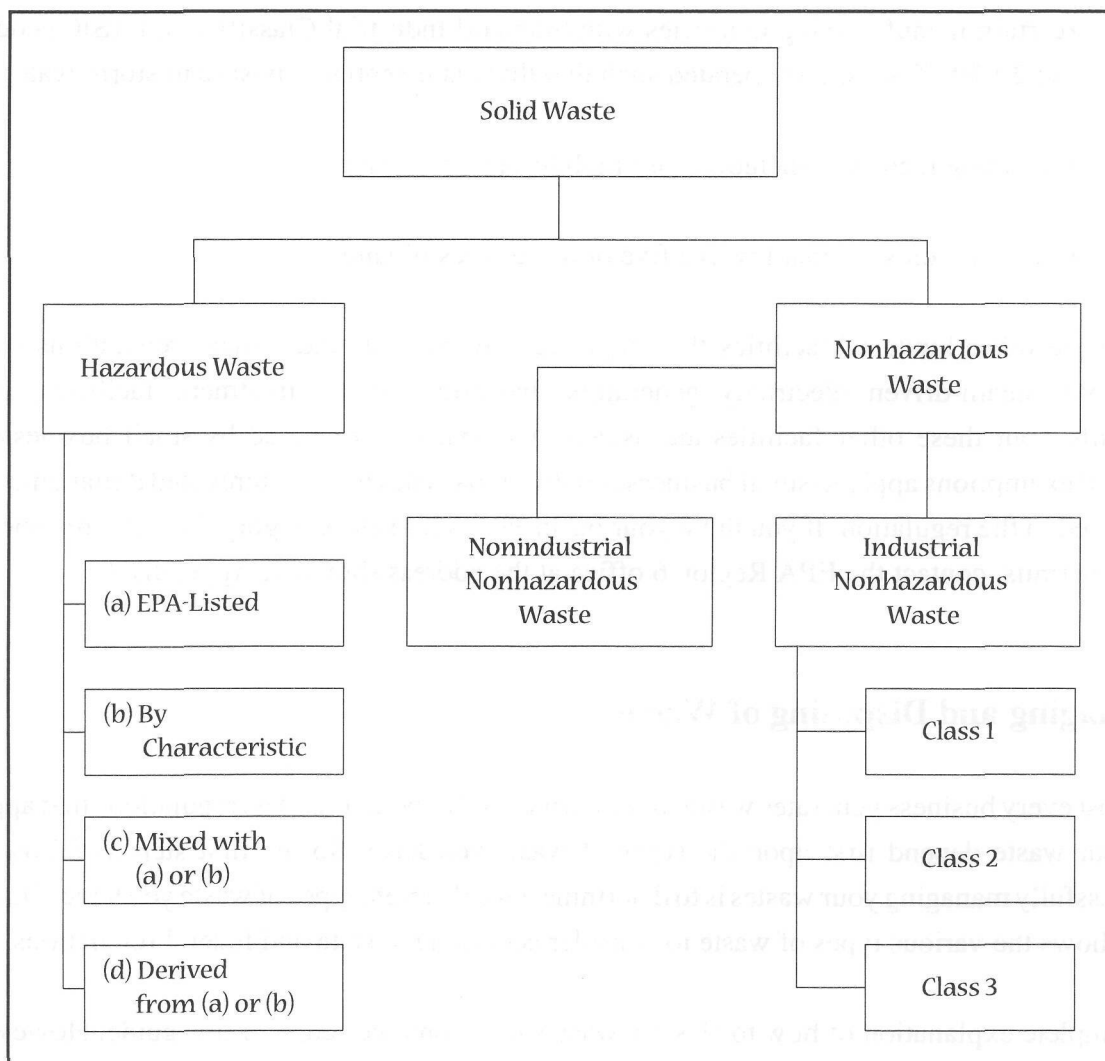


Figure 2-1 Solid Waste Categories.

CHAPTER 3

RECYCLING

Texans annually dispose of more than 22 million tons of trash—more than one ton for every person in the state. That’s enough garbage to fill the Astrodome every two weeks. As our population increases, so does the volume of the wastes we create. At the same time, landfills in Texas are closing—and new ones are difficult to open. In Texas, about half of the solid waste generated is from the workplace. Fortunately, waste is a problem we can do something about. Many workplaces are finding that recycling makes environmental sense and economic sense. When companies reduce their waste, they reduce their disposal costs. Also, when you recycle wastes, these wastes cannot become nonpoint source pollutants.

Every workplace, large and small, can benefit from a recycling program. The TNRCC’s publication *Recycling at Work: Workplace Recycling Guide* (GI-040), provides a ten-step plan for starting or enhancing a recycling program for Texas workplaces. Also, small businesses can promote recycling by buying recycled products. This helps “close the loop.”

Helpful Publications

Demand the Supply: Buy Recycled (GI-234)

This guide will help you start or enhance a buy-recycled program at work.

Texas Directory of Recycling Resources and Information (GI-187)

This directory lists recycling contacts for most Texas cities, councils of government, state agencies, nonprofit organizations, and trade associations in Texas. The directory also contains a list of recycling and composting periodicals.

Recycle Texas (GI-224)

This directory lists more than 800 handlers of recyclable materials to assist waste generators in locating services.

The RENEW Catalog (PD-002)

RENEW, the Resource Exchange for Eliminating Waste is a materials exchange network. This network is a marketing channel for industries, businesses, and governmental entities that want to sell surplus materials, by-products, and wastes to users who will reclaim or reuse them.

Market News (PD-008)

This monthly newsletter spotlights recycling trends.

Green Guide to Yard Care (GI-028)

This comprehensive guide to on-site composting and yard trimmings management includes an overview of the “Don’t Bag It” program, mulching, compost recipes, compost vs. commercial fertilizer, Xeriscaping watering tips, and low-impact pest management.

Related Programs

CLEAN TEXAS STAR

The purpose of the TNRCC’s CLEAN TEXAS STAR program is to encourage a voluntary and significant reduction in solid waste generation and disposal in Texas. The program offers members—businesses, government agencies, nonprofits, schools, and other organizations—a waste reduction plan to save money, public recognition to spotlight achievements, and technical assistance to boost efforts. There are currently more than 1,400 Texas members. For more information on the CLEAN TEXAS STAR program, call (512)239-6750.

Recycling Market Development

The TNRCC’s Recycling Market Development Program provides assistance to communities, businesses, and individuals for the development and expansion of markets for recovered material generated within the state. This program:

- maintains a recycling markets database that lists collectors, processors, brokers, and end users of recyclable materials in Texas
- publishes the annual *Recycle Texas* directory, a hard-copy version of the recycling markets database that lists companies by the materials they handle
- publishes a monthly newsletter, *Market News*, which spotlights current trends and prices of recyclable materials in Texas.

Technical Assistance

For technical assistance, call the TNRCC Recycling Section at 512/239-6750, or write to:

Texas Natural Resource Conservation Commission
Office of Pollution Prevention and Recycling
P.O. Box 13087, MC-114
Austin, TX 78711-3087

CHAPTER 4

BEST MANAGEMENT PRACTICES FOR SMALL BUSINESSES

Small business operators and their employees perform many different tasks during the course of their workdays. Some of these are general in nature and are performed by many different types of businesses. For example, many businesses have vehicles that require periodic maintenance or have significant quantities of new or used fluids such as motor oil or antifreeze. Some, however, perform tasks that are very specific to their type of business. For example, paint and body shops and marinas perform tasks that are unique to what they do.

The pollution prevention best management practices recommended below are divided along these lines. The first three sections recommend BMPs for tasks that may be performed by a variety of different businesses; the final four sections recommend BMPs for specific types of businesses. Owners and operators of these specific businesses should consult these sections for BMPs that might help them prevent pollution at their businesses. If your business is not among these specific ones, consult the first three sections for BMPs that might help prevent pollution.

Each of the seven sections below recommends a series of BMPs that are detailed in the appendixes at the back of this manual. To help you determine which appendixes apply to your business, a checklist of all the appendixes is provided. As you determine that a particular appendix applies to your business, mark it on the checklist. After you have determined all the appendixes that apply to your business, use the checklist to find the appendixes in the back. Each appendix has a tab on its edge with its number.

Checklist

**To find best management
practices for:**

**Look for
this tab:**

__Recycling Centers	A4
__Trash Bins	A5
__Automobile Salvage Yards	A6
__Parking Lots	A7
__Vehicle Repair and Maintenance	A8
__Vehicle Washing Facilities	A9
__Drums and Barrels	A10
__Waste Fluids	A11
__Storm Drains	A12
__Open-Lot Operations and Storage	A13
__Construction Sites	A14
__Grounds Maintenance	A15
__Pesticide and Herbicide Applicators	A16
__Machine Shops and Engine Repair	A17
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__Service Stations	A19
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__Boat Hull Refinishing	A21
__Marinas	A22

Vehicles and Their Care

Cars, trucks, and other vehicles are part of the everyday operations of many small businesses. Perhaps your business has its own fleet of service vehicles and maintains the vehicles on site; perhaps you only provide parking spaces for your employees and customers. In any case, vehicles at your facility might contribute to nonpoint source pollution, and there are steps you can take to reduce that contribution.

Three categories of contributors to nonpoint source pollution from vehicles are parking lots, maintenance and repair activities, and vehicle washing facilities. To reduce the likelihood that such operations contribute to nonpoint source pollution, consider using the BMPs in the following appendixes to this guide:

Appendix 5—Trash Bins

Appendix 7—Parking Lots

Appendix 8—Vehicle Repair and Maintenance

Appendix 9—Vehicle Washing Facilities

Appendix 10—Drums and Barrels

Appendix 11—Waste Fluids

Appendix 12—Storm Drains

Parking Lots

Runoff from parking lots can carry fluids leaked from vehicles to the stormwater collection system. Follow the BMPs in Appendix 7 to reduce contributions to nonpoint source pollution from your parking lot.

Maintenance and Repair Activities

Maintaining and repairing vehicles involves checking, adding, or changing fluids such as:

- antifreeze
- windshield washer solution
- brake fluid
- power steering fluid
- engine lubricating oil
- automatic transmission fluid
- manual transmission and differential lubricating oils

- chassis lubricants

Drips and spills of those fluids can contribute to nonpoint source pollution if proper precautions are not heeded. Follow the BMPs in Appendix 8 and Appendix 10 to minimize nonpoint source pollution from changing and adding vehicular fluids.

Vehicle Washing Facilities

Some small businesses provide vehicle washing services as their principal business activity. Vehicles can either be washed at multi-stall car wash facilities or by using portable trailer-mounted units. Other small businesses wash their own fleet vehicles on site as part of regular vehicle maintenance. In any case, the BMPs found in Appendix 7 and Appendix 9 should help you in minimizing nonpoint source pollution from washing vehicles.

Bulk Liquids Management

It's the end of the workday and it's time to clean up the shop. So hose down the concrete floor and wash all the drips and spills down the drain, right? Wrong! The chemicals that were dripped and spilled from those barrels weren't meant to be washed into the local fishing hole. They must be carefully managed to prevent their release to the environment.

You can prevent nonpoint source pollution from bulk liquids if you know how to properly handle drums and barrels and the fluids they contain. You can also prevent releases from spills if you plan for and know the proper responses for spill control. To reduce the likelihood that such operations contribute to nonpoint source pollution, consider using the BMPs in the following appendixes to this guide:

Appendix 10—Drums and Barrels

Appendix 11—Waste Fluids

Appendix 12—Storm Drains

Drum and Barrel Management

Many small businesses store or use bulk liquids that are contained in 55-gallon drums, barrels of various sizes, or small liquid containers such as 5-gallon buckets and 1-gallon cans. The methods for managing bulk liquid containers are similar regardless of their size: you should train your employees how to prevent spills and how to respond to spills if they occur. You can use the BMPs in Appendix 10 to help train your employees to minimize drips, leaks, and spills from

drums and barrels stored at your facility.

Waste Fluids

Your liquid wastes are probably not much different from those generated by big chemical plants when it comes to the potential for nonpoint source pollution. The big difference between your operation and the big chemical plant is that you probably don't have a full-time environmental specialist to manage your wastes. However, sound waste management procedures for large and small businesses are the same: prevent the generation of wastes where possible; properly manage those wastes that you do produce. In addition to the BMPs of Appendix 10 for drums and barrel handling, you should look at the BMPs in Appendix 11 that have been tailored to the proper management of waste fluids.

Spill Control

Spills happen! Yes, even though your employees are properly trained to prevent spills, sometimes a mistake can result in more than just a drip or splatter. You should be prepared to respond to spills so that they are contained on site. The BMPs in Appendix 10 and Appendix 12 should be used to minimize the potential for nonpoint source pollution from spills of bulk liquids.

Open-Lot Operations

Your facility looks innocent enough. You just store treated fence material to sell to contractors in the area. Problem is, that treated lumber sits outside, uncovered. And when it rains, the chemicals that were put into the wood to kill the fungus that causes rotting leach out of the fenceposts. Where do those toxic chemicals go? That's right, to nearby receiving streams and ultimately to rivers and bays.

Your small business is an "open-lot" operation if you conduct any part of your business outside of a building. Why is this a special concern? Well, anything and everything exposed to rainfall has a tendency to get washed off into nearby streams and bays. This can result in nonpoint source pollution whether you operate an uncovered bulk storage area or work at a construction site. To reduce the likelihood that such operations contribute to nonpoint source pollution, consider using the BMPs in the following appendixes to this guide:

Appendix 4—Recycling Centers

Appendix 5—Trash Bins

- Appendix 6—Automobile Salvage Yards**
- Appendix 7—Parking Lots**
- Appendix 9—Vehicle Washing Facilities**
- Appendix 12—Storm Drains**
- Appendix 13—Open-Lot Operations and Storage**
- Appendix 14—Construction Sites**
- Appendix 15—Grounds Maintenance**
- Appendix 16—Pesticide and Herbicide Applicators**

Uncovered Bulk Storage Areas

If you own a lumberyard, plant nursery, concrete readymix plant, plumbing supply company, paper recycling center—well, you get the idea. When you store materials outside, unprotected, you create a potential for nonpoint source pollution from the material you store. You can prevent contributions to nonpoint source pollution from storing materials outside by following the BMPs in Appendix 13.

Construction Sites

If you are a contractor in any of the building trades, you've seen what a good rainfall can do to a site cleared for a new building. Now, imagine that the runoff from that Monday morning rainfall not only carries off topsoil, but also the paint thinner from that 5-gallon bucket you left outside on Friday. Oops! Construction sites present unique environmental threats because they are temporary. We don't see them as ordinary workplaces. Reduce nonpoint source pollution from your construction site—make sure you and your subcontractors use the BMPs in Appendix 14.

Recycling Businesses

General Recycling

You used to be called a junkyard. Today, you're a recycling center. Regardless of the name, you provide a valuable service in buying and selling recyclable materials—paper, aluminum cans, iron, copper, lead, and other materials too numerous to list. But the materials you buy and store on site could contribute to nonpoint source pollution if not handled carefully. The BMPs in Appendix 4 and Appendix 5 can guide you in the proper operation of your recycling center.

Metals Recycling

Many small businesses generate scrap metal with substantial market value—from the office's soft drink can collection to the copper scrap pile at plumbing, air conditioning, and electrical shops. Protect your scrap metal from the elements by storing it inside or in covered containers. This not only prevents the scrap metals from harming the environment, but, because clean scrap material fetches the best price, puts more money in your pocket. Follow the BMPs for recycling centers in Appendix 4 to keep your scrap metal "gold mine" from becoming a contributor to nonpoint source pollution.

Automobile Salvage Yards

The automobile salvage yard operator sees the hundreds of junked autos on his lot as a valuable investment—some of their parts will be sold, eventually. However, the oil, antifreeze, and other liquids present in those parts present a serious potential liability if improperly managed. If you operate an automobile salvage yard, you should follow the BMPs presented in Appendix 6 to reduce your lot's contribution to nonpoint source pollution.

Manufacturing, Machining, and Printing

You don't pollute. Your facility manufactures plastic toys. No chemicals here! Well, except when you have to paint the parts. And when the stamping equipment is overhauled, well, the mechanics use solvents, and you assume they know what they are doing when they wash the excess out the back of your shop. Okay, maybe there is a *potential* for nonpoint source pollution at your manufacturing, machining, or printing facility. If you use oils, solvents, or other liquids in your small business, consider using the BMPs in the following appendixes to minimize your contribution to nonpoint source pollution:

Appendix 5—Trash Bins

Appendix 10—Drums and Barrels

Appendix 11—Waste Fluids

Appendix 17—Machine Shops and Engine Repair

Appendix 18—Print Shops

Oils, Solvents, and Other Liquids

Your manufacturing, machining, or printing operation might use one or more of the following liquids:

- acids
- alkalies
- cleaning solvents
- degreasers
- detergents
- cutting oils
- engine oil and lubricants
- paint reducers, thinners, and paints
- refrigerants
- spill absorbents
- varnish and varnish solvents
- welding and soldering supplies

Refer to the BMPs in Appendix 17 and Appendix 18 to minimize the potential for nonpoint source pollution from such liquids at your facility.

Source Reduction Opportunities

The manufacturing, machining, and printing industries present many opportunities for source reduction—not generating pollutants or reducing the amount of pollutants generated to begin with. This can be done by substituting one material for another. For example, by substituting a non-halogenated solvent for a halogenated solvent you might cut down on the amount of hazardous waste generated at your business. Or you might reduce the amount of wastes generated at your facility by changing a process. For example, if you lengthen the dragout time from a chemical bath (plating, etching, etc.), you can reduce the amount of chemical which reaches the rinsewater. This can reduce the amount of waste rinsewater generated. Several similar opportunities can be found by investigating the information that is already available from governmental agencies and industry groups such as those listed in Appendix 1.

Service Stations, Auto Repair, and Paint and Body Shops

The automobile is your business's bread and butter: selling gasoline, changing oil, repairing "fender benders." Let's see—gasoline, oil, paint stripper—valuable liquids when they are properly handled. But liquids used in the automobile service industry can be harmful to the environment. If you operate a service station, auto repair shop, or paint and body shop, you should consider using the BMPs in the following appendixes to this guide:

Appendix 5—Trash Bins

- Appendix 6—Automobile Salvage Yards**
- Appendix 7—Parking Lots**
- Appendix 8—Vehicle Repair and Maintenance**
- Appendix 9—Vehicle Washing Facilities**
- Appendix 10—Drums and Barrels**
- Appendix 11—Waste Fluids**
- Appendix 12—Storm Drains**
- Appendix 17—Machine Shops and Engine Repair**
- Appendix 19—Service Stations**
- Appendix 20—Paint and Body Shops**

Service Stations

Gasoline, oil, transmission fluid, power steering fluid, antifreeze, brake fluid—if you intended to pollute a creek, those would make a great “cocktail” for that purpose. To keep your service station from contributing to nonpoint source pollution from normal operations, consider using the BMPs in Appendix 19.

Auto Repair and Paint and Body Shops

You know the smell of a paint and body shop—the solvent carriers of the paint being sprayed on the car. They smell good, somewhat sweet. They’re “aromatic hydrocarbons,” and they work really well in paints. Unfortunately, they are not “sweet” to the environment. Auto repair and paint and body shops use a wide variety of fluids:

- acids
- alkalies
- cleaning solvents
- degreasers
- detergents
- cutting oils
- engine oil and lubricants
- paint reducers, thinners, and paints
- refrigerants
- spill absorbents
- welding and soldering supplies

These fluids have a potential for nonpoint source pollution if improperly handled or managed. Follow the BMPs in Appendixes 8, 17, and 20 to minimize your facility’s potential to contribute

to nonpoint source pollution.

Recycling

Service stations and auto repair shops can help reduce nonpoint source pollution by becoming a drop-off center for used motor oil, used oil filters, and/or used antifreeze. By becoming a drop-off center for these materials, you help citizens in your area properly dispose of these items and thus reduce their potential for becoming nonpoint source pollutants. For information on becoming a drop-off center, contact the Texas Natural Resource Conservation Commission's Used Oil and Used Oil Filter Recycling Program at (512) 239-6695.

Boats and Marinas

It's obvious—you located your marina at the water's edge because that's where the water is and that's where the boats are. So, you clean boats, sell fuel, pump out the boats' heads. You provide for parking for your customers and you also operate a hull maintenance and repair shop at your marina. Nonpoint source pollution from those operations doesn't have very far to go to get to the receiving water!

If you own a small business that refinishes boat hulls or operates a marina you should consider using the BMPs in the following appendixes to this guide:

Appendix 5—Trash Bins

Appendix 7—Parking Lots

Appendix 10—Drums and Barrels

Appendix 11—Waste Fluids

Appendix 12—Storm Drains

Appendix 21—Boat Hull Refinishing

Appendix 22—Marinas

Boat Hull Refinishing

If you refinish boat hulls your business is probably located near the water. It makes sense, you locate your facility where the business is. Unfortunately, boat hull refinishing at marinas presents a good possibility of polluting marina waters. Solvents, paint, and washwater generated during hull refinishing must be collected and prevented from discharge to adjacent waters. Follow the BMPs in Appendix 21 to prevent pollution of marina waters if you refinish boat hulls near marinas.

Marina Operations

Your marina presents the same potential for nonpoint source pollution as does a shopping mall parking lot—except that your marina is located on the water! Any releases from vehicles parked at your marina, or from boat hull refinishing services you provide, or from gasoline dripping from your boat fueling facility go directly into the water. To minimize the potential for your marina contributing to nonpoint source pollution, consider the BMPs in Appendix 22.

APPENDIX 1

GENERAL REFERENCE
Contact Information**GALVESTON BAY REGION CONTACTS*****General Assistance***

One-stop assistance for complying with federal regulations

U.S. Small Business Administration

U.S. General Store

5400 Griggs Road

Houston, TX 77021

(713) 643-8000

Technical and management assistance to small businesses

Texas Manufacturing Assistance Center

1100 Louisiana, Suite 500

Houston, TX 77002

(713) 752-8432

Wastewater Discharge Rules

Assistance in complying with wastewater discharge rules

TNRCC Region 12—Water

5425 Polk Avenue, Suite H

Houston, TX 77023-1423

(713) 767-3650

Solid Waste Rules

Assistance in complying with solid waste rules

TNRCC Region 12—Waste

5425 Polk Avenue, Suite H

Houston, TX 77023-1423

(713) 767-3644

Assistance in complying with hazardous waste rules

TNRCC Region 12—Waste

5425 Polk Avenue, Suite H

Houston, TX 77023-1423

(713) 767-3641

***Other Local Agencies
That Can Provide Assistance***

GCHD

P.O. Box 939
La Marque, TX 77568
(409) 938-2251

Harris County Pollution Control Department

107 N. Munger
Pasadena, TX 77506
(713) 920-2831

City of Houston

Environmental Control/Pollution Control
7411 Park Place Blvd.
Houston, TX 77087
(713) 640-4200

Equipment and Supply Vendors

**To locate vendors of pollution control and recycling equipment and supplies, contact
your local pollution control agency or look in the *Yellow Pages* under:**

Environmental and Ecological Equipment and Services
Recycling Equipment and Services
Solvents
Waste Recycling and Disposal Equipment-Industrial
Waste Recycling and Disposal Services-Industrial

Small Business Development Centers

Galveston College

Small Business Development Center
4015 Avenue Q
Galveston, TX 77550
(409) 762-7380

Univ. of Houston Small Business Development Center (SBDC)
(Other SBDCs of this region can be contacted through this office)

1100 Louisiana, Suite 500
Houston, TX 77002
Tel: (713) 752-8444
Fax: (713) 756-1500

STATEWIDE CONTACTS***General Assistance***

Industry-specific pollution prevention guides
EPA Center for Environmental Research Information
USEPA
ORD Publications, Mail Stop G72
26 West MLK Drive
Cincinnati, OH 45268
(513) 569-7562

Discharges to Sanitary Sewer Systems

(Consult your telephone directory for the municipal agency or utility district which is responsible for wastewater treatment in your area.)

Stormwater Discharge Permitting

Assistance in complying with stormwater discharge rules
EPA Region VI - 6WQ/PM
1445 Ross Avenue
Dallas, TX 75202
(214) 665-7523

TNRCC Publications and Rules

Assistance in ordering TNRCC publications
TNRCC Publications Inventory and Distribution
P.O. Box 13087
Austin, TX 78711-3087
(512) 239-0028

***Other State Agencies That
Can Provide Assistance*****TNRCC Small Business Assistance Program**

Free confidential assistance
P.O. Box 13087
Austin, TX 78711-3087
(512) 239-1066
(800) 447-2827

TNRCC Office of Pollution Prevention and Recycling
Assistance with pollution prevention, recycling, and educational initiatives
P.O. Box 13087
Austin, TX 78711-3087
(512) 239-3100

Copies of Regulations

Agency Information Consultants, Inc.
800 Brazos, Ste 740
Austin, TX 78701
(512) 478-8991

Nongovernmental Organizations

American Boat Builders and Repairers Association (ABBRA)
425 E. 79th Street, Suite 11B
New York, NY 10021

American Petroleum Institute
1220 L Street NW
Washington, D.C. 20005
(202) 682-8000

Association of Petroleum Refiners
1915 Eye Street NW, Suite 600
Washington, D.C. 20006
(202) 639-4490

Convenient Automotive Services Institute
P.O. Box 34595
Bethesda, MD 20827
(301) 897-3191

Filter Manufacturers Council
P.O. Box 13966
Research Triangle Park, NC 27709-3966
(800) 993-4583

International Council of Marine Industry Associations (ICOMIA)**International Boating Facilities Committee c/o NMMA**

3050 K Street NW, Suite 145

Washington, D.C. 20007

(202) 994-4980

International Marina Institute (IMI)

P.O. Box 1202

Nokomis, FL 34275

(401) 294-9558

Marina Operators Association of America (MOAA)

1819 L Street, 4th Floor

Washington, D.C. 20036

National Automotive Dealers Association

8400 Westpark Drive

McLean, VA 22102

National Marine Manufacturers Association (NMMA)**Boating Facilities Development Department**

1819 L Street, 7th Floor

Washington, D.C. 20036

National Oil Recyclers Association

129429 Cedar Road, Suite 26

Cleveland, OH 44106-3172

(216) 791-7316

Service Station Dealers Association

499 South Capitol Street SW, Suite 407

Washington, D.C. 20003

(703) 548-4736

Helpful Web Sites**EPA**

<http://www.epa.gov>

TNRCC

<http://www.tnrcc.state.tx.us>

TNRCC RENEW Catalog

(Resource Exchange Network for Eliminating Wastes)

<http://www.tnrcc.state.tx.us/admin/topdoc/pd/002>

Online TNRCC Pollution Prevention Case Study Manual

<http://www.utep.edu/im3/p2>

Material Safety Data Sheets (MSDSs)

<http://atlas.chem.utah.edu/11/msds>

Code of Federal Regulations

<http://www.epa.gov/epahome/epafr-envsubset.html>

Texas Administrative Code

<http://www.sos.state.tx.us/tac/30/index.html>

Enviro\$en\$e

(EPA site offering pollution prevention information)

<http://es.inel.gov/index.html>

University of Houston Regional SBDC

<http://smbizsolutions.uh.edu/>

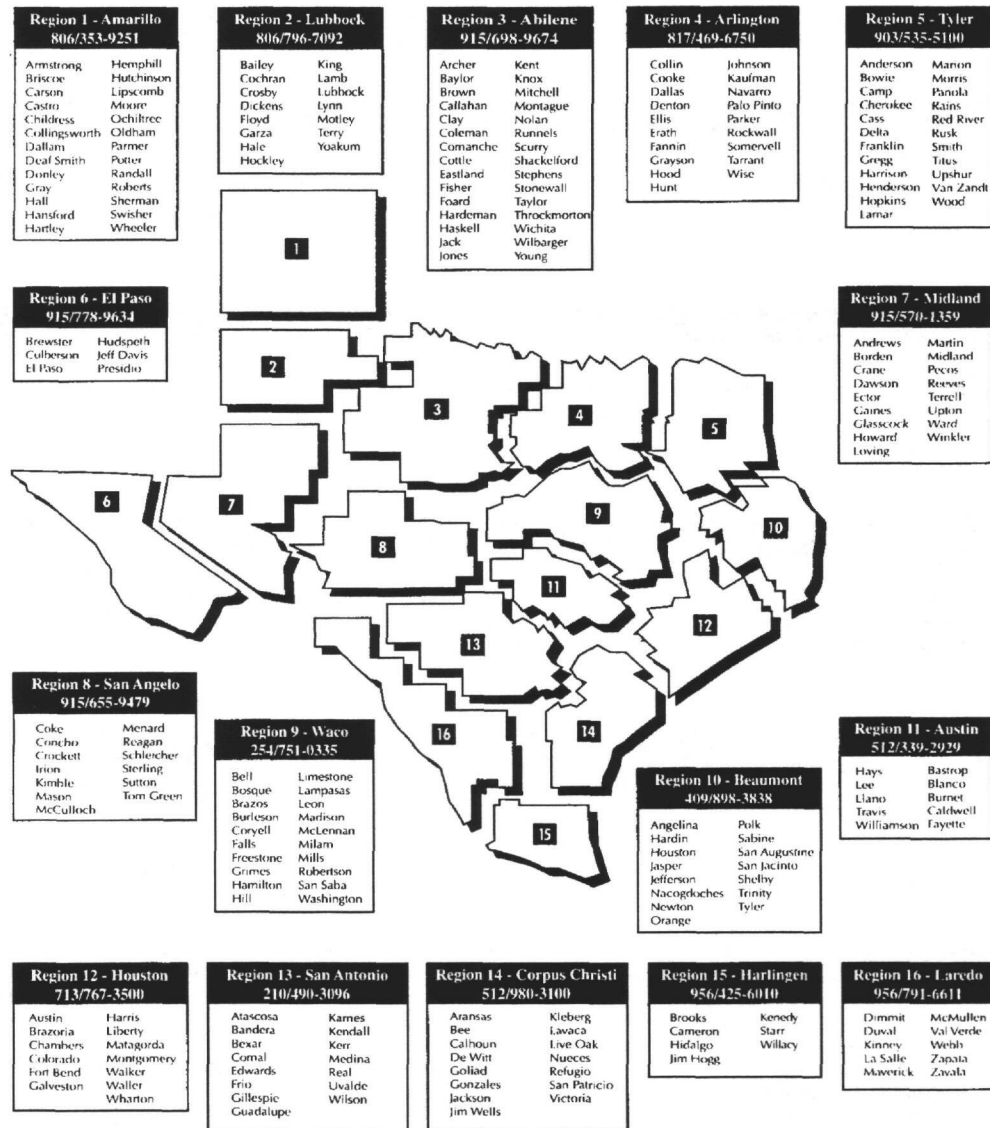
Galveston County Health District

<http://www.gchd.co.galveston.tx.us>

GENERAL REFERENCE

Texas Natural Resource Conservation Commission Regional Offices

TNRCC REGIONS (including counties in each region)





TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

P.O. Box 13087 • Austin, Texas 78711-3087 • 512/239-1000

REGIONAL OFFICES

1 – AMARILLO	2 – LUBBOCK	3 – ABILENE
Regional Manager - Brad Jones 3918 Canyon Drive Amarillo, TX 79109-4933 806/353-9251 FAX: 806/358-9545	Regional Manager - Jim Estes 4630 50th St., Suite 600 Lubbock, TX 79414-3520 806/796-7092 FAX: 806/796-7107	Regional Manager - Winona Henry 209 South Danville, Suite B200 Abilene, TX 79605-1491 915/698-9674 FAX: 915/692-5869
4 – ARLINGTON	5 – TYLER	6 – EL PASO
Regional Manager - Melvin Lewis 1101 East Arkansas Lane Arlington, TX 76010-6499 817/469-6750 FAX: 817/795-2519	Regional Manager - Leroy Biggers 2916 Teague Drive Tyler, TX 75701-3756 903/535-5100 FAX: 903/595-1562	Regional Manager - Frank Espino 7500 Viscount Blvd., Suite 147 El Paso, TX 79925-5633 915/778-9634 FAX: 915/778-4576
7 – MIDLAND	8 – SAN ANGELO	9 – WACO
Regional Manager - Jed Barker 3300 North A St., Bldg. 4, Suite 107 Midland, TX 79705-5404 915/570-1359 FAX: 915/570-4795	Regional Manager - John Haagensen 301 W. Beauregard Ave., Suite 202 San Angelo, TX 76903-6326 915/655-9479 FAX: 915/658-5431	Regional Manager - Gene Fulton 6801 Sanger Ave., Suite 2500 Waco, TX 76710-7826 254/751-0335 FAX: 254/772-9241
10 – BEAUMONT	11 – AUSTIN	12 – HOUSTON
Regional Manager - Vic Fair 3870 Eastex Fwy., Suite 110 Beaumont, TX 77703-1892 409/898-3838 FAX: 409/892-2119	Regional Manager - Larry Smith 1921 Cedar Bend Drive, Suite 150 Austin, TX 78758-5336 512/339-2929 FAX: 512/339-3795	Regional Manager - Leonard Spearman, Jr. Asst. Reg. Mgr. - Karen Atkinson 5425 Polk Avenue, Suite H Houston, TX 77023-1486 713/767-3500 FAX: 713/767-3520
13 – SAN ANTONIO	14 – CORPUS CHRISTI	15 – HARLINGEN
Regional Manager - Richard Garcia 140 Heimer Rd., Suite 360 San Antonio, TX 78232-5042 210/490-3096 FAX: 210/545-4329 South Texas Watermaster Office 210/494-3556 FAX: 210/402-0273 1-800/733-2733	Regional Manager - Buddy Stanley 6300 Ocean Drive, Suite 1200 Corpus Christi, TX 78412-5503 512/980-3100 FAX: 512/980-3101	Regional Manager - Tony Franco 1804 West Jefferson Avenue Harlingen, TX 78550-5247 956/425-6010 FAX: 956/412-5059 Rio Grande Watermaster 1500 Dove Ave. McAllen, TX 78504-3439 956/664-2763 FAX: 956/664-2984
16 – LAREDO	LABORATORY	
Regional Manager - Jorge L. Bacelis 1403 Seymour, Suite 2 Laredo, TX 78040-8752 956/791-6611 FAX: 956/791-6716	Lab Manager - Jim Busceme 5144 E. Sam Houston Pkwy. N. Houston, TX 77015-3225 281/457-5229 FAX: 281/457-9107	TNRCC rules, publications, agendas and highlights of Commission meetings and other environmental information are available from the convenience of your computer by accessing the TNRCC World Wide Web Home Page over the Internet at:  http://www.tnrcc.state.tx.us

APPENDIX 3

GENERAL REFERENCE Typical Hazardous Waste Streams

A3

TYPICAL WASTE STREAMS GENERATED BY SMALL BUSINESSES	
Type of Business	Types of Hazardous Wastes Generated
Building cleaning and maintenance	Acids and bases Solvents
Chemical manufacturers	Acids and bases Cyanide wastes Heavy metals and inorganics Ignitable wastes Reactives Solvents
Cleaning agents and cosmetics	Acids and bases Heavy metals and inorganics Ignitable wastes Pesticides Solvents
Construction	Acids and bases Ignitable wastes Solvents
Educational and vocational shops	Acids and bases Ignitable wastes Pesticides Reactives Solvents
Equipment repair	Acids and bases Ignitable wastes Solvents
Formulators	Acids and bases Cyanide wastes Heavy metals and inorganics Ignitable wastes Pesticides Reactives Solvents
Funeral services	Solvents Formaldehyde
Furniture or wood products manufacturing and refinishing	Ignitable wastes Solvents

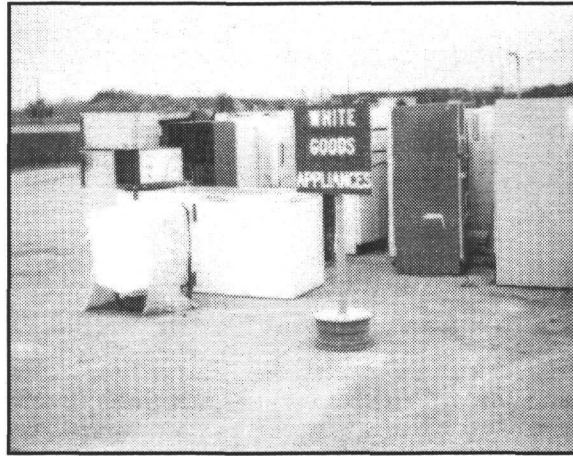
TYPICAL WASTE STREAMS GENERATED BY SMALL BUSINESSES	
Type of Business	Types of Hazardous Wastes Generated
Laboratories	Acids and bases Heavy metals and inorganics Ignitable wastes Reactives Solvents
Laundries and dry cleaners	Dry cleaning filtration residues Solvents
Metal manufacturing	Acids and bases Cyanide wastes Heavy metals and inorganics Ignitable wastes Reactives Solvents Spent plating wastes
Motor freight terminals and railroad transportation	Acids and bases Heavy metals and inorganics Ignitable wastes Lead-acid batteries Solvents
Other manufacturing: • textiles • plastics • leather	Heavy metals and inorganics Pesticides Solvents
Pesticide end users and application services	Heavy metals and inorganics Pesticides Solvents
Printing and allied industries	Acids and bases Heavy metals and inorganics Ink sludges Spent plating wastes Solvents
Vehicle maintenance	Acids and bases Heavy metals and inorganics Ignitable wastes Lead-acid batteries Solvents
Wood preserving	Preserving agents

(Source: EPA. 1986. *Understanding the Small Quantity Generator Hazardous Waste Rules: A Handbook for Small Business*. Washington, D.C. EPA/530/SW86/019)

APPENDIX 4

BEST MANAGEMENT PRACTICES FOR Recycling Centers

A4



General Facility Practices

- ▶ Grade your recycling lot during dry weather. This will help to prevent soil erosion and minimize the runoff of chemicals from exposed materials and containers.
- ▶ Use as little water as possible for dust control on unpaved areas.
- ▶ Keep recyclable materials from leaching chemicals to the environment by storing them in bins with lids or keeping them under covered storage areas.
- ▶ Do not accept items that contain, or that you suspect to contain, hazardous wastes or fluids.

Container Maintenance

- ▶ Keep containers in good condition, handle them carefully, and replace any leaking ones.
- ▶ Inspect containers for signs of leaks or corrosion every week.
- ▶ Make sure that containers are strong enough to contain the materials they are to hold. Line containers with materials that will not deteriorate under normal conditions of use.
- ▶ Use containers for outdoor storage that are watertight, rodentproof, and tamper-resistant.

- ▶ Keep products in the original containers that they were received in, if possible. If not, clearly label the replacement containers. Cover all labels with transparent tape to keep the labels from falling off or from becoming illegible.
- ▶ Keep containers closed except when you fill or empty them.
- ▶ Watch for indications that a drum or barrel is under pressure—such as swelling and bulging—which may result in a leak or rupture.

Spill Prevention

- ▶ Implement regular inspections of your site to look for leaks, recent container damage, or other potential causes of spills or leaks.
- ▶ Fill or drain containers only in an area that has a secondary containment system capable of containing the contents of the containers being filled or drained.
- ▶ Completely fence in your site. Lock your gates or provide for security when your facility is unattended.
- ▶ Turn off valves and spigots when you finish using a container—check for drips before leaving.
- ▶ Provide enough lighting at your facility so that you can also identify spills at night. Lighting your facility will also will minimize the threat of vandalism.
- ▶ Store containers on a base that is chemically resistant to the container contents. The base must be leakproof, free of cracks or gaps, and have enough volume to contain the container contents, plus any rainfall that it may have to hold. It must be designed for ease of inspection so that leaks can be easily seen.
- ▶ The base of the container storage system should slope to a sump for collection of leaks, spills, or precipitation. Alternatively, you could store your containers on pallets to prevent them from being contacted by spilled liquids.
- ▶ Use this rule of thumb for your container storage area: The spill containment system should have sufficient capacity to contain 10 percent of the volume of all containers, or 100 percent of the volume of the largest container, whichever is greater.
- ▶ Prevent run-on into the containment system so that spilled liquids aren't washed out before you can remove them.

- ▶ Remove spilled or leaked liquids and accumulated precipitation from the sump or collection area promptly to prevent overflow of the collection system.
- ▶ Never leave a container unattended if it is being filled or drained.
- ▶ Use a funnel of proper size and material when transferring liquids from one container to another.
- ▶ Place spill collection trays under open containers and under the spouts of liquid storage containers.

Spills

- ▶ Equip floor drains with valves that can be closed in the event of a large spill. Regularly inspect these valves to ensure that they are functioning correctly.
- ▶ Specify cleanup instructions for each material that is handled on site, along with safety requirements and persons designated for spill response and cleanup.
- ▶ Make spill containment and cleanup kits easy to find and use. Conduct initial employee training with periodic refresher training.
- ▶ Contain the spill! If the spill might enter a drain, immediately close the control valve. If no valve is present, plug or cover the drain inlet (for example, with a rubber mat). Turn off any automatic sumps.
- ▶ Cover a powder spill with plastic sheeting to keep it from dusting up or becoming airborne. If the powder will not react with water, you can contain it by covering it with wet paper towels or by using a light spray of water. You can then sweep or wipe up the wetted powder or paper towels easily. Dispose of the towels as if they were made of the same chemical as the powder.
- ▶ Remove spilled or leaked waste and accumulated precipitation from sumps or collection areas in as timely a manner as is possible to prevent overflow of the collection system.
- ▶ If the spill is a liquid, cover it with an absorbent material that can be swept or scooped up. Sawdust or vermiculite are good for this purpose. Absorbent booms can be used to contain and soak up larger spills.
- ▶ Unless the material has a high flash point avoid the use of emulsifiers and dispersants. The idea is to contain the spill—not scatter it. Similarly, do not use a hose or wet mop. Using water adds to the volume of the spill and spreads the material to a larger area.

- ▶ Report significant spills to the appropriate authorities immediately and get outside help if needed.
- ▶ Do not put rags that were used to soak up even nonhazardous spills in an uncovered container. Store them in a covered bin and send them to a professional cleaning service.
- ▶ If possible, connect drains to a dead-end holding tank—especially if your company manages hazardous chemicals or petroleum products. If you cannot drain the area to a holding tank, you may be able to drain it to the sanitary sewer system. Before allowing a spill to drain to the sanitary sewer, call your local wastewater treatment plant and make sure that it is okay.
- ▶ Maintain storage areas to keep any drainage from reaching your site's stormwater management system. If you are not sure where a drain goes to, contact your facility manager, local wastewater utility, or a plumber. If you're still not sure, have the drain dye-tested.
- ▶ Empty all drums and containers completely before cleaning or disposing of them to minimize the amount of waste you generate.
- ▶ Clean up spills on unpaved areas by digging up stained soil areas. Make sure to dispose of the contaminated soil properly.
- ▶ Use wringable pads or booms to recover spilled material. If this is not possible, use dry cleanup methods—such as sawdust, cat litter, or rags. Avoid hosing down dirty pavement or permeable surfaces where liquids have spilled.
- ▶ Use absorbents to their maximum capacity. For more information on using oil absorbent pads, refer to TNRCC document RG-237, *Used Oil Absorbents: Proper Management Practices*.

Bibliography

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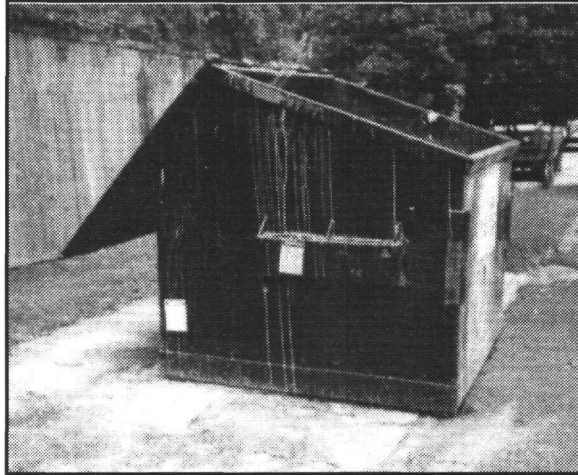
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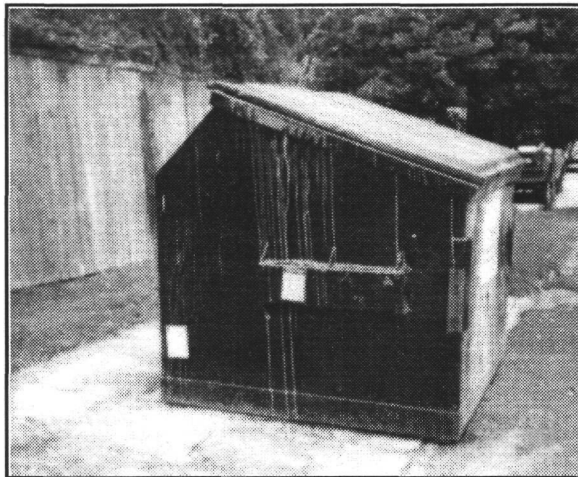
APPENDIX 5

**BEST MANAGEMENT PRACTICES FOR
Trash Bins**



A5

- ▶ Don't put liquids in trash bins or trash cans.
- ▶ Place trash bins or trash cans on concrete surfaces.
- ▶ Keep lids tightly closed to keep the rain out.



- ▶ Assign someone to regularly clean up the ground around trash bins.
- ▶ If a trash bin or trash can leaks, immediately repair or replace it.
- ▶ Make sure that storage containers are in good condition and lined with a material that will not deteriorate.
- ▶ Trash bins or trash cans stored outside should be watertight, rodentproof, and protected from tampering.

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APPENDIX 6

**BEST MANAGEMENT PRACTICES FOR
Automobile Salvage Yards**



A6

General Facility Management

- ▶ Develop an incoming vehicle inspection and inventory program. Your inspections should help identify fluid leaks that should be stopped before storing the vehicle on site. You should also check for any unusual substances or containers that might have been placed in the vehicle.
- ▶ Do not use oil, fuel, or other vehicle fluids for dust or weed control on your lot.
- ▶ Clean up debris and trash on a regular basis.
- ▶ Continually check your vehicle inventory for leaks. Drain leaking inventory or stop the leak if possible—otherwise, place a pan underneath the source to collect leaks.

Crusher Maintenance and Operations

- ▶ Operate vehicle crushers on paved surfaces.
- ▶ Promptly clean up any spills or leaks after crushing operations are completed.
- ▶ Keep the crusher and related equipment clean and in good repair.
- ▶ Schedule periodic inspections of crushing equipment for leaks, spills, and proper functioning, and for worn or corroded parts.

- ▶ Promptly repair malfunctioning parts that could cause a leak or spill from crushing operations.

Antifreeze

A6

- ▶ Segregate antifreeze and other coolants from all other waste fluids.
- ▶ Recycle antifreeze through a TNRCC-registered recycler. For more information on registered recyclers, call the Used Oil and Used Oil Filter Recycling Program at (512) 239-6695.
- ▶ For more information on antifreeze recycling, refer to TNRCC document RG-235, *Used Antifreeze (Used Coolant): Proper Management Practices*.

Batteries

- ▶ Send all batteries off site for recycling.

Carburetor Cleaner

- ▶ Use reformulated carburetor cleaner compound (without 1,1,1-trichloroethane).
- ▶ Use drip pans to collect excess cleaner and then pour the liquid into larger containers to allow solid particles to settle out. Reuse the clear, decanted liquid from the top of the larger containers.
- ▶ Consider off-site recycling—especially if you are a medium to large operation.

Oil Filters

- ▶ Drain oil filters completely—collect the drained oil for recycling.
- ▶ Recycle oil filters through a TNRCC-registered recycler. For more information on registered recyclers call the Used Oil and Used Oil Filter Recycling Program at (512) 239-6695.
- ▶ For more information on oil filter recycling, refer to TNRCC document RG-257, *Used Oil Filter Generators, Collection Centers, and Handlers*.

Oils

(Including Motor, Transmission, and Hydraulic Oils)

- ▶ Segregate oils by type to aid in their reuse or recycling.
- ▶ Recycle used oil through a TNRCC-registered recycler. For more information on registered recyclers call the Used Oil and Used Oil Filter Recycling Program at (512) 239-6695.
- ▶ For more information on used oil recycling, refer to TNRCC document RG-256, *Used Oil Generators, Collection Centers, and Handlers*.

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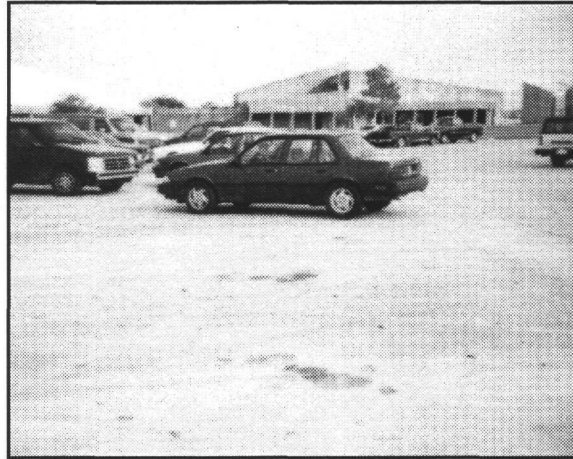
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APPENDIX 7

BEST MANAGEMENT PRACTICES FOR Parking Lots



A7

Cleaning Parking Lots

- ▶ Use dry cleaning methods to clean parking lot pavement—absorbents, brooms, or wire brushes.
- ▶ Clean up sediments and other solids from parking lots immediately to prevent them from blowing or washing away.
- ▶ Mechanically remove loose debris before washing the lot with water.
- ▶ Dispose of parking lot debris properly. To determine the proper disposal method, contact the facility that you expect to take the material to for disposal.
- ▶ Clean parking lots early in the day if heavy rains are forecast.
- ▶ Assign numbered parking spots for each driver or vehicle. This helps to identify leaking vehicles so they can be repaired.

Pressure Washing

- ▶ Pressure-wash pavement only when necessary. Avoid the use of acids and other harsh cleaners.

- ▶ If you intend to conduct pressure washing for lot cleaning because of special circumstances, use the recommendations in “Managing Wash Water” below.

Managing Wash Water

A7

- ▶ Construct a berm around the area to be washed—for example, with sandbags.
- ▶ Pump or divert wash water to the sanitary sewer system. Check first to make sure that the wash water will comply with wastewater treatment plant requirements.
- ▶ Alternatively, divert wash water to an open lawn or other vegetated area so that it can percolate into the ground.
- ▶ If it is not possible to divert wash water to the sanitary sewer or a vegetated area, use at-grade storm drains fitted with filter fabric bags. These bags can be hung down into the drains’ catch basins to filter out solids from the wash water runoff. The solids can be removed when the bags are full.
- ▶ Protect curb gutter inlets with filter fabric to trap solids from the wash water runoff.
- ▶ You can impound wash water by temporarily blocking all storm drains—for example, with rubber mats.
- ▶ Avoid routing wash water to roadside ditches—these features are part of stormwater drainage systems, which in turn lead to local rivers and streams.
- ▶ If pressure washing is used, wash with *water only*. Be aware that dissolved pollutants or cleaning products can percolate through underlying soils to drinking water supplies.
- ▶ Be sure to remove debris and reopen storm drains as soon as possible—do not block storm drains if rain is expected.

Oil Separators

- ▶ Use oil separators to remove oil and grit from runoff before it enters the storm sewer system. Consider installing an oil separator in all high-traffic areas.
- ▶ Regularly maintain oil separators to keep them functioning as intended.
- ▶ Regularly clean each separator chamber. Failure to do so will cause previously trapped pollutants to be resuspended and they will then be discharged with otherwise clean stormwater.

- ▶ Use this method to devise an appropriate cleaning schedule: Inspect the separator after each of several rain events and note the change in depth of collected residue. You can estimate how many rain events must occur before the separator would be full. At a minimum, separators should be cleaned twice a year. Continue to inspect separators regularly to ensure that the cleaning schedules you have estimated are adequate.
- ▶ Replace dirty standing water with clean water to prevent oil from being washed out of the separator. Since this dirty water could be flammable, standing water that has been removed must be managed as a hazardous waste.
- ▶ If your separator has oil-absorbent pads, replace them in the spring, in the fall, and at other times, as needed. If your separator does not have oil-absorbent pads, consider installing them. With pads you might be able to reduce the need to clean out the entire oil separator as frequently.

Cleaning Products

- ▶ Never dump unused cleaning products onto pavement or down a storm drain!
- ▶ When you consider buying deicers, cleaners, cures, paints, or other chemical products, select the ones with the least hazardous chemicals necessary to get the job done.
- ▶ Ask your vendors for products that are less toxic than the products you use now.

Drains

- ▶ Identify every storm drain and stencil each one with the message “Dump No Waste—Drains to Bay” (or “... to Creeks”). This will inform employees and others that dumping wastes down these drains is not appropriate.

Repair and Maintenance

- ▶ Do not allow fresh concrete to be dumped onto a surface that drains to a storm drain or stream. Let unused concrete harden first, and then dispose of it with your construction debris.
- ▶ Wash concrete chutes, readymix trucks, wheelbarrows, handtools and other equipment in an area that will retain wash water while the concrete aggregate settles out.

- ▶ If you have no option but to direct wash water from a concrete pour to a storm drain, protect the drain inlet with a fabric bag. This will filter out the concrete after which the bag and its contents can be disposed of as construction material.
- ▶ Minimize concrete waste when constructing concrete aggregate driveways. Filter fine sediment out of finish water runoff by washing it to the side of the driveway, not down the driveway. If the driveway is sloped, place straw bales at the bottom apron, or divert flow to a temporary depression where sediment can collect and later be removed.

Subcontractors

- ▶ If you hire subcontractors to perform occasional maintenance work, require them to implement practices recommended in these BMPs whenever possible.

Vehicle and Equipment Maintenance

- ▶ Inspect all vehicles and heavy equipment frequently for leaks.
- ▶ Conduct all vehicle and equipment maintenance and refueling at one location away from storm drains, preferably on a paved surface under cover.
- ▶ Perform major maintenance, repair jobs, and vehicle and equipment maintenance at a properly equipped site.
- ▶ For unpaved lots, use gravel approach aprons where truck traffic is expected to be heavy. This will limit the tracking of dirt onto public streets.
- ▶ Use drip pans or drop cloths to catch drips and spills if you drain and replace motor oil, radiator coolant, or other fluids on site.
- ▶ Collect all used fluids, store them in separate containers by type, and recycle them whenever possible.
- ▶ Do not use diesel to lubricate equipment or parts.
- ▶ Use nontoxic cleaning products—baking soda paste for battery heads, cable clamps, and chrome; baking soda mixed with a mild, biodegradable dishwashing soap for wheels and tires; white vinegar or lemon juice mixed with water for windows.
- ▶ Perform maintenance activities in areas that are clearly marked for that purpose and that are designed to contain spills and leaks.
- ▶ Place pans or drip trays under any vehicle not in use for extended periods.

- ▶ Drain all fluids from equipment and vehicles kept in storage.
- ▶ Dispose of all waste materials properly.
- ▶ Conduct pressure washing of equipment on your site only if you are equipped to capture and properly dispose of all wash water. This area should be bermed to collect the wash water and graded to direct the wash water to a treatment facility. In addition, use high-pressure, low-volume water to reduce overspray.
- ▶ Avoid using acids or other harsh cleaning products and detergents that contain phosphates.

A7

Fueling Vehicles

- ▶ Design vehicle fueling areas so that spills are contained on site. These facilities should be designed to prevent runoff from carrying spills into storm drains or sanitary sewers.
- ▶ Equip drains for vehicle fueling areas with a valve, or have a drain plug or blocker available in the event of a large spill.
- ▶ Construct a roof over the fueling area to prevent rain from washing away spilled liquids.
- ▶ Keep absorbent materials on site for use in the prompt cleanup of spills.
- ▶ Post signs instructing people not to overfill fuel tanks.

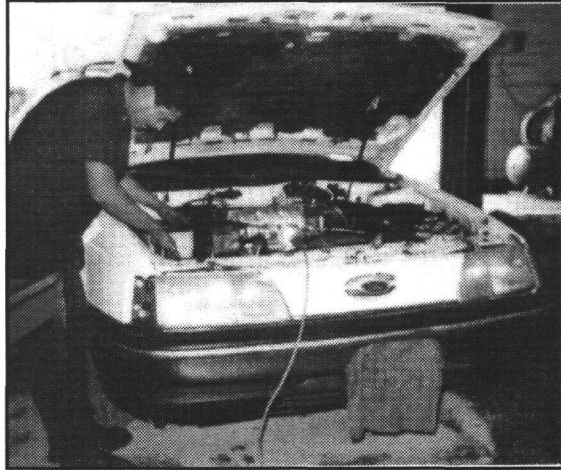
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APPENDIX 8

**BEST MANAGEMENT PRACTICES FOR
Vehicle Repair and Maintenance**



A8

Antifreeze

- ▶ Recycle antifreeze through a TNRCC-registered recycler. For more information on registered recyclers, call the Used Oil and Used Oil Filter Recycling Program at (512) 239-6695.
- ▶ If antifreeze is recycled on site determine by process knowledge or waste analysis if recycling wastes or by-products are considered hazardous wastes. For more information on managing used antifreeze, refer to TNRCC document RG-235, *Used Antifreeze (Used Coolant): Proper Management Practices*.
- ▶ Use two containers for segregating waste antifreeze from new or reusable antifreeze.
- ▶ Avoid mixing antifreeze with any other waste liquids.
- ▶ Do not pour antifreeze down storm drains, floor drains, or sewers.
- ▶ Never pour antifreeze on the ground.

Brake Fluid

- ▶ Collect brake fluid in containers clearly marked to indicate that they are dedicated to that purpose.

- ▶ Recycle brake fluid—which is considered used oil—through a TNRCC-registered recycler. For more information on registered recyclers, call the Used Oil and Used Oil Filter Recycling Program at (512) 239-6695.
- ▶ For more information on brake fluid recycling, refer to TNRCC document RG-256, *Used Oil Generators, Collection Centers, and Handlers*.
- ▶ If your waste brake fluid is hazardous, manage it appropriately and use only an authorized waste receiver for its disposal.

Batteries

- ▶ Send all batteries off site for recycling.
- ▶ Use longer-life batteries.

Carburetor Cleaner

- ▶ Use reformulated carburetor cleaner compound (without 1,1,1-trichloroethane).
- ▶ Use drip pans to collect excess cleaner and then pour the liquid into larger containers to allow solid particles to settle out. Reuse the clear, decanted liquid from the top of the larger containers.
- ▶ Consider off-site recycling—especially if you are a medium to large operation.

Oil Filters

- ▶ Drain oil filters completely—collect the drained oil for recycling.
- ▶ Recycle oil filters through a TNRCC-registered recycler. For more information on registered recyclers, call the Used Oil and Used Oil Filter Recycling Program at (512) 239-6695.
- ▶ For more information on oil filter recycling, refer to TNRCC document RG-257, *Used Oil Filter Generators, Collection Centers, and Handlers*.

Oils

(Including Motor, Transmission, and Hydraulic Oils)

- ▶ Segregate oils by type to aid in their reuse or recycling.
- ▶ Recycle used oil through a TNRCC-registered recycler. For more information on registered recyclers, call the Used Oil and Used Oil Filter Recycling Program at (512) 239-6695.
- ▶ For more information on used oil recycling, refer to TNRCC document RG-256, *Used Oil Generators, Collection Centers, and Handlers*.

A8

Painting

- ▶ Mix only the quantity of paint that is immediately needed.
- ▶ Use equipment with low overspray potential. Avoid unnecessary overspray.
- ▶ Use low air pressure and aim the spray gun perpendicular to the work piece to increase accuracy.
- ▶ Clean and lubricate parts regularly.
- ▶ Use a mechanical paint stripping system—such as plastic blast media—instead of solvents.
- ▶ Use a nonphenolic, nonacid stripper.
- ▶ Schedule jobs to reduce the number of times color or product changes are made so that equipment cleaning is minimized.
- ▶ Use a commercially available gun cleaning machine or use an off-site service.
- ▶ Use recyclable paint filters. Check state regulations on the use and disposal of filters.

Parts Cleaning

- ▶ Use mechanical cleaning methods, such as wire brushing, prior to using a parts cleaning sink.
- ▶ To reduce solvent hazards use an aqueous parts washer.

- ▶ If you use a solvent parts cleaning sink, consider leasing the sink from a service that will maintain the sink and dispose of the wastes.
- ▶ Allow parts to fully drain before reassembling them to reduce drippage to the floor.
- ▶ Locate parts cleaning sinks adjacent to work areas.
- ▶ Keep lids closed on parts cleaning sinks when they are not in use.

Rags

- ▶ Instead of cleaning your own rags, use a commercial laundry service.
- ▶ Use rags and absorbents to their limit before cleaning or disposing of them.
- ▶ Unless you have determined them to be otherwise, manage disposable rags as hazardous wastes.

Shop Cleaning

- ▶ Use dry cleaning methods such as absorbents, brooms, or wire brushes to clean work areas.
- ▶ Mechanically remove loose debris from the shop floor before washing it with water.
- ▶ Clean up sediments and other solids from your shop floor immediately to prevent them from blowing or washing away.
- ▶ Dispose of shop debris properly. To determine the proper disposal method, contact the facility that you expect to take the material to for disposal.
- ▶ Clean outside areas early in the day if heavy rains are forecast.

Solvents and Thinners

- ▶ Use solvents and thinners sparingly.
- ▶ Keep parts as clean as possible to avoid the need for cleaning.
- ▶ Use gravity separation of liquids from solids removed by solvents.
- ▶ Use on-site recycling equipment or use an off-site recycling service for reclaiming spent

solvents.

- ▶ Minimize the loss of solvents and thinners by keeping containers closed when not in use.

Spill Cleanup

- ▶ Use drip pans for leaking or dripping parts.
- ▶ Use clay absorbents to their absorbing limits.
- ▶ Avoid dripping solvents from rags, brushes, and cleaning wands. Use wringable pads and booms for large spills to recover spilled material.
- ▶ Try using lightweight synthetic absorbents.

A8

Catalytic Converters

- ▶ Although catalytic converters do not typically contain hazardous wastes, you can recycle them for precious metal recovery.

Caustic Sludges

- ▶ Dry, dewater, or separate oil from sludges and then dispose of the sludge cake as a hazardous waste.

Radiator Repair Waste Rinse Water

- ▶ Treat and reuse water-antifreeze mixtures that you drain from radiators before you begin repairing them.

Scrap Metal

- ▶ Recycle metal scrap generated during radiator repairs.

Transmission Filters

- ▶ Drain transmission filters of fluid thoroughly before disposing.

Used Tires

- ▶ Send spent tires to a recycling facility.

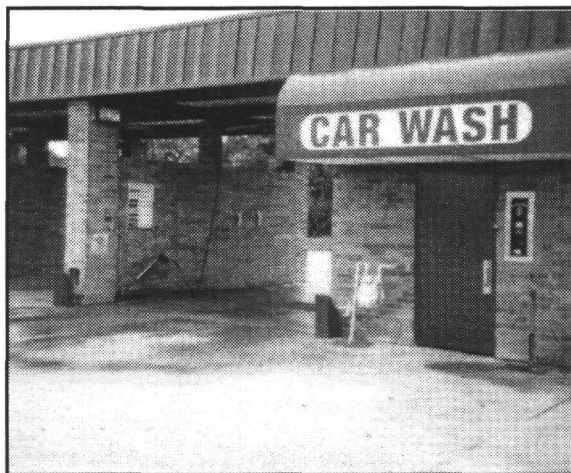
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APPENDIX 9

BEST MANAGEMENT PRACTICES FOR Vehicle Washing Facilities



A9

Facility Design and Operation

- ▶ Make sure that the drains at your facility are installed with grit traps and are routed through an oil separator.
- ▶ Keep vehicle owners from dumping liquids other than water or detergent down your drains—post signs with directions to recycling and reclaiming facilities.
- ▶ Provide trash bins for customers so that they can properly dispose of trash from their vehicles.

Closed Loop Washing and Rinsing System

- ▶ Recycle wash water and rinse water separately to reduce the amount of wastewater generated.
- ▶ Use wash water from the final wash step for the first wash step, which doesn't require clean wash water. Likewise, use final rinse water for the first rinse step, which doesn't require clean rinse water.

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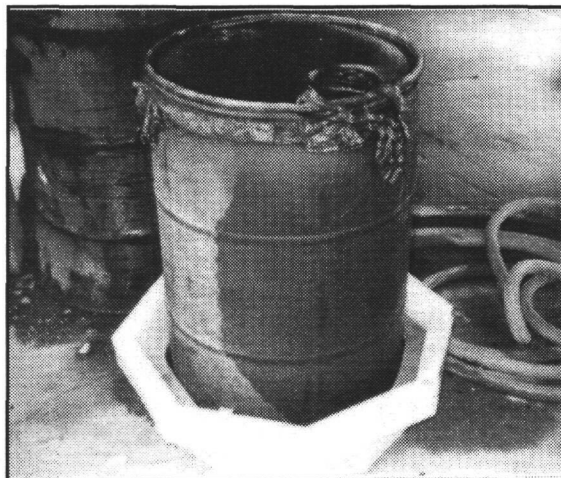
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APPENDIX 10

**BEST MANAGEMENT PRACTICES FOR
Drums and Barrels**



A10

Container Maintenance

- ▶ Keep containers in good condition, handle them carefully, and replace any leaking ones.
- ▶ Inspect containers for signs of leaks or corrosion every week.
- ▶ Make sure that containers are strong enough to contain the materials they are to hold. Line containers with materials that will not deteriorate under normal conditions of use.
- ▶ Use containers for outdoor storage that are watertight, rodentproof, and tamper-resistant.
- ▶ Keep products in the original containers that they were received in, if possible. If not, clearly label the replacement containers. Cover all labels with transparent tape to keep the labels from falling off or from becoming illegible.
- ▶ Keep containers closed except when you fill or empty them.
- ▶ Watch for indications that a drum or barrel is under pressure—such as swelling and bulging—which may result in a leak or rupture.

Spill Prevention

- ▶ Implement regular inspections of your site to look for leaks, recent container damage, or other potential causes of spills or leaks.
- ▶ Fill or drain containers only in an area that has a secondary containment system capable of containing the contents of the containers being filled or drained.
- ▶ Completely fence in your site. Lock your gates or provide for security when your facility is unattended.
- ▶ Turn off valves and spigots when you finish using a container—check for drips before leaving.

A10

- ▶ Provide enough lighting at your facility so that you can also identify spills at night. Lighting your facility will also will minimize the threat of vandalism.
- ▶ Store containers on a base that is chemically resistant to the container contents. The base must be leakproof, free of cracks or gaps, and have enough volume to contain the container contents, plus any rainfall that it may have to hold. It must be designed for ease of inspection so that leaks can be easily seen.
- ▶ The base of the container storage system should slope to a sump for collection of leaks, spills, or precipitation. Alternatively, you could store your containers on pallets to prevent them from being contacted by spilled liquids.
- ▶ Use this rule of thumb for your container storage area: The spill containment system should have sufficient capacity to contain 10 percent of the volume of all containers, or 100 percent of the volume of the largest container, whichever is greater.
- ▶ Prevent run-on into the containment system so that spilled liquids aren't washed out before you can remove them.
- ▶ Remove spilled or leaked liquids and accumulated precipitation from the sump or collection area promptly to prevent overflow of the collection system.
- ▶ Never leave a container unattended if it is being filled or drained.
- ▶ Use a funnel of proper size and material when transferring liquids from one container to another.
- ▶ Place spill collection trays under open containers and under the spouts of liquid storage containers.
- ▶ Stack containers in a way that minimizes the chance of tipping, puncturing, or breaking.

- ▶ Store drums on pallets to prevent concrete “sweating” that can cause corrosion.
- ▶ Maintain MSDSs that detail the correct responses to spill situations.
- ▶ Provide adequate lighting in storage areas.
- ▶ Maintain a clean, even floor surface in worker and vehicle traffic areas.
- ▶ Keep aisles clear of obstructions.
- ▶ Maintain sufficient distances between drums containing incompatible chemicals to prevent reactions in the event of a container leak.
- ▶ Maintain sufficient distances between drums containing different types of chemicals to prevent cross-contamination.
- ▶ Avoid stacking containers against process equipment.
- ▶ Insulate and inspect electric circuitry for corrosion and potential sparking.
- ▶ Use large containers instead of small containers whenever possible.

A10

Spills

- ▶ Equip floor drains with valves that can be closed in the event of a large spill. Regularly inspect these valves to ensure that they are functioning correctly.
- ▶ Specify cleanup instructions for each material that is handled on site, along with safety requirements and persons designated for spill response and cleanup.
- ▶ Make spill containment and cleanup kits easy to find and use. Conduct initial employee training with periodic refresher training.
- ▶ Contain the spill! If the spill might enter a drain, immediately close the control valve. If no valve is present, plug or cover the drain inlet (for example with a rubber mat). Turn off any automatic sumps.
- ▶ Cover a powder spill with plastic sheeting to keep it from dusting up or becoming airborne. If the powder will not react with water, you can contain it by covering it with wet paper towels or by using a light spray of water. You can then sweep or wipe up the wetted powder or paper towels easily. Dispose of the towels as if they were made of the same chemical as the powder.
- ▶ Remove spilled or leaked waste and accumulated precipitation from sumps or collection areas in as timely a manner as is possible to prevent overflow of the collection system.

A10

- ▶ If the spill is a liquid, cover it with an absorbent material that can be swept or scooped up. Sawdust or vermiculite are good for this purpose. Absorbent booms can be used to contain and soak up larger spills.
- ▶ Unless the material has a high flash point, avoid using emulsifiers and dispersants. The idea is to contain the spill—not scatter it. Similarly, do not use a hose or wet mop. Using water adds to the volume of the spill and spreads the material to a larger area.
- ▶ Report significant spills to the appropriate authorities immediately and get outside help if needed.
- ▶ Do not put rags that were used to soak up even nonhazardous spills in an uncovered container. Store them in a covered bin and send them to a professional cleaning service.
- ▶ If possible, connect drains to a dead-end holding tank—especially if your company manages hazardous chemicals or petroleum products. If you cannot drain the area to a holding tank, you may be able to drain it to the sanitary sewer system. Before allowing a spill to drain to the sanitary sewer, call your local wastewater treatment plant and make sure that it is okay.
- ▶ Maintain storage areas to keep any drainage from reaching your site's stormwater management system. If you are not sure where a drain goes to, contact your facility manager, local wastewater utility, or a plumber. If you're still not sure, have the drain dye-tested.
- ▶ Empty all drums and containers completely before cleaning or disposing of them to minimize the amount of waste you generate.
- ▶ Clean up spills on unpaved areas by digging up stained soil areas. Make sure to dispose of the contaminated soil properly.
- ▶ Use wringable pads or booms to recover spilled material. If this is not possible, use dry cleanup methods—such as sawdust, cat litter, or rags. Avoid hosing down dirty pavement or permeable surfaces where liquids have spilled.
- ▶ Use absorbents to their maximum capacity. For more information on using oil-absorbent pads refer to TNRCC document RG-237, *Used Oil Absorbents: Proper Management Practices*.

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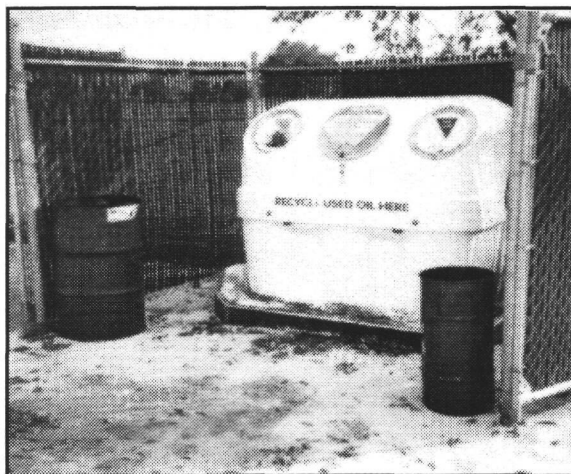
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A10

APPENDIX 11

BEST MANAGEMENT PRACTICES FOR Waste Fluids



A11

Waste Fluid Management

- ▶ Don't mix different types of waste fluids—store used oils, halogenated solvents, and antifreeze separately to allow for their recycling.
- ▶ Keep waste fluid containers protected from the weather.
- ▶ Label all waste fluid containers.
- ▶ Transfer all waste fluids using a funnel of proper size when transferring liquids from one container to another.
- ▶ Recycle all fluids to the maximum extent possible.
- ▶ Use properly designed tanks, containers, and vessels only for their intended purposes.
- ▶ Install overflow alarms on all tanks, containers, and vessels.
- ▶ Regularly inspect all tanks, containers, and vessels to ensure their physical integrity.
- ▶ Develop a written program for all loading, unloading, and transfer operations. Ensure that all employees are properly trained in the program's specific tasks.
- ▶ Install secondary containment areas or structures where waste fluids are managed.

- ▶ Forbid operators to bypass interlocks, alarms, or significantly alter setpoints without management authorization.
- ▶ Document all waste fluid spillage.

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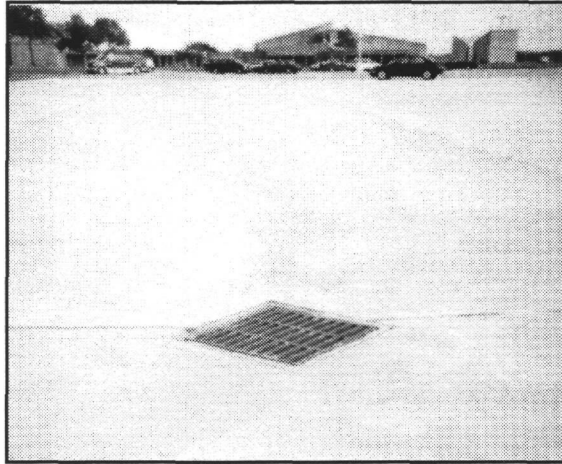
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A11

APPENDIX 12

BEST MANAGEMENT PRACTICES FOR Storm Drains



A12

Inspecting Grates and Basins

- ▶ Prevent pollution downstream of basins—regularly inspect for and remove debris that can block grates and lead to localized flooding.
- ▶ Inspect catch basins at least twice a year to see if they need cleaning.
- ▶ To find out how much material has accumulated in the storage area of your catch basin, insert a long, thin probe into the storm drain grate. Notice where the probe contacts the debris and continue probing to the bottom to estimate the depth of accumulation.

Cleaning Basins

- ▶ Catch basins should be cleaned out before the storage area is half full. After this level is reached, solids begin washing out of the basin.
- ▶ Cleaning should be done in the spring, in the fall, after trees have shed their leaves, and at other times as needed.
- ▶ If the catch basin is shallow enough, you may be able to clean it out yourself with a shovel and bucket. Be careful not to drop the basin's cover down the opening when you remove it—it can be extremely hard to retrieve. If you cannot perform your own maintenance, professional services are available to do it for you.

Disposing of Excavated Materials

- ▶ Solids removed from catch basins may contain high levels of pollutants such as oils, metals, chemicals, and nutrients. To determine how to properly dispose of these solids, contact the waste disposal facility to where they will be sent. Hiring a professional service to maintain your catch basins can help to ensure that solid wastes are handled properly.

Stenciling Drains

- ▶ Stenciled messages that say “Dump No Waste—Drains to Bay” are a good reminder that nothing but water belongs down a storm drain.

Maintaining Detention Systems

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- ▶ Maintain thick, native vegetation around ponds to slow down and filter stormwater. Avoid mowing surrounding vegetation completely to the water’s edge.
- ▶ Regularly remove accumulated sediment and debris from the bottom of detention ponds, especially around outflow control devices.
- ▶ Regularly check and clean sedimentation basins to ensure that they have enough storage volume to function properly.
- ▶ Inspect the entire system at least once a year. If possible, inspections should be carried out by a licensed engineer.
- ▶ Immediately repair or replace any damaged or defective structural components

Weed and Algae Control

- ▶ Herbicides and algicides that are used to control plant growth in ponds can pollute both retention ponds and downstream waters. Alternatively, algae and aquatic plant growth can be controlled by limiting the input of nutrients (such as fertilizers, leaves, and lawn clippings) and providing oxygen by aerating the pond.

Maintenance Plans

- ▶ To properly maintain your drainage system, first prepare a list of all stormwater system components (some components are not so evident, such as access ways and vegetated buffer areas).

- ▶ Next, detail the routine and nonroutine inspections that should be conducted for each component within the system. A licensed engineer should be retained to inspect structural facilities and to conduct emergency inspections.
- ▶ Prepare a list of the tasks required to maintain each component of the stormwater management system and a schedule for completing these tasks. This list should include both preventive and corrective activities.
- ▶ Define the party responsible for performing each of the maintenance activities described.
- ▶ Prepare a description of ongoing landscape maintenance needs, including soil erosion control.

Fueling Vehicles

- ▶ Design vehicle fueling areas so that spills are contained on site. These facilities should be designed to prevent runoff from carrying spills into storm drains or sanitary sewers.
- ▶ Equip drains for vehicle fueling areas with a valve, or have a drain plug or blocker available in the event of a large spill.
- ▶ Construct a roof over the fueling area to prevent rain from washing away spilled liquids.
- ▶ Keep absorbent materials on site for use in the prompt cleanup of spills.
- ▶ Post signs instructing people not to overfill fuel tanks.

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APPENDIX 13

BEST MANAGEMENT PRACTICES FOR Open-Lot Operations and Storage



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General Business Practices

- ▶ Grade your open lot during dry weather. This will help to prevent soil erosion and minimize the runoff of chemicals from exposed materials and containers.
- ▶ Use as little water as possible for dust control on unpaved areas.

Vehicle and Equipment Maintenance

- ▶ Inspect all vehicles and heavy equipment frequently for leaks.
- ▶ Conduct all vehicle and equipment maintenance and refueling at one location away from storm drains, preferably on a paved surface under cover.
- ▶ Perform major maintenance, repair jobs, and vehicle and equipment maintenance at a properly equipped site.
- ▶ For unpaved lots, use gravel approach aprons where truck traffic is expected to be heavy. This will limit the tracking of dirt onto public streets.
- ▶ Use drip pans or drop cloths to catch drips and spills if you drain and replace motor oil, radiator coolant, or other fluids on site.

- ▶ Collect all used fluids, store them in separate containers by type, and recycle them whenever possible.
- ▶ Do not use diesel to lubricate equipment or parts.
- ▶ Use nontoxic cleaning products—baking soda paste for battery heads, cable clamps, and chrome; baking soda mixed with a mild, biodegradable dishwashing soap for wheels and tires; white vinegar or lemon juice mixed with water for windows.
- ▶ Perform maintenance activities in areas that are clearly marked for that purpose and that are designed to contain spills and leaks.
- ▶ Place pans or drip trays under any vehicle not in use for extended periods.
- ▶ Drain all fluids from equipment and vehicles kept in storage.
- ▶ Dispose of all waste materials properly.
- ▶ Pressure-wash equipment on your site only if the site is equipped to capture and properly dispose of all wash water. This area should be bermed to collect the wash water and graded to direct the wash water to a treatment facility. In addition, use high-pressure, low-volume water to reduce overspray.
- ▶ Avoid using acids or other harsh cleaning products and detergents that contain phosphates.

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Fueling Vehicles

- ▶ Design vehicle fueling areas so that spills are contained on site. These facilities should be designed to prevent runoff from carrying spills into storm drains or sanitary sewers.
- ▶ Equip drains for vehicle fueling areas with a valve, or have a drain plug or blocker available in the event of a large spill.
- ▶ Construct a roof over the fueling area to prevent rain from washing away spilled liquids.
- ▶ Keep absorbent materials on site for use in the prompt cleanup of spills.
- ▶ Post signs instructing people not to overfill fuel tanks.

Recycle

- ▶ Recycle what you must: oil and batteries.
- ▶ Recycle what you can: metal, water-based paints, used tires, paper and cardboard, glass, aluminum, and tin.

Erosion Prevention

- ▶ Revegetate any areas that have been cleared, graded, or excavated and that would otherwise leave soil exposed.
- ▶ Avoid excavation and grading activities during wet weather.
- ▶ Construct diversion dikes to channel runoff around the site.
- ▶ Line channels with grass or roughened pavement to reduce runoff velocity.
- ▶ Cover stockpiles and excavated soil with secured tarps or plastic sheeting.
- ▶ Remove existing vegetation only when absolutely necessary.
- ▶ Conduct large projects in phases to effectively coordinate erosion control measures.
- ▶ Consider planting temporary vegetation for erosion control on slopes or where construction is not immediately planned.
- ▶ Plant permanent vegetation as soon as possible, once excavation and grading activities are complete.

A13

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APPENDIX 14

BEST MANAGEMENT PRACTICES FOR Construction Sites



A14

Coordination of Site Controls

- ▶ You should always precede groundbreaking activities at your construction site with the installation of erosion and sedimentation controls. Include erosion and sedimentation control measures as key elements of every construction project.

Surface Stabilization

- ▶ To stabilize a bare soil, apply a protective blanket of straw (or other plant residue), a layer of gravel, or a sheet of synthetic material. This will break the force of each raindrop, reduce runoff, and foster the establishment of vegetation.
- ▶ Establish perennial vegetative cover with seed to minimize runoff, erosion, and sediment yield on disturbed areas. Disturbed soils typically require amendment with lime, fertilizer, and roughening. Seeding should be done in combination with mulching.
- ▶ You can place a layer of stones to protect and stabilize areas subject to erosion. This feature also works well for slopes subject to seepage, or for areas with poor soil structure.
- ▶ Consider using stone riprap on slopes where vegetation cannot be established, such as channel slopes and bottoms, stormwater structure inlets and outlets, and shorelines.

- ▶ Roughen bare, sloped soil surfaces with horizontal grooves or benches in a direction perpendicular to the slope. This will aid in the establishment of vegetative cover, improve water infiltration, and decrease runoff velocity.
- ▶ Establish sodding for permanent stabilization of exposed areas by laying a continuous cover of grass sod. Sod is useful for providing immediate cover in steep critical areas, and in areas unsuitable for seed, such as flowways and around inlets.
- ▶ Preserve, and subsequently reuse, the upper, biologically active layer of topsoil. Stockpiled topsoil should be contained with sediment barriers and temporarily seeded for stability.
- ▶ Construct a temporary gravel apron where vehicles enter and leave your construction site. This provides a buffer area where vehicles can drop their mud and sediment to avoid transporting it onto public roads. It also acts to control erosion from surface runoff and helps in controlling dust.

Runoff Conveyance Measures

A14

- ▶ Plan ahead. Try to establish vegetation in swales or other channels before rainfall events occur.
- ▶ Instead of a vegetated channel, you might construct a hardened channel to convey stormwater at your construction site. This requires the placement of erosion-resistant linings of riprap, paving, or other structural material. Hardened channels replace grass-lined channels where conditions are unsuitable for the latter, such as areas with steep slopes, prolonged flows, potential for traffic damage, erodible soils, or design velocities over 5 feet per second.
- ▶ An alternative to vegetated or hardened channels that you might consider is the use of flexible tubing or conduit. Using this method, you can temporarily route concentrated stormwater flows down the slope face of a channel without causing erosion. Some structure may be required, however, at the outlet bottom, where washout of the receiving channel will be a concern.

Outlet Protection

- ▶ Use a level spreader (an outlet designed to convert concentrated runoff to sheet flow) to “fan out” stormwater uniformly across a slope without causing erosion. Additional erosion control at the outlet of a channel or conduit can be achieved by using an outlet stabilization structure to dissipate flow energy and reduce flow velocity.

Sediment Traps and Barriers

- ▶ Protect stormwater inlets from sediment buildup early on in the project life. Use block and gravel inlet protection—this feature uses standard concrete blocks and gravel to form a barrier around the storm drain inlet, thus acting to prevent sediment from entering the inlet.
- ▶ Alternatively, use a design eliminating the concrete blocks—place a gravel-and-chicken wire doughnut around the inlet.
- ▶ You can protect drop inlets by temporarily excavating an area around a storm drain drop inlet or curb inlet. This feature will trap sediment before the stormwater reaches the inlet. However, you must maintain this structure frequently by removing sediment from the excavation.
- ▶ Place a temporary fabric barrier around your drop inlet to prevent sediments from entering the storm drain.
- ▶ You can retain sediment from small disturbed areas by anchoring filter fabric in soil and supporting it by stakes or straw bales anchored to the ground. These silt fences can cause temporary ponding, so sufficient storage area and overflow outlets should be provided. Silt fence ends also must be well anchored.
- ▶ Some construction sites are large enough to require a sediment trap. This small, temporary ponding basin is formed by an embankment or excavation, and is designed to capture sediment carried by runoff from the site. It is important to remember to protect embankments from possible slope failure that could occur if runoff events exceed the design capacity for the project.
- ▶ To ensure the proper functioning of sediment traps and barriers, maintain them regularly by cleaning and regrading, if necessary.
- ▶ A low-gradient vegetated area (vegetated filter strip, or VFS) can be used to filter solids from overland sheet flow. VFSs can be either natural or planted and should have relatively flat slopes. If vegetated, they use densely stalked, herbaceous, erosion-resistant plants—thick grasses, for example.

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Stream Protection

- ▶ Your project might require the crossing of a stream or water course with construction vehicles. In that case, you'll need to construct a temporary structure such as a bridge or ford.

- ▶ You should avoid the construction of stream crossing structures if possible since they are direct sources of water pollution, they can contribute to flooding, and they are expensive to construct.
- ▶ If you have no alternative but to build a stream crossing structure, a bridge is the preferred method because it results in the least disturbance to streambeds, banks, and surrounding floodplain during construction. A bridge also results in the least obstruction to streamflow and presents the least erosion potential to the streambed.
- ▶ A culvert crossing is the most common form of stream crossing structure. A culvert can cause significant damage to the stream environment, restrict streamflow, and result in the most erosion among alternative methods.
- ▶ A ford can be constructed by making a cut in the stream bank and placing stone over filter cloth directly in the streambed. A ford is often used for a steep streambed where normal streamflow is shallow.

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APPENDIX 15

BEST MANAGEMENT PRACTICES FOR Grounds Maintenance



Soil Foundation

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- ▶ Have the pH and fertility of your soil tested. Your soils may not require any fertilizer. If fertilizer is required, follow the recommendations on the container.
- ▶ Test your soil for degree of compaction. Relatively well-compacted soils are unhealthy for plants and can convey as much runoff as pavement. To test for degree of soil compaction, try advancing a screwdriver into the ground without pounding. If the screwdriver does not penetrate easily, the soil is relatively well compacted.
- ▶ Aerate well-compacted soil with a hand or mechanical corer. Do not use spike-type rollers: these actually make compaction worse.
- ▶ Examine soil texture and drainage. Neither very sandy nor heavy clay soils provide a good foundation for lawns or other plantings. To examine soil texture, squeeze a handful of soil into a ball. If the soil remains in a clump, it has too much clay. In general, soil with a good texture will stay somewhat spongy.
- ▶ If the soil is too sandy, add compost or other organic matter to hold nutrients and prevent leaching.
- ▶ If the soil has too much clay, add organic matter and sandy loam for coarseness. Mixing sand with clay will produce a soil similar to concrete.

Watering

- ▶ Adjust timers on automatic sprinkler systems every week or so, depending on the weather.
- ▶ Avoid overspray onto impermeable surfaces.

Watching Your Landscape

- ▶ Monitor your site at regular intervals.
- ▶ Learn to identify pests and diseases, as well as beneficial insects. For each category of insect, become familiar with their development stages and what they need to survive. This way you can time your actions so that they take place during the most critical stages of weed, insect, or disease development.
- ▶ Consider whether your site is near a water body, a dry pond, or drainage ditch. If it is, select a pest management technique that minimizes harm to these sensitive areas.
- ▶ Maintain irrigation systems by repairing leaks, broken heads, and risers, as well as adjusting application patterns and rates to minimize runoff.
- ▶ Plant seeds and plants when they are least susceptible to stress.
- ▶ Maintain a variety of plants instead of only one or two species.
- ▶ Aerate and add organic matter to the soil.
- ▶ Water and fertilize plants only as needed.
- ▶ Mow grass as high as possible and leave clippings on the lawn.

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Composting

- ▶ Consider installing a compost facility at your business site.
- ▶ If you are a landscaping contractor, encourage your clients to compost as well.
- ▶ Be sure to locate your compost area so that it does not leach into a stream or storm drain.
- ▶ If you do not compost on site, try to take your plant waste to a municipal composting facility.

Integrated Pest Management

- ▶ Integrated pest management (IPM) recognizes that pests are an integral part of the natural system, and works to keep them at tolerable levels by using cultural, mechanical, and biological controls instead of chemicals.
- ▶ When pest controls are needed, identify the pest and its stage of development, and use the least toxic control possible.
- ▶ Work to eliminate conditions favorable to pests and to promote natural controls such as beneficial insects.
- ▶ When treatment becomes necessary, select methods that are least disruptive to natural pest controls and least hazardous to human health and the environment. Start with cultural, mechanical, or biological controls.
- ▶ Space, thin, and prune shrubs and trees to promote air circulation. This is the most important thing that can be done to manage plant disease.
- ▶ Cultural controls are practices that will keep plants healthy, such as selecting disease- and pest-resistant varieties and maintaining a good soil foundation. Redesigning the landscape so that it doesn't provide any support for the pest can be the most cost-effective long-term cultural control strategy.
- ▶ Mechanical controls include
 - removing insect eggs, larvae, cocoons, and adults from plants by hand;
 - removing weeds by pulling or hoeing;
 - covering the garden with landscape fabric or mulch to prevent weed germination;
 - removing pest-infested plant residue in the fall.
- ▶ Many organisms feed on or infect pests. These natural enemies frequently prevent the pest population from reaching damaging levels. Biological controls include predators, parasites, pathogens, pheromones, and juvenile hormones. For more information about these and other chemical-free control techniques, contact your local county extension agent.

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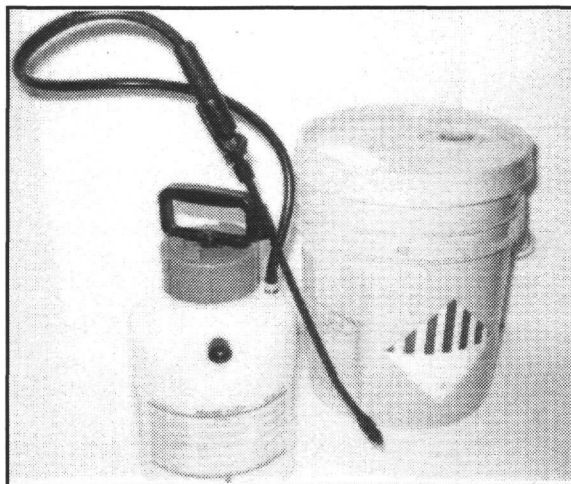
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APPENDIX 16

BEST MANAGEMENT PRACTICES FOR Pesticide and Herbicide Applicators



Pesticide and Herbicide Management Planning

- ▶ Develop a pesticide and herbicide plan for each landscape that your business is responsible for maintaining.
- ▶ List specific uses for selected pesticides and herbicides.
- ▶ Make a chart containing brands, formulations, application methods, and quantities to be used for each location.
- ▶ Monitor equipment use and maintenance procedures at each location.
- ▶ Implement safety, storage, and disposal methods for pesticides and herbicides used at each location.
- ▶ Implement monitoring, record-keeping, and public notice procedures for pesticides and herbicides used.
- ▶ Establish procedures for reviewing pesticide and herbicide plans annually. Be sure to evaluate the effectiveness of all treatments used, public concerns, effects on sensitive areas, and any recent toxicological information.
- ▶ Schedule treatments that must take place during the most vulnerable stage in the pest's life cycle, and when they are least disruptive to naturally existing pest controls.

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- ▶ Apply pesticides and herbicides to the problem area only, versus wholesale application over a wider area.
- ▶ Once an application is made, evaluate its effectiveness.
- ▶ Immediately triple-rinse or power-rinse empty containers in the field at the time of application.

Weatherproofing Pesticides and Herbicides in Storage

- ▶ Pesticides and herbicides, as potential pollutants, should be stored indoors, unless doing so will increase risks to health and safety. Indoor storage is preferred because it prevents containers from weathering, keeps precipitation out, and prevents spills directly to the ground.
- ▶ If you must store pesticides or herbicide outside, construct a covered, paved area designed to contain leaks and spills.
- ▶ If covering and paving of outside storage areas is not possible, place each primary container within a large, leakproof container.
- ▶ You might consider converting an existing room into a secure containment area as a low-cost recommendation for storing pesticides or herbicides.
- ▶ Prevent runoff from entering or leaving the room by making sure that cracks in floors and corners are completely sealed and that door sills are high enough to contain any materials that could spill.
- ▶ If the containment area is located within a larger room or outdoors, construct an impermeable berm around it. Since liquids escaping from punctured containers must be contained, make sure that the area is designed (and that containers are placed) in a way that will prevent any liquids that might squirt out from leaving the area.

A16

Pesticide and Herbicide Application

- ▶ Know what to do if spills occur, but take all possible steps to prevent them. For example, close containers tightly after each use, even if you plan to reopen them soon. Be sure to have adequate cleanup materials readily available.
- ▶ Mix pesticides and herbicides where spills will not be able to soak into the ground or enter a storm drain or stream. When using large tank sprayers, mix only the amount needed at the job site.
- ▶ Calibrate equipment frequently and be aware of weather conditions that can cause drift.

- ▶ Use application equipment that can be shut off immediately in an emergency.
- ▶ Follow the label directions exactly. Never use rough estimates when mixing or applying pesticides or herbicides.
- ▶ Never mix different pesticides or herbicides unless explicitly instructed to do so on the product label.

Cleaning Equipment

- ▶ Always wear protective clothing when handling pesticides or herbicides.
- ▶ Immediately triple-rinse or power-rinse empty containers in the field at the time of application.
- ▶ Triple rinsing is carried out in these steps:
 1. Allow the concentrate to drain from the empty pesticide or herbicide container for 30 seconds.
 2. Fill 20 percent of the container with water, replace the lid, and shake the container so that all interior surfaces are rinsed.
 3. Drain the rinse water into the spray tank, allowing it to drain for at least 30 seconds.
 4. Repeat Steps 2 and 3 two more times.
 5. Use the rinse water (or “rinseate”) according to label directions.
- ▶ Keep your equipment free of leaks to prevent pesticides, herbicides, and other fluids from being unintentionally deposited onto the ground.
- ▶ Clean equipment as soon as you have finished using it—do not leave equipment that contains pesticide or herbicide residue at the mixing, loading, or application site. You can reduce equipment cleaning by clustering jobs that use the same spray solution.

A16

Waste Rinse Water

- ▶ Never allow storage areas to drain to any part of a stormwater management system.
- ▶ If you are not sure where a drain goes to, contact your facility manager, local wastewater utility, or a plumber. If you're still not sure, have the drain dye-tested.
- ▶ Do not allow rinse water to flow into water systems, including storm drains, ditches, wells, and streams.
- ▶ Collect rinse water and apply it to a compatible site at or below the labeled rate.
- ▶ Do not add rinse water to a pesticide or herbicide mix if it could be incompatible with the mix or if it contains a cleaning agent that could harm plants and animals.

Discarded Raw Material Containers

- ▶ Regularly inspect storage facilities to make sure that unused materials do not accumulate.
- ▶ Identify and properly dispose of unusable materials, including those abandoned by previous property owners
- ▶ Be sure to dispose of containers in accordance with the label directions and with federal, state, and local laws.
- ▶ If empty pesticide or herbicide containers cannot be refilled, reconditioned, recycled, or returned to the manufacturer, then promptly crush, break, or puncture them so that they cannot be reused.

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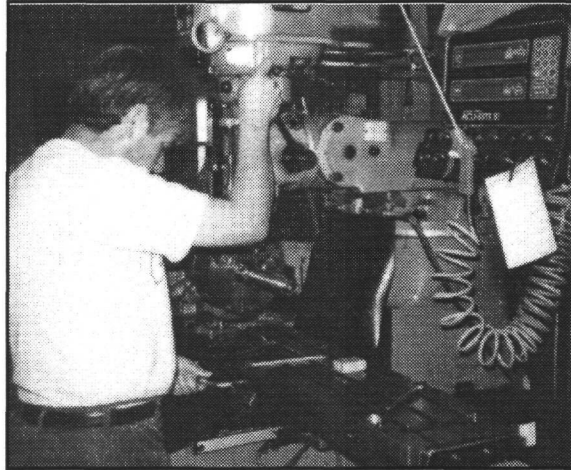
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APPENDIX 17

**BEST MANAGEMENT PRACTICES FOR
Machine Shops and Engine Repair**



Materials Handling—General

- ▶ Assign one employee responsibility for all material control.
- ▶ If possible, computerize your inventory system.
- ▶ Inspect incoming material containers immediately for damage.
- ▶ Implement and enforce an automatic return policy for damaged or unused products.
- ▶ Protect stored materials from damage and contamination.
- ▶ Inspect inventory on a timely basis for leaks.
- ▶ Periodically check date-sensitive products.
- ▶ If your facility captures air conditioning leaks, be sure to follow EPA guidelines for collecting and managing the refrigerant.

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Materials Handling—Antifreeze

- ▶ Recycle through a TNRCC-registered recycler. For more information on registered recyclers, call the Used Oil and Used Oil Filter Recycling Program at (512) 239-6695.
- ▶ For more information on antifreeze recycling, refer to TNRCC document RG-235, *Used Antifreeze (Used Coolant): Proper Management Practices*.
- ▶ If antifreeze is recycled on site recognize that recycling wastes and byproducts may be considered hazardous wastes.
- ▶ Use two containers for segregating waste antifreeze from new or reusable antifreeze.
- ▶ Do not mix antifreeze with any other waste liquids.
- ▶ Do not pour antifreeze down storm drains, floor drains, or sewers.
- ▶ Never pour antifreeze on the ground.

Materials Handling—Brake Fluid

- ▶ Recycle brake fluid (considered used oil) through a TNRCC-registered recycler. For more information on registered recyclers, call the Used Oil and Used Oil Filter Recycling Program at (512) 239-6695.
- ▶ For more information on brake fluid recycling, refer to TNRCC document RG-256, *Used Oil Generators, Collection Centers, and Handlers*.
- ▶ Collect brake fluid in containers clearly marked to indicate that it is dedicated to that purpose.
- ▶ If your waste brake fluid is hazardous, manage it appropriately and use only an authorized waste receiver for its disposal.
- ▶ If your waste brake fluid is nonhazardous, determine from your local solid waste collection provider what should be done for its proper disposal.
- ▶ Do not mix brake fluid with spent motor oil.
- ▶ Do not pour brake fluid down drains or onto the ground.

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Parts Cleaning—Solvents

- ▶ Use parts cleaning solvents only for their intended purpose.
- ▶ Establish guidelines as to when solvents are used for parts cleaning.
- ▶ Use solvent sinks instead of pails or dunk buckets.
- ▶ Locate solvent sinks near service bays where parts are removed for repair.
- ▶ Drain parts cleaned with solvents inside the sink for a few minutes to minimize the dripping of solvent residue onto the shop floor.
- ▶ Carefully place parts into the solvent bath to prevent splashing of solvent onto the shop floor.
- ▶ Keep all solvent sinks and buckets covered when not in use to minimize evaporation or spill potential.
- ▶ Lease solvent sinks from a service firm that specializes in the proper installation, use, and maintenance of solvent sinks.
- ▶ Use only a registered waste reclaimer or hauler to collect dirty solvent for recycling or treatment.

Parts Cleaning—Aqueous Cleaners

A17

- ▶ If an aqueous cleaner is used, use precleaning methods such as scraping or wire brushing to reduce the loading on the aqueous cleaner.
- ▶ If using caustic-based cleaning solutions consider switching to detergent-based cleaners.
- ▶ Pre-rinse dirty engine parts in a first tank of dirty cleaning solution to remove gross amounts of grime before transferring to a clean tank for final cleaning and rinse.
- ▶ Routinely monitor solution composition and make adjustments if necessary.
- ▶ Routinely remove sludge and solids from the solution tanks.
- ▶ Screen sludge and solids out before they reach the waste sump.
- ▶ Install still rinses or convert free running rinses to still rinses. This water can be used as make-up to the cleaner bath.
- ▶ Use demineralized water for the cleaning bath make-up.

- ▶ Use a cleaning tank with an agitator, preferably mechanical rather than air agitation.
- ▶ Use a service firm that specializes in the proper installation, use, and maintenance of aqueous waste treatment equipment.

Shop Cleaning

- ▶ Use dry cleaning methods such as absorbents, brooms, or wire brushes to clean work areas.
- ▶ Mechanically remove loose debris from the shop floor before washing it with water.
- ▶ Clean up sediments and other solids from your shop floor immediately to prevent them from blowing or washing away.
- ▶ Dispose of shop debris properly. To determine the proper disposal method, contact the facility that you expect to take the material to for disposal.
- ▶ Clean outside areas early in the day if heavy rains are forecast.

Recycling

A17

- ▶ Recycle what you must: oil, refrigerants, and batteries.
- ▶ Recycle what you can: metal, used tires, paper and cardboard, glass, aluminum, and tin.

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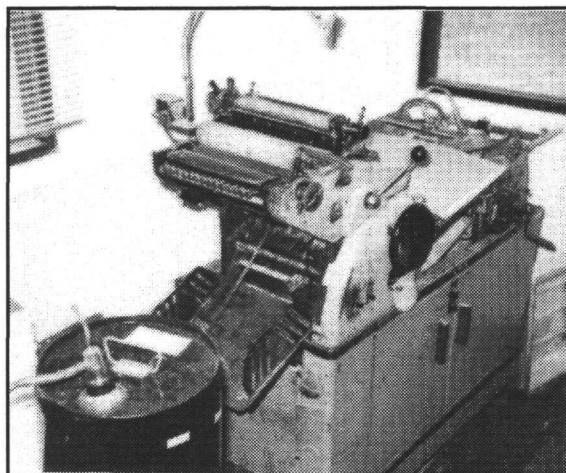
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APPENDIX 18

BEST MANAGEMENT PRACTICES FOR Print Shops



Material Handling

- ▶ Keep all stored materials segregated by physical characteristics—paper stock, inks, etc.
- ▶ Purchase materials that are packaged in reusable or recyclable containers.
- ▶ Return empty containers to suppliers for deposit credit.
- ▶ Label all containers and process tanks properly to minimize misuse and contamination.
- ▶ Stack containers in accordance with manufacturers' instructions. Stacking instructions are designed to prevent container collapse from excessive weight or improper weight distribution. Container collapse can cause leaks or spills if the contents are liquid.

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Production Line

- ▶ Substitute nonhazardous materials for hazardous materials where possible.
- ▶ Mix only the quantity of material required to fill an order.
- ▶ Recover oils, solvents, and other cleaning materials for recycling or reclaiming.
- ▶ Perform regularly scheduled maintenance to prevent leaks and prolong equipment life.

- ▶ Separate recyclable materials from waste materials.
- ▶ Implement a collection system for recoverable materials.
- ▶ Educate employees about source separation, waste minimization, and recycling. Encourage employees to contribute ideas for the recycling program.

Leaks and Spills

- ▶ Collect and reclaim spilled or leaked materials.
- ▶ Routinely inspect and maintain valves, pipe joints, pumps, and tanks for leaks. Promptly repair or replace leaking equipment.
- ▶ Use seal-less pumps.
- ▶ Use oil-absorbent pads, rather than granulated absorbents, to collect oil spills and leaks. Reclaim both the pads and the used oil.
- ▶ Install spill basins or dikes in storage areas.
- ▶ Install splash guards and drip boards on tanks and faucets.
- ▶ Install overflow control devices on process and storage tanks.
- ▶ Specify welded pipe joints instead of threaded joints, which can leak.

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Cleaning and Degreasing

- ▶ Use dry and nonsolvent cleaning procedures when feasible.
- ▶ Use counter-current cleaning methods where possible—that is, use dirty solvent for initial cleaning and clean solvent for final cleaning.
- ▶ Dedicate process equipment to a single product where feasible to reduce the number of cleanups.
- ▶ Recover spent solvent.
- ▶ Avoid cross-contamination of cleaners. Extend the life of cleaners through filtration and replenishment.
- ▶ Increase drain times for parts before and after washing to reduce dragout losses.

Water Use and Conservation

- ▶ Use high-pressure washing equipment to reduce the amount of wastewater generated.
- ▶ Use a centrifuge or cyclone to remove paint solids from water arrestor holding tanks. This can reduce the need for water replacement.
- ▶ Install flow control valves.
- ▶ Measure water inflow and outflow rates from each unit process to control water usage.
- ▶ Reuse clean or contaminated water where possible.

Spill Prevention

- ▶ Implement regular inspections of your site to look for leaks, recent container damage, or other potential causes of spills or leaks.
- ▶ Fill or drain containers only in an area that has a secondary containment system capable of containing the contents of the containers being filled or drained.
- ▶ Completely fence in your site. Lock your gates or provide for security when your facility is unattended.
- ▶ Turn off valves and spigots when you finish using a container—check for drips before leaving.
- ▶ Provide enough lighting at your facility so that you can also identify spills at night. Lighting your facility will also minimize the threat of vandalism.
- ▶ Store containers on a base that is chemically resistant to the container contents. The base must be leakproof, free of cracks or gaps, and have enough volume to contain the container contents, plus any rainfall that it may have to hold. It must be designed for ease of inspection so that leaks can be easily seen.
- ▶ The base of the container storage system should slope to a sump for collection of leaks, spills, or precipitation. Alternatively, you could store your containers on pallets to prevent them from being contacted by spilled liquids.

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- ▶ Use this rule of thumb for your container storage area: The spill containment system should have sufficient capacity to contain 10 percent of the volume of all containers, or 100 percent of the volume of the largest container, whichever is greater.
- ▶ Prevent run-on into the containment system so that spilled liquids aren't washed out before you can remove them.
- ▶ Remove spilled or leaked liquids and accumulated precipitation from the sump or collection area promptly to prevent overflow of the collection system.
- ▶ Never leave a container unattended if it is being filled or drained.
- ▶ Use a funnel of proper size and material when transferring liquids from one container to another.
- ▶ Place spill collection trays under open containers and under the spouts of liquid storage containers.

Spills

- ▶ Equip floor drains with valves that can be closed in the event of a large spill. Regularly inspect these valves to ensure that they are functioning correctly.
- ▶ Specify cleanup instructions for each material that is handled on site, along with safety requirements and persons designated for spill response and cleanup.
- ▶ Make spill containment and cleanup kits easy to find and use. Conduct initial employee training with periodic refresher training.
- ▶ Contain the spill! If the spill might enter a drain, immediately close the control valve. If no valve is present, plug or cover the drain inlet (for example, with a rubber mat). Turn off any automatic sumps.
- ▶ Cover a powder spill with plastic sheeting to keep it from dusting up or becoming airborne. If the powder will not react with water, you can contain it by covering it with wet paper towels or by using a light spray of water. You can then sweep or wipe up the wetted powder or paper towels easily. Dispose of the towels as if they were made of the same chemical as the powder.
- ▶ Remove spilled or leaked waste and accumulated precipitation from sumps or collection areas in as timely a manner as is possible to prevent overflow of the collection system.

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- ▶ If the spill is a liquid, cover it with an absorbent material that can be swept or scooped up. Sawdust or vermiculite are good for this purpose. Absorbent booms can be used to contain and soak up larger spills.
- ▶ Unless the material has a high flash point avoid the use of emulsifiers and dispersants. The idea is to contain the spill—not scatter it. Similarly, do not use a hose or wet mop. Using water adds to the volume of the spill and spreads the material to a larger area.
- ▶ Report significant spills to the appropriate authorities immediately and get outside help if needed.
- ▶ Do not put rags that were used to soak up even nonhazardous spills in an uncovered container. Store them in a covered bin and send them to a professional cleaning service.
- ▶ If possible, connect drains to a dead-end holding tank—especially if your company manages hazardous chemicals or petroleum products. If you cannot drain the area to a holding tank, you may be able to drain it to the sanitary sewer system. Before allowing a spill to drain to the sanitary sewer, call your local wastewater treatment plant and make sure that it is okay.
- ▶ Maintain storage areas to keep any drainage from reaching your site’s stormwater management system. If you are not sure where a drain goes to, contact your facility manager, local wastewater utility, or a plumber. If you’re still not sure, have the drain dye-tested.
- ▶ Empty all drums and containers completely before cleaning or disposing of them to minimize the amount of waste you generate.

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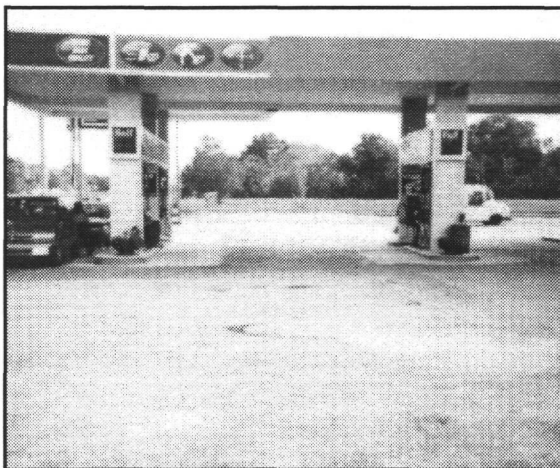
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APPENDIX 19

BEST MANAGEMENT PRACTICES FOR Service Stations



Cleaning Work Sites

- ▶ Sweep floors instead of hosing them down with water.
- ▶ Use nontoxic cleaning products—baking soda paste for battery heads, cable clamps, and chrome; baking soda mixed with a mild, biodegradable dishwashing soap for wheels and tires; white vinegar or lemon juice mixed with water for windows.

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Fluids

- ▶ Change fluids carefully—minimize drips and spills.
- ▶ Use a drip pan to collect drips and avoid spills.
- ▶ Check parked vehicles for fluid leaks—use pans or absorbents if needed to control drips.
- ▶ Drain fluids such as unused gasoline, transmission fluid, hydraulic fluid, brake fluid, and radiator coolant from vehicles or parts kept in storage.
- ▶ Use a funnel when pouring liquids and hold a tray underneath the spout to catch drips.
- ▶ Place drip pans under spouts of liquid storage containers.

- ▶ Clean up spills immediately.

Washing Vehicles

- ▶ Designate a washing site for vehicles where water will drain by gravity to the sewer system.
- ▶ Post signs in the washing area that states that oil changes are prohibited there.
- ▶ Train all employees to use the designated area properly.
- ▶ Wash vehicles with biodegradable, phosphate-free detergent.
- ▶ Use a bucket (not a running hose) to wash and rinse cars to conserve water.

Fueling Vehicles

- ▶ Design vehicle fueling areas so that spills are contained on site. These facilities should be designed to prevent runoff from carrying spills into storm drains or sanitary sewers.
- ▶ Equip drains for vehicle fueling areas with a valve, or have a drain plug or blocker available in the event of a large spill.
- ▶ Construct a roof over the fueling area to prevent rain from washing away spilled liquids.
- ▶ Keep absorbent materials on site for use in the prompt cleanup of spills.
- ▶ Post signs instructing people not to overfill fuel tanks.

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Recycle

- ▶ Recycle what you must: used oil, used oil filters, and batteries.
- ▶ Recycle what you can: metal, water-based paints, used tires, paper and cardboard, glass, aluminum, and tin.

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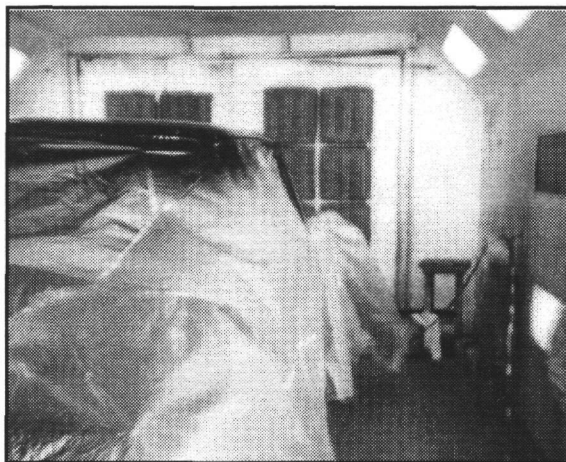
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APPENDIX 20

BEST MANAGEMENT PRACTICES FOR Paint and Body Shops



Materials Substitutions

- ▶ Use paints with high solids and low volatile organic compound (VOC) content.
- ▶ Use paints that are free of heavy metals (mercury, cadmium, chromium, lead, zinc, etc.) and cyanide.
- ▶ Use water-based paints. Clean equipment and parts with water and detergent.
- ▶ Substitute dibasic esters (DBEs) for methylene chloride strippers.

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Process Modifications

- ▶ Be sure that the proper liners are installed in paint pots.
- ▶ Use graduated sizes of sprayer cups specific to the job at hand.
- ▶ Use an automatic paint mixer to minimize spills.
- ▶ Use high-efficiency painting equipment, such as an HVLP spray gun.
- ▶ Use an automatic paint gun washer to minimize paint cleaning wastes.

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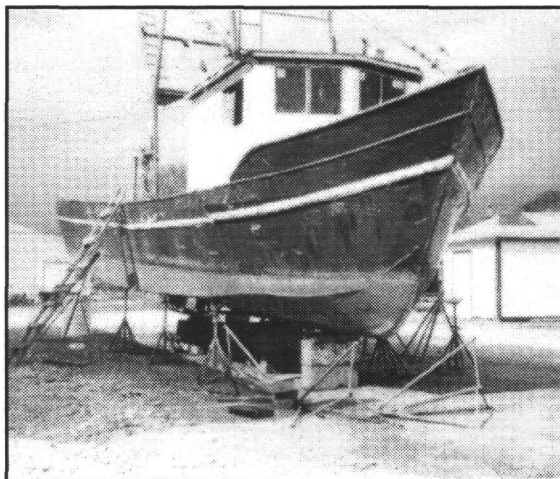
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APPENDIX 21

**BEST MANAGEMENT PRACTICES FOR
Boat Hull Refinishing**



Hull Cleaning in the Water

- ▶ If you must clean your boat while it is in the water, conduct cleaning operations in such a way as to minimize the release of cleaners, solvents, and paint chips from the hull.
- ▶ Use only nontoxic, biodegradable cleaners.
- ▶ Avoid excessive scrubbing that could dislodge paint chips.
- ▶ Use buckets and sponges to contain detergent mixes and to collect wash water.
- ▶ Wash the boat hull above the waterline by hand; don't use a high-pressure water stream.
- ▶ Use phosphate-free and biodegradable detergents and cleaning compounds. Don't overuse detergent; use the minimum amount of detergent recommended on the container.
- ▶ Avoid the use of detergents containing ammonia, sodium hypochlorite, chlorinated solvents, petroleum distillates, or lye.
- ▶ Don't scrape the hull while the boat is in the water; this includes avoiding any underwater cleaning process that might remove paint from the hull.
- ▶ If possible, remove the boat from the water and perform cleaning on land where paint and cleaning debris can be collected and properly disposed of.

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Hull Cleaning on Land

- ▶ To minimize the amount of wash water you generate, don't hose down the hull as a first step. Rather, scrape the hull first to remove large pieces of debris and then dry sweep the area.
- ▶ Collect liquids or wet debris from hull maintenance areas and use vacuum systems for their removal, instead of hosing them off of the site.

Public Education

- ▶ Post signs that encourage environmentally conscious behavior.
- ▶ If you operate a marina or hull repair and refinishing facility, distribute flyers with tips on how to care for the marina environment. Include the flyer with boat registration materials.
- ▶ Recognize that an environmentally conscious attitude is the most important element of protecting the marina's environment—emphasize this point in any marina environmental management program.

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APPENDIX 22

BEST MANAGEMENT PRACTICES FOR Marinas



Liquid Material

- ▶ Build berms, curbs, or other barriers around liquid material storage facilities.
- ▶ Provide separate containers for the disposal of different kinds of liquid wastes (oil, gasoline, antifreeze, etc.).
- ▶ Provide separate containers for the two types of antifreeze—ethylene glycol and propylene glycol. Recycle ethylene glycol antifreeze.
- ▶ Clearly mark all drains that lead directly to a body of water to distinguish them from drains that lead to a wastewater treatment system.

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Petroleum Control

- ▶ Install automatic shutoff nozzles on gas hoses.
- ▶ Encourage the use of oil-absorbent pads for bilges and offer to recycle or manage them properly. For more information on using oil-absorbent pads, refer to TNRCC document RG-237, *Used Oil Absorbents: Proper Management Practices*.
- ▶ Use signs and bulletins to caution about the environmental damage that can occur from fuel spills.

- ▶ Train marina personnel in the proper use of spill containment equipment, and make sure that the equipment is readily available and in good repair.

Boat Cleaning

- ▶ If possible, remove the boat from the water and perform cleaning on land where paint and cleaning debris can be collected and properly disposed of.
- ▶ Use only nontoxic, biodegradable cleansers when in-water hull cleaning is necessary.
- ▶ Avoid excessive scrubbing that could dislodge paint chips.
- ▶ Use buckets and sponges to contain dirt and detergent mixes and to collect washwater.

Public Education

- ▶ Post signs that encourage environmentally conscious behavior.
- ▶ If you operate a marina or hull repair and refinishing facility, distribute flyers with tips on how to care for the marina environment. Include the flyer with boat registration materials.
- ▶ Recognize that an environmentally conscious attitude is the most important element of protecting the marina's environment—emphasize this point in any marina environmental management program.

Maintenance of Sewage Facilities

- ▶ Inspect sewage collection facilities regularly.
- ▶ Use a competent repair and maintenance contractor to service on-site sewage collection equipment.
- ▶ Maintain sewage collection facilities in good condition, and keep them clean and well lit so that boaters will not hesitate to use them.
- ▶ Provide a portable pumpout system that boaters can borrow or rent.
- ▶ Provide dedicated shipside systems for use by live-aboard and transient vessels.
- ▶ Educate boaters about the availability of pumpouts and related on-site facilities to encourage their use.

- ▶ If financial assistance is required to install a pumpout, you should consider applying for a grant for pumpout installation from the U.S. Fish and Wildlife Service under the Clean Vessel Act of 1992.

Shoreline Stabilization

- ▶ Plant natural vegetation along shorelines and protect it from disturbance from land-based activities.
- ▶ Where necessary, build bulkheads, jetties, or breakwaters to protect shorelines.

Solid Waste

- ▶ Locate an adequate number of trash bins in places where they are needed. Empty them frequently. Provide them with lids to prevent rain from getting in and to prevent wind from scattering lighter trash.
- ▶ Establish a recycling program at your marina for aluminum cans, plastic containers, batteries, and other recyclable materials.

Fish Waste

- ▶ Install fish-cleaning stations that are designed to prevent the direct discharge of wastes.
- ▶ Properly dispose of wastes collected from fish-cleaning stations.
- ▶ Recommend to marina users that they clean their catch and dispose of the cleaning wastes at the waters where they caught the fish.

Boat Operation

- ▶ Install signs in sensitive aquatic habitats to alert boaters of locations where they should not use propellers.
- ▶ Establish and enforce no-wake zones.

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