[redacted] ING- NGLOG

2004 Storm water - Pollution Control -
Good Housekeeping

North Central Texas Council Of Governments

TO: FY2004 Storm Water Program Participants DATE: November 5, 2004

FROM: Jeff Rice, Environment and Development Planner

SUBJECT: Storm Water Pollution Prevention Training Resources

Dear Storm Water Program Participants:

Thank you for participating in the NCTCOG Regional Storm Water Management Program during fiscal year 2004. With your support, we were able to accomplish a number of projects that will assist local governments in meeting regulatory requirements and improve storm water quality in the region.

One of the products that we're particularly proud of is the "Storm Water Pollution Prevention: *What We Can Do*" video, a copy of which is enclosed. The video is the centerpiece of a set of resources that local governments may use to train their employees in storm water pollution prevention. The 10-minute video provides a brief introduction to storm water pollution, possible storm water pollution impacts from municipal, county, or state government operations, and basic Best Management Practices (BMPs) for preventing storm water pollution. An Instructor's Guide is included with the video. The Guide contains permit language, tips for preparing training sessions, overview information and talking points for the video, and a form for documenting training.

> Note: If you are interested in obtaining additional copies of the video, NCTCOG plans to conduct a bulk purchase of videos for $3.00 - $5.00 per copy (along with other public education items). See the enclosed form and submit your order to Leslie Calderon at lcalderon@nctcog.org or 817-695-9191 (fax) by the close of business on November 30, 2004. After this purchase, additional copies will be available through NCTCOG's Regional Information Center for $20.00.

To accompany the video, NCTCOG is currently producing a series of presentation modules to provide more detailed training on pollution prevention BMPs for specific government activities. The modules will cover the following government functions and activities:

- Materials Storage and Spill Cleanup (complete)
- Fleet Maintenance and Washing
- Street and Drainage Systems Operations and Maintenance
- Parks and Grounds Maintenance
- Land Disturbances
- Solid Waste Operations
- Building Maintenance

The modules are being released to participants of the FY2005 NCTCOG Regional Storm Water Management Program as they are produced. Participants are able to access completed modules by downloading the materials from a restricted-use web page provided for this purpose. If your jurisdiction has already submitted the contract for FY2005, you will receive the web address and a password. All modules are scheduled to be completed by October 2005, at which time the module series will be available for purchase as a complete package by non-participants and the general public.

Thank you again for your participation in this important program. For additional information on the storm water pollution prevention training resources, please visit http://www.dfwstormwater.com/p2/video/ or contact Jeff Rice, NCTCOG Project Coordinator, at jrice@nctcog.org or 817- 695-9212.

616 Six Flags Drive, Centerpoint Two
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(817) 640-3300 FAX: 817-640-7806 recycled paper
www.nctcog.org

Preventing Storm Water Pollution:

What We Can Do

Instructor's Guide

North Central Texas Council of Governments

September 2004

North Central Texas Council of Governments
616 Six Flags Drive, Suite 200, Centerpoint Two
P.O. Box 5888, Arlington, TX 76005-5888
817.695.9210; 817.695.9191 (fax);
www.nctcog.org

Preventing Storm Water Pollution: *What We Can Do*
Instructor's Guide

Table of Contents

Note: Individual training modules will be released as they are produced, with all modules expected to be complete by October 2005. Sections will be added to this document for each of the modules as they are released.

Preventing Storm Water Pollution: *What We Can Do*
Instructor's Guide

Introduction

This guide provides information to support presentation of the "Preventing Storm Water Pollution: *What We Can Do*" video and accompanying Storm Water Pollution Prevention Training Module Series. The video and modules have been developed by the North Central Texas Council of Governments to assist local governments and state agencies in training their employees on storm water pollution prevention.

Storm water pollution prevention training for employees is required by the proposed TPDES General Permit for Small Municipal Separate Storm Sewer Systems (TXR040000) and may also be required by individual medium and large MS4s permits. The frequency and type of training required, recordkeeping requirements, etc. will vary depending on the Storm Water Management Plan (SWMP) submitted by the operator. Be sure to check your particular SWMP (or individual permit) to determine specific training requirements.

The video provides a brief introduction to storm water pollution, possible storm water pollution impacts from municipal, county, or state government operations, and basic Best Management Practices (BMPs) for preventing storm water pollution. The video (total run time - 10 minutes) is appropriate for all employees of government entities and may be used as a stand-alone training piece (e.g., new employee orientation) or may be supplemented by one or more training modules and/or locality-specific information.

The training modules consist of a series of PowerPoint (or transparency overheads) modules that provide more detailed training on pollution prevention BMPs for various government activities. The modules cover the following activities (individual modules will be released as they are produced, with all modules expected to be complete by October 2005):

- materials storage and spill cleanup,
- fleet maintenance and washing,
- street system operations and maintenance,
- parks and grounds maintenance,
- land disturbances,
- solid waste operations, and
- building maintenance.

Additional Resources

The Pollution Prevention (P2) / Good Housekeeping page of the Regional Storm Water Management Program website at www.dfwstormwater.com/P2/ contains additional information including:

- the Menu of Management Program Options for Pollution Prevention / Good Housekeeping;
- links to other training resources; and
- links to EPA and TCEQ storm water pollution prevention resources and regulations.

Municipal Storm Water Pollution Prevention Regulatory Requirements

The "Pollution Prevention/Good Housekeeping for Municipal Operations" minimum control measure is one of the six measures required by the proposed TPDES General Permit for Small Municipal Separate Storm Sewer Systems (TXR040000). An excerpt from the TPDES permit is contained on the following page for reference. Large MS4 operators may also be required to conduct training of employees depending on the specific requirements of their individual MS4 permits.

Pollution Prevention/Good Housekeeping is a key element of the small MS4 storm water management program. This measure requires the small MS4 operator to examine and subsequently alter their own actions to help ensure a reduction in the amount and type of pollution that: (1) collects on streets, parking lots, open spaces, and storage and vehicle maintenance areas and is discharged into local waterways; and (2) results from operations and maintenance activities related to functions such as vehicle maintenance, parks and open space maintenance, waste transfer stations, etc.

In general, operators of regulated small MS4s are required to:

- Develop and implement an operation and maintenance program with the ultimate goal of preventing or reducing pollutant runoff from municipal, county, or state operations into the storm sewer system;
- Include employee training on how to incorporate pollution prevention/good housekeeping techniques into municipal operations such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance.
- Determine the appropriate best management practices (BMPs) and measurable goals for this minimum control measure.

Excerpt from Proposed TPDES General Permit TXR040000
Small Municipal Separate Storm Sewer Systems

Pollution Prevention/Good Housekeeping for Municipal Operations

A section within the SWMP must be developed to establish an operation and maintenance program. The operation and maintenance program must have the ultimate goal of identifying methods and practices for conducting municipal operations in a manner to prevent or reduce pollution in storm water runoff.

(a) Good Housekeeping and Best Management Practices
Controls must be used to reduce or eliminate the discharge of pollutants when runoff from municipal operations is determined to be a significant contributor of pollution to the MS4. Examples of municipal operations and municipally owned areas include, but are not limited to:

(1) park and open space maintenance;
(2) street, road, or highway maintenance;
(3) fleet and building maintenance;
(4) storm water system maintenance;
(5) new construction and land disturbances.
(6) municipal parking lots;
(7) vehicle and equipment maintenance and storage yards;
(8) waste transfer stations; and
(9) salt/sand storage locations.

(b) Training
A training program must be developed for all employees responsible for municipal operations subject to the pollution prevention/good housekeeping program. The training program must include training materials directed at preventing and reducing storm water pollution from municipal operations. Examples or descriptions of training materials being used must be included in the SWMP.

(c) Structural Control Maintenance
If best management practices include structural controls, maintenance of the controls must be performed at a frequency determined by the MS4 operator and consistent with maintaining the effectiveness of the BMP. The SWMP must list all of the following:
(1) maintenance activities;
(2) maintenance schedules; and
(3) long-term inspection procedures for controls used to reduce floatables and other pollutants.

(d) Disposal of Waste
Waste removed from the MS4, from structural controls, or collected as a result of municipal operations and maintenance activities must be properly disposed. A section within the SWMP must be developed to include procedures for the proper disposal of waste, including:
(1) dredge spoil;
(2) accumulated sediments; and
(3) floatables.

(e) Municipal Operations and Industrial Activities
The SWMP must include a list of all:
(1) municipal operations that are subject to the operation, maintenance, or training program developed under the conditions of this section; and
(2) municipally owned or operated industrial activities that are subject to TPDES storm water regulations.

The SWMP must include a individual permit number, general permit authorization number, or a copy of a signed NOI or NEC (no exposure certification form for TPDES General Permit TXR050000) for each industrial activity conducted by the MS4 and subject to TPDES storm water regulations. If an NOI or NEC has been submitted, but an acknowledgment has not yet been received from the TCEQ, a copy of the submitted NOI or NEC Form may be made readily available.

Complete text available at www.tnrcc.state.tx.us/permitting/waterperm/wwperm/proptxr040000.pdf

Training Guidelines

The trainer should obtain a copy of the jurisdiction or agency's Storm Water Management Plan that was developed in accordance with the TPDES General Permit for Small Municipal Separate Storm Sewer Systems. The SWMP should specify the training requirements (personnel to be trained, frequency, schedule, etc.) that have been established by the jurisdiction in compliance with the permit.

The jurisdiction or agency may want to create employee-training procedures for each department where employees must receive storm water pollution prevention training. The procedures, which must be based on the requirements of the Storm Water Management Plan, should provide additional details to trainers and managers and may include schedules, forms for recording training attendance, and other training-related details.

The trainer should review and become familiar with the Storm Water Pollution Prevention: *What We Can Do* video, the Storm Water Pollution Prevention Training Modules, and the Instructor's Guide. The trainer should also become familiar with the activities performed by the department personnel to be trained. Identify specific activities that have the potential to cause storm water pollution, materials are that are used, materials storage practices, procedures for chemical usage, and procedures for spill cleanup.

The trainer should tailor the training modules to provide additional information that is specific to the jurisdiction. For example, pictures, contact information, storm water Best Management Practice (BMP) maintenance or inspection schedules, waste disposal instructions, or other facility-specific information may be used in place of or in addition to the standard content.

Employee attendance at training sessions must be documented by the trainer. A sign-in sheet is provided in the Instructor's Guide to document attendee names, training subject matter, date, and trainer's name.

Preventing Storm Water Pollution: *What We Can Do* Video

The "Preventing Storm Water Pollution: *What We Can Do*" video is intended to be a general introduction to the topic of storm water pollution prevention related to local government or state operations. The video may be used alone or as an introductory piece followed by one or more training modules (and/or other information specific to local or state government entity).

The video discusses the following topics:

- the importance of protecting the water quality of the region's lakes, streams and rivers to maintain clean water for drinking and to support water recreation activities;
- the potential impact of storm water pollution on the quality of receiving waters;
- operations and maintenance activities performed by government entities that have the potential to cause storm water pollution and the associated pollutants;
- the responsibility of governments in protecting water quality and in setting a good example for citizens;
- regulatory requirement to prevent storm water pollution that might result from operations and maintenance activities; and
- basic storm water pollution prevention Best Management Practices (good housekeeping practices).

After viewing the video, participants should understand how and why storm water runoff is regulated, common sources of storm water pollution, basic storm water pollution prevention BMPs, and the importance of employee actions to prevent storm water pollution.

Discussion Points

The instructor should reinforce the learning objectives by facilitating a discussion session following the presentation of the video. The following questions may be asked by the instructor to stimulate discussion by the participants:

- Why is it important to protect water quality?
- How does storm water runoff cause water pollution?
- What problems can result from pollution in storm water runoff?
- What possible consequences might result if the [city, county, or state] entity fails to follow regulations to prevent storm water pollution?
- What activities performed by participants have the potential to pollute storm water runoff?
- What are some of the good housekeeping practices discussed in the video?

Storm Water Pollution Prevention Training Module Series

The Training Module Series consists of seven PowerPoint modules that supplement and reinforce the training objectives of the Preventing Storm Water Pollution: *What We Can Do* video. The modules provide more detailed information on pollution prevention BMPs for various activities typically carried out by government entities. Individual modules will be released as they are produced, with all modules expected to be complete by October 2005.

The Training Module Series includes the following training modules:

- Materials Storage and Spill Cleanup
- Fleet Maintenance and Washing
- Street System Operations and Maintenance
- Parks and Grounds Maintenance
- Land Disturbances
- Solid Waste Operations
- Building Maintenance

The modules are designed to follow the video or an introduction by the instructor. One or more modules may be presented in combination depending on the audience. In addition to the flexibility offered by various combinations of modules, the content of individual modules may be tailored by the jurisdiction to meet locality-specific needs. For example, pictures, contact information, storm water Best Management Practice (BMP) maintenance and inspection schedules, waste disposal instructions, or other facility-specific information may be used in place of or in addition to the standard content.

The trainer should prepare by reviewing the individual modules and respective Instructor's Guide sections. In addition, the trainer should become familiar with the activities of the employees to be trained, what materials are used, how the materials are stored, procedures for chemical usage, and procedures for spill cleanup. The modules should be tailored to address the specific requirements for the particular department activity as described above.

Materials Storage and Spill Cleanup Module

The Materials Storage and Spill Cleanup presentation module is intended to provide information to employees on how to store and handle materials safely and how to clean up spills properly. This module is appropriate for employees in all departments that handle materials that could pollute surface waters if spilled or washed into a storm drain. For many audiences, it is appropriate to present the Materials Storage and Spill Cleanup Module along with other modules that address related functions or activities.

After completing this module, participants should understand basic material storage and handling and spill cleanup procedures that prevent or reduce the possibility of storm water pollution.

Discussion Points

The instructor should reinforce the learning objectives by facilitating a discussion session during and/or after the presentation of the module. The following questions may be asked by the instructor to stimulate discussion by the participants:

- What materials are used that could contaminate storm water pollution?
- Why is it important to keep materials in original containers or clearly labeled replacement containers?
- What is the best location for storage of hazardous materials?
- What are the basic steps for cleaning up a liquid spill?
- What are the basic steps for cleaning up a powder (dry) spill?
- Where can specific information on how to clean up spills be found?

Storm Water Pollution Prevention Training

Organization Name _____ Date _____

Employee Name	Department	Signature

Training Topics Covered: _____

_____

Trainer's Name _____ Signature _____

North Central Texas Council Of Governments

DATE: February 11, 2002

TO: Regional Storm Water Program Participants

FROM: Derin Warren, Senior Environmental Planner

SUBJECT: **Watershed Roundtable: Building a Storm Water Management Plan**
Part 3 - Pollution Prevention (P2)

Pollution Prevention (P2) Workshop

This will be your third Watershed Roundtable for the FY'02 year, and the third of five workshops aimed at building a Storm Water Management Plan for your MS4. The Pollution Prevention/Good Housekeeping Minimum Measure will be the focus of this Roundtable, scheduled for:

West Fork	Main Stem/East Fork	Elm Fork
Monday, March 11, 2002	**Tuesday, March 12, 2002**	**Wednesday, March 13, 2002**
1:30 - 3:30 PM	**1:30 - 3:30 PM**	**1:30 - 3:30 PM**
Hurst Municipal Court Rm.	**Mesquite Public Library**	**Farmers Branch Manske Library,**
Meeting Room 1	**Main Branch, Meeting Room**	**Main Auditorium**
1505 Precinct Line Road	**300 West Grubb Drive**	**13613 Webb Chapel Rd.**
Hurst	**Mesquite**	**Farmers Branch**

Pollution Prevention/Good Housekeeping Minimum Measure

Please come prepared to share with the other participants and NCTCOG staff the activities that your community has implemented, or is considering, to comply with the regulations on pollution prevention. The ideas presented at this watershed roundtable will form the core of a "Menu of Management Program Options" prepared by NCTCOG staff that you and other participants can select from in developing your storm water management plans. In order for the Menu of Options to be a valuable resource, input from many participants is needed. This is a great opportunity to share information, to learn from other storm water professionals, and to help ensure that a wide variety of program options are available to participants.

The enclosed EPA Fact Sheet on the Pollution Prevention/Good Housekeeping Measure lists specific requirements and guidelines that may assist you in preparing for the Roundtable. What activities have your community considered and what steps have already been taken? What are some potential obstacles to implementing an effective plan in your city? **(Note: If you have ordinances, procedures, or other materials, please bring several copies to share.)**

Please come to the Roundtable prepared to share accomplishments and discuss challenges. If your community is new to the program or not far along in developing a storm water management plan, be assured that you are not alone! Please plan to attend this very informal gathering so that you can become familiar with the regulations and learn practical solutions. We hope to have one or more representatives from the Phase I cities at the meeting so they can share the experience gained over several years of compliance with storm water regulations.

Please fax the enclosed registration form no later than March 7th, 2002. If you have any questions about the Roundtable or agenda items, please feel free to contact Sam Medlock, CFM, Environmental Planner II, at 817-695-9219, or at smedlock@dfwinfo.com. As always, we appreciate your participation in this important program.

616 Six Flags Drive, Centerpoint Two
P. O. Box 5888, Arlington, Texas 76005-5888
(817) 640-3300 FAX: 817-640-7806 ♻ recycled paper
http://www.dfwinfo.com

Pollution Prevention (P2) Workshop

REGISTRATION

West Fork
Monday, March 11, 2002
1:30 - 3:30 PM
Hurst Municipal Court Rm.
Meeting Room 1
1505 Precinct Line Road
Hurst

Main Stem/East Fork
Tuesday, March 12, 2002
1:30 - 3:30 PM
Mesquite Public Library
Main Branch, Meeting Room
300 West Grubb Drive
Mesquite

Elm Fork
Wednesday, March 13, 2002
1:30 - 3:30 PM
Farmers Branch Manske
Library, Main Auditorium
13613 Webb Chapel Rd.
Farmers Branch

☐ **West Fork** ☐ **Main Stem/East Fork** ☑ **Elm Fork**

Please check the appropriate box to indicate which workshop you plan to attend.

Name & Title:	
Organization:	
Address:	
City, State, Zip:	
Telephone:	
Fax:	
Email Address:	

Please fax registration form to Sam Medlock at 817/695-9191 by March 7th, 2002. For more information, please contact Sam Medlock at 817-695-9219 or email smedlock@dfwinfo.com.

We look forward to seeing you there!

United States Environmental Protection Agency | Office of Water (4203) | EPA 833-F-00-010 January 2000 Fact Sheet 2.8

EPA

Storm Water Phase II Final Rule

Pollution Prevention/Good Housekeeping Minimum Control Measure

This fact sheet profiles the Pollution Prevention/Good Housekeeping for Municipal Operations minimum control measure, one of six measures the operator of a Phase II regulated small municipal separate storm sewer system (MS4) is required to include in its storm water management program to meet the conditions of its National Pollutant Discharge Elimination System (NPDES) permit. This fact sheet outlines the Phase II Final Rule requirements and offers some general guidance on how to satisfy them. It is important to keep in mind that the small MS4 operator has a great deal of flexibility in choosing exactly how to satisfy the minimum control measure requirements.

Why Is Pollution Prevention/Good Housekeeping Necessary?

The Pollution Prevention/Good Housekeeping for municipal operations minimum control measure is a key element of the small MS4 storm water management program. This measure requires the small MS4 operator to examine and subsequently alter their own actions to help ensure a reduction in the amount and type of pollution that: (1) collects on streets, parking lots, open spaces, and storage and vehicle maintenance areas and is discharged into local waterways; and (2) results from actions such as environmentally damaging land development and flood management practices or poor maintenance of storm sewer systems.

While this measure is meant primarily to improve or protect receiving water quality by altering municipal or facility operations, it also can result in a cost savings for the small MS4 operator, since proper and timely maintenance of storm sewer systems can help avoid repair costs from damage caused by age and neglect.

What Is Required?

Recognizing the benefits of pollution prevention practices, the rule requires an operator of a regulated small MS4 to:

- Develop and implement an operation and maintenance program with the ultimate goal of preventing or reducing pollutant runoff from municipal operations into the storm sewer system;
- Include employee training on how to incorporate pollution prevention/good housekeeping techniques into municipal operations such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance. To minimize duplication of effort and conserve resources, the MS4 operator can use training materials that are available from EPA, their State or Tribe, or relevant organizations;
- Determine the appropriate best management practices (BMPs) and measurable goals for this minimum control measure. Some program implementation approaches, BMPs (i.e., the program actions/activities), and measurable goals are suggested below.

What Are Some Guidelines for Developing and Implementing This Measure?

The intent of this control measure is to ensure that existing municipal, State or Federal operations are performed in ways that will minimize contamination of storm water discharges. EPA encourages the small MS4 operator to consider the following components when developing their program for this measure:

- ***Maintenance activities, maintenance schedules, and long-term inspection procedures*** for structural and non-structural controls to reduce floatables and other pollutants discharged from the separate storm sewers;

- ***Controls for reducing or eliminating the discharge of pollutants*** from areas such as roads and parking lots, maintenance and storage yards (including salt/sand storage and snow disposal areas), and waste transfer stations. These controls could include programs that promote recycling (to reduce litter), minimize pesticide use, and ensure the proper disposal of animal waste;

- ***Procedures for the proper disposal of waste*** removed from separate storm sewer systems and areas listed in the bullet above, including dredge spoil, accumulated sediments, floatables, and other debris; and

- ***Ways to ensure that new flood management projects assess the impacts on water quality*** and examine existing projects for incorporation of additional water quality protection devices or practices. EPA encourages coordination with flood control managers for the purpose of identifying and addressing environmental impacts from such projects.

The effective performance of this control measure hinges on the proper maintenance of the BMPs used, particularly for the first two bullets above. For example, structural controls, such as grates on outfalls to capture floatables, typically need regular cleaning, while non-structural controls, such as training materials and recycling programs, need periodic updating.

What Are Appropriate Measurable Goals?

Measurable goals, which are required for each minimum control measure, are meant to gauge permit compliance and program effectiveness. The measurable goals, as well as the BMPs, should consider the needs and characteristics of the operator and the area served by its small MS4. The measurable goals should be chosen using an integrated approach that fully addresses the requirements and intent of the minimum control measure. An integrated approach for this minimum measure could include the following measurable goals:

Target Date	Activity
1 year.....	Pollution prevention plan (the new BMPs and revised procedures) completed; employee training materials gathered or developed; procedures in place for catch basin cleaning after each storm and regular street sweeping.
2 years.....	Training for appropriate employees completed; recycling program fully implemented.
3 years.....	Some pollution prevention BMPs incorporated into master plan; a certain percentage reduction in pesticide and sand/salt use; maintenance schedule for BMPs established.
4 years.....	A certain percentage reduction in floatables discharged; a certain compliance rate with maintenance schedules for BMPs; controls in place for all areas of concern.

For Additional Information

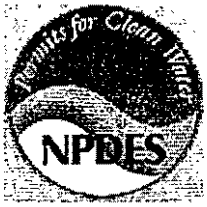
Contact

☞ U.S. EPA Office of Wastewater Management
- Phone: 202 260-5816
- E-mail: SW2@epa.gov
- Internet: www.epa.gov/owm/sw/phase2

Reference Documents

☞ Storm Water Phase II Final Rule Fact Sheet Series
- Internet: www.epa.gov/owm/sw/phase2

☞ Storm Water Phase II Final Rule (64 *FR* 68722)
- Internet: www.epa.gov/owm/sw/phase2
- Contact the U.S. EPA Water Resource Center
  - Phone: 202 260-7786
  - E-mail: center.water-resource@epa.gov



EPA United States Environmental Protection Agency
Office of Water

OFFICE OF WASTEWATER MANAGEMENT

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Pollution Prevention/Good Housekeeping for Municipal Operations

Regulatory Text

You must develop and implement an operation and maintenance program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations. Using training materials that are available from EPA, your State, Tribe, or other organizations, your program must include employee training to prevent and reduce storm water pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance.

Guidance

EPA recommends that, at a minimum, you consider the following in developing your program: maintenance activities, maintenance schedules, and long-term inspection procedures for structural and nonstructural storm water controls to reduce floatables and other pollutants discharged from your separate storm sewers; controls for reducing or eliminating the discharge of pollutants from streets, roads, highways, municipal parking lots, maintenance and storage yards, fleet or maintenance shops with outdoor storage areas, salt/sand storage locations and snow disposal areas operated by you, and waste transfer stations; procedures for properly disposing of waste removed from the separate storm sewers and areas listed above (such as dredge spoil, accumulated sediments, floatables, and other debris); and ways to ensure that new flood management projects assess the impacts on water quality and examine existing projects for incorporating additional water quality protection devices or practices. Operation and maintenance should be an integral component of all storm water management programs. This measure is intended to improve the efficiency of these programs and require new programs where necessary. Properly developed and implemented operation and maintenance programs reduce the risk of water quality problems.

BMP Topics

BMP Menu

1. Public education & outreach on storm water impacts

2. Public involvement & participation

3. Illicit discharge detection & elimination

4. Construction site storm water runoff control

5. Post-construction storm water management in new development & redevelopment

6. Pollution prevention & good housekeeping for municipal operations

Measurable Goals

Storm Water Phase II

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BMP Fact Sheets

Source controls

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Automobile maintenance

Vehicle washing

Illegal dumping control

Landscaping and lawn care

Pest control

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Roadway and bridge maintenance

Septic system controls

Storm drain system cleaning

Alternative discharge options for chlorinated water

Materials management

Alternative products

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Road salt application and storage

Spill response and prevention

Used oil recycling

Materials management

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Additional Fact Sheets

The following fact sheets are available for download in PDF format. (To view PDF files, you need to download and install Adobe Acrobat Reader; click here to download then follow the instructions on your screen to install the software).

Airplane Deicing Fluid Recovery System (121KB) 

Catch Basin Cleaning (761KB) 

Coverings (41.3KB)

Employee Training (54.2KB)

Flow Diversion (56.6KB)

Handling and Disposal of Residuals (130KB)

Environmental Effects from Highway Ice and Snow Removal Operations (229KB)

Internal Reporting (73.8KB)

Materals Inventory (36.1KB)

Preventative Maintenance (49.5KB)

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Storm Water Contamination Assessment (43.3KB)

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Pollution Prevention/Good Housekeeping for Municipal Operations

Illegal Dumping Control

Description

Signs can be used to discourage dumping in sensitive areas (Source: NCDENR, 2000)

Illegal dumping control as a management practice involves using public education to familiarize residents and businesses with how illegal dumping can affect storm water. By locating and correcting illegal dumping practices through education and enforcement measures, the many risks to public safety and water quality associated with illegal disposal actions can be prevented. For storm water managers, illegal dumping control is important to preventing contaminated runoff from entering wells and surface water, as well as averting flooding due to blockages of drainage channels for runoff.

Several types of illegal dumping can occur. The first is the illegal dumping (also known as "open dumping," "fly dumping," or "midnight dumping") of litter that occurs at abandoned industrial, commercial, or residential buildings, vacant lots, and poorly lit areas such as rural roads and railway lines. This dumping primarily happens to avoid disposal fees or the time and effort required for proper disposal at landfills or recycling facilities. A second type of illegal dumping involves disposal of water that has been exposed to industrial activities and then released to the storm drainage system, introducing pollutants into storm water runoff.

Top

Applicability

BMP Topics

BMP Menu

1. Public education & outreach on storm water impacts

2. Public involvement & participation

3. Illicit discharge detection & elimination

4. Construction site storm water runoff control

5. Post-construction storm water management in new development & redevelopment

6. Pollution prevention & good housekeeping for municipal operations

Measurable Goals

Storm Water Phase II

Fact Sheet Topics

Source controls

Materials management

Additional

Illegal dumping can occur in both urban and rural settings and can happen in all geographic regions. The effects of illegal dumping may be more pronounced in areas with heavier rainfall, due to the greater volume of runoff. In more urbanized areas, illegal dumping may occur due to inaccessibility of recycling or solid waste disposal centers, which are often located on the suburban-rural fringe.

Design Considerations

Illegal dumping control programs focus on community involvement and targeted enforcement to eliminate or reduce illegal dumping practices. The key to successfully using this BMP is increasing public awareness of the problem and its implications. Illegal dumping control programs use a combination of public education, citizen participation, site maintenance, and authorized enforcement measures to address illegal waste disposal. Some of the issues that need to be examined when creating a program include the following:

- The locations of persistent illegal dumping activity
- Types of waste dumped and the profile of dumpers
- Possible driving forces behind illegal dumping, such as excessive user fees, restrictive curbside trash pickup, or ineffective recycling programs
- Previous education and cleanup efforts
- Current control programs and local laws or ordinances addressing the problem
- Sources of funding and additional resources that may be required.

Effective illegal dumping control programs use practices that educate and involve the community, local industries, and elected officials in an effort to eliminate the illegal discarding of wastes. An EPA toolkit for preventing illegal dumping focuses on four programmatic areas (USEPA 1998):

1. Cleanup efforts

Cleanup projects will require a coordinated planning effort to ensure that adequate resources and funding are available. Once a site has been cleaned, signs, lighting, or barriers may be required to discourage future dumping. Signs should indicate the fines and penalties for illegal dumping, and a phone number for reporting incidents. Landscaping and beautification efforts might also discourage future dumping, as well as providing open space and increasing property values.

2. Community Outreach and Involvement

This might be the most important tool in ensuring that this best management practice is effective. The organization of special cleanup events where communities are provided with the resources to properly dispose of illegally dumped materials increases the understanding among residents of illegal dumping impacts and supplies opportunities to correctly dispose of materials which may otherwise be illegally dumped. Integration of illegal dumping prevention into community policing programs or use of programs such as Crimestoppers may also be an effective way to increase enforcement opportunities without the additional cost of hiring new staff. Producing simple messages relating the cost of illegal dumping on local taxes, and directions to proper disposal sites will aid in eliminating the problem. Having a hotline where citizens can report illegal activities and educating the public on the connection between the storm drain and water quality will decrease disposal of waste into storm drain inlets.

3. Targeted Enforcement

This tool involves the use of ordinances to regulate waste management and eliminate illegal dumping through methods such as fines, cost recovery penalties for cleanup, and permit requirements for waste management activities. These fines and penalties can be used to help fund the prevention program or to provide rewards to citizens who report illegal dumping activities. Other recommendations for this tool include training of staff from all municipal departments in recognizing and reporting illegal dumping incidents, and dedicating staff who have the authority to conduct surveillance and inspections and write citations for those caught illegally dumping.

4. Tracking and Evaluation

This tool measures the impact of prevention efforts and determines if goals are being met. Using mapping techniques and computer databases allows officials to identify areas where dumping most often occurs, record patterns of dumping occurrence (time of day, day of week, etc.), and calculate the number of citations issued to the responsible parties. This allows for better allocation of resources and more specific targeting of outreach and education efforts for offenders.

Limitations

Illegal dumping is often spurred by cost and convenience considerations, and a number of factors encourage this practice. The cost of fees for dumping at a proper waste disposal facility are often more than the fine for an illegal dumping offense, thereby discouraging people from complying with the law. The absence of routine or affordable pickup service for trash and recyclables in some communities also encourages illegal dumping. A lack of understanding regarding applicable laws or the inadequacy of existing laws may also contribute to the problem.

Municipalities can coordinate with state and federal agencies to help enforce illegal dumping control measures when resources such as funding and staff for enforcement activities are scarse.

Effectiveness

While the effectiveness of illegal dumping control measures at removing pollutant loads to local waters is hard to quantify, there are numbers to demonstrate the preventative effects these programs have in keeping waste from illegal dump sites and ultimately from storm water runoff. Some examples follow:

- The City/County of Spokane, Washington, Litter Control program is responsible for removing indiscriminate dumping on publicly owned properties and road right-of-ways. The program is estimated to remove 350 tons of illegally dumped material each year.
- Project HALT in Phoenix, Arizona, cleaned up a reported 15,000 tons of waste in 1996 and 1997 and issued more than 165 citations.
- The "Tire Roundup" program sponsored by the Southwest Detroit Environmental Visions community organization pays local residents to bring in illegally dumped tires. In 1995, residents were paid 25 cents per tire, and more than 8,000 tires were collected.

Illegal dumping of household and commercial waste has a variety of impacts on water quality. Hazardous chemicals generated from household, commercial,

and industrial sources can contaminate ground and surface water supplies, affecting drinking water and public health as well as aquatic habitat. Reduced drainage of runoff due to blockage of streams, culverts and drainage basins can result in flooding and channel modification. Open burning associated with some illegal sites can cause forest fires that create severe erosion and cause sediment loading in streams. Economically, property values decrease as a result of illegal dumping and affect the local tax base and the ability to maintain pollution prevention programs.

Cost Considerations

The cost of illegal dumping control program activities can vary due to economic and social factors, but with creative thinking potential costs may be reduced. Possible sources of labor for dumping site cleanups can include community and youth groups, county or state corrections programs, or corporations. Equipment for cleanup may be available through either public works or transportation agencies or through donations by private companies. Training municipal staff to report incidents of illegal dumping witnessed during the performance of other duties reduces the need for full-time staff for the program.

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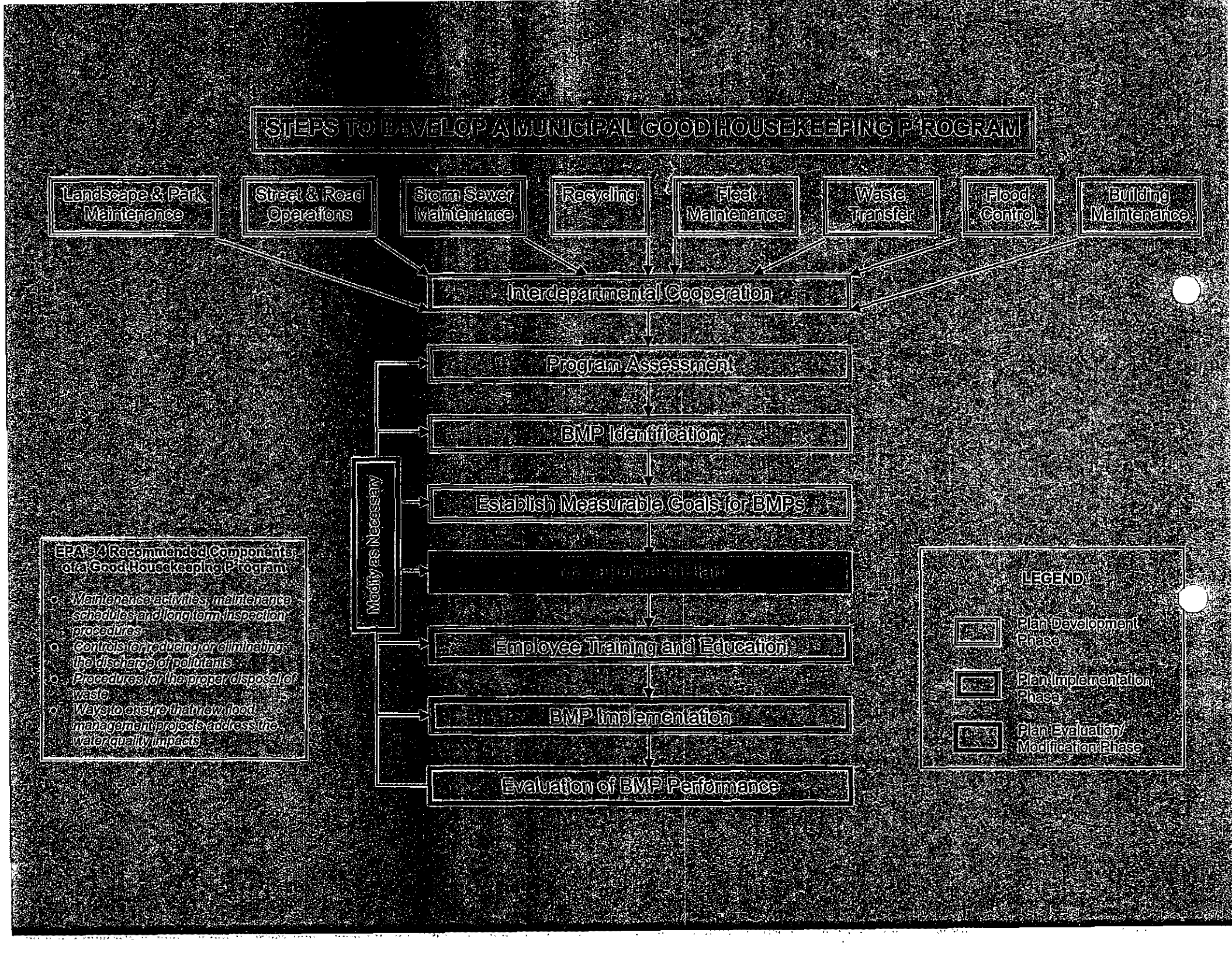
STEPS TO DEVELOP A MUNICIPAL GOOD HOUSEKEEPING PROGRAM
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United States Environmental Protection Agency | Office of Water (4203) | EPA 833-F-00-010 January 2000 Fact Sheet 2.8

EPA

Storm Water Phase II Final Rule

Pollution Prevention/Good Housekeeping Minimum Control Measure

This fact sheet profiles the Pollution Prevention/Good Housekeeping for Municipal Operations minimum control measure, one of six measures the operator of a Phase II regulated small municipal separate storm sewer system (MS4) is required to include in its storm water management program to meet the conditions of its National Pollutant Discharge Elimination System (NPDES) permit. This fact sheet outlines the Phase II Final Rule requirements and offers some general guidance on how to satisfy them. It is important to keep in mind that the small MS4 operator has a great deal of flexibility in choosing exactly how to satisfy the minimum control measure requirements.

Why Is Pollution Prevention/Good Housekeeping Necessary?

The Pollution Prevention/Good Housekeeping for municipal operations minimum control measure is a key element of the small MS4 storm water management program. This measure requires the small MS4 operator to examine and subsequently alter their own actions to help ensure a reduction in the amount and type of pollution that: (1) collects on streets, parking lots, open spaces, and storage and vehicle maintenance areas and is discharged into local waterways; and (2) results from actions such as environmentally damaging land development and flood management practices or poor maintenance of storm sewer systems.

While this measure is meant primarily to improve or protect receiving water quality by altering municipal or facility operations, it also can result in a cost savings for the small MS4 operator, since proper and timely maintenance of storm sewer systems can help avoid repair costs from damage caused by age and neglect.

What Is Required?

Recognizing the benefits of pollution prevention practices, the rule requires an operator of a regulated small MS4 to:

- Develop and implement an operation and maintenance program with the ultimate goal of preventing or reducing pollutant runoff from municipal operations into the storm sewer system;
- Include employee training on how to incorporate pollution prevention/good housekeeping techniques into municipal operations such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance. To minimize duplication of effort and conserve resources, the MS4 operator can use training materials that are available from EPA, their State or Tribe, or relevant organizations;
- Determine the appropriate best management practices (BMPs) and measurable goals for this minimum control measure. Some program implementation approaches, BMPs (i.e., the program actions/activities), and measurable goals are suggested below.

What Are Some Guidelines for Developing and Implementing This Measure?

The intent of this control measure is to ensure that existing municipal, State or Federal operations are performed in ways that will minimize contamination of storm water discharges. EPA encourages the small MS4 operator to consider the following components when developing their program for this measure:

- ***Maintenance activities, maintenance schedules, and long-term inspection procedures*** for structural and non-structural controls to reduce floatables and other pollutants discharged from the separate storm sewers;

- ***Controls for reducing or eliminating the discharge of pollutants*** from areas such as roads and parking lots, maintenance and storage yards (including salt/sand storage and snow disposal areas), and waste transfer stations. These controls could include programs that promote recycling (to reduce litter), minimize pesticide use, and ensure the proper disposal of animal waste;

- ***Procedures for the proper disposal of waste*** removed from separate storm sewer systems and areas listed in the bullet above, including dredge spoil, accumulated sediments, floatables, and other debris; and

- ***Ways to ensure that new flood management projects assess the impacts on water quality*** and examine existing projects for incorporation of additional water quality protection devices or practices. EPA encourages coordination with flood control managers for the purpose of identifying and addressing environmental impacts from such projects.

The effective performance of this control measure hinges on the proper maintenance of the BMPs used, particularly for the first two bullets above. For example, structural controls, such as grates on outfalls to capture floatables, typically need regular cleaning, while non-structural controls, such as training materials and recycling programs, need periodic updating.

What Are Appropriate Measurable Goals?

Measurable goals, which are required for each minimum control measure, are meant to gauge permit compliance and program effectiveness. The measurable goals, as well as the BMPs, should consider the needs and characteristics of the operator and the area served by its small MS4. The measurable goals should be chosen using an integrated approach that fully addresses the requirements and intent of the minimum control measure. An integrated approach for this minimum measure could include the following measurable goals:

Target Date	Activity
1 year.....	Pollution prevention plan (the new BMPs and revised procedures) completed; employee training materials gathered or developed; procedures in place for catch basin cleaning after each storm and regular street sweeping.
2 years.....	Training for appropriate employees completed; recycling program fully implemented.
3 years.....	Some pollution prevention BMPs incorporated into master plan; a certain percentage reduction in pesticide and sand/salt use; maintenance schedule for BMPs established.
4 years.....	A certain percentage reduction in floatables discharged; a certain compliance rate with maintenance schedules for BMPs; controls in place for all areas of concern.

For Additional Information

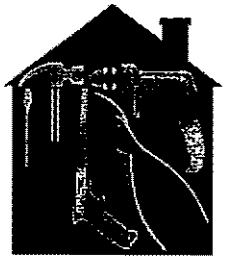
Contact

☞ U.S. EPA Office of Wastewater Management
- Phone: 202 260-5816
- E-mail: SW2@epa.gov
- Internet: www.epa.gov/owm/sw/phase2

Reference Documents

☞ Storm Water Phase II Final Rule Fact Sheet Series
- Internet: www.epa.gov/owm/sw/phase2

☞ Storm Water Phase II Final Rule (64 *FR* 68722)
- Internet: www.epa.gov/owm/sw/phase2
- Contact the U.S. EPA Water Resource Center
  - Phone: 202 260-7786
  - E-mail: center.water-resource@epa.gov



BUILDING MAINTENANCE

Areas where building maintenance, repair, remodeling and minor construction are conducted can contribute contaminants to runoff when measures have not been taken to prevent discharges.

GENERAL POLLUTION PREVENTION BMPs:

- Use soil erosion control techniques if bare ground is temporarily or permanently exposed.
- Enclose painting operations, consistent with local air quality operations.
- Properly store and dispose of waste materials generated from the activity.
- Properly store materials that are normally used in repair and remodeling such as paints and solvents.
- Sweep paved surfaces, rather than hosing down or using blowers.
- Properly contain and dispose of wash water, sweepings and sediments.
- Use non-toxic substitutes for chemicals when possible.
- Regularly inspect and clean storm drains, also stencil inlets with "No Dumping".
- Clean up spills immediately to minimize safety hazards and deter spreading.
- Control litter by sweeping and picking up trash on a regular basis.
- Maintain good housekeeping practices while work is underway.
- Train employees. Your success depends on an effective training program.

CLEANING AND MAINTENANCE OF FLOORS AND OUTSIDE IMPERVIOUS SURFACES

Contaminants from your facility can contribute to polluted runoff when floors and outside impervious areas such as parking lots are not maintained or cleaned properly.

GENERAL POLLUTION PREVENTION BMPs:

- Keep outside areas (dumpsters, parking lots, etc.) free of trash and debris, and regularly clean them to prevent pollutant buildup.
- Use absorbent for liquid spills and sweeping and mopping to clean outside areas.
- Regularly inspect and clean out grease traps.
- Avoid spilling onto floors or other surfaces through good housekeeping.
- Control litter by sweeping and picking up trash on a regular basis.
- Never dispose of wash waters to the storm drain.
- Use "dry" cleaning methods (sweeping, vacuuming, etc.) on sidewalks and parking lots and dispose of waste properly.
- Use damp mop to clean floors, and contain the wash water for proper disposal (sewer, on-site treatment, etc.).
- Label all storm drain inlets "No Dumping".
- Clean up spills immediately to minimize safety hazards and deter spilling.
- Train all employees. Your success depends on an effective training program.

PARKING LOTS

Parking lots can contribute to pollution if not maintained properly.

SPECIFIC BMPs FOR PARKING LOT MAINTENANCE

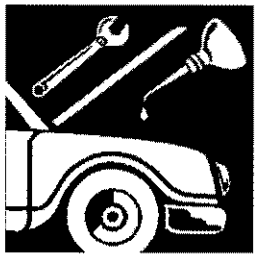
- Use dry cleaning methods to clean parking lot pavement – absorbents, brooms, or wire brushes.
- Clean up sediments and other solids from parking lots immediately to prevent them from blowing or washing away.
- Mechanically remove loose debris before washing the lot with water.
- Dispose of parking 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 wash pavement only when necessary. Avoid the use of acids and other harsh cleaners.
- 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.

TRASH BINS

SPECIFIC BMPs FOR TRASH BIN MAINTENANCE

- Don't put liquids in trash bins or trash cans.
- Place trash bins or trash 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.

FLEET MAINTENANCE



VEHICLE AND EQUIPMENT OPERATION, MAINTENANCE AND REPAIR

Your facility can contribute contaminants to runoff when vehicles and equipment are improperly operated, maintained or repaired. Leaky and poorly maintained equipment and improper maintenance work areas might result in an illegal discharge.

GENERAL POLLUTION PREVENTION BMPs

- Inspect all vehicles and heavy equipment frequently for leaks.
- Conduct all vehicle and equipment maintenance at one location away from storm drains, preferably on a paved surface under cover.
- Move activities indoors, or cover equipment areas with a permanent roof. Conduct maintenance only in areas designed to prevent storm water pollution.
- Inspect and clean equipment to prevent leaks and excessive buildup of contaminants. Keep drip pans and containers under areas that might drip.
- 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.
- Never pour materials down storm drains. Connect process equipment areas to the sanitary sewer or a facility wastewater treatment system.
- Avoid hosing down work areas. Clean small spills with rags, conduct general clean up with damp mops and clean larger spills with absorbent material.
- Use non-toxic substitutes for chemicals when possible. Recycle greases, oil & filters, antifreeze, cleaning solutions, batteries and hydraulic & transmission fluids.
- Do not use diesel to lubricate equipment or parts.
- Clean up spills immediately to minimize safety hazards and deter spreading
- Train employees on discharge prohibitions.

VEHICLE AND EQUIPMENT FUELING

Spilled fuel can contribute contaminants to runoff from your facility. Improperly stored rags used to clean up spilled fuel may also result in an illegal discharge.

GENERAL POLLUTION PREVENTION BMPs

- Covering fueling areas.
- Install perimeter drains or slope the surrounding pavement inward with drainage to a sump or an oil-water separator.
- Pave fueling areas with concrete rather than asphalt, or apply a sealant to protect asphalt from spilled fuels.
- Install vapor recovery nozzles to control drips.
- Discourage "topping off" fuel tanks.
- Use a drip pan to collect drips and avoid spills.
- Use absorbent materials or mop up small spills, and for general cleaning rather than hosing down the area. Remove the absorbent materials promptly.

- Use a rag cleaning service for contaminated rags used to clean up spills, which can not be disposed of in trash.
- Transport industrial equipment to a designated fueling area rather than using mobile fueling.
- Clean up spills immediately to minimize safety hazards and deter spreading.
- Train employees on proper fueling and cleanup procedures.

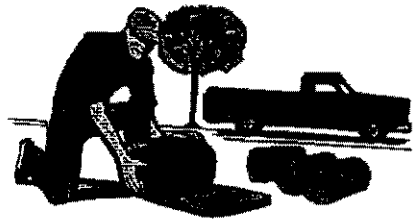
VEHICLE AND EQUIPMENT WASHING AND CLEANING.

Your facility can contribute contaminants to runoff if wash water from equipment and vehicle cleaning is rinsed onto parking lots or into gutters or storm drains. Improperly stored rags may also result in an illegal discharge.

GENERAL POLLUTION PREVENTION BMPs

- If possible use off-site commercial washing and steam cleaning.
- Use designated wash areas, preferably covered, to prevent contact with storm water. Berm wash areas or use other measures to contain wash water.
- Designate a washing site for vehicles where water will drain by gravity to the sewer system. Never discharge wash water to the storm drain. Discharge it to the sanitary sewer after contacting your local sewering agency to find out if pre-treatment is required, or if possible, filter and recycle it.
- Alternatively, divert wash water to an open lawn or other vegetated areas 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 atgrade 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.
- Post signs in the washing area that states that oil changes are prohibited there.
- Wash vehicles with biodegradable, phosphate-free detergent.
- Use non-toxic 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.
- Use a bucket (not a running hose) to wash and rinse cars to conserve water.
- Use alternative washing and cleaning methods to reduce the potential for non-storm water discharges. If possible, use "dry" cleaning methods, such as wiping down, rather than hosing vehicles or equipment.
- Avoid pressure washing if possible. Conduct pressure washing 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.
- Another way to recycle water is to 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.
- Make sure that the drains at your facility are installed with grit traps and are routed through an oil separator.
- Properly contain and dispose of clean up materials (rags, towels, absorbent materials, etc.).
- Label all storm drain inlets "No Dumping".
- Educate employees on proper washing methods to prevent pollution.

GROUNDS MAINTENANCE



Areas where building or grounds maintenance is conducted can contribute contaminated runoff when measures have not been taken to prevent discharges. The overuse of pesticides and fertilizers, over-watering and inadequate erosion control may result in an illegal discharge.

GENERAL POLLUTION PREVENTION BMPs

- Utilize native vegetation to reduce water, fertilizer or pesticide needs.
- Use landscaping pesticides and fertilizers only as needed.
- Avoid over-watering to prevent excess runoff.
- Use integrated pest management (IPM) where appropriate.
- Sweep paved surfaces, rather than hosing down or using blowers.
- Do not dispose of grass clipping and leaves by dumping them into the storm drain.
- Properly contain and dispose of wash water, sweepings and sediments.
- Use non-toxic substitutes for chemicals when possible.
- Regularly inspect and clean storm drains, also stencil inlets with "No Dumping".
- Clean up spills immediately to minimize safety hazards and deter spreading.
- Control litter by sweeping and picking up trash on a regular basis.
- Educate employees on pollution measures.

SOIL MANAGEMENT PRACTICES

SPECIFIC BMPs FOR SOIL MANAGEMENT

- 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.

PESTICIDES, HERBICIDES AND FERTILIZERS

Through use of simple economical gardening and landscaping practices, you can reduce the pollutants that run off from the facility. Avoid using chemicals entirely during wet weather.

SPECIFIC BMPs FOR PESTICIDE AND HERBICIDE APPLICATION

- 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 into the ground.
- Develop a pesticide and herbicide plan for each landscape that your facility 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.
- Implement safety, storage, and disposal methods for pesticides and herbicides used at each location
- Use application equipment that can be shut off immediately in an emergency.
- Monitor equipment use and maintenance procedures 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.
- Follow the label directions exactly. Never use rough estimates when mixing or applying pesticides, fertilizers or herbicides.
- Never mix different pesticides, fertilizers or herbicides unless explicitly instructed to do so on the product label.
- 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 pesticides or herbicide residue at the mixing, loading or application site. You can reduce equipment cleaning by clustering jobs that use the same spray solution.
- 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.

INTEGRATED PEST MANAGEMENT (IPM)

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.

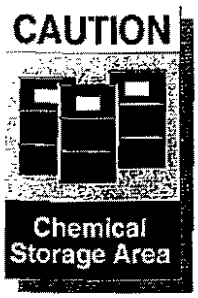
SPECIFIC INTEGRATED PEST MANAGEMENT BMPs:

- 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:
    1. Removing insect eggs, larvae, cocoons, and adults from plants by hand;
    2. Removing weeds by pulling or hoeing;
    3. Covering the garden with landscape fabric or mulch to prevent weed germination;
    4. 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. See table below for more information about natural insect control.

NATURAL PREDATORS FOR INSECT CONTROL

Beneficial Insect:	Controls:
Green lacewings	Praying mantis, aphids, mealy bugs, thrips, spider mites
Ladybugs	Aphids, Colorado potato beetle
Praying mantis	Almost any insect
Ground beetles	Caterpillars that attack trees and shrubs
Parasitic nematodes	Grubs, beetles, cutworms, army worms
Trichogramma wasp (extremely small, non-stinging wasps)	Corn borer, cabbage looper, other worms
Seedhead weevils and other beetles	Weeds

MATERIALS LOADING, UNLOADING, HANDLING AND STORAGE



Your facility can contribute contaminants to runoff when loading, unloading and storing materials. Spills, improper storage and sloppy techniques may result in an illegal discharge.

GENERAL POLLUTION PREVENTION BMPs

- Park delivery vehicles so that spills or leaks can be contained.
- Protect materials from rainfall, run-on, run-off and wind dispersal. For example, cover loading docks to reduce the exposure of materials to rain.
- Use seals or door skirts between trailers and buildings to prevent exposure to rain and use grading or berming to prevent storm water run-on.
- Position roof downspouts to direct storm water away from loading, unloading and storage areas.
- Use drip pans under areas that may leak (hose connections, filler nozzles, etc.).
- Sweep parking lots or other surfaces to remove debris blown or washed from loading, unloading and storage areas.
- Store liquids in a designated area on a paved impervious surface within a secondary containment. Keep outdoor storage containers in good condition.
- Clean storm drains regularly, and stencil inlets with "No Dumping".
- Use catch basin infiltration inserts.
- Clean up spills immediately to minimize safety hazards and deter spreading.
- Provide training to employees on spill prevention, containment and cleanup.

CLEANING RAGS

SPECIFIC BMPs FOR RAGS

- Moisten rags with a squeeze bottle instead of soaking rags in solvent, cleaning fluids, etc.
- Wring out rags with a hand operated or mop wringer.
- Use separate labeled rag containers for each material. Put a wire rack in the bottom of each container so the liquid can drain out; collect and reuse or recycle the material.
- 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.

DRUM AND BARREL CONTAINERS

Container sizes range from 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.

SPECIFIC BMPs FOR CONTAINERS

- Keep containers in good condition, handle them carefully, and replace any leaking ones.
- Inspect containers for signs of leaks or corrosion every week.
- 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.
- 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 indicators that a drum or barrel is under pressure – such as swelling and bulging – which may result in a leak or rupture.
- Store drums on pallets to prevent concrete "sweating" that can cause corrosion.
- Provide adequate lighting in storage areas.
- Maintain clean, even floor surface in worker and vehicle traffic areas.
- Keep isles clear of obstructions.
- Maintain sufficient distances between drums containing incompatible chemicals to prevent reactions in the event of container leak.
- 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.
- Empty all drums and containers completely before cleaning or disposing of them to minimize the amount of waste you generate.

SPILLS AND LEAKS

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.

SPECIFIC BMPs FOR PREVENTING AND MANAGING 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 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.
- 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.
- 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.
- 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 non-hazardous spills in an uncovered container. Store them in a covered bin and send them to a professional cleaning service.
- 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 materials. 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 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.
- 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.
- 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.
- 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.*

STORM DRAINS AND DISCHARGE POINTS

Dirt, oil, grease and litter are washed down the storm drain with each rainfall creating polluted runoff. Polluted runoff from your facility can reach water bodies and other wildlife habitats and harm fish, birds and human life. Identify every storm drain and stencil each one with the message "Do Not Dump". This will inform employees and others that dumping wastes down these drains is not appropriate.

GENERAL POLLUTION PREVENTION BMPs:

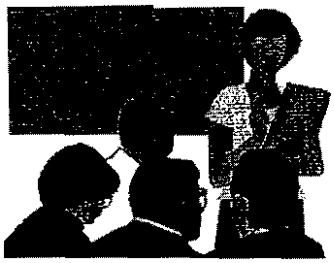
- Prevent spills from entering storm drains and discharge points.
- Eliminate illegal connections to the storm drain.
- Routinely maintain storage areas to keep any drainage from reaching your site's storm water management system. If you are not sure where a drain goes to, contact your facility manager, local wastewater utility, or a plumber. If you're still not sure, have the drain dye-tested.
- Inspect and clean out all storm drains, discharge point & catch basins.
- Control litter by sweeping and picking up litter regularly.
- Clean mats in a floor-mounted mop sink or use a mat cleaning service.
- Collect all wash water and discharge to the sanitary sewer.
- Use "dry" cleaning methods (sweep rather than hose down) to clean shop floors, materials processing and storage areas, access roads and parking lots.
- Use secondary containment measures for waste storage areas.
- Label all storm drain inlets "No Dumping".
- Clean up spills immediately to minimize safety hazards and deter spreading.
- Train all employees on BMPs, good housekeeping practices and spill response. Your success depends on an effective training program.

GRATES AND BASINS

SPECIFIC BMPs FOR INSPECTING GRATES AND BASINS:

- Prevent pollution down stream of basins by regularly inspecting for and removing 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.
- 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.
- 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.

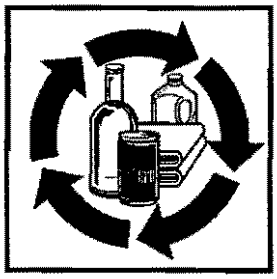
TRAINING AND EDUCATION



Employee training for continuous improvement is recognized as one of the best methods to improve performance, employee morale, and reduce waste and pollution generation.

GENERAL BMPs FOR EDUCATION

- Educate employees in erosion controls.
- Train employees about safe handling of materials and wastes.
- Train employees on spill prevention and clean up.
- Train employees on leak prevention and detection.
- Train employees on integrated pest management (IPM).
- Train employees on proper use and disposal of pesticides, herbicides and fertilizers.
- Write procedures for using equipment and materials in simple form and post them for quick reference. Plastic lamination can protect instructions.
- Require employees to return empty containers before getting new supplies.
- Train employees to recognize and understand the meaning of storm drain stenciling signs.



WASTE MANAGEMENT AND DISPOSAL

Your facility can contribute contaminants to storm water runoff if wastes are not managed and disposed of properly. Poor waste management may result in an illegal discharge.

For specific information about classifying your waste and about regulations that might apply to your facility, refer to the TNRCC publication *Guidelines for the Classification and Coding of Industrial Wastes and Hazardous Wastes (RG-22).*

TNRCC Publications Inventory and Distribution
P.O. Box 13087
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TNRCC RENEW Catalog
(Resource Exchange Network for Eliminating Wastes)
http://www.tnrcc.state.tx.us/admin/topdoc/pd/002

GENERAL POLLUTION PREVENTION BMPs

- Cover and berm waste storage areas.
- Keep outside areas (dumpsters, parking lots, etc.) free of trash and debris.
- Store wastes indoors when possible.
- Keep waste containers covered.
- Regularly inspect and clean grease traps.
- Use non-toxic substitutes for chemicals when possible.
- Recycle food grease, cleaning solutions, oil, antifreeze, batteries, and fluids.
- Sweep parking lots or other surfaces to remove debris blown or washed from storage areas.
- Store liquids in a designated area on a paved impervious surface within a secondary containment. Keep outdoor storage containers in good condition.
- Regularly inspect and clean storm drains, and stencil inlets with "No Dumping".
- Clean up spills immediately to minimize safety hazards and deter spreading.
- Regularly control litter by sweeping and picking up trash and litter.
- Educate employees on proper waste disposal..

WASTE FLUIDS

You should be aware that there are certain restrictions on what your facility 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.* 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.

GENERAL BMPs FOR WASTE FLUIDS:

- Don't mix different types of waste fluids -- store used oils, halogenated solvents, and antifreeze separately to allow for their recycling.
- 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.
- Keep waste fluid containers protected from 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 designated 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.
- Document all waste fluid spillage.

ANTIFREEZE

SPECIFIC BMPs FOR ANTIFREEZE:

- Segregate antifreeze and other coolants from all other waste fluids.
- Never pour antifreeze on the ground.
- Do not pour antifreeze down storm drains, floor drains or sewers.
- Do not mix antifreeze with any other waste liquid.
- For information on antifreeze recycling refer to TNRCC document RG-235, *Used Antifreeze (Used Coolant): Proper Management Practices,* or call the Used Oil and Used Oil Filter Recycling Program at (512) 239-6695.

AQUEOUS CLEANERS

SPECIFIC BMPs FOR AQUEOUS CLEANERS

- If an aqueous cleaner is used, use pre-cleaning 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.
- Use demineralized water for the cleaning bath make-up.

BRAKE FLUID

SPECIFIC BMPs FOR BRAKE FLUID

- Collect brake fluid in containers clearly marked to indicate that it is dedicated for 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 non-hazardous, 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.
- Recycle brake fluid (considered used oil) through a TNRCC-registered recycler.
- For more information on brake fluid recycling, refer to TNRCC document RG-257, *Used Oil Generators, Collection Centers, and Handlers.*

OIL

SPECIFIC BMPs FOR OIL

- Never pour oil down the storm drains or on the ground.
- Clean up oil spills immediately.
- Drain oil filters completely – collect the drained oil for recycling.
- Use oil separators to remove oil and grit from runoff before it enters the storm sewer system.
- Regularly maintain oil separators to keep them functioning as intended.
- 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.
- 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. Also refer to TNRCC document RG-257, Used Oil Filter Generators, Collection Centers, and Handlers.

PAINTS

SPECIFIC BMPs FOR PAINT HANDLING

- 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.
- Use a nonphenolic, nonacid stripper. Substitute dibasic esters (DBEs) for methylene chloride strippers.
- Be sure that the proper liners are installed in paint pots.
- Use graduated sizes of sprayer cups specific to the job at hand.
- Use automatic paint mixer to minimize spills.
- Use high-efficiency painting equipment, such as an HVLP spray gun.
- Use low air pressure and aim the spray gun perpendicular to the work piece to increase accuracy.
- Use automatic paint gun washer to minimize paint cleaning wastes.
- Use a mechanical paint stripping system, such as plastic blast media, instead of solvents.

RECYCLING & DISPOSAL

Properly dispose of wastes (fluids and materials), and recycle when possible, to eliminate illegal discharges. Reduce, reuse and recycle (R3) hazardous and non-hazardous wastes when possible, to lower your disposal costs and the amount of waste going into our landfills. Participate in waste exchange opportunities to decrease the waste you generate and save money. Recycle what you must: oil and batteries. Recycle what you can: metal, water-based paints, used tires, paper and cardboard, glass, aluminum and tin.