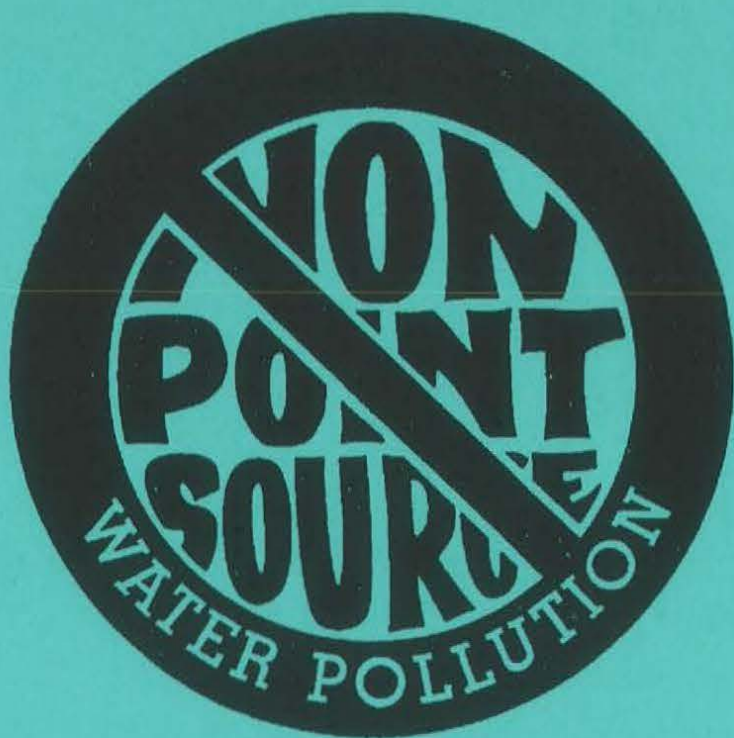


LEAKS, SPILLS AND ACCIDENTS



**LEAKS, SPILLS AND ACCIDENTS
MANAGEMENT PRACTICES CATALOGUE**

FOR

NONPOINT SOURCE POLLUTION PREVENTION

AND

WATER QUALITY PROTECTION

IN

NEW YORK STATE



Prepared By:

**NYS Department of Environmental Conservation
Division of Water
Bureau of Water Quality Management**

**With Assistance From
Division of Spills Management**

June 1996

PREFACE

The *Leaks, Spills and Accidents Management Practice Catalogue* was prepared by the NYS Department of Environmental Conservation, in cooperation with agencies of the New York Nonpoint Source Coordinating Committee. Funds for this activity were provided by the U.S. Environmental Protection Agency - Region II, under a grant through Section 319 of the Clean Water Act.

ACKNOWLEDGEMENTS

The contributions of the following people from the NYS Department of Environmental Conservation, Division of Spills Management are gratefully acknowledged:

- Paul Sausville
- Russ Brauksieck
- Tom Quinn
- Tom Plesnarski

Thanks to Barbara J. Crier, Information Processing Specialist II and Betty-Jo Daly, Publication Production Assistant for the typing and formatting of this manual.

TABLE OF CONTENTS

	Page No.
Preface	LSA-i
Acknowledgements	LSA-i
Table of Contents	LSA-ii
I. INTRODUCTION	LSA-1
A. Background	LSA-1
B. <i>Leaks, Spills and Accidents Catalogue</i> Development	LSA-1
C. Leaks, Spills and Accidents as a Source of Nonpoint Source Pollution	LSA-1
D. What are Leaks, Spills and Accidents Management Practices?	LSA-2
E. How to Use this Catalogue	LSA-4
F. Updating the <i>Leaks, Spills and Accidents Management Practices Catalogue</i>	LSA-4
G. How You Can Propose an Update of the Catalogue	LSA-4
II. LEAKS, SPILLS AND ACCIDENTS MANAGEMENT PRACTICES FOR BULK STORAGE	LSA-5
A. Listing of Management Practices	LSA-6
B. Listing of Publications	LSA-8
C. Publication Summaries	LSA-8
III. LEAKS, SPILLS AND ACCIDENTS MANAGEMENT PRACTICES FOR SPILL RESPONSE	LSA-19
A. Listing of Management Practices	LSA-20
B. Listing of Publications	LSA-21
C. Publication Summaries	LSA-22
Appendix I	LSA-24

LEAKS, SPILLS AND ACCIDENTS MANAGEMENT PRACTICES FOR NONPOINT SOURCE POLLUTION CONTROL IN NEW YORK STATE

I. INTRODUCTION

A. *Background*

The Water Quality Act of 1987 placed increased attention on the development and implementation of nonpoint source (NPS) pollution control programs. Section 319 of the Act required states to prepare an Assessment Report identifying waterbodies affected by nonpoint source pollution, determining categories of nonpoint sources that are significant problems in the state and listing state programs available for the control of nonpoint source pollution. States were also required to prepare a Management Program which explained how they planned to deal with the source categories causing the major problems.

The New York State Department of Environmental Conservation (DEC), by virtue of its statutory authority for the management of water resources and control of water pollution in the state, has assumed the lead responsibility for control of nonpoint source pollution. One action taken by DEC to carry out its NPS responsibility was the development of a Nonpoint Source Management Plan in January 1990. The Management Plan outlines how DEC will identify, describe and evaluate management practices to be used to reduce nonpoint sources of pollution and make recommendations for additional control options needed to address nonpoint source pollution.

B. *Leaks, Spills and Accidents Catalogue Development*

Subcommittees were established to develop catalogues for most source categories of NPS pollution. Leaks, spills and accidents, however, was a category which did not require the creation

of a separate committee due to the existence of well-defined state regulatory programs addressing petroleum and chemical bulk storage and spill response, and federal regulations for underground and aboveground storage tanks. Additionally, management practices appropriate for controlling pollutants from hazardous materials handling at construction sites and from gas and oil well drilling have been developed and published in the *Construction Catalogue* and *Resource Extraction Management Practices Catalogue*, respectively. Management practice summary sheets are contained in all the management practice catalogues except this one, which uses summaries of regulatory program publications.

C. *Leaks, Spills and Accidents as a Source of Nonpoint Source Pollution*

The 1993 Priority Water Problem (PWP) list published by the DEC Division of Water's Bureau of Monitoring and Assessment and Water Quality Management identified nearly 1,500 waterbody segments in New York State, comprising over 725,000 acres of surface (freshwater), marine (bay and ocean) water, and almost 500 miles of Great Lake shoreline that have been negatively affected by NPS pollution. Of these, leaks, spills and accidents are the primary sources of water quality problems on six (6) segments of waterbodies. Thirty-one (31) segments of waterbodies were identified where leaks, spills and accidents were secondary sources of impairment. However, the 1994 Spill Information System Annual Report reported nearly 17,000 spills in State Fiscal Year 1994 (4/1/94-3/31/95). Of the 17,000 reported spills, 13,000 initially were on land and may or may not have affected water resources. One thousand three hundred each initially affected

groundwater and surface water. About 830 of the spills were over 100 gallons each. In SFY '94 over 4.3 million gallons were reported as spilled. Few spills are persistent enough in the environment to be caught in the "snapshot" of the Priority Waterbody List.

Groundwater contamination from petroleum storage and operations appears to be the most widespread form of water quality problem associated with leaks, spills and accidents. Spills on surface waters harm aquatic life and can cause a fire hazard. As petroleum products weather, they sink and may kill benthic fauna and permanently alter the substrate. When spills occur, they are usually the result of human error, traffic accidents, operational problems - such as leaking lines, transfer connections, or tanks - and equipment failure. Problems with operating tanks include leaking due to corrosion and spills and overfills at the fill port. The majority of problems are found in the piping system. Leaks from old abandoned and improperly closed tanks also pose a significant threat to groundwater resources in New York State.

Another potential problem comes from old privately-owned petroleum tanks at sites where the capacity is below the 1,100 gallon regulatory threshold. This is becoming an increasingly significant problem on Long Island where groundwater is the sole source of drinking water and on upstate lands using private wells. A management practice summary sheet (reprinted as Appendix I) titled "Petroleum Products Storage Spill Prevention and Containment" is in the *Agricultural NPS Management Practices Catalogue*. This practice deals with tanks that are below the 1,100 gallon threshold and are used for agricultural operations.

No management practice summary sheet has been written for residential oil storage tanks. Applicable practices from the *Agricultural Management Practices Catalogue* summary sheet could also be implemented by private homeowners with oil storage tanks.

Environmental resources, including surface and groundwater, are protected from impacts associated with chemical and petroleum bulk storage primarily through a cycle of regulatory

requirements that includes monitoring, upgrading, leak detection and inspection procedures and programs. At major oil storage facilities (MOSFs), Spill Prevention, Containment, and Countermeasure (SPCC) Plans are implemented to prevent the discharge of oil to navigable waters and to contain such discharges when they occur. The regulatory programs are more fully explained in the next section.

D. What Are Leaks, Spills and Accidents Management Practices?

Leaks, spills and accidents management practices are most commonly implemented in New York State through three programs: Petroleum Bulk Storage, Chemical Bulk Storage and Spill Response and Remediation.

Petroleum Bulk Storage

The Petroleum Bulk Storage program, as required by Article 17, Title 10, of the Environmental Conservation Law controls the storage and handling of petroleum products at active and abandoned petroleum bulk storage facilities. The implementing regulations, 6 NYCRR Parts 612-614, pertain to facilities storing over 1,100 gallons and less than 400,000 gallons. DEC's Bulk Storage Section coordinates rulemaking, technology development and enforcement for the safe storage and handling of petroleum and hazardous materials. Petroleum storage regulations in effect since 1985 require registration of tanks at facilities with aggregate capacity greater than 1,100 gallons, testing and inspection of tanks, specific practices for transfer of petroleum, proper closure and removal of tanks no longer needed, technology standards for construction, and replacement of tanks.

The state regulations require that underground tanks be checked for leakage by monitoring the inventory and by having the tank tested periodically (at least once every 5 years by state regulations and may be as frequent as annually by federal regulations). In addition to this, the federal regulations for underground tanks require that tanks be corrosion-resistant by 1998 by either

replacing the tank or by retrofitting cathodic protection or an interior lining or both. Also, by 1998, all tanks are required to have spill/overflow prevention devices. This would be some type of catchment basin at the fill port to catch small drips/spills from the delivery hose and some type of warning/shutdown device in the tank so that it isn't likely to be overfilled.

The state regulations require that aboveground tanks and associated equipment be inspected at least once per month to be sure that all equipment is in good working condition. Once every 10 years, aboveground tanks, 10,000 gallons and larger must have a structural inspection to ensure that the tank is not leaking and is in good shape. These tanks are required to have proper valving and gauging to ensure that there is proper control over the product at all times. They are also required to have secondary containment, such as a dike, to catch any type of release from the tank.

No DEC permit is required for constructing or upgrading bulk storage facilities. Plan submittal is only required for Major Oil Storage Facilities (MOSFs). (Facilities storing 400,000 gallons or more are called MOSFs.) Therefore, an important part of the bulk storage and spill response programs, though not a legal requirement, is the DEC Regional site inspection for proposed facilities.

After construction of any bulk storage facility, inspections are the only means of determining compliance with regulations. There are 250 MOSFs and about 40,000 small facilities to inspect. For MOSFs, in addition to meeting all PBS regulations, a Spill Prevention, Containment and Countermeasure (SPCC) Plan must also be written. The SPCC Plan includes management practices to prevent environmental damage.

Management practices for the PBS Program are listed in Section II.A. The Publication Summaries, capsule summaries of the PBS Program documents, follow. The management practices include structural practices for designing and upgrading tanks and storage systems and operational practices to test and inspect tanks, conduct handling and transfer operations, and provide proper recordkeeping.

Chemical Bulk Storage

The Chemical Bulk Storage Program was established to implement and enforce the Chemical Bulk Storage Regulations. Implementing the statutes defined in Article 40 of the Environmental Conservation Law (ECL), the program requires that facilities register with the Department and comply with the regulations. The Phase II Chemical Bulk Storage (CBS) Regulations became final on August 11, 1994 and were developed with input from the chemical industry and the business community following several years of study by the Department of Environmental Conservation. Designed to prevent releases of hazardous substances and to reduce the growing costs associated with the environmental cleanup of spills and leaks, the regulations established statewide standards for storing and handling over 1,000 hazardous substances.

The CBS Regulations, summarized in Section 11.C., contain five parts (6 NYCRR Parts 595, 596, 597, 598 and 599).

Spill Response and Remediation

The Spill Response and Remediation Program provides a prompt response to all leaks and spills reported to the Department so that an evaluation may be done to determine the proper action to be taken. DEC conducts the statewide program to respond to both petroleum and chemical spills.

Actual on-scene response is provided from the Department's regional offices across the State. A network of standby contractors is available to collect and analyze samples and to do actual cleanup when the spiller is unknown or unable to do so. Field response staff are trained in appropriate sampling and cleanup procedures and contractor supervision. A contracting/payment system and spill related data system are maintained and supported. Cooperative spill response is coordinated with other governmental agencies. Regional assistance and guidance is provided on hydrogeological issues and remediation technology. Laws, rules and regulations dealing with the Spill Program are reviewed and developed.

The management practices used within the program and provided to owners and operators through technology transfer are listed at the beginning of Section III. They include structural measures for containing spills and operational measures for conducting responses, inspections, material compatibility analyses, reporting, and planning.

E. How To Use This Catalogue

The *Leaks, Spills and Accidents Management Practices Catalogue* is a reference document for those involved with educating and providing technical assistance to owners and operators of bulk storage facilities, local municipal agencies that track spills, and local planners who site new facilities.

It should be noted that this Catalogue is neither a regulatory tool nor a design manual to be used in place of practice standards and specifications. It is also not meant to replace the numerous guidance documents produced by the Division of Spills Management.

New owners or operators of a facility, or local municipal officials who want to familiarize themselves with both the operations of a bulk storage facility and the regulations that apply to them will find the matrix on pages 6 and 7 to be a useful place to start. This matrix directs the reader to the publications pertaining to the management practice of interest. The publication may contain pertinent regulations, registration information, reference information or guidance for the management practice. On-site assistance with the siting, design and layout of facilities, including choosing and providing for the implementation of management practices, is often provided by consulting engineers or other professional consultants who integrate the required management practices with the specific needs of the site and products stored.

F. Updating the Leaks, Spills and Accidents Management Practices Catalogue

The New York Nonpoint Source Coordinating Committee (NYNPSCC) is responsible for updating the *Leaks, Spills and Accidents Management Practices Catalogue*. NYNPSCC meets quarterly, but dedicates time at one meeting each year to considering updates to the *Management Practices Catalogues*. NYNPSCC, which is composed of 15 member organizations and agencies, including DEC as the lead agency, will be responsible for:

- Reviewing proposed additions, deletions, and revisions to the *Management Practices Catalogue*.
- Identifying additional categories of nonpoint source pollution that have not been adequately addressed in the list of practices
- Suggesting research or demonstration projects on unproven or new management practices that appear to have potential for protecting water quality.
- Periodically reviewing the state list of practices to verify the status of each practice. This review should be based on recently published literature and new or previously unknown research or demonstration projects.

G. How You Can Propose An Update Of The Catalogue

1. Submit proposed updates, in writing, by December 31 of each year, to the New York Nonpoint Source Coordinating Committee, c/o NYSDEC Bureau of Water Quality Management, 50 Wolf Road, Albany, NY. 12233-3508.

2. The NYNPSCC will review the proposed updates at their next regularly scheduled meeting. A subcommittee may be formed to study the proposed update and request input from groups not represented on the Coordinating Committee.
3. The subcommittee will review the proposed updates and determine if they meet the conditions for updating the Catalogue. In consultation with other interested groups, it will make a recommendation to the members of the NYNPSCC by May 1 of the following year.
4. When the proposed update is approved, the NYNPSCC will distribute copies of the addition or revisions, as approved, to all its members and other holders of the Management Practices Catalogues.

II. LEAKS, SPILLS AND ACCIDENTS MANAGEMENT PRACTICES FOR BULK STORAGE

Management practices addressing nonpoint source pollution from Petroleum and Chemical Bulk Storage Facility operations are listed on page LSA-6. The management practices are summed up in one word in the left-hand column of II.A. The associated letters A through P head the matrix columns of II.B. II.B. identifies the Bulk Storage Publications that are summarized in Section II.C.

The management practices are incorporated primarily in the longer publications. While the brochures and regulations are instructive regarding the management practices, they do not provide descriptions.

II.A Management Practices for New York State's Bulk Storage Programs

MATRIX ENTRY	MANAGEMENT PRACTICE
A. Design	Proper Design of Tanks, Piping Systems and Containment Structures
B. Handling	Proper Materials Handling and Transfer Operations
C. Containing	Containing Leaks and Spills
D. Detecting	Detecting Leaks and Spills
E. Inspection (General)	Facility Inspection, Facility Maintenance and Personnel Training Programs
F. Closure	Temporary and Permanent Closure of Storage Facilities
G. Controlling	Controlling Initial Spills (First Response)
H. Upgrading	Upgrading Storage Systems
I. Inspection (Underground)	Testing and Inspecting Underground Storage Tank Systems
J. Inspection (Aboveground)	Inspecting and Maintaining Aboveground Storage Tank Systems
K. Recordkeeping	Recordkeeping
L. Spill Reporting	Spill Reporting Procedures
M. Housekeeping	Good Housekeeping Practices
N. Materials Compatibility	Materials Compatibility Analysis
O. Security	Security Measures
P. Risk	Risk Identification and Assessment (for Chemical Bulk Storage only)

II.B Bulk Storage Publications

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1. Petroleum Bulk Storage (PBS) Publications																
a. Petroleum Bulk Storage (PBS) Regulations.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
b. The following brochures summarize regulatory requirements:																
1. "Registration: Underground and Aboveground Tanks"											•					
2. Aboveground Tanks: Proper Installation	•	•	•	•			•						•	•		
3. Underground Tanks: Proper Installation	•	•	•	•			•						•	•		
4. Underground Tanks: Testing				•					•		•					
5. Upgrading Existing Facilities		•	•				•	•					•			
6. Aboveground Tanks: Inspections	•			•						•	•					
c. PBS Registration Form											•					
d. Petroleum and Chemical Bulk Storage Contractors List	•					•			•	•		•				
e.1 *Recommended Practices for Aboveground Storage of Petroleum.	•	•	•	•	•	•	•	•	•		•	•	•	•		
e.2 *Recommended Practices for Underground Storage of Petroleum.	•	•	•	•	•	•	•	•	•	•		•	•	•		
e.3 Getting Out From Under: Underground Storage Tank Alternatives for Small Towns	•	•	•	•	•	•	•	•	•			•	•	•	•	
f. Petroleum USTs: Compliance with NYSDEC and EPA UST Requirements	•	•	•	•			•	•								
* Items are available from Health Education Services by calling: (518) 439-7286.																
2. Spill Prevention Operations Technical Series Memos (SPOTS)																
a. Tightness Testing of Underground Petroleum Storage Tank Systems (#2)				•					•			•				
b. Inventory Control Requirements at Underground Petroleum Storage Facilities (#4)				•					•							
c. Inspection of Aboveground Petroleum Storage Tanks (#5)					•						•	•	•	•		

A—Design B—Handling C—Containing D—Detecting E—Inspection (General) F—Closure G—Controlling
H—Upgrading I—Inspection (Underground) J—Inspection (Above Ground) K—Record Keeping L—Spill Reporting
M—Housekeeping N—Material Comp-ability O—Security P—Risk

II.B

Bulk Storage Publications (Continued)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
2. Spill Prevention Operations Technical Series Memos (SPOTS) (Continued)																
d. Overfill and Spill Prevention Equipment for Petroleum Storage Tanks (#6)	•	•					•	•								
e. Underground Petroleum Piping Systems (#7)	•			•			•	•							•	
f. Secondary Containment for Aboveground Tanks (#10)	•		•							•						
g. Chemical Bulk Storage Regulations: Manufacturer's Technical Guidance for Spill Prevention (#11)	•	•			•									•	•	
h. Storage Regulations for Oxygenated Motor Fuels and Alternative Fuels (#13)	•															
i. Site Assessment at Bulk Storage Facilities (#14)					•	•					•					
j. Alternatives to Secondary Containment for Small Aboveground Petroleum Tanks (#17)	•	•	•					•						•		•
3. Federal Publications on Underground and Aboveground Storage																
a. Federal Underground Storage Tank (UST) Notification Form												•				
b. Subtitle I of RCRA "Federal UST Law"	•		•	•		•		•				•	•			
c. Federal UST Regulations 40 CFR 280	•	•	•	•	•	•	•	•	•	•	•	•	•			
d. MUSTS FOR USTS: A Summary of Federal UST Program	•	•	•	•		•	•	•	•			•	•			
e. DOLLARS AND SENSE: Federal Financial Responsibility Requirements for USTs												•	•			•
f. STRAIGHT TALK ON TANKS: Leak Detection Methods for Petroleum Underground Storage Tanks and Piping			•	•			•		•		•					
g. USEPA Oil Pollution Prevention Regulations—40 CFR 112			•	•								•		•		•
4. State Chemical Bulk Storage (CBS) Publications																
a. Chemical Bulk Storage Regulations—6 NYCRR 595-599	•	•	•	•	•	•	•	•	•	•	•	•	•			•
b.1 Chemical Bulk Storage Registration Brochure. b.2 Hazardous Substance Bulk Storage Application												•				
c. Manuals																
1. Technology for the Storage of Hazardous Liquids	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
2. Siting Manual for Storing Hazardous Substances	•	•	•	•	•	•	•	•				•	•	•	•	•
3. Administrative and Legal Options for Storing Hazardous Substances	•				•				•	•				•		•
4. Recommended Practices for Storing & Handling Hazardous Substances	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
5. Technical Papers																
a. Standpipe Testing of Underground Storage Tanks										•		•				
b. Pneumatic Testing of Underground Storage Tanks										•						
c. Permanent Closure of Underground Petroleum Storage Tanks							•									
d. Method for Evaluating the Acceptability of a Diking System and Recommended Permeability Standards for Secondary Containment of Gasoline, #2 Fuel Oil, Fuel Oil, #4 and #6 Fuel Oil (\$2.00)			•		•											
e. Permeability Testing Methods for Secondary Containment Systems	•		•		•											
f. Profiles of Major Industrial Chemicals in New York State	•		•		•		•					•				•
6. Tank Bulletin	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
7. Candidate Bulletin for the International Fire Code Institute's Voluntary Certification Program	•								•	•		•	•			

To request any of this material or to ask about Petroleum or Chemical Bulk Storage, please contact Mary Ellen Cowan at:
NYS Department of Environmental Conservation, 50 Wolf Road, Room 360, 50 Wolf Road, Albany, NY 12233-3750.
Telephone Number (518) 457-4351

A—Design B—Handling C—Containing D—Detecting E—Inspection (General) F—Closure G—Controlling
H—Upgrading I—Inspection (Underground) J—Inspection (Above Ground) K—Record Keeping L—Spill Reporting
M—Housekeeping N—Material Compatibility O—Security P—Risk

II.C. PUBLICATION SUMMARIES

1. *State Petroleum Bulk Storage (PBS) Publications*

a. *Petroleum Bulk Storage - PBS Regulations*

This booklet is a February 12, 1992 revision of Title 6 of the New York Code of Rules and Regulations (6 NYCRR), Parts 612, 613 and 614. The regulations were first published on December 27, 1985. They consist of the following:

6 NYCRR Part 612: Registration of Petroleum Storage Facilities

6 NYCRR Part 613: Handling and Storage of Petroleum.

6 NYCRR Part 614: Standards for New and Substantially Modified Petroleum Storage Tanks

The regulations are further summarized in a series of brochures.

The regulations apply to facilities storing petroleum with an aggregate storage capacity (aboveground and underground) of more than 1,100 gallons.

b.1. Registration: Underground and Aboveground Tanks

This brochure describes the current problem with petroleum leaks and spills, Parts 612, 613 and 614 of 6 NYCRR are partially summarized with an emphasis on registration. The who, what, where and when of petroleum bulk storage registration are given, including facility size, type of product regulated, deadlines, posting of registration, renewal requirements and fees. Sources of help and additional information are given, including a DEC region map with phone numbers and addresses.

b.2. Aboveground Tanks: Proper Installation

This brochure summarizes the regulations for construction, installation and monitoring of new aboveground petroleum storage tanks in New York State as given in Part 614 of 6 NYCRR. A short description of requirements is given for each component:

- Steel tanks
- Corrosion protection for tank bottoms and underground piping
- Secondary containment and diking
- Gauges and high level alarms
- Spill prevention valves
- Tank labels

Additional information is given for existing facilities and facility operation. Publication titles are given for sources of further information.

b.3. Underground Tanks: Proper Installation

This brochure summarizes the regulations for construction, installation and monitoring of new underground petroleum storage tanks in New York State as given in Part 614 of 6 NYCRR. A description is given for each component of the underground storage system:

- Corrosion resistant tanks and pipes
- Secondary containment
- A leak monitoring system
- Overfill prevention equipment
- Fill port labels
- Underground piping access ports

Further information is given on facility operation, sources of help and more.

b.4. Underground Tanks: Testing

This brochure briefly describes the pollution and health problems arising from leaking underground storage tanks. It describes state requirements for tank testing, and the who, what and when of underground tank testing.

b.5. Upgrading Existing Facilities

This brochure was written for existing Petroleum Bulk Storage Facilities. It explains a part of Part 613 of 6 NYCRR. The compliance deadline for the requirements detailed in the brochure was December 17, 1990. Upgrading a facility includes:

- Color coding of fill ports.
- Adding gauges or warning alarms.
- Adding shutoff, operating and check valves.
- Adding secondary containment for aboveground tanks.

b.6. Aboveground Tanks: Inspections

This brochure describes the requirements of Section 613.6 of the Petroleum Bulk Storage regulations. Both monthly visual inspections and comprehensive 10-year inspections are described. Exemptions from the 10-year inspection requirement are listed. After-inspection requirements such as inspection reports, repair of equipment deficiencies and taking any uninspected portion of a facility out of service are also discussed. Aspects of the inspection process requiring services of a qualified engineer are described in some detail. Sources of further information available from the Department or the American Petroleum Institute are given. The DEC Regional Office addresses and phone numbers will be corrected in a new printing.

c. Petroleum Bulk Storage Registration Form

Article 17, Title 10 of the Environmental Conservation Law; Title 6 of the NYCRR, Parts 612 through 614 and Subpart 360-14 contain requirements for a registration program and certain details regarding registration. This form and accompanying instructions is used to register petroleum bulk storage facilities. (Since 1986, over 71,000 underground storage tanks and 47,820 aboveground tanks have been registered.) The same form is used for initial registration, new facilities, change of ownership, substantial tank modification, information correction or registration removal. Information requested on side A includes facility and owner type, name, address, identification and other registration numbers.

On side B, information on individual tanks is entered including tank number, installation and closure date, tank and piping materials, spill and leak protection devices and materials, and information on the hazardous substances in storage. Fees, in amounts listed on the form, are required for initial registration, change of ownership and renewals.

d. Petroleum and Chemical Bulk Storage Contractors List

This list is the result of a 1990 survey (updated annually) conducted by DEC. In addition to an alphabetical listing of contractors with name and address, telephone number and contact person, it also indicates the type of services the contractor provides. These services include tank installation (underground and aboveground), testing of cathodic protection systems, tank closure, site assessment (a determination of whether there is any contamination of the environment). Also given are the methods for underground tank tests and aboveground tank inspections. There is also a list of DEC regions served by the contractor.

e.1. Recommended Practices for Aboveground Storage of Petroleum Products

This book was developed as a cooperative effort of DEC's Bureau of Spill Prevention and Response and Fred C. Hart Associates of New York, NY. It was developed as a guide for engineers, inspectors and owners who are upgrading or designing their facilities for leak and spill prevention. Although the manual presents guidelines and recommended practices, it also instructs the reader that the services of a professional engineer should be sought to design storage facilities for the specific petroleum product(s) of concern.

The book is divided into nine chapters. It starts by discussing types of facilities and how they operate and are designed. Then it moves to the components of the facility. Tanks and piping systems, including loading racks, and the leak and spill containment system make up the structural part of the facility. Other chapters cover operational aspects of the facility such as operator responsibility for prevention of spills, operation of

spill control devices or practices, and secondary containment. Leak and spill detection, facility inspection and maintenance, personnel training, and Spill Prevention, Control, and Countermeasure Plans are also discussed in the book.

Throughout the book, state regulations are cited or summarized, tables of industry standards provide summaries of selected information, and photographs show components of operating petroleum storage facilities. Appendices give information on bringing an old facility into compliance, what to examine when acquiring a bulk storage facility, and a glossary of terms.

e.2. Recommended Practices for Underground Storage of Petroleum

Like the *Recommended Standards for Aboveground Storage of Petroleum Products*, this book was also a cooperative effort of Fred C. Hart Associates of New York, NY and DEC's Bureau of Spill Prevention and Response. This publication is intended for engineers, inspectors and owners who are designing or upgrading their underground facilities for leak and spill prevention.

This document contains the Department's recommended practices for (1) the design of tanks and piping systems; (2) installation of UST systems; (3) secondary containment; (4) leak detection; (5) overfill protection and transfer spill prevention; (6) storage system tightness testing; (7) storage tank rehabilitation; and (8) the closure of underground storage facilities.

e.3. Getting Out From Under: Underground Storage Tank Alternatives for Small Towns

This guide, published by the National Association of Towns and Townships, is one of the most recent publications on USTs for local governments. A companion video is also available. The guide explains the problem facing small towns and summarizes the risk management approach of the guidebook. It discusses the fact that the cost of the improvements can bring towns to consider the option of tank closure and fuel purchasing.

The 5 chapters in this document explain the problem in technical terms, outline existing federal

regulations, describe risk management options available to local governments (including providing 3 case studies) and list sources of help available to municipal officials. Appendices in the document provide an UST survey form and list publications and videos on the subject that are available.

f. Petroleum Underground Storage Tanks: Compliance with NYSDEC and USEPA UST Requirements

This 4-page document provides a side-by-side listing of the applicability of state and federal underground storage tank definitions as given in the regulations; and a summary of requirements that must be fulfilled to comply with both federal and state regulations. For information on tanks governed by just one set of regulations, see individual program regulations. The last page is the NYS Bulk Storage Program Publications List.

2. Spills Prevention Operations Technology Series (SPOTS) Memos

Management practices for control of nonpoint source pollution by spill prevention are given in the following guidance memos. SPOTS memos are written to Regional Spill Supervisors, Bureau Directors and Section Chiefs, and are also available to the regulated public. They provide a brief discussion of the regulations followed by detailed guidance on implementing and enforcing the regulations. Missing SPOTS memos are obsolete, except for SPOTS memo #15 that provides Regional DEC program administration guidance.

a. SPOTS Memo #2: Tightness Testing Underground Petroleum Storage Tank Systems

This memo is a guide to the DEC regulations for tightness testing of underground petroleum storage tanks and piping. Included in this guidance are the requirements for testing, the criteria that a tightness test must meet to be acceptable to the Department, and the required qualifications for test technicians. A list of test methods acceptable in New York State is found in Appendix I. In addition, it lists the conditions under which an internal inspection or other alternative method

acceptable to the Department may be substituted for a tightness test. Finally, the relationship of the federal UST requirements to New York State's requirements is discussed in Appendix II.

b. SPOTS Memo #4: *Inventory Control Requirements at Underground Petroleum Storage Facilities*

This memo provides guidance on detecting petroleum product leaks by monitoring product inventories. How existing tank systems can meet the regulations is discussed for both metered and unmetered systems. Leak monitoring systems at new facilities are discussed as a superior alternative to traditional inventory monitoring. A daily inventory monitoring worksheet with instructions is also provided for use at facilities without leak monitoring systems.

c. SPOTS Memo #5: *Inspection of Aboveground Petroleum Storage Tanks*

This document provides guidance for inspections conducted by facility owners or operators as required by the Petroleum Bulk Storage Regulations [6 NYCRR Section 613.6(a) (monthly inspections) and Section 613.6(b) (10-year inspections)]. It summarizes registration, tank testing, installation of new tanks, and goes into detail on the two types of inspections. Further general guidance is given for enforcement actions to be taken when noncompliance with inspection requirements is found. A list of typical violations is given. Appendices provide inspection checklists, confined space entry permit examples, and descriptions of nondestructive tank testing techniques.

d. SPOTS Memo #6: *Overfill and Spill Prevention Equipment for Petroleum Storage Tanks*

This memo provides a background discussion of overfilling and spilling incidents and a list of the regulations addressing the problems. It describes various types of equipment or devices needed to comply with state and federal regulations.

In New York State, the Petroleum Bulk Storage (PBS) Regulations [6 NYCRR Section 613.3, Sections 614.14 (g)(1) and (2)] set forth overfill/spill prevention requirements for the handling and storage of petroleum at aboveground and underground storage systems. At the federal level, U.S. Environmental Protection Agency (EPA) Underground Storage Tank (UST) Regulations [40 CFR Section 280.20(c)] require installation of overfill/spill prevention equipment that will prevent release of regulated products from underground storage tanks (USTs).

The guidance section provides detailed, labeled diagrams of appurtenances or devices available to prevent spills and overfilling, including color-coded fill ports, valves, gauges, sensors, alarms and shut-off devices. Appendices provide further details on tank installation layouts, marking systems and valves, and equipment manufacturers and their addresses.

e. SPOTS Memo #7: *Underground Petroleum Piping Systems*

Technical guidance is provided for new underground petroleum piping systems and the repair or replacement of existing systems as required by the Petroleum Bulk Storage (PBS) regulations (6 NYCRR) in Section 614.14. Regulations for corrosion protection, access ports, installation, joint and pipe tightness testing, leak detection, and safety valves are all briefly described. Further details and specifications are given for each topic. Explanations and guidance are given specific to soil types, pipe dimensions and pipe materials. Appendices include names and addresses for equipment suppliers, corrosion control advisors and the Natural Resources Conservation Service (NRCS) for soils information.

f. SPOTS Memo #10: *Secondary Containment Systems for Aboveground Storage Tanks*

This memo provides guidance on secondary containment systems for aboveground petroleum tanks. The document explains that secondary containment is required for tanks with a capacity of less than 10,000 gallons if a tank failure is considered "likely to discharge to the waters of the

State." Facility location within 500 feet of the following is considered presumptive evidence of that likelihood:

- perennial or intermittent streams;
- public or private well;
- primary or principal aquifers as defined in USGS reports referenced in the Appendix;
- wetlands as defined in 6 NYCRR Part 664;
- lake/pond, estuary, etc.; or
- storm drain.

PBS regulations (6 NYCRR Part 613) require secondary containment for aboveground tanks with a capacity of 10,000 gallons or more, without exception.

The memo does not provide details on how to attain compliance. It prescribes the preparation of an engineering report to do so. The engineering report should detail the complementary relationship between the secondary containment system and the facility's Spill Prevention Control and Countermeasure (SPCC) Plan.

g. SPOTS Memo #11: *Chemical Bulk Storage Regulations: Manufacturers' Technical Guidance for Spill Prevention*

This memorandum outlines technical requirements for storage and handling of hazardous substances set forth by the Chemical Bulk Storage (CBS) Regulations, 6 NYCRR Part 596.5. The requirements include information on the following:

1. Physical and chemical properties data.
2. Design and construction of storage tanks and systems.
3. Conditions for safe and proper substance storage.
4. Recommended storage equipment.
5. Equipment inspection and maintenance procedures.
6. Safety precautions.
7. Emergency response.

Since July 15, 1989, manufacturers or distributors of hazardous substances have been required to supply the owners and operators of bulk

storage tanks with technical guidance and recommended practices for the proper storage and handling of such substances. The DEC Technical Guidance Checklist is included as an appendix.

h. SPOTS Memo #13: *Storage Regulations for Oxygenated Motor Fuels and Alternative Fuels*

This memo addresses the regulation of the storage of fuel mixtures under the Petroleum Bulk Storage (PBS) and Chemical Bulk Storage (CBS) Regulations. It primarily identifies which regulations apply to mixtures of gasoline, oxygenating substances (oxygenates) and additives, such as ethers, alcohols, cosolvents and corrosion inhibitors in various ratio compositions.

The guidance section of this memo designates the regulation of gasoline with additives of 16% or less under the Petroleum Bulk Storage (PBS) Regulations and methanol with 10% to 30% gasoline under the Chemical Bulk Storage (CBS) Regulations. There are no approved fuel blends for gasoline with additives greater than 16% or methanol with gasoline additives greater than 30% at the present time; and they are not expected in the near future. The guidance states that future determinations on the proper regulations to govern any automotive fuel will be done on a case-by-case basis. A glossary of terms related to fuel mixtures is also included.

i. SPOTS Memo #14: *Site Assessments at Bulk Storage Facilities*

This memo provides guidance for tank owners or operators on conducting site assessments as required under the federal EPA Underground Storage Tank (UST) Regulations (40 CFR Part 280). They are conducted when an owner or operator closes an underground tank storing a regulated substance. A site assessment is different than a site investigation. A site assessment is designed to determine if there is any contamination present. If any contamination is found, then a site investigation needs to be done to determine the extent of the problem.

The memo focuses on those studies and measurements needed to determine if the site is free

of contamination and is suitable for closure, but it does not address the level of site investigation to be performed if contamination is discovered, the action levels at which clean-up is required, or what is considered clean. These topics are addressed in the Spill Technology and Remediation Series (STARS) Memo #1: *Petroleum-Contaminated Soil Guidance Policy*. (See Spill Response publication list in Section III.B. for STARS Memo #1.)

Appendix 1 provides details on field instruments including skill level required, calibration requirements, applications and limitations. Appendix 2 provides references for approved scientific methods for analyzing water, soil and free product samples. A site assessment checklist for recordkeeping is in Appendix 3.

j. SPOTS Memo #17: *Alternatives to Secondary Containment for Small Aboveground Petroleum Tanks*

This memo is written for tanks of less than 10,000 gallon capacity. Tanks of 10,000 gallons of capacity or more must have secondary containment, as defined in 6 NYCRR Part 613, without exception.

For small tanks, there are eight causes of spills which must be prevented by tank construction and associated equipment. If the following are prevented, secondary containment is not required:

1. Overfills coming from the fill port, vent and/or emergency vent.
2. Spills at the fill port from the delivery hose.
3. Leaks from valves, pumps, or other connections to the tank.
4. Flow from valves left open either by accident or by vandals.
5. Vehicular traffic that could contact the tank and make it rupture.
6. Flooding and floatation.
7. Fires around the tank that could cause the tank to weaken, rupture or overflow.
8. Vandalism with ballistics.

For the small tanks being discussed by this guidance memo, the Department requires that a storage tank and the associated equipment be designed to prevent discharges from occurring or

that a dike system be installed to prevent these discharges from reaching the environment. Guidance that describes tank design or available equipment is provided for each of the potential causes of spills listed above. An appendix provides examples of systems of tanks, dikes and equipment that are acceptable for complying with Section 613.3(c)(6)(i) of the Petroleum Bulk Storage (PBS) Regulations.

3. *Federal Publications on Underground and Aboveground Storage*

a. *Federal Underground Storage Tank (UST) Notification Form*

This 3-page federal form is to be filled out by the owner of the bulk storage facility within 30 days after bringing a tank into service. Although it is a federal form, owners return them to New York State. Besides owner and facility name and address, there are nine items to complete for each tank and five items to fill out for the entire facility. The object is to ascertain the probable structural integrity of the tank, its structural and procedural leak resistance, and its owner's fiscal ability to pay for a leak or spill.

b. *Subtitle I of the Resource Conservation and Recovery Act (RCRA)*

Commonly known as the Federal Underground Storage Tank (UST) Law, Subtitle I is the legal basis for the federal and state regulation of underground storage tanks. This federal law requires in Section 9002 that tank owners notify the state or local agency designated to implement the federal UST law of the existence, age, size, type, location and use of their tanks. Exempt tanks are noted in Section 9001. Minimum requirements for release detection, prevention and correction are given in Section 9003. These include: (1) maintain some kind of leak detection system that protects human health and the environment; (2) maintain records of the detection system; (3) require reporting of releases and corrective action taken; (4) require corrective action to be taken in response to a UST leak; (5) require closure methods to prevent future releases. Additional regulations

require owners to maintain evidence of financial responsibility, and new tanks to meet certain performance standards.

Section 9004 establishes the state and federal roles in developing and approving state regulatory programs for USTs. Section 9005 requires owners to furnish information and assures confidentiality in certain circumstances. Section 9006 establishes enforcement procedures and fines. Section 9007 applies to federal facilities; and 9008 allows states to establish programs more stringent than the federal program. Section 9009 calls for federal studies of petroleum tanks, other underground storage tanks, farm and heating oil tanks (exempted in Section 9001). Section 9010 authorizes payment for the program as specified in Section 2007(g) of RCRA.

c. Federal Underground Storage Tank (UST) Regulations - 40 CFR Part 280

These federal regulations provide performance standards, specific methods and referenced standards to be used or implemented by owners of USTs in complying with the federal UST law (Subtitle I of RCRA). They are divided into seven subparts. The sections provide definitions and performance standards as well as outlining requirements for general operations, leak detection, release reporting, release response and for temporary or permanent tank closure. The document also contains a copy of the federal UST notification form with instructions.

d. MUSTS FOR USTS - A Summary of Federal Regulations for Underground Storage Tank Systems

This federal guidance document begins with a brief description of existing problems with leaking Underground Storage Tanks (USTs) and the regulations that are meant to prevent and detect releases and to correct the problems they cause. The document also has more detailed information on installation, leak detection, spill and overflow protection and corrosion protection. Further guidance is given to owners and operators regarding required responses to leaking USTs, tank and pipeline repairs, and temporary and permanent

tank closures. Reporting and recordkeeping requirements are also summarized.

A section entitled "For Hazardous Substance USTs Only," describes additional UST requirements that apply to new and existing hazardous substance USTs. Hazardous substances are those designated in Section 101(14) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). The reporting requirements for "reportable quantities" are also stated.

e. DOLLARS AND SENSE - Financial Responsibility Requirements for Underground Storage Tanks

This 16-page booklet published by EPA describes federal financial responsibility requirements for owners of USTs that store petroleum. The requirements are designed to make sure that someone can pay the costs of cleaning up leaks and compensate third-parties for bodily injury and property damage caused by leaking USTs.

Details are given regarding who is responsible (owners and operators), what facilities must meet the requirements (exceptions are listed), and how much coverage is required (a table is shown that includes deadlines and dollar amounts by UST groups). Various financial instruments are described that can be obtained in order to comply with the requirements.

f. STRAIGHT TALK ON TANKS: Leak Detection Methods for Petroleum Underground Storage Tanks and Piping

This July 1995 EPA publication begins with an overview on regulatory requirements for leak detection. The sections that follow focus on leak detection methods. The purpose is to encourage compliance with regulations, to facilitate early preventive action, and to avoid high cost cleanups and enforcement actions.

The methods identified that can be used to meet federal leak detection requirements are: (1) secondary containment with interstitial monitoring; (2) automatic tank gauging systems; (3) vapor

monitoring; (4) groundwater monitoring; (5) statistical inventory reconciliation; and (6) other methods approved by New York State and EPA.

Each section answers the questions:

- Will you, the owner, be in compliance using the method?
- How does the leak detection method work?
- What are the regulatory requirements?
- Will it work at your site?

The last four pages contain lists of publications and videos about USTs and a list of state contacts for UST information.

g. *Federal EPA Oil Pollution Prevention Regulations - 40 CFR Part 112*

This set of regulations, effective since July 1, 1983, is being revised into a two-phase set of regulations. This current set of regulations is useful to explain the intent and approach of the EPA in controlling pollution from oil spills.

These regulations are applicable if the facility has total aboveground storage capacity greater than 1,320 gallons, or any single aboveground tank with capacity greater than 660 gallons, or has total underground storage capacity greater than 42,000 gallons. The regulations call for the preparation and implementation of a Spill Prevention Control and Countermeasure (SPCC) Plan for applicable facilities. They describe the required contents of the plan and specify penalties for not preparing or implementing the plan.

4. *State Chemical Bulk Storage (CBS) Publications*

a. *Chemical Bulk Storage Regulations (6NYCRR Parts 595-599)*

Title 6 NYCRR Parts 595-599 were published August 11, 1994. Part 595 pertains to the reporting of releases and applies to hazardous substances listed in Part 597 but not to hazardous waste or petroleum releases. Part 595 includes prohibition of

releases, the liability of violating the regulation and requirements for reporting releases.

Part 596 lists requirements pertaining to the bulk storage of hazardous substances. These include: (1) registration of stationary storage tanks and registration fees; (2) provision of technical guidance on recommended storage, maintenance, inspection, safety and spill and emergency practices for purchasers of hazardous substances; and (3) emergency response, spill investigation, and corrective action procedures or best management practices required by owners and operators selling and delivering hazardous substances.

Part 597 is the list hazardous substances.

Part 598 pertains to the handling and storage of hazardous substances. Provisions include changes to local laws or ordinances, practices for storage in floodplains, transfer procedures, upgrading storage systems, testing and inspecting underground storage systems, inspecting aboveground tank systems, recordkeeping, maintenance and repair of facilities, closure or change-in-service procedures, and assurance of financial responsibility.

Part 599 contains standards for new or modified hazardous substance storage facilities. Requirements are given for new tank parts and designs, secondary containment, tank installation, piping system materials, detecting leaks as well as spill and overfill protection.

Other issues addressed by these Chemical Bulk Storage regulations include definitions, severability, references to industry standards, variances, confidentiality, right-to-access, required reports and enforcement procedures.

b.1. *Registration Brochure*

This brochure is similar to the Petroleum Bulk Storage Registration brochure. It briefly describes the need for a program to control hazardous wastes, and the components of the program as presented in Article 40 of the ECL. The implementation regulations, 6 NYCRR Parts 595-599, are listed but the emphasis of this brochure is on Part 596, Registration. The who, what and

where of the registration process are defined including tank size threshold for registration (185 gallons, 750 kilograms), exemptions, deadlines, posting of certificate, identification numbers, renewal and fees. An update of the brochure is needed to correct DEC Regional Office addresses and phone numbers.

b.2. Hazardous Substance Bulk Storage Application

This two-sided form, along with an instruction sheet facilitates the Division of Spill Response's registration of tanks. The same form is used for initial registration, new facilities, change of ownership, substantial tank modification, information correction or registration renewal. Information requested on side one includes site and owner identification information. On the second side, information for individual tanks is entered. Fees, in amounts listed on the form, are required for initial registration, change of ownership and renewals.

c.1. Technology for the Storage of Hazardous Liquids - A State-of-the-art Review

This document is a compilation of the state-of-the-art equipment for 1983. It was produced as a cooperative effort between the Bureau of Spill Prevention and Response and Fred C. Hart Associates of New York, N.Y. The book is divided into three parts: an extensive introduction to the storage of hazardous substances; underground storage systems, and aboveground storage systems. Part I addresses the types and causes of leaks from both above-ground and underground storage systems. It also covers behavior of spills in the environment and corrosion types, sources and protection systems. Chapter 2 of Part I gives properties, and storage and handling protocols of hazardous substances.

Parts II and III are written in a parallel style with seven chapters in each part covering tanks, piping systems, spill containment systems, transfer spill and overflow prevention systems, leak and spill monitoring, testing inspection and maintenance of tanks; and temporary closure, abandonment and removal of tanks. The basic principles presented are generally applicable for all hazardous

substances. However, sound engineering principles must be applied in the design and installation of bulk storage systems for specific materials at specific locations. Parts II and III also contain many lists, tables and diagrams to assist the reader in making comparisons between tank and pipe material types, or various available flow control devices; and visualizing installations, procedures, and relative positioning of system components.

c.2. Siting Manual for Storing Hazardous Substances - A Practical Guide for Local Officials

This document is a guide and a reference document for local officials and developers to use in the siting of bulk storage facilities for hazardous substances. The introduction explains the pervasiveness of hazardous substances in household products and the various processes of society that use and transport these hazardous substances. A list is given of local officials who are or could be involved with the siting of hazardous substance storage facilities. The section continues with discussions of the roles and responsibilities of these officials, causes and effects of leaks and spills, all with an emphasis on prevention as the ultimate solution for protecting the environment.

The book contains six more sections that describe the characteristics of hazardous substances and how state and federal agencies control and monitor them; storage systems and their components; separation criteria used for siting storage facilities; site assessment and selection procedures and sources of required background information; risk assessment methods from consultants, the American Petroleum Institute, NYS Department of Health, and the USGS; and decision-making procedures.

The remainder of the manual contains the federal listing of hazardous substances; precautionary storage, loading and containment designs; the SEQR Short Form for Environmental Assessment; federal, state, substate, regional, and county governmental advisory agencies; the LeGrand Analysis for evaluating groundwater contamination potential; and federal, state and local programs pertinent for siting hazardous substance storage facilities.

c.3. Administrative and Legal Options for Storing Hazardous Substances

The stated objectives of the manual are: (1) to identify local options (laws, policies, standards, criteria, and guide-lines) for controlling the storage of hazardous substances and (2) to encourage the enforcement of existing laws and adoption of new laws, policies, and administrative procedures to prevent the release of these substances to the environment.

The document describes environmental problems caused when toxic and hazardous substances are improperly stored or handled, highlights federal and state laws related to hazardous substances, outlines the legal authority that local municipalities have to deal with this issue and explains some of the details of local programs. It also contains a glossary and a model local law for the storage of hazardous substances.

c.4. Recommended Practices for Storing and Handling Hazardous Substances

This book was developed as a guide for engineers, operators and managers who are responsible for storing and handling hazardous chemicals.

The book presents graphic explanations of the hazards of mishandling chemicals, and the physical and chemical properties of hazardous substances. The overall theme of the book is the prevention of leaks and spills.

Chapters 2 and 3 address siting criteria, factors to consider in facility layout and the types and uses of storage vessels. Design, materials and installation are discussed for various types of aboveground and underground tanks. Protection of vessels from puncture, corrosion and fire is discussed. Other chapters describe ancillary equipment such as piping systems, pumps and vents; types of secondary containment including pools and curbs, vaults and dikes; management plans for spill prevention and response as well as leak detection and monitoring. Chapter 8 provides a checklist of external inspection items for tanks. Chapter 10 presents the three fundamental rules of spill response: a) know the chemical; b) have a

trained response leader and c) keep an up-to-date contingency plan.

Appendices provide a guide to chemical compatibility, a list of chemical compounds, chemical reactivity groups, sources of further information, lists of codes and standards, and a list of companies and trademarks referenced in the document.

5. Technical Papers and Memos

a. Standpipe Testing of Underground Storage Tanks

This guidance paper provides a method of monitoring petroleum product inventory in unmetered tanks, thus meeting the regulatory requirement of 6 NYCRR Section 613.4(a). The method described is based on field experiments conducted by the NYSDEC Division of Water in 1986. Included in the description are an equipment list, limitations of the test, a detailed description of the test itself, and a section on interpretation of test results. Factors influencing the results are tank size, temperature fluctuations, water table changes and vapor pocket expansion or contraction. A checklist-style summary sheet is also provided as an aid in conducting the test.

b. Pneumatic Testing of Underground Storage Tanks

This memo gives the technical basis for rejecting pneumatic testing as a tank tightness testing method. Several shortcomings are noted; and results of calculations are shown for various tank sizes, pressures and product levels. This technical paper is now for reference; it is no longer used as day-to-day guidance for owners or operators.

c. Permanent Closure of Underground Petroleum Storage Tanks

This memo addresses tank and tank contents disposal. It reflects both Bulk Storage and Solid and Hazardous Waste Program policies. Regulations of 6 NYCRR Section 613.9(b) must be met. It gives owners and operators guidance on how to comply

with those regulations and what to do with the resulting wastes (i.e., scrap metal, waste liquid and sludge, and contaminated soil).

d. Method for Evaluating the Acceptability of a Diking System and Recommended Permeability Standards for Secondary Containment of Gasoline, #2 Fuel Oil, #4 Fuel Oil and #6 Fuel Oil

This paper describes permeability standards recommended for the construction of an acceptable diking system. Relationships between the permeability coefficients of water and fuels are discussed in terms of lost product and depth of penetration into the protective clay liner. The lost product quantity and the depth of petroleum product penetration are also shown in relation to the time taken to clean up a spill. The results are used to give recommended water permeability coefficients for secondary containment systems. Guidance is provided for applying the method to other fuels and hazardous substances.

e. Permeability Testing Methods for Secondary Containment Systems

This memo discusses a few of the available testing methods for determining a soil's permeability. Both laboratory and in-place (in situ) tests are discussed as well as factors that affect test results, such as soil type, the varying of soil layers at various depths, and soil/void space ratios.

Background information about secondary containment is also presented including regulations, proper construction of secondary containment dikes, and diversion of spills to a retention pond or holding tank.

Conclusions and recommendations are given regarding the application of permeability test results to attaining compliance with secondary containment. Criteria required by the department are: certification by a professional engineer; test results that show a profile of permeabilities along the entire diked area; permeability attained so that a 72-hour clean-up can be conducted with 6 inches or less of soil contaminated; and permeability determined for the lightest product stored.

f. Profiles of Major Industrial Chemicals in New York State

This paper identifies the 22 hazardous substances that comprise 85% of those stored in bulk in New York State. For each, a single data sheet lists a unique identification (CAS) number, chemical characteristics and physical data, descriptions of likely chemical reactions and neutralizing techniques, environmental and health hazards, fire fighting details, and spill or leak control tips.

The data sheet section is preceded by a section describing general information on storage of hazardous chemicals and the four broad classes of aboveground chemical storage tanks:

- i. atmospheric (vented) tanks.
- ii. low pressure tanks (internal pressures range from 0.5 psig to 15 psig).
- iii. high pressure tanks (internal pressures are greater than 15 psig).
- iv. solid storage.

This document is useful as quick reference for field work and inspections.

6. Tank Bulletin

The Tank Bulletin is a newsletter published periodically by the Division of Spills Management. The Tank Bulletin contains articles of interest to tank owners and operators on current events and on the compliance program details and deadlines. Articles may apply to small businesses or major oil storage facilities (MOSFs). Besides providing assistance for complying with state and federal requirements, articles provide information on financing, legal rulings, current technology, and statistical reports of the industry and regulatory programs. Availability announcements for publications and videos are also printed.

7. Candidate Bulletin for the International Fire Code Institute's Voluntary Certification Program

This brochure is for contractors who wish to participate in the voluntary certification program

administered by IFCI. Contractors can demonstrate their knowledge of various regulatory codes, standards and practices pertaining to underground storage tanks. The brochure provides detailed information on program administration. Also included is a description of the four exams that may be taken. NYSDEC views this certification program favorably. It provides a service to the petrochemical industry that the Department cannot.

III. LEAKS, SPILLS AND ACCIDENTS MANAGEMENT PRACTICES FOR SPILL RESPONSE

Management Practices addressing nonpoint source pollution from spills are given in the following list. The management practices have been summed up in one word. The associated letters head the matrix columns in section III.B. The matrix indicates which publications contain which management practices.

III.A Management Practices for New York State's Spill Response Program	
MATRIX ENTRY	MANAGEMENT PRACTICE
A. Containment	Containment of Spills
B. Inspection	Inspection and Maintenance of Spill Control Equipment
C. First Response	Control of Initial Spills (First Response)
D. Cleanup	Spill Countermeasure, Cleanup and Disposal Plans and Practices
E. Training	Spill Response and Spill Control Equipment Training
F. Reporting	Spill Reporting Procedures
G. Material	Material Compatibility Analysis

III.B Spill Response Publications							
	A	B	C	D	E	F	G
1. Hotline Brochure			•			•	
2. NYS Spill Response Program for Petroleum and Hazardous Material			•	•		•	
3. Petroleum Cleanup Stipulation Agreements			•	•			
4. Spill Technology and Remediation Series (STARS) Memo #1: Petroleum-Contaminated Soil Guidance Policy				•			
5. Spill Response—Basic Procedures and Requirements for Responsible Parties in NYS	•	•	•	•		•	
6. Sampling Guidelines and Protocols			•	•	•		
7. Manuals from NYS Chemical Bulk Storage Program							
a. Technology for the Storage of Hazardous Liquids	•	•	•	•	•	•	•
b. Recommended Practices for Storing and Handling Hazardous Substances	•	•	•	•	•	•	•
A—Containment B—Inspection C—First Response D—Cleanup E—Training F—Reporting G—Material							

III.C. PUBLICATION SUMMARIES

1. Hotline: To Report Oil and Hazardous Material Spills

This brochure describes what a person should do when discovering or witnessing a leak, spill or abandoned drum(s). Local, state or federal authorities may have to be notified depending on the material spilled. State and federal phone numbers are given. Information that should be supplied to the hotline is listed, and includes responsible party, location, injury, material and vehicle information.

2. New York State Spill Response Program for Petroleum and Hazardous Materials

This brochure describes the possible dangers of spills on the land, in the water and in the air. The 24-hour per day, 7 days per week hotline is central to the spill response program. The brochure describes how the statewide program is organized around the hotline and explains what the spill responders will and will not do in relation to the responsible party, the spiller, clean-up contractors and the spill itself. Laws and regulations are cited. Both the state hotline and National Response Center phone numbers are given.

3. Petroleum Cleanup Stipulation Agreement

This brochure describes the Stipulation Agreement (STIP) between DEC and a potential responsible party (PRP). The origin of this short-form consent order is given along with what distinguishes it from a long-form consent order. Several questions are posed and then answered regarding the applicability of a STIP and the benefits to the PRP of using one.

4. Spill Technology and Remediation Series (STARS) Memo #1:

Petroleum-Contaminated Soil Guidance Policy

The Petroleum-Contaminated Soil Guidance Policy is intended to provide direction on the handling, disposal and/or reuse of nonhazardous petroleum-contaminated soils. The reuse or disposal options for excavated soils vary, depending on the level of treatment provided consistent with protecting the public health and the environment. While this document does not establish standards, it does identify criteria for determining whether soils are contaminated to levels that require remediation.

This document also constitutes a determination of beneficial use by the Department, as defined in Solid Waste Regulation NYCRR Part 360. Petroleum-contaminated soil, if determined to satisfy the criteria herein, can be reused or disposed of as directed in this guidance. Therefore, soils which meet beneficial use conditions are no longer a solid waste in accordance with NYCRR Part 360-1.2(a)(4).

This guidance is intended for Regional Spill Investigators, Regional Solid Waste staff and responsible parties to assist them in determining the acceptability of remedial activities at a petroleum spill site or in determining the acceptability of a site assessment. While the document was developed for excavated soils, it may be applied to nonexcavated material as well. The evaluation method and criteria included in this guidance may be used to determine the limits of contamination, such as defining the extent of contamination in an excavation that contains contaminated material. There may be instances where the DEC will opt to digress from the guidance to establish cleanup goals reflecting site-specific circumstances at a particular petroleum spill site.

The guidance may also be used by responsible parties to develop corrective action plans that will achieve the criteria set forth in this document. Criteria are given for the protection of groundwater, human health, fish and wildlife, and against objectionable nuisance characteristics.

Nuisance characteristics include petroleum-type odors and any contaminant concentration greater than 10,000 parts per billion.

Laboratory analysis, including EPA methods, and sample collection methods are both described. A distinction is made between gasoline-contaminated soils and fuel oil-contaminated soils. Each has its own list of components of concern and corresponding guidance values.

Management of nonexcavated (in-situ) contaminated soil is briefly discussed, primarily in the context of forthcoming guidance.

5. Spill Response: Basic Procedures and Requirements for Responsible Parties in NYS

This booklet was written in 1991 by the Bureau of Spill Prevention and Response. It is a guide for helping responsible parties respond to all types of spills, but is primarily focused on notification, containment, investigation, corrective action, disposal and ending cleanup of petroleum spills.

Chapters discuss: responsibilities of the responsible party, DEC, and local agencies and organizations; confinement and containment of surface spills; investigation and monitoring of

underground spills; soil, surface and groundwater remediation; spill residuals treatment or disposal options; and spill closure procedures.

The booklet also contains several diagrams to assist the reader in visualizing containment and monitoring equipment and methods; and tables summarizing requirements, responsibilities or reference information. Check lists for initial response and spill termination are provided for use by the responsible party.

6. Sampling Guidelines and Protocols

This guidance document was written in March 1991 by the Bureau of Spill Prevention and Response. It provides technological background information on petroleum products and details QA/QC procedures to be used by Regional Spill Responders, Spill Contractors and Responsible Parties. The chapters in this document discuss: samples and factors affecting samples, characteristics of petroleum products, sampling equipment descriptions, equipment and container cleaning procedures, sampling procedures, sampling statistics and analytical methodologies. If you would like to obtain a copy of the Sampling guidelines and protocols document, please call the Operations Coordination Section at (518)457-2462. There is a \$7 charge for this document for non-DEC personnel.

Appendix I

Petroleum Product Storage, Spill Prevention, and Containment:

***A Management Practice Summary Sheet
from the NYS NPS
Management Practices Catalogue
for Agriculture***



MANAGEMENT PRACTICE SUMMARY SHEET



PETROLEUM PRODUCT STORAGE SPILL PREVENTION AND CONTAINMENT

DEFINITION

The use of proper design, construction, inspection and maintenance techniques for siting, installing, monitoring, inspecting, providing secondary containment and closing of liquid petroleum product storage and dispensing facilities to prevent and contain spills. (**Note:** This management practice pertains to facilities whose combined storage capacity is 1,100 gallons or less. Facilities with storage capacity greater than 1,100 gallons are regulated in New York State under Article 17, Title 10 of the Environmental Conservation Law.)

WATER QUALITY PURPOSE

To prevent ground and surface waterbodies from contamination from petroleum storage facility leaks and spills.

SOURCE CATEGORY

Agriculture / Surface Runoff.

POLLUTANTS CONTROLLED

Petroleum products contain a number of potentially toxic compounds including common solvents, such as benzene, toluene, and xylene and additives such as ethylene dibromide (EDB) and organic lead compounds.

WHERE USED

On farmsteads where liquid petroleum products are stored within 500 feet of a perennial or intermittent stream, public or private well, primary or principal aquifer, wetland, lake, pond or storm drain.

PRACTICE DESCRIPTION

This practice consists of a combination of one or more of the following depending on the water quality risk posed by the storage facility: Proper storage tank siting - considering: soil characteristics (corrosivity, permeability, bearing capacity, etc.), depth to groundwater, distance from a surface waterbody or drinking water well (minimum of 100' required), location of floodplains, vehicular traffic patterns around the tank site; and distance from existing and planned farm buildings (minimum of 25 feet recommended).

Proper tank design and installation - utilizing corrosive resistant tanks and pipes (e.g., tank contains label that it conforms with 6 NYCRR Part 614), using, double wall tanks with wall thickness of at least 7/16th" to protect against ballistics, steel posts to protect against vehicular traffic, anchoring or diking to avoid floatation in areas subject to flooding, installing roof over tank to exclude rain water, etc., and utilizing an experienced tank installer who is familiar with state petroleum tank installation requirements.

Spill and overflow prevention equipment installed such as color coding of fill ports, operating and shutoff valves, gauges and high level alarms, automated shutoff devices, tank labels (showing design and working capacity), spill catchment basin for fill ports of underground storage tanks.

Leak monitoring and tank inspection - provide checking of aboveground tank for corrosion and leaks; installing underground piping access ports for leak testing; installing a concrete pad under above-ground tanks to detect levels and installation of a monitoring well(e.g., 4" slotted plastic pipe) between underground storage tank and secondary containment barrier.

Secondary containment barrier - Aboveground: engineered dikes, curbs, liners, or diversion system designed to contain spills from above-ground tank rupture, overfills, vandals and equipment failure. Includes drainage provisions for stormwater that accumulates within the dike, curb or liner (**Note:** Any contaminated stormwater must be treated to reduce oil and grease concentration to 15 ppm before discharging.), also includes installing of double-wall tanks.

PRACTICE EFFECTIVENESS

IMPACT ON SURFACE WATER

IMPACT ON GROUNDWATER

ADVANTAGES

DISADVANTAGES

PRACTICE LIFESPAN

COST

OPERATION AND MAINTENANCE

MISCELLANEOUS COMMENTS

REFERENCES

University of Wisconsin-Extension, Cooperative Extension; Minnesota Extension Service; and the USEPA: Farmstead Assessment System Worksheet #4 Assessing the Risk of Groundwater Contamination from Petroleum Product Storage and Fact Sheet #4 Reducing the Risk of Groundwater Contamination by Improving Petroleum Product Storage, Madison, Wisconsin, July 1991.

NYSDEC, Petroleum Bulk Storage Regulation 6 NYCRR 612, 613 and 614. Albany, NY, December, 1985.

NYSDEC. Milligan M. Guidance Paper Method of Evaluating the Acceptability of a Diking System and Recommended Permeability Standards for Secondary Containment of Gasoline, #2 Fuel Oil, #4 Fuel Oil and #6 Fuel Oil. Albany, NY. June 1988.

NYSDEC. Spots Guidance Series Memos #5 Inspection of Aboveground Petroleum Storage Tanks. Albany, NY 1987. #6 Overfill Prevention Equipment for Petroleum Storage Tanks. Albany, NY August 1994. #10 Secondary Containment Systems for Aboveground Storage Tanks. Albany, NY 1994. #17 Alternatives to Secondary Containment for Small Aboveground Petroleum Tanks. Albany, NY. August 1994.

Ontario Ministry of Agriculture Food and Rural Affairs. Kennedy, B., Myslik J., Hilborn, D. Farm Contingency Plans, Ontario, Canada. November 1994.

Spill emergency response plan - includes a written emergency plan at the storage facility location that shows action to be taken in case of a spill, leak, fire or explosion. Cleanup equipment should also be available at the site. Tank replacement - involves replacing underground bare steel tank with corrosive resistant tank especially if tank is 15 years or older. Closing down an out-of-service facility - removing all liquid petroleum material, disconnecting all fill lines and filling with inert material such as sand or concrete slurry, and site assessment.

Where designed, installed and maintained properly this practice can significantly reduce the risk of a cataclysmic event occurring from a petroleum spill or leak.

Beneficial.

Beneficial.

*Provides direct protection to farmstead drinking water in addition to the potential offsite water quality benefits particularly if a site evaluation is conducted to identify those facilities that pose a significant pollution risk.

*NYSDEC estimates that of the 150,000 tanks storing petroleum in New York state, many are bare steel and were installed underground in the 1950's and 1960's. These tanks have become weakened by rust and have a fifty percent chance of developing leaks.

New installation of corrosive resistant tanks and pipes should have a service life of 30 years or more.

Varies depending on whether a new storage facility is needed to replace an existing, leaking facility or whether an existing facility needs to be upgraded to include leak detection and spill prevention equipment.

User should visually inspect tanks monthly and conduct structural inspection of the tank and lines every ten years. In unmetred tanks the fuel level should be checked twice per month. The tank should not be used 12 hours. The level of fuel in the tank at start should be measured, recorded and compared with the level of fuel measured at the end of the 12-hour period. Leak detection system if installed (e.g. monitoring well for underground tank and pad under tank if aboveground) should be checked daily. A spill contingency plan should be developed for the farm and appropriate containment and control materials stored in a clearly marked, easily accessible cabinet or locker on the farm. Records should be kept of dates and types of inspections performed, as well as any leaks detected. **Note:** State law requires landowners to report any leak or spill of petroleum using the 24 hour spill hotline 1-800-457-7362.

Leaks from underground petroleum storage are difficult to detect especially since most of the tanks installed on farms lack a leak monitoring system. Also, most landowners are unaware of the significant groundwater contamination risk to their own water supply posed by these underground storage tanks.

1. The first part of the report discusses the background of the project and the objectives of the study.

2. The second part of the report describes the methodology used in the study and the results of the data analysis.

3.

4. The final part of the report discusses the conclusions of the study and the implications for future research.

5. The report concludes with a summary of the findings and a list of references.

The first part of the report discusses the background of the project and the objectives of the study. The second part of the report describes the methodology used in the study and the results of the data analysis.

The final part of the report discusses the conclusions of the study and the implications for future research. The report concludes with a summary of the findings and a list of references.

The report concludes with a summary of the findings and a list of references.