City of Spokane
CRITICAL MATERIALS HANDBOOK

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Critical Materials
Technical Advisory Committee

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CRITICAL MATERIALS HANDBOOK
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TECHNICAL ADVISORY COMMITTEE

The original Technical Advisory Committee was created in 1977 to oversee the technical aspects of the development of the Water Quality Management Plan. This group has evolved to those agencies that are responsible for aquifer protection and enforcement within the City of Spokane. The development of this manual was possible with the cooperation of other agencies that have an enforcement role in the protection of the Spokane Aquifer. It is intended that this Committee will continue to operate in cooperation with the Regional Aquifer Protection agencies to be able to maintain and update this manual.

ACKNOWLEDGEMENTS

This handbook reflects the contributions of a large number of individuals and organizations. We would like to thank those who have contributed material and reviewed text. Specifically, the State of Idaho Department of Environmental Quality is recognized for their cooperation in allowing this document to use part of the Kootenai County manual they developed.

Section I. Introduction

A. Purpose and Use of this Handbook.

The Aquifer Sensitive Area Overlay Zone (Section 4. 16A.000 of the Spokane County Zoning Code) and Spokane Municipal Code Section 17E.010 contains several performance criteria (Section 4.16A.050(4)) which, if satisfied, would result in nearly complete protection of both surface and ground water from any adverse impacts resulting from critical material spills. It is the intent that the freedom of design allowed by stating performance criteria in the Code will result in control measures being developed which apply to each specific problem. This in turn should result in the most cost effective solution for each job. There are a number of tested and proven methods for preventing and controlling spills. In this handbook we present in a general way many of these ideas.

It is the intent of this manual to provide information that will be useful to several segments of the community. Those who are considering locating an activity that uses critical materials within the Aquifer Protection Area will be able to get a general idea of the situations most likely to result in spills, some mechanisms that may be employed to reduce the likelihood of a spill and some control measures that may be required to contain those spills that do occur. Facility designers unfamiliar with spill control facilities may find ideas that can be employed directly or modified to fit particular situations they encounter in their day to day work. Those entrusted with enforcing the provisions of the Zoning Code may use the ideas presented here as a yardstick against which they may judge the effectiveness of proposed spill protection measures.

In using any of these ideas for specific applications care must be taken to avoid interpreting the information presented in the handbook too literally. For example, several types of impervious liners are indicated in different diagrams. The type specified in the diagram may not be appropriate for the product involved in a particular situation; an appropriate liner should be called for in the design, not the one shown in the diagram.

In general the Aquifer Sensitive Area Overlay Zone requires the use of structural secondary containment systems in areas where critical materials will be stored or used. A large portion of this handbook is directed at providing exhibits of ideas that can be used to design such facilities. However, successful operation of any program to prevent product spills or leaks from reaching the aquifer requires an integrated approach. Proper employee training, facility maintenance and spill clean up planning are also required.

When necessary reference the *Spokane Regional Stormwater Manual* regarding standards for stormwater design and management to protect water quality, natural

drainage systems and down-gradient properties as urban development occurs. The purpose of the manual is to help communities in the Spokane region protect water quality, prevent adverse impacts from flooding, and control stormwater runoff to levels equivalent to those that occurred prior to development. During the revision process of this Handbook, the manual was referenced and some content was utilized.

Section II.
Critical Materials

A. Critical Materials Definitions.

Glossary

Aggregate	Total amount of critical material constituents from every container on site.
AST	Above Ground Storage Tank - One tank, or a combination of tanks, including connected piping, that is used to contain critical materials, and whose volume is greater than 90% above ground.
Base Flood Elevation	The elevation of a 100-year flood.
BMP	Best Management Practice - A practice or combination of practices determined to be the most effective and practical means of preventing or reducing contamination to soil or ground water.
CAS	Chemical Abstract Service.
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980.
CMR	Critical Materials Regulation.
Critical Material	A critical material is compound or substance, or class thereof, designated by the division director of public works and utilities which, by intentional or accidental release into the aquifer, could result in the impairment of one or more of the beneficial uses of aquifer water and/or impair aquifer water quality indicator levels. Beneficial uses include, but are not limited to: A. domestic and industrial water supply, B. agricultural irrigation, C. stock water, and D. fish propagation.
DOE	State of Washington, Department of Ecology
Freeboard	Vertical distance between the top of the containment wall, and the surface of the material contained therein.
Medium	Refers to a mixture, wherein the medium is generally the larger, nonhazardous, and non-reactive portion of the mixture.
MSDS	Material Safety Data Sheet.

NDWW	Non-domestic Waste Water.
OPA	Oil Pollution Act.
OSHA	Occupational Safety and Health Administration.
OWS	Oil/ Water Separator.
SARA	Superfund Amendments Reauthorization Act.
SRHD	Spokane Regional Health District.
Sheen	A petroleum product layer, on water, less than 0.1 inches in depth. Visually identified by a bright, reflective layer on water, ranging in color from silver to a rainbow hue.
Site	A parcel, or contiguous parcels, of land on which a single business or operation takes place, or an individual business or operational entity among multiple businesses within a single parcel of land.
Solvent	A substance in which a chemical is dissolved. Usually the substance present in larger quantity and/or the substance that does not change state when mixed
WAC	A numbering designation for all administrative rules in Washington.

B. Critical Materials List.

In order to standardize the names and quantities of products to be included under the critical material definition, a Critical Materials List has been established. The list contains both the name of a product and the quantity of that product which is considered to pose a threat to aquifer quality, referred to as the critical quantity. The core of this list is the discarded chemical products list contained in the State Dangerous Waste Regulations WAC 173-303. In addition, any substance for which a criteria level has been established by a local, state or federal agency has been added to this core. As used here a criteria level is a concentration at which a beneficial use is impaired. Where more than one criteria level for any given chemical or class of chemicals has been set, the lowest concentration was used to calculate the critical quantity. This list is discussed in Appendix A of this document.

The critical quantity of a product is calculated by determining the amount of material needed to raise the average concentration in a plume conforming to the shape of one-half of a right circular cone with a vertex angle of three degrees and an axis length of one-half mile to the criteria level. For most situations in the Spokane Valley-Rathdrum Prairie Aquifer this is equivalent to the amount of material needed

to effect the tabulated (established threshold) concentration increase in 84 million gallons of water.

The critical quantity for products is denoted on the critical material list. All products are regulated in regards to handling and best management practices and will be subject to review for containment requirements. The handling of hazardous/waste materials will be in accordance with applicable laws.

In many cases product mixtures not appearing directly on the list should be controlled because one or more of the components is on the list. Where this is the case the component which results in the smallest critical quantity should be used in establishing the regulated amount.

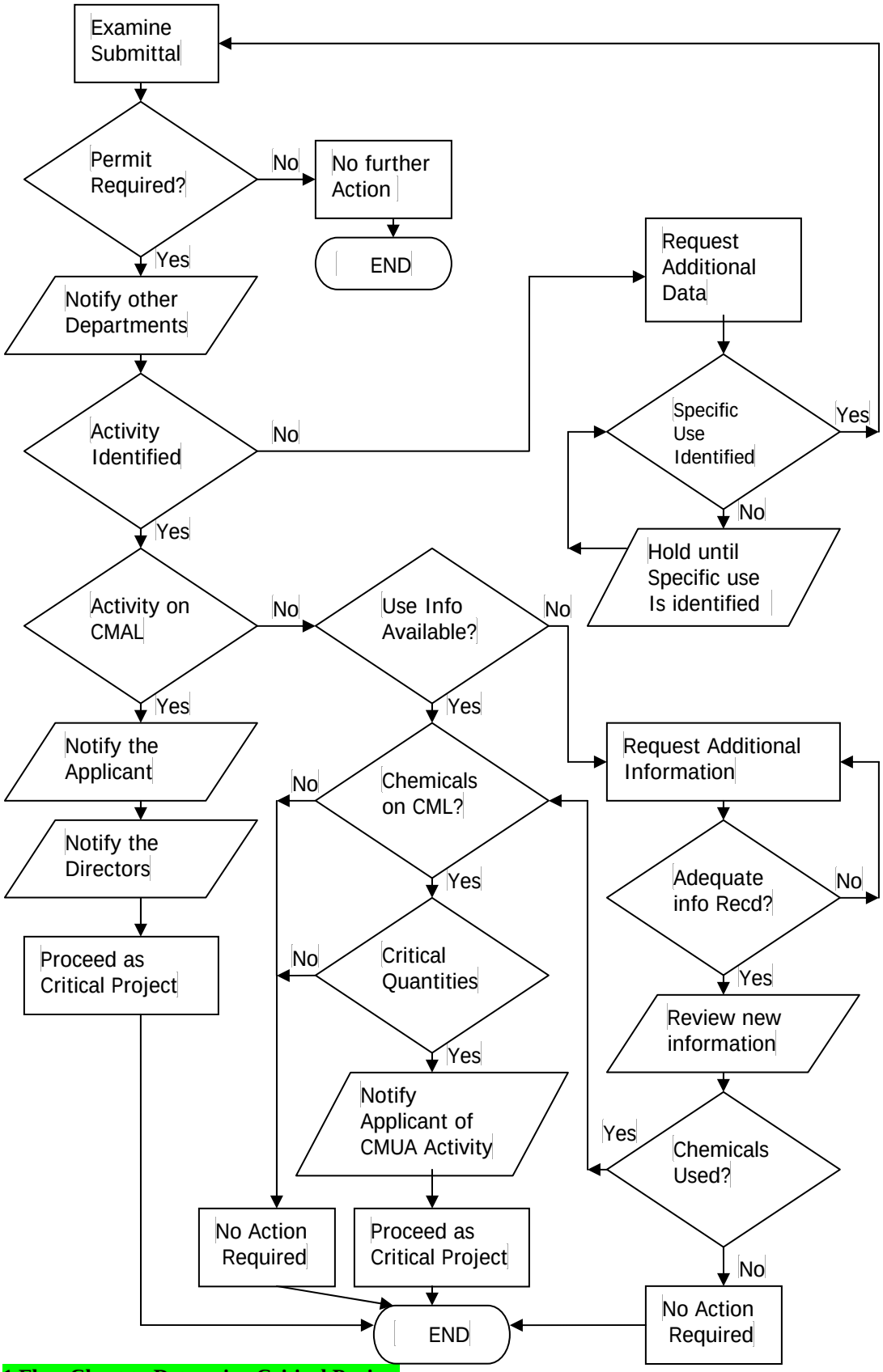
C. Critical Materials Activity List.

The identification of activities which will have critical materials on site is the key to effective implementation of this overlay zone. The Critical Materials Activity List provides a relatively simple means for accomplishing this task. These sources have been updated with more recent information where possible. This list includes the business activity, the Standard Industrial Classification (SIC) and North American Industrial Classification System (NAICS) codes associated with that activity, the types of products reported as being used in the activity in the surveys and where available information on the quantity of product typically found. This list is included in Appendix A of this handbook.

Also included in this handbook is a general listing of businesses having SIC and NAICS codes associated with activities likely to store and/or transport or use critical materials. (See Appendix B) This list should be referred to when the initial review of a proposed project includes activities not found on the Critical Materials Use Activity List. Any activity found on this list but not included on the preceding list should be examined in detail for the potential use of critical materials. If it is found that the activity does involve critical materials, subsequent action should be taken to include the activity on the Critical Materials Use Activity List.

D. Identification of Critical Material Use Activities.

It may not be clear whether or not critical materials use is involved at the time a proposal for development is made. The following flow chart summarizes the procedure for designating a Critical Material Use Activity in the City of Spokane. Reference to this flow chart should simplify application of the provisions of the zone.



1 Flow Chart to Determine Critical Project

Section III. Best Management Practices for the Prevention and Control of Spills

A. Selecting a Secondary Containment Site

Selecting an appropriate site for secondary containment can be important to the ease of operation and maintenance, as well as more protective of the environment. The following are examples of various agency requirements:

Wells – The protection of wells and well heads is currently being reviewed. A regional wellhead protection policy is being developed.

Surface Water and Flood Plains - DOE requires that hazardous and deleterious materials be stored so they will not enter state waters. City of Spokane ordinances require that above ground storage tanks not be located below base flood elevations.

Buildings and Combustible Materials - The Fire Code requires minimum distances between hazardous materials and any buildings or other combustible materials depending upon the amount of materials.

Property Lines – Building and Fire codes require setbacks from the property line depending upon the amount of materials. Additionally local, state, and federal codes often have setback requirements.

B. Constructing a Secondary Containment Site

General

The type of materials used for containment will need to be carefully selected. For instance, laminated, coated, or clad primary containment walls are considered single-walled containment and shall not be construed to fulfill the requirements of secondary containment. The use of Best Management Practices (BMPs) is suggested as the primary guideline for the design and maintenance of secondary containment systems.

There are other factors that may affect the operation of the containment system. For instance, elevating metal primary containment containers above the floor of the secondary containment will reduce corrosion at the bottom of the containment unit.

Depending on the BMP selected, an engineering plan and specification review may be required. All secondary containment systems must be designed and built using generally accepted engineering and construction practices.

Construction Materials

Secondary containment materials must be compatible (impermeable to) with the material being stored. Containers shall be constructed of materials of sufficient thickness and composition so as not to be structurally weakened as a result of contact with accumulated storm water or discharged hazardous materials, weathering, or from the movement of materials or machinery within the containment area.

Capacity

The capacity of secondary containment is addressed in Section IV of this handbook. Spokane Municipal Code 17E.010 is the code reference for secondary containment.

C. Containment Options – Containment options must be approved by the City. Examples of containment are:

Materials

Recognized secondary containment options for storing critical materials include:

Concrete or epoxy-lined concrete.

Metal or metal/polymer (fabricated).

Fiberglass.

Bermed with a synthetic liner.

Double-walled tanks.

Commercially manufactured prefabricated materials.

Piping

Secondary containment options for piping include:

Double-walled piping.

Single-walled piping within a concrete, metal, or imperviously lined trough.

On/Off Loading Areas

Stormwater needs to comply with the Spokane Regional Stormwater Manual. Secondary containment options for other on/off loading areas include:

An impervious pad draining to an above ground storage tank (AST) containment area.

An impervious pad draining to a sealed sump or trench.

Inside Storage

Secondary containment options for inside storage include:

A concrete floor sloped to a containment sump.

A concrete floor sloped to drains that are piped to a containment vessel. (pipe and vessel would need to be provided with secondary containment)

A concrete floor with curb or berm perimeter.

Prefabricated, portable secondary containment units.

D. Operating and Maintaining a Secondary Containment System

Properly operating and maintaining a secondary containment system is critical. To ensure the system continues to function as designed, it is important to regularly inspect and test the containment structure, manage the accumulation of storm water and leaking product, and develop contingency plans for releases.

Loading/ Unloading

Storage and transport containers should include built-in overfill devices to stop the flow of product when the container is full. These containers should also be watched closely by site personnel when in use.

Inspections

Conduct daily inspections of the containment area to include checking:

the secondary containment system for structural integrity,

for the presence of leaks or storm water,

for the presence of debris,

the condition of valves and piping, and

the condition of primary containment.

When access to secondary containment is not physically possible (e.g., double-walled tanks), inspect the interstitial monitoring system to ensure that the system is functioning properly. It is recommended that facilities document the inspection using a checklist, which should then be on file for at least two years. An example checklist is provided to assist in conducting a thorough inspection *(See Appendix D, Daily Facility Inspection Checklist).*

Leaking Product and Accumulated Storm Water

Leaking product that has accumulated in secondary containment should be removed and properly disposed of as soon as possible, or in any case, within 24 hours of discovery. The Washington State Department of Ecology and the Spokane Fire Department need to be notified if a leak has occurred.

Accumulated storm water should be removed any time the amount accumulated compromises the capacity requirement discussed in Section 3B. In the event that the storm water and product have mixed together, the mixture should be removed and properly disposed of within 24 hours of discovery. Hazardous waste will be handled as required by law. Contact the City of Spokane Environmental Programs for current available disposal options.

Primary and Secondary Containment Integrity

Test the integrity of the primary containment system prior to filling the container, following nationally recognized testing standards. For primary tanks, refer to Steel Tank Institute Guidance SPOO1-00, American Petroleum Institute Guidance 653, or other industry standard documents. For piping, refer to American Petroleum Institute Guidance 570 or equivalent.

Visually inspect the primary and secondary containment during the daily inspections mentioned above. If the secondary containment cannot be visually inspected, an annual test of the integrity of the containment should be performed. Hydrostatic or pneumatic tests are both acceptable. Hydrostatic testing entails filling the secondary containment with water and monitoring the fluid level for 24 hours or longer. Pneumatic testing evaluates the welds of the synthetic liner.

Contingency Plans

It is recommended that a contingency plan be developed for the site. This plan should include step-by-step instructions in the event of a spill or any other type of emergency. It is also recommended that response/cleanup materials be kept on site. A “Spill Prevention Control and Countermeasures Plan” (part of the federal Oil Pollution Act (OPA)) would cover the above recommendations, and may be required

if there is a possibility of petroleum overland flow to “waters of the United States” as defined in the OPA statutes.

Training

Training should be provided to all operation and maintenance personnel. The training should include:

loading operations and how to shut off pumps and valves,

location of emergency response and cleanup supplies, and

contact numbers for outside assistance (medical and cleanup response).

E. Construction/Management Alternatives for Storm Water

If storm water can enter into secondary containment, the facility must provide a means for removing and properly disposing of the storm water. Facilities should submit documentation to the appropriate jurisdictional agency regarding storm water testing and disposal. Testing will determine if spilled product has contaminated the water. Disposal options can be established based on whether the storm water is clean or contaminated. Some products in storm water can be identified by visual observation alone. These products must be readily identifiable, float on top of the water and be immiscible with the water. For other products that mix with or are otherwise not visually identifiable in the water, a sample or samples should be collected for laboratory analysis.

Non-Domestic Waste Water (NDWW)

Non-domestic waste water is any waste water at a site that is not produced as sanitary waste water from restroom facilities, showers, or kitchens. NDWW cannot be disposed to any subsurface location without specific approval of the City of Spokane or other authoritative agency. Subsurface disposal of NDWW can contaminate soils and ground water and may become a significant cleanup liability for the owner of the site. If municipal sewer services are available, then the facility must connect and provide proper pretreatment as determined by the waste water treatment plant. If municipal services are **not** available, a recirculation or evaporative system will be required. In all cases, facilities disposing of waste water must submit plans for review (SMC – 13.03A.0212) and will be encouraged to reduce or recycle waste water streams.

F. Who to Contact

Initial contact will normally be with the Building or Fire Department, but could involve other City Departments.

Fire	625-7000
Building	625-6300
Engineering Services	625-6270
Pre-Treatment	625-4600
Environmental Programs	625-6570

Section IV. Spill Control

A. Application of spill control technology and methodology.

Structural systems should be based on the simple criteria that any site on which critical materials are used will be designed so no spilled product will reach unprotected ground surface. The areas in any facility where product transfer activities take place or storage units are located should be designed and constructed with a special emphasis on spill control. Precautions taken during the design stage can greatly reduce the number of spills that occur and will facilitate the cleanup of those that do.

All personnel should be familiar with spill notification procedures and spill clean up plans. They should also have some knowledge of the nature of the products used on site; those working directly with products should be keenly aware of the potential hazards the products they use pose not only to themselves but also to the environment.

B. Structural methods for the control of spills.

In the context of this handbook structural methods for spill control will generally fit the category of secondary containment. A number of ideas for secondary containment systems are described in Appendix C. These are not intended to be engineering design drawings and are intended to be used as a guide for developing specific systems most appropriate for the site in which they are installed. Underground storage tanks and their associated piping, floor drains in critical material use areas and storm water drywells in loading areas are examples of facilities requiring secondary containment.

Other appropriate structural methods of spill control referenced in other documents (such as the protection features for storage facilities described in WAC 173-303) should be used if they provide an advantage over those presented here.

The choice of materials is an important factor in the design of containment systems, especially where the storage of solvents is involved. Containment products may be made from one or more materials that are available. Since the actual formulation used in the product may have properties which differ from those listed, the manufacturer's test data on each product should be consulted if there is any doubt as to product suitability and compatibility with the stored materials.

C. Containment Volume of Secondary Containment Systems.

In order to be effective containment systems must be large enough to contain all the material released in a spill. A containment volume of 110 percent of the

container volume is normally required, but is affected by other factors such as weather, fire sprinklers, and drainage.

For interior storage where a number of small containers are stored the containment volume should hold a volume of at least three times the volume of the largest container or 10 percent of the total volume of liquid stored. If both critical materials and non-regulated materials are stored together, the non-regulated materials should be included in the volume calculations. If the liquids mix during a spill, the entire mixture becomes a critical material.

Outdoor facilities not protected from precipitation should provide containment for the required product volume plus the precipitation from a 100 year precipitation event. Consideration must be made during design for the separation of precipitation and leaked or spilled products or provisions made for proper disposal of the volume of both the precipitation and the product in the event of a release.

Indoor facilities where fire sprinkler systems are installed are required to have the containment designed to hold a minimum of 20 minutes of fire sprinkler flow plus the capacity of the largest container.

Nonstructural procedures for the prevention and control of spills

The following list summarizes areas where operating guidelines and employee training can significantly reduce the potential for and impact of spills. The concepts have been generalized to assist in maintaining wide applicability. As indicated above care should be exercised to insure that the list serves as a guide, not as the final word in how to implement a particular program.

Detection of tank and line leaks
Pressure testing Inventory methods
Periodic inspection of tanks and lines
Prevention of tank overflows
Posting caution signs in the off loading area
Audible warning signals for full tanks
Prevention of line breakage due to collision.
Paint lines in exposed areas with bright colors
Emergency diking
Have available waterproof sand bags
Have available a stockpile of soil and the equipment needed to move it.
Spill clean-up
Have available synthetic absorbent materials for cleaning up small spills or final cleaning at the site of a large spill.
Have available soil~ clay, sawdust or similar material for absorbing spills.

D. Model spill prevention, control and clean-up plan.

As with most efforts of this nature there is a weakness in even the best design. No physical structure can be relied on if it is not maintained; no procedure will be effective if the workers do not follow it. Inspection of facilities and training of workers is an essential part of any spill prevention program. The following model Spill Prevention, Control and Clean-up Plan (SPCC) can serve as a focal point of such a training program.

The spill plan developed for any particular activity should serve several functions. It should provide an outline of the overall spill control program and how that program will accomplish the performance criteria contained in the Zoning Code. It should provide a general description of the physical facilities available for the control of spills and describe the operational and maintenance procedures needed to insure their effectiveness. And it should outline the procedures to be followed in the event of a spill, including a notification schedule listing all corporate and regulatory agency personnel that should be notified in the event of a spill and what disposal procedures should be used for cleaned-up materials.

Developing a Model SPCC

a. Identification and Notification.

The first part of the SPCC should contain a description of the business including the business name and address, the nature of business and the general types of products used in the operation.

This section should also provide a detailed account of the notification procedures to be used in the event of a spill. The names and phone numbers of all corporate officials, public safety organizations and regulatory agencies should be included. The priority of notification should also be listed.

b. Site Plan.

The SPCC plan should contain a site plan showing the location of all buildings and other structures, roadways, parking areas, loading areas and storm drainage facilities. The plan should show the direction of storm water flow from all impervious surfaces, and, if ground disposal of storm water is used, describe the facilities installed to prevent accidental spills from entering the storm water system.

c. Physical description of potential spill sources.

A table such as that illustrated below should be included to describe potential spills for each area where critical materials are stored or used. Each "Source of Spill" should be located on the site plan.

Source of Spill	Type of Failure	Maximum Volume	Maximum Flow	Product	Prevention Measure
(Examples)					
Above ground tank	Rupture	1000 gal	100 gpm	Gasoline	diked containment
Above ground tank	Overflow	1000 gal	50 gpm	Gasoline	diked containment
Chemical store drum	Rupture	50 gal	50 gpm	Trichloroethane	floor drain to sump

d. Specific Spill Control Procedures.

For each of the potential spill situations provide detailed account procedures for the following:

- A list of structural features employed to prevent or contain spills.
- A list of operational spill prevention procedures and non-structural containment and clean-up methods available for use.
- A summary of the proper methods to be used for the disposal of cleaned up spill material.
- A list of the names and contact procedures for persons to be notified in the event of a spill and employees with special skills that may be useful in dealing with a particular spill situation.

e. Training Program.

The SPCC plan should contain a brief description of the methods which will be used to train employees to deal with spills and the nature of the information which will be covered in training sessions.

At a minimum the information contained in the SPCC Plan and manufacturer's data on the hazards posed by and clean up methods for the product(s) on site will be presented in the training program.

APPENDIX A
Critical Materials and
Critical Material Use Activity Lists

APPENDIX A
CRITICAL MATERIALS LIST

Critical Material lists have been developed over time to the point that including the list in this manual would not be practical. The current list of critical materials is a separate document and is maintained on a regular basis to include any change. Any activity which involves the use, handling or storage of any product on the list in the quantity designated is by definition a Critical Materials Use Activity and is subject to regulation.

The list of products is fairly extensive, but is not exhaustive. However, the wide variety of products found on the list and their frequent use in the chemical industry normally result in the presence of at least one critical materials at any location where regulation is needed to assure water quality protection. Should a water quality threat develop as a result of the use of a product not on the list, action should be taken to amend the list and apply the conditions of the ordinance to any activity involving that product.

The current Critical Materials List is maintained by the City of Spokane Environmental Programs staff. A hard copy or electronic copy can be obtained upon request.

APPENDIX B

North American Industrial Classification Codes (NAICS) for activities likely to use chemicals

APPENDIX B
NORTH AMERICAN INDUSTRIAL CLASSIFICATION CODES for
Activities Most Likely to Involve Chemicals

The following list of Standard Industrial Classification Codes includes most of the activities which involve the use of chemicals. The association of chemical use with a given code was made from the description of the code contained in the 1972 Standard Industrial Classification Code handbook or from on site inventories of activities in the Spokane area. While this list will provide a general guide to those activities which can be expected to handle chemicals more detailed information on the nature of the business and the chemicals used can be obtained by referring to the parent document. Industrial surveys of various types can also provide additional information.

NORTH AMERICAN INDUSTRIAL CLASSIFICATION CODE Partial Listing

<u>Agricultural and Related Services</u>	
Soil preparation services	0711 (NAICS 115112)
Crop planting, cultivating and protection	0721 (NAICS 115112)
Veterinary services	0742 NAICS 54194)
Lawn and garden services	0782 (NAICS 56173)
Ornamental tree and shrub service	0783 (NAICS 56173)
<u>Metal Mining</u>	
Silver Mining	1044 (NAICS 212222)
Uranium Mining	1094 (NAICS 212291)
Anthracite Mining	1231 (NAICS 212113)
Bitumunious Coal and Lignite Mining	1221 (NAICS 212111)
<u>Mining and Quarrying of Nonmetalic Minerals, except Fuels</u>	
Construction sand and gravel	1442 (NAICS 212321)
Industrial sand	1446 (NAICS 212322)
Clay, ceramic and refractory minerals~ nec	1459 (NAICS 212325)
Building Construction -- General Contractors and Operative Engineers	1531 (NAICS 23331)
Construction other than Building -- General Contractors	1542 (NAICS 23332)
Highway and street construction~ except elevated highways	1611 (NAICS 23411)
Bridge, tunnel and elevated highway construction	1622 (NAICS 23412)
<u>Construction -- Special Trade Contractors</u>	
Plumbing and heating contractors	1711 (NAICS 23511)
Painting~ paper hanging and decorating	1721 (NAICS 23521)
Electrical work	1731 (NAICS 23531)
Masonry, stone setting and other stonework	1741 (NAICS 23541)
Roofing and sheetmetal work	1761 (NAICS 23561)

Concrete work 1771 (NAICS 23542 Stucco, 23571 Contractors)

Food and Kindred Products

Fluid milk 2026 (NAICS 311511)

Flour and other grain mill products 2041 (NAICS 311211)

Animal and marine fats and oils 2077 (NAICS 311613 Rendering, 311711 Seafood Canning, 311712 Fresh & Frozen Seafood Processing)

Textile Mill Products 2269 (Finishers of textiles) (NAICS 313312)

Lumber and Wood Products, except Furniture

Hardwood veneer 2435 (NAICS 321211)

Softwood veneer and plywood 2436 (NAICS 321212)

Structural wood members, nec 2439 (NAICS 321214 Trusses, 321213 Engineered Wood Member Manufacturing)

Wood preserving 2491 (NAICS 321114)

Particle board 2493 (NAICS 321219 Reconstituted Wood Product Manufacturing)

Furniture and Fixtures 2500 (NAICS 337000)

Paper and Allied Products

Pulp mills 2611 (NAICS 32211)

Papermills, except building paper mills 2621 (NAICS 322122 Newsprint Mills)

Printing, Publishing and Allied Industries

Newspapers; publishing and printing 2711 (NAICS 51111 Newspaper Publishers)

Commercial printing, letterpress and screen 2759 (NAICS 323113)

Commercial printing, lithographic 2752 (NAICS 323110)

Products

Industrial gases 2813 (NAICS 32512)

Inorganic pigments 2816 (NAICS 325131)

Industrial inorganic chemicals, nec 2819 (NAICS 325188)

Plastics materials, synthetic resins, and non-vulcanizable elastomers 2821 (NAICS 325211)

Biological products 2836 (NAICS 325414)

Soaps and other detergents, except specialty products 2841 (NAICS 325611)

Specialty cleaning, polishing and sanitation preparations 2842 (NAICS 325612)

Paints, varnishes, lacquers, enamels and allied products 2851 (NAICS 32551)

Nitrogen fertilizers 2873 (NAICS 325311)

Phosphatic fertilizers 2874 (NAICS 325312)

Fertilizers, mixing only 2875 (NAICS 325314)

Pesticides and agricultural chemicals, nec 2879 (NAICS 32532)

Printing ink 2893 (NAICS 32591)

Petroleum Refining and Related Industries 2911 (NAICS 32411)
Lubricating oils and greases 992 (NAICS 324191)
Rubber and Miscellaneous Plastics Products 3000 (NAICS 32622 Rubber and Plastics Hoses and Belting Manufacturing)
Leather and Leather Products
Leather tanning and finishing 3111 (NAICS 31611)
Stone, Clay, Glass and Concrete Products 3200 (NAICS 327331 Concrete Block and Brick Manufacturing)
Primary Metals Industries
Gray iron foundries 3321 (NAICS 331511)
Malleable iron foundries 3322 (NAICS 331511)
Steel foundries, nec 3325 (NAICS 331513 Steel Foundries (except Investment))
Primary production of aluminum 3334 (NAICS 331312)
Secondary smelting and refining of nonferrous metals 3341 (NAICS 331492 (except Aluminum and Copper)
Aluminum. sheet, plate and foil 3353 (NAICS 331315)
Aluminum, extruded products 3354 (NAICS 331316)
Aluminum foundries 3365 (NAICS 331524 (except die casting)
Brass, bronze. copper and copper base alloy foundries 3366 (NAICS 331525 (except Die Casting))
Fabricated Metal Products except Machinery and Transportation Equipment
Heating equipments except electric and warm air furnaces 3433 (NAICS 333414 (except warm air furnaces))
Fabricated plate work 3443 (NAICS 332313)
Sheet metal work 3444 (NAICS 332322)
Iron and steel forgings 3462 (NAICS 332111)
Electroplating, plating, polishing, anodizing and coloring 3471 (NAICS 332813)
Coating, engraving and allied services, nec 3479 (NAICS 332812)
Industrial Machinery and Equipment 3500 (NAICS 332999 Miscellaneous Fabricated Metal Product Manufacturing)
Electrical and Electronic Machinery, Equipment and Supplies
Power, distribution and specialty transformers 3612 (NAICS 335311)
Switch gear and switchboard apparatus 3613 (NAICS 335313)
Current carrying wiring devices 3643 (NAICS 335931)
Commercial, Industrial and Institutional electric lighting fixtures 3646 (NAICS 335122)
Radio and television transmitting, signaling and detection equipment and apparatus 3663 (NAICS 33422)
Cathode ray television picture tubes 3671 (NAICS 334411)
Semiconductors and related devices 3674 (NAICS 334413)

Electrical equipment for internal combustion engines 3699 (NAICS 335999 All other miscellaneous Electrical Equipment and Component Manufacturing)

Transportation Equipment

Motor vehicle parts and accessories 3714 (NAICS 336300)
Boat building and repairing 3732 (NAICS 336612)
Travel trailers and campers 3792 (NAICS 336214)
Transportation equipment~ nec 3799 (NAICS 336999)

Measuring, Analyzing and Controlling Instruments: Photographic, Medical and Optical Goods: Watches and Clocks

Miscellaneous Manufacturing Industries Marking devices 3953 (NAICS 339943)
Signs and advertising displays 3993 (NAICS 33995)
Manufacturing industries, nec 3999 (NAICS 339999 All Other Miscellaneous Manufacturing)

Railroad Transportation 4011 (NAICS 482111)
Switching and terminal establishments 4013 (NAICS 482112)

Local and Suburban Transit and Interurban Highway Passenger Transportation 4111 (NAICS 48511 Urban Transit)

Terminal and joint terminal maintenance facilities for motor vehicle transportation 4173 (NAICS 48849 Other Support Activities for Road Transportation)

Maintenance and service facilities for motor vehicle transportation 7549 (NAICS 48849 Other Support Activities for Road Transportation)

Motor Freight Transportation and Warehousing

Farm product warehousing and storage 4221 (NAICS 49313)
General warehousing and storage 4225 (NAICS 49311)
Special warehousing and storage~ nec 4226 (NAICS 49312 Refrigerated Warehousing and Storage)

Terminal and joint terminal maintenance facilities for motor freight transportation 4231 (NAICS 48849 Other Support Activities for Road Transportation)

Water Transportation 4449 (NAICS 483211 Inland Water Freight Transportation)

Transportation by Air 4512 (NAICS 481112 Scheduled Freight Air Transportation)

Pipe Lines~ except Natural Gas 4619 (NAICS 48699 All Other Pipeline Transportation)
Crude Petroleum Pipe Lines 4612 (NAICS 48611)
Refined Petroleum Pipe Lines 4613 (NAICS 48691)

Transportation Services

Packing and crating 4783 (NAICS 488991)

Services incidental to transportation, nec 4789 (NAICS 488999 All Other Support Activities for Transportation)
Communications 4899 (NAICS 51339 Other Telecommunications)
Electric, Gas and Sanitary Services (NAICS Utilities)
Electric services 4911 (NAICS 221111 Hydroelectric Power Generation)
Natural gas transmission and distribution 4923 (NAICS 22121 Natural Gas Distribution)
Natural gas distribution 4924 (NAICS 22121 Natural Gas Distribution)
Mixed, manufactured or liquefied petroleum gas production and/or distribution 4925 (NAICS 22121 Natural Gas Distribution)
Electric and other services combined 4931 (NAICS 221122 Electric Power Distribution)
Sewerage systems 4952 (NAICS 22132 Sewage Treatment Facilities)
Refuse systems 4953 (NAICS 562212 Solid Waste Landfill)
Sanitary services, nec 4959 (NAICS 56291 Remediation Services)
Steam and Air-Conditioning Supply 4961 (NAICS 22133)
Wholesale Trade -- Durable Goods
Photographic equipment and supplies 5043 (NAICS 42141)
Scrap and waste materials 5093 (NAICS 42193 Recyclable Material Wholesalers)
Wholesale Trade -- Nondurable Goods
Drugs, drug proprietaries and druggist sundries 5122 (NAICS 42221)
Chemicals and allied products 5169 (NAICS 4226)
Petroleum bulk stations and terminals 5171 (NAICS 42271)
Petroleum and petroleum products wholesalers, except bulk stations and terminals 5172 (NAICS 42272)
Farm supplies 5191 (NAICS 42291)
Paints, varnishes and supplies 5198 (NAICS 42295)
Building Materials, Hardware, Garden Supplies and Mobile Home Dealers
Paint, glass and wallpaper stores 5231 (NAICS 44412 Paint and Wallpaper Stores)
Hardware stores 5251 (NAICS 44413)
Retail nurseries, lawn and garden stores 5261 (NAICS 44422 Nursery and Garden Centers)
General Merchandise Stores 5399 (NAICS 45291 Warehouse Clubs and Superstores)
Food Stores 5499 (NAICS 445000 Food and Beverage Stores)

Automotive Dealers and Gasoline Service Stations

Gasoline service stations 5411 (NAICS 447100)

Miscellaneous Retail 5999 (NAICS 45391 Pet and Pet Supplies Stores)

Personal and Laundry Services

Coin operated laundries and dry cleaning 7215 (NAICS 81231)

Dry cleaning plants, except rug cleaning 7216 (NAICS 82132 Dry cleaning and Laundry Services (except Coin-Operated))

Carpet and upholstery cleaning 7217 (NAICS 56174)

Industrial laundries 7218 (NAICS 812332)

Business Services

Commercial photography, art and graphics 7335,7336 (NAICS 541922, 54143)

Disinfecting and exterminating services 7342 (NAICS 56171, 56172)

Photofinishing laboratories

Commercial testing laboratories 8734 (NAICS 54138 Testing Laboratories)

Automotive Repair, Services and Garages

Paint shops 7532 (NAICS 811121 Automotive Body, Paint and Interior Repair and Maintenance)

General automotive repair 7538 (NAICS 811111)

Automotive repair shops. nec 7539 (NAICS 811118 Other Automotive Mechanical and Electrical Repair and Maintenance)

Car washes 7542 (NAICS 811192)

Miscellaneous Repair Shops

Re-upholstery and furniture repair 7641 (NAICS 81142)

Repair shops and related services, nec 7699 Boiler Cleaning (NAICS 23511 Plumbing, Heating and Air-Conditioning Contractors)

Septic Tank and Related Services (NAICS 562991)

All other Miscellaneous Waste Management Services (NAICS 562998)

Other Support Activities for Water Transportation (NAICS 48839)

Health Services

General medical and surgical hospitals 8062 (NAICS 62211)

Specialty hospitals, except psychiatric 8069 (NAICS 62231)

Medical laboratories 8071 (NAICS 621511)

Educational Services

Colleges, universities and technical schools 8221 (NAICS 61131)

Junior colleges and technical institutes 8222 (NAICS 61121)

Miscellaneous Services

Noncommercial educational, scientific and research organizations 8999 (NAICS 514199 All Other Information Services)

APPENDIX C
Best Management Practices
Design Concepts

APPENDIX C

Best Management Practice (BMP) design concepts

The design concepts illustrated in this section are provided to stimulate ideas that will lead to the development of creative solution of specific design problems; they should not be viewed as engineering design drawings. The preparers of this handbook make no warranty as to the suitability of any of these designs for a specific situation. Plans using these or similar concepts should be prepared by qualified professionals for each installation. In preparing these plans the designer must consider the volume of product stored, the potential for chemical reaction between the containment system and the product and the type of monitoring that will be employed to detect leaks and assure continued reliability of the system.

As-built drawings showing the details of the system actually installed should be provided to both the operator of the facility and the agency responsible for design review.

List of Exhibits

1. **Concrete loading/unloading pad**
2. **Tank and loading/unloading containment area/pad**
3. **Containment pad to trench drain**
4. **Containment pad to oil/water separator**
5. **Canopy over concrete pad**
6. **Concrete containment**
7. **Floor containment**
8. **Membrane liner**
9. **Double wall piping**
10. **Secondary containment piping**
11. **Prefabricated storage units**
12. **Steel containment structure**
13. **Aboveground tank secondary containment**
14. **Temporary secondary containment**
15. **Underground storage tank in sub grade vault**
16. **Catch and store spills at loading docks**
17. **Covered loading docks**
18. **Grated perimeter drain**
19. **Floor drain collection**
20. **Sub-floor containment liner**
21. **Drain pans**
22. **Containers/Cabinets**
23. **Concrete Coatings**

BMP 1 - Concrete Loading/Unloading Pad

Description

An impervious concrete pad, preferably with curbing along the perimeter and a sloped surface to a low point on the pad is needed. The pad should cover the entire area under the transfer vehicle and have the capability to store a minimum of 100 gallons of product. The system must have controls for capturing and disposing of storm water, such as a sump or a drain that directs spilled product or storm water back to the main above ground storage tank containment area. It may be appropriate to line, coat, or seal the pad, depending on the material being transferred.

Application

Bulk transfer of liquid and solid non-petroleum critical materials: This includes, but is not limited to, bulk fertilizers, acids, caustics, road treating, and de-icing materials.

Design Parameters/Construction Guidelines

The pad should be constructed following generally-accepted engineering design and installation practices that account for the anticipated maximum load. The ingress and egress design must ensure the pad's integrity and holding capacity is not compromised. A canopy or covering can be added above the on/off loading area to reduce storm water accumulation. For covered and non-covered areas, the pad should be curbed and sloped to transmit spilled product or storm water to a collection area. This area can be the main product storage containment area or a separate sump or basin. The pad and sump should be sized to hold 100 gallons of product, as well as storm water from an average five-year storm event.

Figure 7 Loading platform that slopes to the center.

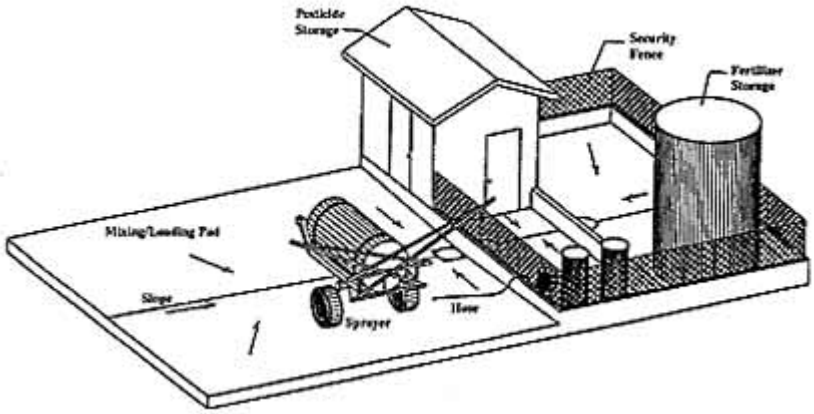
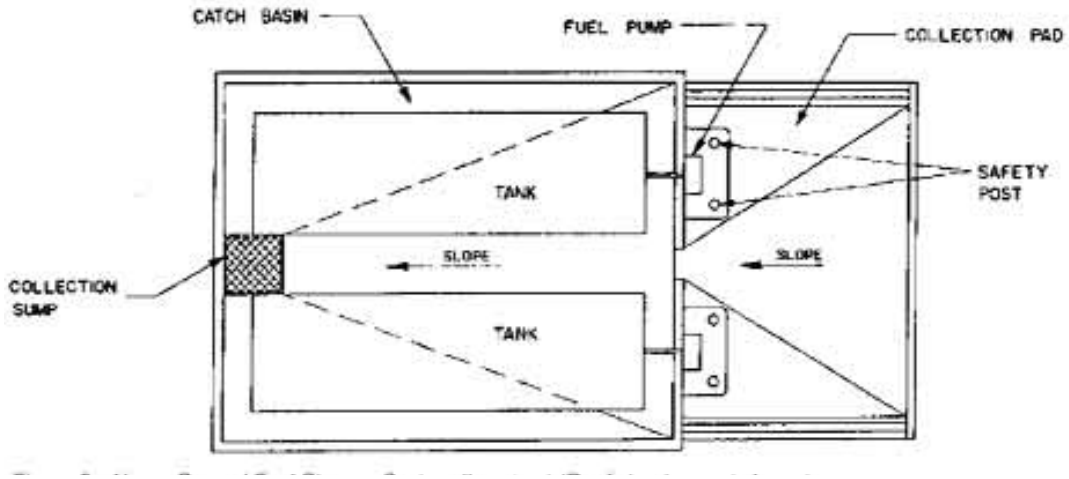


Figure On/Off loading pad that drains to the tank storage area.

Maintenance

The pad and drainage system must be inspected periodically to determine the integrity of the containment. Systems that accumulate storm water must be assessed after storm events to ensure that the 100 gallon product capacity has not been compromised. If accumulated storm water infringes on this capacity, the storm water should be pumped out and properly disposed of within 24 hours. Systems that accumulate grit and sand will eventually require pumping and proper disposal. Spill response and clean up materials should be stored on site.

BMP 2 - Tank and loading/Unloading containment area/pad



Description

A concrete slab that is sloped to the main above ground storage tank containment area. Slab may be curbed for additional containment ability. Spilled product and storm water drains to the tank containment for reuse or disposal. The tank area's secondary containment capacity must take into account the additional amount of fluids that could come from the on/off loading pad. This additional capacity must be a minimum of 100 gallons.

Application

This BMP is applicable for facilities that have above ground storage tanks in close proximity to the on/off loading area. This application also works well for sites that do not have the extra room to provide for a large storm water treatment area.

Advantages

_ Less cost than a pad with a canopy.
_ The storage for spilled product or storm water from the on/off load pad is the entire product storage, secondary containment area.
_ There is only one area where product or storm water would have to be pumped out.

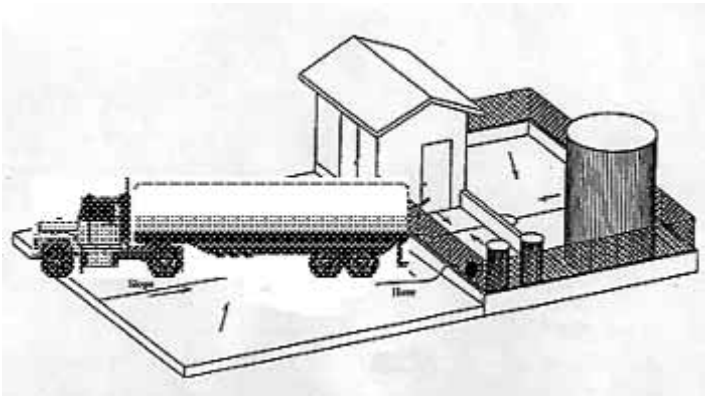
Disadvantages

_ More wastewater to be treated than a pad with a canopy.
_ A larger storage area must be built to accommodate storm water from the on/off loading pad and spilled product from the transfer equipment.
_ Aboveground storage tanks might need to be elevated due to the additional storm water coming from the on/off loading pad.

Design Parameters/Construction Guidelines

The pad should be constructed following acceptable engineering design and installation practices that account for the anticipated maximum load. The ingress and egress design must ensure that the pad's integrity or holding capacity is not compromised.

Coating the pad is recommended; however, the coating must be durable enough to stand up under the stress of vehicle movement and on/off loading operations. *(See Appendix C, Concrete Coating).*



Maintenance

The pad and drainage system must be inspected periodically to determine the integrity of the containment. The inspection should include measuring for adequate freeboard in the containment area. Spills should be cleaned up promptly. Storm water must be removed and properly disposed of when it infringes on required containment capacity.

BMP 3- Containment Pad to trench drain

Description

An area consisting of an impervious pad that drains to a blind sump or trench drain. All materials used must be compatible with and capable of containing minor spills (100-gallon minimum) of petroleum plus additional capacity for any storm water that has collected in the sump or drain.

Figure 11 trench located in shaded area of pad.

Application

Designed to contain small spills that occur when petroleum products are transferred between a stationary tank or tanks and a tanker truck, piece of machinery, or other vehicle. This application should be used only when a business is fueling its own equipment and its total storage tank capacity is less than 2,000 gallons. In such case the containment system should be designed and constructed in a fashion that would contain a petroleum release plus storm water accumulation.

Figure 12 On/off loading pad with blind sumps.

Advantages

- Ease of product recovery.
- Lower construction cost (e.g., no OWS, canopy, or additional piping).

Disadvantages

- Handling of storm water collected in the containment area and sump may add to operation and maintenance costs.

Figure 13 Small on/off loading pad with blind sump.

BMP 4- Containment pad to Oil/Water Separator

Description

A pad constructed of an impervious material (generally concrete) that is curbed or sloped to contain a minimum of 100 gallons of product. Spilled product and rain water drain from the pad to an oil-water separator (OWS). The water from the OWS discharges to a grassy swale or other approved wastewater disposal site.

Application

This BMP is recommended for smaller operations (storage of less than 10,000 gallons of petroleum)
where the cumulative amount of small spills from loading and unloading operations would be less likely to overload the storm water treatment system being used.

Advantages

- No collection and disposal costs for waste water accumulated within the containment system.
- Less cost than a pad with a canopy.
- The control valve at the OWS discharge can be closed, providing immediate, additional containment of product in the event of an emergency.

Disadvantages

- Upkeep and maintenance of OWS and grassy swale.
- More waste water to be treated than a pad with a canopy.
- More expensive than just a containment pad with sumps.
- May not be able to handle all of the product from a large release.
- The OWS is less efficient with higher water flow (large precipitation event).

Figure 14 Shows drain sump, OWS & grass infiltration area.

Design Parameters/Construction Guidelines

The pad should be constructed following acceptable engineering design and installation practices that account for the anticipated maximum load. The ingress and egress design must ensure that the pad's integrity or holding capacity is not compromised.

Coating the pad is recommended, however the coating must be compatible with the petroleum product and durable enough to stand up under the stress of vehicle movement and on/off loading operations (See Appendix C, Concrete Coatings).

The OWS must be sized to handle the maximum product discharges anticipated from the pad.

Operating/Maintaining/Inspecting

The pad and drainage system must be inspected periodically to determine the integrity of the containment. Inspection should include measuring for sludge buildup in the bottom of the OWS and floating product on top of the water in the OWS. Absorbent pads or booms can be used to collect floating product. Sludge buildup and used absorbents must be removed and properly disposed.

BMP 5- Canopy over concrete pad

Description
A canopy constructed over an impervious concrete slab that is curbed or sloped to discharge to a central trench and catch basin. Storm water and contaminants travel by underground piping to an oil-water separator (OWS) that discharges to a grass infiltration area or other acceptable storm water treatment site.

Application
These construction standards are designed for public fueling operations. However, this design meets or exceeds performance standards applicable to all petroleum on/off loading operations.

Advantages
- The canopy reduces the accumulation of storm water that needs to be processed.
- No collection and discharge costs for wastewater collected within the containment system.
- Storm water from the canopy is directed away from the on /off loading pad.
- The system requires minimal maintenance and reduces disposal costs by comparison to holding tanks and blind sumps.
- The control valve at the OWS discharge can be closed, providing immediate, additional containment of product in the event of an emergency.

Design Parameters/Construction Guidelines
Construct a concrete slab that will be compatible in size and thickness for its intended use. The slab should have sufficient slope or curbing to contain and direct the material released to the blind sump or trench drain.

The sump or trench drain should be constructed in a fashion that allows a release to be collected and removed by trained personnel. Water stops shall be installed in all concrete joints to prevent leakage through the joints. If a trench drain is used, a metal or composite grate system may be used to cover the trench. If a sump is used, it must be constructed of a material that is compatible with the product it will contain and it must be leak proof. Multi-part sumps should only be used if the manufacturer certifies them. Otherwise a seamless sump should be installed. The integrity of all sumps should be tested prior to use.

The containment volume of the sump or trench drain shall be large enough to contain the anticipated amount of the largest release combined with a calculated amount of storm water directed to it from the impervious slab.

When calculating the largest anticipated release, take into account the diameter size and length of the transfer hose, the rate of volume (gpm), and the response time to shut off the valving. At a minimum, the sump and pad area must be able to hold 100 gallons of fluid.

Designs should follow standard engineering practices and be approved by the local building, fire, and health departments.

Operating, Maintaining, and Inspecting

This BMP should not be used if the area is subjected to water other than storm water (e.g., equipment washing), as the 100 gallon spilled product holding capacity would be continually jeopardized, and the ability to dispose of the water would likely become more expensive and complicated.

All on/off loading areas should be inspected periodically and a record of inspection maintained. If storm water is detected, it should be maintained at a level below that which would impede either the minimum calculated containment volume or a set 100-gallon capacity. Any deficiencies in this area should be corrected in an expeditious manner. Clean up spills promptly.

BMP 6- Concrete Containment System

Description
An open concrete box, basin, or recess designed to contain above ground storage tanks. These containment systems are generally located outdoors for large-volume storage.

Figure 1 Concrete Block Secondary Containment

Application
This is the most common method of containing above ground storage tanks that are not double-walled.

Advantages
_Versatile design parameters.

_Very durable.

Disadvantages
_Integrity of patches over cracks is sometimes difficult to achieve due to the continuous expansion and contraction of the cracks in the concrete containment system.

Figure 2 Solid Pour Concrete Secondary Containment

Design Parameters/Construction Guidelines
This is a specialized use of a common building material that should be designed and installed by experienced engineers and contractors.

_Design the containment to allow inspection with the primary container in place.

_Consider the site's soil-bearing strength and consolidation.

_Ensure water-cement ratios and curing methods are sufficient to minimize permeability and cracking (Attain a permeability of 10^{-7} to 10^{-10} cm/sec).

_Ensure proper reinforcement to minimize cracking.

_Use chemical resistant water stops in all joints and penetrations.

_Use air entrainment as needed to provide resistance to freeze-thaw cycles.

_A minimum compressive strength of 4,000 psi after 28 days is recommended.

_Grade the floor to an outside drain or to an internal sump.

_Ensure drains are valved and closed.

_Establish quality control measures for the manufacture, delivery, and pour of the concrete.

_Use a canopy to exclude storm water, if possible and where allowed by fire codes.

_Because salts, acids, and alkalis can adversely affect concrete, it should be sealed for use in these applications (See Appendix C, Concrete Coatings).

Maintenance

_Daily inspections recommended.

_Inspect for cracks caused by impact, excessive loading, vibration, freeze-thaw, settlement, etc.

_Inspect joints and penetrations for gaps caused by shrinkage, settling, poor design, etc.

_Immediately clean up any spills and re-use or properly dispose spill waste.

_Drain or pump and haul storm water according to guidelines (See the storm water section in this guidance).

_Thoroughly prepare the surface prior to any repairs.

BMP 7- Floor Containment System

Description

An impervious floor and sidewalls, generally constructed of concrete, that provides containment for either solid or liquid critical materials. The concrete should be coated with a sealant. Due to its permeability and the difficulty of clean up, asphalt is not an acceptable floor material.

Figure 3 Concrete Floor Sloped to Center

Application

Situations where indoor work areas, piping, drums, tanks, bags, or blocks of critical material need secondary containment, and where containment is provided by the floor, curbing, and sidewalls. The entire floor area, or a portion of the floor, may be used for containment. A variation is to construct a recessed area in the floor, with containers either placed in the recessed area, or over the recessed area on grating. This application may not be appropriate for highly flammable, toxic, or volatile materials that are dangerous if spread over the floor.

Figure 4 Example of a secondary containment area built below floor level.

Advantages

_Little or no additional cost for new construction sites.

_Flooring serves as containment and a functional work area.

Disadvantages

_Retrofit may be difficult or expensive.

Design Parameters/Construction Guidelines

_Construct floors and sidewalls of concrete or similar material (not asphalt).

_Concrete should be coated with an impervious material that will be compatible with the critical materials (See Appendix C, Concrete Coatings).

_Curbing may be used to create a small containment area in a portion of the building.

_Ensure the thickness and construction of the floor is compatible with the intended use (e.g. use of heavy equipment).

_For liquid materials, grade the floors to drain to a sump or trench drain where spills can be collected and removed.

_Install water stops in concrete joints.

_Ensure the sidewalls are high enough to provide the required containment volume.

_Design entryways to prevent escape of liquid materials, taking care to not create barriers that will be a tripping hazard, or that will be difficult to negotiate with equipment. Installing ramps at doorways, into sumps, or over curbs may alleviate these problems.

_Grating may be installed over trench drains or recessed containment areas to allow passage of people or equipment, or to allow critical materials to be placed at floor level over containment areas.

_In general, drains should not be installed in floors used for secondary containment. If the situation warrants a floor drain, it must have an approved method of discharge. Floor drains cannot be connected to dry wells, septic systems, sewer systems (unless approved by the wastewater treatment plant), or otherwise discharge from the building. Holding tanks connected to floor drains must be leak proof, constructed of material that is compatible with the products it will contain, and easily accessible for removal of spills. Test the integrity of all holding tanks prior to use.

Maintenance

_Periodically inspect floors and sidewalls and seal any cracks to provide an impervious surface.

_Recoat concrete as necessary.

_Clean up spills promptly.

BMP 8– Membrane Liner containment system

Description

Geomembranes (flexible membrane liners) installed as secondary containment, either in a buried configuration with a suitable cover material or exposed to the surface. Both types of installation are placed on a prepared sub grade selected to provide protection of the liner from damage and to establish grade for the containment.

Figure 5 High Density Polyethylene Liner

Applications

Liners are best suited to installations where access to the secondary containment area will not require the use of heavy equipment that could damage the liner.

This type of containment is more suited to larger installations where a significant area needs to be included within the containment and cost savings are available. Other secondary containment designs might be better suited for small containment areas or for installations requiring access onto the containment area.

Figure 6 Liner Containing Tank and Piping

Liners can be installed in single or multiple layers depending on the sensitivity of the location. Underdrains, interstitial monitors and drains, cushion geofabric liners, and surface drains can be included to enhance monitoring and performance.

The thickness of the liner (expressed as “mils” or thousandths of an inch) should not be less than 30 mils to provide adequate strength and durability. For installations that need greater protection, thicker, reinforced liners can be used. A 60-mil liner is common for many such installations. Liner manufacturers are good sources of technical assistance in the selection of a proper liner material for a particular installation.

Consider the foundation and support when installing the liner underneath a tank or other heavy objects.

A sloping bottom is needed to collect, remove, and treat storm water that accumulates above the liner. If possible, installation of a roof over the containment area is recommended. Liners should not be used in areas of shallow ground water, where the water table has the potential to rise and lift the liner. Maintenance requirements for the liner should be detailed for the owner, by the manufacturer.

Advantages

_Highly impervious to seepage and not subject to cracking because of their flexibility.

_Becoming more available as more contractors can install, test, and repair liner systems.

_Liners without cover material are easy to visually inspect for damage. If damaged, maintenance personnel can repair the liners with patch pieces.

_May be less expensive to install than other containment systems.

_Can be more resistant to deterioration than other materials.

_May be more cost-effective when removal and/or replacement are considered. A liner can be removed and replaced or overlaid with a new liner when worn or damaged, usually at a cheaper cost than conventional containment materials.

Disadvantages

_Exposed liners are vulnerable to rips and tears during installation or when operating equipment inside the containment.

_For covered or buried liners, when leaks are suspected, it may be difficult to locate where the liner has failed.

_If periodic hydrostatic testing is used to determine impermeable condition, the test may be difficult to precisely conduct and may interfere with daily operations.

_Because of the potential of damage to the liner, activities inside the containment are limited.

_Exposed geomembranes may degrade over time and require replacement.

_Exposed liners may be slippery due to spills or precipitation, and therefore dangerous for people working inside the containment system.

_Liners are relatively new technology without a history of service longevity.

_Liner installation requires special equipment and training that might not be locally available in some rural areas. Equipment to install and test the liners is expensive.

Design Parameters/Construction Guidelines

_Either reinforced or unreinforced membranes can be selected for these installations.

The reinforced type consists of an internal polymer thread in a matrix with a polymeric coating on both sides.

The unreinforced type consists of a homogenous flat sheet.

A variety of polymeric resins can be used to manufacture geomembranes.

_In some instances a geotextile cushion liner can be placed below the geomembrane and on the subgrade to provide additional protection and longevity.

_A liner requires careful preparation of the sub grade. Subsequent settling after the liner is installed may cause the liner to stretch or tear.

_When liners are designed for a covered or buried configuration, suitable cover material at least six inches in depth must be compatible with the liner strength, as well as operation and maintenance activities within the containment.

_High-density polyethylene (HDPE) or polyvinyl chloride (PVC) is typically used for the

liner material although other materials with equal performance might be commercially available. The type of membrane material used depends on the resin's resistance to the contained liquid.

PVC liners need to be covered to avoid exposure to sunlight which can damage the integrity of the liner.

HDPE liners have the advantage of being installed exposed to the surface because HDPE does not deteriorate due to ultraviolet radiation.

_Liners can be used with other containment material for berms and edges. The connection between the two materials must be capable of withstanding the conditions present within the containment area. The edges of containments using liners require a suitable structural support for the liner.

_For sensitive areas, liners can be installed with two layers and interstitial monitoring to detect failure of the primary liner and provide an additional barrier to product release.

_Underdrains should be installed to detect and collect product in the event of liner failure.

_Liners should be sloped to a location where periodic visual inspections for the presence of product can be performed.

Maintenance

_A periodic visual inspection of unburied liners must be performed to assure that the liner will contain spilled liquids.

_Test seams using air-testing or spark testing equipment to detect any failure.

_Remove any accumulation of storm water on top of the liner to a proper treatment and disposal site.

_If storm water fails to accumulate as expected after storm events, operators should suspect liner failure. Repairs can then be made before a spill occurs.

_If liners are buried, a hydrostatic test must be performed and documented prior to use of containment system. An annual test of the system should be performed.

BMP 9– Secondary Containment Piping – Below Grade

Description
A piping system that provides for detecting, containing, and recovering product that is transmitted via pipeline. This indoor/outdoor pipeline system may be located either above or below ground.

Figure 18 Flex, outer wall piping.

Application
Sites that need to transfer product via pipeline as a part of the operations process, including loading and unloading.

Advantages
_Limits spilled product exposure to environmental factors (e.g., sunlight, temperature, and storm water).

_Insulating properties.

_Less maintenance, particularly with regard to storm water.

_100% containment of pure product leaking from primary containment resulting in reuse of product.

Figure 19 Example of double wall piping.

Disadvantages
_Unable to perform visual leak detection on the primary containment.

_In some cases, space intensive.

Figure 20 Large, steel, double-wall piping.

Design Parameters/ Construction Guidelines
_The piping must be compatible with terrain, location, environmental factors, and product properties.

_The piping must be designed and installed appropriately for leak detection (i.e., piping sloped to sump).

_The system may include sloping to a containment sump, isolation/shut off valves (if applicable), and pressure relief valves.

Maintenance
_Periodic inspections of the pipeline and monitoring equipment.

BMP 10– Secondary Containment Piping – Above Grade

Description

A piping system with secondary containment that provides for detecting and recovering product that may leak out of the primary piping. Piping may reside inside the main secondary containment system for above ground tanks, or in an open trough made of concrete or metal, or lined with an impermeable membrane.

Figure 21

Application

Sites that transfer product as a part of the operations process or in the loading and unloading process.

Figure 22

Advantages

_Typically less expensive than double wall piping.
_Leaking product is easier to detect and leaks are easier to fix.
_Impact of a foreign object is less likely to compromise the containment (i.e., impact by vehicle or projectile).

Disadvantages

_More maintenance, particularly with regards to managing storm water.
_In some cases, space intensive.
_Debris can collect in the trough, making recovery and reuse of spilled product more difficult.

Figure 23

Design Parameters/Construction Guidelines

_The piping must be compatible with the terrain, location, environmental factors, and product properties.
_The piping must be designed and installed appropriately for leak detection, and the ability to recover the material that leaks into the impervious secondary containment.
_The system may include sloping to a containment area and emergency isolation/shut off valves.

Maintenance

_Periodic inspections and general preventive maintenance, especially in eliminating any outside contamination in the secondary containment.

BMP 11- Prefabricated Storage Units

Description

Prebuilt or prefabricated storage units that can be permanent or portable, and that can be placed in strategic locations within or outside a building.
Prebuilt units can come in several forms. Some of the more common units are plastic or metal.

Constructed units can be portable but may also include a more permanent arrangement, such as a secondary concrete pour to form curbed containment areas on the floor.

Figure 24

Application

Well suited to businesses that have several types or small quantities of materials to contain. Allows for changing or fluctuating products and arrangements. Portable containment areas are beneficial for operators who are leasing, as they can generally take their containment units with them when they leave.

Figure 25

Examples of materials that are typically stored in this type of secondary containment include barrels of lube oil, five-gallon buckets of paint and solvent, anti-freeze, and used oil.

Advantages

_Allows for segregation of incompatible materials.

_Limits spills to smaller areas.

_No large construction or retrofit issues.

_Prevents spills from moving outside of the building.

_Storing products indoors provides added security from vandalism and protection from weather.

Figure 26

Figure 27

Disadvantages

_May limit movement of indoor equipment (e.g., forklifts).

_May be more difficult to move containers into or out of the secondary containment.

_Limited to holding smaller volumes of materials.

Design Parameters/Construction Guidelines

Whether buying or building, ensure that the containment is structurally sound, the containment material is compatible with the material being stored, and equipment accessibility to the containment area is adequate. Special attention should be given to the load-bearing strength of the floor on which the containment unit is placed.
Provisions for channeling spills inside the containment to a collection area (sump) and ventilation in the event a spill occurs, should be considered.

Maintenance

_Absorbent and diking materials should be stored near the containment area.

_Periodic inspections should be conducted to assess containment integrity, indications of leaks/spills, and the operating condition of associated equipment, such as ventilation systems.

_Assure there is adequate room in and around the containment unit to perform proper inspections.

_Keep minor spills cleaned up and do not use the unit to store unrelated material and equipment.

BMP 12– Fabricated Steel Containment System

Description
The steel structure is generally stainless, galvanized, or epoxy coated. Often it is combined with other construction materials (e.g., a liner or concrete for the floors, and rubber or epoxy at steel joints).

Figure 28

Application
A steel containment system is suitable for containing most types of critical materials in any quantity.

Advantages
_Very durable; will not crack over time.

_Less maintenance.

_Can be dismantled and moved.

_The material is usually available locally.

Figure 29

Disadvantages
_May be more expensive than other materials.

_Incompatible with some chemicals (e.g., acids).

_If containment is made with a steel floor, the junction between the floor and wall may be harder to seal. Also, a steel floor would make the total containment fairly expensive.

Figure 30

Design Parameters/Construction Guidelines
_The floor of the secondary containment should be continuous below the primary tanks and strong enough to hold the weight of the primary tanks.

_ A sump and methods for removing accumulated product and storm water should be designed into the system floor.

_ A roof or other mechanism for keeping storm water out of the containment area should be considered.

_ Coating the steel may be appropriate for corrosion protection or to reduce bacteria growth, which can form mold.

Maintenance

Periodic inspection of the containment system with special attention to the wall joints.

BMP 13– Above Ground Storage Tank (AST) Containment System (double-wall)

Description
A tank system that provides for detection, containment, and recovery of product stored in the tank. The system may be located outdoors or indoors.

Application
On site storage of products in single or multiple double-walled tanks. Well suited for critical materials that must be isolated if they should leak out of primary containment.
Above ground storage tanks also work well in areas where space is constricted, whether doing a retrofit where the size of the secondary containment needs to be reduced, or when the original secondary containment cannot accommodate an increased or upgraded primary containment unit.

Advantages
_100% containment of leaked product, resulting in reuse.

_Vapor released to environment much less likely.

_Less maintenance, particularly with regard to storm water.

_Portability - can be moved much easier.

_In some cases, may take up less space.

_May be easier to install.

_Convenience, durability, and expedience.

Disadvantages
_Determining the exact location of a leak may be more difficult.

_Cannot perform visual inspection of primary containment.

_Piping containment may be more difficult.

_Overfills may not be contained.

_Overfill protection devices may be more difficult or expensive to install.

_Additional secondary containment required for piping.

_The primary and secondary walls of these tanks can both fail when struck by projectiles or out-of-control vehicles.

Design Parameters/Construction Guidelines
_Tanks need to be properly designed for the product stored.

_The tank design must meet applicable regulations.

Maintenance

_ Regular visual inspections of the outer containment wall.

_ Regular manual or electronic testing of interstitial area.

Figure 31
Left hand tank is a double walled tank

BMP 14– Temporary Containment Systems

Description

The temporary placement and use of secondary containment vessels, liners, barriers, or encapsulating pads for retaining spilled fluids or solids.

Figure 32 Mobile containment Unit (well suited for fueling areas or on/off loading pads)

Barriers with Liners

Concrete Jersey Barriers, Ecology Blocks, "K" rails, and Masonry Units can be used as the vertical support wall for containment. These walls can be placed in any configuration as long as they form an enclosed vertical barrier 360 degrees around the containment source. Impervious liners are laid or positioned within the boundaries of the vertical walls and secured.

Earthen Berms with Liners

An excavated or at-grade containment area with a bermed perimeter constructed of native soils or other inert materials. An impervious liner is then positioned and secured to protect all of the bermed containment area.

Figure 33 Temporary Containment unit (made of large concrete blocks and liner)

Containment Pads

Plastic, fiberglass, or fabric-formed containment structures that are specifically conformed to the shape and size of the application. Usually placed at fueling station nozzle points or under parked storage containers (e,g., railroad cars, tankers, and fueling stations).

Boom Liners

Constructed of different materials and configurations, these usually offer only small containment possibilities. These units are most often used for inside containment situations (mainly offloads or spill control), but can be used for exterior applications on impervious surfaces.

Liners come in any configuration and shape. Most are tarpaulin form and are PVC, reinforced oil resistant PVC, polyethylene (MDPE), high density polyethylene (HDPE), rubber liners, Koroseal liners, Burke seal, urethanes, and other manufactured materials. All can be used as membranes for temporary secondary containment.

Application

Critical materials that exist on a site for more than 30 days must have secondary containment. Temporary secondary containment units shall meet all jurisdictional setbacks as required for permanent installations. The usual places of installation and

use are in conjunction with new facility construction that needs temporary storage; such as, truck, vessel, or train docking and fueling stations, and road construction projects. Most jurisdictions require engineering for system installations along with manufactured listings.

Advantages

_ Cost effective in labor and installation costs.

_ Ease of removing and installing compared to permanent placement.

_ Leaks are easy to detect.

_ Good for short-term placement.

Figure 34 Synthetic secondary liner

Disadvantages

_ Not a long-term solution.

_ Tend to deteriorate over time and exposure to the elements.

_ May encompass large areas with greater risk of potential exposure.

Maintenance

Due to the temporary nature of these units, they are often not installed with the same care and detail as a permanent containment structure. Therefore, daily inspection of these units is critical. Absorbents, as well as diking and cleanup materials should be on site and readily accessible.

BMP 15- Tank contained in subgrade vault.

PURPOSE:
To contain leaks from corroded or punctured tanks or transfer lines and to contain spills from tank overfilling. To provide for easy inspection of tanks and lines.

ADVANTAGES:
More than one tank can be placed in each vault. Size and type of tank can be changed relatively easily. Vaults will provide for containment of spills from overflows and leaking pipes as well as leaking tanks.

DISADVANTAGES:

High installation cost, especially if vault must be covered to support vehicular traffic. Uncovered vaults must be equipped with storm water removal facilities. Concrete vaults may require special coatings or liners to insure that they are impervious to the material stored.

APPLICATION:
Potentially useful in any situation requiring underground storage. Especially applicable for storage of corrosive materials where frequent tank inspection is desirable. May also be desirable where it is expected that the size or type of tank may be changed in the future. Since the nature of this type of installation demands that the volume of the vault be greater than the volume of the tank(s) it contains the primary criteria for determining the size of the vault should be the needed clearance for inspection
and installation.

BMP 16- Catch and store Critical Materials spilled at loading docks.

CONTROL MEASURE:
Loading dock spill sump with stormwater release.

PURPOSE:

ADVANTAGES:
Simple installation. Relatively inexpensive.

DISADVANTAGES:
Provisions must be made for the release of stormwater. Auxiliary stormwater disposal system must be installed. If load size is variable, storage for large loads may be needed though infrequently used.

APPLICATION:
These systems are suitable for use in any area where stormwater runoff and spilled products will be funneled to the same disposal point.

DESIGN CRITERIA:

The total storage volume should be adequate to contain the largest volume that will be transferred at the site. If the sump is located in an enclosed, sunken loading area, the volume of the enclosed area may be included in the design. If manually operated stormwater release valves are used, their normal position should be the position which retains stormwater in the sump.

BMP 17- Covered loading areas.

CONTROL MEASURE:

PURPOSE:
Prevent the mixing of stormwater and spilled products. thus allowing simple spill sumps.

ADVANTAGES:
MaKes the use of spill containment sumps without stormwater release possible. Provides better foul weather worKing conditions.

DISADVANTAGES:
More expensive than uncovered areas. Drainage must be diverted away from the loading area. Sumps can be pumped to remove products or accidentally discharged water.

APPLICATION:
The system can be used anywhere products are to be loaded or unloaded. It is most appropriate where there is little chance that stormwater or wash water will enter the system necessitating pumping the sump for a non-spill event.

DESIGN CRITERIA:
The covered area must extend beyond
all paved surfaces which slope toward the sump inlet. The sump should be designed to contain the entire volume of the largest container likely to be handled at the loading dock.

BMP 18- Grated perimeter drain

PURPOSE:
Surround level workspace with a trap which will catch spills within the work area.

ADVANTAGES:
Can be used in open areas. Floor does not need to slope as would be required with a simple drain.

DISADVANTAGES:
High installation costs. The grating system must be carefully maintained in order to prevent blocking. The grating must be kept in place to reduce the liKelihood of worker accidents.

APPLICATION:
This system is most appropriate for use in areas which contain equipment or storage containers holding critical liquids, and which experience considerable worker traffic. Also useful in areas which must be level.

DESIGN CRITERIA:
While slope is not necessary, if used, it should be away from the center of the area. The volume of the grated area should contain the total volume of all material stored within the grated perimeter or the system should drain to a storage tank of adequate volume.

BMP 19- Floor drain collection system.

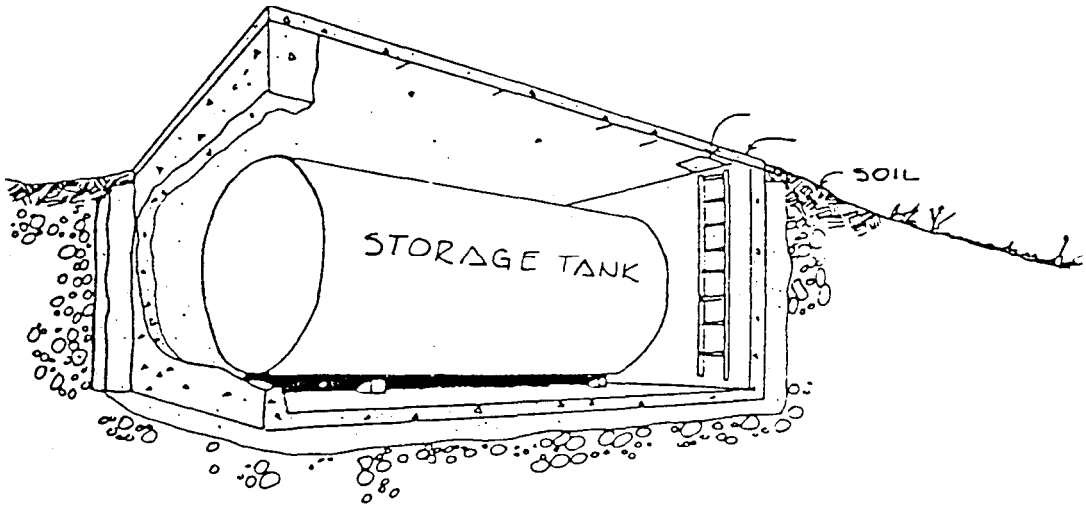
PURPOSE:
To collect spilled material and retain for clean-up.

ADVANTAGES:
low cost installation using traditional plumbing materials.

DISADVANTAGES:
Suitable only for areas where small volumes of products are involved unless drains are piped to a large storage tank. Requires sloping floors to the drains.

APPLICATION:
Most useful in areas where spills are unlikely or only small volumes of products are used. Drains should not be connected to sewer system. This type of system is probably not suitable for areas where equipment requiring level floors is to be installed.

DESIGN CRITERIA:
The tank should be sized to hold the total volume of material contained in the equipment placed on the floor draining to the tank with a ten percent allowance to prevent overflow. Where floor drains are used in product storage areas, the amount of product stored should be determined by the available storage volume assuming the same ten percent safety factor. Due to the lack of outlets on these systems, they are probably not appropriate for locations where where routine



washing of floors or equipment is necessary. Drain tanks located under floors or outside should have easily accessible access ports to allow for cleaning and recovery of spilled material.

In installations having covered vaults both the tank and the vault must be vented.
Uncovered vaults must be equipped with facilities to allow removal of storm water. These facilities must provide for the separation of any spilled or leaked products from the storm water

stream before it is released into the environment. Devices listed under "Selective Flow Devices" may be used. The floor of all vaults should be sloped to a sump depression to allow for easy removal of spills or storm water. In cases where concrete or other material used to construct the vault is not impervious to the product being stored within the vault a suitable liner or coating impervious to the product must be applied to the inside of the vault. In any case, if cracks appear in the vault material they must be sealed with a material resistant to the products being stored.

_ Vault containment facilities may be backfilled with sand if desired to allow covering the vault with a typical pave surface. In this type of installation a liner must be installed prior to backfilling.

Since some infiltration through the paved surface will occur, a well for removal of storm water from the vault must be provided.
C-25

BMP 20- Floor containment liner.

PURPOSE: To contain spills or leaKs which occur inside buildings having earth or gravel floors.

ADVANTAGES:
Relatively low cost. A properly installed synthetic liner will provide a more effective barrier than a concrete floor which has developed cracks.

DISADVANTAGES:
Careful installation is required to prevent puncturing the liner. Material spilled will accumulate in the soil above the liner. This may create health or fire hazards, unless contaminated soil is removed. Disposal of soil contaminated by spills may create a hazardous waste/dangerous waste problem.

APPLICATION:
Though required under floors where no other impervious liners exist, synthetic liners may be installed under any floor where extra protection is desired. As a general rule critical materials storage on earth floors should not be allowed.

DESIGN CRITERIA:
The material selected for the liner membrane must be resistant to the product being contained. The liner installation should include enough sidewall to contain complete loss of all material contained in the largest container stared inside the facility. The volume calculation must consider only the void space in the soil as being available for containing spills. A minimum of six inches of soil must caver the liner. The material placed immediately above and below the liner should be of such a nature that it will not puncture the liner.

BMP 21– Drain Pans

Catch small spills which occur when transferring liquids from storage tanks to small containers.

ADVANTAGES:
Low costs method for controlling small spills. May improve worker safety by keeping spilled material off of floors. May lower materials use by allowing the recovery of small spills.

DISADVANTAGES:
The collection of small amounts of spilled materials may create new disposal problems.

APPLICATION:
This measure is useful only when small amounts of material are being transferred. It should be used only in situations where the filling operation will be attended at all times.

DESIGN CRITERIA:
The drip pan should be located under the filling spout so any drips or overflows are collected. Drip pans should be sized to contain the entire volume of the largest container that is normally filled. While the drip pan should be attached to the floor to prevent accidentally moving the pan away from the desired location, it should be easily removable to allow easy spill recovery or disposal. Due to the limitation on pan size, presented by ease of handling and worker safety (the pan should not protrude into worK areas), the pan volume should be a maximum of five gallons.

BMP 22– Containers, Cabinets

Secondary containment of smaller containers is just as important as larger containers, such as tanks. In the example photo at the right, the potential for spilling of these materials is very high. This could pose a hazard to the aquifer without proper containment.

Although this is an obvious concern, the storage of most critical materials is often taken for granted.

The use of simple containers, such as buckets, can serve as a secondary containment of critical materials.

Secondary containment cabinets can be used for storage of larger capacities of critical materials. These cabinets are designed with shelving and a base that will contain spills and leaks of a container.

BMP 23- Concrete Coatings

Coatings for concrete secondary containment areas are recommended. The main function of the coating is to seal the concrete barrier, which might be unable to prevent seepage of small to large amounts. Coatings also protect the concrete from product breakdown that can occur when liquids come into contact with the concrete.

While coatings can enhance the containment of liquids and prolong the life of the concrete, it is important that new concrete structures be designed with the proper mix/ingredients for the area and product being stored, have proper reinforcement, and have appropriate joint details. This will reduce the potential for cracking or joint separation and help ensure the integrity of the containment.

There is a vast variety of coating materials that are categorized in a number of ways.
Some of the more common materials mentioned for coatings are liners (usually polymers), paints, resins, epoxies, acrylics, polyesters, polyurethanes, bitumens, and lastomers. Trade organizations that deal with the type of materials a facility handles should be able to direct the facility to coating vendors that can provide coatings that are satisfactory for the stored materials.

Selection Factors

Factors to consider when choosing a coating material should include:

_Ability to bond to the substrate.

_Durability (to impacts, heavy equipment used in the containment area, reaction to spilled materials, photo degeneration, etc.).

_Resistance to microbial action (stains, odors, scaling, etc.).

_Flexibility (ability to stretch and shrink instead of crack).

_Product compatibility with the product being stored.

_Projected life of the product.

_Cost.

_Ease of application.

_Reaction to expected weather conditions.

Application Factors

Factors to consider when applying coatings include:

_Safety of the applicators (slipping or presence of volatiles).

_Preparation of the substrate prior to coating application (must usually be very clean).

APPENDIX D
Sample Inspection Checklists

Weekly Facility Inspection Checklist

Inspection Location: _____.
Inspection for the week of: _____.

Accumulation

_____ Are all appropriate containers marked with a hazardous waste label?
_____ Are all and containers marked with a risk label, if appropriate?
_____ Are all containers closed?
_____ Are all container labels visible and readable?
_____ Are all containers in good condition?
_____ Is there 30 inches of aisle space between rows of containers?
_____ Are any containers or cabinets leaking?

Sumps

_____ Are sumps clean and free of contamination, spills, leaks, and standing water?

Safety Equipment

_____ Are fire extinguishers charged?
_____ Are spill kits stocked?
_____ Is the first aid cabinet stocked?
_____ Is the emergency shower and eye wash station functioning properly?
_____ Are the emergency communication devices operating properly?
_____ Is the emergency response information posted near all communication devices?
_____ Is the Material Safety Data Sheet (MSDS) manual readily available?

Secondary Containment

_____ Is the secondary containment free of cracks or other failures?
_____ Does the secondary containment contain any product?

Comments:

Date of Action	***Describe the actions that you took to correct the deficiencies noted above***

Printed Name_____
Signature _____
Date _____
Time _____

Recommended Weekly Facility Inspection Checklist for Small Business

Inspection for the week of: _____
Inspector Printed Name: _____
Inspector Signature: _____
Date of Inspection: Time: _____

Legend Y=Yes; N = No; C = Comment, below

Inventory of Raw Material (Product)

___ Are all drums and containers marked with appropriate labels?
___ Are all drum labels visible and readable?
___ Are all drums and containers in good condition?
___ Are all containers closed?
___ Are any drums leaking?
___ Is the secondary containment free of cracks or other failures?

Accumulation of Waste

___ Are all drums and containers marked with hazardous waste labels?
___ Are all drum labels visible and readable?
___ Are all drums and containers in good condition?
___ Are all containers closed?
___ Are any drums leaking?
___ Is there 30 inches of aisle space between rows of containers?
___ Are all drums marked with the proper waste code(s)?
___ Are there any drums that are near or have exceeded the timeframe?
___ Are all drums and containers marked with a risk label, if appropriate?
___ Is the secondary containment free of cracks or other failures?

Safety Equipment

___ Are fire extinguishers charged?
___ Are spill kits stocked?
___ Is the first aid cabinet stocked?
___ Is the emergency shower and eye wash station functioning properly?
___ Are the emergency communication devices operating properly?
___ Is the emergency response information posted near all communication devices?

SUMPS

___ Are sumps clean and free of contamination, spills, leaks, and standing water?

Comments: _____

_____

_____

Date of Action: _____ Describe the actions that you took to correct the deficiencies noted above (continued on Back)

_____

_____

_____

Printed Name: _____

Signature: _____

Date: _____

Time: _____

Recommended Daily Facility Inspection Checklist for Companies with Outside Storage Areas

Inspector: _____ Date:_____ Time: _____

Legend:	X = Satisfactory
	NA = Not Applica
	O = Repair or adjustment requ
	C = See Comment on back

Drainage
___ Any noticeable oil sheen on runoff.
___ Containment area drainage valves are closed and locked.
___ Oil/water separator systems working properly.
___ Effluent from oil/water separator inspected.
___ No visible oil sheen in containment ar
___ No standing water in containment are

Pipelines
___ No signs of corrosion damage to pipelines or supports.
___ Buried pipelines are not exposed.
___ Out-of-service pipes capped.
___ Signs/barriers for vehicle protection is in place.
___ No leaks at valves, flanges, or other fittings.
___ Are sumps clean and free of contamination, spills, leaks, and standing water?

Storage Areas
___ Is the secondary containment free of cracks or failures?
___ Are all containers marked with appropriate labels?
___ Are all container labels visible and readable?
___ Are all containers in good condition?
___ Are all containers closed?
___ Are any containers leaking?

Above ground Storage Tanks (ASTs)
___ Tank surfaces checked for signs of leakage.
___ Tank condition good (no rusting, corrosion, pitting).
___ Bolts, rivets, or seams are not damaged.
___ Tank foundation intact.
___ Level gauges and alarms working properly.
___ Vents are not obstructed.
___ Valves, flanges, and gaskets are free from leaks.
___ Containment walls are intact.

Truck Loading/Unloading Area
___ No standing water in rack area.
___ Warning signs posted.
___ No leaks in hoses.
___ Drip pans not overflowing.
___ Catch basins free of contamination.
___ Containment curbing or trenches intact.
___ Connections are capped or blank-flanged.

Security
___ Fence and gates intact.
___ Gates have locks.
___ ASTs locked when not in use
___ Starter controls for pumps locked when not in use.
___ Lighting is working properly.

Comments: _____

_____

_____

Date of Action: _____ Describe the actions that you took to correct the deficiencies noted on front of form

_____

_____

_____

_____

Printed Name: _____

Signature: _____

Date: _____

Time: _____