

SC-31 Outdoor Liquid Container Storage

Description

Accidental releases of liquid materials from aboveground storage tanks, drums, and dumpsters present the potential for contaminating stormwater with many different pollutants. Many potential stormwater runoff pollutants are stored in tanks, including gasoline, aviation gas, diesel fuel, kerosene, oils, greases, lubricants, and other distilled, blended, and refined products derived from crude petroleum. Materials spilled, leaked, or lost from storage tanks can accumulate in soils or on other surfaces and be carried away by rainfall runoff. These source controls apply to containers located outside of a building used to temporarily store liquid materials and include installing safeguards against accidental releases, installing secondary containment, conducting regular inspections, and training employees in standard operating procedures and spill cleanup techniques.

Approach

General Pollution Prevention Protocols

- ☐ Educate employees about pollution prevention measures and goals.
- ☐ Keep an accurate, up-to-date inventory of the materials delivered and stored on-site.
- ☐ Try to keep chemicals in their original containers, and keep them well labeled.
- ☐ Develop an operations plan that provides procedures for loading and/or unloading. Refer to SC-30 Outdoor Loading and Unloading for more detailed best management practice (BMP) information pertaining to loading and unloading liquids.
- ☐ Protect materials from rainfall, run-on, runoff, and wind dispersal:
 - ✓ Cover the storage area with a roof.

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Targeted Constituents

<i>Sediment</i>	
<i>Nutrients</i>	✓
<i>Trash</i>	
<i>Metals</i>	✓
<i>Bacteria</i>	
<i>Oil and Grease</i>	✓
<i>Organics</i>	✓

Minimum BMPs Covered

	<i>Good Housekeeping</i>	✓
	<i>Preventative Maintenance</i>	✓
	<i>Spill and Leak Prevention and Response</i>	✓
	<i>Material Handling & Waste Management</i>	✓
	<i>Erosion and Sediment Controls</i>	
	<i>Employee Training Program</i>	✓
	<i>Quality Assurance and Record Keeping</i>	✓



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- ✓ Minimize stormwater run-on by enclosing the area or building a berm around it.
- ✓ Use a walled structure for storage of liquid containers.
- ✓ Use only watertight containers and keep the lids closed.
- Employ safeguards against accidental releases:
 - ✓ Provide overflow protection devices to warn the operator or automatic shutdown transfer pumps.
 - ✓ Provide protection guards (bollards) around tanks and piping to prevent damage from a vehicle or forklift.
 - ✓ Provide clear tagging or labeling, and restrict access to valves to reduce human error.
 - ✓ Build a berm or surround tanks or containers with a secondary containment system, including dikes, liners, vaults, or double-walled tanks.
 - ✓ Find out whether the local government (or responsible utility) requires secondary containment areas to be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.
 - ✓ Contact the appropriate regulatory agency regarding environmental compliance for facilities with spill ponds designed to intercept, treat, and/or divert spills.
 - ✓ Have registered and specifically trained professional engineers identify and correct potential problems such as loose fittings, poor welding, and improper or poorly fitted gaskets for newly installed tank systems.
- Use safety data sheets (SDSs) to identify hazardous components and keep incompatible products apart. Also list/have available appropriate personal protective equipment and cleanup products.



Good Housekeeping

- Provide storage tank piping located below product level with a shutoff valve at the tank; ideally this valve should be an automatic shear valve with the shutoff located inside the tank.
- Provide barriers such as posts or guardrails where tanks are exposed to prevent damage from vehicle collisions.
- Provide secure storage to prevent vandalism-caused contamination.
- Place tight-fitting lids on containers.

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- ❑ Enclose or cover the containers where they are stored.
- ❑ Raise the containers off the ground using a pallet or similar method, with provisions for spill control.
- ❑ Do not store liquid containers near a storm drainage system or surface waters.
- ❑ If the storage area is paved, sweep and clean the area regularly. Do not hose down the area to a storm drain.



Preventative Maintenance

- ❑ Inspect storage areas regularly for leaks or spills.
- ❑ Conduct routine inspections and check for external corrosion of liquid containers. Also check for structural failure, spills and overfills resulting from operator error, and failure of the piping system.
- ❑ Check for leaks or spills during pumping of liquids or gases from a truck or rail car to a storage facility or from a storage facility to a truck or rail car.
- ❑ Visually inspect new tank or container installations for loose fittings, poor welding, and improper or poorly fitted gaskets.
- ❑ Inspect tank foundations, connections, coatings, tank walls, and the piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- ❑ Replace containers that are leaking, corroded, or otherwise deteriorating with ones in good condition. If the liquid chemicals are corrosive, use containers made of compatible materials instead of metal drums.
- ❑ New or secondary containers must be labeled with the product name and hazards.



Spill and Leak Prevention and Response

- ❑ Keep your spill prevention, control, and countermeasure (SPCC) plan up to date.
- ❑ Maintain an adequate stockpile of spill cleanup materials at locations where they are readily accessible.
- ❑ Have an emergency plan, equipment, and trained personnel ready at all times to deal immediately with major spills.
- ❑ Collect spilled liquids, and properly dispose of them.
- ❑ When using adsorbent materials on small spills, remove the materials promptly and dispose of them properly.
- ❑ Have employees trained in emergency spill cleanup procedures present when dangerous waste, liquid chemicals, or other wastes are delivered.

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- ❑ Prevent operator errors by using engineering safeguards to reduce accidental releases of pollutants.



Material Handling and Waste Management

- ❑ Contain the material in such a way that, if the container leaks or spills, the contents will not discharge, flow, or be washed into the storm drainage system, surface waters, or groundwater.
- ❑ Place drip pans or absorbent materials beneath mounted container taps, and at potential drip and spill locations during filling and unloading of containers. Any collected liquids or soiled absorbent materials must be reused/recycled or disposed of properly.
- ❑ Ensure that any underground or aboveground storage tanks are designed and managed in accordance with applicable regulations, identified as a potential pollution source, and have secondary containment such as a berm or dike with an impervious surface.
- ❑ Do not pour liquids into floor drains, sinks, outdoor storm drain inlets, or other storm drains or sewer connections.
- ❑ Collect leaking or dripping fluids in drip pans or containers. Fluids are easier to recycle if kept separate.
- ❑ Promptly transfer used fluids to the proper waste or recycling drums. Do not leave drip pans or other open containers lying around.



Employee Training Program

- ❑ Train employee (e.g., fork lift operators) and contractors in proper spill containment and cleanup. Employees should have the tools and knowledge to immediately begin cleaning up a spill if one should occur.
- ❑ Train employees in proper spill response and prevention, materials handling, and waste management.
- ❑ Use a training log or similar method to document training.



Quality Assurance and Record Keeping

- ❑ Keep accurate maintenance/inspection logs that document minimum BMP activities performed for liquid container storage and improvement actions.
- ❑ Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and what method was used to dispose of the waste.
- ❑ Establish procedures to complete logs and file them in the central office.

Other Facility-Specific Considerations

- ❑ Storage sheds often must meet building and fire code requirements.

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- ❑ The local fire district must be consulted for limitations on clearance of roof covers over containers used to store flammable materials.
- ❑ All specific standards set by federal and state laws concerning the storage of oil and hazardous materials must be met.
- ❑ Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code.
- ❑ Storage of oil and hazardous materials must meet specific federal and state standards, including:
 - ✓ The SPCC plan;
 - ✓ Secondary containment;
 - ✓ Integrity and leak detection monitoring; and
 - ✓ Emergency preparedness plans.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- ❑ Capital investments such as sheds, covers, dikes, and curbs will likely be required at some sites where cover and containment facilities are inadequate and can vary significantly depending upon site conditions.

Maintenance

- ❑ Most of the operations and maintenance (O&M) activities associated with implementing these BMPs are integrally linked to routine operations as previously described. Therefore additional O&M is not required.
- ❑ Conduct regular inspections, and make repairs and improvements as necessary.
- ❑ Conduct regular broom dry-sweeping of area. Do not wash with water.

Supplemental Information

The most common causes of unintentional releases are:

- ❑ Installation problems
- ❑ Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves)
- ❑ External corrosion and structural failure
- ❑ Spills and overfills resulting from operator error
- ❑ Leaks during pumping of liquids or gases from a truck or rail car to a storage tank or from a storage tank to a truck or rail care.

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Aboveground Tank Leak and Spill Control

Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code. Employ the following practices to enhance the code requirements:

- ☐ Place tanks in a designated area.
- ☐ Encapsulate in concrete or the equivalent tanks located in areas where firearms are discharged.
- ☐ Pave designated areas with Portland cement concrete and ensure that it is free of cracks and gaps, and impervious to contain leaks and spills.
- ☐ Liquid materials should be stored in double-walled tanks approved by Underwriters Laboratories or surrounded by a curb or dike to provide the volume to contain 10 percent of the volume of the containers or 110 percent of the volume of the largest container, whichever is greater. The area inside the curb should slope to a drain.
- ☐ For used oil or dangerous waste, install a dead-end sump in the drain.
- ☐ Other liquids should be drained to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.
- ☐ Accumulated stormwater in petroleum storage areas should be passed through an oil/water separator.

Maintenance is critical to preventing leaks and spills. Conduct routine weekly inspections and:

- ☐ Check for external corrosion and structural failure.
- ☐ Check for spills and overfills resulting from operator error.
- ☐ Check for failure of the piping system (pipes, pumps, flanger, coupling, hoses, and valves).
- ☐ Check for leaks or spills during pumping of liquids or gases from a truck or rail car to a storage facility or from a storage facility to a truck or rail car.
- ☐ Inspect new tank or container installation visually for loose fittings, poor welding, and improper or poorly fitted gaskets.
- ☐ Inspect tank foundations, connections, coatings, tank walls, and the piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- ☐ Frequently release accumulated stormwater during the wet season.
- ☐ Have a qualified professional conduct periodic integrity testing.

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Dikes

One of the best protective measures against contamination of stormwater is the use of dikes. Containment dikes are berms or retaining walls that are designed to hold spills. Use of dikes is an effective pollution prevention measure for aboveground storage tanks and rail car or tank truck loading and unloading areas. The dike surrounds the area of concern and holds the spill, keeping spill materials separated from the stormwater side of the dike area. Diking can be used in any industrial or municipal facility, but it is most commonly used for controlling large spills or releases from liquid storage and transfer areas.

- ❑ For single-wall tanks, containment dikes should be large enough to hold the contents of the storage tank for the facility plus rainwater.
- ❑ For trucks, diked areas should be capable of holding an amount equal to the volume of the tank truck compartment. Diked construction material should be strong enough to safely hold spilled materials.
- ❑ Dike materials can consist of earth, concrete, synthetic materials, metal, or other impervious materials.
- ❑ Strong acids or bases may react with metal containers, concrete, and some plastics.
- ❑ Where strong acids or bases are stored, alternative dike materials should be considered. More active organic chemicals may need certain special liners for dikes.
- ❑ Dikes can also be designed with impermeable materials to increase containment capabilities.
- ❑ Dikes should be inspected during and after significant storms or spills to check for washouts or overflows.
- ❑ Regular checks of containment dikes should be conducted to ensure the dikes are capable of holding spills.
- ❑ Inability of a structure to retain stormwater, dike erosion, soggy areas, or changes in vegetation indicate problems with dike structures. Damaged areas should be patched and stabilized immediately.
- ❑ Earthen dikes might require special maintenance of vegetation such as mulching and irrigation.
- ❑ Remove accumulated stormwater after precipitation events and dispose of it according to local regulations.

Curbing

Curbing is a barrier that surrounds an area of concern and is similar to containment diking in the way that it prevents spills and leaks from being released into the environment. It is usually used on a small scale and cannot contain large spills to the degree that dikes can. Curbing is common at many facilities in small areas where

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handling and transfer of liquid materials occur. It can redirect contaminated stormwater away from the storage area and is useful in areas where liquid materials are transferred from one container to another. Asphalt is a common material used for curbing; however, curbing materials can include earth, concrete, synthetic materials, metal, or other impenetrable materials.

- ❑ Spilled materials should be removed immediately from curbed areas to allow space for future spills.
- ❑ Curbs should have manually controlled pump systems rather than common drainage systems for collection of spilled materials.
- ❑ The curbed area should be inspected regularly to clear clogging debris.
- ❑ Maintenance should also be conducted frequently to prevent overflow of any spilled materials as curbed areas are designed only for smaller spills.
- ❑ Remove accumulated stormwater after precipitation events and dispose of it according to local regulations.
- ❑ Curbing has the following advantages. It:
 - ✓ Provides excellent run-on control;
 - ✓ Is inexpensive;
 - ✓ Is easy to install;
 - ✓ Provides an option to recycle materials spilled in curb areas; and
 - ✓ Is a common industry practice.

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References and Resources

Clark County Clean Water Program. 2015. *Clark County Stormwater Pollution Control Manual Best Management Practices for Businesses and Government Agencies, AS A2 & A3*. Available online at <https://www.clark.wa.gov/public-works/stormwater-code-and-manual>.

King County. 2016. *King County Storm Water Pollution Prevention Manual, Commercial Best Management Practice (BMP) Activity Sheets: A-2 Storage of Liquid Materials in Stationary Tanks and A-3 Storage of Liquid Materials in Portable Containers*. Available online at <http://www.kingcounty.gov/environment/waterandland/stormwater/documents/pollution-prevention-manual/commercial-bmp.aspx>.

Orange County Stormwater Program. n.d. *Best Management Practices for Industrial/Commercial Business Activities*. Available online at <http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessactivities>.

U.S. Environmental Protection Agency. 2015. National Pollutant Discharge Elimination System. *Industrial Fact Sheet Series for Activities Covered by EPA's MSGP*. Available online at https://www.epa.gov/sites/production/files/2015-10/documents/msgp2015_fs.pdf.