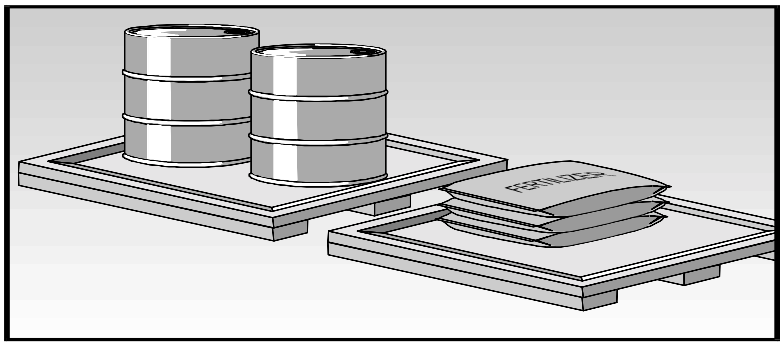
ACTIVITY: Outdoor Container Storage of Liquids	ICP – 06



Targeted Constituents				
● Significant Benefit	◗ Partial Benefit	○ Low or Unknown Benefit		
○ Sediment	● Heavy Metals	○ Floatable Materials	● Oxygen Demanding Substances	
○ Nutrients	● Toxic Materials	○ Oil & Grease	○ Bacteria & Viruses	○ Construction Wastes

Implementation Requirements			
● High	◗ Medium	○ Low	
◗ Capital Costs	◗ O & M Costs	◗ Maintenance	◗ Training

Description

Prevent or reduce the discharge of pollutants to stormwater from outdoor container storage areas by installing safeguards against accidental releases, installing secondary containment, conducting regular inspections, and training employees in standard operating procedures and spill cleanup techniques. This management practice is likely to create a significant reduction in heavy metals, toxic materials, and oxygen demanding substances.

Approach

- All approaches mentioned in ICP-05 Outdoor Loading/Unloading of Materials are applicable to ICP-06 Outdoor Container Storage of Liquids. This fact sheet provides additional detail for storage of liquids.

- Accidental releases of materials from aboveground liquid storage tanks, drums, and dumpsters present the potential for contaminating stormwater with many different pollutants. Materials spilled, leaked or lost from storage containers and dumpsters may accumulate in soils or on the surfaces and be carried away by stormwater runoff. These source controls apply to containers located outside of a building used to temporarily store liquid materials. It should be noted that the storage of reactive, ignitable, or flammable liquids must comply with fire codes.

The most common causes of unintentional releases:

- External corrosion and structural failure,

- Installation problems,

- Spills and overfills due to operator error,

- Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves),

- Leaks during pumping of liquids or gases from truck or railcar to a storage facility or vice versa.

- Protect materials from rainfall, run-on, runoff, and wind dispersal:
  - Store materials indoors.
  - Cover the storage area with a roof.
  - Minimize stormwater run-on by enclosing the area or building with a berm.
  - Use "doghouse" for storage of liquid containers.
  - Use covered dumpsters for waste product containers.
- Storage of oil and hazardous materials must meet specific Federal and State standards including:
  - Spill Prevention Control and Countermeasure Plan (SPCC),
  - secondary containment,
  - integrity and leak detection monitoring, and
  - emergency preparedness plans.
- Train operator on proper storage.
- Safeguards against accidental releases:
  - overflow protection devices to warn operator or automatic shut down transfer pumps,
  - protection guards (bollards) around tanks and piping to prevent vehicle or fork lift damage, and
  - clear tagging or labeling, and restricting access to valves to reduce human error.
- Berm or surround tank or container with secondary containment system:
  - dikes, liners, vaults, or double walled tanks.
- Facilities with "spill ponds" designed to intercept, treat, and/or divert spills should contact the TDEC regarding environmental compliance.

Maintenance

- Inspect storage areas before and after rainfall events, and at least weekly during other times.
- Inspect to ensure that designated storage areas are kept clean and well organized.
- Repair and/or replace perimeter controls, containment structures, and covers as needed to keep them properly functioning.
- Conduct routine weekly inspections.
- Weekly inspection should be considered and include:
  - Check for external corrosion and structural failure,
  - Check for spills and overfills due to operator error,
  - Check for failure of piping system (pipes, pumps, flanges, coupling, hoses, and valves),

- Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa,
- Visually inspect new tank or container installation loose fittings, poor welding, and improper or poorly fitted gaskets, and
- Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.

Limitations

- Space limitation may preclude indoor storage.
- Storage sheds must meet building & fire code requirements.
- Space and time limitations may preclude all transfers from being performed indoors or under cover.
- It may not be possible to conduct transfers only during dry weather.
- Costs may be prohibitive when covering a large loading/unloading area.

Additional Information

Container Management

- To limit the possibility of stormwater pollution, containers used to store dangerous waste or other liquids should be kept inside the building unless this is impractical due to site constraints. If the containers are placed outside, the following procedures should be employed:

  - Dumpsters used to store items awaiting transfer to a landfill should be placed in a lean-to structure or otherwise covered. Dumpsters shall be kept in good condition without corrosion or leaky seams. All drain valves should be closed.
  - Garbage dumpsters shall be replaced if they are deteriorating to the point where leakage is occurring. It should be kept undercover to prevent the entry of stormwater. Employees should be made aware of the importance of keeping the dumpsters covered and free from leaks.
  - A fillet should be placed on both sides of the curb to facilitate moving the dumpster.
  - Waste container drums should be kept in an area such as a service bay. If drums are kept outside, they must be stored in a lean-to type structure, shed or walk-in container to keep rainfall from reaching the drums.

- Storage of reactive, ignitable, or flammable liquids must comply with the fire codes of your area. Practices listed below should be employed to enhance the fire code requirements.

  - Containers should be placed in a designated area.
  - Designated areas should be paved, free of cracks and gaps, and impervious in order to contain leaks and spills.
  - Liquid waste should be surrounded by a curb or dike to provide the volume to contain 10 percent of the volume of all 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, a dead-end sump should be installed in the

drain.
  - All 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.
- The designated storage area should be covered.
- Containers used for liquid removal by employees must be placed in a containment area.
  - A drip pan should be used at all times.
- Drums stored in an area where unauthorized persons may gain access must be secured to prevent accidental spillage, pilferage, or any unauthorized use.
- Employees trained in emergency spill cleanup procedures should be present when dangerous waste, liquid chemicals, or other wastes are loaded or unloaded.

Operator Training/Safeguards

Well-trained employees can reduce human errors that lead to accidental releases or spills. Employees should be familiar with the Spill Prevention Control and Countermeasure (SPCC) Plan. The employee should have the tools and knowledge to immediately begin cleaning up a spill if one should occur. Operator errors can be prevented by using engineering safeguards and thus reducing accidental releases of pollutant.

Tank systems should be inspected and tank integrity tested regularly. Problem areas can often be detected by visually inspecting the tanks frequently. Problems or potential problems should be corrected as soon as possible. Registered and specifically trained professional engineers can identify and correct potential problems such as loose fittings, poor welding, and improper or poorly fitted gaskets for newly installed tank systems. The tank foundations, connections, coatings, and tank walls and piping systems also should be inspected. Inspection for corrosion, leaks, cracks, scratches in protective coatings, or other physical damage that may weaken the tank system should be a part of regular integrity testing.

Secondary Containment

Tanks should be bermed or surrounded by a secondary containment system. Leaks can be detected more easily and spills can be contained when secondary containment systems are installed. Berms, dikes, liners, vaults, and double-wall tanks are examples of secondary containment systems.

One of the best protective measures against contamination of stormwater is diking. Containment dikes are berms or retaining walls that are designed to hold spills. Diking is an effective pollution prevention measure for above ground storage tanks and railcar 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 facility, but it is most commonly used for controlling large spills or releases from liquid storage areas and liquid transfer areas.

For single-wall tanks, containment dikes should be large enough to hold the contents of the storage tank for the facility plus rain water. 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 may also be designed with impermeable materials to increase containment capabilities. Dikes should be inspected during or after significant storms or spills to check for washouts or overflows. Regular checks of containment dikes to insure the dikes are capable of holding spills should be conducted. Inability of a structure to retain stormwater, dike erosion, soggy areas or changes in vegetation indicates problems with dike structures. Damaged areas should be patched and stabilized immediately. Earthen dikes may require special maintenance of vegetation such as mulching and irrigation.

Curbing is a barrier that surrounds an area of concern. Curbing is similar to containment diking in the way that it prevents spills and leaks from being released into the environment. The curbing is usually small scaled and can not contain large spills like diking. Curbing is common at many facilities in small areas where handling and transferring liquid materials occur. Curbing can redirect contaminated stormwater away from the storage area. It 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 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. Curbing has the following advantages:

- Excellent run-on control,
- Inexpensive,
- Ease of installment,
- Provides option to recycle materials spilled in curbed areas, and
- Common industry practice.

Primary References

California Storm Water Best Management Practice Handbooks, Industrial Handbook, CDM et.al. for the California SWQTF, 1993.

Subordinate References

Best Management Practices for Industrial Storm Water Pollution Control, Santa Clara Valley Nonpoint Source Pollution Control Program, 1992.

Storm Water Management for Industrial Activities: Developing Pollution Prevention Plans, and Best Management Practices, EPA 832-R-92-006, USEPA, 1992.

Water Quality Best Management Practices Manual, City of Seattle, 1989.