



**Targeted Constituents**

<input checked="" type="radio"/> Significant Benefit		<input checked="" type="radio"/> Partial Benefit		<input type="radio"/> Low or Unknown Benefit	
<input type="radio"/> Sediment	<input checked="" type="radio"/> Heavy Metals	<input checked="" type="radio"/> Floatable Materials	<input checked="" type="radio"/> Oxygen Demanding Substances	<input type="radio"/> Bacteria & Viruses	<input type="radio"/> Construction Wastes
<input checked="" type="radio"/> Nutrients	<input checked="" type="radio"/> Toxic Materials	<input checked="" type="radio"/> Oil & Grease	<input type="radio"/> Bacteria & Viruses	<input type="radio"/> Construction Wastes	

**Description** Prevent or reduce the discharge of pollutants to stormwater from outdoor loading and unloading of materials by enclosing or covering materials, installing secondary containment, preventing contact with stormwater, training and spill prevention. This management practice will create a significant reduction in most types of pollution.

**Approach** Loading and unloading of materials may take place inside or outside of an enclosed area or building, commonly involving truck or rail transfer. Loading or unloading of materials occurs in two ways: materials in containers or direct liquid transfer. Loading and unloading of materials should preferably occur within a manufactured building so that any leaks or spills can be completely contained.

Materials spilled, leaked or lost while loading or unloading may collect in the soil or on paved surfaces. Material may be carried away by stormwater runoff, wind or other air movement, or when the area is cleaned. Rainfall may wash pollutants from machinery used to unload or move materials. The most important factors in preventing pollution from entering stormwater runoff are:

- Maintain organized and safe working conditions.
- Train good employees.
- Limit exposure of material to rainfall and stormwater runoff.
- Contain leaks and spills during transfer operations.
- Check and maintain equipment regularly for proper operation.

Related BMPs include:

- AM-06 Material Delivery and Storage
- AM-07 Spill Prevention and Control
- IC-03 Outdoor Container Storage of Liquid Materials

**Training**

- Train employees and subcontractors on the proper material delivery and storage practices, including review of a Spills Prevention, Control and Countermeasures (SPCC) Plan if in effect. Make sure forklift operators are properly trained to limit spills or damaged containers, using spotters as necessary.
- Employees should periodically review material safety data sheets (MSDS). They

should be aware of material content, potential hazards, and safety procedures required in the event of a spill or leak.

- Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings). Designate a foreman or supervisor to oversee and enforce proper spill prevention and control measures.

#### ***Material Delivery Practices***

- Keep an accurate, up-to-date inventory of material delivered and stored on site. Verify that MSDS data is updated. Train employees in emergency spill cleanup procedures for dangerous materials or liquid chemicals that may be handled.
- Park tank trucks or delivery vehicles so that spills or leaks can be contained with drip pans under hoses or other secondary containment.
- Cover loading/unloading docks to reduce exposure of materials to rain. Place a seal or door skirt between trailer and building to prevent exposure to rain. Position roof downspouts to direct stormwater away from loading/unloading areas.
- Look for dust or fumes during loading or unloading operations.
- When transferring material from tank trucks or rail cars into aboveground or underground storage tanks, the following procedures should be used:
  - The area where the transfer takes place should be paved, preferably with portland cement concrete.
  - Transfer area should be designed to prevent stormwater runoff from adjacent areas. Install curbs or swales uphill from transfer area.
  - Slope transfer area to a controlled drain or a dead-end sump with a positive control valve and posted instructions.
  - Place drip pans at locations where spillage may occur, such as hose connections, hose reels, and filler nozzles. Use drip pans when making and breaking connections.
- Material storage should be located away from busy areas and posted with conspicuous signs. Locate storage away from storm drains and open channels. Store materials indoors within existing structures or sheds when available. Have proper storage instructions posted at all times in an open conspicuous location.
- Minimize the amount of hazardous material inventory stored on site. Schedule more frequent deliveries of less material.
- Do not store hazardous chemicals, drums, or bagged materials directly on the ground. Place these items on a pallet under cover with secondary containment as required. Keep hazardous chemicals in original containers that are securely shut and well-labeled. Hazardous materials should be protected from vandalism.
- Parking lots or other surfaces near bulk materials storage areas should be swept periodically to remove debris blown or washed from storage area. Install pellet traps at stormwater discharge points where plastic pellets are loaded and unloaded.
- Keep ample supply of storm drain seals near drains and inlets. Maintain an adequate supply of appropriate spill cleanup material near storage areas.

*Spill Cleanup*

- Different materials pollute in different amounts. Make sure that each employee knows what a “significant spill” is for each material they use, and what is the appropriate response for “significant” and “minor” spills. The City of Knoxville Engineering Department and the Tennessee Department of Environment and Conservation (TDEC) require immediate notification of all spills or leaks, in any amount, to the water or soil. A significant spill should be defined after review of MSDS or other documentation of the contents and proper handling procedures. Consult AM-07, Spill Prevention and Control, for general information on what constitutes a minor spill or a significant spill.
- Place a stockpile of spill cleanup materials where it will be readily accessible. Train employees in spill prevention and cleanup procedures for the site. Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- Clean up leaks and spills immediately using dry methods when possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry or disposed of as hazardous waste. Do not discharge hazardous materials into sanitary sewer system without contacting Knoxville Utilities Board (KUB) to obtain written permission.
- Many businesses, commercial facilities and industries are required to have a SPCC Plan. The SPCC Plan must have procedures for specific chemicals that are frequently used. The SPCC Plan must contain emergency contact numbers as well as telephone numbers for emergency response and regulatory organizations.

**Maintenance**

- Inspect storage areas at least weekly if not in use and after rainfall events to be sure that stormwater pollution is not being generated. Verify that designated storage areas are kept clean and well organized. Repair and replace perimeter controls, containment structures, and enclosures as needed to keep them properly functioning. The frequency of repairs may depend on the age of the facility.
- Check loading and unloading equipment regularly for leaks. Concentrate on valves, pumps, flanges, and other connections. Repair and replace parts immediately to prevent spills and leaks.

**Limitations**

- Ideally, most materials should be stored in climate-controlled areas away from stormwater contact. Space limitation may preclude indoor storage. Storage sheds and other buildings must meet structural codes and fire codes. It may not be possible to conduct transfers only during dry weather.

**References**

**31, 33, 34, 35, 99, 100, 103, 137, 138** (see BMP Manual Chapter 10 for list)