

OBJECTIVES

- Proper storage of materials
 - Storage areas
 - Container Units
 - Special Considerations
- Maintain storage areas and handling procedures
 - Training
 - Inspections
- Reduce or prevent polluted discharges
 - Spill Response and Control
 - General Practices
 - Monitoring

DESCRIPTION

Materials such as street sweeping debris, soil, asphalt materials, rubble, crushed rock, yard and organic wastes, road salt, sand, petroleum products, solvents, pesticides, and so on (whether stored in bulk, containers, etc.) exposed to rain and run-off can pollute stormwater and receiving waterways. Implementation for certain protocols including enclosures and secondary containment, along with proper training and regular inspections, will reduce or eliminate the potential for polluted discharges. Accidental releases of materials from above ground storage tanks and containers present a high potential for contaminating stormwater runoff or discharging directly to receiving waterways.

CONSIDERATIONS

Materials can be stored in one of three ways: On a paved surface with a roof or other covering so that no rain directly contacts the materials, on a specially constructed paved area with a dedicated drainage system, or unpaved surface with no roof-type structure but covered with tarps or sheeting secured with weights.

See other appropriate BMP fact sheets for further information regarding hazardous materials and general material storage practices.

Keep outdoor stockpile and storage areas away from waterways or drains to the Maximum Extent Practicable (MEP). Add secondary containment devices and berms/dikes/etc. to reduce the potential for run-on and run-off

Consult local fire departments for clearance limitations of roof covers or overhangs over containers with flammable materials.

Common causes of unintentional or accidental leaks or releases related to container units include, but are not limited to: improper installation of containment devices, insufficient installation of protection measures, corrosion or failure of units, connection failures (pipes, flanges, couplings, etc.), and overfilling a container.

Storage of particular materials, such as reactive and flammable liquids should comply with the Uniform Fire Code and the National Electric Code. Consider all regulatory requirements for final outdoor storage areas.

Secondary containment systems are recommended for outdoor container storage areas—specifically for those areas with hazardous, flammable, or toxic products.

A storage area for hazardous materials should be confined to hazardous materials only. Storage procedures need to consider the manufacturer's recommendations, and an understanding of incompatible materials should be achieved when storing hazardous materials. The appendix of this BMP Manual includes an Incompatible Materials Chart along with a list of highly hazardous chemicals. Depending on specific federal and state regulations or standards, an SPCC Plan or leak detection monitoring may be required. See BMP Fact Sheet GH-8 Hazardous Materials for more information.

RECOMMENDATIONS AND PROTOCOLS

Outdoor storage areas for materials and containers should be dedicated areas. These areas can be storage sheds, bunkers, "lean-to" structures, identified locations, and so on.

For the objectives listed, the following represent further recommendations and protocols for outdoor storage of materials:

Storage areas

General

- Ensure sufficient access for material procurement and inspections
- Store materials away from high-traffic areas
- Cover treated wood products with tarps or plastic sheeting
- Do not place storage areas over or immediately adjacent to drains or waterways
- Keep liquids and dry materials in separate areas
- Ensure that contaminated stormwater is not discharged directly to waterways, inlets, catch basins, and so on

Paved surface with overhang

- Sweep loose materials for collection or disposal on a regular basis. Keep clean up materials (brooms, dustpans, flat shovels, etc.) readily available
- Ensure overhang is structurally sound and reduces contact with rain
- Consider berms or similar to channel run-off to containment or treatment devices
- Types of materials generally stored in such a location include, but are not limited to: road salt, treated wood products, mulch, sand, and bagged materials

Special paved area

- Consider "isolation" measures such as berms, containment devices, and similar to reduce the potential for run-off or run-on with raw materials
- Drainage should be channeled to containment or treatment devices.
- Types of materials that may be stored in such a location include, but are not limited to: compost, mulch, dumpsters, and containers
- Place tarps or sheeting secured with weights or anchors over materials as necessary

No overhang on unpaved surface

- Consider "isolation" measures such as berms, containment devices, and similar
- to reduce the potential for run-off or run-on with raw materials

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- Place tarps or sheeting secured with weights or anchors over materials as necessary
- Types of materials that may be stored in such a location include, but are not limited to: soil, mulch, organic debris (lawn clippings, leaves, etc.), and construction-type of raw materials
- For large stockpiles that cannot be covered with tarps, implement containment devices and/or temporary-type BMPs such as silt fences, straw "wattles," check dams, and so on

Container Units

- An automatic shear valve with shut-off located within a container or tank is more ideal than a simple shut-off valve in-line on a supply pipe.
- Place tight-fitting lids on all containers.
- Repair or replace leaking dumpster containers.
- Keep dumpster lids closed.
- Make sure containers are kept in designated areas
- Replace containers that are deteriorating where leaking is a constant action.
- Drums should be stored under lean-to type structures if stored outside
- Utilize impervious surfaces under a roof or other appropriate cover for container storage
- Provide barriers or posts (bollards), where tanks are exposed to collisions with vehicles or equipment
- Provide container tank piping below product level with a shut-off valve at the tank
- Consider pre-built or structurally sound units that keep the containers off the ground; place drip pans or absorbant pads under the containers as a containment device. Pallets or similar are also acceptable keeping containers off of the ground
- Provide berms, dikes, curbs, or similar around specific containers or the container storage area as secondary containment.
- Provide readily accessible location for spill response materials.
- Consider "spill ponds" as a collection device for spills and leaks, or collection of run-off if exposure to rainwater is inevitable
- Storage areas should be designed to minimize or eliminate run-on, run-off, wind dispersal, and exposure to rainwater.

General Practices

- Check containers and tanks daily as a part of a general monitoring plan. Review containers, fittings, connections, containments devices, and signs of leaks.
- Store bagged and boxed materials on pallets.
- Keep ample supply of appropriate spill clean up material near storage areas.
- Do not "overload" storage areas. Provide ample room for access and inspections.
- Inspect outdoor storage areas after a defined rain event.
- Keep storage areas clean and free of debris.
- Stockpiles or stored materials with nutrients and toxic chemicals should have a containment device (berms, dikes, etc.) installed to prevent run-off or discharge
- If temporary-type erosion and control BMPs (silt fence, check dams, etc.) are used, they need to be maintained for proper operation and replaced as necessary to ensure proper operation.

Spill Response and Control

- Secondary containment should be provided for hazardous chemicals and chemicals identified as specific pollutants (i.e. sediment as outlined in the Chesapeake Bay TMDL)
- Containment devices and temporary-type BMPs (silt fence, straw "wattles," etc.) are considered spill control techniques for outdoor material storage.
- Refer to BMP Fact Sheet GH-5 for non-stormwater discharges and recommended practices for preventing/reducing polluted discharges
- Refer to BMP Fact Sheet GH-10, Spill Prevention and Control for more information

DOCUMENTATION

Proper documentation practices are essential for any municipal SWMP to show compliance with the Clean Water Act, NPDES, and generally the requirements of the permit issued to allow discharges through the defined MS4. As with all sections of an MS4 permit, all documentation should be centralized.

For outdoor material storage, templates are provided within the BMP manual to assist the municipality with documentation compliance. The templates can be used for compliance; however, the following documents are recommended as a minimum for compliance:

- **Training Record:** This document is used to provide record of a training event or session relative to outdoor material storage or use.
- **Training and Education Log:** Enter a completed training record for outdoor material storage and use into the log.
- **Event Record:** If a discharge or leak is observed in a storage area or from a container, an event record should be executed that also outlines response and remediation procedures. Exposed outdoor storage areas should be noted after major rain events requiring an event record.
- **Activity Record:** Complete when remediation is conducted or improvements are made to outdoor storage areas, such as replacement of tarps (if outlined in an inspection) and installation of containment devices and temporary-type BMPs (silt fence, straw bales, etc.).
- **Inspection Record:** Complete an inspection based on the recommendations in the section titled "INSPECTIONS AND MEASUREMENTS" or as outlined in your SWMP
- **Inspection, Event, and Activity Log:** Enter an inspection, activity, or event record for outdoor material storage or use into the log as outlined within this BMP. A record (and corresponding log entry) is not necessary for each and every time material is stored or used.
- **Master Material Inventory List**
- **Municipal Yard Map:** Organize and complete a municipal yard map (including locations of interior building features). Identify the outdoor material storage areas—and specifically stockpile locations with containment devices or temporary-type BMPs marked out and containers—on the map. Place a copy of the map within your SWMP documentation.

INSPECTIONS AND MEASUREMENTS

Frequency of inspections for storage areas is recommended as follows:

- *Rain Event Inspection:* Conduct an inspection of the storage areas and containers after a defined rain event (if storage area is located outside). A defined rain event is determined in the SWMP.
- *Regular Inspection:* If a rain event does not dictate an inspection, inspect the storage area every two weeks.

Items that should be inspected and maintained in material storage areas (and recommended maintenance actions):

Cleanliness: Sweep and remove debris or trash

Inventory: assure inventory matches records and is accounted for

Isolation measures: assure implemented measures (i.e. berms, containment devices, and so on) are sound and in working order

Tarps or plastic sheets (if applicable): repair or replace torn or damaged tarps or plastic sheets. Ensure tarps are not "flapping" in the wind.

Contaminated soils/materials (if applicable): inspect contaminated soil stockpiles and materials until proper disposal. Assure contaminated soil stockpiles are intact and no run-on or run-off is observed

Temporary-type BMPs: Silt fences, straw "wattles, check dams, and so on should properly installed and functioning. Remove built-up debris or sediment as necessary. Replace defunct or damaged materials.

Integrity of storage containers: replace leaking or cracked containers

Evidence of leaks: isolate and clean-up leaks; replace leaking containers

Stockpiles: Ensure stockpiles have proper coverage and material/debris is not "washing away."

Containment devices: assure implemented measures (i.e. berms, dikes, pans, collection units, and so on) are sound and in working order. Inspections should include secondary containment devices as well.

Storage layout: Ensure materials are neatly stored and as recommended by the manufacturer (if applicable). Different materials should be separated.

Storage area: Ensure overhangs or structural delineation items are sound.

Impervious ground surfaces should be free of cracks that could channel leaks

Labels: Ensure containers are fitted with proper labels

Miscellaneous: observe and correct any signs of corrosion, pest damage, or other observed item that may result in leaking containers, spills, and so on.

Look for corrosion and failures on pipes, connections, and so on and repair.

Signs: Assure placards properly represent the hazardous materials stored

Spill Prevention and Control Materials: Replace used or defunct spill clean-up materials

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Effectiveness can be demonstrated by several means. Two specific types of measurements include (1) properly implementing and maintaining practices (and documentation of implementation and maintenance) recommended in this fact sheet and (2) establish sample sites as part of a monitoring program. A successful monitoring program will require collecting and testing samples of stormwater runoff at or near storage locations (within containment boundaries) and simultaneously collecting and testing samples outside of the containment boundaries. If a reduction is observed or specific pollutants are not observed, the BMP controls can be considered effective.

SOURCES

California Stormwater Quality Association, Municipal Stormwater Best Management Practice Handbook (2004 edition) at <http://www.cabmphandbooks.com/Municipal.asp>

Colorado State University SOP Manual at http://www.fm.colostate.edu/sustain/downloads/stormwater_procedures.pdf

City of Kent Public Works SWPPP at <http://www.ecy.wa.gov/programs/wq/stormwater/municipal/MUNIdocs/KentCOMBOfile.pdf>

CALTRANS BMP Manual, 2004 edition at http://www.dot.ca.gov/hq/construc/stormwater/CSBMPPM_303_Final.pdf

Ohio EPA NPDES Phase 2 General Permits Pollution Prevention/General Housekeeping Manual at <http://www.epa.ohio.gov/LinkClick.aspx?fileticket=s13p1%2BO%2BeuE%3D&tabid=2702>