Spill Plans for Transportation Maintenance Facilities

How Minnesota Complies with the Federal Rule

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The federal Spill Prevention, Control, and Countermeasure (SPCC) regulations require that facilities storing petroleum substances in underground or aboveground tanks must implement plans to prevent or minimize spills that may pollute the nation's waters. Even though the rule, Title 40 of the Code of Federal Regulations (CFR), Part 112, went into effect on January 10, 1974, many petroleum tank owners—including transportation agencies—still are not aware of the regulation or do not fully understand its implications.

A cursory interpretation of the federal rules and regulations mandating SPCC plans may give a false impression that a plan is not required for a site. The rules refer to oil pollution of "navigable waters" by "nontransportation" facilities, whether onshore or offshore, causing some tank owners to believe that their facilities are exempt. However, the terms have a more extensive application.

Minnesota does not enforce the SPCC rule in the same way it has enforced the federally mandated program preventing pollution from outdated underground petroleum storage tanks. Nonetheless, the Minnesota Department of Transportation (MnDOT) has assessed the types of facilities affected by the SPCC rule and has implemented a statewide program to ensure compliance, developing facility spill plans, installing spill containment areas, and training employees.

Plan Objectives

An SPCC plan has three objectives:

1. Prevent petroleum releases. Spill prevention measures could include overfill prevention devices, double-walled tanks, and periodic tank inspections.
2. If a release occurs, control the spill. Engineering controls include physical features such as berms (i.e., sloped ledges) or drain plugs at the facility to contain releases and facilitate recovery.
3. If the release escapes control at the site, initiate planned countermeasures for recovery and cleanup as expediently as possible.

Applying the Regulations

Many MnDOT facilities have a variety of petroleum tanks. The smaller aboveground tanks for motor oil, automatic transmission fluid, used oil, hydraulic oil, and hydraulic lift reservoirs generally are located inside truck stations. The larger-capacity aboveground tanks for road oil, diesel fuel, and gasohol generally are located outdoors. MnDOT also stores diesel fuel, gasohol, and heating oil in underground tanks. The SPCC regulations require consideration of all tanks containing petroleum-based materials at a facility.

Volume Thresholds

The quantity of petroleum substances stored on site determines if a facility requires an SPCC plan (Table 1). A site with a capacity to store more than 42,000 gallons of petroleum in underground tanks must complete an SPCC plan. The regulatory threshold for aboveground petroleum storage tanks is much lower—a capacity of more than 660 gallons in a single aboveground tank or a cumulative capacity of more than 1,320 gallons in smaller tanks.

No MnDOT facility has an underground storage capacity exceeding 42,000 gallons. However, if a facility must comply with SPCC regulations for exceeding the aboveground storage threshold, the SPCC plan also must include any underground tanks at the site.

The volume of petroleum storage in aboveground tanks that requires compliance with the SPCC regulations is not great; currently 71 MnDOT facilities

TABLE 1 Criteria for Facility Compliance with the Federal Spill Prevention, Control, and Countermeasure Rule

Criteria	Regulatory Threshold*
Type of facility	Commercial and public facilities that store petroleum must comply with SPCC regulations.
Location of navigable water	If surface water is nearby (including rivers, lakes, streams, ponds, perennial and intermittent ditches, storm and sanitary sewers, wetlands), facility must comply with SPCC regulations.
Petroleum storage capacity	Underground tanks: if capacity of petroleum storage exceeds 42,000 gallons, facility must comply with SPCC rule. Aboveground tanks: if capacity of individual tank exceeds 660 gallons or if several tanks have total capacity exceeding 1,320 gallons, facility must comply with SPCC rule.

*All three criteria must be met before a facility is required to comply with the SPCC rule.

qualify. Fortunately, the state regulations already specify similar responsibilities and equipment as the federal rule—with one exception. The federal rule requires containment at the transfer point when the product is removed or added to a tank.

Navigable Waters

The SPCC plan focuses on preventing petroleum releases from significantly affecting "navigable waters." In most cases only the spillage of large volumes of petroleum would have a significant impact on surface or groundwater; therefore the plan emphasizes prevention and containment of catastrophic releases from tank systems and transport vehicles.

But what are navigable waters? The phrase may bring to mind images of waterways with commercial shipping fleets. In Minnesota, for example, the term seemed to apply only to maintenance facilities on the banks of Lake Superior or the Mississippi River. However, the federal definition goes beyond this simple interpretation.

The determination of the impact of a facility discharge on navigable waters must take into account the distance to and location of rivers, lakes, streams, ponds, perennial and intermittent ditches, storm and sanitary sewers, wetlands, and other bodies of water. By this interpretation, a facility in the "Land of 10,000 Lakes" is more likely to need an SPCC plan than not.

Nontransportation Facilities

Facilities that must comply with SPCC plan requirements under the navigable waters and volume of storage criteria are defined as "nontransportation" facilities. MnDOT facilities, as part of a transportation system, might appear exempt. However, nontransportation facilities include commercial and public facilities that store petroleum. MnDOT truck stations, therefore, are not exempt from SPCC plan requirements.

Taking Action

Site Characterization

The first step in developing a facility SPCC plan is a thorough site inspection by a registered professional engineer, who examines the petroleum storage-tank systems, secondary containment, overfill prevention equipment, and other safeguards, as well as facility security. Acceptable site security comprises fencing, gates that are locked after hours, and sufficient lighting to deter vandalism and allow spills to be visible at night.

The inspection determines site drainage patterns—that is, how spills are likely to flow—and if additional containment is necessary. The inspector's approval attests that the plan follows good engineering practices.

Holding Down Costs

MnDOT retained an environmental consultant experienced in SPCC planning to perform site visits and prepare the plans. According to the literature, completion of an SPCC plan can cost up to $5,000 per site. MnDOT divided the state into several geographic regions, so that facilities in an area could be inspected in one regional tour. This also made it possible to coordinate meetings of the consulting engineer with personnel knowledgeable about the tank storage systems.

MnDOT gathered information about the storage tanks in use and about employee training before the site inspections. The MnDOT project manager described the level of employee training and the typical maintenance operations, supplied site maps, and provided personnel contacts to answer the consultant's questions.

Reducing the travel time and compiling facility data in-house cut the external costs to complete the SPCC plans to approximately $2,000 per site.

Training Personnel

MnDOT assigned two spill prevention coordinators (SPCs)—safety officers and supervisors familiar with storage tank requirements—for each geographic region. The SPCs have authority to initiate spill response actions in the event of a catastrophic release.

Employees at the truck stations are trained to take appropriate action if a petroleum release occurs. They can recognize when the magnitude of

a spill presents a high risk to personnel safety or to the environment. If the volume is not great, employees may contain the spill with absorbents retrieved from a kit on site; they also may use sand to absorb petroleum spills.

In high-risk situations, the employee evacuates the site and refers to the posted spill response instructions to contact the SPC and local authorities. The SPC makes arrangements with the emergency responder to mobilize to the site.

The SPC reviews each facility's plan every three years to make sure it is current and applicable.

Since the primary goal of the SPCC rule is to prevent spills, regular inspection of the storage tank systems is imperative, ensuring that equipment is sound and operating properly. The aboveground diesel and gasohol tanks receive monthly inspections for structural integrity and signs of petroleum releases.

The inspections are scheduled and documented with a computer software program, written so that the inspector can be identified later, if necessary. Product tanks within the work area are not subject to formal inspection, since employees can detect a release immediately. Underground storage tanks are equipped with two types of automated leak-detection systems, inspected annually to ensure proper functioning.

Transfer-Point Containment

The SPCC requirement for containment at the transfer point has had the greatest economic impact on MnDOT. The rule stipulates that when the tank is filled or petroleum is withdrawn, the containment volume must be sufficient to hold the contents of the entire tank truck or of the largest compartment.

Options Considered

There are several ways to comply with the containment requirement. MnDOT has considered the following options:

- Create a depression near the transfer point and grade the area to direct drainage toward the depression (Figure 1). The surface of the depression should consist of a material not readily permeable to the petroleum product. Before a transfer, the depression must be pumped free of water or it must be large enough to accommodate both stormwater runoff and any spill. Some MnDOT facilities already had drainage ponds of sufficient volume to meet the containment requirements.
- Bury an underground storage tank to accept spills from the transfer area. The tank inlet can be closed except during product transfers. MnDOT has not yet used this alternative.
- Slope the pavement from the transfer area to a corner of the yard and construct curbs high enough to contain any spill (Figure 2). An outlet pipe at the lowest elevation point of the containment area can drain normal runoff. The pipe must be capped during product transfers. MnDOT has used this method particularly at sites under renovation for building expansions; accommodating a containment area within the site grading plan did not add much to the overall cost.
- Create large bermed areas around aboveground road-oil tanks. Because of the relatively high viscosity of road oil, the containment area can use more permeable soils, which can absorb precipitation (Figure 3). MnDOT has used this technique at sites with road oil or emulsion tanks. In most cases, this only required enlarging the bermed area already around the tank to include the transfer point.
- If all runoff is directed toward a drainage pipe, block the pipe during transfer; however, the area upslope of the pipe must be able to contain the spill volume. MnDOT considered this alternative for drainage ponds fitted with overflow pipes.

FIGURE 1 Earthen berms around an entire storage yard can contain spillage from road oil tanks. Smaller berms can surround the immediate loading area and the tanks.

FIGURE 2 Low-lying bituminous berms in loading area for diesel and gasohol underground storage tanks can control spills but allow easy passage of vehicles. A blockable drain at low point of berm empties runoff from precipitation.

FIGURE 3 A grassy swale can be effective in containing viscous materials such as road oil and can blend in with surrounding landscape.

- Purchase portable containment units. The transfer vehicle can park within the containment unit during operations. Portable containment units range in cost from $600 to $6,000, depending on size and liner durability. However, the units can be used at several sites. MnDOT is evaluating the cost-effectiveness of the units at different locations. (Figure 4 shows a portable containment unit for transfers to drums and small bulk storage.)
- For aboveground storage tanks inside a building, block all floor drains with domed covers or conical plugs (Figure 5). Plugs and covers generally cost less than $100 each.

Other Measures

In selecting transfer area containment alternatives, MnDOT staff considered the type of product stored, the native soils at the site, the proximity of surface water, the natural drainage patterns, and the cost and practicality. Cost and practicality presented one other option—the removal of the storage tank. In some cases—especially tanks used for the storage of road oil—the convenience of having the product on site did not offset the cost of complying with the federal SPCC regulation.

FIGURE 4 Portable spill control pallet for secondary containment of small-volume vessels.

MnDOT also has instituted another safeguard during transfers, requiring that staff must be present during the delivery of a product to aboveground or underground tanks. This decreases the likelihood of spills from overfilling and ensures that the transfer vehicle is parked within the containment area. The employee also can check that all hoses are disconnected and all valves closed before the driver departs. Experience has shown that spills during product deliveries are common; supervision of product transfers should reduce the number of spill incidents.

Management Commitment

Strong support and commitment from upper management are crucial to the success of an SPCC plan. Instead of having one manager sign approval for all plans, MnDOT selected managers in each geographic district to review the plans, demonstrating extensive organizational involvement.

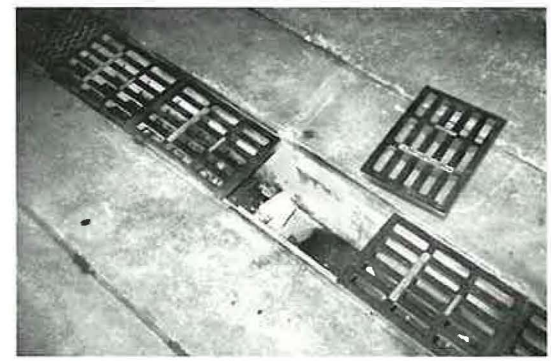

FIGURE 5 Conical plugs placed in floor drains before product transfer provide containment for aboveground motor oil tanks inside building.

The SPCC rules may necessitate increased employee training, moderate expenditures for equipment, installation of containment areas, or even removal of a storage tank. However, the overall goal is to preserve the nation's water resources. Even though petroleum compounds biodegrade naturally, it may take a long time for natural processes to restore contaminated surface water to an unspoiled condition.

MnDOT has expended much effort to meet the goals of protecting the nation's waters and of being a good neighbor to the communities served by its facilities.

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