

Do We Need Secondary Containment for our Electric Power Substations?

The intent of the SPCC rule is to set guidance to prevent oil from entering the navigable waters of the United States.

Electric utilities frequently store large quantities of oil. This is primarily due to the utilities' extensive use of oil-filled power distribution equipment, which includes transformers, voltage regulators, circuit breakers and autoreclosers. The oil contained in these devices is designed to both cool and insulate the electrical conductor. Typically, these devices are located at substations, which are usually unmanned.

By regulation, the oil contained in the power distribution equipment is considered an "oil" under the Spill Prevention, Control and Countermeasures (SPCC) rule which is administered by the United States Environmental Protection Agency (USEPA) per 40 CFR §112. The intent of the SPCC rule is to set guidance to prevent oil from entering the navigable waters of the United States.

The SPCC rule defines several classes of oil storage. The most common is bulk oil storage, which includes tanks, drums, and other vessels that store oil before it is used. Oil-filled power distribution equipment devices fall under a class of oil storage known as oil-filled operational equipment. While secondary containment is mandatory for bulk oil storage containers, USEPA provides an alternative to providing secondary containment for oil-filled operational equipment.

PROBLEM STATEMENT

Though electric power substations may fall under the SPCC rule, it may be impractical to provide secondary containment.

STRATEGY & SOLUTION

The electric utility must first determine if the facility is regulated under the SPCC rule. Facilities are considered regulated if they store 1,320 gallons or more of oil in



containers 55 gallons or larger. As an example, consider two substations:

Substation 1 - Three voltage regulators with 187 gallons of mineral oil capacity each and two transformers with 420 gallons of mineral oil capacity each:
*Oil Storage Capacity = (3 x 187) + (2 x 420) = **1,401 gallons of oil storage capacity***

Substation 2 - Six voltage regulators with 168 gallons of mineral oil capacity each and four transformers with 53 gallons of mineral oil capacity each:
*Oil Storage Capacity = (6 x 168) = **1,122 gallons of oil storage capacity***

[Note: The 53-gallon transformers are not included in the calculations because the capacity of each is less than 55 gallons.]

Substation 1 would be regulated and Substation 2 would not be regulated.

So what exactly can the electric utility do to ensure that Substation 1 is in compliance with the SPCC rule? In short, there are two options:

1. Provide secondary containment
- OR**
2. Implement an Oil Spill Contingency Plan (OSCP)

Option 1 – Provide secondary containment: The first option would entail providing an impervious barrier capable of containing the volume of oil held by the largest single vessel. If exposed to precipitation, the secondary containment would also need to hold a reasonable amount of precipitation (typically a 25-year, 24-hour event).

Option 2 – Implement an Oil Spill Contingency Plan (OSCP): The second option is less disruptive and costly, as the electrical utility would likely prefer to avoid installing secondary containment at a remote facility. Additionally, if secondary containment is not installed, the facility avoids a potential safety hazard due to storage of captured precipitation (from secondary containment) at a facility where high voltage is present. The utility can implement an OSCP that requires the utility to:

- Commit manpower and resources to addressing oil spills/releases
- Monitor the facility for oil spills/releases
- Develop an oil spill response plan

RESULT

Understanding the SPCC rule and how it applies to substations is key to ensuring electrical utilities comply with regulatory requirements. An effective strategy requires that the electrical utility understand the regulations, the amount of oil stored, and what cost-effective options exist.