

Oil Spill Prevention Control and Countermeasures for Electrical Substations – Part I

An Online Continuing Education Course for Engineers

Course Number: E-4062

Credit: 4 Hours / 4 PDH / 4 CPD

Oil Spill Prevention Control and Countermeasures for Electrical Substations – Part I

Lee Layton, P.E.

Table of Contents

<u>Section</u>	<u>Page</u>
Introduction.....	2
Chapter 1: Overview of SPCC Plans	4
Chapter 2: Electrical Facility Applicability	10
Chapter 3: Preparation and Implementation of an SPCC Plan.....	13
Chapter 4: Properties of Oil.....	17
Chapter 5: Oil Spill Prevention Techniques.....	23
Chapter 6: Oil Containment in Navigable Waters	38
Summary.....	52

Introduction

This course covers oil spill prevention and control as a result of accidental discharges of oil from power facilities and electrical equipment containing oil. Topics include,

1. Applicability of Oil Pollution Prevention Regulations (40 CFR, Part 112) published by the Environmental Protection Agency (EPA) regarding electrical facilities and equipment;
2. Preparation and implementation of an oil spill prevention, control, and countermeasure (SPCC) plan for those facilities that, because of their proximity to navigable waters and amount of oil contained, are required by EPA regulations to have an operational SPCC plan;
3. Properties of oil commonly used or stored in electrical facilities and equipment; and
4. Techniques, procedures, and methods for oil spill prevention, containment, removal, and disposal.

EPA Regulations

The original *Spill Prevention, Control, and Countermeasure* (SPCC) rules were published on Dec. 11, 1973 (38 Fed. Reg. 34164). Revisions to the SPCC program were initially proposed on Oct. 22, 1991 (56 Fed. Reg. 54612). Subsequent proposals to amend the SPCC regulations were made in 1993, 1997, and 1999. Final SPCC Phase I amendments were published on July 17, 2002 (67 Fed. Reg. 47042). The final Phase I amendments became effective on Aug. 17, 2002, and are the foundation for this course. Additional final amendments to the Phase I regulations were published on Dec. 26, 2006 (Fed. Reg. 77357) to address issues applicable to “small facilities” and “oil-filled equipment.” EPA issued the “SPCC Guidance for Regional Inspectors” to help explain how the Phase I amendments should be implemented. The latest regulations and guidance can be found on EPA’s web page at www.epa.gov/oilspill. All current EPA SPCC regulations and guidelines should be consulted before SPCC implementation.

To comply with the regulations, a company should conduct an engineering assessment of each power facility to determine the potential for oil discharge and the resulting impact. This assessment is to be based on considerations of the volume of oil and the location of the facility relative to waters that may be affected. If a potential exists, the regulations require the preparation and implementation of an SPCC plan for all new and old facilities that could reasonably be expected to discharge oil into the navigable waters and groundwater of the United States or adjoining shorelines.

Scope of an SPCC Plan

The SPCC plan should address both oil spill prevention and the measures to be employed in the event of a spill to control and contain the oil discharge. The plan should include:

- Physical description of the facility and a facility diagram showing locations and contents of each container in excess of 55 gallons,
- Type of oil in each container and its capacity,
- Discharge prevention measures,
- Discharge or drainage controls,
- Spill countermeasures,
- Methods of disposal of recovered materials,
- Contact list and phone numbers,
- Background information to aid reporting—facility address, location, phone numbers, etc.,
- Prediction of the direction, rate of flow, and the total quantity of the oil that could be discharged as a result of major equipment failure,
- Containment,
- Inspections, tests, and records,
- Personnel, training programs, and discharge prevention procedures, and
- Security.

Need for an Effective SPCC Plan

Besides the necessity of compliance with EPA or state pollution regulations, any sizable oil spill from power facilities may carry serious consequences to the utility even though it may not be near navigable waters. Damage suits, legal fees, penalties, and cleanup expenses may arise from oil releases onto neighboring properties and could have a costly impact on the utility. Adverse publicity from a spill migrating from the facility's property could impair the utility's ability to obtain future zoning or other permits and could detract from the utility's goals of maintaining goodwill with its neighbors and protection of the environment.

Note:

This course is divided into two parts. This is Part I, and concerns what is required in an SPCC, what equipment should be covered by the plan, properties of oil and spills, and issues with spills in navigable waters.

Part II explains some of the tools and methods to contain oil spills, how to address oil spills in water and oil spills on land as well as oil disposal procedures.

Chapter 1: Overview of SPCC Plans

Before an adequate spill prevention plan is prepared, the engineer must first be thoroughly aware of the requirements included in the EPA regulations. What follows is an in-depth discussion of the EPA requirements and how they apply to power facilities.

Regulation 40 CFR 112 applies to all facilities engaged in drilling, producing, gathering, storing, processing, refining, transferring, distributing, using, or consuming oil products. To exclude facilities containing and using small quantities of oil, such as those used by homeowners, these regulations only apply if the facility meets the following conditions:

- Facilities with above-ground storage capacities greater than 1,320 gallons in aggregate storage. Containers of less than 55 gallons are excluded, or
- Facilities with a total storage capacity greater than 42,000 gallons of buried oil storage unless the facility is exempted because it is subject to all the technical requirements of 40 CFR 280 or 281, or
- Facilities that, because of their location, could reasonably be expected to discharge oil into or on the navigable waters of the United States or its adjoining shorelines, or
- Locations required by the EPA Regional Administrator to have an entire SPCC plan, or applicable part, completed so that the purpose of the Clean Water Act is met.

EPA created a subcategory of facilities known as *qualified facilities* that have the option of following certain streamlined regulations designed to reduce the burdens associated with the SPCC program. A qualified facility must not have had 1) a single discharge of oil to navigable waters exceeding 1,000 U.S. gallons or 2) two discharges of oil to navigable waters, each exceeding 42 U.S. gallons within any twelve-month period, in the three years prior to the SPCC plan certification date, or since becoming subject to 40 CFR part 112, if operating for less than three years.

If a facility has 10,000 gallons or less in aggregate above ground oil storage capacity and has an oil discharge history allowing it to be classified as a *small qualified facility*, then an owner/operator of the facility:

- May prepare a self-certified SPCC Plan instead of one reviewed and certified by a Professional Engineer (PE)
- May meet tailored facility security and tank integrity inspection requirements without PE certification
- May prepare a plan which includes PE certified environmentally equivalent measures or impracticability determinations that would require PE certification for only the portions dealing with environmental equivalence and impracticability determinations. The remaining portions of the plan could be self-certified by the facility owner/operator.

If a piece of equipment meets the definition of oil-filled operational equipment at 40 CFR part 112.2 (e.g., transformers, capacitors, and electrical switches) and has the oil discharge history required of a qualified facility, instead of providing secondary containment for that piece of equipment, the owner/operator may choose to prepare an oil spill contingency plan as described in 40 CFR Part 109. In addition, the owner/operator must prepare an inspection or monitoring program for detecting failure/release and a written commitment of manpower, equipment, and materials to quickly control and remove discharged oil. Under this option, it is not necessary for a PE to provide a written determination that containment is impracticable for this piece of equipment.

Before the engineer decides to provide a 40 CFR Part 109 plan to avoid the requirement for secondary containment, the engineer should consider the burdens of maintaining an up-to-date Part 109 spill response plan and compare that approach to a decision to accept the general secondary containment requirement and use “active containment” measures, when appropriate, to satisfy those requirements.

Recommendations

Use of an oil spill contingency plan in lieu of oil retention systems: If the engineer reviewing the facility determines that there is no likelihood of oil reaching navigable waters, it is responsibility of the engineer to adequately show this in the SPCC plan and to include a step-by-step discussion of the cleanup procedures that will be used in the event of a spill. The borrower should be aware that possible serious consequences are associated with developing an SPCC plan around cleanup rather than prevention.

Plans that employ general secondary containment should be prepared for:

- Any facility that has the possibility of discharging oil into the groundwater
- Any facility located in urban, suburban, or rural areas where adverse publicity could be detrimental in obtaining future zoning, building permits, etc.

If pits, tanks, or ponds are used, they should be sized to hold at least 100 percent of the oil contained in the largest single piece of equipment plus a reasonable allowance for precipitation, and not be based on the total capacity of the facility. Berms and equipment pits should be provided with a means to drain to a collection system or to a safe area without possible loss of oil. This may be achieved by a drainage system or by any other acceptable means.

The engineer should use prudent engineering judgment to determine the need for secondary containment. This engineering judgment should be based on the nature of the equipment, the likelihood of occurrence and the nature of the site. The engineer should also consider the need to employ secondary containment for equipment such as current transformers, station service transformers, and other equipment. The engineer should also consider the need for such devices as current transformers, small transformers, and other equipment. The engineer should also consider the need for such devices as current transformers, small transformers, and other equipment. The engineer should also consider the need for such devices as current transformers, small transformers, and other equipment.

A facility that contains oil should also be classified as a Small Qualified Facility and use a spill response plan and secondary containment. The facility should self-certify the plan and use a spill response plan and secondary containment.

To view the remainder of the course material and to take the quiz for PDH credit, you must purchase the course. Close this window and click "Add to cart" on the product page.