How to Prepare Your Own SPCC Plan:
A Step-by-Step Guide for Tier I Qualified Facilities
Using the US EPA Tier I SPCC Template

MODULE IV
Secondary Containment, Oil Spill Control & Spill Prediction
(69 slides + quiz)

Page 3  Secondary Containment and Oil Spill Control Detail

1. Simple Template wording of the requirement and a check box compliance affirmation
   - But containment requirements can be difficult to understand and challenging to ensure in practice

To comply: You must understand the two SPCC-related containment requirements

- 'General' containment: THIS Table G-3
- 'Sized' containment: Table G-10 in Section A (page 9)

Page 9; Section A; Table G-10 (more later)

'Sized' containment requirement for bulk storage containers (applies to sizes 1,000 bbl or larger)
Stationary and portable oil storage containers as stated in Table G-10

'Sized' containment requirement stated in Table G-10
- Applies to bulk tanks & containers
  - Stationary and portable
  - Does NOT apply to oil filled equipment, piping, loading/unloading areas, oil handling areas

+ The 'general' containment (Table G-3 on Page 3) applies to those things
Containment Requirements:
Review and Detail

- Providing adequate oil/petroleum containment is one of the most important aspects of SPCC & APSA compliance.
- But it can be confusing:
  - Containment criteria for bulk storage containers is different than for oil-filled equipment and oil handling & loading/unloading areas.
- Reviewing the requirements and seeing examples help you assure compliance.
- Besides simply checking a few boxes on the Template.

Containment Summary: Two types of containment in the SPCC rule

1. 'Sized' containment (40 CFR 112.6(a)(3)(i) in Table 6-10)
   - For bulk tanks & containers (stationary & portable)
   - 100% containment of largest container capacity
   - Plus 'adequate' precipitation freeboard
   - Should be passive, engineered or constructed systems

2. 'General' containment or other diversionary measures (40 CFR 112.7(c) in Table 6-3)
   - For oil-filled equipment, non-transportation tank trucks, piping and oil handling, loading, unloading & transfer areas
   - Sufficient to keep the 'most likely' oil discharge from reaching navigable waters prior to clean up
   - May be active or passive in design, deployment or operation

Helpful & Handy Reference
Available for download on the DEH website

<table>
<thead>
<tr>
<th>Source of Spill / Type of Equipment</th>
<th>Documentation Requirement (ADE) Code</th>
<th>Documentation Requirement (DEH) Code</th>
<th>Other / Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulk containers / Storage Tanks</td>
<td>Detailed/longitudinal</td>
<td>Detailed/longitudinal</td>
<td>System or other procedures for containment/10% below capacity or 36&quot; minimum.</td>
</tr>
<tr>
<td>Transportation Tanks</td>
<td>Detailed/longitudinal</td>
<td>Detailed/longitudinal</td>
<td>System or other procedures for containment/10% below capacity or 36&quot; minimum.</td>
</tr>
<tr>
<td>Piping, Oil handling equipment</td>
<td>General/10%</td>
<td>General/10%</td>
<td>Sufficient to keep the 'most likely' oil discharge from reaching navigable waters prior to clean up.</td>
</tr>
<tr>
<td>Oil transfer equipment</td>
<td>General/10%</td>
<td>General/10%</td>
<td>Sufficient to keep the 'most likely' oil discharge from reaching navigable waters prior to clean up.</td>
</tr>
<tr>
<td>Oil spill containment</td>
<td>General/10%</td>
<td>General/10%</td>
<td>Sufficient to keep the 'most likely' oil discharge from reaching navigable waters prior to clean up.</td>
</tr>
</tbody>
</table>

June 2010
Page 2

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"Sized" Containment (aka secondary containment) for Bulk Tanks & Containers

- Sized containment:
  - Must contain the capacity of the largest single oil tank, compartment or container plus "sufficient freeboard" to contain precipitation
  - Intended to address catastrophic failure of bulk tanks & containers
  - Precipitation amount is a performance standard (e.g. 24 hours of a 25 year storm)
  - Specific methods are up to the facility
  - Template (Table G-3, Page 3 footnote 'a') lists the various methods to be used
    - But sized containment should be passive, constructed/engineered measures
  - Diked areas (walls and floor) must be sufficiently impervious to contain discharged oil until clean up (40 CFR 112.7(c))
  - Imperviousity is also a performance standard

Capacity of Largest Container/Tank

This containment area would need to hold the capacity of the largest tank (silver one) plus some amount of precipitation (e.g. 6" of rain)

Need to Assure & Verify Proper Containment

Of these three commercially available spill containment trays (from the same manufacturer) - only the 61 gal. capacity one meets SPCC requirements
The sorbent socks would not provide this oil drum storage area with proper 'sized' containment. It needs constructed or more permanent berms, curbs, dikes, etc.

The sock placement also does not render the containment impervious (a full drum release could easily escape).

There is no means of containment (seen in this photo). Even if there is significant distance to the drain or property line, engineered containment in the form of curbs, berms, dikes, spill containment pallets, etc. need to be provided.

Determining Precipitation Freeboard

Only applicable to bulk tanks or containers
- Not required for oil filled equipment, piping, or transfer areas

Only if exposed to rain fall
- ... not required for integral double wall tanks, tanks under roof or inside buildings
  - Sprinkler flow containment is a fire code requirement – not SPCC.

How much? Typically use:
- 24 hours of a 25 year storm
- Local airport should know this
- Or Natl. Weather Service
Full capacity containment? Precipitation freeboard?

The black containment pallets appear to have sufficient capacity for more than 6 inches of rain (plus the 55 gallon drum capacity).

The yellow containment pallet would be sufficient for capacity of a 55 gallon drum - but has far less precipitation capacity. These yellow pallets may have been intended for inside use.

Full capacity containment? Precipitation freeboard?

This containment area would have had sufficient containment and freeboard, but the roof (rain) drain dumps a LOT of storm water directly into this containment.

Outdoor Coverage

Two means of protecting from precipitation (although actually USING the tarp properly is a big help.)
Double-Walled vs Single Walled Tanks

- Double walled (and/or tanks with integral secondary containment)
  - Meets required secondary containment capacity
  - Do not need to account for precipitation freeboard
  - Typically manufactured to various industry specs (UL-142, UL-2085, etc.)
    - But some specs include both single and double wall tanks
  - May look similar to single walled tanks
    - Not always obvious... so you need to verify
  - Additional curbing may be present but not required

Some tanks are obviously double walled or have integral secondary containment.

Double walled & integrally contained tanks do not need to account for precipitation freeboard, and inherently meet sized containment standard.

Double walled tanks? How do you know?

Many times, the manufacturer's plate is painted over, obscured, facing against a wall, otherwise unreadable or missing altogether.
These emergency vents clearly indicate secondary containment (double wall) tank.

"Monitor Port" indicates the presence of an interstitial space (and therefore a double walled tank).

Day tanks for several emergency generators. Most newer ones are double walled, but the manufacturers plate should tell you. If single walled - they would need to have secondary containment curbing installed. These specific ones are double wall.
Separate secondary containment was constructed for a single walled base fuel tank on a portable generator.

Secondary containment does not need to be expensive or sophisticated.

These single wall oil tanks will need to have a secondary containment curb or dike built around them - sufficient to contain the full capacity of the largest tank. They will need to clean the concrete as well.
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Sized containment/spill pallets for drums and IBCs (totes). Need to be careful that the spigots/drain valves do NOT hang over the edge of the containment.

Containment capacity of the room should be calculated & verified. It needs to hold 480 gallons. Room is 10’w x 14’l x 0.5’h = 70 ft³ x 7.48 gal/ft³ = 524 gallons = OK!

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Single walled 480 gallon lube oil tank inside a room with no drain.

Concrete floor, 6” incline up to door.

Containment capacity of the room should be calculated & verified. It needs to hold 480 gallons. Room is 10’w x 14’l x 0.5’h = 70 ft³ x 7.48 gal/ft³ = 524 gallons = OK!

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Sufficiently Impervious

Secondary containment system “must be capable of containing oil and must be constructed so that any discharge ... will not escape containment system before cleanup occurs” (40 CFR 112.7(c))

Diked areas must be “sufficiently impervious to contain oil” (40 CFR 112.8(c)(2))
Clearly not impervious.

Also not very impervious.

If the containment curbing is pre-manufactured and ‘installed’ on the floor surface - it needs to be properly sealed to the floor (epoxied, grouted, caulked, etc.) to prevent oil from leaking through. THIS example was not, and is not impervious.
It WAS impervious...
This is a great example of just checking the boxes on the template vs. making sure you assure ongoing compliance by proper inspections and maintenance.

Generator Base Tanks: Single vs Double Walled?

- Base fuel tanks on generator units (if at least 55 gal capacity) are bulk storage tanks
  - May be single walled or double walled
  - Can range from very easy to very difficult to determine
    - Not always visually apparent or fittings accessible
    - Not always stated on manufacturers plate or other info
    - Often was optional equipment from manufacturer
      - May be no record whether the option was selected
    - Fuel tank serial numbers not always visible or readable
    - Manufacturer may be out of business
    - The older the generator - the more likely it is single wall

May see dual tank drainage plugs (labels may indicate primary and containment drain)
Well marked

Cryptic

R/B = Rupture Basin = secondary containment enclosure

Fill port design & single base tank drain indicate a single walled base tank... these two would need to have sized containment installed/constructed.
We just reviewed "sized" containment for stationary and portable bulk storage containers & tanks.

And if your bulk tanks & containers meet these requirements – you can check the containment compliance box in Table G-10 (Page 9).

Next we will review "general" containment for oil-filled equipment, oil/petroleum loading/unloading areas and transfer areas and non-transportation related tank trucks.

And if your equipment, areas and trucks meet these requirements – you can check the containment compliance box in Table G-3 (Page 3).

40 CFR 112.7(c) requirements for general oil handling areas & equipment are not the same as requirements for bulk tanks & containers:

A much broader, performance-oriented requirement.

General oil/petroleum-handling areas of the tank facility and equipment include:

- Handling and transfer areas (including piping connected to tanks, and facility areas over which oil drums are transported or temporarily staged)
- Loading/unloading areas (e.g. fuel tank loading area)
- Oil-filled manufacturing, operational & electrical equipment

Examples of General Petroleum-Handling Areas/Equipment:

- The oil-filled grinding/machining equipment (>55 gal) in the grinding shop
- The grinding shop area where the oil drums are moved and handled
- The fuel loading area in front of the two fuel tanks
- The area from where the two lube oil tanks are filled
- The areas where 50 gal drums of oil are loaded or unloaded
- The hydraulic presses
- The areas where oil and waste drums are moved or handled
- Oil-filled piping connected to any of the tanks
General Containment or Diversionary Means
(40 CFR 112.6(a)(3)(i), 112.7(c) & Template Page 3, Table G-3)

1. To prevent a discharge in harmful quantities (an oil sheen) to navigable water
2. Must only address the typical failure mode and most likely quantity of oil that would be discharged
3. Entire containment 'system' including walls and floor must be
   ✪ Capable of containing oil
   ✪ Constructed so that any discharge from primary containment will not escape before clean-up occurs

General Containment Criteria
40 CFR 112.7(c)

1. To prevent a discharge in harmful quantities to navigable water
   ✪ Harmful = enough oil to cause a sheen upon the water or adjoining shoreline
   ✪ Navigable water = most storm water systems
     ✪ Discharging into municipal storm water systems, creeks, rivers, ocean, ditch...
       including dry creeks/streams streams
   ✪ Is the public street curb a navigable water?
     ✪ Can easily be interpreted that way
       ✪ Because of storm drain proximity
General Containment Criteria
40 CFR 112.7(c)

2. Must only address the typical failure mode and most likely quantity of oil that would be discharged (from each equipment or equipment type, area, activity, etc.)

Typical failure mode?
- As determined/certified by the facility
- Based on experience & research (available data, professional, institutional/organizational experience or data, anecdotal, informal discussions, etc.)
- Determination is subjective!
  - No standard or requirement for back up or supporting data, or level of research, or depth/breadth of review
  - Uses a 'common sense', reasonability 'test'

Most likely quantity that would be discharged?
- As determined by the facility
- Based on experience &/or research
- Determination is subjective
- Facilities (and Plans) can assume that inspection & response procedures would be followed and a discharge detected per inspection or operational procedures...
  - This will need to be demonstrated during the CUPA inspection
- Spill predictions (Table G-4... coming up, along with examples)
  - Plans must list/describe the various failure scenarios and spill volumes & direction

3. Entire containment 'system' including walls and floor must be
   - Capable of containing oil
   - Constructed so that any discharge from primary containment will not escape before clean-up occurs

'System' could include:
- Traditional curbs and asphalt or concrete base
- Gravel beds and soil base
- Spill pads and sorbent socks
- Storm drain covers or closure systems
- Collection sumps
- Door thresholds and flooring
- Oil-water separators, etc.
Methods of Secondary Containment Listed in 40 CFR 112.7(c)

- Dikes, berms, or retaining walls
- Curbing or drip pans
- Culverting, gutters, or other drainage systems
- Weirs, booms or other barriers
- Spill diversion ponds
- Retention ponds
- Sorbent materials
- Sumps and collection systems

40 CFR 112.7(c) requires that, at a minimum, the facility must use one of these prevention systems or its equivalent.

Passive vs. Active Containment Measures

- Allowed to use active and/or passive general containment measures to prevent a discharge
- Passive measures are viewed by US EPA as being more reliable (and ‘necessary’ for sized containment)
- Selection is up to facility owner/operator
  - Routine facility inspections should verify presence & implementation (as will CUPA inspections)
    - E.g. well stocked and located spill kits, trained and aware employees, well managed sorbent pads and trays, etc.
- Passive measures: Permanent installations and do not require deployment or action by facility or vendor personnel
- Active containment measures: Those that do require deployment or other specific action by facility or vendor personnel

Active measure:
- Spill kit with sorbents and socks

Small curbed area and ‘dead’ sump in front of double walled tank has ~300 gallon capacity. This is passive general containment for fuel loading and unloading activities.

For these type of sumps, check with the CUPA first on requirements for ‘exempt emergency containment (underground) tanks’.
Active Measure Examples

- Use of storm drain covers
  - Should be properly designed and well maintained
  - Covering the storm drain in an area where a transfer occurs prior to a petroleum transfer activity
  - Covering the storm drain in reaction to a discharge, before the oil reaches the drain
- Using spill kits in the event of an oil discharge
- Closing a gate valve that controls drainage from an area
  - Prior to a discharge
  - In response to a discharge

Spill supplies staged at the fuel dispensing area (could be better marked, though).

Use of oil sorbent socks (passive [as they remain in place]) and collection/drip tray (passive) for oil filled equipment in a machine shop.
Spill supplies (granular absorbent) staged at the tank loading/unloading area.
Plan states typical failure mode, volume and rate is loading hose rupture with 60 gallons released (30 seconds to respond & shut off flow at 120 gpm pump rate).
Flow direction is down-gradient toward a storm drain to the left.
Common sense should tell you that the 1/3 barrel of absorbent is not sufficient to keep the 60 gallons from reaching the drain (nor is it positioned properly to protect the drain. For this facility - additional general containment measures would be needed for this loading area.

Example products for general containment - active measures

For active measures using response... deployment speed is important
This facility uses (properly located and well stocked/maintained) spill kits and active response during generator tank filling operations as the general containment for the double wall base tank loading area in front of the generator.

Example of general containment. This facility uses spill trays and sorbent pads for general containment for the most likely release from the oil filled equipment. But if these measures are not being maintained properly - the Plan is not being implemented as required, and the facility could receive a notice of violation.

Like the previous facility, this facility also uses spill trays and sorbent pads for general containment for the most likely release from the oil filled equipment. But if these measures are not being maintained properly - the Plan is not being implemented as required, and the facility could receive a notice of violation.

Not sufficiently impervious (because the spill pad is now completely saturated)
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Example of general containment for this fuel piping/fittings

Non-transportation related tank trucks (on-site mobile refueler) = general containment for most likely spill. Note the curbing... sufficient for the typical failure mode (a minor valve, fitting or nozzle leak).

Review: Page 3, Table G-3 Secondary Containment and Oil Spill Control Detail

Table G-3 Secondary Containment and Oil Spill Control

<table>
<thead>
<tr>
<th>Description</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>Table G-3</td>
</tr>
<tr>
<td>Sized</td>
<td>Table G-10</td>
</tr>
</tbody>
</table>

Now that you understand what the containment requirements are... you can verify & assure that your facility meets these and can check the compliance affirmation check box

- General containment: THIS Table G-3
- Sized containment: Table G-10 in Section A (page 9)

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Review: Page 9; Section A; Table G-10

This is the compliance requirement and affirmation check box for sized containment requirement for bulk tanks & containers.

Just like Table G-3... Now that you understand what the sized containment requirements are, you can verify & assure that your facility meets these and can check the compliance affirmation check box when you are completing Page 9 Table G-10.

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**Table G-4: Spill prediction**

1. i.e. ‘Containers with the potential for oil discharge’
2. Must list:
   - Bulk tanks & containers
   - Oil filled equipment
   - Piping & valves
   - Product transfer & loading/unloading areas
   - Overall oil handling areas

Completed sample in a minute... This Table G-4 is one of the more complicated/time consuming elements of the Template.

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Include:
- All tanks, containers & equipment listed on Table G-2, and connected piping runs
- Areas where tanks, IBCs or drums are filled or emptied
- Areas where oil containers are moved or transported

Yes! You can combine similar areas or be somewhat generic.

Use additional pages if necessary (try the Word version of the Plan template for additional Table G-4a).
Where do these scenarios and numbers come from? Next two slides will explain.

Note: Always include here the rupture of a full bulk tank or container.

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**Failure Modes Based on General Experience**

- Typical failure mode/scenario?
  - Common modes/scenarios:
    - Overfills
    - Loading or unloading hose ruptures
    - Piping connection leaks/ weeps
    - Hose connection failures
    - Weeps/ leaks from fittings or gaskets
    - Weeps/ leaks from small structural defects or damage
    - Portable tank/ drum tip over during movement
    - Puncturing IBCs with a forklift

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**Potential Discharge Volume?**

- Likely quantity that would be discharged?
  - Based on experience & research (as before)
  - Determination is subjective (as before)
    - Not rocket science or a formal statistical analysis
    - e.g. Tank/container overfills & hose ruptures:
      - Est. flow rate x time to shut it down
        - Drums/IBCs: $-10 \text{ gpm} \times 30 \text{ sec. (0.5 min)} = -5 \text{ gallons}$
        - Fuel trucks = $-120 \text{ gpm} \times 30 \text{ sec. (0.5 min)} = -60 \text{ gallons}$
    - e.g. Drum / IBC handling (tip over or forklift spear)
      - $-25 \text{ gpm} \times 1 \text{ min} = 25 \text{ gallons to 150 gallons}$
    - e.g. Mill or hydraulic press leak
      - $-1 \text{ gpm} \times 5 \text{ min} = 1 \text{ gallon to 50 gallons}$
Then... complete the rest of the table.

Can state: 'spill kits/response measures' or 'collection trays' or sorbent pads/socks', etc. for general containment if applicable...

Remember: need 100% sized containment for bulk tanks & containers.