

Section 5

Secondary Containment and 'Impracticability'








*(as applicable to APSA tank
facilities)*

Summary Secondary Containment Requirements

- Several SPCC rule requirements and specifications for controlling releases from tanks, containers and equipment
 - ❖ All to prevent a harmful discharge to navigable waters
 - ❖ Requirements located in several places in the rule
- Two basic types... applicability depends on tank/container type
 - ❖ General Containment
 - ❖ Specific 'sized' Containment








Secondary Containment Provisions

Non-Tier I facilities (as related to APSA)

Secondary Containment Required	40 CFR Section(s)
<p>General containment for areas with potential for discharge, e.g.:</p> <ul style="list-style-type: none">  Piping  Oil-filled operational and manufacturing equipment  Bulk and non-bulk loading and transfer <u>areas</u> (non-<u>rack</u> related transfer areas)  Non-transportation related tank trucks 	<p>112.7(c)</p>
<p>Specific (sized) containment for:</p> <ul style="list-style-type: none">  Loading/unloading <u>racks</u>  Bulk storage containers (tanks, containers) – fixed 	<p>112.7(h)(1) 112.8(c)(2)</p>
<p>Specific (sized) containment (and discharge prevention positioning) for:</p> <ul style="list-style-type: none">  Bulk storage containers (tanks, containers) – mobile or portable 	<p>112.8(c)(11)</p>

Secondary Containment Provisions

Tier I Qualified Facilities (as related to APSA)

Secondary Containment Required	40 CFR Section(s)
<p>General containment for areas with potential for discharge, e.g.:</p> <ul style="list-style-type: none">  Piping  Oil-filled operational and manufacturing equipment  Bulk and non-bulk loading and transfer <u>areas</u> (non-<u>rack</u> related transfer areas)  Non-transportation related tank trucks 	<p>112.7(c)</p>
<p>Specific (sized) containment for:</p> <ul style="list-style-type: none">  Loading/unloading <u>racks</u> (likely not present at Tier I QFs)  Bulk storage containers (tanks, containers) – fixed 	<p>112.6(a)(3)(ii)</p>
<p>Specific (sized) containment (and discharge prevention positioning) for:</p> <ul style="list-style-type: none">  Bulk storage containers (tanks, containers) – mobile or portable 	<p>112.6(a)(3)(ii)</p>

Example Methods of Secondary Containment Listed in 40 CFR 112.7(c)

Examples include:

- Dikes, berms, or retaining walls
- Curbing
- Culverting, gutters, or other drainage systems
- Weirs or booms



- Barriers
- Spill diversion ponds and retention ponds
- Sorbent materials
- Drip pans
- Sumps and collection systems

Which Can a Facility Use?

- Can a facility use any of the listed example methods for general OR specific sized containment?



- Maybe... but likely not:
 - ❖ Specific sized criteria imposes technical and engineering limitations on some of these measures
 - ❖ Active measures, separators (unless HUGE), sorbents, weirs or booms can't meet the passivity, volume, or containment holding requirements of sized specific containment

Specific (Sized) Secondary Containment Requirement

Specific 'Sized' Containment

- ❖ Address the potential of oil discharges from specific parts of or equipment at a facility where oil is stored or handled
- ❖ Requirements include set sizing design criteria, and minimum freeboard intended to address catastrophic failure of bulk tanks & containers and certain equipment
 - The design decision does not rest with the PE... it has been dictated in the rule itself
- ❖ The SPCC rule specifies a required minimum size for secondary containment for the following areas
 - Bulk storage containers 40 CFR 112.8(c)(2)
 - Loading/unloading racks 40 CFR 112.7(h)
 - Mobile or portable bulk storage containers 40 CFR 112.8(c)(11)

Specific Secondary Containment Criteria

- Must contain the largest single oil compartment or container plus “sufficient freeboard” to contain precipitation
 - ❖ Largest single compartment may consist of permanently manifolded containers (i.e. more than a single tank)
- Must be passive and permanent – no deployment or other action necessary
 - e.g. curbs, dikes, double-wall shell
 - Valves must remain closed and be manually operable only
 - ❖ Precipitation determination?
 - N/A for integral double wall or indoor/weather protected tanks or containers
 - ❖ Tank/container displacement volume?
- Sufficiently impervious to the spilled material









DIESEL

WASTE OIL

Sufficient Freeboard Design Standard

- ❏ EPA did not set a standard requirement for freeboard capacity
 - ❖ e.g., precipitation from a 25-year, 24-hour storm event or 110% of storage tank capacity
- ❏ The proper method of design is a matter of good engineering practice
- ❏ Whatever method is used to calculate amount of freeboard “sufficient” for the facility and container configuration should be documented in the Plan



Figure 1.

Example Calculations from SPCC Plans

Attachment 8

Islander Blenders Facility

Containment Calculations for Blending Tanks

The total dimensions of the containment structure are:

- 25 ft in length
- 25 ft in width
- 6 in. in height

All four cylindrical tanks are identical and are rated at ~1,500 gallons capacity.

- Square footage of each tank = $\pi \times (\text{tank diameter}/2)^2 = \pi \times (7/2)^2 = 38.5 \text{ ft}^2$
Square footage multiplied by three tanks = $38.5 \text{ ft}^2 \times \text{three tanks} = 115.5 \text{ ft}^2$
- Dike volume must be equal to or greater than the volume of the largest tank =
Height of the tank X Square footage of the tank X 7.48 gal per $\text{ft}^3 =$
 $5 \text{ ft} \times 38.5 \text{ ft}^2 \times 7.48 \text{ gal}/\text{ft}^3 = 1,440 \text{ gal}$
- The total dike area = 25 ft in length by 25 ft in width = 625 ft^2
- Available dike area = (total dike area) - (displacement area of the tanks)
 $= 625 \text{ ft}^2 - 115.5 \text{ ft}^2 = 509.5 \text{ ft}^2$

Note: The leaking tank was not used in the displacement calculation.

- The total actual containment volume = (Dike area (ft^2)) X (Dike height (ft)) X (7.48 gal/ ft^3) = $509.5 \text{ ft}^2 \times 0.5 \text{ ft} \times 7.48 \text{ gal}/\text{ft}^3 = 1,906 \text{ gal}$

Thus, the actual containment volume (1,906 gal) is larger than the volume of a tank (1,440 gal) and can hold 132 percent of a spill from a single tank.

RECYCLABLE OIL STORAGE AREA

- ENTIRE FACILITY UNDER ROOF
- NO RAINFALL REQUIRED IN SECONDARY CALCULATION
- CASE 1: SINGLE LARGEST TANK
CRO #5 = 1,900 gallons
- CASE 2: 10% OF TOTAL TANKAGE

TANK	NORMAL GALLONS
1 CRO	360
2 CRO	580
3 CRO	1030
4 CRO	1030
5 CRO	1900
TOTAL	4,900 GALLONS

10% OF 4,900 = 490 GALLONS

CASE 1 (1900) IS LARGEST TOTAL
SECONDARY CONTAINMENT = 1900 GALLONS

- AREA WITHIN CONFINED WALLS OR BERMS
 $10'-10" \times 27'-5" = 297 \text{ ft}^2$
- CONTAINMENT FEATURES
a 16.5" WALL AROUND PERIMETER
- ESTIMATED CONTAINMENT CAPACITY BASED ON AVERAGE OVER 297 ft^2
 $297 \text{ ft}^2 \times 1.315 \text{ ft} = 408 \text{ ft}^3$
 $408 \text{ ft}^3 \times 7.48 \text{ gal}/\text{ft}^3 = 3054 \text{ GALLONS}$
REQUIRED AMOUNT 1900 GALLONS
AVAILABLE AMOUNT 3054 GALLONS
SURPLUS 1154 GALLONS OK

FREE BOARD $\frac{1154 \text{ G}}{7.48 \text{ GAL}} = 154.3 \text{ ft}^3$
 $\frac{154.3 \text{ ft}^3}{297 \text{ ft}^2} = .519 \text{ ft} \times 12"/\text{ft} = 6.2 \text{ INCHES}$

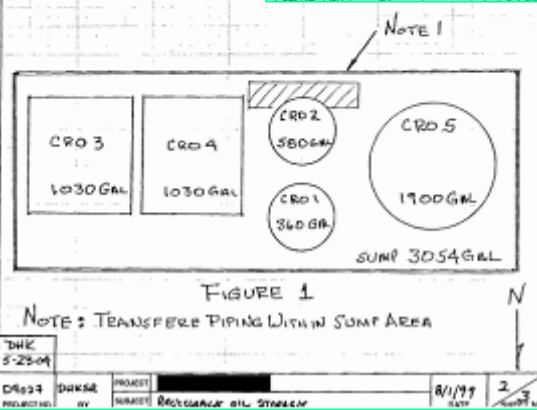
5/23/04
DHK

DR27	DIKSR	PROJECT		8/1/99	1
PROJECT NO.	BY	NAME	RECYCLABLE OIL STORAGE	DATE	REV

RECYCLABLE OIL 5

5/23/04
DHK

DR27	DIKSR	PROJECT		8/1/99	1
PROJECT NO.	BY	NAME	RECYCLABLE OIL STORAGE	DATE	REV




NO SMOKING

SUFFICIENT FREEBOARD ?

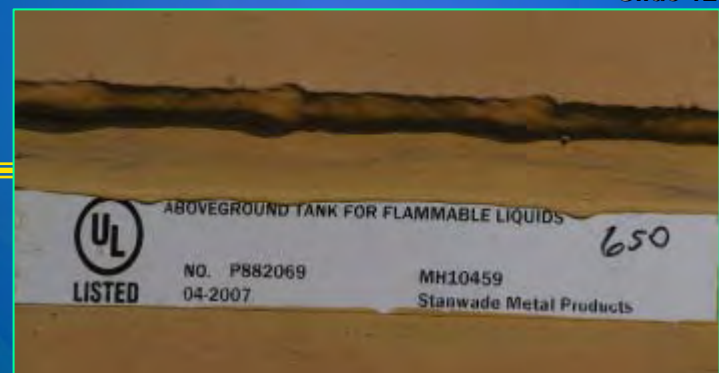
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Double Walled Tanks?

How do you know?



Double Walled Tanks?

How do you know?



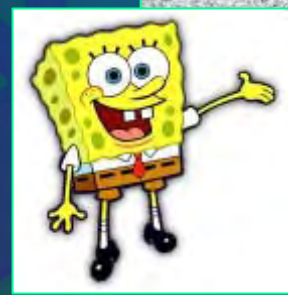
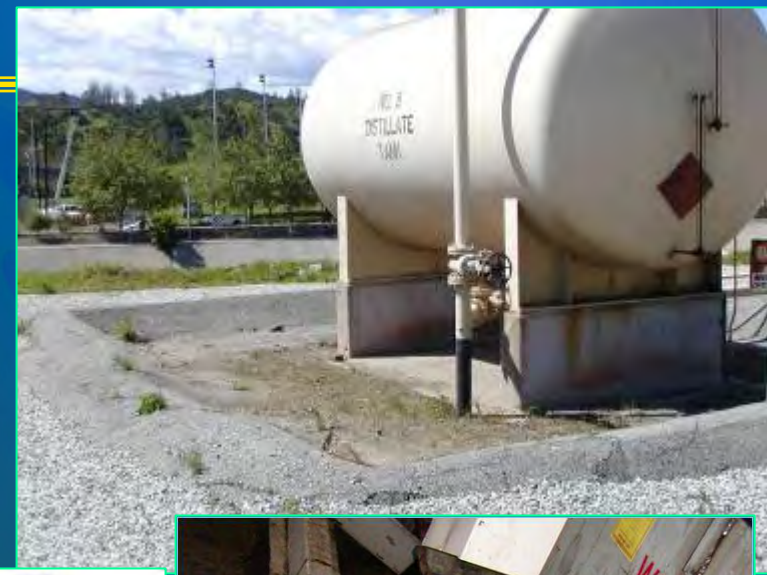
Visual vs
mfr specs vs
purchase records
vs optional
equipment

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))

Describe in the Plan



Sufficiently Impervious?



Secondary Containment for Mobile/Portable Containers

- Mobile and portable bulk containers must comply to the specific sized secondary containment requirements of 40 CFR 112.8(c)(11)
 - ❖ Must be positioned or located to prevent a discharge to navigable waters
 - ❖ Secondary containment must be sized to contain capacity of largest single compartment or container with sufficient freeboard for precipitation
 - **While in stationary or unattended mode of operation**
 - ❖ Except mobile refuelers and non-transportation related tank trucks





Secondary Containment Requirements

(General Provisions)

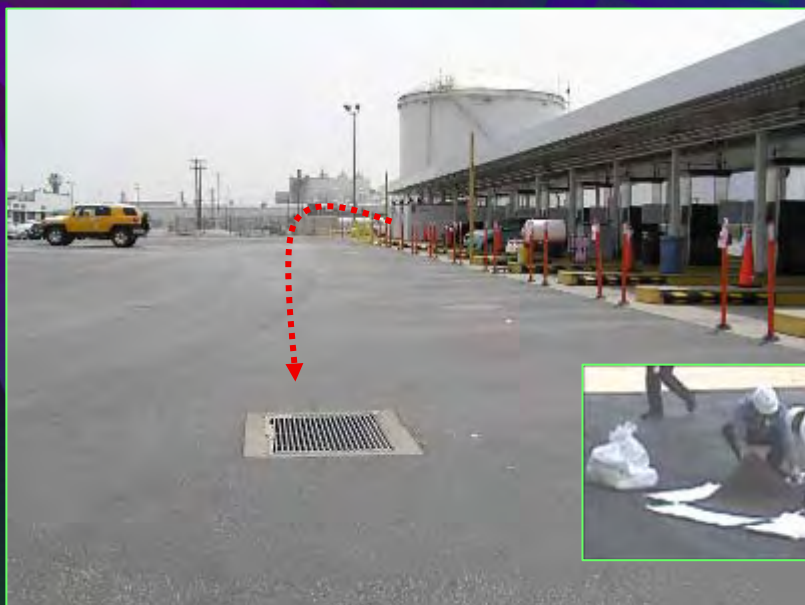
- ❏ 'General Provisions' aka General Containment (40 CFR 112.7(c))
 - ❖ Addresses the potential for oil discharges from all parts of a facility where oil is handled, and from specific equipment
 - ❖ Containment method, design, and capacity are determined by good engineering practice to contain the most likely oil discharge until clean-up occurs
 - ❖ Intended to address most likely discharge
 - Site, equipment, location and personnel-specific
 - Determined or reviewed/certified by PE
 - Or facility owner/operator for qualified facilities

General Secondary Containment Requirement

- Required secondary containment for all areas with the potential for a discharge
 - ❖ Performance requirement... broader than usual use of term 'secondary containment': i.e.:
 - Appropriate containment and/or diversionary structures to prevent a discharge to navigable waters that may be harmful
- This is the minimum expectation for containment
- This is where plan preparer experience & technical knowledge come in (e.g. PE using good engineering practice)

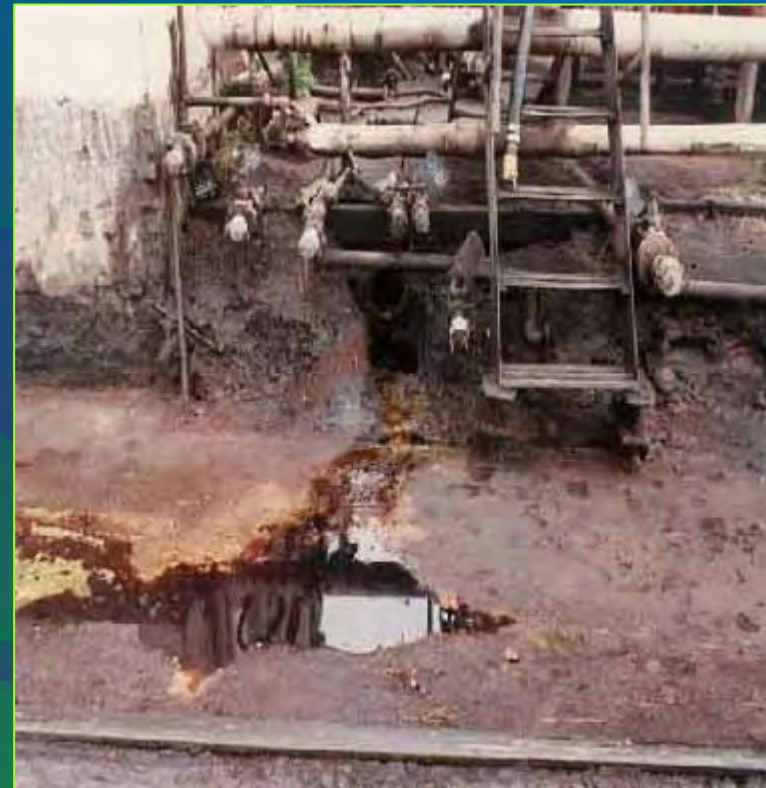
General Secondary Containment Requirement

- General facility requirement with no specified sizing or freeboard requirements
 - ❖ Active or passive (e.g. spill or discharge response, weirs, closing valves, drain mat placement, berms, dikes, containment pallets, pre-positioned socks, etc.)
 - ❖ Can be facility-wide or equipment/tank specific



General Secondary Containment

- Can be a combination of all types of measures
 - ❖ Performance standard:
 - Prevent navigable water discharges
 - Keep the discharge from containment until



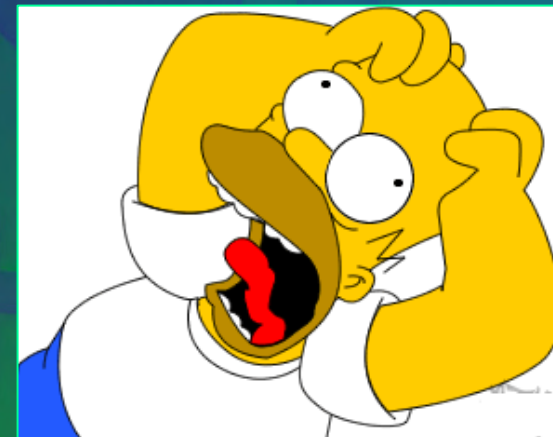
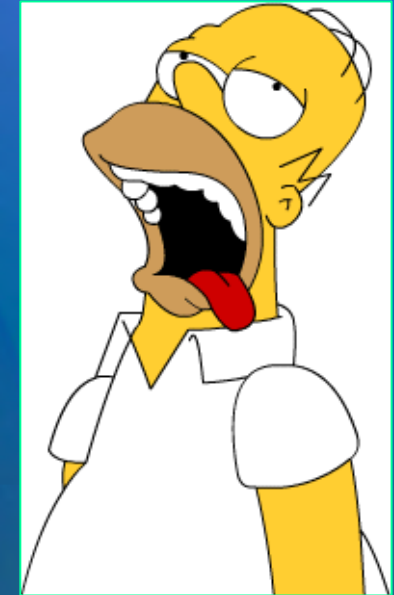
Passive vs. Active Measures

40 CFR 112.7(c) allows for the use of certain types of active containment measures to prevent a discharge and may be used when permanent containment is not feasible

- ❖ Feasibility determined by the facility owner/operator or the reviewing/certifying PE

Passive measures are permanent installations and do not require deployment or action by the owner or operator

Active containment measures are those that require deployment or other specific action by the owner or operator



Active Measure Examples

- Placing a properly designed storm drain cover over a drain to contain a potential spill in an area where a transfer occurs, prior to the transfer activity
- Placing a storm drain cover over a drain in reaction to a discharge, before the oil reaches the drain
- Using spill kits in the event of an oil discharge
- Using spill response capability (spill response teams) in the event of an oil discharge





Efficacy of Active Measures

Efficacy depends on:

- ❖ Effectiveness & capacity of the containment measure
- ❖ Timely deployment and proper placement prior to or following a discharge
- ❖ Availability of personnel and equipment to implement the active measure timely and effectively at the facility
- ❖ Personnel and equipment performance (drills?)




Active containment measures to be used at a facility (and described in the SPCC Plan) should be reasonable, appropriate, tested and believable

Unloading Procedures Impact on Spill Prediction / Failure Analysis and Containment







Can include both passive and active measures

- ❖ But like anything else: must be maintained and implemented!





Oil-Filled Operational Equipment

- Subject to the general secondary containment requirements of 40 CFR 112.7(c)



Requirements for Mobile Refuelers & Other Non-Transportation Related Tank Trucks

- General secondary containment requirements apply
 - Dec. 2006 amendment eliminated the specific sized secondary containment requirement



- Does not apply to vehicles that are used primarily to store oil in a stationary location
- As with any portable/mobile container, must also position or locate them to prevent a harmful navigable water discharge


What do you observe? Any issues?




Piping

- ❑ All piping, including buried piping, at regulated facilities must comply with the 40 CFR 112.7(c) general secondary containment requirements
- ❑ A determination of adequate secondary containment should consider:
 - ❖ The reasonably expected sources of discharge
 - ❖ Maximum flow rate
 - ❖ Duration of a discharge
 - ❖ Spill detection capability

Piping

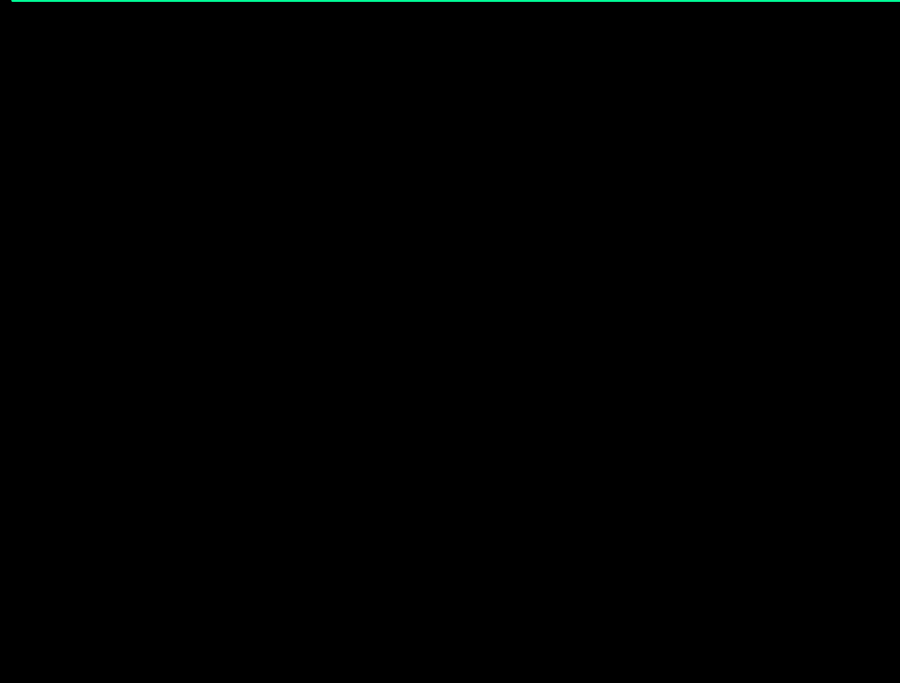
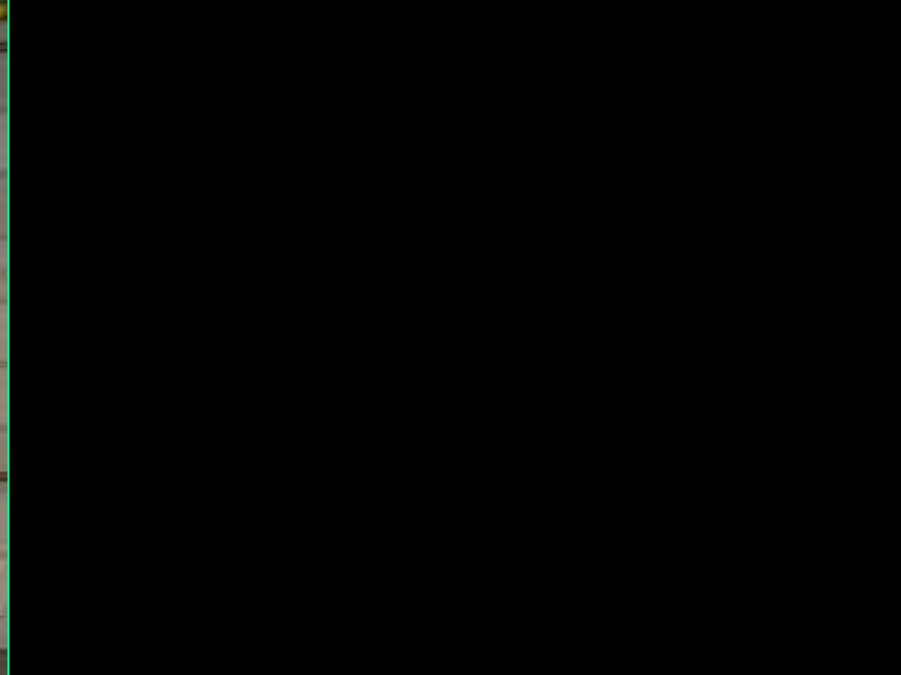
 In many cases, secondary containment (especially active measures) will be possible

- ❖ In other cases, active measures would not be appropriate
 - E.g. 8" high pressure jet fuel transfer pipeline at facility edge
 - Facility recently replaced this with double-walled piping

 If active methods of containment are selected, facility personnel should be able to demonstrate that they can effectively deploy these measures to contain a potential spill before it reaches navigable waters or adjoining shorelines







Transfer Areas

- 🗄 Activities that occur within transfer areas include:
 - ❖ Unloading fuel from a truck to a bulk fuel tank
 - ❖ Loading oil into a vehicle from a dispenser
 - ❖ Loading fuel from a mobile refueler into an airplane
 - ❖ Loading lubricating oil from a truck into equipment
 - ❖ Unloading and moving drums and totes on a forklift
- 🗄 Transfer areas are subject to the general containment requirements of 40 CFR 112.7(c)

Containment at Transfer Areas

- ❖ Determination of adequate secondary containment should consider:
 - ❖ Reasonably expected sources and causes of a discharge
 - ❖ Reasonably expected maximum rate of discharge
 - ❖ Ability to detect and react to the discharge
 - ❖ Reasonably expected duration of the discharge
 - ❖ Time it would take a discharge to impact navigable waters or adjoining shorelines



Loading/Unloading Racks

- ❏ Definition of loading/unloading rack was clarified and made more specific in the 12-2008 amendments, and the requirements clarified
 - ❖ Fixed structure (such as a platform, gangway)
 - ❖ Necessary for loading or unloading a tank truck or tank car and located at an SPCC regulated facility
 - ❖ A loading/unloading rack includes a loading or unloading arm, and may include any combination of the following:
 - piping assemblages, valves, pumps, shut-off devices, overfill sensors, or personnel safety devices

Facility Drainage: From Diked Areas

- ❏ Drainage from diked storage areas must be restrained by valves to prevent discharges into facility drainage or effluent treatment systems
 - ❖ Unless the systems are designed to control such discharge
- ❏ Diked areas may be emptied by pumps or ejectors only by manual activation
 - ❖ Must inspect the condition of the accumulation before starting, to ensure no oil will be discharged
- ❏ If the facility drainage drains directly into a watercourse (i.e. storm water discharge) and not into on-site wastewater treatment, the facility must inspect uncontaminated retained stormwater prior to draining
 - ❖ 40 CFR 112.8(c)(3)(i) - (iv) are also required

Facility Drainage: From Diked Areas

- Draining diked areas into stormwater (or other surface watercourse) requires compliance with 40 CFR 112.8(c)(3)(ii) - (iv):
 - ❖ Not allow drainage of uncontaminated rainwater from the diked area into a storm drain or open watercourse, lake, or pond, bypassing the facility treatment system unless the facility
 - Normally keeps the bypass or drainage valve sealed closed
 - Inspect the retained rainwater to ensure that its presence will not cause a discharge as described in §112.1(b)
 - Open the bypass valve and reseal it following drainage under responsible supervision; and
 - Keep adequate records of such events, for example, any records required under relevant stormwater discharge permits or NPDES discharge permits





CAUTION

NORTH L. O.
TANK



NO
SMOKING

SOUTH L. O.
TANK



NO
SMOKING

CAUTION

CAUTION
**CHECK FOR OIL
CONTAMINATION BEFORE
OPENING DRAIN VALVE**
RECORD ALL VALVE OPERATIONS
IN OPERATIONS LOGBOOK
CLOSE VALVE AFTER DRAINING



C
Accumulated Stormwater Discharge/Drainage Record/Log

All discharge of stormwater accumulated in secondary containment areas must be:

1. Visually inspected carefully for presence of oil (sheen) or other contaminants *prior* to draining/pumping
2. Free of all debris, oil sheen or other oil spill residues, sediments, or other signs of pollutants

Drainage valves must be closed immediately after drainage activity is completed


Date	Initials	Secondary Containment Area (name or location)	Condition of Accumulated Stormwater	Drainage Start (valve open) Time	Drainage Stop (valve closed) Time	Drainage Valve Closed or Pump Turned Off When Completed?
			<input type="checkbox"/> Clear <input type="checkbox"/> Oil sheen <input type="checkbox"/> Cloudy <input type="checkbox"/> Sand/grit <input type="checkbox"/> Odor <input type="checkbox"/> Debris			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Clear <input type="checkbox"/> Oil sheen <input type="checkbox"/> Cloudy <input type="checkbox"/> Sand/grit <input type="checkbox"/> Odor <input type="checkbox"/> Debris			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Clear <input type="checkbox"/> Oil sheen <input type="checkbox"/> Cloudy <input type="checkbox"/> Sand/grit <input type="checkbox"/> Odor <input type="checkbox"/> Debris			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Clear <input type="checkbox"/> Oil sheen <input type="checkbox"/> Cloudy <input type="checkbox"/> Sand/grit <input type="checkbox"/> Odor <input type="checkbox"/> Debris			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Clear <input type="checkbox"/> Oil sheen <input type="checkbox"/> Cloudy <input type="checkbox"/> Sand/grit <input type="checkbox"/> Odor <input type="checkbox"/> Debris			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Clear <input type="checkbox"/> Oil sheen <input type="checkbox"/> Cloudy <input type="checkbox"/> Sand/grit <input type="checkbox"/> Odor <input type="checkbox"/> Debris			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Clear <input type="checkbox"/> Oil sheen <input type="checkbox"/> Cloudy <input type="checkbox"/> Sand/grit <input type="checkbox"/> Odor <input type="checkbox"/> Debris			<input type="checkbox"/> Yes <input type="checkbox"/> No

A drainage log is provided in Template Attachment 3.3 (Table G-18)

Un-Diked Facility Drainage

- When secondary containment requirements are addressed through facility drainage controls (vs. berms or dikes), other requirements apply
 - 40 CFR 112.8(b)(3) and (4)
- ❖ The drainage system must be designed to flow into ponds, lagoons, or catchment basins designed to retain oil or return it to the facility

Impracticability Provision

 If a facility owner or operator finds that containment methods are “impracticable,” a combination of other measures in place of secondary containment may conditionally be substituted

- ❖ Bulk tanks/containers
- ❖ Transfer areas, piping
- ❖ Oil-filled equipment
- ❖ Loading/unloading racks



Meaning of “Impracticable”

- 🗄️ An “impracticability determination” is intended to be used when a facility owner/operator is incapable of installing secondary containment by any reasonable method

- 🗄️ Considerations include:
 - ❖ Space and geographical limitations
 - ❖ Local zoning ordinances
 - ❖ Fire codes
 - ❖ Safety
 - ❖ Other good engineering practice reasons that would allow for secondary containment

Impracticability Requirements

The impracticability provision requires:

- Explanation in SPCC Plan of why secondary containment methods are impracticable
- Periodic integrity testing of bulk storage containers and periodic integrity testing and leak testing of the valves and piping associated with the containers
- Unless facility has submitted a Facility Response Plan (FRP) under §112.20:
 - An oil spill contingency plan (per 40 CFR 109.5); and
 - A written commitment of manpower, equipment, and materials required to control and remove any quantity of oil discharged that may be harmful

Impracticability and Qualified Facilities

- 🗄 Self-certified SPCC Plans may not include any determinations that secondary containment is impracticable
 - ❖ At all for Tier I qualified facilities
 - ❖ *At Tier II qualified facilities – only if the determination and alternative provision is reviewed and certified by a PE.*