



# Spill Prevention Control and Countermeasure (SPCC) Plan

## Single Vertical Cylindrical Tank Inside a Rectangular or Square Dike or Berm

### WORKSHEET

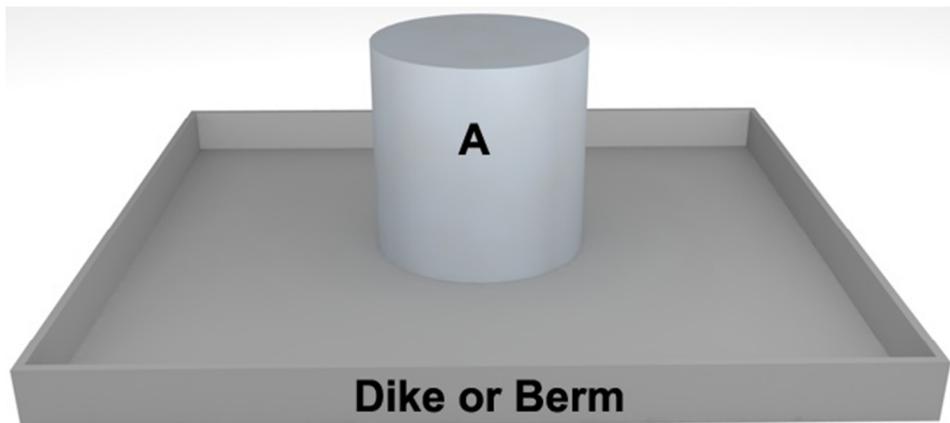
This worksheet can be used to calculate the secondary containment volume of a rectangular or square dike or berm for a single vertical cylindrical tank. This worksheet assumes that there are no other objects or structures within the dike or berm that will displace the volume of the secondary containment.

#### Steps:

1. Determine the volume of the secondary containment,  $V_{SC}$
- 2a. Determine the volume of the tank when the tank shell capacity is unknown,  $V_{Tank}$
- 2b. Determine the volume of the tank when shell capacity is known,  $V_{Tank}$
3. Determine the percentage of the secondary containment volume,  $V_{SC}$ , to the tank volume,  $V_{Tank}$
4. Determine whether the secondary containment can contain the entire tank shell capacity with additional capacity to contain rain.

#### Information needed to use this worksheet:

- Tank shell capacity in gallons or tank diameter and height in feet
- Secondary containment length, width, and height in feet
- If rain can collect in secondary containment: amount of rain in inches or feet



Tank A Shell Capacity (gal) =   
a

**Disclaimer:** Please note that these are simplified calculations for qualified facilities that assume: 1) the secondary containment is designed with a flat floor; 2) the wall height is equal for all four walls; and 3) the corners of the secondary containment system are 90 degrees. Additionally, the calculations do not include displacement for support structures or foundations. For Professional Engineer (PE) certified Plans, the PE may need to account for site-specific conditions associated with the secondary containment structure which may require modifications to these sample calculations to ensure good engineering practice.



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#### 1. Determine the volume of the secondary containment, $V_{SC}$

$$\text{Secondary Containment Area, } A_{SC} = \boxed{\phantom{000}} \times \boxed{\phantom{000}}$$

Length (ft)                      Width (ft)

$$= \boxed{\phantom{000}} \text{ ft}^2$$

**b**

$$V_{SC} (\text{ft}^3) = \boxed{\phantom{000}} \times \boxed{\phantom{000}} = \boxed{\phantom{000}} \text{ ft}^3$$

b (ft<sup>2</sup>)                      Height (ft)                      **c**

#### 2a. Determine the volume of the tank when the tank shell capacity is unknown, $V_{Tank}$

$$\text{Tank radius (ft)} = \boxed{\phantom{000}} \div 2 = \boxed{\phantom{000}} \text{ ft}$$

Diameter (ft)

$$V_{Tank} (\text{ft}^3) = 3.14 \times \boxed{\phantom{000}}^2 \times \boxed{\phantom{000}} = \boxed{\phantom{000}} \text{ ft}^3$$

Radius<sup>2</sup> (ft)<sup>2</sup>                      Tank Height (ft)                      **d**

#### 2b. Determine the volume of the tank when shell capacity is known, $V_{Tank}$

*a* is the tank shell capacity from page 1.

$$V_{Tank} (\text{ft}^3) = \boxed{\phantom{000}} \times 0.1337 = \boxed{\phantom{000}} \text{ ft}^3$$

a (gal)                      ft<sup>3</sup>/gal                      **e**





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*Selected Rainfall Event:*

$$\text{Rainfall (in)} = \boxed{\phantom{000}} \text{ in}$$

**h**

$$\text{Rainfall (ft)} = \frac{\boxed{\phantom{000}}}{h \text{ (in)}} \div 12 \text{ in/ft}$$

$$= \frac{\boxed{\phantom{000}}}{\mathbf{i}} \text{ ft}$$

$$\text{Volume of Rain to be Contained, } V_{\text{Rain}} \text{ (ft}^3\text{)} = \frac{\boxed{\phantom{000}}}{i \text{ (ft)}} \times \frac{\boxed{\phantom{000}}}{b \text{ (ft}^2\text{)}} = \frac{\boxed{\phantom{000}}}{\mathbf{j}} \text{ ft}^3$$

*b is the area of secondary containment calculated in Step 1.*

$$\text{Total Containment Capacity Required (ft}^3\text{)} = \frac{\boxed{\phantom{000}}}{\mathbf{j}} \text{ (ft}^3\text{)} + \frac{\boxed{\phantom{000}}}{\text{d or e (ft}^3\text{)}}$$

*d/e is the tank volume calculated in Step 2.*

$$= \frac{\boxed{\phantom{000}}}{\mathbf{k}} \text{ ft}^3$$

If the volume of the secondary containment, **c**, is equal to or greater than the required containment capacity, **k**, the secondary containment is sufficient to contain the shell capacity of the tank with sufficient additional capacity to contain a typical rainfall amount. If the volume of the secondary containment, **c**, is less than the required containment capacity, **k**, the secondary containment is not sufficient to contain the shell capacity of the tank and a typical rainfall amount.