Update to EPA's Pesticide Container Frequently Asked Questions

Update as of: December 30, 2009

One-Way Valves

Question 1: How much material can go back through a valve for it to be considered a one-way valve?

Answer: The regulations (§165.3) define a one-way valve as a valve that is designed and constructed to allow virtually unrestricted flow in one direction and no flow in the opposite direction, thus allowing the withdrawal of material from, but not the introduction of material into, a container. EPA recognizes that there could be a small amount of seepage of material before the one-way valve would engage against any back flow and that deliberate efforts to damage a one-way valve could cause it to fail. EPA is not planning to quantify the maximum amount of seepage that could pass through the valve for it to meet the regulatory definition. Instead, the design of the one-way valve should be consistent with the intent of this requirement, which is to prevent any person other than the refiller from placing material into the container.

Question 2: Does a pump that is integrally attached to the container count as an opening on the container that requires a one-way valve or tamper-evident device?

Answer: Yes. Where the design of a portable refillable pesticide container (typically a large container) includes an integral pump, the pump is considered to be an opening on the container. The refillable container regulations (§165.45(e)) require that each opening of a portable pesticide container for liquid materials (except for DOT cylinders) other than a vent must have a one-way valve, a tamper-evident device or both. The regulations provide that the one-way valve may be located in a device or system separate from the container if the device or system is the only reasonably foreseeable way to withdraw pesticide from the container. The requirement for one-way valves and tamper-evident devices is intended to give refillers reasonable indication about whether substances other than the pesticide product for which the containers are labeled may have been introduced into the containers. Therefore, if there is a practical way for a person to introduce material into the container through the pump, then the container would not comply with this requirement and the pump would need to be fitted with a tamper-evident device and/or a one-way valve to prevent someone from introducing material through the pump into the container.

Label Deadline

Question 3: When should a registrant submit an amended label that includes the new container-related instructions to EPA for review? If submitting a label change via notification, when should a registrant submit the label to EPA for review?

Answer: There is no hard deadline for submitting an amendment or a notification to EPA, other than §156.159, which requires that any pesticide product released for shipment by a registrant after August 16, 2010 must bear a label that complies with the new container-related requirements in §156.140 - §156.156. EPA recommends that registrants submit revised labels with the new container language before February 1, 2010 (if the changes qualify for amendment by notification) or August 1, 2009 (if the changes require submission as a request for amendment.) However, the sooner the amendments or notifications are submitted, the better to allow time for EPA review and approval, state review and approval and printing.

Labels and Subregistrants

Question 4: Are subregistrants allowed to continue to use their current stock (deplete their stock and when ordering new labels, make the change then), as with the changes to the first aid statements a number of years ago?

Answer: No, subregistrants may not use current labels after August 16, 2010. This situation is different than the first aid statements because the container-containment regulations include a specific compliance date for the new container-related requirements in §156.140 - §156.156. The deadline of August 16, 2010 in §156.159 applies to products sold by supplemental distributors (subregistrants) because they are being sold under the registrant's EPA registration. The regulations on supplemental distribution in 40 CFR 152.132 state that "the registrant may distribute or sell his registered product under another person's name and address instead of (or in addition to) his own. Such distribution and sale is termed 'supplemental distribution' and the product is referred to as a 'distributor product.' The distributor is considered an agent of the registrant…and both the registrant and the distributor may be held liable for violations pertaining to the distributor product."

In addition, if the registrant revises the label to comply with the new container-related instructions before the compliance date, the distributor products must also comply before the compliance date. Section 152.132 establishes certain conditions for supplemental distribution, including that the label of the distributor product is the same as that of the registered product with a few exceptions. However, different storage and disposal instructions are not one of the exceptions in §153.132(d). When the registrant revises the label to change the storage and disposal instructions, the label of the distributor products must be changed at the same time.

Portable Containment Structures

Question 5: Can a facility use a portable pad to comply with the requirement for a containment pad?

Yes, a facility could use a portable structure to comply with the federal pesticide containment regulations, as long as the portable structure meets all of the requirements for new structures. These requirements include standards for: construction materials (§165.85(a)); general design (§165.85(b)); capacity (§165.85(c)); operations, inspection and maintenance (§165.90); and recordkeeping (§165.95). In addition, the portable structure would have to comply with the specific design requirements for containment pads in §165.85(e); secondary containment of liquid pesticides in §165.85(d); or secondary containment of dry pesticides §165.85(f).

This reflects an evolution of the Agency's understanding, relative to the discussion in the preamble to the final rule (71 FR 47396), which stated "EPA does not believe that flexible, portable, or non-rigid structures can adequately ensure the permanent and continuous liquid-tight containment of large quantities of agricultural pesticides or of areas where pesticides are transferred and handled regularly." EPA still believes that "rigid material" in §165.85(a) and §165.87(a) means that the structure, considered as a whole, has definite retained shape and form and is self supporting. This is consistent with our description of "rigid container" in the proposed rule (59 FR 6723, February 11, 1994) and the Response to Comment Document (Reference 19 in the final rule, 71 FR 47330, August 16, 2006.) EPA continues to agree with the recommendations in key technical documents for using steel or reinforced concrete for pesticide containment. EPA recommends that facilities use these materials for secondary containment for the long-term storage of large quantities of bulk pesticide or for containment pads in areas where pesticides are transferred regularly or where large cumulative quantities of pesticides are transferred. However, recently-obtained information has lead EPA to reconsider whether portable structures might meet the requirements of the rule. EPA has learned about portable containment structures that are of higher quality than those we were aware of when the rule was being developed. In addition, EPA has become aware of a larger-than-anticipated number of facilities where pesticide transfers covered by the containment regulations (in §165.82) happen very intermittently. For example, there are quite a few retailers that have one bulk tank in secondary containment and that repackage and clean their minibulk containers within their secondary containment structure. Facilities such as this may receive only one or two shipments of bulk pesticide from tanker trucks each year, which would be the only transfers for which a containment pad is necessary. This situation is not what EPA had in mind when we described "areas where pesticides are transferred and handled regularly." Therefore, EPA has revised its position and believes that portable structures could be used to comply with the containment regulations, as long as they meet all of the relevant regulatory requirements.

As an example, a new portable containment pad would have to comply with the standards for construction materials (§165.85(a)); general design (§165.85(b)); capacity (§165.85(c)(3) and (4)); specific design of containment pads (§165.85(e)); operations, inspection and maintenance (§165.90); and recordkeeping (§165.95). Some of the key requirements are whether the containment pad:

- Is constructed of a rigid material capable of withstanding the full hydrostatic head, load and impact of any pesticides, precipitation, other substances, equipment and appurtenances placed within the structure (§165.85(a)(1)).
- Is made of materials compatible with the pesticides stored, where compatible means able to withstand anticipated exposure to stored or transferred substances and still provide containment of those same or other substances within the containment area (§165.85(a)(3)).
- Has a volume of at least 750 gallons or 100% of the largest pesticide container or pesticide-holding equipment used on the pad, whichever is smaller (§165.85(c)(3) and (4)).
- Allows for removal and recovery of spilled, leaked, or discharged material and rainfall, such as by a manually activated pump (§165.85(e)(3)).
- Has its surface sloped toward an area where liquids can be collected for removal (§165.85(e)(4)).

These requirements would prevent a person from using only a flexible tarp as a pad because it would not be rigid, would not have the minimum volume and would not allow for removal and recover of liquids. These requirements would also prevent a person from using a baby pool as a pad because it is unlikely to be compatible with the pesticides or to meet the minimum volume requirement. However, it is possible that a portable structure that is specifically designed for chemical containment could meet these standards in addition to the other containment requirements cited above.

Anchoring or Elevating Stationary Tanks

Question 6: The containment regulations (§165.85(d) and §165.87(d)) require stationary containers of liquid pesticides that are protected by a secondary containment unit to be anchored or elevated to prevent flotation in the event that the secondary containment unit fills with liquid. How high do the tanks need to be elevated?

This requirement is a performance standard. The tanks must be anchored or elevated (or anchored and elevated) so the tank does not float if the secondary containment unit becomes filled with liquid. Whether or not a tank would float in that situation depends on a number of factors, including how the tank is secured, the weight of the tank, the weight of the pesticide in the tank, the volume of the tank that would be submerged if the secondary containment was full, and the density of the liquid that fills the secondary containment unit.

One way to comply with this requirement is to elevate (and secure) the tanks so the bottom of the tank is above the top of the secondary containment wall. Another way to comply is to anchor the tanks with bolts or cables that are strong enough to prevent the tank from floating if the secondary containment unit filled with liquid. (Click here[1] for more information about mechanically anchoring a tank.) In addition, a facility could ensure that the tank always holds enough pesticide so it is heavy enough that it would not float if the secondary containment unit filled with liquid. (See question 7 for more details.) Lastly, a facility could use a combination of these approaches – elevating the tank above the floor but not higher than the wall, anchoring with bolts or cables, and/or ensuring that the tank always has a certain amount of pesticide in it – as long as the performance standard of preventing flotation if the secondary containment fills with liquid is met. Please note that the goal of the performance standard is to prevent flotation in the event that the secondary containment unit fills with liquid, but not necessarily to prevent the tanks from moving in a catastrophic event, such as a flood or tornado, where the forces on the tanks are stronger than the buoyant forces in a full secondary containment unit.

Question 7: Would a tank be considered anchored if it always holds enough pesticide so it would not float if the secondary containment unit fills with liquid?

Yes, a facility could ensure that the tank always holds enough pesticide so it is heavy enough that it would not float if the secondary containment unit filled with liquid. EPA considers this a form of anchoring because it would meet the performance standard of preventing flotation if the secondary containment unit filled with liquid. If a facility chooses to anchor a tank in this way, the level of pesticide in the tank must always be at or above the required volume and the facility should have documentation of the buoyant force calculations that support the required minimum volume. (Click here[2] for more details about the buoyant force calculations to support a minimum volume.)

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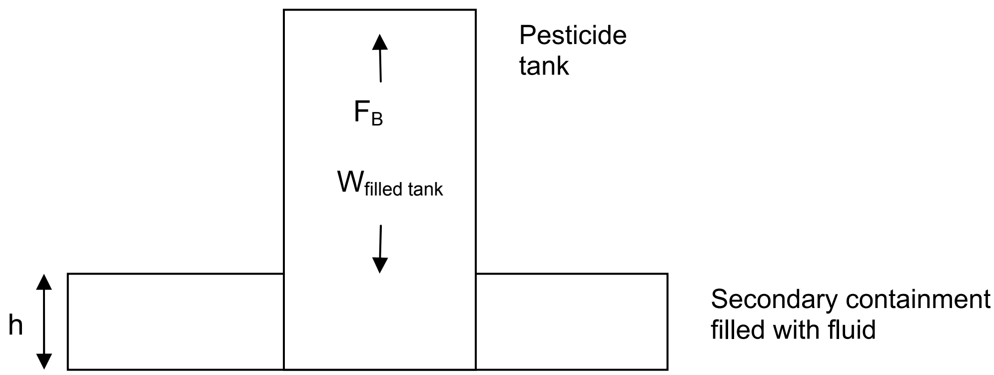
[1] The following information will be included in a link: For more information about mechanically anchoring a tank, see pages 29-33 of the MidWest Plan Service document *Designing Facilities for Pesticide and Fertilizer Containment*, MWPS-37 (http://www.mwps.org/) or pages 35-39 of Wisconsin Minimum Design and Construction Standards for Concrete Mixing and Loading Pads and Secondary Containment Structures, (http://www.datcp.state.wi.us/arm/agriculture/land-water/environ_quality/atcp33.jsp).

[2] This will link to the information on buoyant force calculations below.

Buoyant Force Calculations

When a rigid object is submerged in a fluid (completely or partially), there exists an upward force on the object that is equal to the weight of the fluid that is displaced by the object. In terms of the situation of a tank in a secondary containment unit filled with liquid, this means that a tank will not float if the weight of the tank (including any pesticide in it) is greater than the buoyant force pushing up. The strength of the buoyant force depends on the density of the fluid that could fill the secondary containment (e.g., water, pesticide or fertilizer) and the volume of the tank that is below the secondary containment wall.

Assume that there is a cylindrical flat-bottom tank that sits on the floor of a secondary containment unit. The secondary containment is filled with a fluid (water, pesticide or fertilizer) that has a density of ρ_{fluid} (in pounds/gallon) and the height of the secondary containment wall is h (in feet).



The **weight of the filled tank ($W_{filled\ tank}$)** is equal to the weight of the empty tank plus the weight of the pesticide in the tank (which is the volume of the pesticide in the tank multiplied by the density of the pesticide):

$W_{filled\ tank} = W_{empty\ tank} + W_{pesticide}$

$W_{filled\ tank} = mass_{empty\ tank} * g + \rho_{pesticide} * Volume_{pesticide} * g$, where g = acceleration due to gravity.

The **buoyant force (F_B)** is equal to the weight of the fluid displaced by the tank.

F_B = weight fluid that is displaced = $mass_{fluid} * g$

$mass_{fluid}$ = density of fluid * volume of tank that is submerged

$F_B = \rho_{fluid} * Volume_{tank\ submerged} * g$

For the tank to not float, the weight of the filled tank must be greater than the buoyant force:

$W_{filled\ tank} > F_B$

$W_{empty\ tank} + W_{pesticide} > F_B$

$mass_{empty\ tank} * g + \rho_{pesticide} * Volume_{pesticide} * g > \rho_{fluid} * Volume_{tank\ submerged} * g$

(Dividing this equation by "g" gives the following:)

$\mathbf{mass_{empty\ tank} + \rho_{pesticide} * Volume_{pesticide} > \rho_{fluid} * Volume_{tank\ submerged}}$

This equation really boils down to: the mass of the filled tank (the tank itself and the pesticide in it) must be greater than the mass of the fluid displaced by the tank. Fortunately, the parts of this equation are all things that will be known for a given situation: (1) the mass of the empty tank; (2) the density of the pesticide; (3) the volume of pesticide in the tank; (4) the density of the fluid that fills the secondary containment (The calculations should be done using the most dense fluid that could fill the secondary containment.); and (5) the volume of the tank that is submerged.

One other equation is needed to calculate the volume in a cylindrical tank:

Volume of a cylinder (in gallons) = $d^2 * 5.874 * h$, where

d = the tank diameter (in feet) and
h = the height of the cylinder (in feet), i.e., the secondary containment wall height when calculating the volume of the tank that is submerged or the level of pesticide in the tank when calculating the mass of the pesticide in the tank.

Here are several examples of the calculations. All three examples use the same tank size and secondary containment height. However, the minimum required height of pesticide in the tank and the material that fills the secondary containment unit (fertilizer or pesticide) varies. The situation is:

- A 2,500-gallon cylindrical steel tank is in secondary containment. The mass of the tank is 1,235 pounds and the tank's diameter is 6 feet.
- The wall of the secondary containment unit is 2 feet high.
- The tank holds pesticide with a density of 8.5 pounds/gallon. (The density of water is 8.3 pounds/gallon.)

Example 1: Pesticide and fertilizer are in the same secondary containment unit and a minimum of 4 feet of pesticide in the tank.

The secondary containment unit also includes a tank that holds liquid fertilizer with a density of 11.6 pounds/gallon. The facility has set the minimum level of pesticide in the tank to be 4 feet.

The worst case (biggest buoyant force) would be if the fertilizer tank failed and the secondary containment unit filled with liquid fertilizer. In this case, the mass of liquid fertilizer displaced by the tank (essentially the buoyant force) would be:

Mass of fluid displaced by tank = $\rho_{fertilizer} * Volume_{tank\ submerged}$

First, calculate the volume of the tank that is submerged in the secondary containment unit:

$Volume_{tank\ submerged}$ (in gal) = $d^2 * 5.874 * h$ = 6 ft * 6 ft * 5.874 * 2 ft = 423 gal.

Then calculate the mass of fertilizer displaced by the tank, which is 4,907 pounds:

$$\text{Mass of fluid displaced by tank} = \rho_{fertilizer} * \text{Volume}_{tank\ submerged} = 11.6\ \text{lb/gal} * 423\ \text{gal} = 4{,}907\ \text{lb}$$

To determine the mass of the filled tank, first calculate the volume of pesticide in the tank:

$$\text{Volume}_{pesticide\ in\ tank}\ (\text{in gal}) = d^2 * 5.874 * h = 6\ \text{ft} * 6\ \text{ft} * 5.874 * 4\ \text{ft} = 846\ \text{gal}.$$

Then determine the mass of the filled tank, which is 8,426 pounds:

$$\text{mass}_{filled\ \ tank} = \text{mass}_{empty\ tank} + \rho_{pesticide} * \text{volume}_{pesticide} = 1{,}235\ \text{lb} + 8.5\ \text{lb/gal} * 846\ \text{gal}$$
$$\text{mass}_{filled\ \ tank} = 8{,}426\ \text{lb}.$$

Because the mass of the filled tank (8,426 pounds) is greater than the mass of fluid displaced by the tank (4,907 pounds), the tank would be considered to be anchored and would not float if the secondary containment unit filled with liquid fertilizer, that pesticide or water. (The pesticide and water are less dense than the fertilizer, so the buoyant force would be smaller.)

Example 2: Pesticide and fertilizer are in the same secondary containment unit and a minimum of 2 feet of pesticide in the tank.

The secondary containment unit also has a tank that holds liquid fertilizer with a density of 11.6 pounds/gallon. The facility wants to set the minimum level of pesticide in the tank to be 2 feet.

The mass of the fertilizer displaced by the tank is the same as in Example 1 and is 4,907 pounds.

The mass of the filled tank is different than in Example 1, because there is a smaller amount of pesticide in the tank:

$$\text{Volume}_{pesticide\ in\ tank}\ (\text{in gal}) = d^2 * 5.874 * h = 6\ \text{ft} * 6\ \text{ft} * 5.874 * 2\ \text{ft} = 423\ \text{gallons}$$

$$\text{mass}_{filled\ \ tank} = \text{mass}_{empty\ tank} + \rho_{pesticide} * \text{Volume}_{pesticide} = 1{,}235\ \text{lb} + 8.5\ \text{lb/gal} * 423\ \text{gal}$$
$$\text{mass}_{filled\ \ tank} = 4{,}831\ \text{lb}$$

In this example, the mass of the filled tank (4,831 pounds) is less than the mass of fluid displaced by the tank (4,907 pounds), so the tank would not be considered to be anchored and would float if the secondary containment filled with liquid fertilizer.

Example 3: Only pesticide in the secondary containment unit and a minimum of 2 feet of pesticide in the tank.

Liquid fertilizer is in a separate secondary containment unit and the pesticide with a density of 8.5 pounds/gallon is the most dense material stored in the secondary containment unit. The facility wants to set the minimum level of pesticide in the tank to be 2 feet.

Because this pesticide is more dense than water, the worst case (biggest buoyant force) would be if the secondary containment unit filled with this pesticide. In this case, the mass of fluid displaced by the tank would be:

Mass of fluid displaced by tank = $\rho_{pesticide}$ * $Volume_{tank\ submerged}$ = 8.5 lb/gal * 423 gal = 3,596 lb

The mass of the filled tank is 4,831 pounds, as calculated in Example 2:

$mass_{filled\ tank} = mass_{empty\ tank} + \rho_{pesticide} * Volume_{pesticide}$ = 4,831 lb

In this example, the mass of the filled tank (4,831 pounds) is greater than the mass of the fluid displaced by the tank 3,596 pounds), so the tank would be considered to be anchored and would not float if the secondary containment unit filled with that pesticide or water.

In other words, two feet of pesticide in the tank is enough to anchor it if the pesticide is the most dense fluid that could fill the secondary containment unit (in Example 3). However, two feet of pesticide in the tank is not enough to anchor it if the secondary containment unit also has a tank holding liquid fertilizer with a density of 11.6 pounds/gallon (in Example 2). These examples show that the specific conditions of each secondary containment unit must be considered to determine the level of pesticide in a tank that would make it heavy enough to be anchored for the purposes of complying with the containment regulations.