Tank-nically Speaking

by Marcel Moreau

*Marcel Moreau is a nationally recognized petroleum storage specialist whose column, **Tank-nically Speaking**, is a regular feature of* LUSTLine*. As always, we welcome your comments and questions. If there are technical issues that you would like to have Marcel discuss, let him know at* **marcel.moreau@juno.com.**

What Will the New UST Rules Bring?

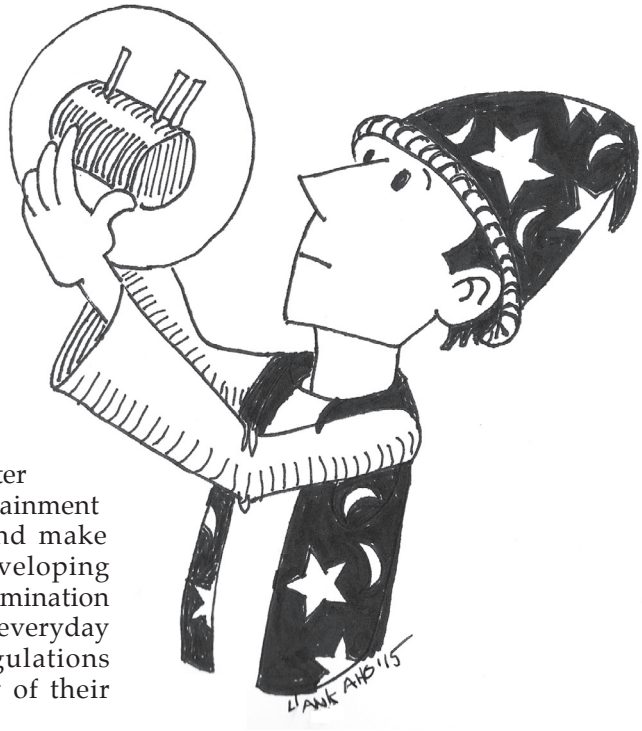
The 1988 UST regulations have had a remarkable run. For over a quarter century they served as an unwavering compass to the UST world. The rules have shepherded the nation's USTs through a remarkable transformation from a "bury it and forget it" mentality, where leaks were a part of doing business, to a time when leak-free storage is a primary concern for many tank owners.

Due, in part, to regulations, we have witnessed a major consolidation of the industry as multitudes of small, low-throughput garages and gas stations fell by the wayside and were replaced by fewer, larger, more efficient convenience stores. The regulations have demonstrated their flexibility by surviving virtually unscathed from a world where people handling wooden gauge sticks in rain, snow, and dark of night were the rule, to a world where a tank manager with a smartphone can see how much fuel is in his tanks in Maine while sunning on the beach in Waikiki.

Although the main body of the 1988 UST rule lives on in the content of the recently published UST rule revisions, there are now new sweaters, scarves, and bling in the UST rule wardrobe. New UST systems will have secondary containment, operators will be trained, and equipment will be routinely inspected and tested. Field-constructed USTs and airport hydrant systems will be fully incorporated into the UST fold, and emergency generators will finally be required to have leak detection.

Change...and Some "Uh-Oh" Moments

By their nature, regulations induce change. They are meant to provide a specific direction to a particular segment of society into the future. So it was in 1988, when the need was to divert the path of the UST world from a continually reoccurring cycle of bare-steel-tank failures and piping leaks into a world where tanks and pipes had much longer leak-free life expectancies. The 1988 rule was designed to implement better hardware for primary containment of petroleum products and make vigilance against any developing leaks and cleanup of contamination a part of the tank owner's everyday world. The 1988 UST regulations have accomplished many of their intended goals.



But as is often the case when such widespread change takes place, new issues arise. To a certain extent the 1988 rule carried forward the "bury it and forget it" mentality to an "install it and forget it" mentality. With the exception of annual testing of line leak detectors and cathodic protection monitoring, the rule took for granted that once new equipment was installed, it would operate flawlessly forever, and knowledgeable people would oversee its operation. As the 1988 rule became widely implemented in the 1990s, a rude awakening occurred in the regulatory community.

It became apparent that someone had to be overseeing the operation of the improved hardware and responding appropriately to information provided by leak detection equipment in order for the full benefits of the equipment to be realized. The new rule makes universal what the Energy Policy Act of 2005 had widely encouraged: upgrading the knowledge level of UST operators. The new rule also formalizes how operators are to manage their UST equipment by describing specific tasks (i.e., walkthrough inspections) that they must periodically complete.

As for the equipment end of things, the intent of the new rule is to be sure that this equipment continues to function over time (i.e., annual inspection of leak detection equipment, tri-annual inspection of overfill equipment, testing of containment sumps and spill buckets).

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That Crystal Ball Again

Rules sometimes lead us down paths that are detours on the road to progress. For example, it is my suspicion that ball-float valves have likely caused more delivery spills than they have prevented in the last quarter century. In any case, the new rule will eventually phase out the use of ball-float valves as overfill-prevention devices.

As I gaze into my crystal ball, I don't see any ball-float-type issues lurking in the recesses of the new rule, but I do see some things that bear watching and some things that may turn out to be less than optimal—at least in the short term. So the following is my take on some of the things that will be happening in the UST world as the changes envisioned in the upgraded UST rule come to pass.

Inspecting Overfill Prevention Will Have Its Pitfalls

I have a feeling that this requirement is going to elicit a great many curses from tank workers.

Let me be clear: I'm all in favor of inspecting overfill-prevention devices for proper installation and operation. I'm only pointing out that this will not be easy (at least the first time through), and there are a number of pitfalls that will need to be avoided.

Many ball floats and flapper valves have been languishing in tanks, undisturbed for many years, perhaps even decades. For these devices, removal will not be an easy task. Corrosion will have virtually welded drop tubes to fill risers. Likewise, the extractor fittings in which ball floats are typically installed will be corroded in place. In addition to curses, removing these devices will require ingenuity and a fair amount of muscle. In many cases, removing these devices will ruin them and replacements will need to be installed.

Those Pesky Ball Floats Will Continue to Cause Problems

If a replacement is called for, ball floats will need to be replaced with flapper valves since ball floats may not be replaced under the new rule. I see the demise of the ball float as a good thing, but there will need to be some education among tank workers about this issue. I see tank workers resorting to two simple solutions when ball floats resist removal: 1) removing only the ball, and 2) leaving the ball float assembly in place.

Why Removing the Ball from the Ball Float Isn't Enough

With the ball float stuck in place, it will be tempting to merely force the ball out of its cage with a gauge stick and leave the pipe portion of the ball float in place. "After all," thinks the tank worker, "with the ball gone, the ball float has effectively been disabled." It is true that with the ball gone the ball float will no longer function as an overfill device. But leaving the pipe portion of the ball float in place may have dire (but not obvious) consequences for the delivery driver.

Let's assume the old ball float (now minus the ball) was correctly installed at the 90 percent level of the tank and the new flapper valve is correctly installed at the 95 percent level. If the pipe portion of the ball float is left in place, the air and fuel vapor in the top 10 percent of the tank will be trapped in the tank once the fuel level rises above the lower end of the ball float pipe. As a result, when a fuel delivery exceeds the 90 percent level, fuel will flow up the pipe portion of the ball float and into the vent line (and the Stage I vapor recovery hose if one is in use) before the flapper valve ever has a chance to stop the delivery.

In this situation, if the tank vent is not manifolded to other tanks, the vent line will fill with fuel until the fuel level in the vent pipe is equal to the level of the fuel in the truck. If a Stage I vapor recovery hose is in use, this hose will be full of fuel as well. And of course, the delivery hose itself will be full of fuel too. The fuel delivery driver will not know what happened. He will be back to the bad old days before overfill prevention with lots of fuel in his hose(s) and nowhere to put it. This will create many opportunities for delivery spills to occur as drivers discover that they have hoses full of product that will not drain.

On the other hand, if there are multiple tanks with vents that are manifolded together, fuel will flow through the vent line into an adjacent tank. If the adjacent tank is a gasoline tank, the facility owner will scratch his head over his inventory records as he finds he is missing fuel in one tank and has excess fuel in another. If the adjacent tank is a diesel tank that used to be a gasoline tank and the diesel vent line has not been isolated from the other tanks, the diesel fuel will be contaminated with gasoline (or vice versa if the diesel tank is the one that is filled beyond the 90 percent level).

None of these scenarios is desirable, and some are downright scary. But I'm sure punching the ball out of the ball float will seem like a very practical solution to the problem posed by inspecting stuck-in-place ball floats to some tank workers.

Why Leaving the Ball Float in Place Is Not a Solution

There are also likely many ball floats still in service that were never installed in extractor fittings and so are inaccessible from grade without excavation. Excavating to find and remove these will be expensive. It will be tempting to leave these ball floats in place and merely install a flapper valve without removing the ball float. This approach creates problems because if the flapper is installed at 95 percent of tank capacity and the ball float is set at 90 percent of tank capacity, the flapper valve will be ineffective. This is because the flapper valve relies on a rapid flow of fuel down the fill pipe to operate properly. If the ball float closes first it will have severely restricted the flow of fuel down the fill pipe and the flapper valve will not close. Because of this, the Petroleum Equipment Institute's PEI RP100-11, *Recommended Practices for Installation of Underground Liquid Storage Systems*, specifies that ball float valves not be used when flapper valves are installed.

An intrepid tank technician, however, may think that this problem can be overcome by having the flapper valve set below the ball float (say at 88 percent) so the flapper valve operates first. While the flapper valve may now operate properly, this situation will confuse delivery drivers who see that a flapper valve is present and expect to be able to

fill the tank to 95 percent. And three years later when a tank technician who is unaware of the presence of the ball float checks the level of the flapper and finds it at 88 percent, he may decide that this is inappropriate and reset the flapper at 95 percent. Now the flapper valve will be ineffective and the ball float will become the overfill device again.

Flapper Valves Have Their Own Issues

Even if ball floats are not present, there will still be issues with the flapper valves. All this removal and reinstallation activity with flapper valves will create many opportunities for improper installation of the devices. A private study of the installation of flappers by a Northeast tank owner found that only about a third of flapper valves were properly installed. Some of the installation errors were attributed to incomplete installation instructions, while others reflected UST component design issues. Unless a substantial effort is made to upgrade the installation instructions for these devices and the tank technicians' understanding of how to properly install them, the verification of operation will have little effect in improving our overfill prevention efforts.

Testing Secondary Containment Could Be an Expensive Aggravation

I have a feeling that secondary containment testing will decrease secondary containment usage.

History has shown that half of secondary containment structures will fail testing (see "What States Should Expect with Secondary Containment Testing," presentation by Laura Fisher of the California Water Resources Control Board, at the National Tanks Conference, September 15, 2015). Some sump leaks will perhaps be easily repaired, but even so, many owners in areas where secondary containment is not required will find the cost and trouble of repeated testing burdensome.

In addition, a great many under-dispenser sumps will have penetration fittings for the piping that will need to be made liquid-tight in order to test the dispenser sump. Access to these fittings in many sumps is very limited because the dispenser blocks access to the sump below. Removing a dispenser in order to conduct a test will be costly and disruptive to fueling operations, creating additional incentives to use an alternative method of leak detection where secondary containment is not required

My sense is that many tank owners, when faced with the trouble and expense of repeated containment-sump testing, will revert to line-leak detection and line-tightness testing as a cheaper and more hassle-free method of leak detection. The secondary containment advocate in me says this is a bad thing, but a more pragmatic part of me says that it is better to have functioning leak detection than to indulge in a fantasy that a storage system is securely contained when in reality the secondary containment would be ineffective in containing and detecting releases.

While the 1988 UST rule focused on installing better equipment, the 2015 rule focuses on implementing behavior changes. Because of the huge number of owners, operators, and workers in the UST world, it will be a challenge to keep these behavior changes moving in the direction of continuous improvement while avoiding counter-productive detours.

Requiring New Tanks to Be Double-Walled May Slow Down Replacement

I have a feeling that the universal mandate for secondary containment will have the effect of slowing down the replacement of existing single-walled systems by increasing the cost of replacing UST systems. California's experience, as discussed by Laura Fisher, has been that 10 percent of its tanks are still single-walled some 30 years after the state mandate that all replacement tanks had to be double-walled went into effect. California has finally set a deadline of December 31, 2025 for the closure of all remaining single-walled tanks. This forced-removal deadline came 40 years after the installation of single-walled tanks was first outlawed.

Walkthrough Inspections May Lead to Check Off Issues

In the new USEPA regulations, monthly walkthrough inspections are pretty straightforward. At most facilities, they will basically involve checking fill openings for issues and ATGs for alarms. However, I suspect some regulators may be tempted to formulate detailed checklists describing a multitude of UST elements for inclusion in the walkthrough inspection. It is my sense that this will lead to widespread "pencil whipping" of the forms, where UST personnel merely check off all the required items from the comfort of their offices rather than actually conducting an inspection.

This is an area where incremental improvement will likely be more effective than attempting to mandate immediate perfection. In Utah's experience it was more productive to create a simple checklist containing only the most important items. The Utah UST program found that its original checklist, although more comprehensive, was viewed as overwhelming, impractical, and too much of a bother to complete by UST operators. Utah regulators concluded that a slimmed down, more operator-friendly checklist had a better chance of being completed, and therefore more likely to be effective in identifying problems. ("UST Operator Inspections – Utah's Experience," presentation by Doug Hansen of the Utah DEQ at the National Tanks Conference, September 15, 2015.)

Bottom Line?

The new federal rule is intended to produce changes in the UST world. While the 1988 UST rule focused on installing better equipment, the 2015 rule focuses on implementing behavior changes. Because of the huge number of owners, operators, and workers in the UST world, it will be a challenge to keep these behavior changes moving in the direction of continuous improvement while avoiding counter-productive detours. As states move forward toward implementation, everyone should keep a wary eye out for developing problems and ways to address them. ■