Tanks Down East

by W. David McCaskill

David McCaskill is an Environmental Engineer with the Maine Department of Environmental Protection. ***Tanks Down East*** *is a regular feature of* LUSTLine. *In this edition, David, at long last, provides a second installment of his popular June 1994 article, "Those Tanks in America's Backyards and Basements." This update describes Maine's strategy for dealing with the problem of spills and leaks from aboveground home heating oil tanks. As always, we welcome our readers' comments.*

Those Tanks in America's Backyards and Basements—Part 2

A Report from Maine on the Trials and Tribulations of Leaking Aboveground Home Heating Oil Tanks

Oh, the idyllic life of spending the summer in a cottage on a coastal island in Maine. The picture of evergreens marching down to the rocky, wave-washed shores, accented with a touch of wispy fog, is so beautiful it just plain hurts. Many an out-of-stater has purchased his or her own little slice of the Maine coast. Many of these folks summer in small cottage communities year after year, and, more to the point, some of these cottages have outside heating oil tanks that fuel small furnaces that help inhabitants enjoy those chilly June and September evenings in comfort.

Such was the case on one island in Casco Bay in the fall of 1996, except the comfort level diminished when the contents of one particular tank at one particular cottage "mysteriously" escaped their confines. Whether this spill was the result of an overfill or a damaged oil filter, we'll never know. Nevertheless, by the time the Maine Department of Environmental Protection (MDEP) found out about the problem, the fractured bedrock arteries of this rocky island made sure that the tank had shared its contents with the entire cottage community.

Needless to say, some old summer friendships, like the bedrock, were now fractured—around $80, 000 would be spent on this site. This scenario was nothing new for those of us at MDEP, inasmuch as we'd spent the last five years responding to an ever-increasing number of these types of releases from aboveground home heating oil tanks.

Shortly after the spill was discovered, I was asked to take a gander at the then "fixed" offending tank. While at the site, one of my coworkers pointed out a neighboring cottage whose tank rested at a precarious slant on rickety, five-foot high wooden legs. We attempted to contact the out-of-state owner to provide counsel on the condition of this "tippy tank" (MDEP has no jurisdiction over these tanks), but not in time to avoid it falling over two weeks later during an autumn storm, adding its contents to the mess!

You betcha, we were more than frustrated about our lack of preventative powers. In fact, our boss demanded that we come up with some scheme to take a more proactive role in addressing our burgeoning problem of leaking aboveground home heating oil tanks.

The Grim Statistics

Since 1991, MDEP has seen an increasing number of aboveground home heating oil tank releases. Until the Casco Bay island affair, however, our efforts at addressing the problem had been limited to working with the state's oil industry to develop a series of public service announcements and informational pamphlets to alert the public of the need to pay attention to these tanks. After dealing with the situation on the island, we moved toward a more proactive approach—to replace these tanks, especially in sensitive areas, such as coastal islands and peninsulas, where shallow bedrock and limited alternative water supplies hinder cleanup of an invaluable resource.

But before our department was to undertake this new initiative, our industry "stakeholders" wanted to see some data. With the gauntlet thrown down, we looked over spill records from 1994 to 1997. We determined that we were responding, on average, to one home heating oil tank / piping leak or spill per day!

We also had some data from a case study performed by a staff member on home heating oil tank releases in the three southern Maine counties. Out of 498 incidents investigated during a period between 1994 and 1996, 17 percent of the spills resulted from internal corrosion, 11 percent from breakage of piping and filters, 10 percent from tank overfills, and 6 percent from corrosion of buried piping. The other remaining categories included vandalism (3%), poor / improper installation (8%), human error (10%), other piping / valve failures (12%), storm damage (5%), other (12%), and unknown (5%). We felt that this information was fairly typical of the rest of the state. The fre-

quency and causes coupled with the long-term cleanup costs associated with these releases really got the industry's attention!

Spills associated with damage to the oil filter and lines (often caused by falling snow and ice) or a corroded tank bottom are one thing; they are usually noticed and cleaned up relatively quickly. Releases from corroding buried piping, however, are more insidious, because by the time they are discovered, the damage is done.

Here's a real-life example of a grim, corroded, buried-pipe statistic. Picture this. It's Super Bowl Sunday. A husband and wife sit glued to the television watching the game, when the wife notices the sweet smell of fuel oil. They investigate and find a pool of oil around the tank in the garage. They later find that it's been seeping up from a leak in the copper line buried in the concrete slab running from the tank to the furnace.

The MDEP investigates and finds that the soil and water under the home are contaminated. The MDEP Groundwater Cleanup Fund will pay for the remediation, but they still have the aggravation of having their yard dug up and a remediation system full of pumps and blowers housed on their property. To add to the confusion, the husband is to be transferred to another state in several months and the couple are afraid (rightly so!) that the house won't sell.

According to the MDEP and its consultant, the cleanup will take years, but some relative tells the wife that digging the contaminated soil from under the house will do the trick. The couple talks the MDEP into letting them manage this portion of the cleanup, which means gutting the bottom story of their house down to the studs so that a bobcat with a front end loader can come in and dig up the soil. It comes to pass, the soil is removed, the house is put back together, and months later it sells. What fun. All that hassle caused by something most people think about as often as they think about their hot water heater or the inner workings of their toilet!

Going with the Program

Back to MDEP's efforts to curtail heating oil releases. With the data in hand and the problem defined, it was up to us to devise a strategy to prevent tank and piping leaks. The first thing we did was to meet with the oil industry and the Oil and Solid Fuel Board (OSFB), the state agency that licenses oil technicians and sets the tank standards. Our goal was to upgrade the state code to address some of the problems that we were seeing.

As in most states where heating oil fuel is used, OSFB adopts the National Fire Protection Code 31, *Installation of Oil-Burning Equipment*, with some modifications. In February 1998, the state rules were amended to include requirements for a layer of well-drained, crushed rock or gravel under the tank pad to prevent the tippy tank scenario; overhead protection from ice and snow falling off the roof; and sleeving for underslab or buried copper lines.

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The oil industry recommended that a two-year compliance schedule be set for upgrading buried copper lines and a five-year schedule for overhead protection and padding. These deadlines turned out to be a bit too aggressive, inasmuch as there are more than 250,000 oil heating customers in the state. So, after some public and political pressure, the piping deadline was extended from February 2000 to September 2000. Extending the deadline into a non-heating season makes sense and has given the OSFB, MDEP, and the oil industry more time to get the word out.

The other prong of our strategy is a two-year pilot project, negotiated with our Groundwater Cleanup Fund stakeholders, that will allow MDEP to spend $250,000 per year for two years to replace tanks in sensitive areas at no cost to the homeowner. This project is focused on coastal islands and peninsulas, where groundwater is especially valuable and vulnerable.

Another reason to focus on offshore islands is because some islands, such as Monhegan (one of our replacement sites), are several miles from the mainland, and the logistics of cleaning up a major release would cost many times more than an onshore cleanup. So far, MDEP has replaced 150 tanks on two coastal islands and one peninsula and plans to replace over 100 tanks on two more islands. We provide grant monies for these communities; they, in turn, contract out the work.

We have also contracted with the Community Action Program (CAP—a program set up to help low-income families) to use $750,000 per year for two years to replace tank systems at low-income homes. In Maine, there are around 30,000 CAP clients who use heating oil, so finding places to spend the money is not an issue. So far, CAP has replaced around 1,000 tanks, giving priority to homes that are on private wells. MDEP and OSFB audit/inspect a number of the installations to see whether they meet state requirements and specifications and to find out about any unforeseen problems with implementation of the project.

MDEP keeps a balance of about $25,000 that can be used for quick tank replacement when field staff run across a questionable tank that has the potential to contaminate multiple wells.

Contentious Specifications

For the purposes of our replacement program, MDEP developed a set of storage system specifications that include several items not included in the OSFB rules or NFPA 31. The most contentious requirements involve tank specifications. We specified that:

- Each heating oil tank be an Underwriters Laboratory (U.L.) listed tank (Standard for Steel Oil Furnace Tanks-U.L.-80) that has a bottom outlet so that water and sludge drain into the fuel filter

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and don't cause tank bottom corrosion.

- Tanks be painted a light color to reduce condensation and, thereby, help reduce tank bottom corrosion.
- The tank end be welded to the body of the tank using a lap joint rather than a crimp connection to prevent rupture caused by joint fatigue resulting from repeated fillings.

We knew that these features were not found on the standard tank in Maine, and we were willing to pay extra for them.

Sounds good, huh? But you'd think that we had asked for the sun and moon! Many oil burner technicians don't like the bottom outlet because they want the water and sludge to stay in the tank and not plug the lines, which results in midnight service calls. However, other service technicians assure us that with proper maintenance and filter replacement this issue should not be a problem. The tanks come with only a black primer so the technician would have to paint them, which we are willing to pay for. The stronger end weld is one of the approved welds found in U.L. 80 and offered by some tank manufacturers; still it is different, and technicians need to make the adjustment. By the way, in the next version of U.L. 80 (published July 30, 1999, and effective 18 months later), the "crimped," U.L. 80 weld number 25 will no longer be allowed.

It's a groundwater and indoor air quality issue. Ideally, the combination of public outreach, retrofit deadlines, and industry support should help us succeed in reducing the environmental and health and safety effects of substandard home heating oil tanks.

As Maine Goes...

We are now in the second year of our program and are quite pleased with

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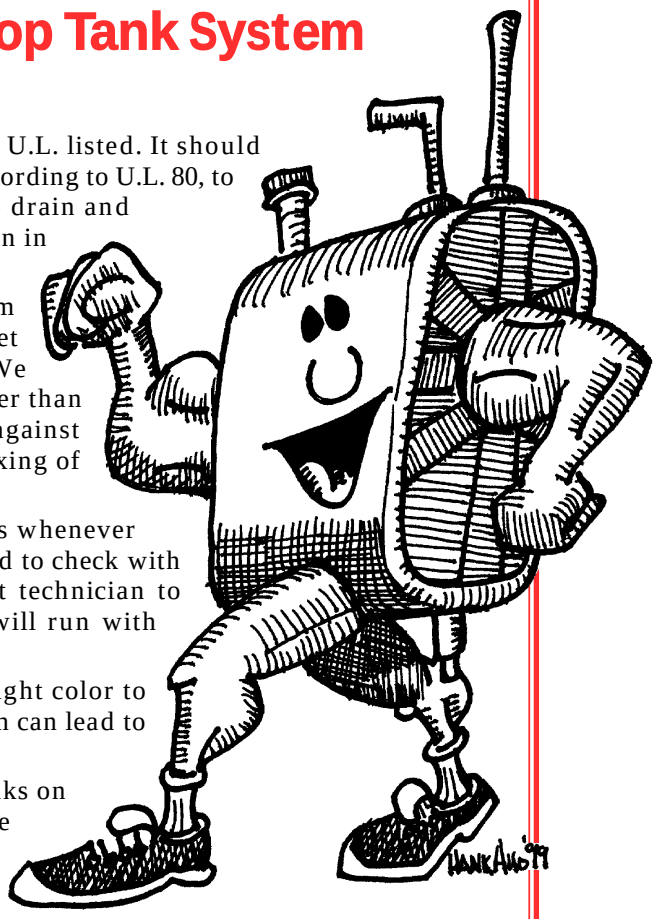
Make Your Tank a Super Tank

Tips for a Tip-Top Tank System



The Tank

- ✔ Make sure that the tank is U.L. listed. It should include a bottom outlet, according to U.L. 80, to allow water and sludge to drain and to prevent bottom corrosion in the tank.
- ✔ Be sure that tank ends form a tight lap joint using a fillet weld with the tank shell. We recommend a capped rather than a crimped end to guard against joint fatigue caused by flexing of the tank end during filling.
- ✔ Use horizontal or flat tanks whenever possible. Homeowners need to check with their professional oil heat technician to find out if their furnace will run with this configuration.
- ✔ Paint all outside tanks a light color to reduce condensation, which can lead to bottom corrosion.
- ✔ Rest all outside vertical tanks on a 3-inch, reinforced concrete slab that is underlain with 6 inches of well-drained gravel or crushed rock. Four-inch solid concrete blocks placed under each leg are sufficient for horizontal or flat tanks, along with the 6-inch crushed stone or gravel.
- ✔ Be sure that the filter is protected from falling ice and snow. Ideally, tanks should be located at the gable end of the house. If this setup is not possible, filter protectors can be installed. (Check with Peter Moulton at MDEP for details.)
- ✔ Provide the tank with a gauge and a whistle so that the delivery person knows that the tank is full. This setup has always been a requirement, but it has often been overlooked.

The Piping

- ✔ Protect all piping. If copper lines are buried under or in a concrete or grout-filled trench, replace the lines aboveground and keep them out of the way of traffic. Most lines can be run overhead (again, homeowners need to ask their service technician if this option will work with their furnace pump) or along the wall. If the lines must go back under the basement or garage floor, sleeve them in plastic pipe or conduit. We also recommend that all aboveground piping be run in a protected sleeve.
- ✔ Run vent and fill lines to the outside of the basement or garage.

Care and Feeding

- ✔ Routinely check the tank for leaks and weeps.
- ✔ Have the oil dealer add a fuel additive to prevent sludge buildup and displace any water.
- ✔ Fill tanks in late spring to keep them full throughout the summer to reduce condensation.

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the results. In fact, there is a good indication that our legislature will approve our proposal to continue the project until 2005 (when our Groundwater Fund will be severely cut back). Still, we are targeting only a small portion of the population and it is going to be up to the people of Maine to comply with the OSFB rules.

Meanwhile, our sister states here in northern New England and our Canadian Maritime cousins have had to deal with this problem as well. In a recent meeting of the NFPA 31 Technical Committee, the New Hampshire delegates proposed that NFPA adopt many of the requirements currently found in Maine's rules. This problem is a very regional issue, but it does affect a large number of people. It's a groundwater and indoor air quality issue. Ideally, the combination of public outreach, retrofit deadlines, and industry support should help us succeed in reducing the environmental and health and safety effects of substandard home heating oil tanks.

For a detailed copy of MDEP's specification, e-mail Peter Moulton at peter.t.moulton@state.me.us. ■