New England Interstate Water Pollution Control Commission
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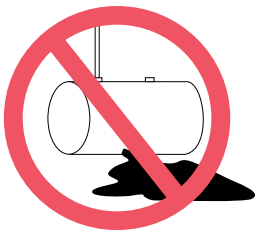
# L.U.S.T. LINE



A Report On Federal & State Programs To Control Leaking Underground Storage Tanks

# The Growing Vulnerability of Groundwater

## How Do UST Systems Factor in to a Changing Water Dynamic?

*"When we honor water, we honor ourselves and the rest of life."*

*Dr. Veer Bhadra Mishra*


Illustration courtesy the Ground Water Protection Council's *Ground Water Report to the Nation: A Call to Action*

*by Fran Kremer, John Wilson, and Jim Weaver*

*Water supply has long been a concern in the western states. More recently, however, water supply is also a growing concern and at times a contentious issue in southeastern states. Increasing water demands in this region have led to some severe water restrictions, and in some cases, this has necessitated the use of the judicial system to resolve water allocation disputes.*

*So how does this pertain to underground storage tanks (USTs)? Those who have been engaged in UST issues over the past two decades can readily recall some high-profile instances in which UST sites have impacted drinking water supply wells. This vulnerability is of particular concern when water supply wells are being pumped at higher rates in order to deliver water to meet the demand of communities. Can we expect this vulnerability to change?*

■ *continued on page 2*

## Inside

## ■ Growing Vulnerability of Groundwater *from page 1*

### Co-location of Population and USTs

There are several factors that may contribute to potential impacts of leaking underground storage tanks (LUSTs) on water supplies, including locations of USTs, climate change, types of fuels stored in USTs, and growing demand. First is the co-location of the population and gas stations which is, of course, driven by ready access to the stations. However, if we put co-location in the context of available shallow groundwater used by communities for drinking water and in proximity to gas stations, we find, not surprisingly, that these are similarly co-located. This proximity has the potential to increase the vulnerability of that water supply. Two national data sets on service stations and drinking water from shallow groundwater illustrate this. Figure 1 depicts the distribution of service stations nationally. Figure 2 identifies the distribution of people reliant on shallow groundwater for their drinking water supply.

**FIGURE 1. DISTRIBUTION OF SERVICE STATIONS**

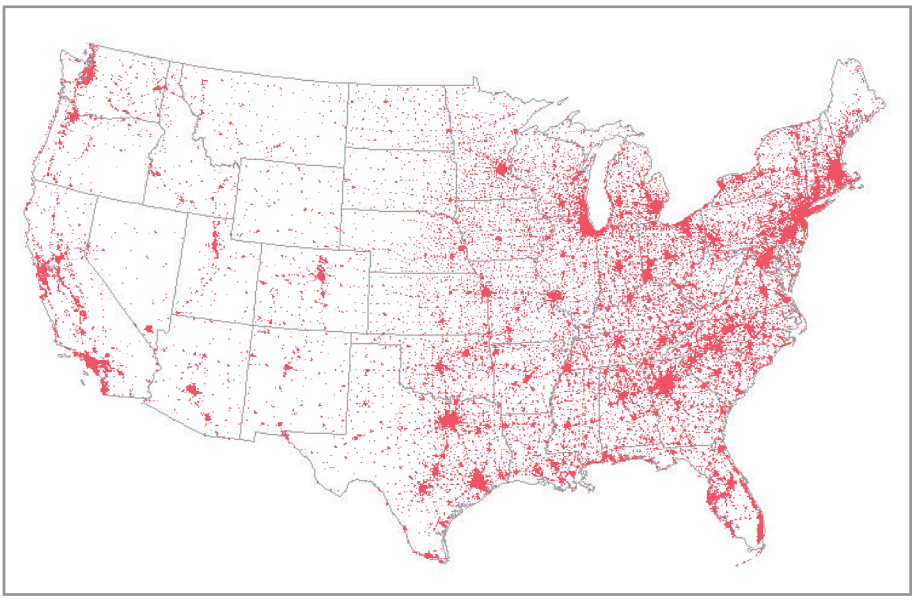
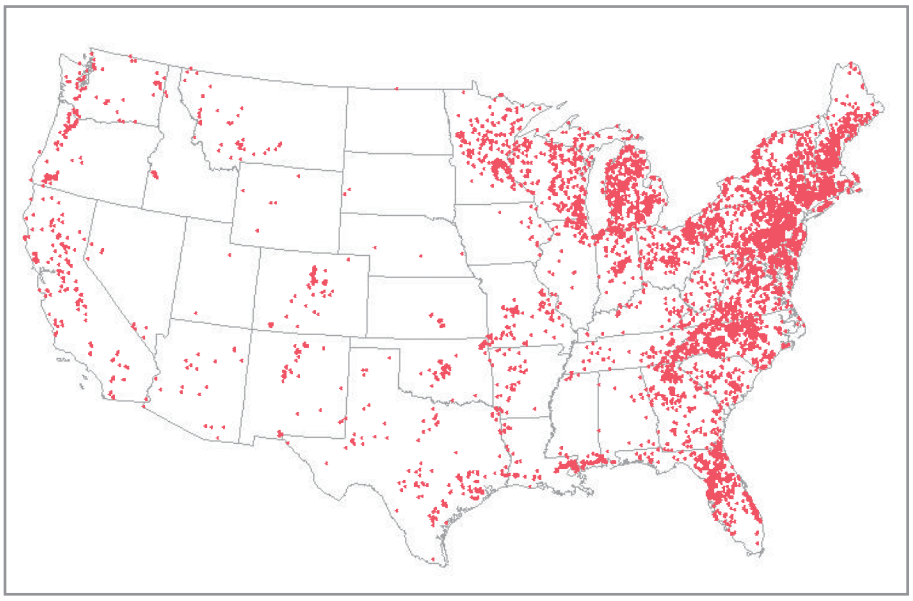


**FIGURE 2. DISTRIBUTION OF PEOPLE DRINKING SHALLOW GROUNDWATER**

*(1990 census data, each dot is 1,000 people.)*



### Vulnerability Index

The data on service stations and on populations utilizing shallow groundwater for drinking water was integrated by using a vulnerability index. The index was calculated for each census district in the 1990 census. The density of people using shallow groundwater in each census district was calculated by dividing the number of shallow groundwater drinkers by the surface area of the district. The density of service stations in each census district was calculated by dividing the number of service stations by the surface area of the district. An index of potential vulnerability in each census district was calculated by multiplying the density of people drinking shallow groundwater by the density of service stations.

The distribution of potential vulnerability is shown in Figure 3. If the potential vulnerability of a census district falls with the highest

**L.U.S.T.Line**

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30 percent of all districts, the district is colored in the figure. This shows potentially greater vulnerabilities in the midwestern, southeastern, and eastern regions, particularly in urban areas.

### Potential Impact of Climate Change

A second factor that could contribute to the impact of LUSTs on water supplies is the potential impact of climate change. The U.S. has been experiencing drought conditions and extreme precipitation events, both of which contribute to changes in hydrology. Under drought conditions, municipalities that rely on shallow groundwater may need to pump at higher rates to deliver adequate water supplies. These increased pumping rates can create conditions for contaminated plumes to move farther or faster than they would under normal conditions. Alternatively, with extreme precipitation events, groundwater recharge from surface runoff can alter the direction and flow rate of plumes. Both of these extreme weather events can change the vulnerability of water supplies.

### Type of Fuel

A third factor that may change groundwater vulnerability is the type of fuel being stored in USTs. Laboratory and field studies in recent years have indicated the potential for ethanol to extend LUST contaminant plumes. These longer plumes increase potential impacts to shallow groundwater drinking water supplies.

### Population Growth and Shifts

Fourth, population growth and shifts, especially toward coastal areas, will place additional burdens on water demands. Outside of Alaska, 53 percent of the U.S. population lives in coastal counties that account for only 17 percent of the nation's land mass (*Population Trends Along the Coastal US, 1980 – 2008*, U.S. Department of Commerce). Consequently, we need to have better tools to provide information on water supply demands for communities with longer temporal scales that are integrated with the tools to assess where USTs may create greater vulnerability and may require more timely efforts to control contamination.

## Why Use 1990 Census Data on Water Supply Sources?

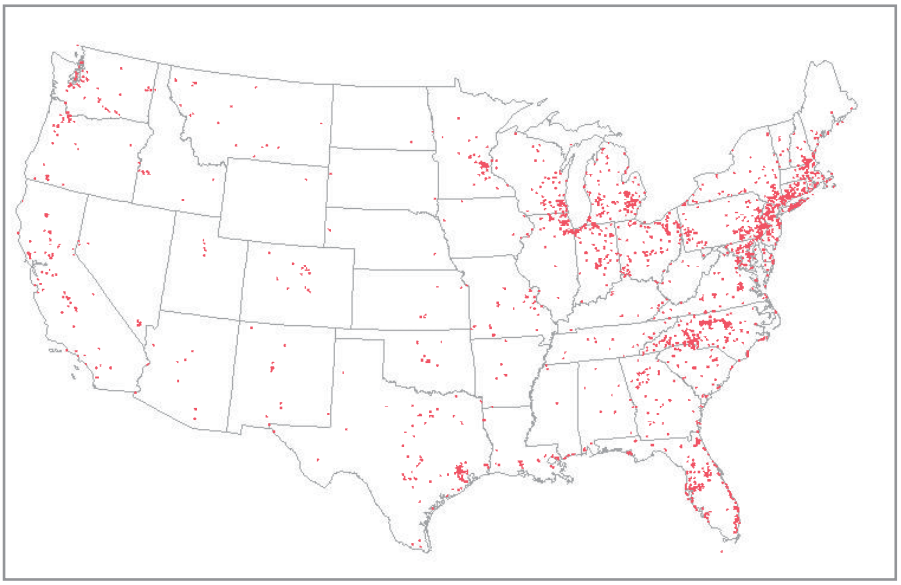
**WHY?** Because no such questions were asked in the census questionnaires for either 2000 or 2010. The 1990 census was the last one that asked questions related to drinking water sources:

Do you get water from:

- ☐ A public system such as a city water department or private company?
- ☐ An individual drilled well?
- ☐ An individual dug well?
- ☐ Some other source such as a spring, creek, river cistern, etc.?

So why, when water availability has become so increasingly problematic, have source water questions been eliminated from the census? Why, when this information could have been so useful and easy to obtain, was the subject deleted from the census? We don't know, but it was.

**FIGURE 3. POTENTIAL VULNERABILITY**



*Density of people drinking shallow groundwater multiplied by the density of service stations.*

### So How Are We Addressing This?

The USEPA, U.S. Geological Survey, and the Association of State and Territorial Solid Waste Management Officials are collaborating to develop the needed data and decision support tools to assist communities in managing impacts to groundwater to protect drinking water supplies. In evaluating the nation's shallow groundwater supplies, we as a nation must be vigilant in identifying and assessing the factors that contribute to the vulnerability of these supplies. We not only need to anticipate future water demands over the next 5, 10, and 20 years, we also need to anticipate these demands in the context of these vulnerabilities. ■

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## A MESSAGE FROM CAROLYN HOSKINSON

*Director, USEPA's Office of Underground Storage Tanks*

# Alas, Poor Groundwater

Those of us in the UST program have known for years the importance of our work in relation to groundwater. Considering that UST system leaks are one of the leading sources of groundwater contamination, the need to do all we can to protect this valuable resource cannot be overstated. According to the Ground Water Protection Council's *Ground Water Report to the Nation: A Call to Action* (October 2007),

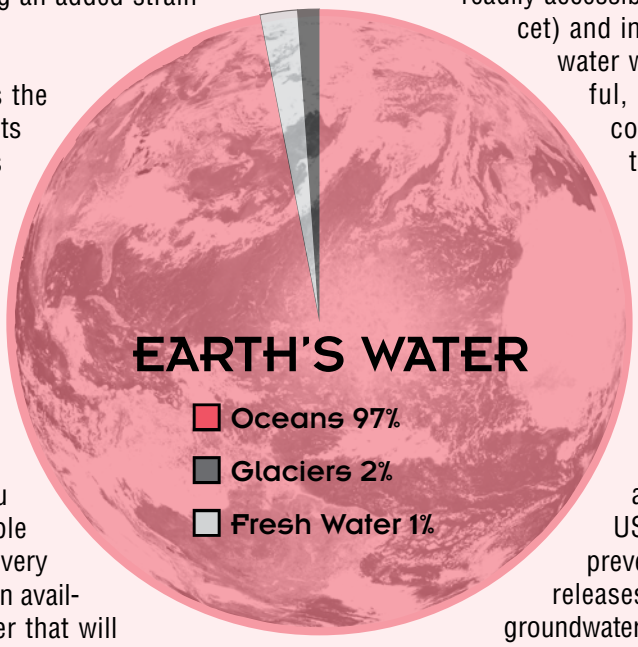
> "Human activities have altered many landscapes, changing the water balance and the physical, chemical, and biological processes that control water quality. Harmful substances have entered groundwater by way of leaks, spills, seepage, disposal, and burial. In the process, groundwater has been degraded, placing an added strain on limited water supplies."

And yes, groundwater has the misfortune of having to share its domain with things like tanks that contain toxic substances. This is significant, considering that groundwater is the source of drinking water for approximately half of all Americans and 99 percent of Americans in rural areas.

Ah, water! Our very existence depends on it. It is the quintessential antique, when you consider that the water available to us here on planet Earth is the very same water that has always been available to us and is the only water that will ever be available to us. The water we drink could contain the very same molecules that dinosaurs drank!

As they tell us in Water 101, water occurs on the Earth's surface as liquid, ice, and gas. It covers three quarters of Earth's surface. Water in the form of clouds masks approximately one-half of Earth's surface at any time. Volcanic eruptions continually extract water and gases from rocks deep within Earth's interior. That Earth is known as the "water planet" is no fanciful notion.

Yet, only a very small portion of all this water is available to us for our daily water supply needs. And although you've probably heard the following bits of water trivia many times, they are worth repeating. Over 97 percent of Earth's water is in oceans as salt water. Two percent of Earth's fresh water is stored in glaciers, ice caps, and snowy mountain ranges. Only the remaining 1 percent of Earth's fresh water is available to us for our daily water supply needs. It is stored in all kinds of soils, cracks, and fissures as groundwater, or as surface water.




We use that 1 percent of fresh water for a variety of purposes. Nationally, agricultural uses represent the largest consumer of fresh water, about 42 percent. Approximately 39 percent of fresh water is used for producing electricity; 11 percent is used in urban and rural homes, offices, and hotels; and the remaining 8 percent is used in manufacturing and mining activities.

In the United States, water has been for the most part readily accessible (as simple as turning a faucet) and inexpensive, so we assume our water will always be available, plentiful, and clean. But…people with contaminated water understand that is not necessarily so.

Lately we are hearing a lot about "the water crisis." Water is being referred to as the twenty-first century's "blue gold," the resource that will "determine the wealth of nations." The lack of available water is being felt in many parts of the world, including areas of our own country. Our UST program's core priorities—preventing releases and cleaning up releases—are essential to protecting groundwater, in this case, from UST system releases. We have a responsibility to be part of the water solution.

### Prevention Is Fundamental

We know that preventing releases and ensuring that petroleum does not contaminate soil and groundwater in the first place costs much less than cleaning up leaks after they have polluted the environment. I'm pleased with the UST program's confirmed releases trend over the last 20 years. We've seen a steady reduction in confirmed releases from almost 67,000 in fiscal year 1990 to 6,328 in fiscal year 2010. Inspecting UST facilities routinely, operating and maintaining existing equipment, and installing required equipment has contributed greatly to this continued decline in the number of new UST releases reported each year.

**MESSAGE FROM CAROLYN HOSKINSON** *continued from page 4*

As of September 2010, there were approximately 597,000 federally regulated active USTs at approximately 215,000 sites across the United States. Inspections are a good way to determine whether these USTs are being operated and maintained properly and in compliance with release prevention and leak detection requirements. The 2005 Energy Policy Act provided us with a mandate requiring on-site inspections every three years for all active USTs. States and territories exerted considerable effort to meet the initial three-year inspection requirement of August 2010. And almost all successfully completed the requirement by the deadline or soon thereafter, while USEPA and our tribal partners conducted inspections at nearly all UST sites in Indian country.

Looking ahead, the federal UST program is committed to continuing improvements in preventing UST releases. For example, in summer 2011 we intend to issue proposed federal UST regulation revisions aimed at further reducing UST releases. By August 2012, state and territorial UST programs will need to ensure UST facility operators are trained according to state-specific training requirements, resulting in properly trained operators possessing the knowledge to better operate and maintain their UST systems.

As the UST program continues to mature, we will look to our UST partners for help in identifying future UST release prevention opportunities that protect our groundwater resources.

### Cleanup Is Our Duty

Over the past 25 years, more than 401,000 cleanups have been completed, approximately 12,000 of which were completed in fiscal year 2010. Yet the annual number of cleanups completed nationally has declined steadily since fiscal year 2000.

Although the cleanup backlog—currently at 93,000—is at its lowest level since 1992, we still need to aggressively tackle the backlog and each year do our best to achieve our cleanup goals. I realize some of the remaining cleanups are those that are more complex and may require lengthier cleanup processes because of complications.

To better understand the makeup of the backlog of releases and why the pace of cleanups is slowing, USEPA has been analyzing the backlog. In summer 2011, we plan to issue results of our analysis and use them as the groundwork for discussions with states and tribes and other stakeholders to develop targeted backlog reduction strategies.

The American Recovery and Reinvestment Act of 2009 gave our cleanup efforts a welcome one-time infusion of money, which is helping to increase the number of cleanups beyond those traditionally accomplished through our annual appropriation. Recovery Act money has funded site assessment and cleanup work at over 4,900 sites nationwide. To date, thanks to Recovery Act money, approximately 830 assessments have been completed, and nearly 800 sites have been cleaned to health-based cleanup levels. Cleaning up these sites protects groundwater and restores contaminated land to conditions suitable for future use.

### We Will Continue to Be Part of the Solution

Together, we—states, tribes, local governments, industry, and USEPA—have done a great job of protecting America's precious groundwater resource. I thank each of you for your dedication to the job, despite recurring struggles.

Going forward, we will need to identify new opportunities for protecting Earth's limited groundwater resources. It's our responsibility to help ensure future generations of Americans have ready access to clean, useable water. ■

## USEPA's FY 2010 Annual Report Available

The *FY 2010 Annual Report on the Underground Storage Tank Program* (EPA-510-R-11-001, March 2011) provides a snapshot of national UST program activities during fiscal year 2010. This 8-page report contains information regarding tank program highlights in 2010; advances in preventing releases; progress in cleaning up leaks; an update on the LUST Recovery Act; and a look ahead for future years. The 2010 annual report is available on USEPA's website at *www.epa.gooust/pubs/2010annrpt.htm*

## We Need to Hear Your Story

Here at *LUSTLine*, we try to keep our readers informed on what is being done throughout the U.S. to protect groundwater from LUST contamination. Of course we have a lot to say about UST prevention and LUST cleanup, but what other measures are being taken to keep USTs away from vulnerable water supplies? We need to hear from you about any such efforts. For example, one such effort was reported by Maine DEP's David McCaskill in *LUSTLine* #41 (June 2002), "When It's Hard to Take 'No' for an Answer—Maine's UST Siting Law Revisited." If you have a story, we want to share it.

# Come on, Really…Can't We Do Better with the Sources and Causes of Releases?

*by Carol Eighmey*

Six years have passed since Congress enacted new UST legislation as part of a larger bill called the "Energy Policy Act" (EPAct). Oddly, the law did not impose any new requirements on owners or operators of USTs; instead, it imposed several new requirements on the state agencies that implement our nation's UST program.

One of those requirements says, "The [EPA]…shall require each State that receives Federal funds… to maintain, update at least annually, and make available to the public…a record… [T]he public record…shall include, for each year…*the number, sources and causes of underground storage tank releases in the State*…" [italics added].

After this new federal law was passed, USEPA's Office of Underground Storage Tanks issued guidance to help states understand what Congress wanted, and most state regulators dutifully began following that guidance. Specifically, USEPA's guidance on the "Public Record" requirement provides a sample chart that states can use to report on the sources and causes of UST releases. USEPA required states to provide their first "Source and Cause" reports no later than December 31, 2008, and annually thereafter.

## What Is Leaking and Why?

Last year, I assembled the most recent Source and Cause reports from 47 states. (One state admitted it had forgotten to prepare such a report in 2009; two others did not respond to requests for their reports.) I then attempted to compile the data from the 47 states to get a national picture of what is leaking, and why. The compiled data appear in Table 1.

The results of this effort were less informative than I had hoped. In fact, readers may recall Tom Schruben quoted me in the last issue of *LUSTLine* (#66 – "Investigating Petroleum UST-Equipment Problems…") saying the data "present a largely meaningless picture…"

This article will explain why I reached that conclusion, and will offer ideas on how we, as a community of regulators, might improve our data collection and reporting procedures so that the annual reports required by Congress are more informative. But first, please note a few things about the data.

It would appear that 31 percent of UST releases are from the tank itself. But we all know that's not true. When I queried some state regulators who reported relatively high numbers of "tank leaks," several said that's the "catch-all" category they use, for example, when an UST system is removed and petroleum is found in the soils of the tank pit. This is borne out by the Cause data—more than half of the supposed tank leaks had an unknown cause.

In fact, of the 5,168 releases reported on the states' Source and Cause reports, less than one-third had an identified source and cause. In other words, two-thirds of the time, we have incomplete information on what leaked and why. Can we do better? Here is some food for thought.

## Clarify What We Are Reporting

In my conversations with other state UST/LUST regulators, it quickly became apparent that some state annual reports on sources and causes of releases contain only data on "actual leaks" from federally regulated USTs, which are (presumably) operating with corrosion protection and spill/overfill prevention equipment. Other states include every newly reported "release" in their reports, even if the release is discovered during a site assessment on a property where no USTs have been operated for 30 years or more.

This clearly means the states' reports are a mixture of "apples and oranges." Obviously this undermines any effort to analyze the compiled data.

USEPA's guidelines for Source and Cause reports specify that states must report on all releases that "occurred" during the reporting period. However, the guidelines also specify that the number of releases reported on the Source and Cause report is to be the same as reported in states' semi-annual activity reports. Experienced bean counters will know that the semi-annual activity reports include releases that are "confirmed" during the reporting period.

**TABLE 1. COMPILED STATE SOURCE AND CAUSE DATA (2009)**

| | CAUSE | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | | Spill | | Overfill | | Phys/Mech Damage | | Corrosion | | Install Problem | | Other | | Unknown | |
| SOURCE | # | % | # | % | # | % | # | % | # | % | # | % | # | % | # | % |
| Tank | 1616 | 31.27% | 37 | 2.29% | 59 | 3.65% | 179 | 11.08% | 321 | 19.86% | 9 | 0.56% | 157 | 9.72% | 854 | 52.85% |
| Piping | 720 | 13.93% | 9 | 1.25% | 6 | 0.83% | 190 | 26.39% | 48 | 6.67% | 25 | 3.47% | 43 | 5.97% | 399 | 55.42% |
| Dispenser | 655 | 12.67% | 38 | 5.80% | 31 | 4.73% | 160 | 24.43% | 8 | 1.22% | 9 | 1.37% | 49 | 7.48% | 360 | 54.96% |
| STP | 76 | 1.47% | 4 | 5.26% | 2 | 2.63% | 36 | 47.37% | 1 | 1.32% | 5 | 6.58% | 9 | 11.84% | 19 | 25.00% |
| Delivery Problem | 342 | 6.62% | 92 | 26.90% | 121 | 35.38% | 100 | 29.24% | 0 | 0.00% | 1 | 0.29% | 14 | 4.09% | 14 | 4.09% |
| Other | 564 | 10.91% | 14 | 2.48% | 6 | 1.06% | 97 | 17.20% | 6 | 1.06% | 4 | 0.71% | 171 | 30.32% | 266 | 47.16% |
| Unknown | 1195 | 23.12% | 1 | 0.08% | 21 | 1.76% | 8 | 0.67% | 2 | 0.17% | 1 | 0.08% | 23 | 1.92% | 1139 | 95.31% |
| Totals | 5168 | | 195 | 3.77% | 246 | 4.76% | 770 | 14.90% | 386 | 7.47% | 54 | 1.04% | 466 | 9.02% | 3051 | 59.04% |

It is a well-known fact that when a release "occurred" and when it was "confirmed" may be two very different dates—years or even decades apart. Clarification is needed on exactly *which releases* are to be included in state Source and Cause reports. Perhaps the rules USEPA is drafting to codify the EPAct's requirements will provide this clarification.

## Decide Who Is Responsible for Investigating the Source and Cause of Leaks

It was also apparent from my project that preparing the annual Source and Cause report is viewed by many state agencies as something they have to do to keep USEPA happy, not a task that has much relevance to their daily responsibilities. At first this was puzzling, since I personally know many UST/LUST regulators and find them to be a diligent and thoughtful group of folks.

After reflection, it seems one reason the Source and Cause report is not viewed as a more important task is that it falls into the crack between UST and LUST responsibilities. In the numerous states where UST and LUST regulators are in different agencies, this problem is particularly acute.

UST regulators are focused on compliance with UST technical and operational requirements, so anything that has to do with "releases" seems outside their bailiwick. On the other hand, LUST regulators view their primary responsibility as ensuring that someone properly cleans up a release after it occurs—why it happened is of little interest.

I contend the Source and Cause reports *should* be of primary interest to UST regulators *and* whoever is paying for cleanups. Both of those parties have a vested interest in knowing what is leaking so they can a) focus their inspection, compliance, and operator training efforts accordingly, and b) reduce the number of leaks that occur in the future, thereby reducing costs.

## Improve Our Investigative Protocols

Another improvement we should consider is how we might do a better job investigating the source and cause when an UST leak is reported to us. The majority of states rely on owners/operators, equipment companies, or environmental consultants to identify and report the source and cause of releases. None of the three, however, have any real incentive to do any real investigation.

When he suspects he may be losing fuel, the owner/operator typically calls the same equipment company that installed or recently performed maintenance on the UST system. If that company's personnel were the ones who overtightened something or installed a piece of equipment poorly, how likely is it the equipment company will volunteer any meaningful information about what leaked and why it leaked?

Similarly, the owner's primary interest is getting the leak fixed and getting back into operation as quickly as possible. He has little incentive to investigate or care why his system sprang a leak.

The environmental consultant is focused on the cleanup, and rightly so. Who will pay for his or her time to investigate the source and cause of the leak?

So…what to do? As already mentioned, *someone* first has to take responsibility for the Source and Cause investigation. Then that person—and it will have to be a UST or LUST regulator or Tank Fund Manager—must figure out how, in today's world of declining resources, to get a sound investigation accomplished.

Recognizing the need for some uniform procedures, ASTM has published a new standard, E2733-10, which was discussed in Tom Schruben's article. One approach suggested by Mr. Schruben is to require, as part of installer or inspector training, that state-licensed UST installers or inspectors be trained, then be required to follow the procedures outlined in E27330-10 when they respond to a suspected release.

Another option might be for state personnel who respond to environmental emergencies to be similarly trained and enlisted to report Source and Cause information to the UST regulator or tank fund manager. Or, in some states, the tank fund may have resources with which to engage a trained investigator to go to the UST site immediately after a release is reported and conduct the investigation.

## Combine or Replace Activity Reports with Source and Cause Reports

I offer one final suggestion: USEPA should consider how states' reporting responsibilities can be consolidated so that the reporting burden is minimized and the validity of the data is improved.

When the data assembled from 47 state Source and Cause reports was compared with the number of confirmed releases, those same states reported in their semiannual activity reports that a significant discrepancy was apparent. There were 5,168 releases reported on the Source and Cause reports; compared with 6,839 in the semiannual activity reports. Even taking into consideration some variation in the timing of the reports, this seems too large a discrepancy.

Perhaps USEPA should consider consolidating these two reporting responsibilities, which should save time for state regulators and improve the accuracy and quality of the data.

## Let's Do Better!

Congress clearly expressed its desire to know whether our collective regulatory efforts are reducing the frequency of leaks, and what weaknesses in the regulatory system need to be addressed to further reduce the incidence of UST releases. We're now into our fourth reporting cycle. If you're the person who is required to fill out this report annually, consider how you can make it a more useful endeavor. Have you talked to the equipment companies in your state to see whether they have records that might shed some light on what parts are "failing" most frequently? (See Tank-nically Speaking on page 8.) Are there other personnel in your agency, or in other state agencies, who can share photographs or field notes with you? Can the new ASTM Standard be incorporated into inspector or installer training?

In most states, the number of actual leaks from operating UST systems is not that large, so improving our investigations and reporting shouldn't be an overwhelming challenge. Let's do it! ■

*Carol Eighmey is Executive Director of the Missouri Petroleum Storage Tank Insurance Fund. She can be reached at pstif@sprintmail.com.*

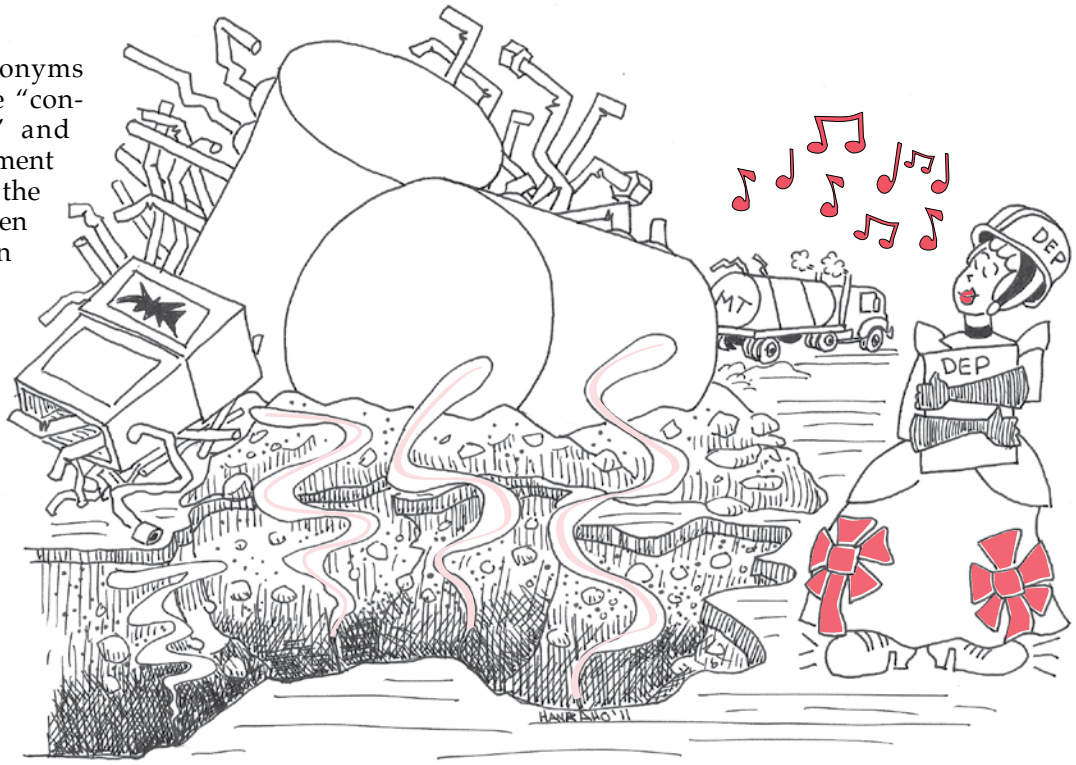
# Tank-nically Speaking

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.**

## Someday My Facts Will Come...Part 1

## TQM & USTs—A Marriage Made in Heaven




If you can remember acronyms like "TQM," phrases like "continuous improvement," and terms like "Deming management method" and "franchise" in the context of USTs and LUSTs, then you qualify as an old-timer in the world of tank regulation. For all of you more youthful *LUSTLine* readers, these were all catchwords of Ron Brand, the first director of USEPA's Office of Underground Storage Tanks (OUST) and visionary founder of the UST regulatory program.

"TQM" stands for Total Quality Management, an approach taught by W. Edwards Deming for improving manufacturing processes through repetition of a series of steps:

- Measurement of the status quo
- Implementation of small changes
- Comparing measurements from before and after the change to determine what has been achieved

For example, if I were making widgets, I would carefully measure a sampling of my finished widgets to see how closely they matched the "perfect" widget I had set out to make. I would measure dimensions and weights, and do tests to see how long my widgets would last. I would also measure how long it took to make my widgets, how much raw material went into them, and how many widgets I had to reject because they didn't do whatever they were supposed to do. Once I had my baseline measurements, I would then make changes. Ideally these changes would come from ideas generated by the workers who made the widgets, because they were the ones who knew best where the mistakes were being made and how to improve the process.

After implementing a change, I would compare my pre-change measurements to the post-change measurements to see how much the quality of the widgets had been improved, or the time required to make them had been reduced, or how many fewer widgets were rejected because of quality problems. This is a process of endless measurement of the entire widget-making process, continually tweaking the process in order to make improvements, and tracking the resulting effect on the finished widgets and/or the widget-making process—always with a goal of making better widgets and making them faster and cheaper.

Nearly a quarter century has passed since the tank rules were finalized, and there is no question that our UST systems are of a higher quality (less prone to leak) than they have ever been. That said, if I were to try to quantify this "quality" of our UST system population I would be hard-pressed to come up with many meaningful numbers. I can say with some level of certainty that there were 597,333 tanks in active service last year and that 1,748,204 tanks have been closed since the USEPA regulatory program began. I can look up

how many confirmed releases have occurred each year over the last 22 years. I can count how many ongoing cleanup operations we have (93,123) and how many have been completed (401,874). These numbers certainly tell a story that tank owners and tank regulators alike can be proud of. (Figures from USEPA's *Semiannual Report of UST Performance Measures End of Fiscal Year 2010; www.epa.gov/oust/cat/ca_10_12.pdf.)*

But there is another statistic that has a crimping effect on this happy news: Last year, 6,328 new releases were reported. And keep in mind, this is only the number of releases *reported*—we don't know about the unreported releases. In the interest of continuous improvement, the ultimate goal of the tank program should be to whittle down the number of new releases to zero. While I can imagine a lot of heads nodding affirmatively as they read this, there is one big problem—**we haven't got a clue how to do this!**

## Doctor Doctor!

As Tom Schruben pointed out in his *LUSTLine* #66 article "Investigating Petroleum UST-Equipment Problems…," and Carol Eighmey has been preaching from her soapbox for quite a while now (see her article on page 6), we don't know what's wrong with our UST systems, and if we don't know what's wrong, how are we ever going to fix them?

The fundamental tenet of TQM is that you measure your product or your process continually so you can see where you are and plot a course to where you want to be. It seems to me that to establish where we are in the UST-release world, we should have a firm grip on statistics like:

- **How many new releases did we actually have last year?** As Eighmey points out in her article, we don't know whether the "new" releases reported last year are in fact releases from new storage systems or whether they are newly discovered releases from old storage systems.
- **How many leaks did each method of leak detection actually detect last year?** For example, how many tank leaks were discovered by ATG monthly tests? How many piping leaks were discovered by line-leak detectors? How many leaks were discovered using secondary containment? And just as important, how many leaks were missed by each of these methods of leak detection?
- **How many delivery spills happened last year, and how many spill buckets are leaking?** Are our methods of preventing and containing delivery spills actually working?
- **What UST components are failing, how often do they fail, and why do they fail?** Although the generally accepted wisdom today is that most leaks are associated with the piping, that is not what the current national statistics say (see Eighmey's article). So where does the truth lie?

While I'd wager that any group of UST owners or installers or regulators could sit around a table with a pitcher or two of beer and have a very lively discussion on any of these issues, none of us could pull out a chart or a table with hard numbers to answer any of these questions. In an era of limited resources, how do you know which problem to tackle when you don't know which problem causes the most frequent and/or most severe leaks? And how do you know whether whatever it is you change is working if you don't continuously measure the effect of the change?

## We've Been Here Before

Back in the 1980s, when Ron Brand and a team of OUST folks and state regulators were structuring the regulatory program we have today, they faced a similar problem. They knew there were lots of things wrong with UST systems, but they wanted to know what the *biggest* problems were and how best to tackle them. Back then, there were very few UST regulators, so the idea of gathering national statistics using regulatory personnel was not feasible.

But the OUST program did have a budget, so they commissioned various studies. They sent consultants out to review state leak files. They interviewed Petroleum Equipment Institute (PEI) contractors. They got statistics from testing companies that had conducted thousands of tightness tests. Eventually, all of these data were consolidated into a "Cause of Release" study. Though nearly a quarter century old, the findings of this study are still worth reviewing. Among the major points made:

- While the historical problem had largely been caused by corrosion of bare steel tanks, the study recognized that this particular problem (except for internal corrosion of steel tanks) had largely been solved.
- The big remaining problem was the piping, because although piping materials had been improved (fiberglass had largely replaced galvanized steel) there was still an issue of quality control (good workmanship) in installing the piping under field conditions.
- Pressurized pumping systems were particularly prone to large releases.
- Delivery releases were very common.
- "Nonoperational" leaks (e.g., loose tank-top bungs, loosely screwed-together vent lines) were very common. (In later years these would come to be known as "vapor leaks," and they came to have great significance while MtBE was present in our gasoline.

In short, back in the 1980s we got a pretty good qualitative (and sometimes quantitative) handle on the problems by consulting with the people out in the field actually doing the work!

## Who Is in Touch with the Cold, Hard Facts?

It is my belief that in trying to get regulators to gather UST system failure statistics, we are trying to pound square pegs into round holes. As a group, regulators lack the funding, the time, the motivation, and the knowledge to conduct tank autopsies. I would note that it can be done, as shown by the statistics gathered in Florida during Marshall Mott-Smith's tenure as administrator of the Florida UST program, but this effort required a substantial commitment of resources and a regulatory structure and discipline that is lacking in most states.

■ *continued on page 10*

## ■ TQM and USTs *from page 9*

If we really want to understand what's going wrong with our UST systems, we should look at history. We need to look back to the late 1970s, when, under the auspices of the American Petroleum Institute (API), storage system failure data were gathered (primarily by PEI members). While the data were not perfect, they did show conclusively that corrosion was the biggest issue with steel tanks. Likewise USEPA's Cause of Release study gave us information that helped put the national UST program on sound footing. In short, we should look to the people doing the work in the field—the installers, testers, and maintenance folks who are out there every day, responding to alarms, discovering, and repairing leaks—for the answers.

We can get some tantalizing clues about what is going on in the UST world because, in this computer age, we have huge databases that can be mined for information. These include those of large-scale tightness-testing companies like Crompco that maintain databases of their test results, and remote monitoring services like Gilbarco's Fuel Management Service that record tens of thousands of alarms.

Just to see if this approach is worthwhile, I've been working with Ed Kubinsky of Crompco to get a peek at what their testing statistics can tell us. Just looking at some of the "big picture" numbers that Ed was able to generate quite rapidly gives us some interesting information. For example, a ranking of what types of equipment fail the most frequently (Figure 1) tells us that our secondary containment systems are in trouble because they have, by far, the highest failure rates of any storage system component that Crompco tests.

This is somewhat disconcerting because as a result of the 2005 Energy Act, we as a nation are headed in the direction of adopting secondary containment. The clear message is that if we do not address the liquid-tightness of secondary containment, our chosen method of leak detection will turn out to be less than satisfactory in detecting and preventing releases. The bottom line is that periodic testing of the integrity of secondary containment is going to be key to the success of secondary containment. What this graph does not show is exactly *how* these containment systems are failing. That would require a more labor-intensive review of the tester's notes for each failed test, but such a review might be a crucial step in figuring out how to design more reliable containment systems for the future.

**FIGURE 1. FAILURE RANKING OF UST COMPONENTS**

*(Based on 2004 through 2010 Crompco data)*

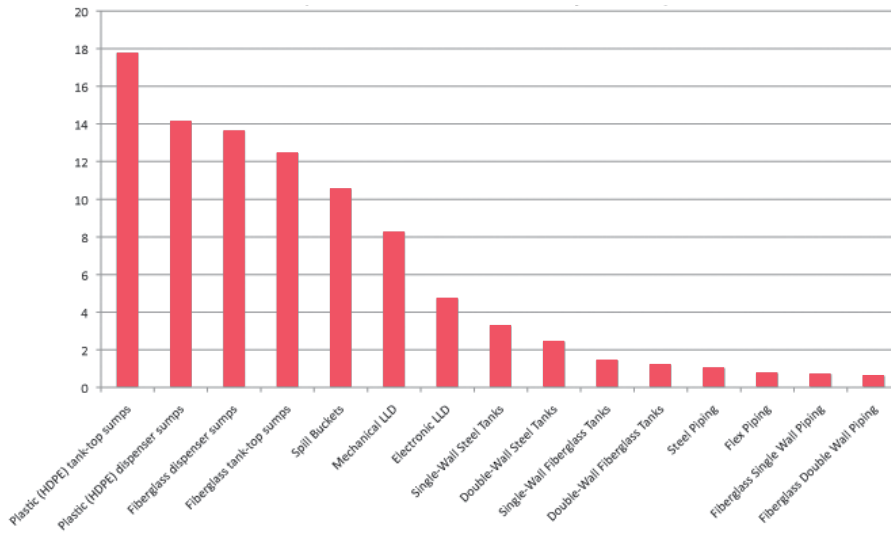



**FIGURE 2. SPILL BUCKET FAILURE RATE**

*(Based on 2004 through 2010 Crompco data)*


Looking at trends over time, we can see that spill buckets, for example, are showing marked improvement (Figure 2). Keep in mind, however, that this improvement is being seen only in spill buckets that are being tested periodically. States where periodic spill-bucket testing is not the rule should be looking at the early years of the data in this graph and realizing that they have a substantial problem with leaky spill buckets that will only grow worse over time.

As with any data set, the limitations of the data have to be understood. For example, Figure 1 tells us that steel tanks have a higher failure rate than fiberglass tanks but that fiberglass tanks, even double-walled tanks, fail tightness tests as well. We have to keep in mind that these data

■ *continued on page 23*

# The Fuel Quality and Tank Design Disconnect

*by Paul Nazzaro*

*Whether buried underground, positioned above ground, or exposed in a basement, fuel-storage tanks have kept millions of cars and trucks, as well as businesses, industry, aircraft, homes, and the like adequately supplied with gasoline, diesel fuel, aviation fuel, and home heating oil for as long as distillate fuels have needed some form of bulk storage. Generally, the consumer rarely notices these tanks, nor does the consumer think about how fuel quality could be impacted by factors such as fuel quality and tank design.*

*Over the past few years, a great deal of attention has been given to what appears to be an increase in premature filter plugging and corrosion activity in the underground storage tank (UST) systems across the country, which can affect every type of distillate fuel. Given my 30 years of experience storing, blending, and shipping fuel, not much surprises me when the phone rings and a concerned fleet manager begins to share his story of an early-morning filter-plugging problem that's causing him to experience his worst nightmare—costly downtime.*

## The Petroleum Supply Chain

To appreciate what could be happening to these fuel-storage systems we need to understand how the petroleum supply chain functions and how quality standards are used to maintain fuel quality while the fuel type is "in commerce" from the point of manufacture to the point of sale.

It is interesting to contrast fuel-quality management practices between the aviation industry and the pleasure-craft industry. In the case of the former, the airline industry worldwide has invested millions of dollars and hundreds of thousands of hours to develop a fuel-management program that ensures that jet fuel maintains stringent fuel-quality standards by filtering and dewatering it every step along the distribution network. From production, transport, and storage to fueling the aircraft, industry practices ensure and maintain optimum fuel quality, resulting in reliable aircraft operation and, in turn, passenger safety during flight.

In stark contrast to the aviation industry is the marine retail market, selling diesel fuel, gasoline, and E10. These fuel-storage tanks are typically near a body of water, subjected to diurnal temperature fluctuation, and in humid conditions. Over time, these elements lead to the formation of sediment and bottom water that remain with the stored fuel until the tank is physically cleaned and dewatered.

The situation with middle-distillate fuel used in home heating oil lies between these two extremes. Even though the industry is committed to maintaining fuel within specification while in commerce, fuel-handling, storage, and maintenance practices may be much less rigorous before the fuel reaches the consumer.

## Fuel Quality—the Big Picture

For decades the world energy markets have been chaotic, to say the least. With recent downturns in the world economy and uncertainty about how it will all play out, the demand for energy and the near-term future of that market have been significantly impacted.

Projections provided in the U.S. Energy Information Administration's *Annual Energy Outlook 2009* look beyond current economic and financial woes and focus on factors that drive the U.S. energy markets and their impact on energy investment decisions in the long term. These factors include the growing and uncertain global crude oil prices, improving domestic air quality and reducing greenhouse gases (GHG), the need to increase renewable fuels inventories, the increasing production of unconventional natural gas, the move from inefficient to more efficient engines, and improved efficiency in end-use appliances.

If anything is different in 2011, it is that the 2009 report is on track for advancing the original agenda—today's fuels need to be cleaner, more efficient, and sustainable to survive in the energy marketplace of the twenty-first century.

## What Contributes to Fuel-Quality Degradation?

The road to fuel-quality degradation begins with the process in which crude oil is transformed into the finished petroleum products. Refiners are driven to maximize each barrel of crude oil. Their objective is to optimize technology in order to produce as much high-value product per barrel of crude that enters the refinery as they can.

Through several distinct processes—distillation, cracking, reforming, blending, and treating—refiners convert barrels of crude oil into higher-value products such as gasoline, diesel fuel, jet fuel, and home heating oil. Once the products exit the refinery, they are transported through a network of pipelines, barges, ships, and rail cars to their final destination.

During the various transfers, the fuels are subjected to the ravages of time, temperatures, and organic and inorganic contaminants, all of which can potentially compromise their future performance and the storage systems in which they will be held until they are sold to the general public. From the time the fuels are produced to the time they reach the downstream marketplace, they are in the process of degrading (the initial point of recognized fuel instability).

When a fuel product arrives at a regional petroleum deep-water pipeline or a break-out terminal strategically located in the United States, it is then redistributed to a local distribution zone and placed in a large storage tank with other products, all of which must coexist by way of "like" fuels (i.e., fuels that meet their respective American Society for Testing and Materials (ASTM) specifications).

■ *continued on page 12*

## ■ Fuel Quality/Tank Design

*from page 11*

For example, ASTM D975 benchmarks standards for diesel fuels, ASTM D396 benchmarks standards for home heating oil, and ASTM D6751 benchmarks standards for B100 biodiesel. Subsequent designations for biodiesel blends (i.e., B6–B20), must conform to their respective benchmark specifications. Biodiesel blends of up to 5 percent biodiesel (B5) in either diesel or heating oil fall under core diesel and heating oil specifications—D975 and D396, respectively. Biodiesel blends that range between B6 and B20 percent are governed under ASTM D7467.

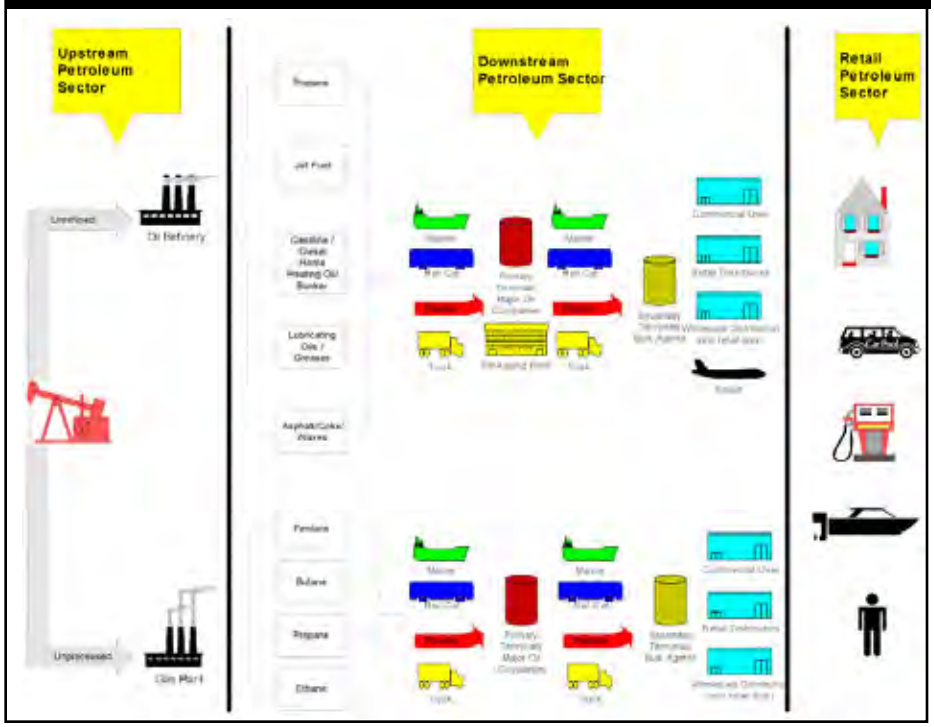
During the period of time before a product is sold to the consumer for use as a transportation fuel or heating fuel, the custodian of these fuels may blend other products into the fuel stream to optimize both supply and economics. These blend stocks may be light-cycle oil (LCO), Russian Gas Oil (RGO), or even various types of biodiesel; all of these blends must continue to meet their respective specifications.

In the end, millions of gallons of fuel products produced at home or abroad are transported daily through thousands of miles of a "fungible" product network in order to arrive to the end user (Figure 1). Imagine, in the absence of a minimum fuel-quality standard throughout the storage and distribution network, these fuels could initiate and contribute to fuel-product degradation during transport, ultimately affecting the integrity and performance of the fuel product and fuel-storage systems.

### Can It Get Worse?

In addition to the physical aspects associated with fuel quality and fuel storage, fuel dealers must also address growing negative perceptions on the part of consumers regarding fuels, price fluctuations of their respective fuel products, and attacks from market competition anxious to take their rightful place in the twenty-first-century energy market by offering an alternative energy solution to the long-term traditional fuel market. The very issues that bulk-storage-system professionals are trying to grapple with and understand—unexplained increases in dispenser filter plugging, premature tank failure, corrosion, and microbial events—can also be reflected in the local home heating oil dealers who are fighting for their economic survival in the face of the natural gas industry's effort to devour every last oil heat customer.

**FIGURE 1. DOWNSTREAM PETROLEUM SECTOR REVIEW**




Courtesy Measurement Canada *(http://www.ic.gc.ca/eic/site/mc-mc.nsf/eng/lm00252.html)*

The reason home heating oil dealers are looking at a mind-numbing market contraction is primarily due to their inability to control what is happening inside the homeowner's 275-gallon home heating oil tank. For example, large aboveground storage tanks (1,000 – 20,000 in capacity) typically have built-in man ways on the side of the tank that allow access to the tank interior for inspection and cleaning.

Contrast this to the typical home heating oil tank, which is sealed and virtually inaccessible to the removal of any degraded fuel product, water, or microbial contamination that has accumulated inside. After decades of accumulation, fuel-degradation product, water, and microbes at the bottom of these home heating oil tanks are roiled each time fuel is delivered, which ultimately leads to plugged fuel lines, filters, strainers, and worse, degraded burner nozzle performance.

### Taking on the Challenges

So what can we do to make a better product? Many industry observers understand that to compete with cleaner-burning technologies, government intervention is needed to help reduce the environmental impacts of available fuels by way of establishing legislation/mandates/incentives to use low-sulfur fuel and/or renewable fuel. The liquid-fuel industry will have to transition to selling lower-sulfur fuels, consider blending biodiesel into middle distillates, and, if they wish to truly compete, begin paying attention to what they are buying and find ways to protect the fuel prior to sale.

The big question on the minds of many marketers at the moment is: How will ultra-low-sulfur heating oil (ULSHO) impact the industry's challenges associated with heating oil systems? For example, the high levels of hydro treatment required to make ULSHO will have a significant impact on many chemical and physical properties of the fuel. These changes can subsequently affect field performance and result in end-user problems. Currently there is very little true ULSHO in the field; however, one should be able to anticipate the impact of potential changes based on experiences with ultra-low-sulfur diesel (ULSD) fuel.

There have been a great number of industry discussions regarding ULSD's potential role in causing corrosive activity and hardware failure in fuel dispensers. Industry leaders were quick to address these isolated incidents and formed a task force to explore the problem. To date, there have been no findings that clearly indicate cause and effect of those reported incidences. But one question remains: Should the oil-heat industry be concerned about ULSHO?

Our team of fuel blenders, manufacturers, and components developers have had discussions and pulled together several parameters that will change the fuel chemistries and the net effect downstream in both vehicles and tanks.

## Fuel Stability

One of the major contributors to a customer's fuel-related, "no-heat call" has been degradation material derived from unstable fuels. This situation occurs because the fuel itself contains material that readily degrades under the right circumstances. These degradation materials form particles and sludge that can plug filters, lines, and burner nozzles. Preventing fuel degradation is key to eliminating fuel-related, no-heat calls and goes a long way in extending the life-expectancy of a fuel storage tank.

For example, as a result of the desulphurization process for making ULSHO fuels, many of the potential degradation precursors are transformed to materials that are insensitive to traditional storage (oxidative) degradation. Thus sludge production is expected to be negligible (and great for the consumer, fuel merchant, and tank environment).

It is rare, however, that changes in the processing of fuel result in one simple phenomenon. It is well documented that heavily hydro-processed fuels readily generate aggressive free radicals that can form peroxides in the fuel. Upon achieving certain minimum levels, these peroxides easily attack and degrade fuel-system elastomeric seals and gaskets.

The same peroxides can initiate the premature degradation of biodiesel/heating oil blends, resulting in fuel instability, high acid content, and sludge formation. ULSHO, again by nature of desulphurization, does not have the natural peroxide inhibitors that would protect the consumer and tank from this phenomenon. Fortunately, properly formulated additives focus on this new problem and can protect against peroxide formation.

## Existing Sludge/ULSHO Solvency

The absence of newly formed degradation material should not imply that existing sludge will not be problematic. Both heating oil systems and diesel-fuel storage systems that have not been proactively protected may have years of built-up sludge. This buildup occurs over a long period of time and reaches a state of equilibrium. Part of this phenomenon is due to the solvency effect of high-sulfur fuels. The solvency of ULSHO can be markedly different from high-sulfur diesel or low-sulfur diesel, and may have a negative impact in mobilizing sludge. Agitation during the fill process and change in solvency may cause sludge to be "sloughed off" and can result in filter and strainer plugging and negatively impact nozzle and injector performance.

A mild dispersant may effectively control the rate and size of sludge particle removal. Dispersants function to gradually mobilize sludge and to keep sludge particles at a microscopic and filterable size so as not to have a detrimental impact on the fuel-delivery system. Many premium diesel and heating oil packages currently marketed by oil companies contain these components to aid the fuel dealer by way of offering a higher-quality product.

## Corrosion

As mentioned earlier, the petroleum industry is currently trying to determine the reasons why corrosion problems have increased so rapidly over the past few years. Multiple technical associations have formed groups to study the root cause and determine the appropriate path forward. It is only logical to assume that ULSHO, being made and handled in the same manner as ULSD, may have similar problems.

Some have postulated that it is the overuse of corrosion inhibitor additives in the fuel that is potentially causing the corrosion problem. However, others postulate that it may not be the presence of the corrosion inhibitor additive that is causing the corrosion but rather the lack of the corrosion inhibitor additive in the bulk fuel.

Specifically, corrosion inhibitors work by binding to bare metal surfaces to protect them from attack by corrosive contaminants. However, freely available metal contaminants in the bulk fuel can preferentially bind to molecules of the corrosion inhibitor while it is in the bulk fuel, forming what is termed as a "soap."

By definition, the process of forming soaps results in removing the corrosion inhibitor from the fuel and, as a result, removes ability of the corrosion inhibitor to provide protection to the metal surface. Keep in mind that the soaps would not have formed if it were not for the trace contaminants that some feel should not be in fuel in the first place. Regardless, the fuel will most likely need to be treated (with a properly formulated additive) to provide corrosion protection for the entire fuel-handling system, including the storage tanks.

## Microbial Issues

The growth of microorganisms in middle-distillate fuels is nothing new. What is new is their potential new home. ULSHO will, like ULSD, have numerous changes in chemical composition due to desulfurization. The changes in fuel composition may directly impact chemistries that were responsible for inhibiting growth of certain microorganisms. This is not unlike a weakened immune system that is vulnerable to infection.

Microbes will consume fuel for energy and growth while generating sludge and short-chain acids as by-products of their metabolic processes. These short-chain acids can cause not only corrosion problems in the tank (wetted surface) but, due to their volatility, they can also cause corrosion on metallic surfaces above the level of the fuel. ULSHO has no defense against these corrosion issues and may offer a more favorable environment for this to occur.

In a nutshell, microbial contamination can be minimized if tank owners establish and implement a proactive review of their storage

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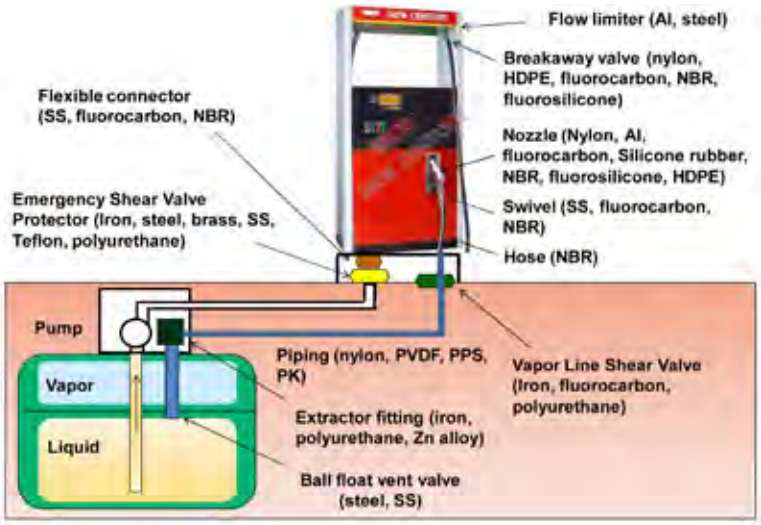
## BIOFUELS Happenings

# Oak Ridge National Lab Study Weighs in on Compatibility of Intermediate Ethanol Blends and the Fueling Infrastructure

A key provision of the Energy Independence and Security Act (EISA) of 2007 is the Renewable Fuel Standard (RFS), which requires the nation to use 36 billion gallons of renewable fuel in vehicles by 2022. Ethanol is the most widely used renewable fuel, and a significant portion of the 36-billion-gallon goal can be achieved by increasing the ethanol in gasoline to 15 percent. In March 2009, Growth Energy (a coalition of ethanol producers and supporters) requested a waiver from USEPA to allow the use of 15 percent ethanol in gasoline. This waiver has now been partially granted for car and light truck model years 2001 to the present.

In anticipation of the E15 waiver being granted, uncertainties arose as to whether additional fuel ethanol, such as E15 and E20, would be compatible with legacy and current materials used in standard gasoline-fueling hardware. The U.S. Department of Energy (DOE) recognized the need to assess the impact of intermediate blends of ethanol on the automotive fueling infrastructure. This research effort was led by the Oak Ridge National Laboratory (ORNL) and the National Renewable Energy Laboratory (NREL) in collaboration with Underwriters Laboratories.

In *LUSTLine* #66, we reported on the result of the NREL study *Dispensing Equipment Testing with Mid-Level Ethanol/Gasoline Test Fluid*. At the same time, ORNL was leading the effort to evaluate the impact of intermediate blends of ethanol on a large number of materials (i.e., metals, elastomers, plastics, sealants) representing those typically used in dispenser infrastructure. The results of these studies are now available in the report, *Intermediate Ethanol Blends Infrastructure Materials Compatibility Study: Elastomers, Metals, and Sealants* (*http://info.ornl.gov/sites/publications/files/Pub27766.pdf*). Additional work is under way at ORNL, and additional interpretation of the combined data from ORNL, NREL, and UL is expected in the near future.




*Schematic showing dispenser materials and components from the UST to the nozzle. (http://info.ornl.gov/sites/publications/files/Pub27766.pdf)*

### What Was Evaluated?

According to the report Executive Summary, material selection was based on a thorough investigation of dispenser materials by the ORNL materials research team. Team members contacted dispenser component and elastomer/seal manufacturers and received input from stakeholders, including UL, the Petroleum Equipment Institute (PEI), and the API members. The broad material classes that were identified for use in gasoline fuel dispensers include metals, elastomers, plastics, and sealants. ORNL tested for the metals, elastomers, and sealants only. During the time this report was being written, the plastic specimens were still undergoing compatibility exposures. A follow-up report discussing the plastic results will be issued upon completion of that portion of the study.

In this study, four test fuels were used to evaluate material compatibility. These formulations are based on test fuels described in SAE J1681, *Gasoline, Alcohol, and Diesel Fuel Surrogates for Materials Testing*. The fuel types used were Fuel C, CE10a, CE17a, and CE25a. Fuel C is a 50-50 mixture of toluene and isooctane and is representative of highly aromatic gasoline (>40% aromatics by volume). In order to simulate long-term exposure, the other test fuels contain a slightly soured, or "aggressive" ethanol solution added to Fuel C. See the study for the details.

### Results in a Nutshell

#### Metals

The study observed very little corrosion of any of the metallic coupons from exposure to Fuels C, CE10a, CE17a, or CE25a. Coupons exposed to the vapor phase above each solution exhibited slight discoloration in some cases (particularly the brass and bronze coupons), but no loss of mass was observed for any of the metals exposed in the vapor regions. In short, metals did not appear to be a problem.

#### Elastomers

All of the elastomer specimens that were exposed to the test fuels (including Fuel C) exhibited some level of volume swell. Ethanol was found to further increase the volume swell and produce softening. The level of swell is an indication of solubility, and for most elastomers tested, the highest level of swell occurred with either the CE10a or CE17a (not CE25a). This result suggests that the highest level of mutual solubility for elastomers occurs at relatively low levels of added ethanol. After drying for 20 hours at 60˚C, all of the samples, except the fluorocarbons, exhibited some level of shrinkage and mass loss. The details for elastomers are further refined in the report.

### Sealants

The results show that the standard sealant passed the ASTM D6396 criteria in Fuel C but did not pass following exposure to either CE10a or CE25a. However, when standard sealant was combined with Teflon tape, leaking did not occur. The results also show that the ethanol-resistant sealant product passed when tested with both CE10a and CE25a. Hence the standard sealants may not be compatible without the additional sealing provided by Teflon tape. The ethanol-resistant sealant product was successful at preventing leakage in CE25a according to the ASTM standard.

As noted in the report, the results of this study will be used to assist with the design and selection of materials to be used in future dispensers, possibly including retrofits. The experimental analysis of the plastic specimens will conclude this test series, and a final report summarizing these conclusions will be forthcoming.

## USEPA Grants E15 Fuel Waiver for Model Year 2001 – 2006 Cars and Light Trucks

In January, USEPA partially waived its limitation on selling gasoline that contains more than 10 percent ethanol for model year (MY) 2001 through 2006 passenger vehicles, including cars, SUVs, and light pickup trucks. The waiver applies to fuel that contains up to 15 percent ethanol—known as E15. The decision was made following a review of testing performed by the Department of Energy and other available data on the effect of E15 emissions from MY 2001 through 2006 cars and light trucks. Possible effects of E15 on the fuel storage infrastructure cannot legally be considered as a part of the waiver decision.

In October 2010, USEPA approved a waiver allowing the use of E15 for MY 2007 and newer cars and light trucks. At that time, USEPA denied a request to allow the use of E15 for MY 2000 and older vehicles and postponed its decision on the use of E15 in MY 2001 to 2006 cars and light trucks until DOE completed additional testing for those model years.

The Agency also announced that no waiver is being granted this year for E15 use in any motorcycles, heavy-duty vehicles, or non-road engines because current testing data does not support such a waiver. These waivers represent one of a number of actions that are needed from federal, state, and industry to commercialize E15 gasoline blends.

USEPA is also developing requirements to ensure that E15 is properly labeled at the gas pump. The label will be designed to prevent refueling into vehicles, engines, and equipment not currently approved for the higher ethanol blend. The Agency continues to review public comments for an E15 pump label to help ensure consumers use the correct fuel

Ethanol is an alcohol that can be mixed with gasoline to result in a cleaner-burning fuel. E15 is a blend of 15 percent ethanol and 85 percent gasoline. The primary source of ethanol is corn, but other grains or biomass sources, such as corncobs, cornstalks, and switchgrass, may be used. The Energy Independence and Security Act of 2007 mandated an increase in the overall volume of renewable fuels into the marketplace, reaching a 36-billion-gallon total in 2022.

Ethanol is considered a renewable fuel because it is produced from plant products or wastes and not from fossil fuels. Ethanol is blended with gasoline for use in most areas across the country. USEPA granted the waiver after considering the March 2009 E15 petition submitted by Growth Energy and 54 ethanol manufacturers. In April 2009, the Agency sought public comment on the petition and received about 78,000 comments.

The petition was submitted under a Clean Air Act provision that allows USEPA to waive the act's prohibition against the sale of a significantly altered fuel if the petitioner shows that the new fuel will not cause or contribute to the failure of engine and other emission-related parts that ensure compliance with emission standards. For more information, go to: *http://www.epa.gov/otaq/regs/fuels/additive/e15/*

## UL Retracts Position on E15 Dispensers

In February 2009, Underwriters Laboratories (UL) issued a statement which said "[UL]...announced today that it supports Authorities Having Jurisdiction (AHJs) who decide to permit legacy system dispensers, listed to UL 87 and currently installed in the market, to be used with fuel blends containing a maximum ethanol content of 15 percent." In December 2010, however, UL went back to its earlier position on E15 dispensers, saying that "in light of recent research published by the Department of Energy (DOE) and the National Renewable Energy Laboratory (NREL)," UL is confirming its previous position regarding the use of existing dispensing systems with greater than E10 ethanol blends.

UL now reasserts, "fuel dispensers certified under UL Standard 87 are certified for use with gasoline and ethanol blends up to E10 at a maximum. Research has shown that there are some issues with legacy equipment exposed to higher ethanol fuel blends. Of particular concern is the degradation of gaskets, seals, and hoses, which can occur when these elastomers are exposed to greater than E10 ethanol blends. Breakdown of these components can cause leaks."

In short, UL says, "In situations where E15 is to be dispensed, UL recommends the use of new, listed equipment designed and identified for use with mid-level blends. There are currently dispensing units on the market listed for use with blends up to E25 under UL Standard UL 87A-E25.

It notes that "determinations of fuel compatibility and warranty are made only by the manufacturer and users with questions about the compatibility of their pump should contact the manufacturer." *http://www.ul.com/global/eng/pages/offerings/industries/energy/alternative/flammableandcombustiblefluids/updates* ■

# Tanks Down East

*by W. David McCaskill*

*David McCaskill is a Senior Environmental Engineer with the Maine Department of Environmental Protection (MEDEP). "Tanks Down East" is an irregular feature of* LUSTLine. *David can be reached at David.Mccaskill@maine.gov. As always, we welcome your comments.*

# Kittery to Fort Kent

## An ARRA Pilgrimage Across Maine and the Lessons Learned

*The State of Maine is big enough to swallow up the five other New England states. (I know that doesn't mean much to many other states, especially those big western ones, but in New England, it's something to crow about.) So when given $1.4 million of American Recovery and Reinvestment Act (ARRA) monies to spend on UST/LUST work, those of us at the Maine Department of Environmental Protection (MEDEP) had to give careful thought to how we would best use this money throughout our vast state.*

*When we describe the length of our state we often use the phrase "Kittery to Fort Kent" (hence the title of this article). Kittery is one of our two big retail "outlet" towns. You'll find it at the southernmost end of the state, just after you cross the Piscataqua River, which separates Maine from its only U.S. neighbor, New Hampshire. Fort Kent is up in the northernmost Aroostook County, a small farming and community college town a stone's throw across the St. John River from the Canadian province of New Brunswick.*

*The truth is, we ended up selecting ARRA UST/LUST sites that covered the length and breadth of the state, except that we started in Elliot, which is just across I-95 from Kittery, and up north in the Crown of Maine we worked in the town of Grande Isle, just east and slightly up from Fort Kent. To stretch the projects out sideways we worked in the logging town of Patten on the western flank of the mile-high Mount Katahdin and across 'til our feet got wet in the lobster fishing port of Jonesport on the ragged edge of the sunrise County of Washington.*

*In this edition of "Tanks Downeast" I'm going to tell the tale of the MEDEP's ARRA pilgrimage up, down, and over Maine, the problems encountered, and the lessons learned.*

### The Strategy

Our site selection strategy was simple (or so we thought) and in keeping with our grand plan for this endeavor—spend the funds as locally as possible to clean up some knotty LUST/UST sites. We decided to focus on three areas of concern: a) out-of-service UST systems in groundwater-sensitive areas where the owners could no longer afford to operate or maintain their facility; b) the need for after-the-fact site closure assessments where USTs had already been removed; and c) removal of contaminated soil at three backlogged LUST remediation sites where the tanks were long gone but contamination remained.

Many of the ARRA tanks were at active facilities (or in the case of Grande Isle, a gas station turned residence) where the owners could no longer afford to operate the tanks, let alone remove them. These were classic cases of "if we don't remove them then no one will." In this article I will focus on just one of the 14 ARRA projects MEDEP carried out. This site, in the Town of Patten, had several attractive aspects, not to mention the benefits of lessons learned.

The advantage of remediating sites with out-of-service tanks is if they are located in a sensitive geological area and are removed with no plans to replace them, then our UST siting law prevents any future USTs from being installed at that site—no USTs, then no threat of future releases. For the purpose of a strict prohibition for installing a UST, a sensitive geological area is considered to be one that is within 300 feet from a private well, 1,000 feet from a community water supply well, or located over a mapped high-yield sand and gravel aquifer.

### The Thickened Plot

The subplot to this tale is that during the two years the ARRA projects were under way, MEDEP was beta testing its new petroleum cleanup standards, based on Massachusetts DEP Volatile Petroleum Hydrocarbon (VPH) and Extractable Petroleum Hydrocarbon (EPH) Methods. These methods break down volatile (gasoline) and extractable (middle distillates) to a list of constituents that have an individual health risk based on specific cleanup standard scenarios. Prior to this we used a composite method of Gasoline Range Organics (GRO) and Diesel Range Organics (DRO).

We were also retuning our use of the photo-ionization detector (PID) bag head-space method for volatile organic compounds (VOCs), including replacing the commonly used zip-lock plastic bags with aluminized bags to reduce errors owing to vapor loss. The PID screening methods also changed from using set points to using screening values for specific PID models, specific sample volumes, and cleanup levels. For diesel and fuel-oil soil screening we were trying out an oleophilic dye-shake field test. All these methods are in

use now and waiting to be formally incorporated into our standards. (See *http://www.maine.gov/dep/rwm/petroleum/index.htm*.)

All the sites we worked on were primarily gasoline and in groundwater-sensitive areas, so we used the leaching to groundwater scenario standard. Also, for comparison purposes, we tested for both GRO/DRO and VPH/EPH and tested for ethylene di-bromide (EDB).

## The Roadblocks

The major roadblock to using the ARRA funding for UST assessments and cleanups was cost recovery. Because these funds came through existing grants—the LUST grant, in particular—we were required to seek reimbursement for any funding spent. This made it difficult to find suitable sites for removing tanks and assessing and cleaning up any contaminated soils. This was a concern in many other states as well when the LUST ARRA guidance was rolled out. We limited our search to facilities that were in sensitive groundwater areas and to owners who could pass our existing financial test for nonreimbursement.

The other roadblock was making sure that our contracts were ARRA compliant and also acceptable to our Bureau of Purchases. The upshot to of all this was that a retainer contract was developed for UST installation/removal companies and for companies with direct-push soil-sampling rigs. Both contracts included contractors from the south, central, and northern parts of the state.

## The Patten Project

Of all the ARRA work we did during 2009 and 2010, the UST assessment, tank removal, and contaminated soil removal at the former Patten General Store was the best tale of all and was successful because of the fits and starts and lessons learned from our previous ARRA projects. Patten, Maine, was a once thriving logging and potato-growing town of around 1,100 near the north gate of Baxter State Park—the Northern Terminus of the Appalachian Trail. The Patten General Store was once a mecca for sportsmen to pick up hunting, camping, and fishing supplies before heading off to the park or into the north woods.

In 2010 the current owner finally let the property go for taxes, and the Town of Patten was stuck with a non-tax-producing environmental liability. Unlike the other ARRA UST assessments/removal projects involving failing businesses, the town was solvent. Since financial commitments were made before the site's eligibility status was fully clarified, the site was considered LUST Trust eligible. So the town did not have to pay for the assessment and remediation but did provide us with invaluable service throughout the project.

The Patten General Store had five abandoned single-walled, cathodically protected tanks and associated single-walled piping located less than 600 feet from one of the town's drinking water wells. The town has another well but it was not in service because of contamination concerns resulting from a failed home-brew biodiesel experiment carried out in the now burned-down building next door!

***We limited our search to facilities that were in sensitive groundwater areas and to owners who could pass our existing financial test for nonreimbursement.***

Since this project was basically a wellhead-protection project, we also decided to use monies of our own to replace the aboveground home heating oil tanks in the town's mapped wellhead protection zone. This endeavor involved replacing the tanks in most of the homes and businesses in the town. MEDEP responds to an average of one spill a day from residential aboveground home heating oil tanks. Spills from corroded tanks, leaking oil lines, and overfills cost the state between $1 million and $2 million a year.

Twelve years ago, Maine set up a program, carried out through our Groundwater Cleanup Fund, to proactively help replace home heating oil tanks and tanks in wellhead protection areas for towns and water districts. The replacement specifications that we use include double-walled tanks and many other requirements over and above the state requirements. We started this process with the town, working with the superintendent of the Patten Water Department, months before the ARRA UST assessment project started. He not only walked door to door with us to talk to folks about the tank replacement project, but was also extremely helpful during the UST assessment project, locating utilities, coordinating with the local Department of Transportation maintenance garage, the local electrical utility, and site security, and more.

## Tanks Away!

We used our ground-penetrating radar unit to locate the USTs and piping and clear locations for pre-removal soil sampling. In June 2010 we hired a company that we had used on other ARRA sites to sample the site with direct-push soil-sampling equipment. Findings from this work indicated that around 1,300 tons of soil needed to be excavated, primarily in front of the store under the dispensers. This information was used to bid the removal project out to our three prequalified tank installation/removal contractors.

The contractor selected was from central Maine and had done a job for us in 2009 at a Jonesport site. He is a very savvy and colorful businessman whom we have known for over 20 years and is a great negotiator for trucking, soil disposal, and all the little details that make for a successful cleanup. His bid price included sending the excavated contaminated soil to a secure special-waste landfill about two hours away from the site.

Our other option was to take the dirty dirt about 45 minutes away to a licensed asphalt batch plant, but the tipping fee was much higher. This, quite frankly, was a relief to us since our air-quality agency had an emissions issues history with this facility, which could have created an "uncomfortable" situation. In fact, the writing was on the wall that the thermodesorption option was on its way out unless facilities were willing to invest in advanced emission controls.

In July 2010 the tanks at the former Patten General Store came out, along with 1,300 tons of contaminated soil. We had sent out a

■ *continued on page 18*

## ■ Tanks Down East *from page 17*

press release to advertise the ARRA project, and three camera crews from the local television affiliates actually showed up. And something else showed up—three more small circa 1930s USTs and a chunk of contaminated soil under the building.

In October 2010 we came back to Patten for Phase II and, to the delight of most townspeople, tore the abandoned 70-year-old building down and sent the demolition debris to the same secure special-waste landfill where the dirty dirt went. The main section of the store came down around lunchtime. On that day, in that small rural town, everybody who was anybody was there to watch the biggest news since the building across the street burned down two years earlier. Everybody had a story about the old place, and it had its own stories to tell.

During the subsequent removal of an additional 1,500 tons of soil and the three surprise USTs, we found two old treasureless safes, a Model-T wheel with its rubber tire, a truck axle and wheels, and an intriguing selection of old liquor bottles.

### So Was This a Successful Project?

Were jobs created and lessons learned? The site has been cleaned up, which will facilitate the sale and redevelopment of the property. This and three other UST-assessment sites served as great testing grounds for our new cleanup standards and procedures. The general contractor, his environmental consultant, and the direct-push contractor got more work than they normally would, considering the economy. Most of the subcontractors were local, including the flaggers, truckers, backfill supplier, paving contractor, motel and inn owners, and the deli next door, where the whole project team ate everyday on and off for about two weeks. Finally, one can't put a price on protecting a town's drinking water supply.

Oh, by the way, at the end of the Patten Project we were the first state in New England and third in the nation to spend our LUST ARRA funds. ■


*#1. Phase 1 soil excavation at the "door yard" of Patten General store.*

*#2. Three surprise tanks are discovered underneath the store. This discovery leads to Phase 2 of the project.*

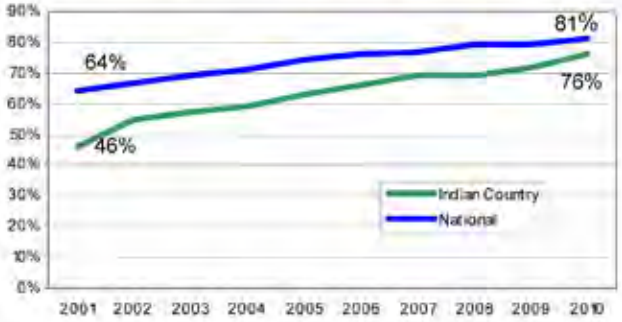
*#3. The store is demolished and Phase 2 soil removal begins.*


# TANKS ON TRIBAL LANDS

*USEPA is responsible for implementing the UST program in Indian country (IC). The primary objective of the 2005 EPA UST Tribal Strategy agreed on by the tribes and USEPA, was to strengthen relationships, communication, and collaboration—and this has indeed been the case* (http://www.epa.gov/oust/fedlaws/Tribal%20Strategy_080706r.pdf). *To increase the likelihood of successful implementation of the UST program, the tribes and USEPA work together in a strong partnership. For years, the significant operational compliance and cleanup completion rates in IC have lagged behind the national averages. However, this is changing. In both cases, there has been steady improvement in IC. In fact, the IC rates nearly equaled the national rates the end of FY2010 (September 20, 2010). (See Figures 1 and 2.) This article explores some of the recent successes in IC and identifies some of the factors.*


**FIGURE 1.**

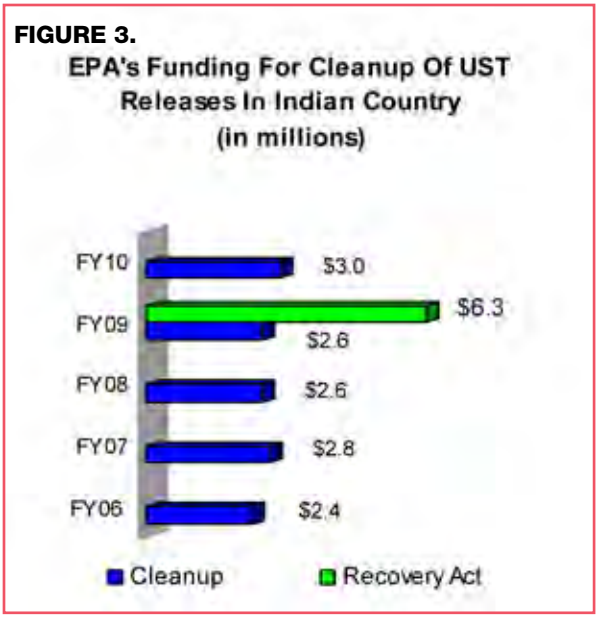

**FIGURE 2.**




## $6.3 Million of Recovery Act Money for Cleaning Up Tank Releases in Indian Country

IIn 2010, USEPA continued its work to cleanup sites in Indian country using an additional $6.3 million of 2009 Recovery Act funds (Figure 3). The money was allocated to existing USEPA cleanup contracts with Alaska Native and Native American firms. This one-time addition substantially increased USEPA's ability to assess and clean up LUST sites in Indian country by supporting work at 53 sites, benefiting 23 tribal communities. The following two stories are examples of projects carried out in Indian country. ■


**FIGURE 3.**




■ *continued on page 20*

■ **Tanks on Tribal Lands** *from page 19*

## Winnebago Tribe of Nebraska, Former Skelly Gas Station

USEPA Region 7's UST program worked in partnership with the Winnebago Tribe of Nebraska to use Recovery Act money to clean up the former Skelly Gas Station site. The Skelly Gas Station was abandoned in the 1960s. Work included assessing the site, removing USTs in conjunction with contaminated soil, and addressing petroleum vapor exposure that affected the Tribal Courthouse. The remediation activities have reduced the risk to human health and the environment from petroleum vapor and soil contamination, and improved the neighborhood environment for the nearby elderly community center and boys and girls club. This cleanup created several jobs on the reservation and will facilitate the reuse of this site for commercial purposes. ■

## Navajo Nation, Former Painted Desert Inn Gas Station

USEPA Region 9's UST program is working in partnership with the Navajo Nation Tribe to use Recovery Act money to clean up the former Painted Desert Inn Gas Station. This gas station originally operated two 10,000 gallon and two 2,000 gallon USTs, which were removed in August 1991. The remediation activities have been instrumental in helping determine the extent of soil and groundwater contamination. Navajo Nation plans to improve the drinking and wastewater system for the residents in the area and revitalize the site for potential commercial purposes. According to a 2004 survey, approximately 30 percent of Navajo Nation residents haul water because they do not have water piped to their homes. ■

*Remediation work at Navajo Nation, Arizona.*

## Status of Significant Operational Compliance at UST Facilities

Significant operational compliance (SOC) is a key element to preventing releases because it means that a facility has the equipment required by regulations and performs operation and maintenance to prevent and detect releases. SOC rates in Indian country have varied considerably from year to year, owing to the relatively small number of USTs. Between 2006 and 2010, SOC in Indian country has been on average about 8 percent below the national rate. However, at the end of FY2010, the gap was reduced to 1.6 percent, and for the first time, the SOC rate for Indian country exceeded the national goal of 66.5 percent. (See Figure 2.) Increased compliance assistance by USEPA staff and particularly tribal compliance assistance officers, who are often located closer to regulated facilities, play an invaluable role in educating owners and operators and thus promoting compliance. Furthermore, training for tribal environmental staff and UST owners and operators is important to helping maintain and improve SOC. ■

## Tribal Inspectors Authorized to Conduct Federal UST Inspections

Designating tribal inspectors as authorized representatives of USEPA to inspect USTs can help increase the geographic coverage and frequency of inspections in Indian country. It also helps enhance relationships and increase the capabilities of tribal inspectors. Since USEPA's commitment in 2006 to issue federal credentials for tribal inspectors, a total of six inspectors have received credentials; although only four currently hold credentials, a result of changes in tribal staff responsibilities and turnover. However, since the beginning of the new fiscal year on October 1, 2010, three additional tribal staff members have received federal credentials. In FY2010, these federally credentialed tribal inspectors contributed significantly to meeting the inspection requirements of the Energy Policy Act, having completed 63 inspections. USEPA anticipates that at least two additional tribal staff will receive federal credentials in FY2011. ■

## Strengthening Tribal and USEPA Communications over the Past Five Years

- Developed website *http://www.epa.gov/oust/tribes/*
- Developed website *http://www.epa.gov/oust/tribes/index.htm*
- Developed UST Program Directory *http://www.epa.gov/oust/pubs/ustindiancountrydirectory11-08.pdf*
- Held Annual Tribal-EPA Meetings in Albuquerque, NM (2007), Rapid City, SD (2008), Miami, FL (2009), and quarterly conference calls
- Increased tribal role in the National Tanks Conference
- Developed chat room *http://tech.groups.yahoo.com/group/Tribal_UST/ and http://groups.yahoo.com/group/Tribal- EPA_UST_Workgroup/*
- USEPA Administrator Jackson reaffirmed USEPA's 1984 Indian Policy on July 27, 2009. ■

# Field Notes

*from Robert N. Renkes, Executive Vice President, Petroleum Equipment Institute (PEI)*

## PEI Committee Developing UST Equipment System Testing Document

Release detection, release prevention, and overfill equipment is currently employed at underground storage tank (UST) facilities as required by local, state, and federal regulations. For this equipment to be operated effectively and safely, it must be maintained, inspected, and tested for proper operation on an ongoing basis.

To date, there has not been a document available to UST owners and/or regulators that provides information on the proper procedures related specifically to the verification and testing of spill, overfill, release detection, and secondary-containment equipment at UST facilities. The PEI Board of Directors thought that a single authoritative source of information would benefit not only the regulated community but also the equipment industry and UST regulators, so the board authorized the appointment of a committee to develop a recommended practice on the subject.

The committee has hit the ground running, meeting for the first time this January and again in March. Although the scope of the recommended practice may change as the committee proceeds with its work, the document is currently limited to facilities that are equipped with UST systems used for the storage of motor fuels, jet fuels, distillate fuel oils, residual fuel oils, lubricants, petroleum solvents and used oils. Equipment covered includes USTs, connected underground piping, underground ancillary equipment, and containment systems.

While it is important to consider the design and operational characteristics of an UST system when specifying overfill prevention and release prevention and detection equipment, the committee clearly will not provide guidance in the document to address the design, installation, or day-to-day operation of UST systems.

The committee intends to cover the testing and verification of all equipment used to prevent overfills, and prevent and detect releases to the environment. Although it's still early in the process and the committee has not completely finished its initial draft, chapters on the following subjects have been included:

- Dry and wet methods for testing the integrity of tank secondary-containment systems
- Testing the interstitial space of fiberglass and flexible/semi-rigid piping systems
- Hydrostatic and vacuum testing of single- and double-walled spill buckets
- Testing of sumps and under-dispenser-pan containment—this would include all containment sumps including, but not necessarily limited to, submersible sumps, piping sumps, vent riser sumps, and tank-top sumps
- Verification, inspection, and testing of overfill prevention valves (flapper valves), high-level alarms, and flow restrictors (ball float valves)
- Inspection and testing of automatic tank gauge (ATG) systems
- Testing of mechanical and electronic line-leak detectors
- Inspecting and testing of shear valves

Plans now call for the committee to be in a position to circulate a draft of the yet-to-be-named recommended practice sometime this fall to all interested parties. If you want a copy to review, write *rrenkes@pei.org* and I'll see that you get one. The committee should be able to review and act on the comments before the end of the year and publish a final document early in 2012.

The committee is made up of representatives from equipment suppliers, tank owners, release-prevention testers, industry-related associations, and the regulatory community (Paul Miller from USEPA's Office of Underground Storage tanks and Kevin Henderson from the Mississippi Department of Environmental Quality). A complete list of all committee members is available under the "About PEI" tab at *www.pei.org*. ■

## Latest Version of PEI's *Recommended Practices for Inspection and Maintenance of Motor Fuel Dispensing Equipment (PEI/RP500)* Now Available

The Petroleum Equipment Institute's *Recommended Practices for Inspection and Maintenance of Motor Fuel Dispensing Equipment* (PEI/RP500) has been updated and is now available. This new edition will be welcomed by regulators who permit petroleum marketers to dispense ethanol at blend levels higher than the dispenser's listing, provided that the dispensers are inspected on a regular basis. The reaction to the initial version of RP500 was very positive. This improved and updated edition builds on that fine document.

PEI's Fuel Dispensing Equipment Inspection and Maintenance Committee made over 35 changes to the document. Some of the more important changes address:

- Emergency stop switches
- Inspecting dispenser cabinets
- Procedures for taking nozzles out of service
- Methods for checking the integrity of hose
- Procedures for testing nozzles equipped with a mechanical interlock

■ *continued on page 22*

## Field Notes... continued from page 22

- Plumbing from the top of the shear valve
- Suction-pumping systems
- Warning users that the country's move to higher ethanol blends and lower amounts of sulfur in diesel may result in leaks or unusual operating conditions that may necessitate more frequent inspections than outlined in the document
- Determining that DEF is outside the scope of the recommended practice.

*Recommended Practices for Inspection and Maintenance of Motor Fuel Dispensing Equipment* (PEI/RP500) can be purchased at *www.pei.org/rp500*. Price is $40 for members; $95 for nonmembers. ■

# FAQs from the NWGLDE

***...All you ever wanted to know about leak detection, but were afraid to ask.***

## Adding Biodiesel Blends to NWGLDE Leak-Detection Equipment Listings

*In this LUSTLine FAQs from the National Work Group on Leak Detection Evaluations (NWGLDE), we discuss our policy for the addition of biodiesel blends to our leak-detection-equipment listings.* Note: *The views expressed in this column represent those of the work group and not necessarily those of any implementing agency.*

**Q.** ***Is the NWGLDE going to allow the addition of biodiesel blends to listings in accordance with the Biodiesel Industrial Advisory Panel report?***

**A.** The Biodiesel Industrial Advisory Panel (BIAP) report *Effects of Biodiesel Blends on Leak Detection for Underground Storage Tanks and Lines* dated August 2010 (amended January 2001), prepared by Ken Wilcox Associates, Inc. states that the ASTM D975 standard allows diesel fuel to include up to 5 percent biodiesel. In response, the work group added the following definition to the NWGLDE website glossary:

- **Diesel or Diesel Fuel:** Middle petroleum distillate fuel that may contain up to 5 percent biodiesel in accordance with ASTM standard D975.

As a result, all work group listings that are applicable for use with diesel are also acceptable for use with B5 biodiesel.

Based on the BIAP report, the work group implemented a policy that allows a leak-detection-equipment vendor to request that certain biodiesel blends meeting ASTM standards be added to listings without additional third-party evaluation, as follows:

- *ASTM D7647 Biodiesel B6–B20:* Acceptable for all current methods of leak detection, except an out-of-tank product detector (vapor phase)
- *ASTM D975 Biodiesel B100:* Acceptable for all current methods of leak detection, except an out-of-tank product detector (vapor phase), liquid sensors (dry interstitial space and out-of-tank), and all tracer methods

The BIAP Report also made a recommendation that certain leak-detection equipment should not require third-party evaluation prior to listing the equipment for biodiesel B21–B99. The NWGLDE did not agree with this recommendation, since the production of B21–B99 is not in accordance with an ASTM standard. Instead, B21–B99 blends are currently produced by blending ASTM D975 diesel and ASTM D6751 B100. Since the report was written, the BIAP has indicated that they are working with ASTM to develop a standard for B21–B99. Until such a standard is developed and implemented, the NWGLDE will only add this range of biodiesel to a listing if the leak-detection equipment was third-party evaluated using biodiesel blends in the B21–B99 range. Once the ASTM standard is completed, the NWGLDE will review the standard and may revise its policy.

The BIAP report discussed only biodiesel fuels produced using ASTM standards. Leak-detection-equipment manufacturers who request listing of a biodiesel fuel not produced in accordance with ASTM standards must submit a third-party evaluation using this fuel to the Work Group before consideration will be given to add the fuel to the NWGLDE listing.

Another recommendation by the BIAP report is that compatible materials be used in the manufacture of leak-detection equipment for use with biodiesel blends. Since protocols used to evaluate leak-detection equipment do not include material compatibility testing, the NWGLDE previously developed the following disclaimer to address material compatibility:

- Since long-term material compatibility with the product stored is not addressed in test procedures and evaluations, the NWGLDE makes no representations as to the compatibility of leak-detection equipment with the product stored.

Therefore, since the NWGLDE does not take into account material compatibility when considering requests to list leak-detection equipment. No changes will be made to leak-detection equipment-listings based upon this aspect of the BIAP report.

## FAQs... *continued from page 22*

Manufacturers of leak-detection equipment are encouraged to contact the appropriate members of the NWGLDE to request the addition of ASTM standard biodiesel blends to their current listings. Contact information can be found under *"Group Members"* and *"Team Members"* at *www.nwglde.org.*

A copy of the Biodiesel Industrial Advisory Panel (BIAP) report *Effects of Biodiesel Blends on Leak Detection for Underground Storage Tanks and Lines* can be found at *www.nwglde.org* under "Downloads." ■

### About the NWGLDE

The NWGLDE is an independent work group comprising ten members, including nine state and one USEPA member. This column provides answers to frequently asked questions (FAQs) the NWGLDE receives from regulators and people in the industry on leak detection. If you have questions for the group, please contact them at questions@nwglde.org.

### NWGLDE's Mission

- Review leak detection system evaluations to determine if each evaluation was performed in accordance with an acceptable leak detection test method protocol and ensure that the leak detection system meets EPA and/or other applicable regulatory performance standards.
- Review only draft and final leak detection test method protocols submitted to the work group by a peer review committee to ensure they meet equivalency standards stated in the U.S. EPA standard test procedures.
- Make the results of such reviews available to interested parties.

## ■ TQM and USTs *from page 10*

represent strictly pass/fail statistics. The data at this point do not indicate whether the leaks are liquid leaks at the tank bottom or vapor leaks from the tank top. Nor do the statistics indicate whether the failed tests for double-walled tanks merely resulted in a release to the interstitial space or to the environment. Ed tells me that many of these issues could be resolved by reviewing the tester's notes on the test, but that review would need to be done by a person familiar with the test protocols and the often-cryptic language that testers use to document their findings.

### So What's the Point of this Soapbox?

Simple. a) We need some hard data on what is wrong with our UST systems today, if we're ever going to learn how to make them better (i.e., more leakproof) in the future. b) If we really want the data, we need to enlist the help of those out there doing the work—the installers, testers, and third-party monitors who are seeing the warts in our UST systems in real time on a daily basis. I believe that many of these people would be happy to help, especially if there were funds available to pay for the time it will take to pore through their data bases and get the information that we really need to move our UST system population to the next level of integrity.

P.S. I'm planning on spending some more time with Ed's data to see what's there and describing my findings in the next issue of *LUSTLine*. ■

## ■ Fuel and Tank Disconnect *from page 13*

system every quarter. Keeping tanks water free, incorporating a desiccant dryer on the vent alarm, and managing the water content by immediately removing it to avoid that "perfect storm" when water and temperature combine to manifest microbial contamination. This is in fact the one place where tank owners can lend a helping hand to their fuel supplier and make a big difference in both fuel performance and storage tank longevity.

### What Next?

My goal in writing this article was to help the reader look beyond the tank system to the entire fuel-supply chain and understand that no matter what happens in that fuel tank, whether good or bad, it is still a direct result of its entire life cycle. A short summary would suggest that all parties involved in the fuel-distribution business work collegially to establish an easy-to-follow road map for quality fuel preservation from upstream to downstream. Open communication will be required if we are to minimize fuel-quality issues that have compromised performance both under the hood and inside the tank system. ■

*Paul Nazzaro is President of Advanced Fuel Solutions, Inc. He can be reached at paulsr@yourfuelsolution.com,* www.yourfuelsolution.com *A special thanks to Ed English at Fuel Quality Services, Inc. for his much-appreciated input in preparing this article.*

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# OUST UPDATE

## LUST Corrective Action Compendium Now Available

The USEPA Office of Underground Storage Tanks (OUST) LUST Corrective Action Compendium is now available at *www.epa.gov/oust/lust/intro.html*. The Compendium is a clearinghouse that presents concepts and addresses issues associated with corrective action at LUST sites. It provides valuable information and links to resources for all aspects of the LUST remediation process.

The Compendium is divided into six sections, beginning with an overview of the LUST corrective action process. It then discusses each of the steps in the process—release discovery, confirmation, and initial response; characterization of the source and site; physical site assessment; corrective action; and site closure.

The information is intended for the use of federal, state, and tribal LUST remediation specialists, but other stakeholders will find it a valuable resource as well. A work group made up of UST stakeholders from states, tribes, USEPA, and the private sector developed the Compendium. ■

## New UST Flood Guide Available

USEPA's new *Underground Storage Tank Flood Guide*, EPA 510-R-10-002, is available on OUST's website at *www.epa.gov/oust/pubs/ustfloodguide.htm*. The guide presents useful information and guidelines for state, local, and tribal authorities in the event of a threatened or actual flood. It will help authorities prepare for, prevent, or lessen the catastrophic effects and environmental harm that could occur as a result of flooded UST systems, as well as aid the return of these UST systems to service as soon as possible. It includes information about preparing for a flood, important actions after the disaster strikes, and financial assistance. It consolidates information from various federal, state, nongovernmental, and UST industry resources. ■

## Online Insurance Resource for UST Owner/Operators Updated

OUST recently updated its *List Of Known Insurance Providers For Underground Storage Tank Owners And Operators*. The publication is available on OUST's website at *www.epa.gov/swerust1/pubs/inslist.htm*. It contains a list of insurance providers who may be able to help UST owners and operators comply with financial responsibility requirements by providing a suitable insurance mechanism. ■