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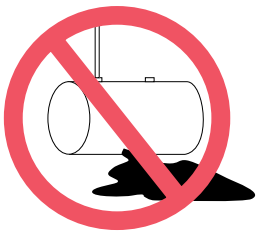
L.U.S.T.LINE

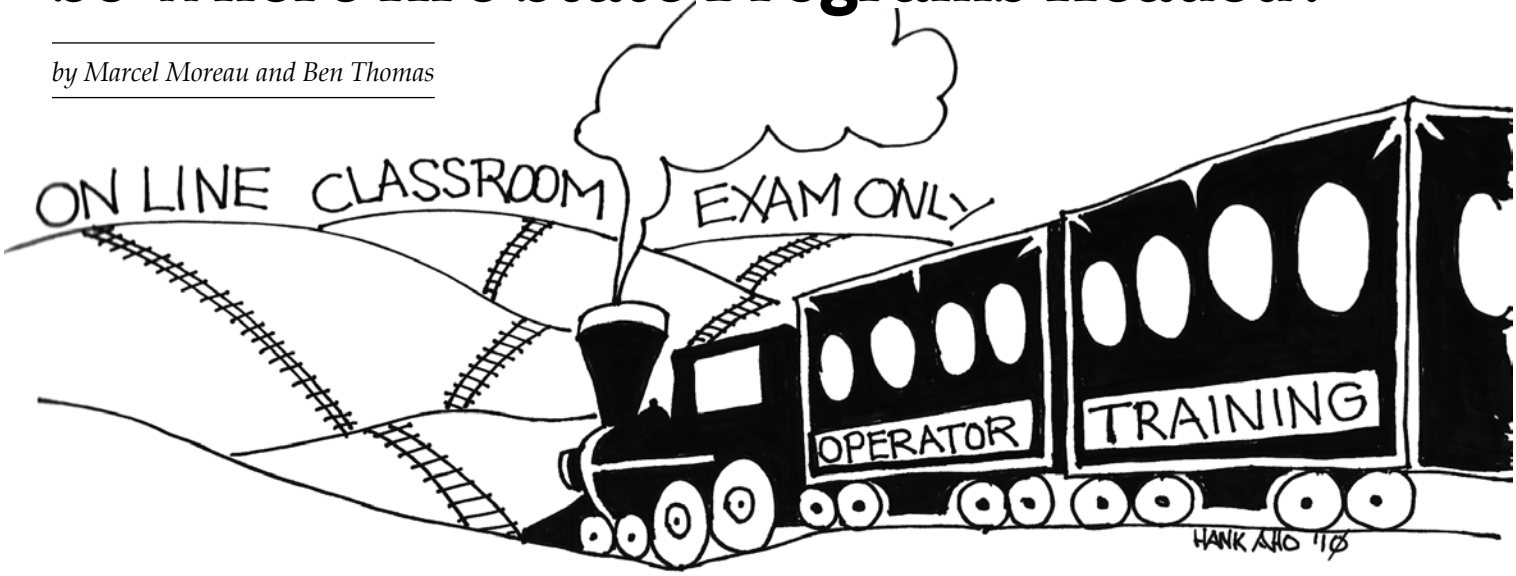


A Report On Federal & State Programs To Control Leaking Underground Storage Tanks

Operator Training Has Left the Station...

So Where Are State Programs Headed?

by Marcel Moreau and Ben Thomas



UST OPERATOR TRAINING: *Will it radically improve our UST compliance rates, or will it be another add-on regulation that regulators and UST owners must endure? The crystal ball is still fuzzy and we're not making any predictions, but we thought it might be useful to review some of the diverse approaches that states are taking toward implementing the operator training requirements of the 2005 Energy Act.*

As we write, the deadline for training UST operators in Oregon and California passed some five years ago, and Colorado has had a training requirement in place for a few months. New Mexico is beginning to implement its operator-training requirement this year. A few states like Louisiana have a deadline of 90 days after the next upcoming compliance inspection, and Minnesota deadlines will be driven by area code (novel but painful for large operators). Most other states, as far as we can determine, are aiming for a training deadline of August 8, 2012, the deadline set in the Energy Policy Act of 2005 (EPAct). A number of states have training mechanisms or at least training plans already in place in anticipation of the 2012 deadline; however, it looks like a few states may not meet the deadline.

■ *continued on page 2*

Inside

■ Operator Training Programs

from page 1

The focus of state programs is to establish training mechanisms for what the EPAct defines as Class A and Class B operators. Class A operators can be loosely defined as "owners" and Class B operators can be loosely defined as "facility managers." The EPAct also establishes a Class C operator that can be loosely defined as "clerk." (See USEPA's guidance document on operator training for the official definitions of these operator classifications at *www.epa.gov/oust/fedlaws/otgg_final080807.pdf*.)

Because of the large overlap in Class A and Class B operator knowledge and the relatively small number of people who are strictly Class A operators, a number of states are providing for a combination Class A/B operator. Class C operators can be trained by Class A and B operators, so states are not focusing on establishing programs to directly train this class of operator, but several private-sector training providers are promoting training specifically for Class C personnel.

In this article we will focus specifically on the approaches that states are taking toward setting up Class A and Class B (or combined Class A/B) training programs.

At present we have identified four kinds of approaches to accomplishing Class A and B operator training:

- State-funded internet-based
- State-funded classroom
- Free-market, operator-funded
- Examination only, operator-funded.

Links to State Internet-Based Training Programs

MONTANA
TankHelper2 – *https://app.mt.gov/tank2/*

OKLAHOMA
Operator Training – *http://www.occeweb.com/operatortraining*

MAINE
TankSmart – *http://www.maine.gov/dep/rwm/ust/tanksmartonlineservice.htm*

SOUTH CAROLINA
UST Training System –
http://www.scdhec.gov/environment/lwm/UST_Training/Default.aspx

State-Funded, Internet-Based Training

MONTANA

In 2005, the Montana Department of Environmental Quality (MDEQ) unveiled a state-sponsored UST operator-training program that was 100 percent web-based and interactive. The Montana program, known as TankHelper, is being replicated in various ways in several states, including Idaho, Maine, and Kentucky.

Prominent features of the Montana TankHelper program include:

- The TankHelper program links to the Montana UST database so the training information presented to the operator is facility-specific. For example, if a facility is all fiberglass, uses an ATG for tank leak detection, and has safe-suction piping, then these topics are presented and all other methods of corrosion protection and leak detection are ignored. This approach to training requires an accurate database but has huge advantages in that it presents only information that the UST operator needs to know. This suits the great majority of UST operators who just want to meet the regulations and are not interested in becoming all-around experts in UST management. It also eliminates the problem faced by many operators who do not know what kind of tanks, pumps, or leak-detection method they have and emerge overwhelmed and confused from a training course that covers all the possible variations of UST systems.
- At the end of the training, the operator is presented with a facility-specific compliance plan. The plan describes the operational and leak-detection requirements for each facility in a concise format so operators have a complete listing of exactly what they must do to be in compliance at their facility.
- The program is funded entirely by the state and is available free to the operator.
- The MDEQ maintains complete control over the program.

The original version of TankHelper was silent. Users would log onto the website, select a facility, read a series of screens, and then take a quiz to evaluate their understanding of their UST site. In 2009, MDEQ unveiled Version 2 of TankHelper, which provides the operator with a video and audio presentation of the training material and requires very little reading. For those who pass the final exam with an 80 percent score or higher, the State of Montana issues a Class A/B certificate of completion.

L.U.S.T.Line

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MAINE

Maine has developed a program very similar to the original version of Montana's TankHelper; it goes by the name of TankSmart. The Maine program also links to the UST database so that facility-specific information can be presented. The student reads screens and then takes an exam. In addition to the web-based program, the Maine program includes a downloadable manual that can be printed for future reference by the UST operator or provided upon request by the DEP via mail to operators who do not have convenient computer access. While the Maine training is facility specific, the TankSmart program does not produce a facility-specific compliance plan. TankSmart provides a combined Class A/B certificate to UST operators who successfully pass the exam. TankSmart is funded by the State of Maine and is provided free of charge to UST operators.

SOUTH CAROLINA

South Carolina has a hybrid web-based training program that provides a library of downloadable PDF documents on the various aspects of UST systems. The student selects, downloads, and reviews the lessons, then returns to the web to take an online exam. The program allows the user to download only the lessons they need; the state assumes you know which lessons apply (a big assumption). South Carolina has also combined the A/B training. South Carolina, like California, expects operators to know their stuff afterward and now requires a monthly inspection form be completed. The program is free but must be completed by August 11, 2011. (We assume the site will remain in business after the deadline for new and replacement operators.) Users who successfully complete the program are issued a certificate.

OKLAHOMA

Oklahoma has developed an online PowerPoint-like show as its UST operator-training mechanism. The program is self-guided, generic (i.e., not site-specific), and silent and includes a short quiz after each training category. The trainee is prompted to print a certificate after each category is reviewed and each category exam is passed.

IDAHO

Idaho has developed a program similar in format to the Montana TankHelper program in that it links to the UST database and provides facility-specific information and a facility-specific management plan. The Idaho approach has a unique teaching method. Instead of having the UST operator go to the web to learn the information, an Idaho UST inspector delivers the training on a laptop computer as part of the facility inspection process. The inspector also prints out the management plan and provides a binder in which to store the plan and the required recordkeeping paperwork. A certificate is printed for operators who pass the associated quiz.

The goal is to raise the bar on UST-operator knowledge. A training program that does little more than review material that UST operators already know will only serve to bless the status quo and not produce the desired improvements in UST management.

KENTUCKY

The Kentucky Division of Waste Management is creating an online operator-training program, modeled closely on the Montana TankHelper program, called TOOLS (Tank Operator Online Learning System.) This program is still under development, but the plan is to include a series of PowerPoint-based lessons with audio narration. The program will provide facility-specific training based on information contained in the state UST database and a facility-specific compliance management plan. Operators who successfully complete the exam will receive a combination Class A/B certificate that includes a listing of the lessons taken.

The TOOLS program will provide the names of certified operators and the UST facility(ies) with which they are associated to the Kentucky UST database so that compliance with the UST-operator requirements can be easily tracked. UST owners will also be able to go online and assign or remove UST operators from UST facilities as personnel change over time.

State-Funded Classroom Training

KANSAS

Since 2007, the Kansas Department of Health and Environment has contracted with the Petroleum Marketers & Convenience Store Association of Kansas to provide live UST-operator classes at various locations across the state. The classes are presented free of charge to the UST operators. The association promotes the classes, registers UST operators, and provides instructors for the classes. Class A/B certificates are provided to attendees. Kansas plans to continue to fund these live classes for at least the next few years. In order to obtain an UST operating permit in 2012, operators will need to prove that they have attended an UST-operator class.

LOUISIANA

The Louisiana Department of Environmental Quality has adopted an operator training approach that is nearly identical to the Kansas model.

U.S. VIRGIN ISLANDS

The Virgin Islands (VI) Department of Planning and Natural Resources, using federal funding, decided to act quickly and offer free classroom training to the island's UST-facility owners (about 60). Training was completed in early May 2010, before the UST-training rules were finalized. With such a small population of owners, VI should be able to reach all operators with not too much effort. It remains unclear what VI will do after the presumed 2012 deadline.

Free Market, Operator-Funded Training

In our classification system, "free market" states are ones where the state agency is approving or authorizing private-sector training vendors to provide training for a fee to

■ *continued on page 4*

■ Operator Training Programs

from page 3

UST operators. Usually, training can be provided through a variety of venues, including traditional classroom, webinars (where an instructor is present at specific times to teach the class via the Internet), and online (where a course is available anytime the student wishes to take it). Many states appear to be pursuing this type of operator-training approach. Only a few representative examples are described here.

OREGON

With a deadline of March 2004, Oregon was the first state to require UST operator training. (See LL #58, "Operator Training—The Oregon Experience;" LL #47, "Mandatory Training for UST Operators.") Oregon took the approach of having the private sector run the operator-training program. The state merely authorizes trainers to provide the training. Operators have a number of private training providers from which to choose. To date, only live classes have been offered. The number, location, and cost of the classes offered is entirely up to the training providers, who provide a certificate to the attendees. The state provides little oversight to monitor the quality of the training.

Oregon also allows operators to use the International Code Council (ICC) UST operator exam to meet the state requirements. The ICC provides a list of reference documents to prepare for the exam but does not provide any actual training. As far as we can tell, live training classes have proven to be much more popular among UST operators than the ICC exam.

COLORADO

Colorado's operator-training deadline was January 1, 2010. The state encouraged the free-market approach and approved a variety of classroom, internet-based, and examination options. Several vendors were approved to provide classroom training, concluding with an examination; one vendor was approved to provide training in a webinar format with an online exam. Colorado is also accepting the ICC UST operator exam. As might be expected, most of the training activity took place in the two months immediately prior to the regulatory deadline. A number of UST consulting firms started a Colorado market for third-party Class A/B operators, where the owner on record outsources the training and monthly/annual inspections.

NEW MEXICO

Like Colorado, New Mexico is approving private sector vendors to provide training in a variety of formats. The state has chosen to stagger the training deadlines between now and 2012. Owners of 12 or more UST facilities must have their operators trained this year. Owners of between three and eleven facilities must meet a 2011 deadline. Operators of one or two facilities have until 2012. New Mexico is also requiring training for aboveground storage tank operators.

Examination-Only, Operator-Funded Training

In our classification system, "Exam-only" states are ones where the emphasis is placed on passing a required exam, and the prospective UST operator is left to fend for himself in terms of learning the information needed to pass the exam. To date, states adopting this approach are using the UST-operator exam developed by the ICC.

CALIFORNIA

California's UST-operator certification deadline was January 1, 2005, which became effective prior to the passage of the Energy Policy Act. The California strategy requires that each UST facility have a designated operator (DO). The DO must conduct a monthly inspection of the UST facility(ies) for which they are responsible, and provide basic leak-detection and alarm response training to onsite personnel. Private-sector vendors are providing live classes to assist prospective DOs in preparing for the ICC examination. These classes are not subject to any state-approval process. A substantial number of California UST owners have outsourced their DO responsibilities to third-party service providers.

WYOMING

Wyoming also limits operator-certification mechanisms to the national- and state-specific ICC UST operator examinations. The Wyoming DEQ initially provided a number of free seminars to prepare prospective operators for the exams. Future exam preparation will be handled, for the most part, by private-sector providers.

How Will We Measure Success?

So as most states (and hopefully UST owners and operators) begin to ramp up activities for the 2012 operator-training deadline, we think this is a good time to ask, "How will the success of operator training be measured?" All too often, regulators measure success by the mere fact that a required program exists. While the existence of a program is no doubt a significant achievement, the purpose of the EPAct was not to increase bureaucracy.

So how will the states measure the success of their UST operator-training programs? Will it be measured by the number of certificates issued? By the number of people who take the various courses? By the increase in reports of suspected or confirmed releases? By increases in the rates of significant operational compliance? While any of these measures is feasible, it seems to us that the goal of UST operator training is to increase compliance with UST regulatory requirements. If this is correct, then the success of a program might be measured by increases in the percentage of facilities found to be in compliance with UST requirements.

OUST has been tracking rates of regulatory compliance as reported by states since 2002. To satisfy our curiosity, we plotted the percentage of UST facilities in compliance with release-detection and release-prevention requirements for several states: Oregon, California, Kansas, and Colorado (see Figures 1a, 1b).

Oregon's UST operator training requirements went into effect on March of 2004. California's program took effect on January 1, 2005. Kansas has been doing some training since 2008, but this is in advance of the Kansas deadline, so it is not clear how

FIGURE 1a

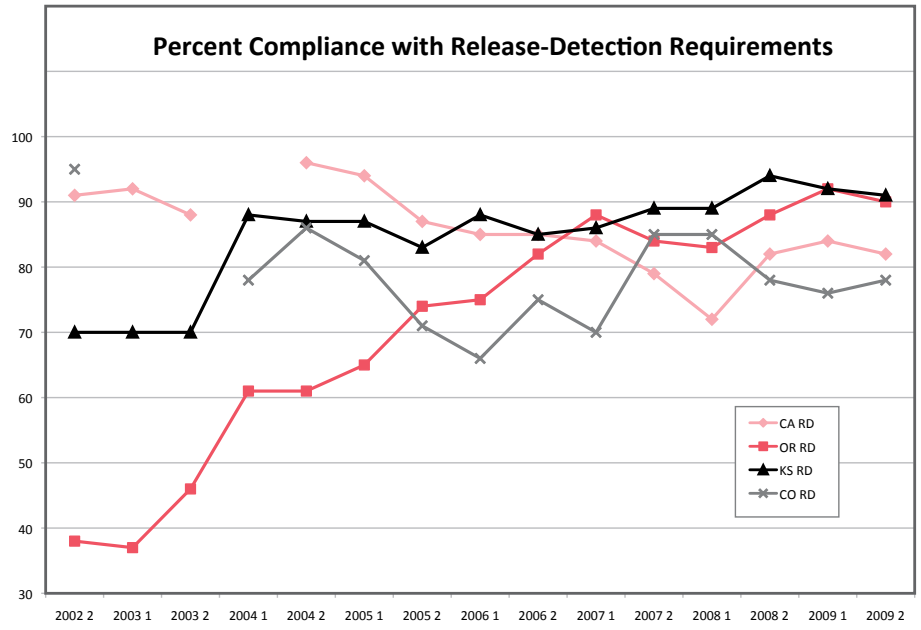
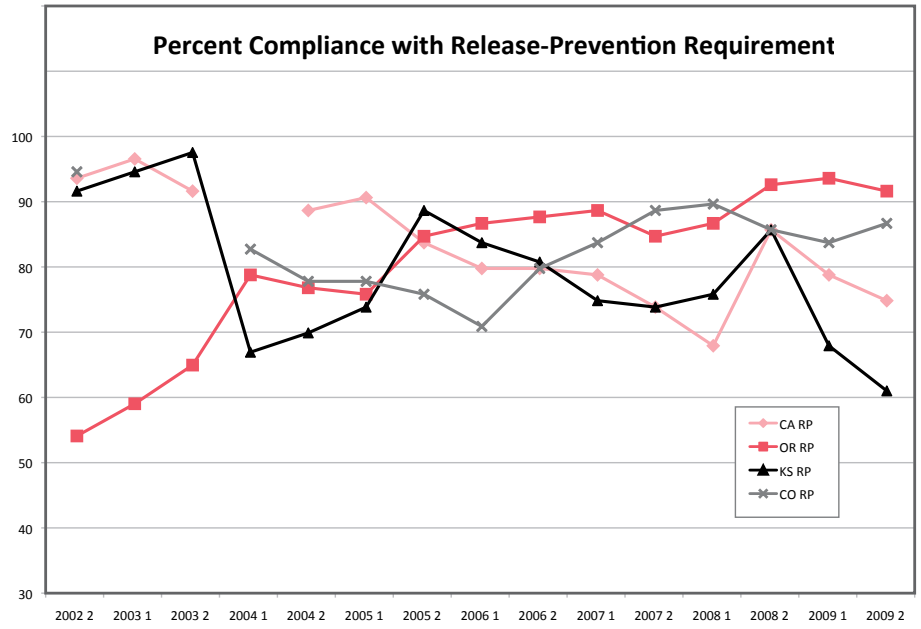


FIGURE 1b



large a portion of the Kansas UST operator population has been trained to date. Colorado's program went into effect on January 1 of this year, so it is clearly too early to see any effects of this training in the data.

From the Figure 1a and 1b graphs, it would appear that Oregon's rate of compliance with both release-detection and release-prevention measures has been increasing since the operator-training requirements went into effect, with a substantial jump in compliance coincident with the implementation of the program in March of 2004. The California trend is not so rosy; the compliance rates appear to have held steady or even declined slightly since 2005. The Kansas and Colorado compliance rates seem more or less the same over the years presented in the graphs.

There is considerable variability in most of the state data, so we need to be careful when reaching conclusions, but the Oregon data indicate that there may be some hope that operator training can result in improved compliance. The California data point out that the success of operator training may be elusive, or that measuring success may be more complex than just monitoring reported compliance rates.

Operative Words—Enforcement! Training!

The premise for including UST operator-training requirements in the EPAct was that compliance with UST requirements was lagging. The remedies prescribed for this problem were increased inspection frequency (hopefully accompanied by increased enforcement via red-tag authority) and increased operator knowledge of the regulations via training. There is no question in our minds that without effective enforcement, the operator-training requirements will not bear the desired fruit.

It is also clear to us that the purpose of training is to increase knowledge. The goal is to raise the bar on UST-operator knowledge. A training program that does little more than review material that UST operators already know will only serve to bless the status quo and not produce the desired improvements in UST management. As state agencies that are adopting the "free market" approach review the course materials presented to them by vendors for approval, they would do well to keep this in mind. Examinations should be structured so that if UST operators were to simply take the exam without any preparation, a large percentage of them would fail. If the training is effective, then most UST operators will pass the exam only after they have taken the training. ■

NOTE: *If your state is doing something you think is special with regards to operator training, let* LUSTLine *Editor Ellen Frye know, and maybe it can be covered in a future issue.*

Marcel Moreau is a nationally recognized petroleum-storage specialist whose column Tank-nically Speaking is a regular feature of LUSTLine. *He can be reached at marcel.moreau@juno.com. Ben Thomas was one of the first UST-operator trainers in Oregon and continues to provide operator-training services across the U.S. He can be reached at bthomas@whidbey.com. Marcel and Ben are partners in Petroleum Training Solutions, developing online operator-training courses for all levels of UST operators.*

Transition

What's in Store for Tanks and Tank Programs Over the Next Decade?—Part 2

by Ellen Frye

As we enter the second decade of this millennium, it seems as good a time as any to take a peek into ye olde crystal ball in an attempt to fathom what is clearly a transition into that great unknown looming on the fuel-storage-tank horizon, so that we can be prepared to be prepared.

Part 1 of this exercise appeared in LUSTLine *#64, March 2010. As with Part 1, Part 2 has taken the form of a series of questions formulated by a small group of industry and regulatory aficionados, including Patricia Ellis, Delaware NREC; Kevin Henderson, Mississippi DEQ; Richard Speise, Vermont DEC; Hal White, USEPA OUST; Carol Eighmey, Missouri PSTIF; Marcel Moreau, and Curt Johnson, Alabama DEM. We have asked the questions and provided reasons for the questions, but we have not necessarily attempted to provide answers… maybe just some speculation. We welcome your thoughts and questions.*

Just Wondering

? Will regulators ever have a standardized terminology and protocol for evaluating UST systems test-data?

Regulators continue to face many, many challenges but one of the things they can't lose focus on is the need to make sure that the progress made over the past 20 years isn't tossed out the window. A big part of the UST regulator's job is to review facility records for various required tests (e.g., cathodic protection, line leak detectors, tank tightness) to ensure that various operational systems are functioning as required.

As we look ahead at the next decade, we must ask ourselves: Is it the role of the regulator to control the quality of this testing? Or, is the role of the regulator simply to ensure that the testing gets done? If a test is not done correctly, is it of any value?

More frequent inspections and stronger enforcement tools will help ensure that more of the testing and monitoring required in the rules actually gets done. But this does not necessarily mean that testing is being performed correctly. Unfortunately, it seems as though testing, in general, is actually becoming worse as economic pressures drive things to be done quicker and cheaper.

Regulators can't, nor should they, rely on the owner/operator to ensure that the testing is performed correctly. Even with Class A or B certification, operators typically don't know an automatic line-leak-detector test that has been done correctly from one that has not. Unfortunately, they often pay the same amount of money in either case.

Regulators have traditionally relied on a simple "pass/fail" approach to reviewing testing records. If the person who conducted the test indicates that it passed, the regulators have accepted this as gospel. This approach has serious drawbacks—regulators need to be able to review the test records and determine for themselves whether or not the test was done correctly (the trust-but-verify doctrine of the Cold War). The only way to be able to do this is to mandate that test records document certain information. Standardized forms accomplish this, and training the inspectors is the first step.

? As interstitial monitoring becomes the norm instead of the exception, will there be enough new leak-detection technologies to generate sufficient leak-detection evaluations and protocols to justify the continued existence of the National Work Group on Leak Detection Evaluations (NWGLDE)?

Since pressure/vacuum systems came out five or six years ago, there has not really been anything new in interstitial monitoring to hit the market. The methods seem to be too simple to justify any new technologies. All the issues currently being addressed by the NWGLDE have to do with whether or not traditional systems are working with alternative fuels. Also, there seems to be little incentive to come up with new leak-detection technologies for single-walled tank systems, since this tank population will continue to decline in the next decade.

"The people who review the facility compliance records must be able to recognize suspect test documents. These can then be referred to the person or persons within the regulatory organization who have the expertise to effectively critique the test data. Not necessarily to declare it as bogus but to at least raise the right questions so that the person conducting the test understands that there is someone who is scrutinizing their work. If they understand that there is someone with authority looking with a critical eye, they are much more likely to perform the testing correctly.

"In my experience, most people want to do the right thing. For various reasons, they just don't know what that is. If there is not someone who knows what is really going on, then they have no impetus to learn themselves."

KEVIN HENDERSON
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY

Now that we have red-tag authority to lock out tanks that are not in compliance, will compliance rates go up for UST systems? Fewer leaks? And how many leaks are occurring from compliant USTs?

In the past, the enforcement process could take months, or even years. Now, thanks to our red-tag authority, we can stop owners and operators from making money from continued use of out-of-compliance tanks. (See Figure 1.) It would be nice if we had some sort of equivalent for LUST non-compliance, but often, tanks are gone and there isn't anything to tag, so we have to go through the old enforcement process with warning letters, Notice of Violation, Secretary's Order, penalty orders, and threats to take over investigation and cleanup and then cost-recover. Maybe we just need big signs to post on out-of-compliance LUST properties, stating that violations are threatening public health, safety, and the environment (and a big fine for removing the signs).

FIGURE 1. *Red tag on fill pipe in Delaware.*

What is a "green" gas station, and will we ever get there?

There is a lot that gas stations can do to improve their impact on the environment and serve as public showcases for all kinds of best management practices, such as controlling storm water and roof runoff, recycling water from car washes, reducing air-pollutant emissions, using electricity generated by power sources like solar panels and wind turbines, where feasible, and using building components made of recycled materials. They can become "transportation service centers," where they not only pump gasoline/biofuels into auto fuel tanks, they also service electric cars, bikes, and motorcycles and other transport modes such as bicycles, pedal cars, and even weary walkers.

But wait. If "green" means something that's environmentally friendly, what's the greenest imperative at any gas station? Wouldn't that be preventing any and all vapor emissions, fuel and oil spills and overfills, and UST system releases? Wouldn't that mean a zero tolerance for releases? A release is an expensive proposition and it's bad for the environment.

Since gas stations are primarily owned by smaller entities, is green just too expensive to hope for? Larger companies might do this, but might it be too expensive for the little mom-and-pops? In ten years will we finally realize that spilling bad stuff into the environment is too expensive?

Will we be conducting "greener" cleanups, using "sustainable" remediation techniques?

The SURF "Sustainable Remediation White Paper" (see box on page 8) broadly defines sustainable remediation as "a remedy or combination of remedies whose net benefit on human health and the environment is maximized through the judicious use of limited resources."

Remediation decisions often have a triple bottom line—environmental, economic, and social interests. The rush to remediation is often encouraged by regulatory policy, regulatory culture, statutes, public pressure, and often the unwillingness of all parties to recognize the limitations of their own approaches. As a result, repeated attempts at source remediation are not uncommon—each requiring additional resources and energy and each having additional negative environmental consequences without achieving the treatment objectives.

For more information about green remediation, go to *http://www.epa.gov/oswer/greencleanups/index.html*, a USEPA resource for learning about greening cleanups. The goal for the site is to communicate with stakeholders about initiatives related to greener cleanups, lessons learned, success stories and updates on current developments and upcoming events.

Will we ever agree on how much LNAPL we can leave behind?

Regarding light nonaqueous-phase liquid (LNAPL), federal rule 40 CFR 280.64 (1988) states "remove free product to the maximum extent practicable as determined by the implementing agency…." Federal statute, state statutes/regulations, policies, and guidance documents range from:

- Remove all detectable levels of LNAPL at all sites.
- A defined measurable amount (0.01 ft.-1/8 in.) may remain.
- Guidelines are risk-based/site-specific.
- Less stringent cleanups are allowed, based on an evolving understanding of LNAPL behavior (in many cases without formally adopting related rule or policy changes).

■ *continued on page 8*

■ **Transition** *from page 7*

Many of these rules were developed prior to the current state of knowledge. Regulations generally don't consider the fact that LNAPL is potentially mobile only if the saturation exceeds residual saturation. After LNAPL releases are abated, LNAPL bodies reach a stable configuration, generally within a short period of time. Regulators and cleanup consultants need to assess the stability of dissolved plumes to establish whether they are stable.

At some point, LNAPL ceases to be mobile and is just a residual. Depending on composition, it may or may not be contributing to a plume of groundwater contamination. Opposing philosophies maintain that since we have many new technologies that we didn't have early on, we should be able to get more of the LNAPL out of the ground than we could before. But the question remains that if there is no risk-based reason to remove it, why go to the expense of doing it?

See *LUSTLine* #64, "The Top 10 LNAPL Myths," and also go to:

- *http://www.api.org/ehs/groundwater/lnapl/index.cfm*
- *http://www.itrcweb.org/teampublic_LNAPLs.asp*

? Will longer dissolved plumes associated with ethanol/gasoline fuel releases cause additional problems, or have we done better or enough to reduce release rates to offset additional risk?

Only time will tell if we have done enough to offset any additional risk posed by ethanol due to our progress in reducing overall leak rates from tank systems. There are concerns that UST system compatibility issues associated with ethanol may cause more, but perhaps smaller, releases. In fuel releases that contain ethanol, microorganisms seem to prefer to feast on the alcohol first, allowing the BTEX plume to move farther along than it would if there were no alcohol.

With regard to fuel releases from LUST sites, private water supplies and small groundwater systems tend to be more impacted by contaminants than public water supplies because there is little dilution. A study of MtBE releases in New Hampshire found that standards were exceeded more often in private water supply wells. Contamination may be especially problematic in areas with sole-source aquifers or where water-table levels are dropping due to prolonged drought.

According to the USEPA, approximately 15 percent of Americans rely on their own private drinking water supplies, and these supplies are not subject to USEPA standards, although some state and local governments do set rules to protect users of these wells (*www.epa.gov/safewater/privatewells/index2.html*). Unlike public drinking water systems serving many people, they do not have experts regularly checking the water's source and its quality before it is sent to the tap.

? Will institutional controls be effective long-term environmental stewardship mechanisms at LUST sites?

Should we be leaving sites with contamination so that future uses of the land must be restricted in some manner? Even if (a big if) there are effective tracking mechanisms and notification systems for sites that have some sort of institutional control on land-use and there is good coordination among agencies at different levels of government, where does all of this get us long term? Do we end up with a lot of "groundwater management zones" so that eventually you can't use the groundwater for much of anything?

Groundwater should be considered one of the most precious commodities on earth, but that's not how it's treated. What do we pass down to our children and grandchildren? Again, how much do we clean up, and how much do we leave behind?

? Will there be increased potential for vapor intrusion due to production of methane associated with new gasohol releases?

Gasoline leaks and spills at UST sites happen, and with the advent of E10 (and the potential for E15), these releases will contain a significant amount of ethanol. Gasohol releases may cause greater risks to indoor air than traditional petroleum releases due to the production of methane. (See Figure 2.)

At traditional release sites petroleum vapors migrating upward toward a basement in the vadose zone are quickly biodegraded by microbes in the soil matrix. This occurs, primarily, due to the prevalence of oxygen in the pore space of the soil. At sites where releases occur that have ethanol in the fuel, the ethanol is biologically broken down into acetic acid. Once all of the ethanol is degraded, the acetic acid is broken down into methane. The biodegradation of the ethanol consumes available oxygen and the methane, as it moves upward into the soil matrix, displaces the oxygen in the soil pore space.

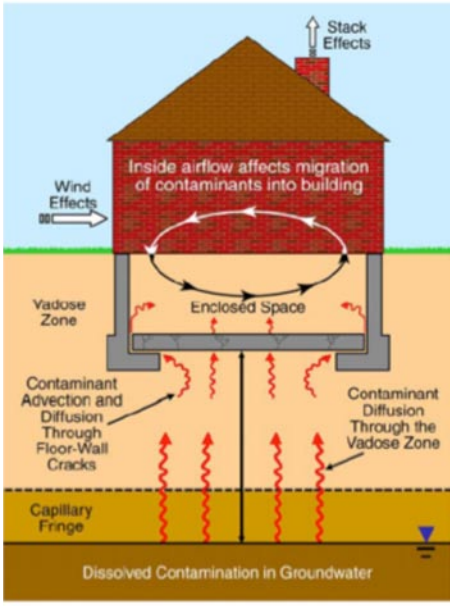
Without oxygen to promote biological breakdown of the benzene,

SURF's "Sustainable Remediation White Paper" Is a Must-Read for LUST Program Personnel and Consultants

The Sustainable Remediation Forum (SURF) authored a groundbreaking white paper titled "Sustainable Remediation White Paper—Integrating Sustainable Principles, Practices, and Metrics into Remediation Projects" (edited by David E. Ellis and Paul W. Hadley). The paper was published in a special edition of the Summer 2009 *Remediation Journal*, and is currently available at *http://www.sustainableremediation.org/*.

SURF's primary objective is to provide a forum for various stakeholders in remediation—industry, government agencies, environmental groups, consultants, and academia—to collaborate, educate, advance, and develop consensus on the application of sustainability concepts throughout the lifecycle of remediation projects, from site investigation to closure.

The paper communicates SURF members' thoughts on incorporating sustainability principles into environmental remediation. It promotes the use of sustainable practices during implementation of remedial action activities with the objective of balancing economic viability, conservation of natural resources and biodiversity, and the enhancement of the quality of life in surrounding communities. ■



Courtesy of ITRC.

FIGURE 2. *Vapor intrusion cross-section.*

as well as other components of the petroleum vapors, these compounds have greater potential to migrate through the soil profile and into confined spaces like basements, thereby increasing the risk of violation of indoor-air health criteria.

Is indoor vapor inhalation exposure a real threat? Or is the "vapor intruder" a bogeyman?

As all good LUST managers know, benzene and the "indoor inhalation pathway" drive the majority of LUST cleanups. States have used a variety of methods to analyze this risk, and most have relied heavily on the Johnson-Ettinger model, developed in 1991. It's 2010, and we've been addressing this risk for 20-plus years. What have we learned?

In recent years, USEPA and state regulators have collaborated with industry experts to review available research and the knowledge gained collectively from tens of thousands of tank-site cleanups. What conclusions have we reached? Is it time for a new model? In an era when financial resources and economic development are evermore precious, are we reaching reasonable conclusions that achieve the right balance between protecting the public from undue risk and site remediation?

Given the bleak financial state of state budgets, will state tank funds continue to be the primary Financial Responsibility (FR) providers for UST owners/operators?

Or will USEPA and state regulators have to require owners/operators to use other FR mechanisms?

Where's the peak in peak oil?

Oil seems a finite resource, so peak oil is in our future somewhere. But will it be the next decade or the next century? What happens to petroleum (and thus the tank world) is largely dependent on the price we pay at the pump. The spike in 2008 prices made a big impression on a lot of fuel users. So what does the future hold? Here are some of the competing factors:

- Gasoline consumption in China and India is going to go UP!
- Speculation in the markets (responsible for the 2008 price spike?) may or may not be controlled by new rules.
- Natural gas production in the U.S. is likely to increase dramatically because of shale gas production.
- Oil production in Iraq is likely to increase dramatically as new fields are found and foreign oil development comes to fruition (unless unrest or politics puts the kibosh on this). China is the leading developer of Iraqi oil.
- How will Iraq fit in with OPEC? Having a new large-volume player in the oil market will upset the current equilibrium on the supply side. What will happen then?
- Assuming increased supplies of energy in both native natural gas and imported oil, will the supply be ahead of, keep up with, or fall behind the expected increase in demand? ■

Related reading: The Party's Over: Oil, War and the Fate of Industrial Societies *by Richard Heinberg.*

USEPA Provides Recommendations on Lead Scavengers at LUST Sites

In May, OUST Director Carolyn Hoskinson signed a memorandum recommending the investigation and cleanup of lead scavengers at LUST Sites. Lead scavengers, common additives in leaded gasoline, pose risks to drinking water sources. The memorandum encourages states, tribes, and the USEPA Regions to:

- When appropriate, monitor and report the presence of lead scavengers in groundwater at LUST sites;
- Analyze EDB and 1,2-DCA using EPA Methods with the appropriate detection limits;
- Remediate lead scavengers when such constituents could threaten a source of drinking water; and
- Share information on the presence and remediation of these constituents.

Not all LUST sites are potential candidates for lead scavenger investigation. Only sites at which leaded motor fuels were or are currently stored are appropriate candidates. Both off-road racing fuel and aviation gasoline (Avgas) are leaded fuels. LUST sites where these fuels have been or are still stored should generally be investigated for EDB and 1.2 DCA. (See Table 1.)

The complete memorandum is available at *http://www.epa.gov/oust/cat/leadscav*. Go to "lead scavengers" and click on "Phase 3: Recommendation for States, Tribes, and EPA Regions to Investigate and Clean Up Lead Scavengers When Present at Leaking Underground Storage Tank (LUST) Sites - May 2010." ■

TABLE I Summary of Recommendations for On-Road Gasoline Sites

Recommendation to sample and analyze for EDB and 1,2-DCA.	Recommendation to sample and analyze for EDB and 1,2-DCA dependent upon: •UST's storage history •Threat to drinking water sources.	Recommendation to sample and analyze for EDB and 1,2-DCA only at sites where USTs continue to store leaded fuels (off-road racing fuel, aviation gasoline).
← 1986		1996 →
Years of Storage		

Wander LUST

....a roving column by Patricia Ellis.....

Pat Ellis is a hydrologist with the Delaware Department of Natural Resources and Environmental Control (DNREC). The opinions expressed in this column are hers and not necessarily those of DNREC. Pat welcomes your comments and suggestions and can be reached at Patricia.Ellis@state.de.us.

Release, Remediate, Repeat

Just when one of our LUST sites had come within spitting distance of meeting its cleanup goal…after 22 years as an active LUST project…oh no, a new release! Up to five feet of free product has been discovered in the monitoring wells! ARRRRGH……..

The site has been a LUST site since 1988, when a leak occurred around a fill neck. Historically, up to several feet of free product existed in the area of the tank field, and by 2004, following several years of operation of a pump-and-treat system, followed by operation of product-only skimmers, the free product was no longer observed.

A post-remedial monitoring phase followed to evaluate the continued natural attenuation at the site. By 2007, we were down to one well that slightly exceeded our Risk-Based Screening Levels (RBSLs) for closing the site, and if we had entered site-specific parameters, I'm sure we would have met Site-Specific Target Levels (SSTLs) in all of the wells (the site is in the Piedmont, with finer-grained soils than were used to generate our generic RBSLs).

But site closure was evidently not meant to be. When the remediation consultant for the site was on site performing the regular quarterly gauging and sampling event, he/she encountered up to five feet of free product in the monitoring wells.

To add further complications, the site had been sold in 2001, so we had the former owner who was still on the hook for the 1988 release, and the new owner with a new release. We also had two sets of consultants for the site.

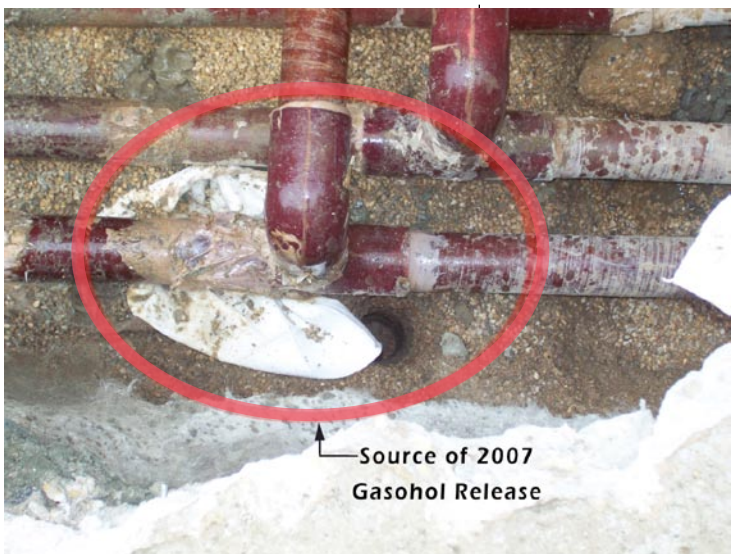


FIGURE 1. *"T" fitting under the dispenser where 2007 release occurred.*

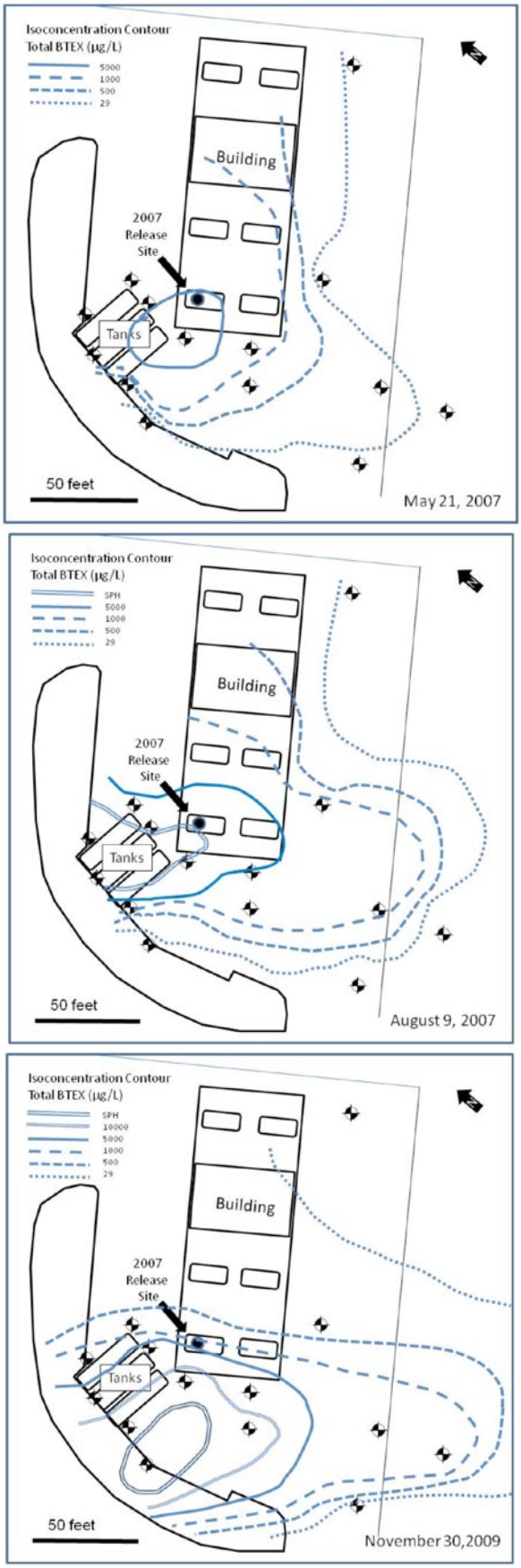
What's Going On?

The consultant for the current owner mobilized to the site and began conducting vacuum-truck events in wells with free product to minimize the spread. The source of the release was identified as a failure of a "T" fitting under the dispenser closest to the tank field (Figure 1). It appears that the ethanol in the gasoline may have dissolved the adhesive used to secure the "T" fitting; however, the cause of the failure was not verified by laboratory analysis. A portion of the release followed a preferential pathway along the piping run back to the tank field, which is where the 1988 release occurred, while the other portion mobilized into the soil beneath the dispensers and associated UST piping.

Examination of inventory records for the site did not show a discernable release and the line leak detectors did not alarm. Initially, it was thought that the 2007 release was less than 100 gallons. The release could have been going on for as long as three months, because that is the time period between groundwater monitoring events. If monitoring had not already been underway at the site, the release could have gone undetected for a much longer period of time. (See figures 2a, 2b, 2c.)

The Shades of Time

Two distinct types of free product have been found at the site since the new release. In the tank-field monitoring wells, the LNAPL column had a gradual color change from dark-colored LNAPL (1988 release) to light-colored LNAPL (2007 release) (those



FIGURES 2A, 2B, 2C. *Site diagrams show plume size prior to 2007 release, shortly after discovery of 2007 release, and more than two years after 2007 release. Note increasing size of plume and area of separate-phase hydrocarbons.*

bailers must have looked stunning!). In source-zone monitoring wells, the LNAPL column was dark, indicating that the NAPL was weathered and likely from the 1988 release (Figure 3).

Graphs plotting contaminant concentrations and free product thickness through time show that benzene and BTEX levels have begun to increase in downgradient wells (Figures 4a and 4b). Free product observed in the wells downgradient of the 2007 release is dark-colored and highly weathered. It is not known whether the increase in dissolved concentrations is primarily due to migration of the 2007 release to these wells, or whether the dissolved component found in these wells is resulting partially from the dissolution of residual product. The concentration of ethanol in the 2007 release (E10) would not be expected to cause co-solvency.

Pilot testing conducted in November 2009 showed that air sparging coupled with soil-vapor extraction should be an effective remedial technology for the site. The sparge well radius of influence was nearly 75 feet, and the soil-vapor extraction radius of influence was 50 feet. Ten paired air sparge/SVE wells are planned. Due to the location of a car wash on-site (not shown on the maps in Figures 2a,2b, and 2c.), it will be necessary to obtain county approval to locate the remediation building or trailer along the property boundary.

Remobilizing?

A majority of the releases that we've identified lately have been at facilities that have previously experienced a release, so we're superimposing new contamination on residual hydrocar-

■ *continued on page 12*

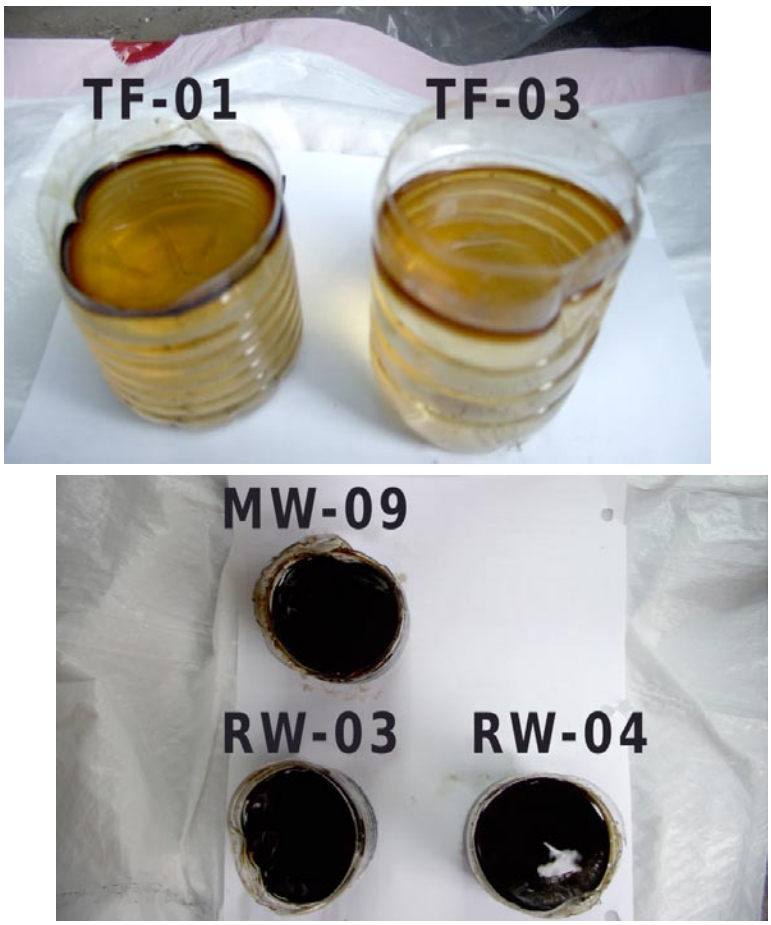
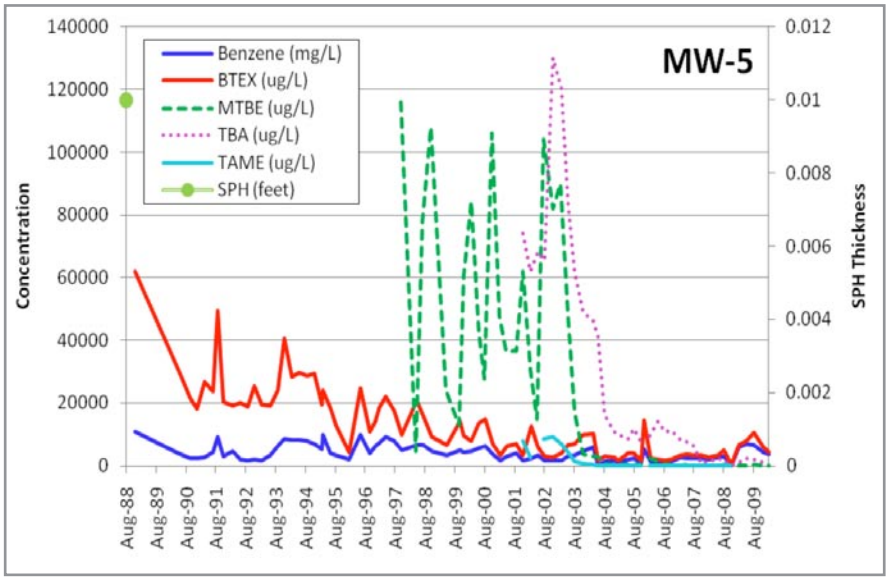
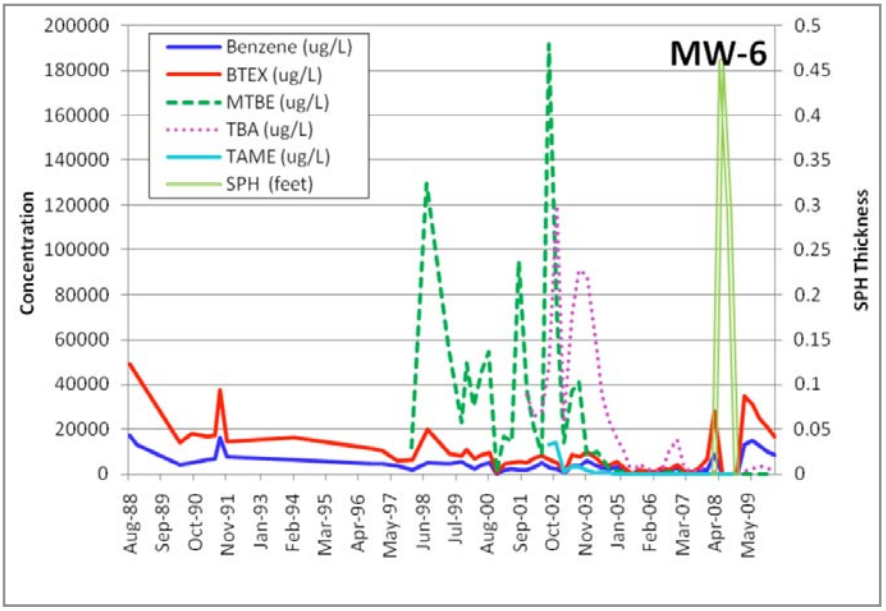


FIGURE 3. *Top: Light-colored LNAPL from tank field wells (2007 release); Bottom: Dark, weathered product from source zone wells (1988 release).*

■ **Release, Remediate, Repeat** *from page 11*





FIGURES 4A and 4B. *MW-5 and MW-6 are located 30–50 feet downgradient of the 2007 release. Weathered LNAPL was observed in MW-6 approximately one year after the release. Increases in dissolved concentrations of benzene and BTEX were also observed about one year after the release.*

bon plumes that had become stable or were shrinking. The presence of ethanol in these new releases may cause remobilization of the preexisting contamination, and the new plumes can be expected to travel farther because the aquifer is already anaerobic and electron acceptors are already depleted.

What FOOTPRINT Tells Us

USEPA contractors recently used the FOOTPRINT decision-support software tool (available at *http://www.epa.gov/ada/csmos/models/footprint.html*) to estimate the possible impact of higher concentrations of biofuels on the size of plumes that are produced by releases from UST systems. Forty Coastal Plain sites from Sussex County, Delaware were modeled.

Depending on the decay rate used (ranging from 20 mg/L/day to 2 mg/L/day), the plume area for an E10 release increased from 13 to 189 percent over the plume area for a release with no ethanol in the gasoline. Increasing ethanol content (up to E85) caused large increases in plume area (up to 2,377% over a plume area with no ethanol and a decay rate of 2 mg/L/day).

Research has shown that ethanol can inhibit natural anaerobic biodegradation in benzene, toluene, ethylbenzene, and xylenes (BTEX) in groundwater, making for longer BTEX-compound plumes. Ethanol can also produce potentially explosive concentrations of hydrogen and methane gas at gasoline spill sites.

As we see more and more sites where E10 (or higher ethanol concentrations) is released in areas of preexisting contamination, we can expect to see larger plumes, consequently putting downgradient receptors at higher risk. These effects may be multiplied by the fact that we have equipment in the ground as components of our UST systems that we can't be sure is compatible with E10 gasoline, much less higher concentrations of ethanol. ■

I would like to acknowledge Environmental Alliance of Hockessin, Delaware for providing the photographs in this article.

Two E85 Dispensers Now Have UL Listings

On June 25, the Underwriters Laboratory (UL) officially issued certification for two dispensers for use with preblended E85: Gilbarco Veeder-Root's Encore E85 and Dresser Wayne's Ovation Eco Fuel.

The issue of certifying E85 dispensers was first raised in 2006 after it became evident that no safety standard existed to test and certify high ethanol fuel blends. At that time, UL launched an extensive research initiative in collaboration with federal, industry, and international experts and advisory groups to better understand the corrosive properties of ethanol/gasoline fuel blends and to develop test methodologies that address potential fire, explosion, and shock hazards while addressing degradation issues for products that distribute the fuel blends up to E85.

Those certification requirements were published in 2007, and the Gilbarco and Dresser Wayne dispensers were the first complete systems to have met all of those requirements. For more information, contact Claire Kammer at Claire.A.Kammer@us.ul.com.

NOT FOR THE SQUEAMISH!

Those Alcohol-Loving Acetobacters at Work…or What?

by Ellen Frye

SENT: Wednesday, December 17, 2008, 4:30 PM
SUBJECT: Some odd corrosion and reactions
FROM: Steve Pollock

I ran across this mess in a sump today. I've seen similar messes, but this was just a little different. The environmental consultant I was with had never seen anything like it either. Kind of mounded, with recently active-looking bubbles (hydrogen gas?) on top. Sort of like the sulfur-reducing bacteria crud we sometimes find, but somehow a little more pillowy. The consultant knocked it around a little (with his neatly designed lid lifter which he described as the best tool they've ever purchased), and I was waiting for the whoosh of rotten-egg smell. Instead, it was a vinegar smell-acetic acid. Maybe in the presence of E10, our native soil/water bacteria now prefer to chomp on the ethanol first as Acetobacters or just as opportunistic bacteria loving an easier chain (the alcohol) to digest, creating acetic acid--you know, like wine going bad. Or perhaps, in the presence of E10, these are the first bacteria to feast at the buffet, then the vultures, and then the oil metabolizers

Anyway, the acetic acid, bacteria, and some funky mold (or yeast?) is tearing up the steel, too. Also note that the line leak detector was supposedly replaced this past February with a Red Jacket FX-1V series part. Maybe...though it sort of looked like the older, bigger XL's. But if it's new as of Feb '08, it has had a hurting put on it. Oddly, the next-door STP sump was also full of water, but not this mess. And it was clear that the LLD had been replaced.

Eew!

The facility that Virginia DEQ Petroleum Program Compliance Inspector Steve Pollock described in his e-mail above to co-workers had been selling E10 since its introduction to the non-attainment areas of Virginia in 2006. "I was accompanied by a local environmental consultant contracted by the tank owner," says Pollock. "The owner had also submitted a few records prior to the day of inspection. The inspection was fairly typical until the consultant removed the Submersible Turbine Pump (STP) containment sump lid for one of the USTs.

"The containment sump contained a good deal of liquid, nearly covering the STP's motor head. This condition is not unknown to UST inspectors. The surface of the liquid was also covered in what appeared to be a biological mat. I've run into this condition before, where there are iron-reducing bacteria; it seems to occur in shallow groundwater areas, particularly near swampy areas or former swamps covered by suburban sprawl."

"But," notes Pollock, "this mat appeared slightly different from others I've encountered—it had a lighter color and what appeared to be larger, recently formed gas bubbles."

The consultant investigated the situation by disturbing the mat and liquid with a pry bar. "I didn't stop him quickly enough, so I stepped back to avoid the predictable rotten egg smell of the sulfurous metabolic products of the bacteria," says Pollack. "But, instead of sulfur, the odor was vinegary—acetic acid. The consultant removed the STP sump lid from the adjacent UST. It was also full of liquid, but seemed to be just clear water."

All photos courtesy of Steve Pollock, VA DEQ.

STP sump showing biological mat from a 2008 inspection at an E10 facility.

Having received some of the testing data ahead of the inspection, Pollock was aware that the line leak detectors for these UST systems had been replaced in February 2008 with new Red Jacket FX-1Vs. This certainly seemed believable for the equipment in the sump with the clear water, but he had trouble believing that the leak detector in the other sump was only eight months old. That leak detector appeared to be very old and corroded. But strangely, the STP head and even the visible electrical conduit appeared covered by an aggressive, almost mounding layer of corrosion, not typical of the corrosion Pollack had seen during previous inspections.

■ *continued on page 14*

■ **Not for the Squeamish**
from page 13

Could Ethanol Be Involved?

"I began to think the recent testing and button-up work for the USTs (the facility was in the midst of a property transfer) allowed for a small amount of E10 to have been deposited in the containment sump," says Pollock. But he wondered if it might also be possible, despite passing UST and vapor-recovery testing, that small weeps or vapor releases allowed for the continuous input of a miniscule amount of E10 to the containment-sump environment from the one UST but not the other. John Wilson, at USEPA's National Risk Management Research Lab in Ada, Oklahoma, found it quite plausible that "ethanol is probably finding its way to the water in the sump through a vapor release pathway."

Spill bucket from a 2010 inspection at an E10 facility. Note the stalactite-type corrosion under the lid.

USEPA did a study of two sites in Northern Virginia that had MtBE plumes in groundwater, even though the tanks were tight. They established that the MtBE in groundwater was coming from MtBE that had escaped the USTs as vapors. Ethanol and MtBE are similar in some of their physical properties in that both have a high vapor pressure from gasoline (i.e., the proportion of ethanol or MtBE in the vapors is greater than the proportion of ethanol or MTBE in the liquid gasoline), and both are very soluble in water. So if MtBE vapors can escape an UST system and dissolve in water, it is plausible that ethanol can do the same thing.

Recalling recent ethanol research and its degradation products, Pollock formed a hypothesis, or at least a guess. In the presence of E10, were different native bacteria selected to degrade the product? Are *Acetobacter* or other opportunistic bacteria favored to digest the alcohol, creating acetic acid as a waste product?

At the time this condition was observed, John Wilson theorized that the vinegar smell could, indeed, come from aerobic degradation of ethanol to produce acetic acid by *Acetobacter*. He noted that it could also be produced by anaerobic bacteria that ferment ethanol to acetic acid and hydrogen gas. "The hydrogen gas might be the bubbles. Other bacteria can ferment acetic acid to carbon dioxide and methane, and the carbon dioxide and methane might also be in the bubbles," he said.

The resulting problem for our UST equipment seems to be that a more-corrosive-than-expected environment develops, attacking steel and other metals. "The brew can attack metals by a variety of methods," says Wilson. "Probably the most important is that the acetic acid is a good electrolyte, making the water more conductive of electricity. The acetic acid also obviously makes the water more acid."

Once the liquid in both UST sumps at the facility was pumped out, and the fouled equipment was cleaned, both Pollock and the owner asked for confirmation that the leak detector was only eight months old. The serial number was compared to the invoice, confirming that a technician had installed a new leak detector earlier in the year.

Following that inspection, Pollock and his co-workers have kept an eye out for similar conditions. They have continued to encounter similar scenarios and acetic acid odor at sites in the Richmond area and near the North Carolina border. The condition has been noted in STP sumps, spill buckets, and around ATG probe risers. Some UST service providers have told Pollock of similar observations.

An ATG probe area from a 2010 inspection at an E10 facility. Notice the extreme corrosion throughout.

What Are You Seeing?

Clearly, more information is needed to determine exact causes and effects surrounding these and other phenomena taking place in UST systems. For those of you out there in the field doing facility inspections: Are you seeing anything like this? We'd like to help USEPA's Office of Underground Storage Tanks (OUST) gain a better understanding of potential impacts to UST systems caused by ethanol and other biofuels. So if you have observed corrosion and that telltale vinegar odor similar to that described by Steve Pollock and inspectors in a few other states (New Hampshire is currently studying similar findings), please contact Andrea Barberry at OUST (Barbery.Andrea@epamail.epa.gov) to let her know what you have seen.

The more OUST learns about what you are seeing in the field the better chance we have of understanding the physical and chemical challenges UST systems face from new fuels. John Wilson has agreed to offer a test kit to the first ten people that send an e-mail to wilson.johnt@epa.gov. His lab will provide materials, including test strips to allow them to measure the pH of the water in the sumps in the field at the time the samples were collected, for 10 samples in each kit. They will attempt to determine the concentration of ethanol (it may well be degraded) and the concentration of acetate and butyrate. ■

Plugging the Rest of the Leaks

New Hampshire Aims for Comprehensive Secondary Containment for New UST Systems

by Mike Juranty

Secondary containment and leak monitoring have been required for all new UST installations in New Hampshire since 1985; in 1997 that requirement was extended to new product piping installations as well. In spite of the secondary containment requirement, however, these "modern" UST systems still have releases. Leaks from modern tank systems were recognized and brought to the forefront through the work of Gary Lynn, New Hampshire Department of Environmental Services (NHDES), and others who demonstrated that methyl *tertiary*-butyl ether (MtBE) was escaping in the form of "vapor releases" from the UST systems.

Further forensic leak investigation by Jason Domke at NHDES has shown that other events, such as UST overfills and "topping off" motor-vehicle gas tanks at facilities with Stage II vapor-recovery systems, can go unnoticed but result in liquid-product releases from tank-system components that "don't routinely contain product," are not double-walled, and have no release detection. These releases enter the relatively porous pea-stone or sand-bedding/backfill layer surrounding the UST system. This layer acts as an infiltration gallery of sorts that routes any contamination into the groundwater.

Mechanisms for Releases at "Modern" Facilities

NHDES, as well as most other state tank programs, identified the following mechanisms for releases that have not been adequately addressed in both its own rules and in the federal rules:

- **Stage II vapor recovery systems and "topping off" at the pump.** Many gas station patrons like to get a little bit of extra fuel in the tank or round off their gasoline purchase by repeatedly activating the gas nozzle after it has automatically shut itself off. This behavior can cause liquid gasoline to be drawn into the vapor path of the nozzle and then into the Stage II vapor piping that leads back to the underground tank. Product also enters the Stage II piping during the periodic liquid-blockage testing of the vapor-recovery system and by condensation of fuel vapors in the below-grade portion of the piping. Releases then occur through leaks in the single-walled vapor-recovery piping.
- **UST overfills.** Despite the widespread use of overfill-prevention devices such as ball-floats, drop-tube shutoff valves (a.k.a. "flapper-valves"), and electronic alarms, overfills still occur. Lack of routine maintenance, incorrect overfill-device installation, use of inappropriate overfill devices for the type of tank fill method, and old-fashioned human "ingenuity" can and do result in UST overfills. Many of these overfills can be detected by the distinctive spray patterns surrounding the tank vents but many more go unnoticed until inspection time or until a groundwater-contamination spike is evidenced. Overfill releases occur through tank-top fittings such as fill risers that have corroded or loosened up over time, automatic tank gauge (ATG)

■ *continued on page 16*

All photos courtesy of Spruce Wheelock, NHDES.

Top: Typical ATG riser installation surrounded by the tank backfill. Overfill events can leak from such unprotected risers and spill directly into the tank backfill. Such releases can be prevented by locating all risers within a collared sump.

Bottom: Typical ATG riser installation surrounded by the tank backfill. An overfill event popped the cap off the riser, and product leaked into the tank backfill. The release would have been prevented if the riser was located within a collared sump.

■ **NH and Secondary Containment** *from page 15*

risers and fittings (ATG caps can be blown off by the overfill event), and leaking single-walled vent piping and vapor-recovery piping.

Product was released from the vent cap during an overfill event. A leak in the single-walled vent line resulting from improper installation, corrosion, or movement of the vent riser would result in a product release into the backfill during such an overfill event. Gasoline vapors and vapor condensates can also be released from these leaking vent lines

- **Leaking spill buckets.** Spill bucket covers are a tank's "front line of defense" against vehicular traffic. Repeated hits from snow plows and car and truck tires passing over the spill buckets can cause degradation of the surrounding concrete, damage to the spill bucket/concrete support ring, as well as the spill bucket and riser. Leaks from spill buckets and spills around the spill buckets then have a direct route into the tank bedding.

Damage to a spill-bucket support ring. Such damage allows surface spills to enter the tank backfill.

A tank equipped with a collar for attaching a full-depth sump. Such collared sumps provide secondary containment and can be used to isolate tank risers and spill buckets from the tank backfill material.

How Can These Types of Releases Be Prevented?

One method for preventing these releases is to rely on the facility owners, contractors, fuel suppliers, and patrons to "do the right thing" once they have been educated on the proper procedures and requirements for constructing, maintaining, operating, and servicing the facility, and in the case of patrons, pumping gas. But history has shown that it is prudent to employ the complementary approach of building a system that will capture or at least minimize the adverse effects of equipment failure or human error.

This approach has been partially implemented in New Hampshire and much of the country with rules requiring secondary containment and leak detection for new tanks and product piping, low-point piping sumps, dispenser sumps, and spill buckets. NHDES now plans to complete that containment system by requiring secondary containment and release detection for vent and vapor-recovery piping, as well as sumps connected to tank collars (a "collared sump") wherever a tank-top penetration is made, at all new UST installations. Tank-top penetrations include submersible pumps/product piping, ATGs, vents, vapor-recovery connections, interstitial risers, and fill risers with spill buckets.

The additional overall cost of installing double-walled (versus single-walled) vent and vapor piping and collared sumps (versus manway-connected sumps, sumps mounted at the top of a tank riser, or risers without any sump at all) at new UST installations is negligible compared with the costs associated with groundwater cleanup and business down time that would result from a product release. Collared sumps may even provide an operational cost savings as they allow repairs of system components such as spill buckets and tank risers to be made without the need to break concrete and excavate to the tank top. ■

Mike Juranty is supervisor of the Oil Compliance Section of the New Hampshire Department of Environmental Services. He can be reached at michael.juranty@des.nh.gov.

From Our Readers

Observations from an UST Compliance Service Provider

I read Marcel Moreau's article, "If I Had to Choose Just One Method of Achieving UST Operational Compliance…," in the March 2010 issue of *LUSTLine* with great interest. I have, for the last 18 years, operated a company providing UST compliance services to tank owners.

Mr. Moreau advocates an annual, thorough check of the entire fueling system from top to bottom, including operability checks of the various components. Not bad, but is it good enough? I think not, based on my experience in the field.

I have the oil changed in my company vehicles every 3,000 miles. While the mechanic changes the oil he checks the belts, hoses, brakes, along with various fluid levels—transmission, coolant, brake…even windshield washer fluid—and alerts me to any potential problems. I've found it is easier and cheaper to address problems early rather than when I'm broken down on the side of the road. Like the TV ad says: "You can pay me now or you can pay me later…."

Just as most of us get our oil changed every 3,000 miles, I advocate a monthly visual check of all the components of an UST system. This will allow you to identify small problems early enough to keep them from becoming major issues. Let me give you some examples based on my experience in the field.

I probably check and clean around 500 spill-containment manholes every month. Not one of them is clean and dry from one monthly visit to the next. I regularly find cracks or holes in those plastic spill buckets, caused by movement and rough handling of the equipment by transport drivers, I suspect. Another problem area is where the spill-containment "boot" is clamped to the riser—these clamps break or come loose. If you catch these problems early you can prevent ongoing leakage into the surrounding backfill and, in North Carolina at least, use an approved method to repair the spill bucket, rather than face a minimum $6,000 expense to replace it with a monitored double-walled spill-containment manhole. I cannot count the number of gauge sticks I've removed from overfill-prevention valves; occasionally I've even found these valves missing entirely from one monthly inspection to the next.

At one site I visit there's an old mechanical line leak detector in the submersible turbine pump (STP) sump and a filter in the under-dispenser containment (UDC) sump. On one inspection I see that these contain a bit of product, and if the sump fills with water, the fuel could leak out. Fuel is dripping from the new filter, or meter. Smells like gas around that STP, and I notice some soil staining I didn't see last month. Inside, the ATG shows a probe is out. One of the ELLDs is no longer performing a 0.1 or 0.2 gph test because the STP is running constantly. The impressed current rectifier box is reading 0 volts and amps because someone flipped the breaker, or a fuse blew after a thunderstorm. Jane is supposed to call the office about these problems, but she got busy with paperwork, and forgot. And so it goes…

So I choose a hybrid monthly visual inspection by a qualified third party for UST compliance. Just as you can prevent a lot of expensive auto repairs with regular scheduled preventive maintenance, you can avoid expensive repairs and UST compliance issues with a monthly scheduled visual check of your UST system. I simply do not think that an annual inspection/operation check is often enough.

Do you have the discipline, or the staff with enough time to do the monthly check? Probably not. Are you worried about your UST operator filling out his checklist in the office instead of actually looking under the manhole covers and inside the dispensers? You should be. It's cold outside, those manhole covers are awfully heavy, and last month he couldn't get the regular cover off at all! He broke the key off in the door to dispenser 1–2, and he doesn't have another one. After the monthly check he smells of gas and just wants to go home and take a shower and change. He works 9–10 hours a day as it is, without this added burden. Get a qualified third party to do it. Get someone who knows about petroleum-handling equipment as well as the UST regulations. He needs to "think" like a regulator while performing the monthly inspection. ■

Charles Broadfoot
Charles Broadfoot & Associates, Inc.
Fayetteville, NC

UST Operational Compliance? Keep It Simple!

In his article, "If I Had to Choose Just One Way of Achieving UST Operational Compliance," *LUSTLine* #64, Marcel Moreau claims that by having an annual operational inspection by a qualified service technician, "one phone call does it all." He says the UST operator doesn't need to remember all the things he is responsible for—like line leak detector testing, ATG maintenance, crash-valve checks, etc., etc. Well what is operator training for? Who is ultimately responsible for compliance? The service provider? No, it's the operator.

I agree with what Marcel is promoting, but operators need to know their system to ask the right questions and not get snowed by the low-cost service provider. Of course I know Marcel knows that. The problem is in most states operator training is the law,

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■ UST Operational Compliance? Keep It Simple!

not annual inspections by qualified technicians. Also, if most operator training will simply be a test, I expect that Marcel's suggestion would be a good one.

However, we are dealing with mostly mom and pops and they need to understand what is necessary. I see too many sites where the method of leak detection could be less costly, but the owner is talked into purchasing, for whatever reason, a more expensive method. Now that, in most cases, we require secondary containment for new tanks and piping, why would you need to do any tank leak detection outside of monitoring the interstice?

I think that the best way to address this and other issues is to design systems that require little oversight. Use suction systems on piping, use double-walled tanks, install piping and tanks that do not require any cathodic protection, and use spill buckets with secondary containment. If these features were in place, you would need service providers primarily for fixing card readers and the like.

Most mom and pops don't have the resources to respond to water alarms in sumps and other nuisance issues associated with more complicated monitoring systems. In some of our rural areas it costs $600 just to get to the location before any work is done. In fact, with many systems, even if inspectors identify problems such as compatibility issues, cracks in piping, or that yellow piping that is falling apart, our regulatory hands are tied to get them replaced because they are not leaking.

So why require annual inspections by service providers when we do not have the staff to see if the work that is done will help the owner meet the regulations? We only visit the sites every three years, and by the time we get back, 30 percent of the operators will be someone else, and they need to be trained so they understand that they are responsible for the day-to-day operations of that facility.

So, if I had to choose just one way of achieving UST operational compliance, it would be to Keep It Simple! ■

Rick Jarvis, Idaho DEQ UST/LUST Program Coordinator

Verification Testing of ATG Performance for Ethanol-Blended Fuels

The USEPA Office of Research and Development's Environmental Technology Verification Program (ETV), Advanced Monitoring Systems (AMS) Center, operated by Battelle, is developing a test plan to assess automatic tank gauging (ATG) systems for detecting leaks from USTs using various ethanol blends. The intent is to collect unbiased data concerning the performance of leak-detection technologies with ethanol blends. It is important to understand the performance of ATGs when used with ethanol-blended fuels because of the differences in chemical and physical properties between petroleum and ethanol, specifically the difference in their miscibility with water. The test plan is being developed in collaboration with the National Work Group on Leak Detection Evaluations (NWGLDE), USEPA Office of Underground Storage Tanks (OUST), and other stakeholders. ATGs are the first in a series of planned leak-detection technology assessments. ATGs will be tested first since they are the most widely used leak-detection method in the United States.

Over the past six months, the AMS Center has formed a technical stakeholder panel and a vendor panel to provide input to the test plan. These panels consist of representatives from industry associations, state and federal governments, and users. Panel constituents include the Underwriters Laboratories, Renewable Fuels Association, Petroleum Marketers Association of America, Oak Ridge National Laboratories, NWGLDE, USEPA Regions 4 and 10, 12 states (WI, NY, TN, MA, CA, MS, AL, NH, UT, CT, DE, MI), and the U.S. Army Environmental Command.

Panel discussions have been held, and a draft test plan has been written. The plan is currently going through a peer review process to establish an unbiased evaluation of the performance of this particular technology category. During the coming months, the AMS Center will solicit collaborators and vendors to participate in technology testing through this third-party testing process. Depending on the scope of the test plan and vendor/collaborator interest, testing is expected to start in late 2010. For more information on the ETV AMS Center, visit the website at *http://www.epa.gov/nrmrl/std/etv/center-ams.html*. For specific inquiries about this verification test, contact Anne Gregg at Battelle (gregga@battelle.org or 614-424-7419). ■

A MESSAGE FROM CAROLYN HOSKINSON

Director, USEPA's Office of Underground Storage Tanks

What's New at USEPA?

It's been over a year since Administrator Lisa Jackson took on the job of leading the USEPA under the Obama Administration. So what's new and different under this leadership? And how is it playing out in our tanks program?

Earlier this year, Administrator Jackson announced seven priorities for USEPA, underscored by three core values for how we are to go about our work (see text boxes and *http://blog.epa.gov/administrator/2010/01/12/seven-priorities-for-epas-future/*). She also said that she expected each of us at USEPA to consider ourselves not just within the scope of our individual programs, but as one united USEPA committed to working together to achieve our mutual goals.

USEPA's Priorities

- Taking action on climate change
- Improving air quality
- Assuring the safety of chemicals
- Cleaning up our communities
- Protecting America's waters
- Expanding the conversation on environmentalism and working for environmental justice
- Building strong state and tribal partnerships

USEPA's Core Values

- Science
- Transparency
- The rule of law

Each of us has been asked personally to consider how the work we do and the work of our programs serve to further the agency's mission.

It's obvious that the national underground storage tank (UST) program's ongoing work to prevent and clean up UST releases supports three of these Agency priorities—cleaning up our communities, protecting America's waters, and expanding the conversation on environmentalism and working for environmental justice.

The last, and arguably the greatest, priority—building strong state and tribal partnerships—is one that is interwoven into the fabric of all we do. Since the beginning of the UST program, we have embraced our relationship with state, territorial, and tribal UST partners, and indeed with all our program stakeholders—from regulated tank owners, to equipment manufacturers, to service providers, to affected communities. For me personally, these relationships are truly the most rewarding part of being in the UST program.

To Further USEPA's Priorities, OUST Is Involved in Specific Initiatives

Within USEPA's Office of Solid Waste and Emergency Response (where OUST resides along with such sister programs as Superfund, Brownfields, Hazardous and Solid Waste, and Emergency Response), OUST has embraced and become a part of several cross-OSWER and cross-Agency initiatives. Below are five examples of where we're doing our part to overcome the individual, narrow stovepipes, or spheres of interest, within which we often operate. I don't know if our stovepipes are built out of straw, sticks, or bricks, but we're huffing and puffing at them and maybe someday we'll blow them all down.

■ **COMMUNITY ENGAGEMENT** – In December 2009, USEPA's Office of Solid Waste and Emergency Response (OSWER) issued its community engagement initiative, released a proposed action plan—which presents principles, goals, and objectives for community engagement—and solicited feedback from community stakeholders and the general public. On May 20, 2010, OSWER released a detailed implementation plan, listing specific actions to enhance community engagement (see *www.epa.gov/oswer/engagementinitiative*). OSWER is committed to reaching out to all stakeholders so they can meaningfully participate in government decisions regarding land cleanup, emergency preparedness and response, and hazardous substances and waste management.

How is OUST involved? While we recognize that states and territories implementing the UST program often engage with communities above and beyond that required in the federal UST regulations, OUST is examining current practices, identifying best practices, and evaluating ways the UST program currently engages with communities. Over the coming months, we will be developing materials about community engagement in the context of the UST program, discussing it in September at the National Tanks Conference in Boston. We ask that you share with us your thoughts and comments. For more about OUST's work on community engagement, contact Barbara Grimm-Crawford at grimm-crawford.barbara@epa.gov or 703-603-7138.

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MESSAGE FROM CAROLYN HOSKINSON *continued from page 19*

■ **INTEGRATED CLEANUP** – OSWER's integrated cleanup initiative is a strategy to integrate and leverage land cleanup authorities to address a greater number of contaminated sites, accelerate cleanups, and put these sites back into productive use while protecting human health and the environment. (See *www.epa.gov/oswer/integratedcleanup.htm* for more information.) OSWER is currently working on an implementation plan for the integrated cleanup initiative.

OUST's backlog characterization study and petroleum brownfields projects clearly fit within the integrated cleanup initiative's objectives of working to advance cleanups; enhance partnerships between cleanup programs, other agencies, states, tribes, and local governments; and link cleanup and revitalization efforts. For more about OUST's work on the integrated cleanup initiative, contact Sue Burnell at burnell.susan@epa.gov or 703-603-9231.

■ **RE-POWERING AMERICA'S LAND** – OSWER launched the RE-Powering America's Land initiative to explore opportunities for siting renewable energy on potentially contaminated land and mining sites (see *www.epa.gov/oswercpa/*). USEPA and the Department of Energy's National Renewable Energy Laboratory (NREL) are collaborating on projects to evaluate potential opportunities.

NREL's investigation for the UST program is exploring opportunities to site or otherwise support the infrastructure for alternative-fuel vehicles. Because former gas stations are often small in size, energy-supply facilities may be difficult to site there; but because they are located near traffic intersections and other heavily trafficked routes, an alternative-fuel-vehicle infrastructure may present unique ways for petroleum brownfields sites to contribute to the nation's use of alternative fuels and renewable energy. USEPA expects to release a report summarizing the investigation in winter 2011. For more about OUST's work on RE-Powering America's Land, contact Deb Steckley at steckley.deb@epa.gov or 703-603-7181.

■ **URBAN WATERS** – USEPA recently launched an urban water initiative, a component of Administrator Jackson's priority to protect America's waters. The goal of this initiative is to restore and protect urban water bodies by engaging communities in activities that foster increased connection, understanding, and ownership of their waters and surrounding land. Urban environments, particularly in disadvantaged communities, are often dominated by impervious surfaces, industrial facilities, and abandoned or vacant, often contaminated, lands.

OUST is participating in a cross-agency workgroup on this initiative. We plan to involve state and tribal UST partners in activities that support leaking UST-system cleanup and petroleum brownfields reuse and that focus on the restoration and protection of urban waters. USEPA intends to make a draft strategy available for stakeholder review in late spring. The agency also plans to hold a forum for stakeholder comment and input. For more about OUST's work on the urban waters initiative, contact Deb Steckley at steckley.deb@epa.gov or 703-603-7181.

■ **AREA-WIDE PLANNING** – USEPA's Office of Brownfields and Land Revitalization is piloting a program that will provide communities with grants to develop area-wide plans, which will help in assessing, cleaning up, and reusing brownfields. The goal of the area-wide planning program is to work in partnership with local communities to help create a shared vision for brownfields-impacted areas —neighborhoods, districts, city blocks, or corridors—and to ensure that brownfields assessment and cleanup decisions include planned reuse for the sites and support area-wide revitalization strategies. USEPA will share information about lessons learned with stakeholders nationally. See text box for information about the request for proposals.

Area-Wide Planning For Brownfields

- Approximately $3.5 million available ($175,000 per project) to provide money and technical assistance for 20 pilot projects in brownfields-impacted areas, such as neighborhoods, districts, city blocks, or corridors
- Assistance will enhance area-wide planning and revitalization
- Request for proposals issued March 30
- Proposals were due June 1, 2010
- Awards anticipated in August 2010
- Proposal available on EPA's Web site: *www.epa.gov/oswer/docs/grants/epa-oswer-oblr-10-05.pdf*

OUST is supporting this effort inasmuch as many brownfields are impacted by petroleum, much of it from leaking USTs at old gas stations. In addition, many states and others have already been pursuing area-wide efforts, such as Route 66 in the Southwest, Colorado Historic Revitalization Initiative, Tamiami Trail in Florida, National Historic Voting Rights Trail from Selma to Montgomery in Alabama, Route 99 in California, I-5 in Oregon and Washington, and many more. For more about OUST's work on area-wide planning, contact Steve McNeely at mcneely.steven@epa.gov or 703-603-7164. ■

OUST Issues a Revised "Short List" of Potential Changes to UST Regulations

Two years ago the USEPA Office of Underground Storage Tanks (OUST) started the process to consider changes to the UST regulations to better protect the environment and to improve implementation of the program. After considering input from a wide variety of stakeholders, in June 2009 OUST shared a "short list" of issues it planned to evaluate further. After considering the costs, benefits, and technical feasibility of the possible changes, OUST has now revised the short list. Below is the current list of issues OUST plans to continue to move through the USEPA regulatory process. This list may change further as OUST navigates the regulatory process. OUST hopes to publish a proposed rule in the federal register for public comment this coming winter.

Release Prevention

- **Operation and maintenance (O&M)** – Includes overfill-functionality testing, walk-through checks, spill-bucket testing, and integrity testing for interstitial areas.
- **Ball floats** – Eliminate flow restrictors in vent lines as an overfill device on new systems and when overfill is replaced.
- **Repairs**
  - Address repairs and secondary containment – If primary or secondary wall is fixed, must verify structural integrity of the interstitial space before returning tank/piping to service.
  - Revise repairs section – Include non-release repairs and requirements/testing. This will also require re-evaluating repair definition and disassociating repair from release.

Release Detection

- **O&M** – Walk-through checks and periodic operational checks and testing (i.e., automatic tank gauge, probes, sensors, line leak detectors, and alarms).
- **New technologies** – Incorporate new technologies with applicable performance standards (i.e., statistical inventory reconciliation (SIR), continuous in-tank leak detection systems (CITLDS)).
- **Suspected releases** – Address interstitial alarms with regard to section 280.50 "Reporting of Suspected Releases."
- **Leak-detection methods** – Phase out groundwater and vapor monitoring as leak-detection methods.

Other

- Update Regulations to acknowledge 1998 deadline has passed.
- Require closure of lined USTs that fail periodic inspection and cannot be repaired.
- Update tank and piping sections for new technologies – include clad and jacketed tanks, flexpiping.
- Require revised notification forms when ownership changes at the facility.
- Make technical corrections (e.g., update standards, correct typos).
- Address alternative fuels and compatibility.

Deferrals

- Exclude USTs containing radioactive substances.
- Exclude emergency generator USTs at nuclear power generation facilities regulated by NRC.
- Fully regulate emergency generator USTs.
- Regulate airport hydrant systems with alternate release-detection requirements.
- Regulate field-constructed USTs with alternate release-detection requirements.
- Regulate wastewater treatment tanks. ■

FAQs from the NWGLDE

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

Continuous Leak Detection Methods

In this LUSTLine *FAQs from the National Work Group on Leak Detection Evaluations (NWGLDE), we discuss the differences between the types of continuous leak detection methods that are available for detecting leaks from single-walled underground storage tank (UST) systems. Note: The views expressed in this column represent those of the work group and not necessarily those of any implementing agency.*

Q. ***What are the different types of continuous leak-detection methods being used to detect leaks in single-walled UST systems?***

A. The most common type of continuous leak-detection method being used today is **Continuous Automatic Tank Gauging.** This method uses a probe to collect product-level and temperature data continually and software designed to identify time intervals when there is no activity in the tank to ensure that the data are stable enough for analysis. An algorithm then combines data from a number of these stable periods until there is enough evidence to make a determination about the leak status of the tank. This method functions like a static automatic tank gauge (ATG) test, except that it does not require the tank be taken out of service for a set period of several hours whenever a test is to be performed.

The method is designed to meet the USEPA monthly monitoring performance standard of detecting a leak of 0.20 gallon per hour with a 95 percent probability of detection and no more than a 5 percent possibility of a false alarm. Like the static ATG test, this method only evaluates the tank vessel itself. It is widely used in locations where monthly static ATG testing would be disruptive to business but the tank still has occasional periods of inactivity. Vendors such as Dresser Wayne Europe (TIG ATG System), EBW (AutoStik with SCALD), Hectronic GmbH (Optilevel CITLDS), OMNTEC (OEL with CITLDS), OPW (EECO and Galaxy ATG Systems), Simmons (Tank Manager with CITLDS), Veeder-Root (ProMax and ProPlus with CSLD), and Franklin Fueling (TS with SCALD) manufacture Continuous Automatic Tank Gauging equipment.

Another continuous leak detection method, **Continual Reconciliation,** uses an onsite industrial computer to retrieve data from pump controllers associated with the point-of-sale system as well as from the ATG. The method develops an ongoing record of fuel inventory observations by pulling together sales data every time a fuel transaction is completed, and simultaneous tank-level and product-temperature observations from the ATG. It uses algorithms similar to those used for statistical inventory reconciliation (SIR). Data from delivery records can be recorded, but the actual volumes of deliveries to the tanks can also be independently calculated. When the method's algorithms analyze the data, a very accurate picture emerges of the product activity in the tank (or tanks), and a loss, if present, becomes apparent. Operational issues such as theft, miscalibrated meters, blending problems, and delivery discrepancies can also be determined. In addition, this method may identify sudden or unexpected losses of product from the tank vessel, pressurized lines, or both.

This method is also designed to meet the USEPA monthly monitoring performance standard of detecting a leak of 0.20 gallons per hour with at least a 95 percent probability of detection and no more than a 5 percent probability of a false alarm. The only example of a continual reconciliation method currently appearing on the NWGLDE list is PetroNetwork S3 from Warren Rogers Associates, Inc. PetroNetwork S3 allows a combination of monitoring data from both static and dynamic operations of the tank to be combined to monitor the tank system for a tank or line leak. (See *LUSTLine* Bulletin #56 [August 2007] article "Continual Reconciliation Applications for Active Fueling Facilities" for additional information about this system.) PetroNetwork S3 is used widely at high-throughput locations where there is no down time for static ATG testing or where continuous automatic tank gauging does not have sufficient quiet time to collect sufficient data to determine a monthly leak detection result.

The **Automatic Monthly Inventory Control** method is a third method of continuous leak detection. This method uses continuous inventory monitoring as a tank-management tool, both for business and inventory. The Business Inventory Reconciliation (BIR) system by Veeder Root and Reconciliation System by Incon are two examples of this type of method. To date, neither vendor has developed an automatic monthly inventory control method that meets USEPA requirements for monthly manual inventory monitoring, either alone or combined with another leak detection method. These two systems are marketed as business management tools while providing an automatic way to meet daily inventory records and monthly inventory reconciliation requirements.

The systems use the concept of inventory control by adding the variance of 130 gallons to the gallons pumped after dividing the gallons pumped by 100. They then compare the overage and shortage of the month with the leak-check result. These methods are not third-party certified. Whether to accept the use of

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FAQs... continued from page 22

these systems as part of a release-detection method, either alone or in combination with other evaluated release-detection methods, is ultimately the decision of each implementing agency. ■

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.

Field Notes

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

ULSD, ULSD, ULSD...THE BEAT GOES ON

In the last issue of *LUSTLine* (#64), I reported that PEI held a meeting earlier this year at USEPA headquarters with various industry and governmental stakeholders seeking input on what seemed to be an abnormal number of reports of excessive rust and other damage to equipment in ultra-low-sulfur diesel (ULSD) service. The result of that meeting was to develop a screening survey that would go out to industry and state UST inspectors in an effort to understand the extent of the corrosion in ULSD storage and dispensing systems.

The month-long survey was hosted by PEI and sent to North American tank owners, fuel suppliers, equipment service providers, equipment manufacturers, tank/equipment regulators, cargo tank motor-vehicle owners, and others in March/April of 2010. Nearly 1,200 people responded and some findings from the survey were quite revealing:

- 496 (42 percent) of respondents reported increased equipment-related issues of one kind or another after introduction of ULSD.
- These respondents identified close to 5,000 locations with apparent ULSD-related problems.
- Reported problems were spread widely across the United States and Canada, rather than being confined to a particular geographic region.
- Only 124 (12 percent) of survey participants were service providers. Tank owners (including fuel suppliers who may also own tanks) accounted for 829 of the responses (69 percent). Six percent of the respondents were either tank or equipment inspectors/regulators.

Notably, 449 survey participants gave additional comments about their experiences with ULSD. The problems mentioned most frequently were:

- Filters clogging/requiring more frequent replacement
- Seal/gasket/O-ring deterioration
- STP replacement/column pipe wear/motor problems
- Tanks rusting/leaking (includes fuel tanks on vehicles)
- Meter failure
- Line leak detectors damaged or broken
- Automatic nozzle shutoff failure/shorter lifespan
- Tank probes malfunctioning
- Check valves not seating
- Shear valves not sealing/failing tests
- Swivels failing/shorter lifespan
- Dispenser leaks/failure/premature replacement
- Solenoid valves clogged/failing
- Corrosion on the riser pipe
- Pipe failure

On April 8, 2010, the stakeholders gathered again in Washington, D.C., to discuss the survey results and plan next steps. At that meeting, the consensus was that while the preliminary survey uncovered a variety of apparent ULSD-related issues, the results were inconclusive as to the potential causes of these issues. The meeting ended with the Clean Diesel Fuel Alliance (CDFA) agreeing to head future efforts to understand the nature and determine the causes of the problem.

The CDFA Steering Committee met May 19 and agreed to develop a tank-maintenance guidance document and post it on the CDFA website (*www.clean_diesel.org*). In addition, the committee will seek a consultant to assist in determining the scope and nature of the issues associated with the storage and dispensing of ULSD. The CDFA hopes to have more information on which to act by the end of the year.

The ULSD problem will be discussed this September at the National Tanks Conference in Boston. A more detailed report on the survey results is available at *www.peijournal.org*. ■

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Check out the updated National Tanks Conference & Expo website! Updates include:

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The 2010 conference will feature an optional Bulk Fuel & Marine Terminal Tour. This tour of the Gulf Oil Limited Partnership Chelsea Terminal provides a behind-the-scenes visit to the terminal responsible for providing a significant percentage of petroleum products to the New England Region. Go to the conference website to download an informational flyer. Space is limited, pre-registration is required. Sign up for the tour when registering for the conference!