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www.neiwpcc.org/lustline

Wannalancit Mills
650 Suffolk Street, Suite 410
Lowell, MA 01854-3694

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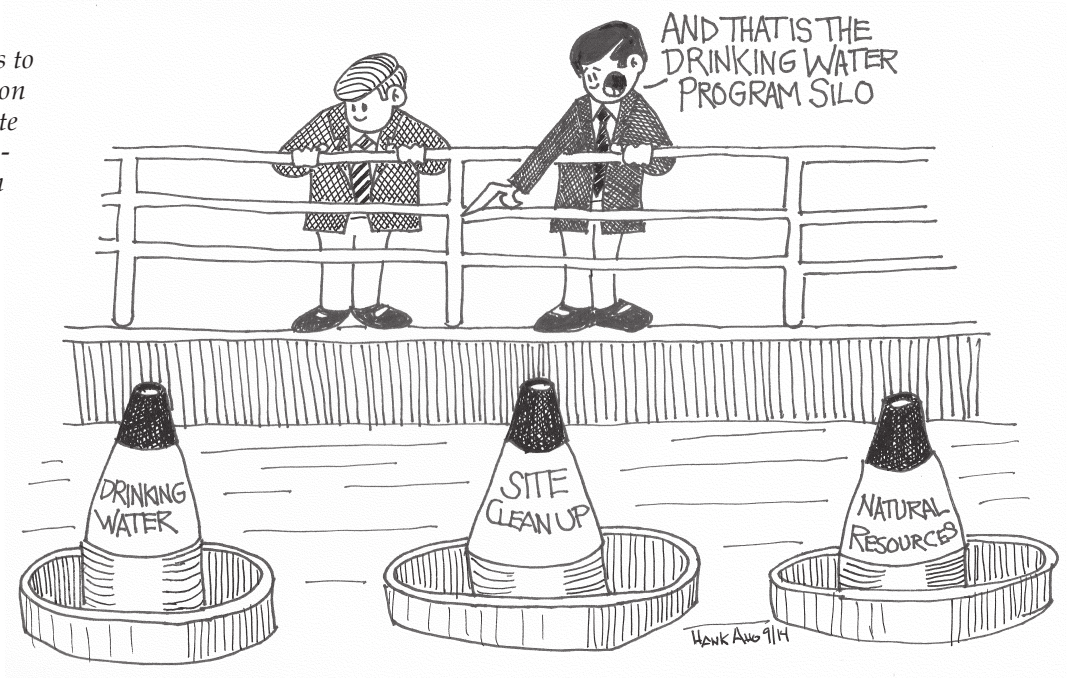
A Report On Federal & State Programs To Control Leaking Underground Storage Tanks

It's Time to Decommission the Silos

Reimagining a Remedial Program for New Hampshire

by Gary Lynn

I've accepted a new job. The job is to create a new MtBE Remediation Bureau and program for the State of New Hampshire; its first completely new environmental program in many years. A unique opportunity exists because the funding for this initiative is not tied to a specific class of site, type of grant, set of rules, or historical precedent. This gives us the freedom to reimagine existing programs and establish a more integrated and comprehensive response to MtBE problems. Limitations exist, however: all program activities must be geared toward addressing the widespread impacts of MtBE, the most common synthetic organic contaminant in New Hampshire groundwater.



Building on Lessons Learned

When thinking through the options for the new program, we evaluated existing programs and incorporated their most successful elements into our creation of something new. For example, in the beginning in New Hampshire there was the Groundwater Protection Bureau. This program had a broad mandate to address all things groundwater. In those days there were relatively few high-profile sites that the bureau could study in depth, regardless of contaminant or release source. The program was fully integrated (i.e., it had the mandate to address any type of site or contamination), but it was not organized to manage a large number of sites. Because program funding was limited and unreliable, the program lacked the resources

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to move seamlessly from study to cleanup. Nevertheless, the high degree of integration in this program and the focus on the key threatened resource were concepts worth emulating with our new program.

What followed next in our state's cleanup program evolution was what I would call the age of acronyms. In biblical terms it would go something like this: CERCLA begat TSCA begat RCRA Subtitle D, begat RCRA Subtitle I, and so on. Although these programs are quite effective, they tend to be focused and funded based on one specific class of site, which produces a situation of funding and information technology haves and have nots. Well-funded programs typically possess better databases and more robust staffing and resource availability. Poorly funded programs typically get by on what they can cobble together. Either way, there have been many successes that we can learn from and in some cases improve on (e.g., the creation of a successful cleanup program using a public reimbursement fund, a highly effective tank release prevention program, development of a digital library for reports and correspondence, a functional GIS system).

Based on the lessons learned we are developing an MtBE remediation program that will build on and use decades of experience to improve on existing structural and programmatic frameworks. Key objectives include the elimination of program "silos" and the development of a fully integrated program to address MtBE problems in the state. Think missile silos, not grain silos, and the isolation of the cold war warriors that manned them.

Although MtBE has been banned in New Hampshire since January 1, 2007, it is still of great interest. This gasoline additive is recalcitrant to biodegradation, highly soluble in water, and extremely mobile. New Hampshire is highly dependent on private, shallow drinking water wells that are vulnerable to spills and releases. These factors have made MtBE the most common contaminant in New Hampshire groundwater that is not naturally occurring. MtBE is a key contaminant at over 600 New Hampshire sites, and treatment systems have been installed at over 100 properties to address MtBE-contaminated drinking water supplies. In 2013, New Hampshire received money from litigation settlements and we are actively using these funds to create a new program to address the MtBE contamination problems.

Frustrations of the Funding Silo

By silos I mean that the grant and site-focused nature of existing programs have unwittingly produced structural barriers to full integration of cleanup activities. Funding is based on grants, and appropriations are tied to specific activities. Procedures are in place to ensure money is properly spent on these eligible activities, but the drawback is that it can be difficult to break out of the funding silo to ensure that programs are fully integrated.

Don't get me wrong, extraordinary efforts have been made in New Hampshire to coordinate and integrate distinctly separate programs. There have been many trips to the bowels of our building to review full size topographic maps depicting locations of water distribution lines when evaluating potential contaminated water supply remedies. Joint investigations and sanitary surveys have been conducted when community water supplies have detected contaminants. The effort to map MtBE trends statewide and develop correlations with risk factors was spearheaded by a joint Water and Waste Division task force.

The former head of the petroleum cleanup program even became the head of the Water Division and brought with him and acted on a thorough understanding of our separate systems and processes. Although the existing system has been made to work and work well, our goal is to eliminate the need for extraordinary effort and turn coordination into more manageable ordinary efforts.

For example, our drinking water program has separate databases that few site cleanup program staff can access. The drinking water program can access a GIS layer that maps existing water lines but most cleanup program staff do not have the necessary software licenses to use this information to quickly evaluate how close a water line is to a nearby contaminated water supply.

This situation is completely understandable and a predictable consequence of the existing structure of programs. The databases and GIS system for the two programs were developed independently and separately because of the different funding sources and programmatic grant commitment needs. The drinking water program is housed in a separate division and has several completely separate funding sources, a different statute, and different rules. Better access to these databases and GIS layers would eliminate extra coordination steps and significantly reduce the time and effort required to obtain relevant information.

To a lesser extent there are divisions among brownfields,

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Ellen Frye, *Editor*
Ricki Pappo, *Layout*
Marcel Moreau, *Technical Adviser*
Ronald Poltak, *NEIWPCC Executive Director*
Jaclyn Harrison, *NEIWPCC Project Officer*
Erin Knighton, *USEPA Project Officer*

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NEIWPCC
Wannalancit Mills
650 Suffolk Street, Suite 410
Lowell, MA 01854
Telephone: (978) 323-7929
Fax: (978) 323-7919
lustline@neiwpcc.org

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superfund, state sites, and other contaminated site programs. Separate funding, separate grant commitments, and differences in the types of sites create artificial divisions that do not foster integrated activity. Although a lot of effort has been put into coordination between programs, the existing structure impairs rather than enhances these efforts.

Here's the Plan

The silo issue is being addressed in a number of ways. Staff are being hired from a wide cross section of programs at the Department of Environmental Services (DES). Key positions have been filled from the drinking water program, as well as the contaminated sites program and traditional waste management programs. The diverse cross section of experience and disciplines ensures familiarity with all programs and databases. We are creating a new, more inclusive network of contacts and relationships with each new bureau employee.

Another way that these silos are being broken down is by the ambitious objectives of the new program. DES has designed the new bureau so it focuses on the following activities:

- Implementing measures to prevent further MtBE contamination
- Sampling and analysis of at-risk private drinking water wells
- Providing safe, clean drinking water to MtBE-impacted citizens
- Investigating and remediating MtBE-contaminated sites
- Installing and improving the public water supply infrastructure in areas with significant MtBE contamination.

Our state's traditional model for contaminated site prevention focuses efforts within either RCRA-based waste management program or a Clean Water Act–related drinking water program. With the exception of UST prevention efforts, these prevention efforts are independent from our cleanup program. Due to statutory limitations, cleanup funding is only available to responsible parties if petroleum storage tanks are present. Gasoline releases from drums or containers aren't covered. The recent spills of MCMH in West Virginia and fly ash lagoons in multiple localities highlight the disparity in national release prevention efforts and funding based on the type of chemical and storage scenario.

Prevention is cheaper than cleanup, so MtBE release prevention activities are a key part of the new program's mission. This is very similar conceptually to regular dental checkups for tooth decay prevention. In both cases, the alternative to prevention is the high costs of drilling, excavation, and backfill. Whether backfilling with dental amalgam or soil, prevention saves money and is much less painful than dealing with the alternative.

A strength of the new program is that our prevention efforts are not tied solely to releases from tanks. They extend to a number of other source areas. Funding is available to address the most significant MtBE release risks, regardless of the origin of the MtBE release threat. For example, several of our municipalities have suggested they would welcome a program that addresses junked cars. Removing all of the MtBE gasoline from old junk cars in the State of New Hampshire would not be practical. However, we intend to work on larger, more significant potential sources of releases than lots with the occasional junk car. This would include situations such as tanks with hundreds of gallons of old gasoline and junkyards with poor fluids handling practices.

The Unified Field Theory

The water supply testing program is a particularly interesting piece of the new program. DES has hired samplers for the new bureau whose job will be to focus on the evaluation of MtBE drinking water impacts. The water supply sampling scope is not dependent on negotiations with responsible parties and can address all potential MtBE sources in the aquifer. To ensure all MtBE sources are evaluated and addressed, our new program is working hard to integrate all available information on known MtBE contamination and aquifer water quality data into one platform. In physics, the Holy Grail is the integration of all theories into a unified field theory. With our data our holy grail is to integrate all of the data into a single GIS system. This wasn't a reasonable goal even five years ago, but now progress on a number of fronts makes this viable.

One of these paradigm-changing events is the development of GIS datasets by a wide variety of state agencies. Now a variety of powerful datasets are available, such as a statewide e911 street address GIS layer. This 911 street address initiative was implemented to ensure that there is a unique address for every property in the state. The information can now be compared with the locations of public water supply lines to identify properties outside of drinking water service areas that rely on private wells to obtain drinking water. The results can then be combined with another GIS data layer on property ownership thereby creating a powerful tool for the generation of mailings offering water supply well testing services to at-risk well owners.

GIS data layers are now available for the following: every class of contaminated site, our environmental monitoring database (EMD) of sample locations and results, source water protection areas, water supply well inventory, and drinking water supply database. We are using information from all these DES programs to learn where potential sources of contamination exist, where drinking water impacts have already been observed, and where water supply wells exist. Other GIS data layers are also available on water supply well construction details and geologic information such as areas with shallow depth to bedrock. When we design our water supply testing program for an area, GIS system capabilities ensure that we are compiling useful information from all programs regardless of division, agency, or data source.

The investigation and remediation piece of the new program is recognizable to anyone operating an integrated petroleum financial assurance program. It is focused on responsible party–based action with reimbursement of eligible costs. In the instance that a viable responsible party is not available, contracts are being put in place to ensure there is a robust state-lead response and cleanup effort. The main difference with the new program is that all releases are potentially eligible, not

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just releases from tanks. This creates the need to prioritize the potential projects, but fills in gaps in the existing programs that are more focused on tank releases.

Funding MtBE-Related Infrastructure

Finally, the ability to fund significant infrastructure projects to address MtBE-related problems is something new for us. Previously, funding limitations made it difficult to implement water line extensions and infrastructure projects. With the new program, our capabilities have been significantly expanded. Now, we can use the GIS system to search for all contaminated water supplies within a set radius of a water system distribution line. Instead of hours of time spent researching one site, in a similar amount of time all sites can be researched for cost effective, risk-reducing water line extension projects.

We will use our newly strengthened partnership with the drinking water program to learn about water supply projects that are in the planning or study phase so that we can evaluate potential opportunities to implement permanent solutions for MtBE-contaminated private drinking water wells. We will use the Safe Drinking Water Act water-quality-monitoring database to identify MtBE water supply problems in aquifers. This expanded focus has already resulted in significant additional collaboration and information sharing with the state's drinking water program.

Our program was authorized in December of 2013 and I started work as the first of the program's staff at the end of March of this year. In the short time that has been available, the Bureau has:

- Completed a statewide outreach effort
- Created a reimbursement system for site owners that complete MtBE-related cleanups
- Completed a tank removal prevention and cleanup project
- Initiated multiple water-line extension projects
- Approved funding for a project that seeks to relocate an MtBE-contaminated municipal water supply well.

Shortly, we will initiate, in collaboration with a municipality, an aquifer-testing project that addresses multiple sources of MtBE contamination with a potential water-line extension solution to address the contamination.

The scope of the state's efforts is certainly ambitious. For a problem of this magnitude, it has to be. Undoubtedly, there will be many lessons learned, and successes and failures. We believe that there is a strong, important tradition of states acting as a laboratory for new ideas and programs; hopefully this effort will contribute some additional ideas for ways to address the difficult aquifer protection and restoration problems we collectively face. ■

PS: My new job title at NHDES is Administrator of the MtBE Remediation Bureau. This new program and job was made possible by funds from the settlement of the state's MtBE lawsuit. I can be reached at Gary.Lynn@des.nh.gov. *Due to the challenges posed by the new job, I'm sorry to say that I will no longer be able to write my* LUSTLine *column "Cleanup Corner." It's been wonderful to be a part of the underground storage tank release prevention and remediation community and the* LUSTLine *publication.*

MtBE Remediation Bureau Cleanup

Snap, Crackle, Pop, Ignition… Richmond, NH

by Gary Lynn

In my article on page 1, I discussed the establishment and conceptual framework of New Hampshire's new MtBE Remediation Bureau. This case study illustrates how the new program enhances and integrates with existing programs by providing a summary of the first MtBE Remediation Bureau completed project—soil remediation and tank removal—at the Richmond Four Corners Store.

The Richmond Four Corners Store is located at the intersection of the two main roads in town, near the fire department and library. This country store and local gas station had operated since the early 1900s. At least five underground storage tanks (USTs) were located at the property. In 1992, high levels of gasoline contamination were detected in a neighbor's water supply well. An investigation was completed, and five point-of-entry treatment systems (POEs) were installed on impacted water supplies. Previous cleanup efforts included a 225-cubic-yard soil excavation in 1995 and the operation of a pump-and-treatment system from 2004 to 2008. Full remediation was impossible during this time period because the contaminated soil surrounded the active, remaining UST.

In 2013, the Richmond Four Corners Store closed. In 2014, the property mortgage holder commissioned an environmental due-diligence investigation as part of its foreclosure process. The property is currently in the mortgage "workout phase," according to the mortgage holder; the owner also owes back taxes to the town. In early 2014, the town, the property owner, and the Southwest Regional Planning Commission (SWRPC) worked together to apply for brownfields assistance to remove the existing UST system from the property.

The Town of Richmond was very engaged because of the back taxes, the central location of the property, and the boarded-up/in-foreclosure nature of the store. The MtBE Remediation Bureau quickly entered into these discussions and collectively,

Figure 1. *July 2014 contaminated soil excavation at the Richmond Four Corners Store.*

the decision was made to proceed with a joint project to remove the tank system and excavate the soil contamination.

Why This Project?

We selected this project for inclusion in our program based on a number of factors. First and foremost, there was a significant MtBE contamination problem that required cleanup—the new bureau's funding source is restricted to MtBE-related cleanup activities. Equally important was the high risk posed by MtBE contamination and the significant number of contaminated water supplies. Prevention of additional gasoline releases was a serious consideration because the tanks had been in temporary closure for years, and the property was heading toward foreclosure-process limbo.

The final factor prompting the selection of this site as our first project was what economists refer to as "opportunity cost." Immediate cleanup of the site was not on the remedial schedule for the state's financial assurance fund. If action wasn't taken immediately, however, the brownfields funding leveraging the project would have lapsed and the willing owner potentially replaced by a new player such as the bank or the winner of a foreclosure auction.

Figure 2. *Total Containment Enviroflex pipe unearthed during piping removal. NHDES had required such piping to be removed from UST systems due to ethanol compatibility concerns.*

Good Riddance!

In July 2014, SWRP's brownfields program removed the 12,000-gallon tank (Figure 1). During the piping removal, the contractor discovered a Total Containment's Enviroflex pipe (Figure 2). DES would have previously required the removal of this piping, if we had been aware of its existence, due to its gasoline compatibility problems. The outer pipe was blackened and stained, indicating the presence of gasoline between the inner and outer walls of the double-walled piping run.

When the excavator reached the impacted soil, petroleum vapors from the soil ignited as the excavator bucket scraped against a cobble. This suggests a recent gasoline release from the piping in the same area as the larger, older gasoline release. Approximately 946 tons of contaminated soil were removed, including contaminated soil below the building's dirt floor. The excavation project generated a great deal of community interest and one gracious nearby landowner provided freshly baked corn muffins and lemon bars to the hungry work crew.

NHDES will replace the groundwater monitoring wells and continue to reimburse for POE system operation. SWRPC will conduct a hazardous building material survey and indoor air survey to assist with site redevelopment. The remedial project and SWRPC's efforts should help to clean up area water supplies and revitalize this crucial town focal point.

DES believes that this site illustrates the importance of meshing with existing programs and the desirability of being able to act on release prevention, leveraging, and other opportunities that are not typically built into existing regulatory structures. ■

Transmissivity—the Emerging Metric for LNAPL Recoverability—Part 1

The Science Behind It

by Andrew Kirkman

Light Non-Aqueous Phase Liquid (LNAPL) transmissivity, identified as early as 2000 by David Huntley (Huntley, 2000), has been gaining traction in recent years as an emerging metric for assessing LNAPL recoverability at petroleum-contaminated sites. Industry organizations such as ASTM International and the Interstate Technology Regulatory Council (ITRC) have published guidance that includes or focuses on LNAPL transmissivity as a metric (ASTM International, 2013; ITRC, 2009). The states of Virginia and Michigan have included it as a metric recoverability in final guidance documents.

This evolution has risen out of historic frustration with relying on gauged LNAPL thickness as a metric. Thickness is great because it is cheap and easy to collect. But where's the part that says that thickness is great because it is accurate or that a given thickness or a small range of values provides a technical basis for identifying where recovery is beneficial? Thickness has been useful in telling us that some amount of mobile LNAPL exists at the site. But that isn't enough. So how can we overcome frustrations that have continually been encountered in the industry, such as "Why does one site produce lots of LNAPL at one foot of thickness and the next produces hardly any at four feet of gauged LNAPL thickness?"

This article describes the science behind LNAPL transmissivity as a recoverability metric. Prior to describing this I will review some LNAPL concepts to pave the way for the more interesting aspects of the topic in both this article and in Part 2.

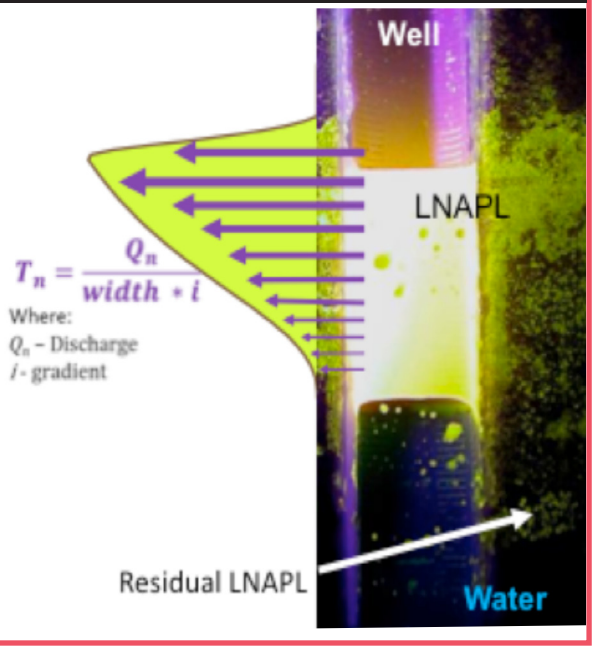
LNAPL Transmissivity (Tn)

What Is LNAPL Transmissivity?

LNAPL Transmissivity refers to the recovery rate of LNAPL through a unit width of aquifer for a unit gradient. It quantifies how much oil an entire formation thickness will transmit in a unit width for a 1:1 slope. It is analogous to groundwater transmissivity in that the term is directly related to the recoverability of LNAPL for a given drawdown.

$$T_n = \frac{Q_n}{width * i}$$

Where:
Q_n – Discharge
i - gradient



What Gauged LNAPL Thickness Tells Us

Gauged LNAPL thickness within a given well indicates that the soil in the formation exhibits sufficient LNAPL above residual saturation such that it has a continuous pore network within the soil to transmit LNAPL. In other words, the LNAPL transmissivity is above zero. Residual LNAPL in soil is similar to water in a sponge in that it does not drain completely. It is immobile to gravity drainage mechanisms and persists beyond hydraulic recovery as a source for vapor- and dissolved-phase contamination—thus its LNAPL transmissivity has a value of zero. Residual LNAPL affects many sites that have no gauged LNAPL in wells, as these sites can exhibit dissolved- and/or vapor-phase plumes because the residual LNAPL is acting as a source.

Where LNAPL exists above residual saturation, an accurate metric is a necessary means to evaluate the magnitude of LNAPL impacts above residual saturation, the rate at which LNAPL can be recovered, and, ultimately, where hydraulic recovery may be effective. Historically, gauged LNAPL thickness was used to determine the level of effort needed or whether hydraulic recovery of LNAPL would benefit the site. However, both sound science and experience have shown that it is difficult to consistently use thickness as a metric across sites or between wells.

The relationship between gauged LNAPL thickness and recoverability is affected by factors other than impacts alone (e.g., soil type, LNAPL type, hydrogeologic scenario). The recoverability and impact within a formation for the same LNAPL thickness can vary from well to well, and from site to site.

It is understood that a silt is less permeable than sand and therefore for a given fluid and saturated thickness of soil the silt will produce less for a given drawdown than the sand. Since articles such as Lenhard and Parker, 1990 and Farr et al., 1990 were published, it is now also understood that the magnitude of impact for a finer-grained soil is less than for a coarse-grained soil, given the same gauged thickness and LNAPL type. This level of impact can be referred to as LNAPL saturation, which is the fraction of pore space occupied by LNAPL. As the saturation of a fluid increases so does the ability of the formation to transmit that fluid under a given gradient induced.

The LNAPL saturation magnitude is dependent on soil type, which determines the distribution of pore

sizes, and capillary pressure (represented by gauged LNAPL thickness). Large pores require little capillary pressure for LNAPL to occupy relative to water. Smaller pores require larger capillary pressure to occupy. As the average pore size for a soil increases or the capillary pressure of the LNAPL increases, the higher the saturation.

Capillary pressure for unconfined LNAPL is represented by the gauged LNAPL thickness. Notice how the fluorescence increases with height above the oil/water interface in the transmissivity diagram on page 6. This is because the capillary pressure of LNAPL is zero at the oil/water interface and capillary pressure increases as the height above the oil/water interface increases. LNAPL saturation starts out low, near residual saturation at the oil/water interface shown in the diagram. The LNAPL saturation increases corresponding to increased capillary pressure (height above the oil/water interface). The peak capillary pressure and therefore saturation occurs at the air/LNAPL interface (note the high fluorescence shown in the diagram).

LNAPL saturation is directly related to the number of pores interconnected (i.e., an increase in the permeability of the soil to LNAPL). Relative permeability is the quantified parameter that relates LNAPL saturation to the fraction of the total soil permeability open to LNAPL flow. Relative permeability varies between 1, for 100 percent LNAPL saturation of the pore space, and zero, at residual LNAPL saturation. The soil permeability, LNAPL density, viscosity, and gravity, combined with integrating the relative permeability over the vertical interval over which LNAPL flows results in LNAPL transmissivity.

When a baildown test is completed a drawdown is induced and the formation responds by discharging LNAPL to the well. The saturation is known to be variable across the mobile interval. Therefore, the LNAPL relative permeability also varies; however, the discharge to the well represents the integral of all of the variables (soil permeability, LNAPL density, viscosity, relative permeability) over the mobile LNAPL interval. The varying saturation or even varying soil type and saturation are accounted for because the calculation of transmissivity utilizes the discharge that occurs from the entire vertical interval and the induced drawdown. LNAPL transmissivity is a summary metric that accounts for the varying saturation across the entire mobile interval of LNAPL.

Additionally, LNAPL has been identified as occurring in confined and perched conditions where the gauged LNAPL thickness in the well exaggerates the interval in the formation over which LNAPL flows (Illangasekare, et al., 1995, Hawthorne et al., 2011a, Hawthorne et al., 2011b, and Kirkman et al., 2013). Gauged LNAPL thickness data alone do not account for these additional factors, which is a fundamental reason why thickness has historically been inconsistent as a metric. LNAPL baildown tests can help to identify perched or confined conditions (Kirkman et al., 2013) and accurately quantify the LNAPL transmissivity for these conditions.

LNAPL transmissivity helps better quantify and prioritize the recoverability between wells and even sites because in addition to accounting for the thickness that LNAPL flows through it also accounts for soil permeability, magnitude of LNAPL saturation, and the LNAPL density and viscosity.

Factors That Affect LNAPL Recoverability

The factors that affect LNAPL recoverability are similar to the factors that affect water producibility in aquifers. The gauged water column is not the only criteria upon which aquifer producibility is considered. Specifically, aquifer transmissivity has been used consistently as a summary metric to describe aquifer producibility and incorporates the properties of water, thickness through which flow occurs, and permeability of a soil to the water.

The gauged water column is compared to the soil profile to evaluate whether it is an unconfined, confined, or perched aquifer. Then slug or pumping tests are conducted to determine aquifer transmissivity, which is generally viewed as independent of the drawdown induced.

The transmissivity metric is applicable regardless of whether one foot or ten feet of drawdown is being induced. It does not represent the influence of the recovery method but rather the aquifer properties alone. Similar to aquifer transmissivity accounting for the hydrogeologic settings of unconfined, confined, or perched aquifer conditions, LNAPL transmissivity also accounts for unconfined, confined, or perched LNAPL.

At some sites the recovery rate has been used as one of the metrics to measure remedial progress. LNAPL recovery rate is dependent on the drawdown induced to the LNAPL. Different technologies apply different drawdowns at a site (e.g., skimming versus vacuum-enhanced total fluids pumping). For two wells in exactly the same aquifer with exactly the same LNAPL recoverability, the well with the higher drawdown will produce more LNAPL, even though both wells technically have exactly the same LNAPL recoverability potential. LNAPL recovery rate is a metric that is dependent on technology as well as formation impacts. Thus, comparing recovery rate values across multiple sites or wells with varying drawdown is not a good comparison of the relative impacts alone.

LNAPL transmissivity is representative of formation conditions. LNAPL transmissivity estimates from recovery data normalize the recovery rate to drawdown induced. Therefore, a similar transmissivity value would be estimated from a given recovery well using either LNAPL skimming or total fluids recovery data. Additionally, the unit width ensures that a shorter LNAPL recovery trench does not skew the results relative to a longer LNAPL recovery trench.

The Goals of LNAPL Transmissivity

Returning to the well analogy, the pumping rates of the wells in the aquifer are not the criteria utilized to design gradient control groundwater extraction systems. Aquifer test(s) are conducted to calculate transmissivity for each aquifer, and these values combined with background gradients are utilized to design the gradient control systems or to support modeling fate and transport of

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contaminants. Lower transmissivity aquifers require less water to achieve a similar capture zone width.

Transmissivity normalizes out differences in drawdown between operational differences or technology types. The result of estimating transmissivity from baildown tests or recovery system data is a standardized transmissivity scale that is used to compare recoverability at different wells or sites. Such a scale is universal, regardless of aquifer or liquid properties. Consequently, a transmissivity value of 10 feet squared per day yields the same production potential in Montana as it does in Florida. This type of standardization is a beneficial property of metrics.

Additionally, in order to measure a recovery rate, a recovery system is generally needed. Recovery rate is not a characterization or leading metric, rather it is a lagging metric and is quantified after the installation of a recovery system. LNAPL transmissivity can be measured at monitoring wells using baildown tests or, if recovery wells are already present, it can be measured using the recovery system performance data. LNAPL transmissivity is both a leading and a lagging metric and is, therefore, both more robust and more meaningful.

The goals of LNAPL transmissivity are to:

- Provide accurate estimates of LNAPL mobility and recovery potential
- Improve upon the gauged LNAPL thickness and recovery rate by being universally comparable across sites, soil types, and hydrogeologic scenarios
- Provide a metric that is measurable throughout the remediation process such that it can be used during both characterization and remediation.

LNAPL transmissivity essentially relates the ability of the soil profile to transmit LNAPL (i.e., LNAPL recoverability) by incorporating LNAPL fluid properties (density and viscosity), permeability of the soil to LNAPL, the gravitational constant, and the thickness over which LNAPL flows.

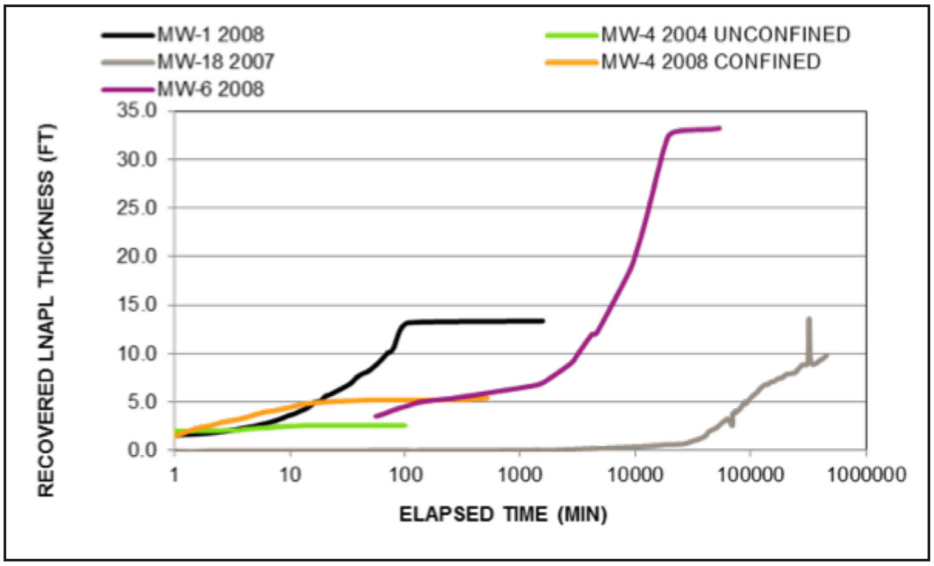

Figure 1. *Recovered LNAPL thickness over time from baildown tests.*

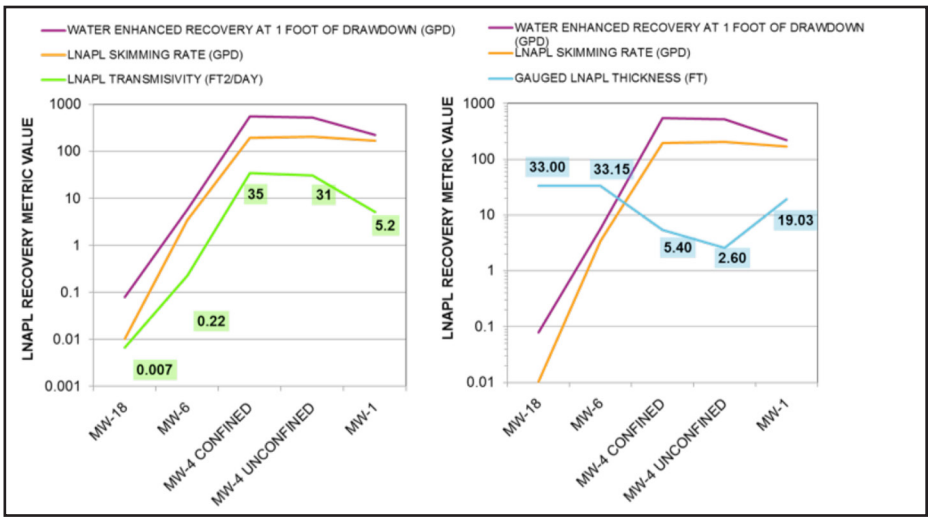

Figure 2. *Plots of LNAPL recovery, LNAPL transmissivity, and gauged thickness for various wells.*

LNAPL Transmissivity vs. Gauged Thickness

The set of data shown in Figure 1 provides a comparison of relative LNAPL recoverability to gauged LNAPL thickness. The figure shows the recovered LNAPL thickness in the well for five wells, one of which was tested under both unconfined and confined conditions. Well MW-6 recovered to 33 feet of LNAPL in 14,000 minutes, which is roughly ten days. Well MW-18 recovered to ten feet of LNAPL in one year and was expected to recover to 33 feet of LNAPL eventually. These wells recovered relatively slowly compared to well MW-1 which recovered to 12 feet of LNAPL in under two hours.

LNAPL transmissivity values were calculated for all of these wells and compared to LNAPL recovery rates. LNAPL recovery rates for skimming and an additional foot of water drawdown were then calculated based on the test results. Figure 2 provides both the gauged LNAPL thickness and LNAPL transmissivity as compared to achieved LNAPL skimming rates and calculated LNAPL recovery rates for one foot of drawdown.

The wells that stabilized the fastest exhibited the high recovery rates and LNAPL transmissivity values. The gauged LNAPL thickness trend does not correspond to the recovery trends and is inconsistent relative to the recovery rates. However, LNAPL transmissivity is proportional to the recovery rates. This is not surprising as the preferred metric for aquifer producibility has consistently been

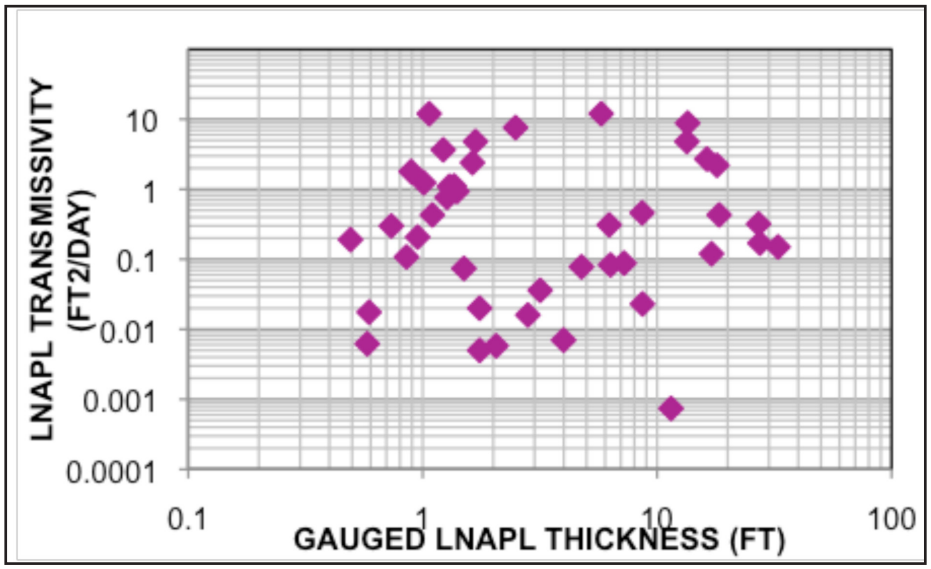

Figure 3. *LNAPL transmissivity values versus gauged LNAPL thickness.*

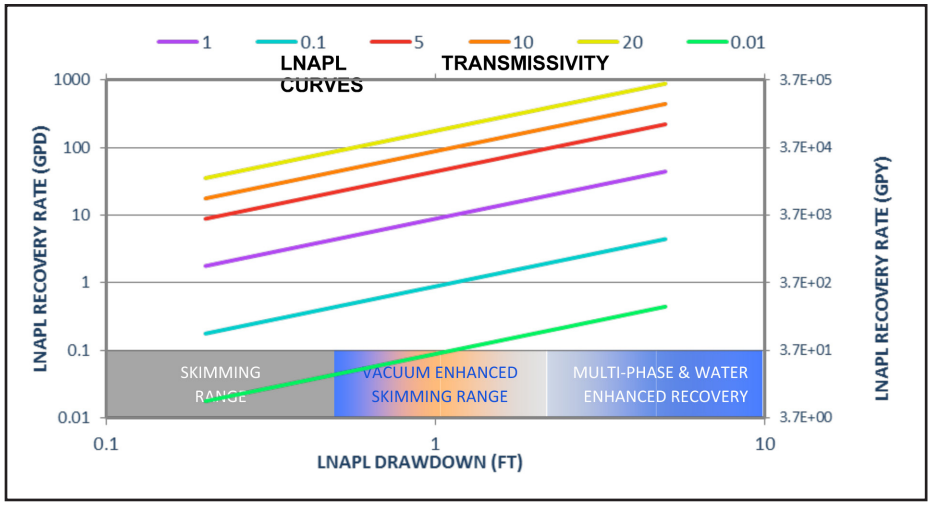

Figure 4. *Graph of expected recovery rate for a given LNAPL drawdown and LNAPL transmissivity.*

transmissivity rather than gauged water thickness.

Figure 3 plots LNAPL transmissivity versus gauged LNAPL thickness across several sites representing railroad and petroleum facilities with LNAPL existing in silts to coarse sand soil types in unconfined, perched, or confined conditions. Understanding that LNAPL transmissivity accurately portrays the recoverability for a given location in conjunction with this data highlights the inconsistency in applying gauged LNAPL thickness as a recoverability metric. Many of the larger thicknesses in this plot occur where LNAPL is primarily mobile in a sand lens that is several feet below the water table and overlain by a fine silty clay-type soil. The finer grained intervals do not exhibit mobile LNAPL in many of these cases. When the baildown test was conducted it became apparent that the LNAPL transmissivity and recoverability at these locations was low because of the low recharge rate into the well for a given drawdown.

So what does a given LNAPL transmissivity value mean in terms of an LNAPL recovery rate? Figure 4 is a graph of induced drawdown versus recovery rate. Each series plotted on the graph represents a different LNAPL transmissivity value. Recovery rate is plotted on both the left and right axes in different units to compare the recovery rate per day and over a one-year period. The location of the technologies named on the graph provides a general indication of the expected drawdown achieved from each of these technologies.

Stay Tuned

This article provides an introduction to LNAPL transmissivity as a recovery metric. However, it is not particularly enlightening as to when LNAPL recovery would benefit a given site. The follow-up article (Part 2) will discuss how LNAPL transmissivity at LUST sites relates to hydraulic recovery as an effective remedial technology. This discussion will include a description of the development of the LNAPL transmissivity range 0.1 to 0.8 ft^2/day identified by ITRC in the 2009 document *Evaluating LNAPL Remedial Technologies for Achieving Project Goals*. The discussion will not specifically attempt to define when remediation is warranted; rather it will identify when hydraulic recovery is effective and how LNAPL transmissivity can be used to support remediation strategies across various regulatory frameworks. ■

Andrew Kirkman is the lead LNAPL Technical Specialist for BP America. Andrew has led and participated in multiple industry advocacy efforts related to LNAPL. These include: chairing the ASTM task groups related to LNAPL transmissivity and LNAPL Conceptual Site Models; generating publications for Applied NAPL Science Review, American Petroleum Institute, *and* Groundwater Monitoring and Remediation. *Supporting ITRC since 2008, Andrew became an ITRC LNAPL trainer in 2012. He can be reached at andrew.kirkman@bp.com.*

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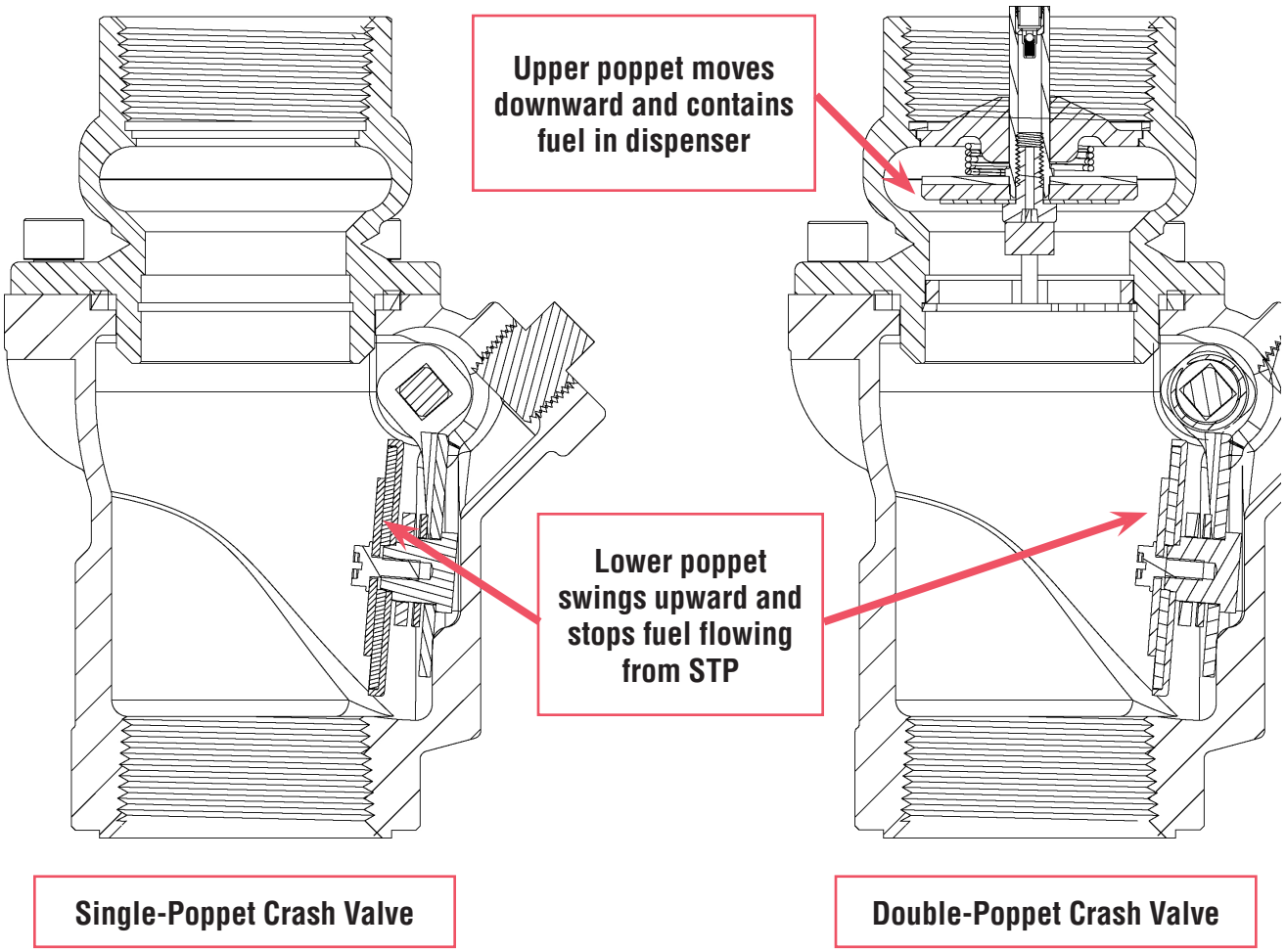
Tank-nically Speaking

by Marcel Moreau

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

Are Two Poppets Better Than One?



Note: Both valves are shown in the open position.

Graphic courtesy of OPW

Crash valves installed at the base of dispensers are supposed to stop the flow of fuel from the submersible pump when a vehicle hits the dispenser. Yet…

- **In New York State** this past July (2014), a driver, suffering from a medical condition, plowed into a dispenser at a high rate of speed. A substantial fire erupted immediately and was beginning to engulf the passenger compartment of the car when an off duty policeman, who was filling up nearby, bravely pulled the unconscious driver to safety (and then ran back to retrieve the ammunition in the trunk of his car before his vehicle was engulfed in flames.) But for the courage of the bystander, the driver would have been toast. (To view surveillance camera footage of this incident, go to: *https://www.youtube.com/watcH?V=V0HULVEK6I0&LIST=PLD185CA6C7ACA4E45&INDEX=51*)
- **In Washington State** (2012), a driver maneuvering at a gas station backed into a dispenser and knocked it over. Flames erupted as the driver drove away. The fire continued to burn for some time. (To view surveillance camera footage of this accident go to: *https://www.youtube.com/watch?v*

=gL360th3mFI&list=PLD185CA6C7ACA4E45&index=40)

- **In Maine** (2004), the inebriated driver of a pickup truck crashed into a dispenser, which immediately erupted into flames. The driver backed up and drove away. A couple fueling their car at a nearby dispenser ran for safety. An automatic fire suppression system eventually put the fire out, but not before the flexible piping in the sump beneath the dispenser had been substantially damaged by the heat. If an alert operator had not activated the emergency stop switch to shut down the submersible pumps, the fire could have been catastrophic. (To watch the video go to: *https://www.youtube.com/watch?v=zgTBtwoo1io&index=45&list=PLD185CA6C7ACA4E45*)

In each of these incidents, the single-poppet crash valves functioned as designed. Flow from the submersible pump was stopped and no geysers of gasoline erupted from the dispenser islands. But there were still serious fires that could have resulted in serious injuries or death. How come?

Alas, the Single-Poppet Crash Valve

When a single-poppet crash valve shears, the valve mechanism in the bottom half of the crash valve closes and stops the flow of fuel from the submersible pump. But the fuel already in the dispenser can flow out into the environment because the top part of the crash valve contains no valve mechanism.

How much fuel can be released? It depends on the dispenser design, but for dispensers with three products on each side, there could be as many as six filters, six meters, six hoses, plus tens of feet of tubing connecting all these components, potentially releasing several gallons of gasoline. When the vapor from the spilled gasoline encounters broken electrical wires, sparks from scraping metal, or hot components of the vehicle engine, the likelihood of a fire is high. The result? Serious fires that cause significant damage and sometimes kill or severely injure people.

Is There a Better Way?

A quarter century ago, at the request of oil companies seeking to limit the damage resulting from vehicle/dispenser crashes, petroleum equipment manufacturers introduced the double-poppet crash valve. The bottom half of the valve is identical to the single-poppet version of the crash valve. The difference is in the upper half. In the double-poppet design, the upper portion of the crash valve contains another valve mechanism that remains open as long as the crash valve remains intact. When the crash valve activates in an accident, the upper poppet closes and the gasoline in the dispenser components is contained.

Using double-poppet crash valves seems like a no-brainer in terms of safety. The additional cost seems easily justifiable as well, because the cost of repairing extensive fire damage from even one event will pay for the extra cost of a lot of double-poppet crash valves. Despite the apparent advantages, fire codes and industry recommended practices (with one exception) are silent on the advantages of double-poppet crash valves:

- American Petroleum Institute Recommended Practice 1615, *Installation of Petroleum Storage Systems*, states, "Double poppet or secondarily contained double poppet impact (shear) valves should be considered for additional safety." (API 1615, sixth edition, April 2011, p. 41).
- PEI RP 100, *Recommended Practices for Installation of Underground Liquid Storage Systems*, is silent on the matter. (PEI RP 100-11, p. 25).
- The *International Fire Code* also does not indicate a preference for either single- or double-poppet crash valves (IFC 2009, Section 2206.7.4).
- NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages* (the code that has required the installation of crash valves since 1966) is also silent as to which type of crash valve to use (NFPA 30A, 2012 edition, Section 6.3.9).

The NFPA *Flammable and Combustible Liquids Code Handbook*, which provides background information and additional commentary concerning the code requirements, explains that the NFPA Technical Committee does not recommend double-poppet crash valves because some members of the Committee believe that these valves pose a hazard to emergency response personnel. According to the Handbook, the concern is that if there is a fire surrounding the dispenser, the fuel trapped inside the dispenser could "forcefully rupture," endangering emergency response personnel who might be working to control the fire (*Flammable and Combustible Liquids Code Handbook, 2012 Edition*, p. 515). This has been the position of the NFPA Technical Committee since at least the 1996 edition of the NFPA Handbook (*Flammable and Combustible Liquids Code Handbook, 1996 Edition*, p. 404).

But is the scenario envisioned by the NFPA Technical Committee realistic? In other words, do dispensers equipped with double-poppet crash valves commonly blow up when they are hit and a fire results? Because a large number of double-poppet crash valves have been in service for many years now, we should be able to answer this question. What has been the experience of people who have used double-poppet crash valves as standard equipment for many years? To help answer this question, I sought the help of my colleague Ben Thomas of UST Training, who has a vast network of contacts in the UST world. Here's what we found.

- Larry Gregory, who was responsible for Exxon's gas stations on a global scale until a few years ago, reports that he specified double-poppet valves immediately after they were introduced. He is a firm believer in their ability to reduce fires when dispensers are hit and reports that he has never heard of an incident where a dispenser equipped with a double-poppet crash valve blew up.
- An east coast petroleum marketer with well over a thousand stations has also equipped his facilities with double-poppet crash valves for many years. He reports that on average he sees

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■ Tank-nically Speaking
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a dispenser accident about once a week, but despite hundreds of dispenser impacts in recent years, he has not had any fires that resulted from these incidents.

- Another east coast petroleum marketer with several hundred gas stations uses double-poppet crash valves exclusively and has thousands in service. These stations typically experience one or two dispenser accidents a month, but in the past 18 years, there have only been four fires. In one incident that resulted in a fire, the fire chief's report concluded that the fuel that ignited came from the vehicle and not the dispenser. This company has never experienced a dispenser explosion.

John Albert, who administers Missouri's tank program, reports that dispensers in Missouri with non-metallic product piping must either have double-poppet crash valves or fire extinguishers installed in a sump beneath the dispenser. The rules reflect John's experience that double-poppet crash valves greatly limit the potential for fires when dispensers are hit. "We've had many dispensers get hit over the past 25 years, but very few fires," says John. He is aware of the differing points of view among fire officials but has never had a dispenser explode because of a double-poppet crash valve. "My experience is that the soft seals in the meter and filter are the first things to fail in a fire scenario. This results in a slow release of product, but no explosion."

OPW is a major manufacturer of both single- and double-poppet crash valves for use not only in North America but also throughout the world. Glenn Eckart of OPW told us that the OPW double-poppet shear valve has incorporated a pressure relief feature since it was first introduced in the late 1980s. Since they were first manufactured in the late 1980s, no one at OPW can recall ever receiving a report of a dispenser equipped with a double-poppet crash valve exploding.

These anecdotal reports from a variety of knowledgeable people clearly point to the advantages of double-poppet crash valves and provide no support for the NFPA position that these valves pose a threat to emergency response personnel. We e-mailed Robert Benedetti, Principal Flammable Liquids Engineer at NFPA, to ask whether they knew of any incidents where the "forceful rupture" of a dispenser equipped with a double-poppet crash valve had actually occurred.

Mr. Benedetti replied, "This issue of single- versus double-poppet valves came up several editions of the code ago. At the time, the Technical Committee discussed this issue with respect to fire suppression activities. As I recall, the fire service representatives on the Technical Committee were leery of a fire beneath a dispenser whose components contained liquid that was 'locked in.' This issue has never been brought up since."

If experience shows otherwise, then all that needs to be done is for someone to submit a proposal to amend NFPA 30A to allow the double-poppet design.

Bottom Line?

You guessed it. We believe that double-poppet crash valves have clear safety advantages over the single-poppet versions and their use should be at least a recommended practice if not an outright requirement. While some well-informed petroleum marketers are already using double-poppet crash valves, many marketers who are not aware of the added safety provided by double-poppet valves continue to specify the single-poppet versions. This substantially increases the risk that fires will result when dispensers are hit and people will get seriously hurt. Our goal in writing this article is to educate the UST community about this issue and to encourage UST owners to seriously consider double-poppet shear valves as a means to limiting liability, limiting damage, and ultimately, saving lives.

Oh, and we do plan to submit a comment to amend the next edition of NFPA 30A. ■

If you have a shear valve story you'd like to share showing how single- or double-poppet shear valves did or did not save the day, we'd love

Crash Valve Musts

While crash valves are the wallflowers of the UST world, waiting patiently for their turn to save the day, they must not be ignored. Crash valves are critical pieces of UST safety equipment that must be properly installed and maintained if they are to do their job. Here are some basics:

- They must be rigidly anchored to the island and properly fastened to the dispenser
- They must be installed at the proper height relative to the dispenser island
- They should be tested for operation annually
- Fittings tightness testers installed in the test plug opening of the valves must NOT be left in place when the tightness test is completed.

You Say Crash, I Say Shear

The crash valves in this article are called different names around the country. What do *YOU* call them?

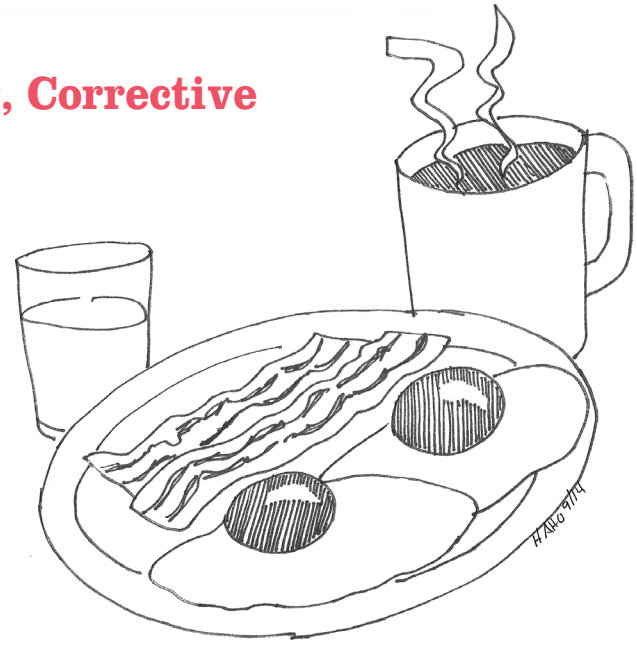
- ☑ Crash valve
- ☑ Shear valve
- ☑ Fire valve
- ☑ Impact valve
- ☑ Emergency shutoff valve
- ☑ Earthquake valve

A "Pig" Chews Over Meeting Federal UST Regulatory Goals

Part 1 – Leak Detection, Reporting, Corrective Action, Tank Closure

by Patrick Rounds

> *In a breakfast of bacon and eggs, the chicken is involved, but the pig is committed.*
>
> Attributed to Fred Shero



In 1984, the administrator of the USEPA was directed to "promulgate release detection, prevention, and correction regulations applicable to all owners and operators of underground storage tanks, as may be necessary to protect human health and the environment." This November marks 30 years since UST regulations became a federal priority. So let's walk through the directives one at a time to see, in my view as an insurer, how well we are doing.

The average cost of corrective action for an UST release is over $144,000. Once a release has occurred, as an insurer, we aren't just involved; we have a significant financial liability. We are the pig in the corrective action breakfast. For the pig, unlike the chicken that can lay another egg tomorrow, there is no turning back.

The company I represent, Petroleum Marketers Management Insurance Company (PMMIC), provides financial responsibility coverage for thousands of our customer's UST facilities. Most of our policyholders are also our shareholders. We want every one of our policyholders to be successful so they can continue in business as our customer and as an investor in our company. Our goals are to eliminate UST system leaks, stop leaks that occur as quickly as possible, and respond immediately to address corrective action and minimize third-party liability if a leak becomes a release. We use strict underwriting standards, experienced professional actuaries, stringent loss control programs, and result-driven claims management practices to ensure our, and our customers', success.

If regulations don't work, we are directly impacted. In simple terms, if tank regulations are a bacon and eggs breakfast, regulators may be the chickens who are dedicated to the meal but who can also keep trying in the future. As insurers, we are the fully committed pig that is all in—if an insured tank leaks, we pay. Corrective action costs us money. If too many of our insured tank systems fail, we fail. We don't get to lay another egg. So, although we don't write the regulations, we need the regulations to achieve their intended goals so we can achieve ours. Quoting Yoda, "Do. Or do not. There is no try." Trying does not keep a business in business.

FEDERAL REQUIREMENTS, ACT 1

Leak Detection

Regulations include:

(1) requirements for maintaining a leak detection system, an inventory control system together with tank testing, or a comparable system or method designed to identify releases in a manner consistent with the protection of human health and the environment

(2) requirements for maintaining records of any monitoring or leak detection system or inventory control system or tank testing or comparable system

(3) requirements for reporting of releases and corrective action taken in response to a release from an underground storage tank

(4) requirements for taking corrective action in response to a release from an underground storage tank

(5) requirements for the closure of tanks to prevent future releases of regulated substances into the environment.

Results

(1) and (2) federal regulations and most state regulations require that tanks be monitored monthly with a system that can detect a release of 0.2 gallons per hour. Pressurized lines must be monitored monthly and have an automatic line leak detector (ALLD) to identify catastrophic leaks of 3 gallons per hour or greater. Federal UST regulation also allows owners and operators the option to conduct an annual line tightness test. As of March 31, 2014, USEPA reports that state compliance figures vary from a low of 26%, to a high of 100% compliance, with an average of 79.3% of regulated UST facilities in significant operational compliance with release detection regulations at

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■ Meeting Regulatory Goals

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the time of the most recent regulatory inspection.

(3) Nationally we have reported more than 517,300 releases. We don't know how this compares with the actual number of releases that have occurred.
(4) Nationally we have addressed and closed over 85% of all confirmed releases. State Funds have spent more than $15 billion on corrective action.
(5) Nationally we have closed over 1,806,000 tanks. That is three times more than the remaining regulated tanks.

Areas for Improvement

■ **LEAK DETECTION.** The USEPA notes that *"Significant operational compliance (SOC) generally means that the UST systems at a facility have the proper equipment/procedures in place, and are being properly operated and maintained in order to detect a release."* SOC does not mean that every tank and every line is in compliance at all times. SOC may mean that each tank and each line had adequate records to demonstrate compliance for eight or more of the past 12 months (75% monthly compliance). Allowing some leeway in recordkeeping makes sense but allowing leeway in capability or operation does not. During our annual inspections, if any system is not in full compliance with leak detection system requirements, the insured is given a 60-day timeframe to correct the deficiency or the policy is canceled. Nearly every facility complies with the compliance request and policies are not canceled.

- **Dispensers.** Federal leak detection requirements do not cover dispensers even though our on-site inspections have documented that approximately 90% of all leaks occur at the dispenser and the USEPA published a study in 2004 indicating that nearly half of all closures studied in South Carolina had contamination at the dispenser islands. Although dispensers are currently outside the USEPA UST program's regulatory authority, some states do require under-dispenser containment and monthly leak detection. Leak detection isn't leak detection if dispensers are not included. Our inspections address every dispenser, every man way, and every component of the UST system. If any leak is discovered the insured must address the release immediately, no exceptions.
- **Safe suction** systems do not require monthly line leak detection. Safe suction systems can leak at or above the check valve and allow a dispenser leak to go unnoticed for a very long time. The South Carolina study noted that contamination at the dispenser islands was not affected by the type of pump present, which means that suction systems had as much contamination under dispensers as pressurized systems. If you are not checking for leaks where leaks occur, you do not have adequate leak detection. Dispenser inspections are crucial for evaluation of suction systems and leak detection in general. Periodic visual inspections of this area of an UST system is relatively simple and requires very little cost to achieve.
- **ALLDs** require quiet time (electronic line leak detectors require pump shut down, mechanical line leak detectors require pump start up to trigger the tests) and may not identify large line leaks at high volume facilities where the pumps may not shut down for many hours at a time. Any portion of a line that is hidden from the leak detector by a solenoid or other valve is not being tested. Such valves often separate satellite dispensers. Leak detection that doesn't cover all portions of a pressurized line is not adequate. While many owners and operators may believe they are in compliance with leak detection, in fact, they are not.
- **Non-Sudden Leaks.** Significant releases have been identified at tank closure even though the tanks have excellent records demonstrating monthly compliance with 0.2 gph leak detection requirements. Slow, non-sudden leaks cause significant damage. Many releases have been discovered at tank closure without any previous indication of a release. We need better leak detection.

Fully contained systems with continuous electronic liquid sensors could address many of the leak detection deficiencies. We need to work with the industry to convert facilities to be fully contained with continuous electronic monitoring. Until then, our insured single-walled systems will pay higher premiums than fully contained systems and will require more diligent oversight. More frequent inspections can help reduce the probability of releases from non-contained systems.

■ **RELEASE REPORTING.** We need to remain vigilant for undiscovered releases. We also need to use release information better. Internally, we compile data on every release from our insured population. Cause of loss, method of discovery, system information at time of the loss, and other data is obtained by our insureds and our claims adjusters. We use this data to look for solutions to address causes of releases and to modify our premiums for various tank systems. Better data allows us to have a more discerning and more reliable premium structure.

Unfortunately, state reporting of cause of loss is limited and inconsistent. A review of all available state reports indicates that "unknown" is the number one cause of reported releases and the number one source of releases. Regulators should obtain and evaluate the same data that insurers use. State funds should use this same data to control and project future liabilities. All cause of loss data should be submitted to USEPA so it can be compiled and utilized by every regulatory agency with jurisdiction over UST systems.

The more data, and the better its reliability, the better we can all use it to manage our futures. The information is there, it just has to be documented, compiled, and tracked. Nationally, three percent of UST facilities have a release each year. We should be able to use release data to reduce the frequency of releases. EPAct 2005 required states to report number, sources, and causes of releases. States should take this requirement to heart and provide as accurate data as possible.

■ **CORRECTIVE ACTION.** State funds have spent more than $15 billion on corrective action. Are we $15 billion better off? We need to focus our limited resources to address necessary corrective action. We need to reduce the need for and the cost of corrective action. No matter who is paying for corrective action—an owner, a state fund, or an insurer—if costs become excessive, corrective action will be delayed and may not be completed. As several state funds have recently realized, unless you prioritize your resources on real threats to human health and the environment, available funds will be depleted and many cleanups will not be completed.

Corrective action should be risk based and designed to protect human health, not to return all dirt and water to pre-human status. Cleaning groundwater only to pump it into the wastewater stream is a waste. Monitoring a site without specific monitoring objectives is a waste. Any required monitoring report that is not reviewed and relied upon by the regulator is a waste. Let's use our financial and technical resources wisely.

■ **TANK CLOSURE.** A significant number of substandard tanks have been closed. Let's not allow a new wave of substandard tanks to become abandoned. We need to eliminate the potential for future abandoned tanks by enforcing limits on temporary closure. If a tank system is economically viable, there is little reason for it to be temporarily closed for more than one year. Business transactions generally do not idle viable business infrastructure for more than a year. We insure temporary closed tanks for longer than one year, if the regulatory agency approves an extended temporary closure, and if we insured the tank while it was operational. The coverage is basically an extended reporting period until the tank system is closed.

All tanks should maintain financial responsibility coverage until permanently closed. Closing substandard tank systems (any system that is not fully contained) should be a high priority for all state assistance programs. Former UST facilities have better resale values if the tanks are removed and corrective action (if required) is addressed. Many insurers may not provide coverage for tanks in temporary closure more than one year. Allowing continued temporary closure may result in an unfunded release at the time of closure. Don't allow unfunded releases to occur.

If You Are the Pig

The shortfalls in release detection and release reporting can be addressed with greater attention to on-site inspections and consistent regulatory requirements. Instead of relying on the three-year regulatory inspection schedule, we inspect our insured systems every year. Inspections reduce our corrective action liabilities. Instead of relying on regulatory enforcement of technical operating requirements, we enforce underwriting criteria immediately with cancellation notices. Because our insureds know what to expect and because we are consistent in our expectations, our cancellation notices rarely result in cancellation. Owners will address operational compliance if they know it is required for their continued business operation.

Even if we were perfect at implementation, it doesn't mean we would necessarily achieve all intended goals. However, we would be closer to achieving our goals of protecting human health and the environment if, as an industry, we did a better job of implementation. Implementing loss control strategies that go beyond the federal law as many tank owners and some states do, will also get us closer to our goals.

Inspections and operational compliance are business issues—if you are the pig. The entity responsible for responding to a release has the greatest risk from non-compliance. The Missouri PSTIF recognized this and has been conducting inspections for years and has been reducing PSTIF liabilities as a result. Spend a little on inspections and system fixes, or a lot on corrective action. If you were the pig, you would choose inspections. ■

Stay tuned for ***Part 2 – New Tank Standards and Financial Responsibility,*** *and* ***Part 3 – Energy Policy Act Requirements*** *of this series.*

Patrick Rounds is President and CEO of PMMIC Insurance. He can be reached at pjr@roundsassociates.com.

Let's Talk "Green"...at LUST Sites

ASTM's New "Standard Guide for Greener Cleanups"

by Alexander Wardle, Kevin Carpenter, Tom Potter

Greener Cleanups have their origins in the 1999 Clinton Presidential Executive Order *Greening the Government Through Efficient Energy Management*. In 2007 a Bush Presidential Executive Order, *Strengthening Federal Environmental, Energy and Transportation Management*, gave further impetus to the concept of integrating sustainability- and life-cycle-assessment principles into government activities. Those ideas have been developed for site remediation practices by three key sectors: private, state, and federal.

Private industry started the ball rolling with its Sustainable Remediation Forum (SURF) in 2006; state government followed with the Association of State and Territorial Solid Waste Management Officials (ASTSWMO) Greener Cleanups working group in 2007; and USEPA published its technical primer, *Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites*, in 2008, followed by the *Principles for Greener Cleanup* in 2009. The "*Principles*" is the defining document for USEPA's greener cleanup policy, establishing a framework with five core elements for evaluating greener cleanup activities. The core elements are: minimize total energy use and maximize use of renewable energy; minimize air pollutants and greenhouse gas emissions; minimize water use and impacts to water resources; reduce, reuse, and recycle material and waste; and protect land and ecosystems.

In 2009 USEPA asked the ASTM International (ASTM) to initiate a task group to develop a greener cleanup standard through its consensus process. In the same period the Department of Energy, the Army, Navy, and Air Force all developed guidance and approaches to green and sustainable remediation. In 2011, the Interstate Technology and Regulatory Council (ITRC) published two documents on Green and Sustainable Remediation.

ASTM's task group, which included a broad range of stakeholders from the cleanup community, released the *Standard Guide for Greener Cleanups* E2893 in November 2013 (see resources listed at the end of the article). On December 23, 2013, Mathy Stanislaus, USEPA Assistant Administrator for the Office of Solid Waste and Emergency Response (OSWER), issued a memo to regional administrators and OSWER program directors recommending that they facilitate and encourage use of the standard to reduce the environmental footprint of cleanup activities.

What Is a "Greener Cleanup?"

A greener cleanup seeks to minimize energy use, waste generation, and other external impacts (e.g., air emissions) that might be associated with the remediation. It includes all phases of cleanup, from initial site characterization to final site closure. A greener cleanup does not require an assessment of financial cost, broader sustainability issues, or remediation objectives, which remain determined by the relevant regulatory program laws, regulations, and guidance.

How is a greener cleanup adopted for a LUST case, and what does that mean to the case management process? In a 2009 survey the top barriers the ASTSWMO workgroup identified to adopting greener cleanup methodologies included: a lack of awareness of greener cleanup practices, the potential for more costs, the absence of any regulatory authority to require greener cleanups, the lack of any incentive to promote greener cleanups, and the perception that a "greener cleanup" is "greenwashing" used to justify a less effective remedial solution.

For these reasons and others, incorporating greener cleanup methodologies is not yet part of the routine case management process. What follows is a brief review of the ASTM process and examples of how, within the normal regulatory process, the ASTM standard approach can be used to identify and select "greener cleanup" practices that are as effective as a "traditional" cleanup.

The ASTM process

The ASTM guide describes a process that can be used to select practices that minimize the environmental footprint of a cleanup project and to ensure that the activities selected are appropriate and properly documented.

The standard identifies five cleanup phases—site assessment (characterization); remedy selection; remedy design and implementation; operation and maintenance; and remedy optimization—each of which can be evaluated and optimized with regard to implementing "greener" best management practices (BMPs). In most cases, LUST sites are sufficiently small that a review of BMPs for each phase may be sufficient. Generic tools, such as the *Leaking Underground Storage Tank Footprint* calculator described in *LUSTLine* #73, may be appropriate ways of providing a program-wide quantitative assessment of remediation technologies without requiring a site-specific evaluation.

The BMP evaluation consists of five steps:

1) Review BMPs that are potentially applicable to the site conditions and cleanup phase

2) Prioritize BMPs with the greatest potential for reducing the environmental footprint (essentially based on the five "core elements" described in USEPA's 2009 *Principles for Greener Cleanup*)

3) Select BMPs from the prioritized list for implementation and provide rationale for those not implemented

4) Implement the BMPs

5) Document the work.

Figure 1. *Hollow stem auger (HSA) vs. MIPS and LIF with direct push. Note the waste drum for the HSA rig and the bucket for the direct push—a significantly different amount of waste.*

ASTM provides a list of over 150 BMPs which can be sorted by cleanup activity (e.g., sampling and analysis), remediation technology, or core element.

How Might This Process Work at a LUST Site?

Here are some examples of some practices that have been selected at LUST sites, and how they might be evaluated using the ASTM process.

Site Characterization

Traditional LUST site characterizations typically include three to five, eight- to twelve-inch diameter, hollow-stem auger boreholes with four-inch monitoring wells. Each 30-foot well typically generates four to five drums of potentially contaminated soil, requiring offsite transport and disposal. In addition, well purging during sampling requires removal of three well volumes of water and may generate 20 to 30 gallons of water, again, requiring containment and offsite disposal.

Using Table X3.1 of ASTM E2893-13, "Greener Cleanup BMPs," waste disposal options could be to "segregate drilling waste based on location and composition to reduce the volume disposed of off-site, or to "use alternative drilling methods, including direct-push technology…to minimize drill cuttings that require disposal" (Figure 1). A sampling and analysis BMP could be to select the "direct sensing, non-invasive technology."

Another best management practice could be to use "treated water" from borehole purging to manufacture the well grout. Implementation of these BMPs would reduce the environmental footprint across all five core elements discussed in the framework for both the USEPA *Principles* and the ASTM standard.

Monitoring

With regard to site monitoring, selecting ASTM's multi-port sampling systems BMP (particularly advantageous in bedrock) minimizes the number of wells installed,

■ *continued on page 18*

Figure 2. *A multi-level ("CMT") bedrock monitoring well with multiple groundwater elevation gauges. A single well gains the same data as five separate wells at multiple elevations.*

■ **Greener LUST Sites** *from page 17*

which addresses the "materials and waste" and "land and ecosystems" elements (Figure 2). Selecting passive or no purge groundwater sampling addresses the core elements of water use and materials and waste. Additionally, in-situ monitoring with automated data logging addresses the core elements associated with energy, air, and water by minimizing sampling visits and volumes.

Corrective Action

As for corrective action, the opportunities for implementing green cleanup BMPs multiply, from the initial selection of remedial technologies through to onsite implementation. Tools such as the *Leaking Underground Storage Tank Footprint Calculator* described in *LUSTLine* #73 help quantify the power and fuel category of potential remedial technologies.

Particular corrective action options can be further evaluated using the ASTM BMPs. Examples of BMPs used at gasoline releases under existing regulatory procedures include phytoremediation with native or non-invasive plant varieties, passive sub-slab depressurization and one-way check valves to promote barometric pumping, and a directly wind-driven compressor operating a biosparge system to increase the dissolved oxygen at a gasoline UST spill site (Figure 3).

A Matter of Mindfulness

These brief examples show that following a "greener cleanup" approach at LUST sites using the ASTM standard guide need not be a heavy lift—alternative and effective technologies exist, their benefits can be described, technologies already used at LUST sites are applicable, and they do not require regulatory change to implement. The "greener" approaches for LUST sites are often no more expensive than traditional methods and frequently save money. The use of "greener cleanups" at LUST sites is, as with so many environmental decisions, more a matter of making mindful choices than being precluded by regulatory or cost barriers.

Figure 3. *A wind-driven compressor operating a biosparge system to increase dissolved oxygen.*

Check Your Case Files for Examples

Deborah Goldblum, with USEPA Region 3's RCRA program, has been a leading contributor to national efforts to integrate greener cleanups into remediation projects. She is interested in highlighting various applications of ASTM's *Standard Guide for Greener Cleanups*. Contact Deb at Goldblum.deborah@epa.gov if you have a project that might be a suitable candidate.

USEPA is holding a series of Greener Cleanup Standard Guide state trainings. The next will be at the USEPA Region 5 Office in Chicago on November 18, 2014; 9:30 – 4:30 Central Time. For remote access, contact Brad Bradley at Bradley.brad@epa.gov. Check USEPA's Contaminated Site Clean-Up Information (Clu-in) website (*http://www.clu-in.org/live/*) for details on other forthcoming training opportunities. ■

Alex Wardle is an environmental geologist with the Virginia Department of Environmental Quality petroleum program (Alexander.Wardle@deq.virginia.gov). Tom Potter is the Clean Energy Development Coordinator at the MADEP Bureau of Waste Site Clean Up (thomas.potter@state.ma.us). Kevin Carpenter is with the New York State Department of Environmental Conservation (kevin.carpenter@dec.ny.gov). Tom, Kevin, and Alex were members of the ASTSWMO Greener Cleanups workgroup that has recently sunsetted.

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Interstate Technology and Regulatory Committee (ITRC), *Green and Sustainable Remediation: State of the Science and Practice*, May 2011.

Linder, S., Magnan E., Graves, K., Barnes, A., Cooper, K., and Martinson, M. It's the LUST Footprint Calculator (a la Green Remediation), *L.U.S.T.Line* Bulletin 73, June 2013.

The President, *Executive Order 13123 – Greening the Government through Efficient Energy Management*, Federal Register volume 64, No. 109, June 8, 1999.

The President, *Executive Order 13423 Strengthening Federal Environmental, Energy and Transportation Management*, Federal Register, Volume 72, No 17 2007.

USEPA, *Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites*, 2008.

USEPA Office of Solid Waste and Emergency Response, Principles for Greener Cleanup, August 2009.

USEPA (Mathy Stanislaus), *Encouraging Greener Cleanup Practices through use of ASTM International's Standard Guide for Greener Cleanups*, December 2013.

Resources

ASTSWMO: *http://www.astswmo.org/Pages/Policies_and_Publications/Sustainability/Greener_Cleanups.html*

ITRC: *http://www.itrcweb.org/Team/Public?teamID=7*

USEPA: *http://www.clu-in.org/greenremediation/*

http://www.epa.gov/oswer/greenercleanups/

SURF: *http://www.sustainableremediation.org/remediation-resources/*

A Message from Carolyn Hoskinson

Director, USEPA's Office of Underground Storage Tanks

Sound State Funds Make Good Sense

More than 25 years ago, USEPA developed a financial responsibility regulation to ensure that owners and operators can pay the costs of cleaning up leaks from underground storage tanks (USTs) and compensate third parties for bodily injury or property damage resulting from leaks. The financial responsibility regulation at 40 CFR Part 280, Subpart H allows UST owners and operators to choose from a variety of financial mechanisms to comply with the regulation. One option is for UST owners and operators to participate in a state UST financial assurance fund that provides money for cleanups.

Many UST owners and operators participate in their state funds and rely on state funds to help them meet the financial responsibility requirement. In addition, state funds pay for most UST cleanups. As re-emphasized in our January 2012 guidance for reviewing state UST funds, USEPA takes quite seriously our responsibility to ensure state funds are sound and adequate money is available to clean up releases from underground storage tanks.

With that responsibility in mind, USEPA in fiscal year 2013 collected and analyzed state fund soundness data from 34 (out of 35 total) states that have funds. Our goal in collecting this data was to provide a starting point for discussions with state funds and, when needed, hold collaborative conversations with state funds. Ultimately, we want to ensure there is money available to pay for cleanups and determine if there are adequate financial resources to keep moving cleanups forward. In our analysis, we did not compare state funds to each other, nor do we plan to do so in the future. Rather, we compared states to themselves and looked at trends over time.

State Funds Analysis Findings

In working to analyze state funds, we heard about many of the similarities among the state funds. And, as expected, we heard that state funds have distinct differences and nuances regarding their structure, funding, and coverage. As is often the case, the devil is in the details; and, we heard lots of details. Below is an overview of our findings about state funds.

- **Most state funds look fine and have sufficient money, and a few look great** – We looked closely at two areas: whether a state fund is showing sufficient environmental performance by reducing the number of cleanups remaining and whether a state fund is in a decent financial position with enough money to keep making progress on cleaning up releases. Here is the good news: in most cases money is available, cleanups are moving forward, and the cleanups remaining are decreasing. Also, we found that in most cases revenue appears sufficient going forward to continue making environmental progress.

- **A few state funds are struggling** – It was interesting, but not surprising, to hear that a few struggling state funds are dealing with staffing constraints and financial challenges. For these state funds, cleanups appear to be slow to reach completion and revenue may be insufficient. USEPA is working with these states to devise a plan for improving the health of their funds.

- **Some state funds are heading toward recovery** – Some state funds that had struggled in the past are implementing changes to address their weaknesses and challenges. The result is those state funds are making progress toward recovery.

- **Some state funds are doing a lot of work on fraud** – As discussed in the June 2014 *LUSTLine* articles by Missouri and California, even though state fund fraud is a problem, states are working to uncover, investigate, and prosecute it. State funds are using increasingly more sophisticated data-mining techniques, among other strategies, to prevent and uncover fraudulent billing practices. For example, some states are moving to electronic claim submittals, which aid in comparing and reviewing claims faster.

- **A few states are looking at getting back into the state fund world** – Interestingly, we heard that a few states, which don't currently have active state funds, are thinking about creating or restarting state funds. These states are realizing the benefits of a state fund in keeping cleanups moving forward.

While there is no bright line between a sound state fund and an unsound state fund, our data review and analysis provided us with a better understanding of the condition of state funds. USEPA's renewed focus and emphasis is providing us all with more information, which will help us together work toward overall strengthening of state funds. As the old management adage says, you can't manage what you don't measure.

■ *continued on page 20*

A Message from Carolyn Hoskinson continued... continued from page 19

What Are States Doing to Continue to Strengthen Their Funds?

Because there are so many variations in state funds' end of year money balances, cleanup times, average cleanup costs, and percent of universe covered, we do not need or want a one size fits all approach. We saw that some state funds are increasing fees, which results in increased revenue and improved financial positions of funds. Some state funds are directing money toward abandoned tanks, while one is directing money toward prevention and compliance. These and other approaches result in positive benefits for the environment, even though they take different ways to get there.

State Funds for Next Year and Beyond

Two years of experience in looking at state fund data has given us a good baseline about the soundness of state funds. Looking ahead, we want to streamline the process and triage our efforts to focus on those funds experiencing challenges.

Our discussions with state funds have raised broader questions, such as: What kind of financial responsibility are those owners and operators not covered by state funds using? Are deductibles causing cleanup delays in some states? Are some ways of determining fund eligibility creating orphaned leaking UST sites?

Moving forward, USEPA will continue working with states to strengthen state funds and ensure they provide appropriate financial assurance for UST tank owners. This makes good management sense and good business sense because sound state funds are important financial engines that help drive our program forward toward achieving our goals. ■

STATE FUNDS BY THE NUMBERS

- **35 states** have state financial assurance funds, which help UST owners comply with the federal financial responsibility regulation; these funds pay to clean up newly reported releases as well as ongoing cleanups
- **5 states** have funds, which no longer provide financial responsibility for UST owners, but continue to pay for those ongoing cleanups where they assumed financial responsibility in the past
- **10 states, the District of Columbia, and 5 territories** rely entirely on USEPA-approved, privately-funded financial responsibility mechanisms to finance all UST cleanups and comply with the federal financial responsibility regulation
- **Approximately $1 billion** = state funds raised in 2013 for cleaning up underground storage tank leaks
- **Approximately $20 billion** = cumulative amount state funds paid since the early 1990s to clean up underground storage tank leaks

EPA's state fund website
www.epa.gov/oust/states/fndstatus.htm

Ten-Year Old UST Violation Saga Ends with Payment of Over $2.8 Million

In September 2004, USEPA filed an administrative complaint against Duncan Petroleum Corp., Dover, Delaware, citing violations of federal regulations designed to detect and prevent leaks from USTs at five Maryland gasoline stations. That complaint was settled in a February 2006 consent agreement that included a $65,000 penalty, and required measures to ensure continued compliance with UST safeguards.

After Duncan Petroleum failed to carry out the compliance measures, USEPA inspected 13 additional Duncan Petroleum stations, documenting UST violations at each facility. In December 2008, after providing multiple opportunities to settle the matter, the United States Justice Department filed a civil action against Robert Duncan and Duncan Petroleum. After two days of jury trial, the claims were resolved in August 2010 by a stipulated order, agreed to by Robert Duncan, requiring payment of a $2 million penalty by December 15, 2010.

Robert Duncan failed to pay the agreed penalty, claiming an inability to pay. After analyzing his financial information, the government discovered that six months prior to trial, Robert Duncan conveyed assets worth about $10 million to several LLCs, trusts, and foundations under his control.

In August 2011, the United States filed a new complaint against Duncan and affiliated parties, seeking to void these asset transfers pursuant to the Federal Debt Collection Procedures Act. On the eve of the trial in March 2014, Duncan stipulated that the government had sufficient evidence to establish that most of the transfers were fraudulent, and the United States agreed to delay proceedings to permit him to settle his liability by selling and refinancing assets.

As of August 11, 2014, the United States has received total payments in settlement of the federal lawsuit of $2,889,351.97, which includes the $2 million penalty imposed in 2010, plus interest, as well as attorney's fees and costs exceeding $450,000, and daily, stipulated penalties exceeding $300,000. ■

Field Notes

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

At Long Last, Recommended Practices for Emergency Generators

While the requirements contained in 40 CFR 280 regulate underground storage tank (UST) systems associated with emergency power generators (except for Subpart D requirements for release detection, which were deferred), standard and consistent engineering practices have not been fully developed for the design and installation of these fueling systems. Recognizing the critical need for viable guidelines/practices, PEI formed a Generator Fueling System Installation Committee in 2012 and asked it to write recommended practices for these systems. The committee recently completed its work and PEI's *Recommended Practices for the Design and Installation of Fueling Systems for Emergency Generators, Stationary Diesel Engines and Oil Burner Systems* (PE RP1400-14) is now available to those who wish to know more about the subject.

The recommended practices in this document are limited to the design and installation of shop-fabricated tanks, piping, and auxiliary equipment for oil burners and stationary systems that provide fuel to diesel-powered pumps and generators for primary, standby, and emergency use.

The recommended practices only address systems that operate on distillate fuels, such as diesel or #2 fuel oil. Systems using gasoline, natural gas, compressed natural gas, liquefied natural gases, and/or any other products are not included in this document.

The recommended practices may be applied to aboveground storage tanks, USTs, day tanks, and/or sub-base (belly) tanks, piping, and all associated auxiliary equipment in the fueling system. Maintenance and operational items are mentioned only if they relate to the initial tank installation system. Since the committee was not quite sure of what would be required on equipment inspection in the final UST regulation, RP1400 suggests that specific, ongoing, or periodic inspections should follow industry codes and/or accepted inspection and maintenance practices and procedures.

RP1400 includes many chapters common to most PEI recommended practices (e.g., definitions, tank placement and installation, piping and components, electrical, testing, documentation, and training). But the document also includes chapters that cover subject matter unique to emergency generators. For instance, the chapter on pump and controls recognizes there is no "one-size-fits-all" design for systems that supply fuel to an emergency generator or fuel-supplied burner. Since design considerations can include sizing of the tank, how much redundancy the user needs, which alarms the user needs to see, and external controls, each are extensively described in the document. Although not required by the current UST regulation, selection and installation of release detection equipment is also covered.

Typical supply and return piping from a tank.

Another chapter in RP1400 that you will not find in other PEI recommended practices concerns the fuel to be stored, since the design of the fueling system can affect fuel quality. For example, excessively large tankage will increase the average age of the fuel, which could make it more susceptible to the formation of paraffin, wax, and asphaltene structures. The document recommends a water draw-off sump and/or floating suction assembly to greatly reduce problems from water contamination and biological growths. And the committee suggests consideration of a fuel polishing system when designing stand-alone emergency generators.

Recommended Practices for the Design and Installation of Fueling Equipment for Emergency Generators, Stationary Diesel Engines and Oil Burner Systems (PEI/RP1400) can be purchased at *www.pei.org/rp1400*. The price is $40 for PEI members and regulators; $95 for nonmembers. Regulators purchasing online should contact Teresa Jonkman (tjonkman@pei.org) to receive help in obtaining member pricing.

CNG Fueling in the Works

PEI is in the final stages of publishing *Recommended Practices for the Design, Installation, Operation and Maintenance of Compressed Natural Gas Vehicle Fueling Facilities* (PEI/RP1500-14). The PEI CNG Vehicle Refueling Committee met in September to review and act on public comments to the document. We expect the finished document to be available before March 1, 2015.

While CNG fueling facilities are common across many parts of the globe, CNG dispensing facilities are still relatively rare in the United States. Recent dramatic increases in natural gas production in the United States have given CNG a cost advantage over traditional liquid motor fuels. This cost advantage has provided the incentive for many fleet operators and some members of the general public to look to CNG as a way to significantly reduce fuel costs.

I recognize that most state and federal UST personnel do not/will not regulate CNG dispensing facilities. Aside from the outward appearance of the fueling island, CNG fueling facilities have little in common with traditional liquid motor fuel storage and dispensing systems. But it's likely you will come into contact with one of these facilities since it is likely to be attached or adjacent to an UST regulated facility. This 100+ page recommended practice will give you a real good idea about what you are looking at. ■

FAQs from the NWGLDE

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

What Is the Correct Operating Mode for My ATG—95% or 99%?

In this issue's FAQs from the National Work Group on Leak Detection Evaluations (NWGLDE) we discuss the different operating mode settings that can be used on an automatic tank gauge (ATG). Please Note: the views expressed in this column represent those of the work group and not necessarily those of any implementing agency.

Q. ***I use an ATG that was evaluated by a third party with the equipment in the "99% operating mode." During a compliance inspection, the inspector pointed out that the ATG was in the 95% operating mode, and since there was no evaluation for the 95% operating mode he said that the ATG must be set to the 99% operating mode. I contacted the ATG manufacturer to follow up. They said they had no plans to have an evaluation done for the 95% operating mode. Do I need to have the ATG set to the 99% operating mode?***

A. We will try to explain the 99% and 95% operating mode in the prelude to your question, but whether you need to operate your ATG in the 99% operating mode is a question that must be answered by your regulatory agency. Most UST regulators would recognize 95% as the figure associated with the Probability of Detection (Pd) for leak detection. What that means is that statistically, a method must be capable of identifying a leak of a certain size at least 95 times out of 100. If a method cannot achieve that level of precision, then it does not meet the federal standard for UST leak detection precision. A number of leak detection methods are capable of performing *better* than the minimum federal standard, and are capable of accurately declaring a leak of a certain size 99% of the time, so their P(d) is said to be 99%.

Think of "operating mode" as a measure of sensitivity, like an eye exam. If you go to the optometrist for a vision check and you can correctly read a certain size letter at a specified distance, then the doctor can say you have 20/x vision, with the x being the description of your specific vision compared to an ideal standard. The optometrist's goal is that you have 20/20 vision, and he may need to prescribe corrective lenses to reach that goal if your unaided vision is not at that level. Let's say 20/20 vision is equal to the 95% operating mode, so the expectation is that most people can see 20/20, or be corrected to see 20/20, so you might say most people would be in the 95% operating mode.

If you examine eye charts, many of them have rows of letters below the 20/20 vision line. These lines measure people who may have better than 20/20 vision, and sometimes these individuals may have extremely good vision, like 20/15 or even 20/10 vision. Think of those individuals with 20/10 vision as equal to the 99% operating mode. So if you had an eye exam and it determined that you had 20/10 vision (99% operating mode) it would automatically mean that you could see 20/20 (95% operating mode). With that explanation, does it make sense why it would be pointless for a manufacturer who had been evaluated in the 99% operating mode to go back and have another evaluation in the 95% operating mode?

Regarding your question concerning a regulatory agency request to have an ATG set to the 99% operating mode: that would be up to the regulatory agency. During installation, the ATG set-up menu provides a choice between a 99% or 95% operating mode. The 95% operating mode means an ATG is slightly less sensitive, but still capable of detecting leaks at the minimum 95% P(d) level required. If a regulatory agency determines that an ATG must operate at the same level as it was evaluated by the third party who performed the evaluation, then you should always comply with the guidance given by the regulatory agency. ■

OOPS! In the *LUSTLine* #74 issue, in the first sentence of the first answer to the first question in this column, we stated an incorrect date. The USEPA regulations became effective 12/22/1988, not 12/22/1998. *Gasp!*

About the NWGLDE

The NWGLDE is an independent work group comprising eleven members, including ten 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, 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 USEPA 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.

Changes in NEIWPCC's Training Program

by Jaclyn Harrison

For more than 25 years the New England Interstate Water Pollution Control Commission (NEIWPCC) has been working with USEPA's Office of Underground Storage Tanks (OUST) to enhance information sharing among state, territorial, and tribal UST-related programs. Funded through a cooperative agreement with USEPA OUST, NEIWPCC has been actively developing training opportunities for the past four years.

In 2009, NEIWPCC began discussions with USEPA OUST on developing a national inspector training program to address training needs identified by states. After many months of planning and gathering feedback, NEIWPCC held its first webinar (Tank and Line Tightness Testing) in June 2010. These trainings were so popular among inspectors that NEIWPCC began placing more emphasis on training to address LUST corrective action, state fund, and financial responsibility issues.

In order for the growing training program to remain sustainable, a few changes have been made to the training development process.

TRAINING SCHEDULES: Both UST and LUST training will be scheduled on a quarterly basis. To see a current training schedule, visit: *http://www.neiwpcc.org/ust/schedule.asp*.

AGENDA SURVEYS: For regional in-person inspector trainings, a survey has been created with a list of the most frequently requested agenda items. When a regional training is planned, this survey will be sent to that region's states, territories, and tribes to gain feedback on their specific training needs. This feedback will then be used to develop the training agenda.

INTERNAL DATABASES: Over the next couple of months, NEIWPCC will be gathering information on speakers and site locations. Having all of this information in one place will make planning more efficient.

TOOLS: NEIWPCC is exploring new ways to engage learners, both online and in-person. This month, we will explore a new webinar platform that will allow for more participation from attendees. We hope to introduce some new tools to classroom trainings in the future as well.

Although things are changing, we hope the new process will continue to offer everyone sufficient opportunities to voice their training needs. The good news is that NEIWPCC will be able to process training more quickly and efficiently. Attendees should also benefit from increased opportunities to actively participate.

If you would like the opportunity to provide feedback and guidance on training needs, contact Jaclyn Harrison, NEIWPCC's tanks program manager, at 978-349-2515 or jharrison@neiwpcc.org. ■

LUST Factoid

Owner/Operator Training Required for Temporarily Closed UST Facilities

USEPA's *Grant Guidelines to States for Implementing the Operator Training Provision of the Energy Policy Act of 2005* (EPAct) requires operator training for all federally regulated UST systems, including those in temporary closure status. Owners and operators of federally regulated UST systems, at minimum, must complete state-specific operator training requirements. Only UST systems that are deferred, excluded, or permanently closed, as identified in the federal UST regulation at 40 CFR Part 280, are exempt, by the grant guidelines, from meeting operator training requirements. ■

L.U.S.T.LINE
New England Interstate Water
Pollution Control Commission
Wannalancit Mills
650 Suffolk Street, Suite 410
Lowell, MA 01854

Non-Profit Org.
U.S. Postage
PAID
Wilmington, MA
Permit No.
200

USEPA Extends Biofuels Blending Requirements Deadline...Again

USEPA is extending the compliance period for refiners to meet 2013 renewable fuel standard (RFS) requirements, citing delays in finalizing the 2014 standards.

In a direct final rule issued August 1, 2014, USEPA said it would extend the deadline for refiners to submit RFS compliance reports until 30 days after the 2014 rule is finalized. The agency previously said refiners would have to show compliance with the 2013 standards by September 30, 2014. According to USEPA this action is being taken because the agency is still working on the 2014 RFS final standards and is "taking the time to get them right."

USEPA's proposal for 2014, released in fall 2013, has been highly controversial and taken much longer to finalize than the agency originally anticipated. It would represent the first rollback of the federal standards for both ethanol and advanced biofuels, requiring refiners to blend 15.21 billion gallons of biofuels this year.

USEPA received more than 16,000 comments on the proposal from supporters on both sides. Farmers and biofuel producers warned that the proposal would erase some gains made in the rural economy and energy independence and hurt development of the advanced biofuels industry. The petroleum industry and other supporters of the rollback cite the 10 percent ethanol "blend wall" as a limitation that prevents ethanol from being added into the fuel supply at higher concentrations than can be safely blended. Lobbying was heavy for both sides.

At this point it is unclear when the 2014 rule will be finalized; it should be released by November 2014, as a draft of the rule for final review was sent to OMB on August 22, 2014. ■

NEW ASTSWMO PUBLICATION

LUST Trust Fund Fact Sheet

The Tanks Subcommittee has developed a *LUST Trust Fund Fact Sheet* to summarize information, guidance, and budget information specific to the LUST Trust Fund. The Trust Fund provides federal funding to support USEPA's, states', territories', and tribal LUST prevention and response programs. The document is available at: *www.astswmo.org/Files/Policies_and_Publications/Tanks/2014-08-AST-SWMO-LUSTTrust-FundFSv2.pdf*