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L.U.S.T.LINE

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

Sandy Clobbers Long Island Home Heating Oil Tanks

by Karen Gomez

For several days, like many others, I monitored the weather reports and warnings as Hurricane Sandy approached Long Island. Although only a predicted Category 1 storm at landfall, meteorologists referred to the storm as Superstorm Sandy, due to its record size. Would the impacts on Long Island be significant? Our recent experience with Hurricane Irene in 2011 was moderate coastal, tidal flooding in low-lying coastal areas, accompanied by high winds felling trees and power lines throughout Long Island. In terms of fuel spills, Irene was mostly characterized by several hundred transformer spills, and only a handful of fuel spills, on Long Island.

Ominously, however, Hurricane Sandy approached very slowly, building up water in the New York bight for several days in advance. The tides were rising, and expectations grew that Sandy would be far worse than Irene for coastal Long Island and New Jersey. With coastal flooding exceeding anything that had ever been recorded before, we simply did not have a full comprehension of the type and kind of damage we would be dealing with. The New York Department of Environmental Conservation (NYSDEC) prepared for the storm; response vehicles were stocked with response equipment, oil absorbent supplies, and had full tanks. The incident command system was activated…then we waited.

The Lay of the Land

Geographically, Long Island extends 118 miles east of New York Harbor to Montauk and includes four counties, two of which (Brooklyn and Queens) are boroughs of New

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York City. However, Long Island is often referred to as only including Nassau and Suffolk counties, which are my jurisdiction, in NYSDEC's "Long Island" office.

According to the 2010 Census, the population of Nassau and Suffolk counties is more than 2.8 million. Given people's desire to be near the water, Long Island's south shore mainland is densely populated along miles of natural and man-made canals. The canals extend north from a bay system protected from ocean wave action by barrier beaches. These communities include commercial establishments such as retail stores, restaurants, marinas, and gas stations.

Landfall

Hurricane Sandy made landfall northeast of Atlantic City, New Jersey, early on October 29, 2012. Onshore winds pushed huge amounts of water toward the shores, and a full moon compounded the storm surge. The record storm surge caused water levels to rise 7 to 14 feet above normal on the north and south shores of Long Island. As a result, there was extensive tidal flooding on both shores, and on the relatively flat, low-lying south shore tidal flooding extended more than a mile inland in some places, with as much as 9 feet of water in some communities in southwest Nassau County. Streets and homes were flooded, trees and power lines knocked down, and boats and docks scattered throughout communities.

On the morning of October 30, I wound my way through a maze of downed trees and power lines to NYSDEC's office, only a mile from home. The building had power, an encouraging sign, but NYSDEC's office is inland, on the elevated north shore of Long Island. Most of the island had no power, most traffic signals were out, many secondary roads were blocked with trees and debris, and gasoline availability was soon to be a logistical problem that would last for several weeks.

Awash in Heating Oil

Before long, NYSDEC started receiving reports of floating and tipped heating oil tanks in communities that spanned more than two-thirds of Long Island's south shore. The agency immediately sent responders to evaluate impacts. What they found was a pattern of oil-coated flood waters throughout the south shore communities. By midday NYSDEC had tasked and dispatched dozens of teams of oil spill response contractors to recover oil from tanks and accumulated floodwaters that remained after the tides receded.

As it turned out, in the weeks that followed, more than 3,900 spills were reported throughout all four counties of Long Island; with more than 2,600 spills reported in Nassau and Suffolk counties. In Nassau and Suffolk, residential heating oil tanks caused approximately 80 percent of the spills; damaged transformers caused 15 percent of the spills. Communities that were heavily impacted by fuel oil included Mastic, Moriches, Town of Babylon, and shoreline communities throughout southern Nassau County.

What caused the spills from heating oil tanks? In the first instance, we saw that floodwaters floated and then tipped and disconnected outdoor aboveground tanks from houses. Floodwaters carried away many floating tanks, depositing them in yards, wetland areas, and canals. Floating or wind-strewn boats, docks, and other debris also damaged tanks. Many tanks, upon first observation, appeared to have survived the floodwaters; however upon closer inspection, we determined that floodwaters entered aboveground tanks through fill necks or vents, and displaced oil or left an oil/saltwater mix in the tanks.

L.U.S.T.Line

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As residents returned to their homes, NYSDEC began receiving reports of oil in basements and crawlspaces. In some cases, oil had been carried by the floodwaters into the homes. However, we found floodwaters had filled the basement and crawlspace tanks through fill or vents and displaced the oil. Sadly, even some residents in Nassau County communities who had switched to natural gas for heat and hot water were affected, as they had never removed or completely emptied their "abandoned" oil tank. In fact, some residents told us that they had always been connected to gas and never knew that there was an abandoned tank in the crawlspace.

Jumble Response

The vast tidal flooding made the source of many of the reported spills difficult, if not impossible to positively identify. Rising, windblown waters during the storm spread the floating product that leaked from tanks, and receding tidal waters deposited floating product, coating land surfaces and structures, often with no more that a thin residual stain or coating. Complicating things even more, we discovered over time that many underground fuel oil tanks also filled with water that had displaced oil. In some cases, we found underground tanks that had actually floated up out of the ground by force of the floodwaters.

NYSDEC targeted its response efforts at recovering as much oil as possible as staff went through impacted communities street by street. NYSDEC responders from other parts of the state and contractors helped to assess and recover oil from areas that were heavily impacted, based on reports that we received and our own observations. For six weeks, working 12- to 16-hour days, NYSDEC spill responders assessed impacted areas, pumped out tanks, corralled oil, and used all available means to maximize product recovery so that residents could begin to restore their homes.

Responders even lassoed floating tanks and hauled them onto docks so contractors could pump them out. In total NYDEC pumped more than 225,000 gallons of oil/saltwater from more than 1,300 locations with floating, tipped, or unstable tanks; tanks where an oil/saltwater mix prevented power or heat restoration; impacted basements or crawlspaces; yards with floating oil; storm drains; and canals.

NYSDEC also provided absorbents to residents to pad up small amounts of oil indoors and outdoors and advised residents on how to clean residual oil on indoor structures to alleviate oil odors. Responders were not able to recover all oil, and oil-stained lawns were a community concern brought to our attention. However, research indicates that natural processes, such as evaporation and biodegradation, play an effective role in reducing these residual amounts left behind. In fact, as of spring, former turf areas will likely be suitable for replanting.

What About Those Retail USTs?

Early on, there was also concern regarding the fate of the underground tanks at gas stations that were flooded. Fortunately, New York State petroleum bulk storage regulations and compliance efforts by both the state and the counties limited problems in this regard. On Long Island, most underground tanks at regulated facilities are double-walled fiberglass. The tanks were intact although many took on some water from the flooding. Notably, NYSDEC did not receive reports or observe any evidence of significant gasoline spills from these tanks. Nevertheless, stations that were flooded had to replace pumps, dispensers, leak detection, and any other electrical devices that were impacted by the saltwater.

Reflecting on the Future

While NYSDEC has completed most of its response efforts, many homeowners are still faced with rebuilding their homes. Many will carefully consider whether or not to heat their homes with oil. Some will connect to natural gas lines that may already be available to them and others will consider propane. Certainly, our experience demonstrates that residents with unused tanks should remove and properly abandon these tanks given the impacts noted from even a small amount of oil floating on the surface of the floodwaters. In New York State bulk storage facilities with less than 1,100-gallon capacity are below the regulatory threshold. However, local jurisdictions are now considering stricter controls in flood prone areas.

Some scientists and climatologists are warning that New York State can expect storms like Sandy to be more frequent and worse as a result of climate change and sea level rise. Clearly, Long Island remains vulnerable with its dense residential communities along both shores. Rebuilding and restoration efforts should consider that this storm might not have been a once in a lifetime event and take measures secure the fuel storage and delivery infrastructure to withstand another Sandy-like event. ■

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Bunyan, Babe, and Natural Attenuation

The Bemidji Crude Oil Research Project Is a Gift that Keeps on Giving

by Jim McCann and Mark Toso

Natural attenuation is a concept so engrained in the LUST world it's easy to forget that not long ago it was a hotly debated topic. Natural attenuation involves a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. The concept of natural attenuation was first documented in the far northern reaches of Minnesota, the stomping grounds of the mythical Paul Bunyan and his trusty blue ox Babe. That neck of the woods is also the whereabouts of the Bemidji Crude Oil Research Project, the longest operating natural attenuation research site in the country. The work done here has led to significant advancements in our understanding of natural attenuation and biodegradation processes, but few know its history and remediation contributions.

Paul Bunyan and Babe have been on the National Register of Historic Places since 1988.

Why Bemidji?

From 1983 to the present, the U.S. Geological Survey (USGS) Toxic Substances Hydrology Program has supported interdisciplinary research at the site of a crude-oil spill near Bemidji, Minnesota, in an effort to understand the physical, chemical, and biological processes controlling the migration of petroleum hydrocarbons in the subsurface. We now recognize the multiple controlling processes at work under the concept of "natural attenuation." Since its inception, the project has supported research by the USGS and more than a dozen academic institutions.

The crude oil spill took place on August 20, 1979 when a pipeline carrying crude oil from Canada ruptured and released approximately 10,700 barrels (450,000 gallons to those not in the "industry") of light crude oil. Additionally, oil under high pressure sprayed from the ruptured line and impacted an area of about two acres, which is known as the "spray zone." Crude oil flowed to topographically low areas and, aided by the predominantly sandy soils and a shallow glacial outwash aquifer, infiltrated to the water table, eventually forming three light non-aqueous phase liquid (LNAPL) bodies. Initial recovery efforts removed approximately 75 percent of the spill volume, leaving an estimated 105,000 gallons of crude oil in the subsurface. Of these, the north pool is the most extensively studied.

MNA versus NA

Monitored natural attenuation, or MNA, refers to the "reliance on natural attenuation processes (within the context of a carefully controlled and monitored site cleanup approach) to achieve site-specific remediation objectives within a time frame that is reasonable compared to that offered by other more active methods. The 'natural attenuation processes' that are at work in such a remediation approach include a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater."

Source: *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites, USEPA Directive 9200.4-17P (April 21, 1999)* *http://www.epa.gov/oust/directiv/d9200417.pdf.*

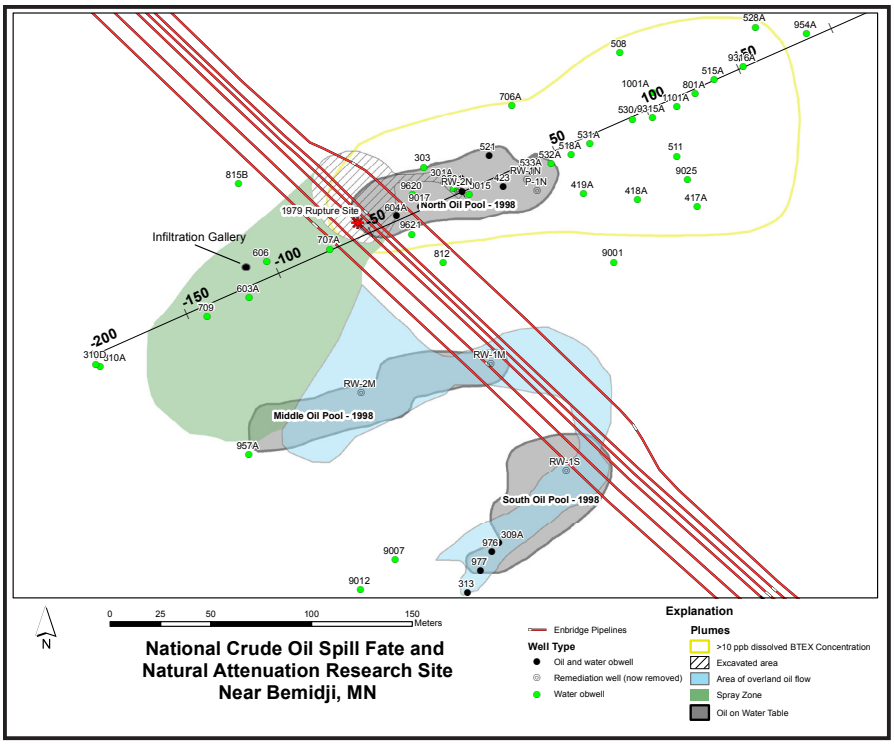
Given that the release occurred in a Beltrami County forest, well away from human habitation, it offered a unique opportunity to observe a large petroleum release long term, in a relatively ideal geologic setting. Research at the site began under an informal agreement between the USGS and the Minnesota Pollution Control Agency (MPCA). In 2009, the MPCA, Enbridge Energy Limited Partnership, Beltrami County, and the USGS Minnesota Water Science Center entered into a Collaborative Agreement, formally establishing the National Crude Oil Spill Fate and Natural Attenuation Research Site.

A principle goal of the Collaborative Agreement was to bring together academia, which had led research at the site for decades, with remediation practitioners employing best practices in the field. Another goal was to expand the use of the site to more practical, real world research that would directly benefit the MPCA and the rest of the remediation world.

What the LUST World Has Learned

A major outcome of the Collaborative Agreement was a symposium, "Terrestrial Crude Oil Spills: Decades of Science from the Bemidji, Minnesota Research Site," held on June 11, 2012, at the University of St. Thomas, in St. Paul, Minnesota. Following the symposium, many attendees participated in a four-hour journey to Bemidji to see firsthand the innovative research and investigative techniques pioneered at the site.

A highlight of the trip was the freezing drive-shoe core barrel. This device takes a core of saturated,



unconsolidated aquifer sediments, with all fluids intact and undisturbed, by freezing the bottom of the core with compressed carbon dioxide. This unique tool gives researchers a new method to directly observe and measure oil saturation in the field. If you ever had any doubt about NAPL behavior in the subsurface, this device will remove those doubts.

Another novel technique for estimating in situ biodegradation is measuring soil gas efflux at the surface using a device originally developed to measure plant reparation. This system has recently been adapted to measure methane flux rates at biofuel release sites based on development work done at Bemidji. Many more innovative techniques and ideas tested at Bemidji can be found in the bibliography of published papers on the USGS website: http://mn.water.usgs.gov/projects/bemidji.

With all there is to see at the site, by far the most popular destination for visitors is the spray zone, which still contains hydrophobic soils. Even after 30 years they still repel water. You wouldn't think scientists would be so fascinated by pouring water on the ground and watching it bead up like a freshly waxed car, but it was the highlight of the trip for many.

Above all, the most significant lesson learned for those of us working on petroleum release sites comes from the sheer number of data points at this site versus a typical LUST investigation. There are close to 200 monitoring wells and over 80 vapor monitoring locations in addition to the hundreds of soil cores taken at the site just for the north pool. The amount of data generated by the research is truly staggering and both the LNAPL and dissolved phase contamination has been well defined in all dimensions. The resolution is so good that researchers have been able to pinpoint the location of the LNAPL front to within a few feet for the last 30 years. What this tells us is that despite a limited number of wells, borings, and sampling events at LUST sites, less intensive (and less expensive) investigations may be sufficient to assess risk.

Another well, or one more round of analytical data is always nice, but the research on LNAPL and dissolved-phase plume migration at the Bemidji site has demonstrated that petroleum plumes stabilize relatively quickly due to natural attenuation, and that extremely precise and exhaustive investigation and monitoring isn't needed to make appropriate risk determinations. The process of natural attenuation is quite prevalent such that we can often forgo direct measurements (such as electron acceptors) and just use plume stability data knowing that natural attenuation is quietly at work in the background. This is the legacy of Bemidji and the foresight of researchers 30 years ago who decided to test a controversial theory at a real site.

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USGS researcher Barbra Bekins with a freezing drive-shoe soil core.

Watching water bead on soil in the spray zone.

Remembrance

Patricia Ellis…A Brilliant Life

by Ellen Frye

Patricia Ellis (1949–2013)

The LUST program, *LUSTLine*, and I would go so far to say that humanity and the environment have lost an invaluable friend and ally. Patricia Ellis died on February 17, 2013. She will be deeply missed by many of us who knew her and who, quite frankly, were blown away by her "dedication, leadership, and significant contributions to the science of site assessment, risk evaluation, and cleanup for LUST sites" (as cited on the award she received in 2010 at the National Tanks Conference in Boston from her friends and colleagues). Also read Jeff Kuhn's (Montana DEQ LUST Brownfields Program) remembrance on page 7 describing Pat's invaluable work at the national level.

On a personal level, Pat's contributions to *LUSTLine* in her "WanderLUST" column, her command of and interest in applied sciences, her collaboration with me in developing three national surveys aimed at state and territory LUST program managers, and her talents and interests above and beyond leaking tanks are incalculable.

Pat spent much of her career working for the Delaware Department of Natural Resources and Environmental Conservation (DNREC) where she quickly rose to the highest technical rank. It seemed like each LUST cleanup was a curiosity that she delved into with analytical fervor. She was nationally known for her work on gasoline additives, was a member of the U.S. Blue Ribbon Panel, and taught continuing education classes on her skills all around the country.

According to Jim Werner, a former DNREC colleague, "when Pat was with you, you were grounded on the solid firmament of what was known scientifically, what could be deduced technically, and what could not. She had a casual manner that belied intense intellectual complexity. She combined this casual manner with an ability to simplify and be direct when needed.

"In various meetings about MtBE indemnification," recalled Werner, "she carried with her a small vial of water contaminated with a few ppb of MtBE to provide a real-time olfactory illustration of the stink it produces in a way no amount of scientific explanation could reveal.

"Pat had a seemingly limitless capacity to link abstract science with practical field remediation issues, along with state and national policy, and just plain getting things done by working well with others," said Werner.

Pat's office space was legendary for its assorted stacks of papers and publications. Information was literally at her fingertips, both in her office and on her computer. I have been told that when a piece of information was needed she knew just where it was.

When I would call to ask about writing her column for an upcoming *LUSTLine* issue, she would often launch into a tale of the latest work-related issue nipping at her heels—a problematic cleanup site, a frustrating meeting she'd just been to in the middle of the country, a contractor that was getting it all wrong. She was passionate about her work.

I, overwhelmed at the thought of her workload, would sheepishly ask if she had time to do anything for her column. Without hesitation she would blurt out her topic du jour, which in recent years was often related to ethanol. Concerned that writing the column would take up too much of her time; I would suggest that she keep it short. That never happened. Once she got into a subject her story was off and running, full of a wealth of information. Her columns were thorough and often reprinted in other state newsletters.

Pat graduated from the University of Rochester in 1970, earned a Master's Degree from Duke University in 1972, and her Ph.D. from the University of Texas in 1985. She specialized in the formation and alteration of coral reef deposits, and enjoyed scuba diving in the Bahamas, Indonesia, and the Philippines. She also enjoyed flying hot air balloons while in Texas.

She was an avid quilter and a long-term member of the Ladybugs Quilt Guild. She exhibited her quilts in shows and had them exhibited in the lobbies of prominent local businesses. She loved to travel and spent time in the Philippines, Indonesia, Mexico, Caribbean islands, Europe, India, Tibet, Nepal, Bhutan, and Egypt. She leaves her husband Dave and their children Katie and John. And yes, through all the years she was always so proud of her children and always made it a point to be there for them.

Dear Pat, we'll miss you. ■

Determined to Understand MtBE and Get It Right

by Jeff Kuhn

I got to know Pat Ellis sometime during the early 1990s through her presentations at the annual National Tanks Conferences. By 1996 we began a discussion on the impact of MtBE and other fuel oxygenates on the nation's drinking water resources. We both recognized the need to communicate this discussion more broadly to states and to try to distill the real story that we saw unfolding as more and more water supplies across the country were impacted.

In 1997 at the National Tanks Conference in Long Beach, California, we chartered the ASTSWMO MtBE Workgroup and toured the area in Santa Monica where MtBE associated with petroleum releases from service stations had affected the Charnock and Arcadia well fields, rendering Santa Monica's water supply unusable. It was the beginning of an intense work effort that brought me into almost daily working contact with Pat and a number of other colleagues that were also following the MtBE debate. The workgroup eventually engaged the efforts of over 40 representatives from all spectrums of government, industry, and environmental consulting.

Over a seven-year period we shared hundreds of emails, phone calls, and detailed reviews of professional papers and state case incidents, trying to accurately portray the MtBE story and represent the viewpoint of state regulatory agencies. Anyone who knew Pat remembers the immense of amount of information she had the remarkable ability to wield with a few keystrokes.

For me it was a great lesson to see what the determination of a single individual could accomplish, and to see the synergy of a group of like-minded individuals who joined forces with someone as skilled and determined as Pat. None of us had any experience with producing a "no cost" electronic reference document that attempted to combine technical issues, case incidents, and regulatory policy. But we all shared the conviction of the importance of the discussion, and Pat championed it in every sense.

Production of the newsletter was an overwhelming task and Pat's convictions kept us all going. In the course of developing the quarterly MtBE Workgroup Newsletters it was quite normal for Pat to provide 50–100 pages of material for me to digest and condense into a hyper-linked format that could be quickly referenced by electronic users. I would often call Pat to verify facts and would find her at her kid's high school sporting events—the only additional time she had for duties above and beyond her normal job. Of course she would have her computer open and would verify facts on the spot.

It was critically important for the information to be accurate and informative for states. And Pat was thorough! She would frequently find late-breaking information that required further consideration before finalizing and distributing the newsletter. I was always amazed at her ability to locate obscure details that would suddenly become very significant. Her expertise on MtBE and other fuel oxygenates was quickly recognized and she was chosen as a key technical advisor to USEPA's Blue Ribbon Panel on MtBE, a position that was critical in presenting an accurate national picture of the impact of MTBE.

With a Ph.D. in geology, Pat was always a true geologist at heart. Her keen interest in groundwater science was a sign of her unfailing commitment to protecting human health and the environment. Her detailed articles were published routinely in *LUSTLine*. It is hard to forget articles with names such as "A Tale of Two Plumes." These stand out in my mind as classic Pat Ellis creations. Her many presentations at National Tanks Conferences will long be remembered. I am truly honored to have worked with Pat Ellis. We will all miss her dearly. ■

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■ **Natural Attenuation** *from page 5*

But the Story Doesn't End There

The Collaborative Agreement has funds to support research for at least three more years, and we hope to secure additional funding from outside parties to maintain the site for many more years beyond that. The history of highly detailed research continues to make the Bemidji site an ideal test bed for new ideas. We also hope to expand the research into more practical areas, such as testing new equipment or investigative techniques. This is a site that keeps on giving and it still has a lot more to give.

For example, two fairly unaddressed pools of oil at the site may be appropriate for testing new remediation and assessment technologies. Additionally, there has been a lack of ecological studies at the site, which is an area of needed research. Essentially, we would like to invite other researchers and practitioners to Bemidji that are interested in studying and testing concepts that will contribute to a better overall understanding of petroleum releases and remediation.

The RFP process for Collaborative Agreement research funding begins in the fall, with a submittal deadline in January. The USGS hosts a two-week field session in the summer months, which is attended by most of the researchers. A drill rig and other field support are usually provided. The site is also available year-round for any approved research and use of the site is not limited to funded proposals. New research proposals and visitors are encouraged and who knows, while at the site, out of the corner of your eye, you may glimpse Paul Bunyan and Babe roaming the woods and lakes nearby. ■

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The authors wish to thank Shannon Martin for her assistance with this article.

Jury Returns Speedy Verdict in New Hampshire MtBE Case

by Ellen Frye

Oh what a tangled web we weave when first we begin to regulate.

— Apologies to Sir Walter Scott

On April 9, 2013, a New Hampshire jury took less than 90 minutes to return a verdict of $236,372,664.41 against ExxonMobil for contamination of New Hampshire water supplies with MtBE. Given that the lawsuit had been filed ten years earlier, and the trial had lasted for three months, the verdict was unexpectedly swift.

What Was Case About?

The Attorney General for the State of New Hampshire filed the case in 2003. New Hampshire was seeking compensation for MtBE contamination of the state's groundwater. The state originally sued 22 gasoline refiners and MtBE manufacturers claiming that:

- Manufacturers of MtBE were negligent. This means that manufacturers did not exercise reasonable care in evaluating the harm that could be done by their product. The harm at issue in the case was the damage to drinking water and groundwater due to MtBE contamination. According to the lawsuit, this harm was foreseeable because of MtBE's high solubility in water, mobility, and resistance to biodegradation compared to other gasoline components, and because of what the defendant oil companies knew about MtBE and the integrity of the nation's UST systems.
- MtBE gasoline was a defective product. This means that MtBE gasoline was unreasonably dangerous. This is related to the threat posed to groundwater, not the fire and explosive properties of the gasoline. Again, MtBE gasoline was more dangerous than traditional gasoline to groundwater because of its high solubility in water, mobility, and resistance to biodegradation. As for the negligence claim, this hazard was a foreseeable consequence of adding MtBE to gasoline.
- Manufacturers failed to warn anyone about the increased hazard to groundwater quality. A warning was required because the danger to groundwater was not immediately apparent to people storing and using MtBE gasoline. A warning was necessary to avoid harm to groundwater resources.

The jury found for the State of New Hampshire on all three counts.

What Was the Compensation Awarded For?

During the trial, the state argued that because of the defendant's negligence and failure to warn concerning a defective product, they should bear the costs of dealing with MtBE contamination. The costs included:

- $142 million to reimburse the state for cleanup money already spent remediating releases of MtBE gasoline in New Hampshire.
- $218 million to clean up 228 high-risk, high-priority sites identified by the state. Although the state knows of over a thousand sites that have MtBE contamination, it only asked for money to clean up these high-priority sites.
- $456 million to identify and treat the 5,590 private wells that state experts calculated have levels of MtBE that exceed the state maximum contaminant level of 13 ppb. This number is an extrapolation based on the number of known contaminated wells, so the challenge is to identify which of the 250,000 wells in New Hampshire are the contaminated ones. New Hampshire asked for money to both sample all the water wells in the state to identify which ones were contaminated with MtBE and to treat the ones that were found to be contaminated.

The state sought a total of $816 million from MtBE manufacturers to pay for all of this work. Because gasoline is commingled as it goes through the national distribution network, it is not possible to identify which company manufactured the MtBE gasoline that leaked from any particular site, so the state argued that each defendant should pay a portion of the total sum based on the company's market share of gasoline sold in the state.

Of the 22 MtBE manufacturers named in the lawsuit, 14 settled prior to the beginning of the trial. Several of the companies were interrelated so more than 14 defendants actually resolved the allegations against them before the trial began. One additional defendant began settlement negotiations after the first day of trial, leaving ExxonMobil as the sole remaining defendant. The 15 companies that eventually settled paid a total of $136.5 million plus interest to the state. ExxonMobil's market share was calculated by the state to be 29 percent, so ExxonMobil's share of the expenses was $236 million.

Exxon is planning to appeal the verdict, so it will likely be years before the final result is known. Meanwhile, the state will begin the job of addressing MtBE contamination with the money received from defendants who settled.

Is E15 the Next MtBE?

The New Hampshire MtBE verdict has prompted the American Fuel and Petrochemical Manufacturers (AFPM, an oil and gas industry lobbying group) to trade blows with the Renewable Fuels Association (RFA, an ethanol lobby-

ing group) concerning E15, a blend of gasoline and 15 percent ethanol. The AFPM believes it is unfair that even though MtBE gasoline was "approved" by USEPA, a jury labeled it a defective product and oil companies are being made to pay for it. The AFPM claims that this scenario is about to be repeated.

The AFPM argues that USEPA's "approval" of E15 gasoline for cars and light trucks manufactured after 2000 ignores the damage that E15 can cause to vehicle fuel systems and gas station fuel storage systems. E15 is also very rough on small engines (e.g., lawn mowers, weed whackers, chain saws). They tend to run poorly and have a shortened lifespan. The RFA has countered that MtBE gasoline was never tested as thoroughly as E15 has been. (*The Progressive Farmer,* "Groups Argue Over E15 Liability Issues," April 15, 2013.)

Gasoline composition has been part of the political scene since the tetraethyl lead phase-out which began in the mid-1970s. The removal of lead in gasoline prompted the introduction of MtBE into gasoline in the 1980s to replace the octane lost from the elimination of lead. Air pollution concerns led to requirements to add oxygenates to gasoline in some portions of the country in the 1990s. Groundwater pollution by MtBE led to elimination of the oxygenate requirements and institution of a renewable fuel requirement in 2005. Now the debate focuses on the percentage of ethanol that can safely be added to the nation's gasoline. In the fuel business, as in the world these days, the only constant is change. ■

DEF, the Newcomer in the UST Neighborhood

by Carol Eighmey

What freezes at 12° F, is highly corrosive, is stored in or near regulated USTs, is prone to leak, but is not subject to traditional environmental regulations?

If you answered, "Diesel Exhaust Fluid," you're on top of your game!

Known as DEF, this liquid is becoming ubiquitous at truck stops. But answers to questions regarding its potential impact on regulated USTs and UST cleanups are hard to find.

First, a brief background on why DEF has come to our neighborhood: As part of its plan to ensure we all have clean air to breathe, USEPA set stringent limits on diesel engine emissions. By 2010, diesel engine manufacturers had to meet a target very close to zero for particulates and nitrogen oxides (NO_x). No more black smoke belching from that bus or truck as it pulls away from the intersection!

After trying several technologies to achieve NO_x standards, diesel engine manufacturers settled on "Selective Catalytic Reduction Technology," an explanation of which is beyond the scope of this article. Suffice it to say that, in order for this technology to successfully limit NO_x, the diesel engine must have a constant supply of DEF. This means that trucks and other vehicles using this technology must have onboard containers for this fluid, and drivers must refill those containers regularly.

Diesel engines are quite finicky about the quality of the DEF. Any contaminant in the DEF will trigger a sensor in the emission technology that automatically slows the engine to a crawl and disengages the throttle. Drivers complain of their rigs suddenly decelerating while in heavy traffic, tunnels, or bridges, causing safety concerns. Retailers are working hard to assure their DEF remains pure, and Weights and Measures' inspectors are still figuring out how to test the quality of the product and the accuracy of the dispensing devices.

Storing and Dispensing DEF

While the vehicle does not consume as much DEF as it does diesel fuel, DEF does need to be replenished regularly. One trucking company owner in Missouri says his trucks consume two to three gallons of DEF for every 100 gallons of diesel fuel. So when his drivers refuel at truck stops, they often also buy DEF.

Initially, many truck stops offered DEF in jugs, drums, or totes. But with an estimated 12 million gallons of DEF being consumed monthly in the United States, and demand growing, truck stops are quickly moving to install tank and piping systems to store and dispense DEF easily while their customers are fueling up.

Love's and TA Travel Centers both planned to have bulk DEF available at all their locations by the end of 2012, and Pilot Flying J has announced it intends to have bulk DEF at all of its truck stops by the end of 2013.*

As mentioned, DEF properties present challenges for those who store and dispense the substance. It freezes at 12° F, so in most U.S. locations, DEF tanks and piping must either be underground and/or heated. At 87° F, it loses some of its properties, which means retailers in warmer climates may also prefer to store it underground. Many truck stops now dispense DEF from the

■ *continued on page 10*

* According to *PEI Journal,* Volume 7, Issue 1, 1st quarter 2013.

■ **DEF** *from page 9*

same dispenser cabinet as diesel fuel. This is convenient for the driver, but it raises a question as to whether this corrosive liquid—or its vapors—may affect metal components of the diesel UST or dispenser hardware.

DEF is 67.5 percent water and 32.5 percent urea. As noted in a September 2009 memorandum from Carolyn Hoskinson, USEPA OUST Director, DEF may contain a small amount of ammonia, but the international quality standard for DEF limits ammonia to no more than 0.2 percent by weight, and DEF manufacturers strive for zero ammonia. The USEPA memo concludes that DEF USTs are not regulated USTs, although it leaves the door open for a future policy change.

UST Inspectors Beware!

Use of DEF has risen dramatically since USEPA's 2009 memo, and the number of retail fuel locations where DEF is stored is expected to continue to rise, although some industry experts predict DEF usage will be a short-term phenomenon and that another technology will displace it within seven to ten years. In the meantime, we may see DEF at retail locations other than truckstops, as DEF usage expands to light-duty trucks, ATVs, and other diesel-powered vehicles. UST inspectors need to be aware of this and be able to recognize DEF storage and dispensing equipment. Reportedly, some retailers may be storing DEF in one side of a compartmentalized underground tank and diesel fuel in the other, which presumably would mean the owner/operator has a "half-regulated" tank?

Industry experts report some difficulties with DEF storage and dispensing equipment; some allege nothing but stainless steel or plastic will do. Equipment installers report having to try out various gaskets, joints, valves, and so on, and see repeated maintenance issues at new installations, due to the product's sly habit of leaking out.

When DEF hits air and the water evaporates, it leaves behind a white, crystalline substance. When spilled on the surface, small quantities can be diluted and washed away with water; small quantities will act as fertilizer. What must be done if a large quantity is spilled, or how DEF behaves (or misbehaves) if a significant volume is released underground is... well, is unknown to this writer.

A recent inquiry to the 50 states about their experience with DEF generated 15 responses. Several indicated the corrosive nature of DEF and the fact that it is being stored and dispensed near regulated petroleum UST systems are potential concerns, but that the lack of information and the relative newness of DEF make it difficult to assess risks. Only two states—Wisconsin and Kentucky—reported they are reviewing and/or issuing permits for DEF UST installations. No other respondents are even tracking the number or location of DEF tanks in their states, although one state reported it is considering regulating DEF tanks.

One state noted industry standards seem to be working well and reported that a major truck stop owner is installing all double-walled systems and leak detection equipment for his DEF USTs.

LUST regulators reported no problems to date with DEF releases, although most said they lack data to make an informed judgment, partly because DEF is so new on the scene.

DEF is likely here to stay unless it is replaced with a new technology. Perhaps in a few years, *LUSTLine* will run an article concluding DEF is posing no problems. Until then, let's keep our eyes on this new neighbor! ■

(A good resource for DEF information is www.discoverDEF.com*)*

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It's the LUST Footprint Calculator (à la Green Remediation)

by Steve Linder, Eric Magnan, Kevin L. Graves, Adrienne Barnes, Jessica W. Cooper, and Mike Martinson

The California State Water Resources Control Board (SWRCB) and USEPA have released the Beta version of the Leaking Underground Storage Tank (LUST) Footprint Calculator, now available at *www.ustcalc.org*. The Calculator is an initial attempt by the SWRCB and USEPA to quantify greenhouse gas emissions resulting from cleanup at LUST sites. It is not intended to be an all-inclusive greenhouse gas analysis, but rather a tool to help remediation professionals develop better information to optimize cleanups and reduce emissions. It considers only greenhouse gas emissions that result from activities directly related to a cleanup. Emissions numbers are normalized to CO_2 equivalents.

In many cases, the Calculator has found that excavation may result in the lowest greenhouse gas emissions. This result is due to fewer mobilizations required for excavation versus multiple trips made to a site undergoing long-term treatment; that and the likelihood that mass removal of the source may be the primary driver for the lower carbon footprint.

It's no surprise that monitored natural attenuation (MNA) has an even lower carbon footprint, since it is a more a passive remediation technology. It is often used as a way to finish the remediation process at sites where active remediation has already removed a significant amount of contamination. In these cases, the efficiency of an active remediation contaminant–mass removal is reduced and no one is at risk of exposure. MNA is included in the Calculator as a finishing step and not as an alternative to active remediation. The use of MNA may serve as a feasible remediation approach to

be used in the primary cleanup pipeline provided cleanup can be accomplished in a reasonable timeframe and is protective of human health and the environment. The Calculator can estimate the differences in greenhouse gas emissions resulting from the length of time active remediation is underway before MNA is applied.

The Calculator was designed and built by Sullivan International Group, Inc., to specifications developed by Antea Group USA (formerly Delta Consultants). Antea used empirical data and practical on-site remediation engineering experience provided by stakeholders within the petroleum industry.

This collaboration of industry experts and consulting expertise provided real-world information that helped the developers determine the most common cleanup technologies used in California. Antea Group's prior carbon footprint development experience with its European remediation sister-company, Hannover Milieu en Veiligheidstechniek B.V (HMVT), was also applied to the development of the LUST Footprint Calculator. Technologies addressed in the Calculator include soil-vapor extraction (SVE), pump and treat (P&T), multi-phase extraction (MPE), excavation, and MNA.

What Is Green Remediation?

The Calculator is a tool to assist cleanup professionals in applying "green remediation" concepts to Leaking UST sites. USEPA defines green remediation as "the practice of considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprints of cleanup actions" (USEPA 2012a). Green remediation supports the broader concept of sustainability, defined as creating and maintaining the conditions under which people and nature can exist in productive harmony, fulfilling the social, economic, and other requirements of present and future generations (Executive Order 13514, 2009).

Some stakeholders have expressed concerns that green remediation may sacrifice cleanup goals. This should not be a problem given the definitions of sustainability and green remediation. As always, care should be taken when implementing green remediation practices to protect human health and the environment during cleanup operations.

Figure 1: *Leaking UST Footprint Calculator Home Page,* www.ustcalc.org.

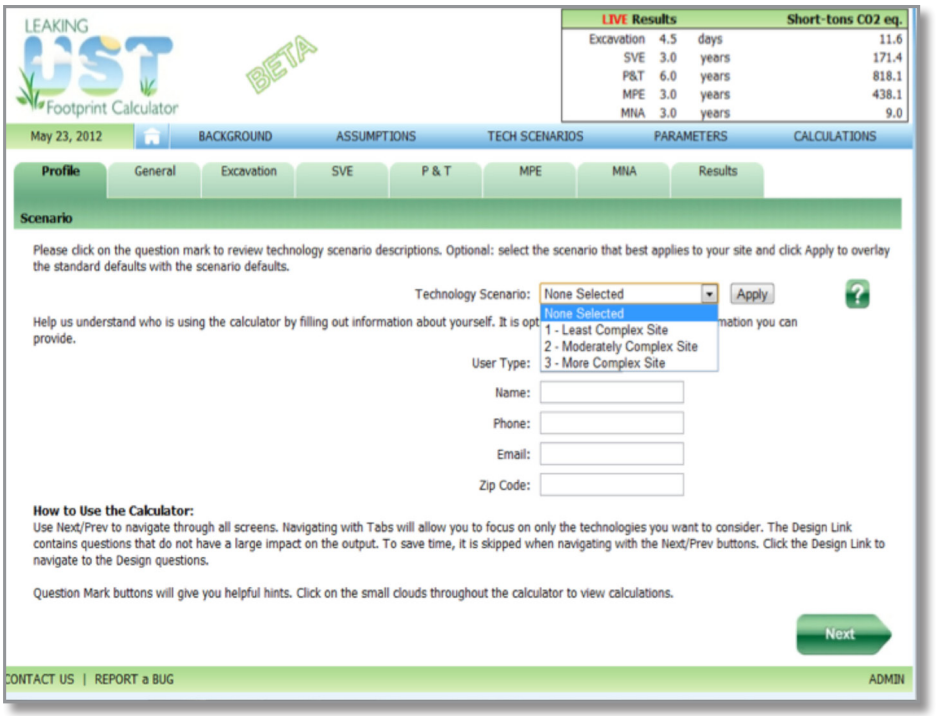

Figure 2: *Leaking UST Footprint Calculator Technology Scenarios* www.ustcalc.org.

Calculator Features

The Calculator is designed to allow users to assess the five most common remedial technologies used at LUST sites in California, including SVE, P&T, MPE, excavation, and MNA (Figure 1).

Input fields are populated with default values based on a survey completed by responsible parties who manage LUST sites. Additionally, there are three typical site scenarios for small (least complex), medium (moderately complex), and large (more complex) sites based on data from the survey (Figure 2). This allows users to quickly select a baseline to approximate their site and then modify inputs to account for the site's unique aspects.

■ *continued on page 12*

■ LUST Footprint Calculator

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Another time-saving feature is that inputs with the greatest effect on output are clearly labeled. A sensitivity analysis was performed to identify high- and low-impact inputs. High-impact inputs tend to result in a relatively large amount of emissions. These inputs are highlighted in the Calculator to help the user focus on the factors that contribute most to greenhouse gas emissions. For example, the primary electrical source of the remediation system is a high-impact field, whereas the number of monitoring wells installed is not.

The Calculator is transparent to all users and stakeholders. The equations, assumptions, constants, and methodologies used are accessible within the Calculator and are based on industry standards.

Boundary Conditions and Limitations

Models, including the Calculator, are approximations of reality. To understand its results, it's important to understand the Calculator's boundary conditions and limitations. The Calculator does not provide a full life-cycle assessment of a site. It only considers greenhouse gas emissions that result from activities related directly to the cleanup.

LUST sites are relatively small and less complex than Superfund sites. While each site is unique, LUST remediation systems typically have similar designs and use a limited set of technologies. Contamination plumes also do not vary as greatly in size and complexity as those in large sites. This makes them good candidates for a calculator with prepopulated fields, where the user may be required to change only a few factors.

Direct activities that the Calculator considers include:

- Energy required to design, install, operate, and abandon the remediation system
- Transportation to and from the site
- Energy required to treat contaminated media
- Energy required to move potable water, among other things

Key sources of greenhouse gas emissions that are *not* considered by the Calculator include the energy required to:

- Perform sampling analyses
- Treat water released offsite to a wastewater treatment system
- Manufacture materials used

There are other tools available to perform a more complete life-cycle assessment (USEPA 2012a).

Keep in mind that the Calculator only estimates greenhouse gas emissions that are normalized to carbon dioxide equivalents. It does not consider emissions of air toxics such as nitrogen oxides (NO_x), sulfur oxides (SO_x), volatile organic compounds (VOCs), or particulate matter (PM), among others. Emissions of air toxics may be a significant consideration for some sites. For example, excavation may create PM emissions in the form of dust and exhaust from heavy machinery, which can be a concern in residential areas.

Interpreting and Viewing Results

The remediation technology with the minimum amount of emissions is not necessarily the best for a given site. Users should avoid directly comparing remediation technologies to each other. The Calculator is not meant to specify the type of remedy that should be selected; it is intended to help remediation professionals identify areas where emissions can be reduced.

The Calculator gives results in short tons of carbon dioxide equivalents as well as metric ton units. One short ton equals 2,000 pounds. One metric ton equals 2,204 pounds, or approximately 1.1023 short tons. The carbon dioxide equivalents are also converted into other equivalents, such as a number of cars on the road, using USEPA's Gas Equivalencies Calculator (EPA 2012b).

The total emissions for each remediation technology are refreshed in the carbon equivalents chart each time an input is changed, and are displayed in the upper right-hand corner of the Calculator website at all times. The output value for each phase (Assessment, Equipment Operation, Transportation, Treatment, or Abandonment) is recalculated as well. This visual change helps users see the direct result from the question being answered, allowing the viewer to identify areas with the greatest potential for emission reductions. Results can be viewed, printed, or exported to Excel/PDF for an expanded carbon equivalents chart, a pie chart, or bar chart with emissions grouped by phase.

Next Steps

We encourage you to visit *www.ustcalc.org* and practice using the Calculator. It is a work in progress, and we invite you to send comments and suggestions on how the Calculator can be improved to best serve your needs. All comments are welcome and can be emailed to USTCalc@onesullivan.com. ■

Steve Linder, PE, is with USEPA Region 9; Eric Magnan, PE, is with USEPA Region 9; Kevin L. Graves, PE, is with the California State Water Resources Control Board; Adrienne Barnes, PMP, is with Sullivan International Group, Inc.; Jessica W. Cooper, is with Sullivan International Group, Inc.; Mike Martinson, Antea Group. For more information about this project, go to: USTCalc@onesullivan.com.

Resources

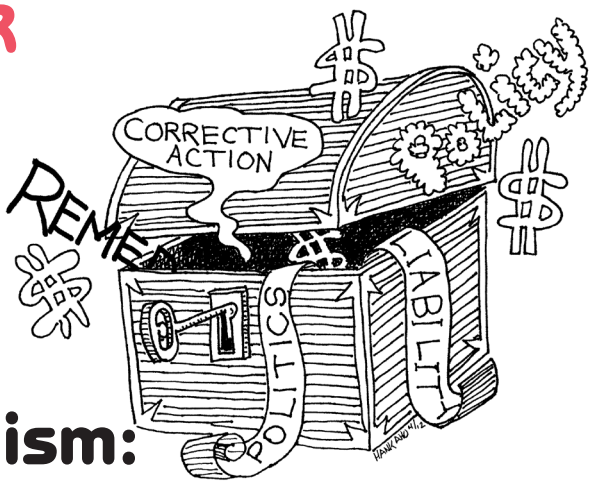
- ASTM. *http://www.astm.org/*.
- ITRC GSR. *http://www.itrcweb.org/teampublic_GSR.asp*.
- SuRF. *http://www.sustainableremediation.org/*.
- USEPA. 2012. "Sustainability." *www.epa.gov/sustainability*.
- USEPA. 2008. *The Smart Energy Resources Guide: A Resource for Greener Environmental Cleanups*. *http://nepis.epa.gov/Adobe/PDF/P1000Z9K.pdf*.

References

- Delta Consultants. 2009. LUST Cleanup Footprint Calculator Business Design Document, Version 2.3.
- Executive Order 13514. 2009. *Federal Leadership in Environmental, Energy, and Economic Performance*.
- Hannover Milieu en Veiligheidstechniek B.V (HMVT). 2009. *Carbon Calculator*. Voor het berekenen van uw Carbon Footprint heeft HMVT een online rekentool ontwikkeld (this is written in Dutch) *http://www.hmvt.nl/sites/hmvt.nl/files/project/CO2_v0.5_0.swf*.
- ITRC. 2011. *Green and Sustainable Remediation: State of the Science and Practice*. GSR 1. Washington, DC: Interstate Technology & Regulatory Council, Green and Sustainable Remediation Team. *www.itrcweb.org*.
- USEPA. 2012a. Green Remediation. *www.clu-in.org/greenremediation*.
- USEPA. 2012b. Greenhouse Gas Equivalencies Calculator. *http://www.epa.gov/cleanenergy/energy-resources/calculator.html*.

Unlocking the Mystery of FR

A straight-talking column by Jill Williams Hall, Senior Planner with the Delaware Department of Natural Resources and Environmental Control (DNREC). She can be reached at jill.hall@state.de.us.



How to Get the Most Out of the UST Insurance Coverage as an FR Mechanism: A State Perspective.

The most widely utilized financial responsibility (FR) mechanism, second only to state funds, is pollution liability insurance. Underground storage tank owners and operators who use this mechanism must comply with the applicable state and/or federal requirements in their jurisdiction. This means purchasing a policy with at least minimum coverage amounts, a required six-month reporting "tail," and first dollar coverage. Assuming that the tank owners and operators in your state purchase a policy that meets the minimum state and federal regulations, beyond checking the policy to ensure it meets these minimums, what else can or should a state do to increase the effectiveness of this insurance to its tanks program?

According to the 1988 *Federal Register,* the goal of the financial responsibility requirements is to "require adequate and reliable financial assurance for the costs of UST releases." The regulations, as written, appear to meet this goal. But as with all good intentions the devil is in the details. So, after 17 years of enforcing the financial responsibility requirements through the use of pollution liability insurance, what have we learned that may assist states in fully meeting the goal of the financial responsibility regulations?

Delaware has never had a state fund. UST owners and operators have had to choose a private mechanism to comply with FR requirements since 1996. Approximately 80 percent of our UST owners and operators choose to purchase pollution liability insurance. Our first priority has been to educate owners and operators on the terms and rules associated with this form of insurance. Now we are moving on to explore where we can identify deficiencies in our enforcement of compliance with the FR requirements and try to plug the holes.

I offer the following suggestions for tweaking regulations in states that utilize private FR mechanisms. I offer my apologies to Texas, Iowa, Michigan, and Washington for stealing their excellent regulatory language.

Ways to Improve the Effectiveness of Private Insurance

■ **The biggest issue facing our state has been the fact that tank owner/operators may purchase insurance and show evidence of such to a state inspector but then cancel the insurance, leaving the state none the wiser until the next compliance inspection. So states should be sure that they receive notification when owners/operators fail to renew their insurance at the end of the policy period, or when either the insurance provider or the owner/operator cancels that policy.** For example:

> "In the event of termination or nonrenewal of liability insurance coverage used to meet the financial responsibility requirements, the insurer shall notify the department of termination or nonrenewal not more than 20 days after the date of termination or nonrenewal. The notice shall state the name and address of the insured, the date of termination or nonrenewal, and the address of the facility previously insured." **Michigan**: *http://www7.dleg.state.mi.us/orr/Files/AdminCode/922_2008-041EQ_AdminCode.pdf.*
>
> "If a provider of financial responsibility cancels or fails to renew for reasons other than incapacity of the provider as specified in rule 136.23(455B), the owner or operator must obtain alternate coverage as specified in this chapter within 60 days after receipt of the notice of termination. If the owner or operator fails to obtain alternate coverage within 60 days after receipt of the notice of termination, the owner or operator must notify the director of the Iowa department of natural resources of such failure and submit the name and address of the provider of financial assurance; the effective date of termination; and the evidence of the financial assurance mechanism subject to the termination maintained in accordance with subrule 136.20(2)." **Iowa**: *https://www.legis.iowa.gov/DOCS/ACO/IAC/LINC/Chapter.567.136.pdf.*
>
> "Duplicate originals or certificates of insurance of the policies provided shall be furnished by the tank owner/operator to the Department and shall contain an agreement by the insurer

■ *continued on page 14*

■ UST Insurance Coverage

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that such policy or policies shall not be canceled without at least ten (10) days prior notice to the insured and the Department." **Delaware:** *draft regulatory language.*

■ **State regulators should seriously consider amending their state regulations to require that tank insurance policies require a retroactive date that is at least 10 years prior to the date the policy is purchased.**

Tank insurance policies are primarily "claims made" policies. Remember that pollution liability insurance only pays for releases that occur during the policy period, and are reported before the end of the federally required six-month extended reporting period. A retroactive date is the date after which losses may occur and be covered under the policy. It may be older than or the same as the policy's effective date. It is the earliest date a confirmed release can occur for coverage to be provided under the policy. Therefore, if a tank owner/operator changes insurance providers and starts afresh with a "new" policy with a retroactive date that coincides with the start (i.e., effective) date of the new policy, any previously existing contamination will not be covered by the new policy. The policy only covers releases that occur back to the day of the retroactive date. This frequently occurs when an UST facility is sold and the new owner purchases a policy with a retroactive date that is the day they bought the facility.

■ **Require a site assessment at the time of property transfer or tank ownership transfer.**

While tank owners/operators typically look askance at a requirement by the state that a site assessment be performed, it protects both buyer and seller in many ways. For the buyer, obviously it allows them to determine if they are purchasing a property with pre-existing contamination, an issue they need to settle with the seller before they purchase the property. The seller is typically held responsible for any release that occurred while they owned or operated the tanks, and if they have tank insurance they must make a claim before the expiration of the extended reporting period. Without a site assessment, if contamination is discovered, there will be much finger pointing as to who is responsible for payment of the cleanup. For example:

"Any person taking ownership of a facility or underground storage tank shall complete a Change in Ownership Assessment prior to the transfer of ownership of the facility or underground storage tank. Such person shall provide the written results of the Change in Ownership Assessment to the Department within thirty (30) days of such transfer." **Delaware:** *draft statute language.*

■ **Allow for notice by the state to the insurance provider to preserve coverage to the insured. Often tank owners/operators are not familiar with the policy rules regarding timely notice to the insurance company if they suspect they have a release. When the state is notified of a suspected release it may then access records to determine what type of FR the facility has and in the case of insurance, notify the insurance provider.** For example:

"Timely notice of a release and claim for coverage to the insurer by the Iowa Department of Natural Resources shall be deemed sufficient notice on behalf of the insured under the terms, conditions, and exclusions of this policy. Notice by the department does not modify or enlarge the terms, conditions, and exclusions of coverage but is only intended to preserve coverage to which the insured may otherwise be entitled under the policy." **Iowa**: *https://www.legis.iowa.gov/DOCS/ACO/IAC/LINC/Chapter.567.136.pdf.*

■ **Remind the insured that all tank insurance policies must by federal requirement include a six-month extended reporting period. Often a tank owner/operator does not realize that he has six months after the expiration of the policy to report contamination to the insurance carrier.** For example:

"The ["Insurer" "Group"] will notify the insured and any additional named insureds of the 6-month extended reporting expiration date as provided in paragraph 136.8(2)"a"(2)"5" in any written final cancellation or nonrenewal notice in accordance with rule 567—136.18" **Iowa**: *https://www.legis.iowa.gov/DOCS/ACO/IAC/LINC/Chapter.567.136.pdf.*

■ **When all else fails, require that tanks without adequate FR be emptied. While this will in no way pay for releases that may have already occurred it will at least stop further releases that will potentially be a financial burden on taxpayers.** For example:

§37.867. Duty to Empty Tanks After Termination of Financial Assurance.

(a) The owner or operator of a tank for which insurance coverage or other financial assurance has terminated shall ensure that the tank is empty, as defined in §334.54(d) of this title (relating to Temporary Removal from Service), not later than the 90th day after the coverage terminates, unless the owner or operator provides the commission proof that the owner or operator maintains evidence of financial responsibility. The owner or operator shall demonstrate that the tank is empty by submitting evidence satisfactory to the executive director if requested by the executive director.

(b) Any regulated substances removed from the tank must be handled properly, in accordance with agency requirements. If the regulated substances are disposed of, disposal must be at a properly licensed facility.

(c) Failure to empty a tank, or to demonstrate to the executive director that it has been emptied as required under subsection (a) of this section may be considered by the commission to be a separate violation in addition to a

violation for failure to maintain financial assurance as required by §37.815 of this title (relating to Amount and Scope of Required Financial Assurance).

(d) An owner or operator may demonstrate that the owner or operator had been released from financial assurance requirements by having met all the requirements of §37.885 of this title (relating to Release from the Requirements) prior to the date of financial assurance termination. However, even in the case where a tank has been properly temporarily removed from service by having met all the requirements of §334.54 of this title, including corrosion protection and leak detection, regulated substances may not remain in the tank longer than 90 days, in accordance with subsection (a) of this section.

(e) Subsection (a) of this section does not affect the commission's authority to require a shutdown of a facility under Texas Water Code, §26.3475(e), nor any other sections, rules, or statutes, with regard to financial assurance.

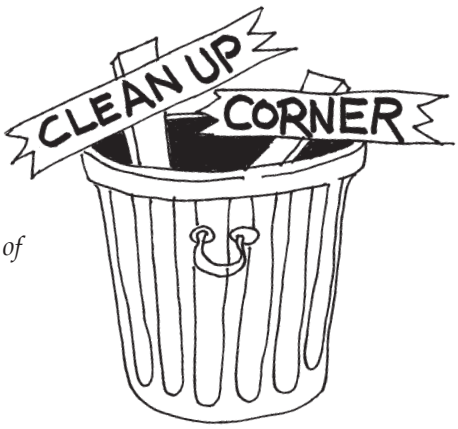
Texas: *http://www.tceq.texas.gov/assets/public/legal/rules/rules/pdflib/37i.pdf.*

■ **Finally, educate owners and operators on the terms and language associated with pollution liability insurance. Refer to past issues of LUSTLine for numerous articles on this subject (http://www.neiwpcc.org/lustline/lustline_pdf/lustline_index.pdf).** ■

Cleanup Corner

A Neat Little Column by Gary Lynn

Gary Lynn is Petroleum Remediation Manager for the State of New Hampshire Department of Environmental Services (NHDES). He can be reached at glynn@des.state.nh.us.



Eyes Wide Open

Nothing seems simple or straightforward anymore. Funding, politics, even the science behind site cleanups is getting more complicated as our knowledge increases and the patience of taxpayers decreases. To address the challenges of this brave new world, it is necessary to apply an interdisciplinary and interagency approach with multiple sets of eyes wide open to new trends and phenomenon. For example…

Interdisciplinary Problem Solving (or Why Expertise and Old Salts Matter)

NHDES, like many programs, is using in-situ chemical oxidation (ISCO) a lot more than in the past. As more projects were completed, we noticed short-term spikes of chlorinated VOCs (CVOCs) at multiple ISCO sites. The chlorinated VOCs usually dissipated in about a year, but their detections were troubling and mysterious. The answer became obvious once the right mix of disciplines became involved. A diverse background is desirable when evaluating ISCO, and a strong chemistry background was helpful when troubleshooting the CVOC detections. ISCO typically destroy organics contamination via a free-radical reaction. For example, in the case of persulfate, the following free-radical reaction occurs:

$S_2O_8^{-2}$ + activator → $SO_4^{\bullet-}$, $OH^{\bullet-}$ + SO_4^{-2}

Where $SO_4^{\bullet-}$ and $OH^{\bullet-}$ are free radicals

The free radicals are extremely reactive and result in the destruction of petroleum compounds. One of the other side reactions that can occur when chloride is present in groundwater is the generation of a chlorine free radical (see *Influence of chloride and carbonates on the reactivity of activated persulfate*, Bennedsen, et al, *Chemosphere* 2011). The chlorine free radical generation reaction is as follows:

$SO_4^{\bullet-} + Cl^- \rightarrow SO_4^{-2} + Cl^{\bullet}$

Where $Cl^{\bullet}$ is the chlorine free radical

Once a chlorine free radical is present, chlorinated VOCs such as chloromethane, chloroethane, methylene chloride, 1.1-dichloroethane, 1,2-dichloroethane, tri-halo methanes, and other chlorinated organics can be formed. An example reaction pathway would be:

$CH_4 + Cl^{\bullet} \rightarrow CH3^{\bullet}$

$CH_3^{\bullet} + Cl^{\bullet} \rightarrow CH_3Cl$ (chloromethane)

This is a good theoretical explanation of how the CVOCs could be present if chloride is present in high enough concentrations. You can always rely on a geologist to weigh in with something practical. For example, the geologist working on some of the ISCO projects asked, "What about road salting during the winter and

■ *continued on page 16*

■ **Cleanup Corner** *from page 15*

the proximity of the ISCO injections to parking lots or heavily salted roads?" New Hampshire has brutal winters and uses salt and sand liberally during snow clearing operations. Insights from a different discipline explained how chloride levels could be high enough to generate chlorine free radicals. This suggested some potential solutions, such as run cheap tests for chloride when drinking water receptors are present and high salt levels combine to raise the potential for CVOC problems.

Interagency Interaction (Too Often Just a Sometime Thing)

Our Water Division recently forwarded groundwater-monitoring data to us from one of their commercial geothermal installations that is required to sample for VOCs periodically. The results showed screaming high levels of VOCs, including acetone, THF, t-butanol, ethylbenzene, ETBE, xylene, and perchlorethylene. The installation was near both a dry cleaner site and a significant MtBE plume. Our program is helping the Water Division understand the potential source of the VOCs (probably maintenance work on the geothermal system plumbing). In this case, the confirmation sampling came back with no detections and this particular mix of contaminants more closely matches PVC adhesives and cleaners than plumes from the nearby LUST sites.

However, in learning about this site, the Water Division also informed us that there were 498 open loop geothermal installations in the state. We quickly became concerned about the potential for open loop geothermal installations to cause vertical gradients and expanded plumes. The Water Division gave us something to think about (i.e., pumping-induced vertical gradients can exist even in areas where we wouldn't traditionally think there is groundwater usage).

Another conversation involved our spill response group, which is in our bureau but under a different section. We have a good working relationship and are in frequent communication. Last year the spill response group received a complaint about a business that had a lot of waste containers and construction debris on its property. Their investigation revealed that the enterprising business owner had contracts with a number of financial institutions to empty out houses that had been foreclosed on.

The contractor would consolidate all of the household hazardous waste and trash at its property and then dispose of the wastes illegally. His illegal disposal activities allowed him to underbid competitors but created a mess at his property. After being warned that he must properly manage the wastes, he decided to consolidate of all of the liquid wastes in a septic tank. His new "solution" created additional problems and a witch's brew of mixed paint, pesticides and solvents.

Problems with foreclosed properties are not unusual and have included situations where banks have failed to notify NHDES about leaking home heating oil tanks at burned out properties and heating oil leaks at poorly managed foreclosure properties. Our spill response group has collaborated with our remedial group on a banking industry outreach effort and we are working together on keeping track of and addressing problem foreclosure properties.

Groundwater Doesn't Care What Division Is Managing It

UST systems are rated by water protection programs as one of the top threats to drinking water quality. (Could this mean that UST release prevention programs are one of the key drinking water protection programs in any given state?) Nationally, petroleum remediation programs are one of the largest suppliers of water treatment services and largest testers of water supplies for VOC contamination. In many cases the data generated are relevant to and usable by their counterparts in drinking water programs.

So often, however, these programs are functionally related but structurally separated, at least in my state. The good news with NHDES is that after a long overdue cross-cultural meeting, the Drinking Water and Groundwater Bureau has a designated liaison; the Petroleum Remediation Section in turn has had a liaison for several years. Better coordination and protection of our drinking water aquifers should be kick-started by more effective communication among the key programs.

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Communication an Illusion?

No one doubts that engineers, chemists, geologists, and program managers think and communicate differently. These differences bring depth and experience to the effectiveness of all our environmental programs, which is all the more reason why we must make sure we are keeping our eyes wide open by making the most of the talents at hand. We should heed George Bernard Shaw's advice that, "The single biggest problem in communication is the illusion that it has taken place." Good communication between programs and disciplines can only lead to better overall outcomes when we make sure that it happens. ■

A Message from Carolyn Hoskinson

Director, USEPA's Office of Underground Storage Tanks

Take a Tip from Tom Sawyer

The LUST Program Has Lots of Work and Scarce Help

Remember the part of the story where Tom doesn't want to spend his Saturday whitewashing the fence, so he cleverly persuades his friends that it would be their privilege to do it for him?

In the September 2012 *LUSTLine*, I wrote about strategies some states are using on legacy (also referred to as stalled or backlogged) releases. Building on that theme, in this article I want to discuss some ideas about how we might persuade others to pursue the privilege of helping us clean up lingering, legacy, low-priority underground storage tank (UST) releases.

Let's not forget, this has been a hugely successful program! We've cleaned up nearly 84 percent of all releases in the country. We've been seeing a steady decline in the number of UST releases identified each year—from almost 67,000 in fiscal year 1990 to approximately 5,700 in fiscal year 2012, meaning we're adding less new workload to our plates—hooray! Yet, even with our success, we still need to address that measly 16 percent of releases—nearly 83,000—yikes!

As we've completed cleanups over the years, the remaining sites tend to have specific challenges, and one of those challenges is the abandoned UST sites. By abandoned, I mean there is neither a viable responsible party nor anyone else to provide the finances (like a state fund or insurance company). So where can we turn for some help?

Petroleum Brownfields?

For many years, USEPA has been working to strengthen the connections between the LUST and the Brownfields programs. Remember, for petroleum-contaminated sites to be eligible for Brownfields grant funds, USEPA or a state must determine that:

- The sites are of relatively low-risk compared with other petroleum-only sites in the state
- The sites have no viable responsible party (abandoned)
- The funding will be used by a party that is not potentially liable for the petroleum contamination to assess, investigate, or clean up the site
- The site must not be subject to a corrective action order under Resource Conservation and Recovery Act (RCRA) §9003(h).

For most UST release sites, especially the old and abandoned ones, it is rather easy for our state programs to make these determinations. In fact, states have probably already made the first two: low-risk and abandoned.

Maybe brownfields tools provide some opportunities to address those lingering, legacy, low priority UST releases in your state. So we've come up with some ideas of things we could do that might be helpful, and we discuss them in our new document Petroleum Brownfields 2013: Opportunities for Action, which is available on our website at *www.epa.gov/oust/pubs/petrobfactionplan.htm*.

We would very much appreciate input from all stakeholders on what actions we could implement that would be most effective in helping move petroleum brownfields sites toward cleanup and redevelopment. Particularly, we welcome feedback on which actions within the proposed plan we should prioritize, or whether there are additional good ideas we didn't include, but should! Robin Hughes Parker (parker.robin@epa.gov or 703-603-7149) of my staff welcomes your thoughts and input. Also, please share the plan widely with others you know that are involved or interested in petroleum brownfields.

A Few Ideas You Might Want to Try

- **Show me the money.** Often, redeveloping formerly contaminated properties results in increases in property values and tax revenues. Linking UST release sites to tax parcel ID numbers can enable you to track and demonstrate that benefit, and perhaps motivate more players to join the game. Was there any positive publicity about the redevelopment of an UST site? If so, talk it up, particularly to people who might be interested in positive publicity (e.g., your senior leadership, your state legislators (especially if it was in their district).
- **Demonstrate why potential new partners might care about your problem.** Is there a LUST in their backyard, so to speak? Together, South Carolina's state UST program and a local organization developed a comprehensive inventory by using the state's data and tapping other experts. For particulars, see Mark Berenbrok's September 2012 *LUSTLine* article discussing how communities in South Carolina produced detailed maps of contaminated sites with help from UST programs. Once you have a map, it's easier to get the interest of those potential new partners.
- **Build new relationships with folks who might share your desire to get these sites addressed.** Economic development coordinators, city or county planners, community organizers, or health care advocates all might be interested in turning that old, neglected, weedy gas station into something new. Those new partners might have access to additional sources of funding beyond what the UST program has. They might have the visibility or the leverage to get and keep the project moving, especially if they have a desire to see the property blossom into a new use.

■ *continued on page 18*

Message from Carolyn Hoskinson, *continued from page 17*

Without a doubt, most redevelopment areas being considered for reuse likely include an existing or former UST. Why not encourage folks to work into their planning process the cleanup and redevelopment of those sites while they're at it? The state LUST program will probably get involved if and when a tank is found. It is best for everyone involved to identify that petroleum component early in the planning process so it doesn't become a problem later. Maybe after your new friends have seen how helpful you can be, they may even talk to others about how valuable your assistance was to their revitalization project.

- **Encourage more folks to apply for petroleum brownfields grants and forge partnerships with those who already have them.** Since 2003, when petroleum-contaminated sites first became eligible for Brownfields grants, USEPA has awarded approximately $235 million for assessing and cleaning up petroleum sites. These are competitive grants, and USEPA's Brownfields Office is always hoping for good, high-quality petroleum applications. Maybe there's someone out there who could clean up some of your lingering, legacy, low priority UST releases if they were encouraged to apply.

  Other kinds of brownfields funding and assistance can also help make progress at addressing petroleum sites (e.g., Area-Wide Planning grants, Technical Assistance for Brownfields (TAB) grantees, targeted Brownfields assessments funds). I bet there are LUST sites within the areas being addressed by those area-wide planning grants. Maybe you could chat with grantees and make sure they're considering the LUST sites in their plans. Maybe TAB grantees could help stakeholders who might be interested in addressing petroleum sites. Maybe your USEPA Region could get some of your lingering, legacy, low-priority UST releases assessed for you with some targeted Brownfields assessments funding. You can find information about brownfields grants and grantees in your state at http://cfpub.epa.gov/bf_factsheets/index.cfm.

The Privilege of Working Toward Everyone's Benefit

On the cleanup side of the UST program, I believe we all want to see that those cleanups keep progressing at a steady pace. The UST program has historically valued creativity in getting the job done. Working with others, such as our partners in petroleum brownfields, is yet another creative way to recruit friends to help us in our responsibility of protecting Americans' health and the environment from petroleum contamination to the benefit of all partners. ■

USEPA RESOURCES FOR PETROLEUM BROWNFIELDS PARTNERS

Petroleum Brownfields Action Plans

The 2013 and 2008 action plans foster collaboration in returning abandoned, under-used petroleum brownfields sites to productive use.

Petroleum Brownfields: Developing Inventories

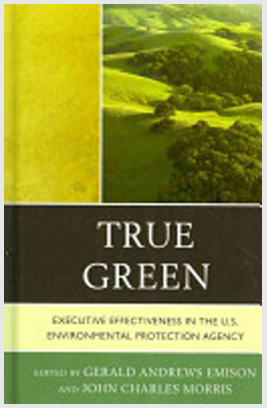
(EPA 510-R-09-002). May 2009. This 34-page document helps states, tribes, and petroleum brownfields stakeholders develop an inventory of low-risk, petroleum-contaminated brownfields properties. The purpose of this document is to enhance communication among stakeholders and facilitate opportunities for redeveloping petroleum brownfield sites.

USEPA's petroleum brownfields website: www.epa.gov/oust/petroleumbrownfields/.

EPA's First OUST Director Recounts Building the Tanks Program Using the Franchise Model

Drawing on the careers of senior executives of USEPA, including one Ron Brand, Director of USEPA's Office of Underground Storage Tanks from 1985 to 1991, *True Green* identifies the concrete actions that work in protecting our nation's environment. Chapter 6 is Brand's "Taking the Franchise Route to Solve an Environmental Problem." For those of you who were not in the tanks program during its formative period, this chapter provides an instructive description of the evolution of this unique program. For those who were, it is a great recollection by the man who led the charge.

By examining the exquisitely difficult tasks of executive leadership in environmental protection, one of the most conflicted public issues of today, the authors of this book provide lessons of executive effectiveness in the principal government institution essential to national environmental progress. USEPA shoulders great expectations from the public and political leaders on fulfilling its statutorily assigned activities. As a result, USEPA must act in concert with state and local governments, nongovernment organizations, and interest groups, as well as business and industry. This volume also highlights the career civil servants who bridge across from policymakers to the government bureaucrats who must make real the abstract policy choices of politicians. ■



READ: *True Green: Executive Effectiveness in the U.S. Environmental Protection Agency (published in 2012 by Lexington Books).*

Musings on UST Operator Training

by Ben Thomas

In May 2009, I delivered what I believe was the nation's first live, online state-approved Class A/B UST operator webinar. From the comfort of my Washington-based office, I was able to guide 35 or so slightly bewildered Colorado operators through everything from tank registration to spill bucket cleaning.

I say "bewildered" because most operators had never sat through a webinar, much less one that contained over six hours of screen time. These students, a tad skeptical at first, quickly found that online learning wasn't so bad. They could watch, listen, ask questions, and ultimately (hopefully) learn something—even though they might have been wearing their fuzzy bunny slippers and hugging their favorite coffee mug. The most common comment I received back then was, "Boy, I thought this was going to be terrible!"

Roll the clock ahead four years to the present day. It's past the training deadline for most states and thousands of Class A/B operators and tens of thousands of Class C operators have been trained without entering the traditional brick-and- mortar classroom. Many are still a bit bewildered when they enter. But are they educated when they log off?

Does It Work?

The big question remains: Does using the Internet to deliver training improve UST compliance? Are spill buckets cleaner? Are there fewer leak detection violations? Fewer leaks? Alarms? If the instructor can't see the student, does learning really occur? Once they leave the virtual classroom, do the students become more virtuous tank operators? Whether online or in the classroom, I do believe that training that engages the student tends to have a longer lasting impact.

In my experience, having trained several thousand operators, both live and by webinar, I've noticed that webinar students tend to engage more when asked questions. And it helps to ask lots of questions and badger them to reply. I suspect engagement is higher overall in a webinar because people are less intimidated to hazard a guess or ask a question if no one is looking at them, as in a traditional classroom setting. In fact, when we polled operators after class the majority said it was at least as good as a live class—and this from a population of largely first-time webinar attendees. I will admit that it can be harder to engage students online than in a classroom, but I believe that student engagement is key to achieving the goals of any kind of training program—UST operator training included.

Most of the research I've done concerning live versus web training focuses on whether one approach is better than the other, based on testing student scores, not on performance or behavior change. All states have some level of field inspection program in place, so we have an opportunity in these field visits to measure UST operator training against the gold standard for any training program: Does training change behavior?

With the federal UST operator-training deadline less than a year behind us, I think it's too early to tell if web-based training, classroom, or any other method of training for that matter has advanced the cause of improving UST operational compliance. (A *LUSTLine* article I wrote for LL#58, September 2008, suggested that was the case for Oregon, the first state to adopt rules and have a history of compliance data after the deadline.) Hopefully, time will tell.

But I'm not optimistic that we'll ever have hard numbers to show. After a quarter century of leak detection regulations in place, we still don't have hard numbers for how well specific methods of leak detection work. While USEPA will be compiling state data on operational compliance, will anyone be documenting to what we can attribute any of the observed trends? Will there be any attempt to evaluate the effectiveness of the many different approaches to operator training that have blossomed across the country? Will there be any attempt to assess the compliance rate with operator training requirements? Will we find out whether effective enforcement of operator training rules plays a role in achieving compliance with the requirements that operators are supposed to be learning about through training?

What Keeps Me Going

I don't pretend to have any hard data on training effectiveness, but I am heartened by occasional anecdotal evidence that learning does alter behavior. As I was preparing this article, I received the following email from an operator who'd participated in our training:

> *Thanks for the training. We did a once over of our UST system with the knowledge given and decided immediately that we have several areas that need improvement.*

This kind of feedback is music to the ears for any trainer who is in the business for reasons beyond just making a living—we didn't just certify an operator, we altered behavior. And altering behavior, especially without the threat of fines and penalties, is what I believe training should be about.

One of the challenges of teaching release prevention is that you never know exactly how many expensive cleanups you have prevented, fiery spill incidents you have mitigated, or home water wells you have protected from contamination. You just have to believe in what you are doing.

The Bottom Line

So whether you are a trainer, tank owner/operator, inspector, manufacturer, or sales rep, it's important

■ *continued on page 23*

Field Notes

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

New PEI RPs Hot Off Your Computer: Aviation Fueling Systems and AST Installation

PEI has recently released a new recommended practice, updated an oldie-but-goody and is proud to offer electronic versions of all our recommended practices.

Aviation Fueling Systems

The new document is entitled *Recommended Practices for the Design, Installation, Service, Repair, and Maintenance of Aviation Fueling Systems* (PEI/RP1300). Over the years, fueling systems at general aviation airports have grown in sophistication, as have the aircraft they refuel, but safe fueling and fuel quality maintenance remain the highest priority for aviation fuel providers. Aviation fueling facilities are the primary providers of services to general aviation aircraft and are generally located at or adjacent to airports. The systems typically store aviation gasoline and jet turbine fuel.

The 24-page document establishes minimum acceptable practices for installing new equipment and guidelines for upgrading existing fueling equipment at general aviation facilities. The document provides a single reference source for engineering firms, installers, and regulators who need critical information to properly design, operate, and approve these systems. The document does not cover the design or operation of hydrant systems or ground equipment fueling distribution systems.

Users of PEI/RP1300 are encouraged to install aviation fuel storage tanks, tank accessories, and piping in accordance with other PEI recommended practices, manufacturers' instructions, and applicable codes. But because aviation fueling systems have special requirements, additional considerations and recommendations are contained in RP1300.

For tanks, these requirements include materials of construction (compatibility), testing procedures, product segregation, tank slope/pitching, and exterior coating. Tank accessories such as floating suction, tank vents, external ladders and stairways, tank low-point sumping, and color codes merited special attention in PEI/RP1300 by the PEI Aviation Fueling Committee. Piping materials and sizing—to ensure proper internal pipe scrubbing and reduce the potential for static electricity buildup—are covered in detail.

Aboveground Storage Systems for Motor-Vehicle Fueling

The sixth edition of PEI's *Recommended Practices for Installation of Aboveground Storage Systems for Motor-Vehicle Fueling* (PEI/RP200-13) is now available from PEI. The 2013 edition supersedes and replaces the 2008 edition of RP200. PEI's AST Installation manual was first written in 1990 in response to the environmental considerations and emerging technology that prompted state governments to permit—and the industry to use—

aboveground tanks at refueling sites to store motor-vehicle fuel.

The 43-page manual provides a concise reference to preferred practices and procedures for the installation of aboveground storage tank systems at service stations and other fueling sites. Users of this 2013 edition will note that it updates references to UL 142 tanks, deletes the section on UL 2244 tanks (listing withdrawn by UL in 2008), revises section 6.2.2 on UL performance testing, corrects a hydrostatic precision test pressure value, and updates Appendix C, which compares the aboveground storage tank code requirements of the National Fire Protection Association with that of the International Fire Code.

Electronic PEI RPs

Finally, PEI now offers electronic versions of all PEI Recommended Practices. These are files that can be downloaded to your computer for viewing or printing. The files are in a secure PDF format and encrypted so that only the original purchaser can access the document. Cost of the electronic versions is the same as our printed copies, but you save time and shipping/handling expense by purchasing the electronic version.

The security feature is managed with a plugin called OpenFile. This free software is an extension to Adobe Acrobat and validates your identity when you open the files. The OpenFile plugin is available for most computer operating systems and some mobile devices. For more information and links to download the necessary software, refer to *www.pei.org/FAQ*.

Copies of all recommended practices, paper or electronic, can be ordered online at *www.pei.org/shopping*. Retail price is $95 per copy or $40 for PEI members. PEI is pleased to provide its recommended practices at member prices to regulators who use a coupon code at checkout. Regulators should contact Teresa Jonkman at tjonkman@pei.org to take advantage of this special offer. ■

NEIWPCC Offers Training on Timely Topics

by Jaclyn Harrison

The New England Interstate Water Pollution Control Commission (NEIWPCC) has been working with USEPA's Office of Underground Storage Tanks (OUST) for over 25 years to enhance information sharing among state, territorial, and tribal UST, LUST, and Financial Responsibility programs. Funded through a cooperative agreement with USEPA OUST, NEIWPCC has been actively developing training opportunities for the past two years. In the past few months, NEIWPCC delivered three trainings, which reached over 400 people.

There are two ways for states, tribes, and territories to share their training needs with NEIWPCC. The first way is to respond to an online feedback survey, following webinar or classroom training, with suggested future topics. The second way is to simply e-mail the NEIWPCC tanks program manager. Since national trainings are ongoing throughout the year, NEIWPCC keeps a master list of suggested topics with how many times that topic has been requested. Regional trainings are provided to regions that request training. These trainings are then held on a rotational schedule so that NEIWPCC is not visiting one region more than another. For all national and regional trainings, NEIWPCC works with advisory committees to develop agendas in order to better meet the needs of the attendees. The committees are comprised of state, tribal, and federal staff who are willing to lend some of their time and expertise to training development.

On November 14–16, 2012, 35 individuals across EPA Region 10 traveled to Lacey, WA for a 2.5 day UST Inspector Training. Attendees heard from Bill Jones on SIR & CITLDS, Scott Wilson on fiberglass pipe, Dave Emmington on Veeder-Root systems, Tim Curns on Incon systems, and Kevin Henderson on a myriad of topics ranging from biofuels to automatic line leak detectors. On November 15, attendees went out in the field to see a demonstration on how to do line tightness and automatic line leak detector testing. One person commented on NEIWPCC's process for setting up trainings, "I really liked how we had a training committee because it helped get a useful agenda with pertinent topics."

Edward Kubinsky, Crompco, leads a NEIWPCC inspector training site visit in Windsor Locks, Connecticut, for states in USEPA Regions 1 and 2.

The first installment of the Biofuels Webinar Series, Release Detection Challenges Posed by Biofuels, was held on March 13, 2013. The live event was attended by approximately 325 people. Attendees heard from the EPA National Biofuels Team; Kevin Henderson on the potential impact of biofuels on leak detection; Curt Johnson, chair of the National Workgroup on Leak Detection Evaluations (NWGLDE); and Anne Gregg on the detection of water. One attendee said, "This was a very good introduction to a controversial topic that isn't going to go away. The more information that is made available will assist regulatory boards such as ours to be able to adjust testing requirements that impact the petroleum industry in our state."

The Alaska 2013 Annual UST Certified Worker Summit, held on March 28–29, was a different type of training for NEIWPCC. There were 50 attendees of various certifications: Inspectors, Installers, CP Testers, Tank Tightness Testers, and UST Closure Workers. NEIWPCC had to work carefully with speakers Scott Wilson and Kevin Henderson to balance the agenda so that everyone walked away with useful information. Attendees also heard from Alaska State Personnel on upcoming Alaska UST regulation changes, enforcement actions, and 2013 UST inspection season goals and objectives. The reviews for the training have been very positive with one person saying, "This was a very useful and applicable training, it was extremely helpful to have both certified workers/UST regulators/owners operators in the same room discussing the topics that affect UST systems. I'm surprised this type of training/conference has not been done in the past; more like this would help improve the UST systems and strengthen the program in the state. Absolutely EXCELLENT idea!"

Keep an eye out this summer for the second installment of the Biofuels Webinar Series on Corrosion Challenges Posed by Biofuels. NEIWPCC will also be visiting EPA Region 7 this summer for a UST Inspector Training. Also be on the lookout for more remediation training in the future as we are currently expanding our training opportunities For an upcoming training schedule, please visit *http://www.neiwpcc.org/ust/schedule.asp*.

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. ■

SNAPSHOTS FROM THE FIELD

What in Earth Were These?

On November 20, 2012, while working on a petroleum remediation project at the former Kennett Oil Bulk Storage Facility in Conway, New Hampshire, an excavator unexpectedly scraped a metal object a few feet below the surface. The operator carefully removed additional soil to discover what appeared to be two underground storage tanks. Further inspection revealed riveted seams and one of the tanks had a flat bottom with a curious step built into it. A little sleuthing uncovered that the older tank was likely from a horse-drawn wagon used to transport oil in the late 1800s. In the photos of the excavated tank and the restored horse-drawn vehicle you can see that the driver's seat was built right into the end of the tank matching the odd-looking step configuration of the excavated tank.

As it turned out, a total of three oil tanks were eventually excavated. Two of the tanks were part of the 1922 Kennett Oil Model T delivery fleet shown in this historical photo of the site. The third horse-drawn tank is believed to be one of the oldest tanks discovered in New Hampshire. NHDES believes that the three tanks were either disposed of by onsite burial or were used for product storage for a time after being decommissioned from the delivery fleet.

Thanks to Gary Lynn, New Hampshire Department of Environmental Services.

From Our Readers

Speaking of Ghosts

The "Ghosts Are Stakeholders Too" story in *LUSTLine* #72 reminded me of an inspection I conducted recently here in Arizona. Shortly before last Halloween, the Waste Program Division of the Arizona Department of Environmental Quality (ADEQ) received a call from a concerned citizen who reported an empty, abandoned tank at a house he was purchasing. I, as the lucky ADEQ underground storage tank inspector who was assigned the inspection, met the future homeowner at the site, just miles from Wild West town of Tombstone where there are said to be a number of haunted sites.

As soon as I arrived at the site I could feel that something was not right about this property and its UST. In speaking with the potential purchaser I learned that the house had been until recently an illegal embalming and crematorium site. The crematorium had been demolished; the embalming area had been located in the master bedroom of the existing house.

Upon further investigation, I determined that the UST was actually full of a horrific slurry of water, formaldehyde, and human remains. Apparently the former owner had been stopped from discharging the by-product of the embalming operation to the public sewer system and in response had installed one 500-gallon UST.

The site was overgrown and had a creepy feeling. When I went to take pictures of the site I noticed there was a white streak in the middle of the camera's LCD display that was not visible when I looked at the site without the camera. Also, though the streak remained visible in the display, the white streak was not visible on the actual picture.

Soon after, the new batteries that I had just put into the camera went dead. I put in new batteries and went to take another picture and the white streak was on the screen again. The potential owner and I were amazed because the streak got smaller when I moved the camera to the left and the right. In fact it became a single white line down the middle of the screen. I again took the picture and the white streak did not show up on the picture; and again, the new batteries went dead.

I thanked the potential owner and left the scene, quickly. The tank was taken care of by a state contractor that works with the embalmers. The person did buy the site and had no doubt there are ghosts there.

Matthew F. Garcia, ADEQ

■ **Operator Training** *from page 19*

to understand that training isn't just about complying with a new rule or passing a competency test. Training is teaching people information in ways that they can understand *and* motivating them to modify their behavior based on that information. In the UST operator arena, this means helping people run their businesses better by reducing risks they hardly knew existed.

Student engagement in a class should result in heightened awareness of risks and responsibilities and be followed by thoughtful analysis of the UST operations for which the student is responsible. This analysis should produce ideas on how to upgrade equipment and make operations more effective. Those ideas can ultimately reduce the likelihood of a leaking pipe, a major spill, or a contaminated drinking water well.

I once heard that, "Bad training costs and good training pays." As operator-training programs mature, we'll see if that's the case in our UST industry. ■

Ben Thomas is with USTTraining, a company that provides operators and inspectors with motivational training seminars throughout the United States. He can be reached at ben@usttraining.com. He is a frequent contributor to LUSTLine.
Note: A version of this article originally appeared in the Steel Tank Institute's newsletter Tank Talk.

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USEPA HAS EXTENDED THE PUBLIC INPUT PERIOD on the vapor intrusion and petroleum vapor intrusion draft final guidances to June 24, 2013. For your convenience, go to the following links to the guidance documents and USEPA's docket.
www.epa.gov/oswer/vaporintrusion
www.regulations.gov/#!docketDetail;D=EPA-HQ-RCRA-2002-0033

L.U.S.T.Line Index
Aug. 1985/Bulletin #1 – June. 2013/Bulletin #73
Download the Index at www.neiwpcc.org/lustline/ and then click LUSTLine Index.

National Tanks Conference & Expo

Registration for the 24th National Tanks Conference and Expo in Denver, Colorado, is open. The 2013 agenda features sessions covering a wide range of underground storage tank topics, including biofuels, remediation technologies, and crucial financial responsibility issues. In addition to the educational sessions, ample opportunities for informal networking will be provided, allowing you to share knowledge and experiences with fellow attendees. The Expo will feature informative booths from state, tribal, and federal agencies, as well as displays from vendors showcasing the latest tanks-related products and services. As a host city, Denver offers several outstanding social opportunities, which we know will enhance your conference experience.

The conference website will be updated regularly with the latest information, so please visit it often. Additionally, if you wish to be included on the National Tanks Conference e-mail list to receive periodic updates and reminders about the conference, please send your e-mail address to NTCInfo@neiwpcc.org. We look forward to seeing you in Denver in September! ■