

New Approaches for Clean-Up at Petroleum UST Sites

Read Miner, Underground Storage Tank (UST) Program, Corrective Action Section

Many different remediation technologies have been developed by the industry to clean up petroleum releases such as pump and treat, air sparging, soil vapor extraction, aggressive fluid vapor recovery, chemical oxidation and bioremediation. Each of these technologies relies on the volatility of petroleum and the ease at which petroleum can be broken down when in contact with chemical oxidants or by naturally occurring micro-organisms in the presence of oxygen or harmless nutrients.

In some cases, groundwater may transport released petroleum hundreds of feet onto a neighboring property. In these cases, it may be necessary to implement corrective action strategies that use a combination of technologies to treat large areas. Historically, the Underground Storage Tank (UST) Division has managed these clean-ups using a "Pay-for-Performance" (PFP) approach. The UST Division prepares a bid specification that outlines the current site conditions and the clean-up goals. Each bidding

contractor then prepares a strategy using technology(ies) of their choice to complete the clean-up. Innovative approaches are encouraged. During clean-up, the progress is monitored, and the contractor is paid a percentage of their bid price as they document progress toward meeting the clean-up goals. Because these clean-up contracts commonly cover large areas, they typically take years to complete. This strategy has proven itself to be a very effective way to manage clean-ups and is a wise use of taxpayer money.

Not all petroleum plumes migrate long distances. In some cases, the petroleum remains close to the former or existing UST system. Where the petroleum is not migrating and is not posing a risk, clean-up may not be deemed necessary. However, if that small area of petroleum impact poses a risk, clean-up may still be necessary, but a large-scale PFP clean-up contract may not be appropriate. During 2012, the UST Division began a pilot program in which the Division



developed its own Corrective Action Plans for six sites. Funding for four of the sites in the pilot program came from the American Recovery and Reinvestment Act of 2009 (ARRA) (i.e., Federal Stimulus money) and two of the sites were funded by the State Underground Petroleum Environmental Response Bank (SUPERB).

After review of all bids, these six jobs were awarded to three environmental contractors: Emerald, Inc.; Midlands Environmental Consultants, Inc.; and phA Environmental Restoration. Chemical oxidants were injected at each of those sites at locations and depths specified by the S.C. Department of Health and Environmental Control (DHEC). Post-remedial sampling activities are in progress at the sites.

If results for the six sites are favorable, DHEC's UST Division intends to expand this initiative for sites that do not warrant a full-scale traditional PFP clean-up. The targeted approaches will be expanded to include more options such as soil excavation, bioremediation, air sparging, surfactant, etc.

The goal is to add more options that can quickly be employed to accelerate the clean-up time frame, increase the clean-up completion rate and continue to maximize the benefit from the available clean-up funds.

Hiding in Plain Sight: Inventorying South Carolina's Petroleum Sites

Mark Berenbrok, Petroleum Brownfields Coordinator, DHEC's Brownfields Program

Gas stations have been a common fixture of the American landscape in both rural and urban areas since the 1920s. Given the possibility that contaminated soils or a long-forgotten underground storage tank could be lurking just beneath the surface, communities attempting to address vacated petroleum sites – referred to as brownfields – often face a challenge in developing a comprehensive inventory. Locating the corner gas station that closed three years ago is easy. But what about that much less obvious gas station that closed in the 1960s and the building has been remodeled and repurposed? Memories fade, people move away, buildings are demolished and parking lots are repaved. The gas station your grandfather visited may now be the sandwich shop that went out of business last year.

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Many S.C. communities have applied for and received grants from the U.S. Environmental Protection Agency to inventory and assess both hazardous substance and petroleum sites in areas they have targeted for development or revitalization projects. DHEC assists grantees in compiling inventories, developing work plans, conducting site assessments, and understanding assessment results. Petroleum brownfields such as former gas stations present a unique challenge because they're numerous and usually small.

Educating stakeholders about the many sources of petroleum and how those sources are regulated are key components of our outreach.

The Tip of the Iceberg ...

Grantees often begin their inventory with a windshield survey of gas stations and bulk terminals. They may supplement it with a list of sites from the State Petroleum Program. But this may be a mere glimpse at what is actually buried out there. To understand its limitations, the user of any list needs to know how it was compiled and what it does and doesn't include.



Below are some examples.

- **Any list of UST sites is going to be biased towards facilities that have operated since 1974.** Since gas stations have been opening and closing since the 1920s, you're going to miss a considerable number of sites if you limit yourself to a list from a state agency. We have found that an inventory composed only of regulated UST sites will include less than half of the potential population of petroleum sites.
- **Some states regulate heating oil tanks and aboveground storage tanks (ASTs) in addition to USTs.** Some lists may only include AST and heating oil sites if a release has been reported.
- **Petroleum facilities that no longer exist** – called historic sources – include gas stations, garages, bulk terminals, heating oil tanks, dry cleaners and fleet tanks. These sources should be included when building an inventory.
- **Historic sources often cause greater delay in site redevelopment than existing sources.** Finding contaminated soil or that forgotten set of USTs during grading activities can bring everything to a grinding halt.

Mapping It Out in Dillon County ...

Dillon is a small city of about 6,800 located in rural northeastern South Carolina. In 2009, the City received a U.S. Environmental Protection Agency (EPA) Brownfield Assessment Grant to develop an inventory of petroleum sites and conduct Phase I and Phase II assessments.

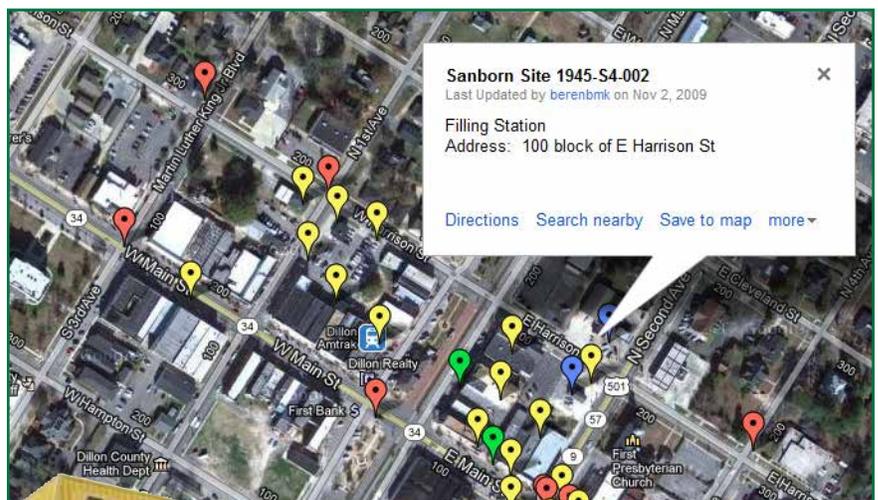
The City of Dillon had been working with the S.C. Department of Health and Environmental Control (DHEC) on a large derelict manufacturing site prior to 2009 and was familiar with the Brownfields Program and its staff. This experience was key to allowing the City to incorporate petroleum brownfields into its overall brownfields initiative. A DHEC Brownfields Program staff member was assigned as a liaison and assisted the City throughout the project.

To allow the City of Dillon to identify potential sites, DHEC's Brownfield Program staff created a Google® map of petroleum sources that included DHEC records and Sanborn Fire

Insurance (SFI) maps. (The SFI maps were originally created for assessing fire insurance liability in urbanized areas in the United States. Since 1867, they have provided detailed information regarding town and building information in about 12,000 U.S. towns and cities.)

BELOW: Pictured is a Google® map of downtown Dillon, South Carolina. Each place mark represents a petroleum source.

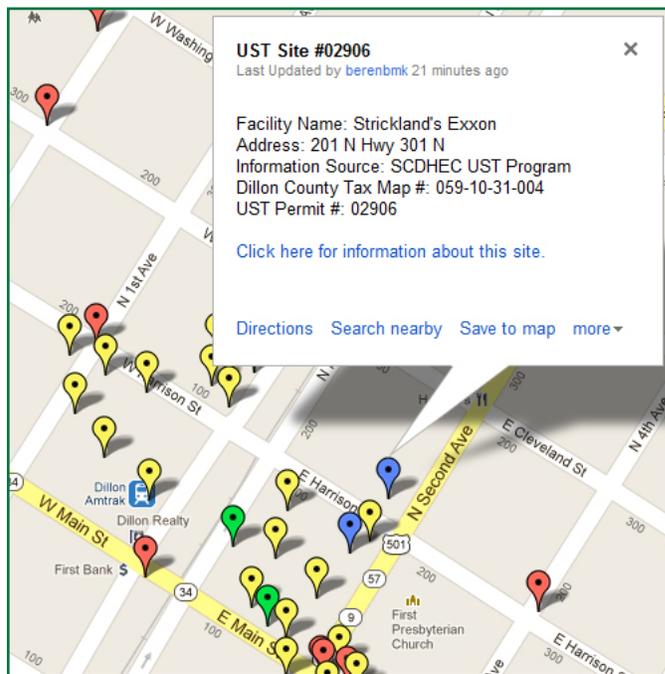
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The City of Dillon Google® map included registered underground storage tank (UST) sites, aboveground storage tanks sites and dry cleaners. About 140 existing and historic sites were shown on the map along with a brief description for each. Tax parcel identification numbers were included if they were available from DHEC records. The map allowed the City to easily identify sites for follow-up with DHEC's liaison and was a valuable tool for stakeholders.

RIGHT: Place marks are color-coded. Clicking a place mark opens an information box for each site.



So what's the payoff?

By educating stakeholders, giving them the tools to easily identify sites and providing them with a liaison, DHEC has enabled communities to begin building comprehensive petroleum brownfields inventories. Creating an inventory is just the first step in moving forward with a desired economic improvement goal.

Absentee landlords, site qualification and access, mystery USTs and assessment problems are future issues, but an upfront investment in time and resources can make the journey much easier.

2018 Upgrade Requirement: What will it mean for you?

According to R.61-92, Part 280.25 – no later than December 22, 2018 – all underground storage tank (UST) systems located within 100 feet of an existing water supply well, coastal zone critical area or state navigable waters must comply with one of the following requirements:

- secondary containment requirements of Section 280.20(g); or
- permanent closure requirements under Subpart G of this part – including applicable requirements for corrective action under Subpart F.

DHEC's UST Management Division currently is working on determining which regulated facilities will be affected by this regulation. Once determination has been made, all affected facilities will receive notification from the UST Management Division.

NEW CERTIFIED SITE REHABILITATION CONTRACTORS

PERMIT #	CONTRACTOR	DATE CERTIFIED
UCC-0428	EnviroRisk Consultants, Inc.	09/25/12
UCC-0429	Zava Industrial, Inc.	09/25/12
UCC-0430	Apex Companies, LLC	09/25/12
UCC-0431	Martin O Klein, PA	10/25/12
UCC-0432	W. Walker Environmental	11/28/12
UCC-0433	Hulsey McCormick & Wallace, Inc.	01/03/13
UCC-0434	Professional Service Industries, Inc.	03/05/13
UCC-0435	PSI Engineers & Consultants, PLLC	03/06/13
UCC-0436	Petra-Tech Environmental, LLC	03/26/13
UCC-0437	ExoTech, Inc.	04/29/13
UCC-0438	T K Tank Services, Inc.	04/29/13
UCC-0266	Altamont Environmental, Inc.	08/26/13

DECERTIFIED SITE REHABILITATION CONTRACTORS

PERMIT #	CONTRACTOR	DATE DECERTIFIED
UCC-0392	AECS	02/08/2013
UCC-0292	Aware Environmental, Inc.	04/24/2013
UCC-0357	Greenleaf Environmental Services	04/24/2013
UCC-0252	Professional Service Industries, Inc.	06/24/2013
UCC-0136	Terraine, Inc.	06/24/2013
UCC-0324	4QR Environmental Solutions	06/24/2013
UCC-0368	Swift Creek Environmental, Inc.	08/08/2013
UCC-0155	Applied Technology & Mgt.	08/23/2013
UCC-0399	Hazclean Environmental Consult.	08/23/2013
UCC-0033	Lorris Environmental, Inc.	08/23/2013
UCC-0427	Winyah Environmental PC	08/23/2013

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