THINK TANK

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Problems With Flexible Plastic Piping

by Brian Churchill

Over the years there have been great advancements in UST product piping design. This is especially true with thermoplastic flexible product piping. Overall, flexible plastic piping has proved to be very durable and has greatly reduced releases to the environment from product piping. Unfortunately, there have been several states over the past year that have reported failing flexible product piping systems with increasing frequency.

UST Branch is now the ***Tank Management Branch*** *— responsible for* ***USTs*** *and* ***ASTs***

According to John Mason, U.S. EPA Region 4 UST Program Manager, this includes several different generations of polyethylene flexible piping. "Some of the changes appear to be an elongation of the pipe resulting in torn containment sump boots, connectors, and splitting of the pipe as it grows over metal fittings. There are other reports where the outer layer has wrinkled, softened and split," says Mason.

To date, the Tank Management Branch (TMB) has not seen widespread flexible plastic piping failures as in some other states but over the years the TMB has noted several facilities with degrading Total Containment Enviroflex PP1500 product piping produced prior to September 30, 1994. When new, this piping has a dark yellow color but when exposed to moisture, the piping degrades due to a fungus or microbial growth. Signs of degrading include small cracks in the outer dark yellow layer, dark staining, mold, flaking and dissolving of the piping material. For more information, please refer to Think Tank Summer 1999 or visit: http://www.dnrec.state.de.us/dnrec2000/Divisions/AWM/ust/Thinktank/PDF/tt28.pdf

UST owners with flexible product piping should be aware of these potential problems and maintain release detection as specified in the *Regulations*. If possible, owners are encouraged to use as many methods of release detection available including monthly or ideally continuous methods to detect potential releases as quickly as possible. In addition, frequently monitor the piping and any related connections or components for evidence of degradation, twisting, elongation, softening or failure in tank and dispenser sumps. Please also note that tank and dispenser sumps must always be kept free of liquid and should maintain a water tight seal. It is extremely important that no fuel be allowed to remain in the sumps where it is able to react with the outer wall of the piping. Following this advice will help reduce the potential for a release to the environment and may minimize the length of time required to detect a release.

If you are the owner or operator of a UST facility and have any concerns or questions about compromised integrity of product piping or if your facility has dark yellow piping, please contact us immediately at (302) 395-2500. For photographs showing various flexible plastic piping problems please visit: http://www.deq.state.ms.us/newweb/gwhome.nsf/pages/USTfiles/$file/FlexConcerns.pdf. ■

Aggressive Remedial Technology Benefits Town of Kenton

by Tripp Fischer

In 2001, a year-long hydrogeo logical investigation of an un derground storage tank release in Kenton, DE revealed a 1,100' by 400' dissolved phase MtBE, TBA and benzene plume that traveled beneath several properties, and impacted several wells. The plume, Figures 1 and 2 (GES, Inc. 2003), contained up to 16,000 parts per billion (ppb) MtBE and 2,400 ppb benzene at the source and contained as much as 500 ppb MtBE and 100 ppb benzene more than 600' down-gradient.

Once the investigation was complete and all potential receptors were deemed "safe", Groundwater & Environmental Services (GES), Inc. of Exton, PA, began collecting data and searching for potential remedial options. From December, 2001 through February 2002, GES, Inc. conducted groundwater parameter and remediation feasibility tests to determine the most efficient system to accomplish three main goals:

- Remediate the plume to less than Delaware's Risk-Based Corrective Action Program's Tier 1 Risk-Based Screening Levels in less than one year.
- Keep project costs below the coverage of the insurance policy.
- Accomplish the remediation goals while causing little to no interference with the community.

Using a mobile Data Acquisition and Processing Laboratory (DAPL), GES, Inc. was able to collect data to efficiently characterize the contaminated aquifer and vadose zone while in the field. Based on the results, GES, Inc. submitted a work plan to remediate the site using three aggressive technologies to address petroleum vapors, contaminated soils and groundwater. The remedial technologies used were soil vapor extraction (SVE), air-sparging (AS), and chemical oxidation.

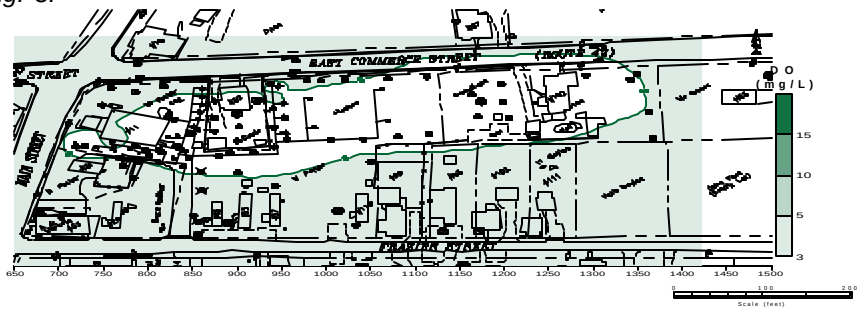
With the exception of four down-gradient air-sparging wells, the entire SVE/AS system was designed on-site in and around the "source" area. This portion of the system was designed to strip the source area of petroleum contamination by removing vapors from the unsaturated soils while simultaneously blowing air (AS) into the saturated zone. The AS system thus "strips" the contaminants from the water and into the vapor phase and forces them up into the unsaturated zone above, where the vapors are removed with the SVE system.

The chemical oxidation portion of the system involved in-situ ozone and hydrogen peroxide in-

Fig. 1.

Fig. 2.

Fig. 3.



Graphics courtesy of GES, Inc., 2003

jection. GES, Inc. developed a technique to utilize injected air as an aid to further spread the powerful oxidizers throughout the aquifer. The result was groundwater and soil remediation utilizing five major processes (GES, Inc. 2003):

- Chemical oxidation via ozone injection
- Chemical oxidation via hydrogen peroxide injection
- Chemical oxidation via the hydroxyl radical which results from the reaction of ozone with hydrogen peroxide
- Increased bioremediation as a result of an increase in dissolved oxygen
- Mass transfer of volatile organic compounds via air injection

The injection wells for the chemical oxidation system were installed in a line along the down-gradient property line of the source property (6 wells), and another line, parallel to the first, about 60' down-gradient (4 wells). The wells were spaced 15-20' apart and were capable of delivering ozone and hydrogen peroxide simultaneously. Figures 3 and 6 (GES, Inc. 2003) demonstrate the effectiveness of the injection system in terms of increased dissolved oxygen. Prior to remediation, there was little to no dissolved oxygen throughout the plume, and after three months of remediation, there were "zones" as high as 25 parts per million.

After three months of remediation, concentrations of BTEX, MtBE, TBA and TAME went from 422 ppb, 1,500 ppb, 790 ppb, and 750 ppb respectively to all non-detect (ND) 10' down-gradient of the injection points. After four and a half months of remediation, none of the 45 sampling locations contained measurable concentrations of BTEX contaminants and only one well contained MtBE and TBA. Figures 4 & 5 (GES, Inc. 2003) demonstrate the depletion of the dissolved phase BTEX and MtBE plumes after only three months of remediation. After five months of remediation, the chemical oxidation system was turned off and the site is currently being monitored for closure.

Much of the success of this project can be attributed to the overwhelming cooperation of the Mayor of Kenton, the citizens of Kenton, and the owner/operator of the source property. Their cooperation allowed the Tank Management Branch and GES, Inc. to install a very aggressive system almost identical to the original design. If we were not allowed property access for the installation of several monitoring and injection wells, we would not be preparing for closure at this time. Their will to protect their community is admirable. ■

Fig. 4.

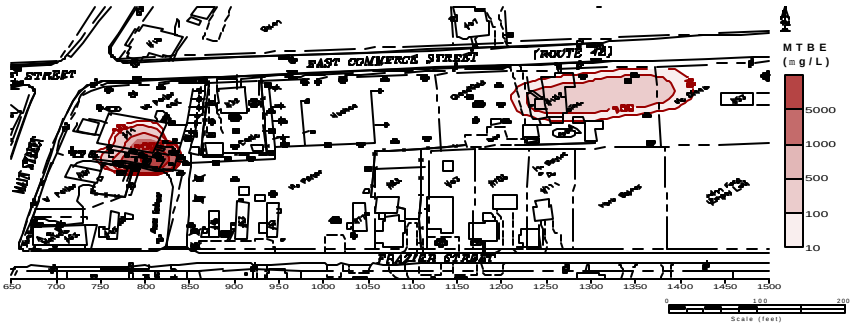


Fig. 5.

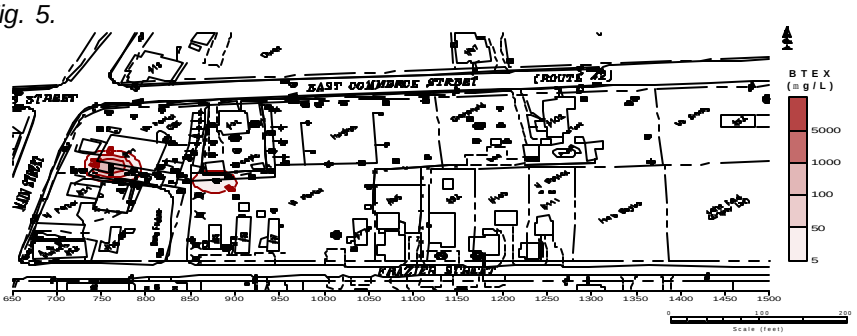
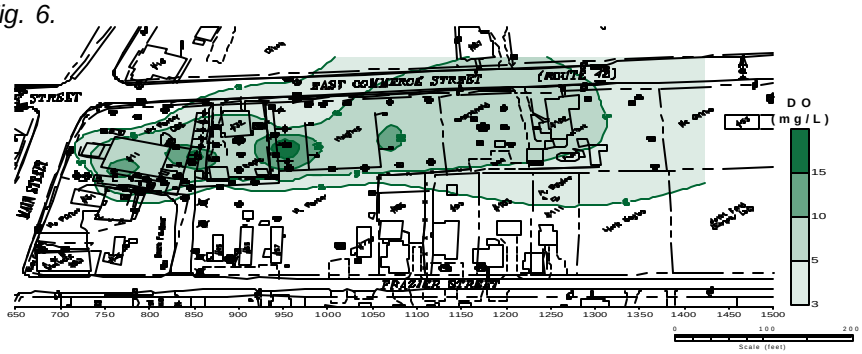


Fig. 6.



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Announcements

Tripp Fischer – William Zachary Fischer, "Zack", was born November 12, 2002. He tipped the scales at 6lbs 13oz and stretched out to 19 inches. No words or teeth after four months but, according to his dad, his fastball has already been clocked in the mid-sixties.

Odds 'N Ends

UST Compliance statistics

Delaware participated in an EPA Pilot project to determine compliance rates at UST facilities. Statistics are based on 1100 inspections performed in 16 states over a 10 week period.

The most common equipment violation was failure to meet corrosion protection standards. In most instances, correction of the violation is to isolate flex connectors from the soil with a boot. The most common leak detection violation involved either not performing monthly monitoring, or not being able to show that monthly monitoring of the tank and lines was performed.

Compliance with:	Equipment	Release Detection
Delaware	62%	79%
Avg. - 16 states	68%	58%

Aboveground Storage Tanks

The AST Technical Advisory Committee continues work on drafting the AST regulations. Three subcommittees have been formed: Installation/Modification, Inspection/Monitoring and Financial Responsibility/ Corrective Action. The steering committee meets on a bi-monthly basis; the subcommittees meet more frequently. The public is invited to attend any of those meetings. All meetings are held at the DNREC office at 391 Lukens Drive, New Castle. Meeting dates and times and meeting minutes are posted on the DNREC web site at http://www.dnrec.state.de.us/dnrec2000/Divisions/AWM/ast/.

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