

LDT LEAK DETECTION TECHNOLOGY

UST Inspector Training Webinar 06-23-10

Presenter David Rabb

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Chemical Base Tracer Testing

- Ken Wilcox and Associates completed the Third Party Evaluation of the MDleak® Technology
- Nation Work Group approval shortly after
- The MDleak® method was approved for both the liquid and vapor phase of the product
- The sensitivity of the test can be changed by adjusting the tracer concentration within the tank

Introduction to Chemical Base Tracer Testing

- **Inoculation**
 - **MDleak[®] testing begins by adding a chemical marker to the liquid and vapor phase within the tank**
 - The chemical tracer is added to the tank while the facility is in operation
 - The tracer defuses evenly between the liquid and vapor phase of the tank
 - Mixing is completed within one hour
 - As the customers pump fuel the tracer labeled fuel is moved throughout the product, and vapor piping system
 - The process does not require any of the facility operations to be interrupted



Single Wall Systems

- **Sampling probes are installed around the tanks and down the pipeline tranches**
 - Tank probes are installed to the centerline of the tanks
 - Pipeline probes are installed above the pipeline
- **If a leak exists the tracer labeled fuel exits into the soil where the tracer will evaporate out of the fuel and into the soil vapor space**

Single Wall Systems

- **Migration Period:**
 - Sampling probes are installed on 10, 15, or 20 foot centers
 - Depending on the distance between sampling probes a different wait period is required for the tracer to migrate from the leak to the nearest sampling probe

Double Wall Systems

- **Samples are taken from the interstices**
- **Migration Period:**
 - **Passive Sampling Method**
 - Depending on the distance between sampling location and the furthest distance to a leak location the migration period can vary
 - **Active Sampling Method**
 - Samples are taken by displacing the atmosphere within the interstice

Remote Analysis

- Samples are evaluated utilizing two methods
- **Remote Analysis:**
 - Advantages are a low cost test method
 - Used for annual and monthly monitoring
 - Samples are taken at the sites and sent to the laboratory in Arizona where they are analyzed for the tracer compound

Onsite Analysis

Onsite real-time analysis utilizing onsite test equipment

- Advantages are real-time analysis
- Used for sites where a leak may exist
- Exact leak locations can be pinpointed
- Used in extreme high water conditions
- Two methods:
 - Full laboratory service
 - Express laboratory



What Components are Regulated?

Component

- Product Piping
- UST
- Shop Fabricated AST's <50K

- Vent Lines
- Subsurface Vapor Leaks
- Tank Top Fittings
- Spill Buckets
- New Construction

Regulated Leak Rate

0.1 GPH or 876 Gallons Per Year

0.1 GPH or 876 Gallons Per Year

0.1 GPH or 876 Gallons Per Year

Current Practice

Non Regulated

Non Regulated

Non Regulated

Non Regulated

2.4 GPD Soap and Pressure

What Is A Liquid Leak

- **Federal and State Regulations require that a test method be capable of detecting leak rates equal to or greater than 876 GPY (0.1GPH) to 1752 GPY (0.2GPH)**
- Testing methods divide facilities into test sections
- Each tank or pipeline at a facility could have a small leak which accumulative could add up to a significant release over time
- From recent data gathered from states and owners associated with large populations of UST sites, 20 to 40% of these sites are contaminated

What is a Vapor Leaks

- **168 gallons of vapor equals one gallon of evaporated liquid gasoline**
- Outside of California – subsurface vapor leaks are not regulated (vapor leaks found underground)
- California's Field Base Research project proved that both subsurface vapor leaks and liquid leaks below the federal allowable leak rate of 876 GPY were the cause of California's groundwater contamination
- The research was conducted over several years.
- Once completed California legislated a new leak rate standard of 44 GPY

LDT List of Tracer Services

- **New Construction Acceptance Testing**
 - Pre-Backfill Testing
 - Final Certification
- **Annual Testing**
 - Facilities that perform annual tracer testing are Guarantee not to leak
- **Leak Locating**
 - Two testing methods; Onsite Laboratory and Express Laboratory
- **Environmental Leak Assessment (ELA)**
 - Onsite laboratory for real time analysis and leak location
 - Performance evaluations for SVE and Pump and Treat systems
- **LUST Data Base**
 - LDT has the largest leak analysis data base in North America
 - Each leak is documented by:
 - Component, Manufacture, Owner, Contractor, and includes Photographs



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New Construction Acceptance Testing

New Construction Testing

- Test Sensitivity:
 - Primary components 44 GPY (0.005 GPH) liquid leak
 - Secondary components 876 GPY (0.1GPH) liquid equivalent
- Test are at two different events, before backfilling, final
- Will find 3 to 10 leaks at every location [\(CERT\)](#)
- Reporting is detailed and informative [\(Report\)](#)
- Historical Leak data is captured and maintained for retrieval by the owner at anytime [\(Historic\)](#)

MDleak[®] New Construction Testing:

- Sensitive testing during construction makes sense:
 - Verifies and ensures construction quality
 - Saves risk of later site contamination and liability
 - Maintains property value
 - Test cost versus long term clean up costs is low
- MDleak[®] testing method rapidly points to the exact leak location allowing the contractor to quickly make repairs while the testing continues on other components of the system.
- The contractor can move from leak to leak as fast as he can make repairs which saves him and the owner money both short and more importantly long-term
- Primary wall to Interstitial and interstitial to soil can be tested

Pricing

- Tests are completed throughout North America
 - Proposals are generated from a standard RFP form
 - The form is intuitive and takes less than 3 minutes to complete.
- [\(RFP\)](#)
- Cost:
 - \$3500 within the USA
 - Reports include photos of each leak and access to our data base

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Annual Monitoring

Case Study
Missouri

Liquid and Vapor Leaks

Overview

- Tanks and piping were installed in 1995
- Site was adequately maintained
- LDT located the following underground leaks
 - Liquid tank leak was detected at 175 GPY
 - One very small pipeline leak was detected 10 GPY
 - Large vapor leak was detected
 - 60 gallons per day Vapor
 - 130 gallon per year liquid equivalent
 - Total of 300 gallons per year liquid equivalent leak



ATG Conduit was plumbed directly into the tank ullage. During construction the ATG conduit tee was severed allowing direct communication from the tank to the soil.



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A close-up photograph of a concrete structure, likely a tank pit, showing a significant gap in the construction. The gap is approximately 1 inch wide and is located at the top of a vertical concrete wall. The surrounding concrete is heavily stained with yellow and brown marks, indicating potential leaks or spills. The ground surface is composed of dark, loose gravel.

**A leak from this 1 inch gap left from
the original construction installation
would fill the tank pit with vapors
during tank fill events**



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**Leak was detected in pipeline.
Contractor saw cut as directed
and found the cause of the leak
within the first shovel removals.**



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A very small leak of a few gallons per year. Undetected could have been the cause of a catastrophic failure.

MDleak® Monitoring

- **Monthly or Annual Testing:**
 - Regular chemical based testing would have discovered these leaks years before they become a problem
 - Risk by State Funds and Insurance Companies is reduced when leak testing can identify all leaks
 - **MDleak®** annual testing costs are in line with traditional costs around the country
 - MDleak® Annual Testing **guarantees** a tight system



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Leak Locating Technology

Case Study New Hampshire



New Hampshire Case Study Summary

- The facility was a new site approximately six months old
- Unlimited resources were made available to achieve an environmentally tight facility
- The site was constructed using double wall piping
- Contactor and the product piping manufacture are rated very high to highest in the industry
- Data proves that piping failures are just about even between piping manufactures



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← **Leak Number One**



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← **Leak Number Two**



Leak Number Three →



Leak Number Four

A large, translucent green pipe is shown lying on a gravel surface. The pipe has a white 'X' mark on its side. A black arrow points down from the text 'Leak Number Five' to a small, white, irregular mark on the pipe's surface, indicating a leak site. The pipe is partially cut open at one end, revealing a brown interior.

Leak Number Five





Leak Number Six

Leak was detected 14 inches from the Tank Sump wall and proven using a handheld camera. Leak was repaired through the inside of the pipe from the tank sump without breaking concrete.



Minor Interruption to Traffic



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Environmental Leak Assessment (ELA)



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Environmental Leak Assessment (ELA)

- Why are active sites being remediated?
 - Because of a Major Spill?
 - No, most sites being remediated today are not because of a major spill event
 - Because of Ongoing Leaks?
 - Yes, most sites being remediated have one or more chronic leaks below the 876 GPY federal leak rate threshold
 - An MDleak® Environmental Leak Assessment (ELA) test should be completed to turn off the ongoing leaks



Environmental Leak Assessment (ELA)

- Sensitivity 44 GPY or 0.005GPH
- This method is used at:
 - Problem sites where remediation system have not been able to complete the cleanup
 - If remediation is being considered environmental engineers and State Regulator should consider an ELA test to identify the leak source and to quantify the leak rate.
 - The report gives valuable information which is then utilized by the engineer's in their cleanup design

Delivery

- Companies are licensed through a Subcontract Agreement
- Employees are trained by LDT and can only work under the licensed Subcontractor
 - If the employee leaves the employment of the subcontractor the manufacture's training certification become invalid

Questions?

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