Case Study- Release at a Wisconsin High-Throughput Facility

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Facility Background

- Current diesel fuel tank and piping system installed June of 1997 (all single-wall fiberglass)
- At least three separate owners over last 11 years
- Current owner has owned the facility since May 2010
- Monthly throughput ranged from 80-115K gallons over the 18 months prior to release discovery (1/01/2010-06/05/2011)
- Veeder Root TLS-350R with PLLD (2008)
06/01/11: Equipment Functionality Testing by service contractor
06/05/11: Release discovery/diesel system shutdown
06/06/11: Department notified of release by WDNR- Local inspector investigation began
06/10/11: Site visit and data collection by department technical staff
06/14/11: Damaged regular diesel line discovery
06/20/11: System repairs/re-configuration completed; Facility returned to service.
Back Fill Product Retention
Product staining from trench drain overfill during tank backfill draining
Cumulative Inventory Analysis

Cumulative Inventory

Start of Release

Poor Inventory Records

Date

Gallons
Root Cause of Release
Damaged Pipe Section
Collision Post Depth

29” Burial Depth
Leak Detection Investigation

• Focus: to determine why the release detection system did not detect the release as it was in progress.

• Method:
  – On-site review of release detection system and site configuration/layout.
  – Review of Veeder Root technical manuals
  – Review of printed set-up/history reports
  – Interview owner, DSPS state inspector, DNR site clean-up personnel, service company personnel, Veeder Root Technical resources.
<table>
<thead>
<tr>
<th>Date</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>06-06-11</td>
<td>15:04</td>
</tr>
</tbody>
</table>

**PRESSURE LINE LEAK TEST HISTORY**

Q 3: DIESEL

LAST 3.0 GAL/HR PASS:
06-06-11 14:42

FIRST 0.20 GAL/HR PASS EACH MONTH:

- 06-04-11 3:38
- 05-07-11 7:39
- 03-06-11 6:06
- 12-07-10 18:30
- 11-14-10 3:22
- 10-25-10 13:02
- 09-25-10 7:42
- 08-16-10 7:57
- 07-09-10 7:52
- 06-09-10 6:57
- 05-04-10 4:19
- 04-10-10 1:55

FIRST 0.10 GAL/HR PASS EACH MONTH:

- 05-29-11 3:00
- 10-25-10 16:07
- 03-09-10 2:55
- 08-06-09 0:22
- 01-31-09 16:22

* * * * * END * * * * *
# Diesel System Set-up

<table>
<thead>
<tr>
<th><strong>T5: on-road diesel</strong> (alternate operation w/T6)</th>
<th><strong>T6: on-road diesel</strong> (alternate operation w/T5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Manifolded via siphon bar and lines with T6</td>
<td>- Manifolded via siphon bar and lines with T5</td>
</tr>
<tr>
<td>- RJ Big Flo submersible Model P500H3-2K</td>
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</tr>
<tr>
<td>- Leak detection: Veeder Root PLLD with legacy RJ Prolink accumulator and Check and Regulating valve installed. Also in-line check valve installed.</td>
<td>- Leak detection: Monitored via Veeder Root PLLD on T5 with legacy RJ Prolink Check and Regulating valve installed. Also in-line check valve installed.</td>
</tr>
</tbody>
</table>
As-Found LLD

- PLLD
- Check/Relief valve
- Accumulator

As-found
As-found LLD issues

- **Configuration/ATG Set-up**
  - Estimated line lengths of manifolded piping exceeded actual programmed for premium and on-road diesel.
  - Estimated line length of manifolded piping exceeded the third-party certification of the Veeder Root PLLD system.
  - PLLD system programmed to perform monthly 0.2 gph and annual 0.1 tests
As-found LLD issues

• Configuration/ATG Set-up
  – The original Red Jacket line leak detection equipment (accumulator, check/regulating valve, in-line check valve) was left installed
  – The PLLD transducers were installed in a horizontal position
  – V/R “Pressurestat” kit not installed
Post-Repair

Post-repair

Pressurestat Kit

PLL D
Tank System Layout Post-Repair

- Tank T6
- Tank T5
- Siphon
- Manifold Break
- Tank T6
Causal Factor

- **Poor construction practices.**
  - below-grade portion of the bollard was approximately 29-inches deep; WI required depths are at least 36-inches.
  - 10-inch bollard too close to the product piping, approximately 4-inches. PEI/RP 100 minimum of 6-inches wide with no obstructions placed in the trench.
  - The bollard diameter itself was probably too large for its intended purpose; typically dispensers are protected with smaller -6 inch- bollards so they bend above-grade instead of cantilevering below grade.
Causal Factor

- Poor installation practices.
  - Programming line length based on old setup data from original leak detection equipment;
  - not performing a walk-down or system plan review to confirm actual manifolded line length;
  - ATG mis-application for performance of 0.2/0.1 gph testing when not certified for use by Veeder Root with RJJ Big Flo submersible;
  - leaving old leak detection system equipment in place and not installing equipment as required by Veeder Root application manual No: **577013-465**.
Causal Factor

- **Poor site work practices.**
  - Use of on-site drain system by owner and service company technicians to remove product/water from tank backfill instead of bringing in a tanker for waste disposal.
Causal Factors

- **Site compliance practices.**
  - Poor record keeping
    - Original construction plans
    - Oil/water separator data
    - Storm sewer layout/Maintenance
    - Inventory verification records
  - Lack of department plan review/inspection on LD replacement in 2008
Lessons Learned

• **Site inspection and investigation.**
  - Know the system layout
  - Know the equipment
  - Look at big picture
    • Comprehensive design/plan review
  - OBSERVE!
  - If it doesn’t look/seem right- investigate
    • Product in tank bed
  - Don’t jump to conclusions!
    • Root cause (may be more than one)
    • Causal factors
Post-Incident Corrective Actions

• Department continuing education training:
  – Contractor:
    • importance of performing thorough system reviews during equipment installation and during leak detection equipment functionality testing. **NEED TO KNOW THE SYSTEM!**
    • contractor cannot rely on functionality testing alone for confirmation that a system can perform the required leak detection as evidenced by the passing of periodic tests on a system that was not installed per manufacturer specifications. **NEED TO KNOW THE EQUIPMENT!**
  – Inspector:
    • importance of DSPS inspectors reviewing vendor equipment installation documents prior to inspecting recently replaced or installed equipment. **NEED TO KNOW THE SYSTEM!**
    • inspectors cannot rely on functionality testing alone for confirmation that a system can perform the required leak detection as evidenced by the passing of periodic tests on a system that was not installed per manufacturer specifications. **NEED TO KNOW THE EQUIPMENT!**
Post-Incident Corrective Actions

- **State Plan review:**
  - Require a system walk down and submittal of site drawings and ATG set-up printouts when submitting leak detection equipment documents for state plan review.
Post-Incident Corrective Actions

**Owner:**
- Inventory verification accuracy/review
- records retention
- investigate oil/H₂O separator layout, construction and throughput.
- develop a periodic maintenance clean-out program for trench and other drains.
- have precision tightness testing performed annually on diesel lines.