

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)

Incident Timeline

06/01/11: Equipment Functionality Testing by service contractor

06/05/11: Release discovery/diesel system shutdown

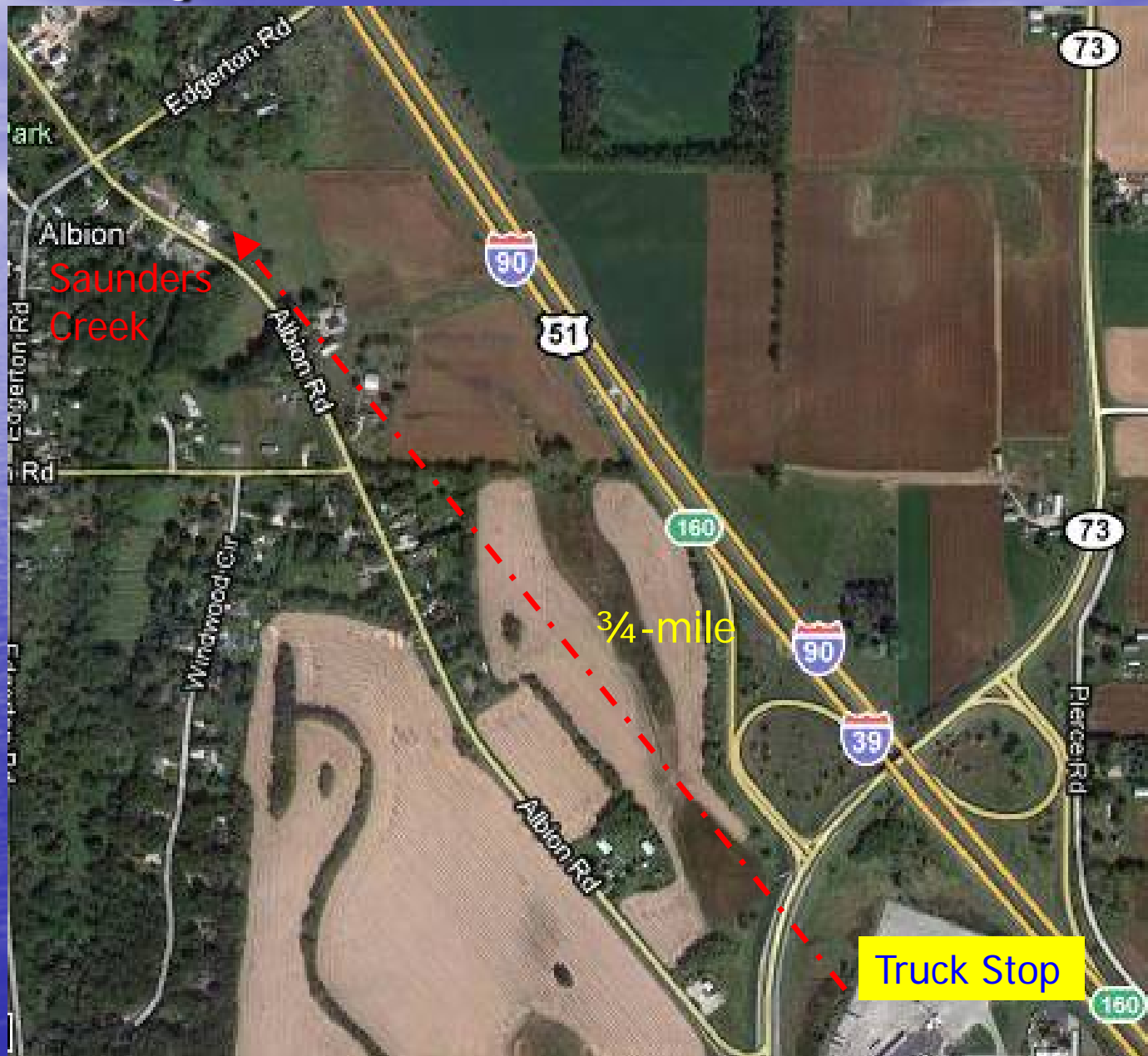
06/06/11: Department notified of release by WDNR- Local inspector investigation began

06/10/11: Site visit and data collection by department technical staff

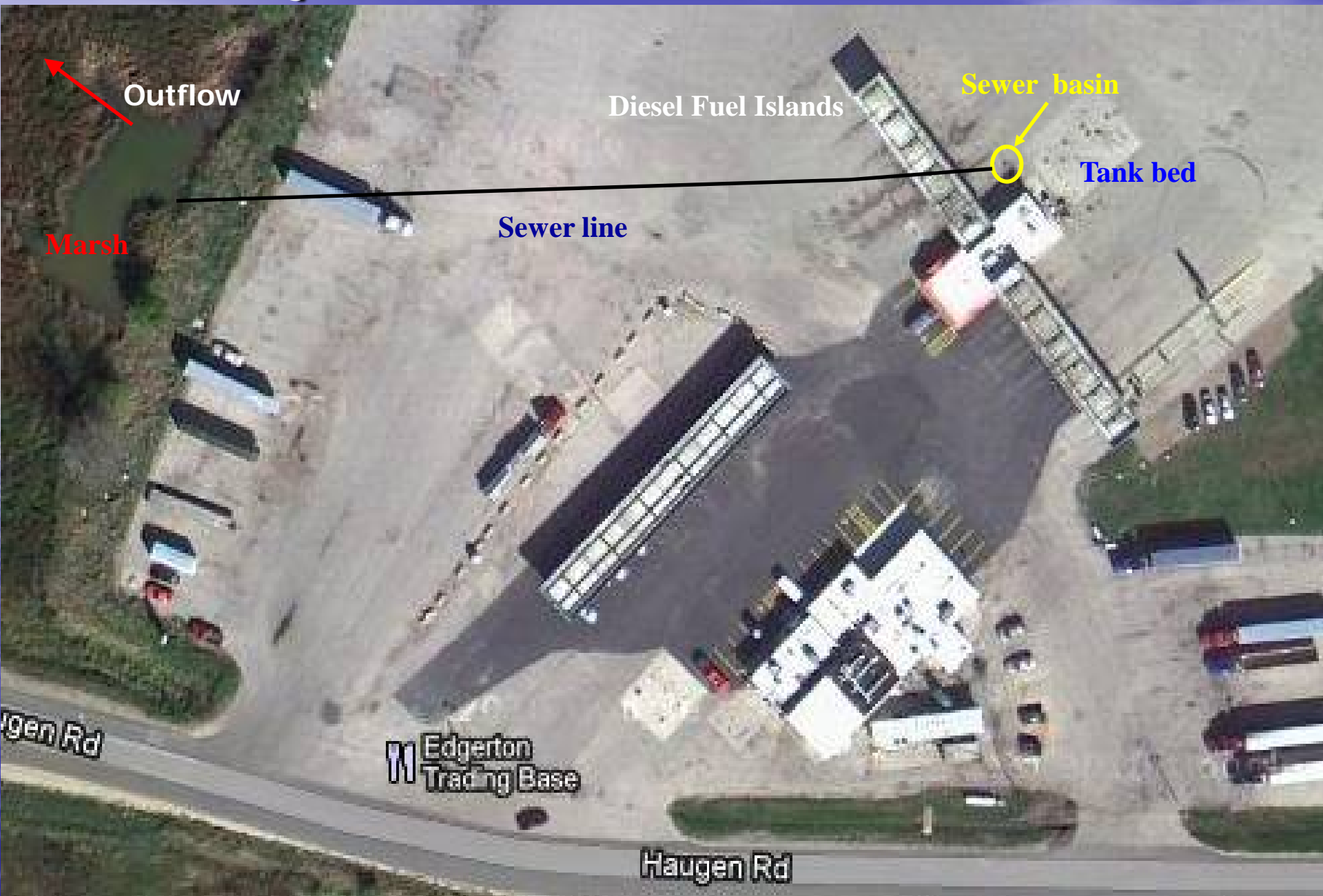
06/14/11: Damaged regular diesel line discovery

06/20/11: System repairs/re-configuration completed; Facility returned to service.

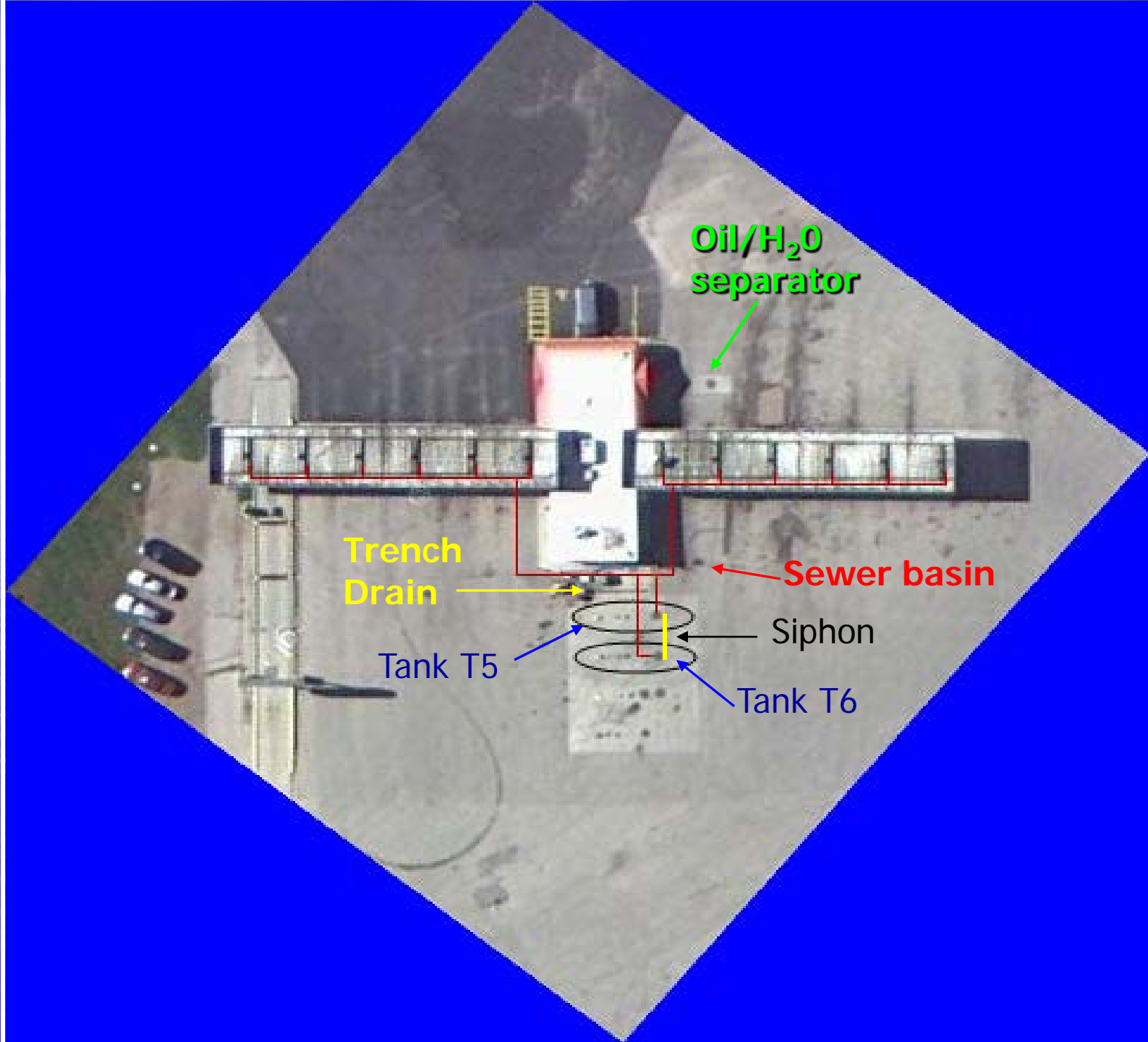
Discovery



Site Layout



Tank System Layout



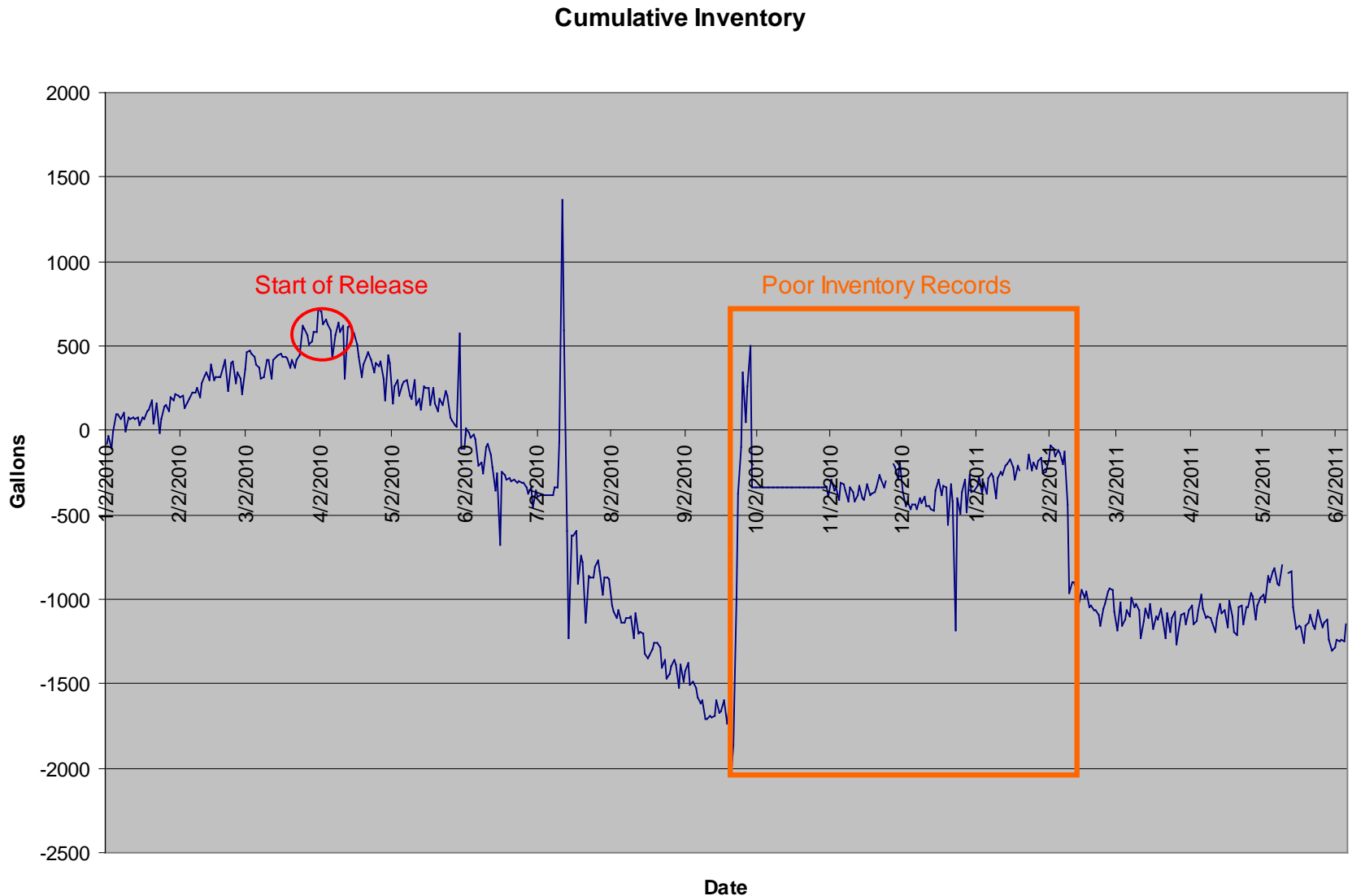
Back Fill Product Retention



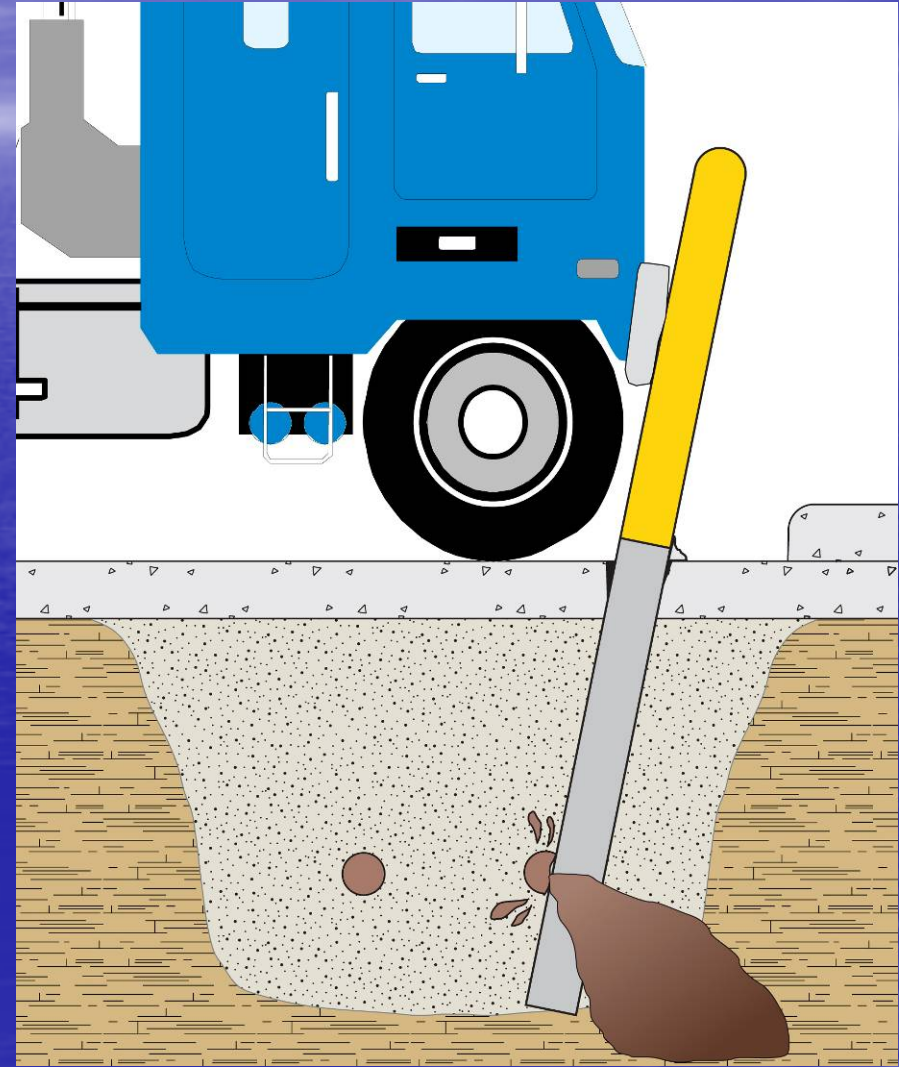
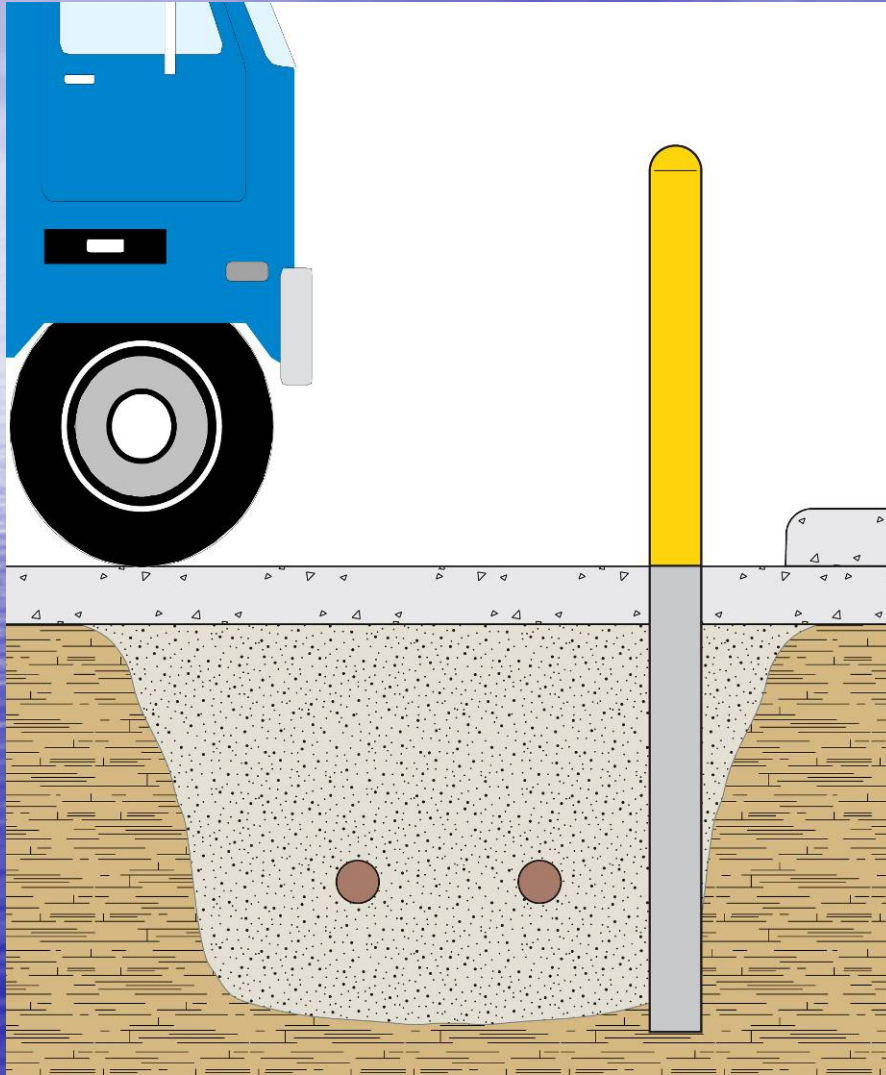
Product staining from trench drain overflow during tank backfill draining



Cumulative Inventory Analysis



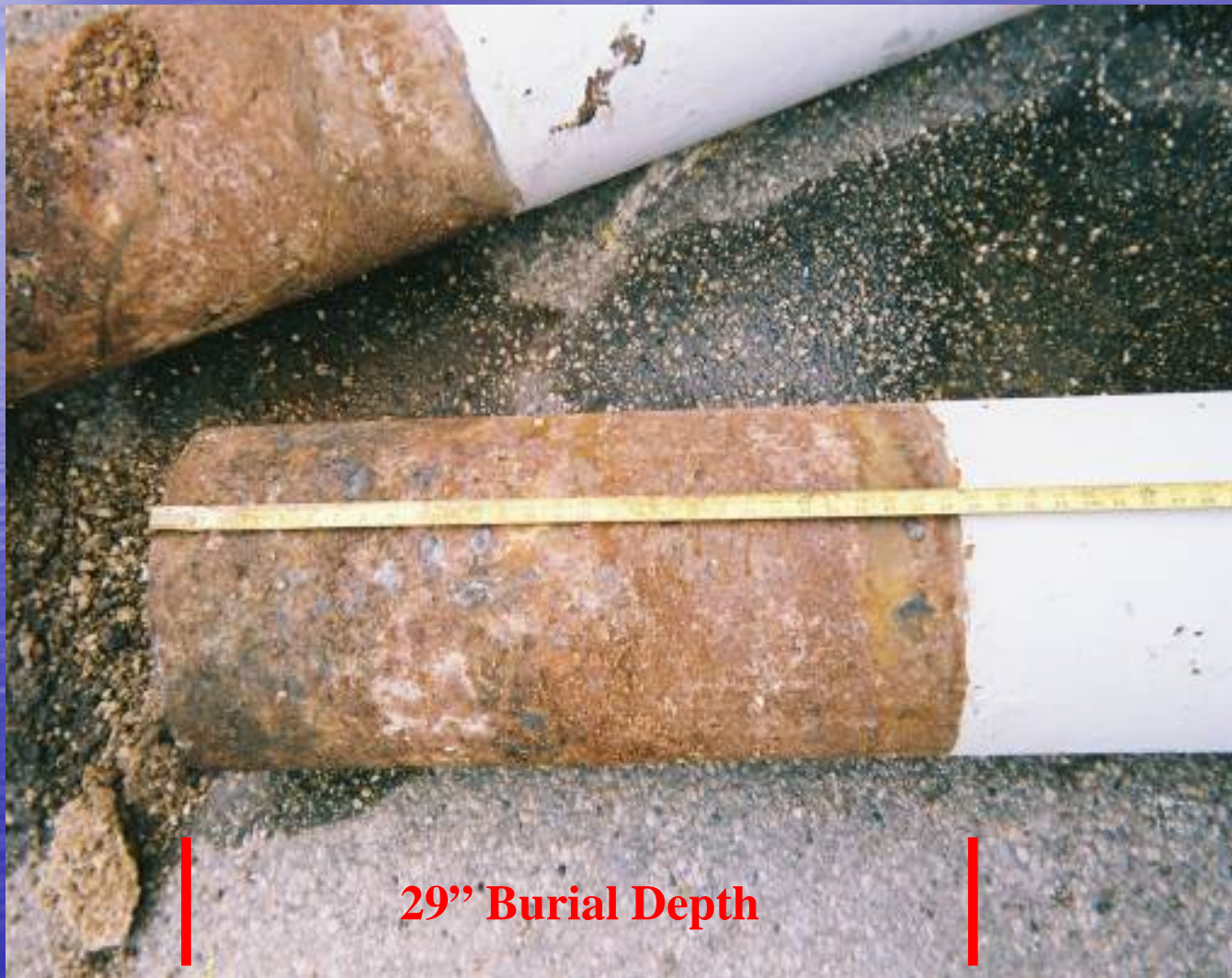
Root Cause of Release



Damaged Pipe Section



Collision Post 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.

ATG Printout- PLLD Test History



06-06-11 15:04

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	9:38
05-07-11	7:39
03-06-11	6:05
12-07-10	18:38
11-14-10	8:22
10-25-10	13:02
09-25-10	7:42
08-16-10	7:57
07-09-10	7:52
06-03-10	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

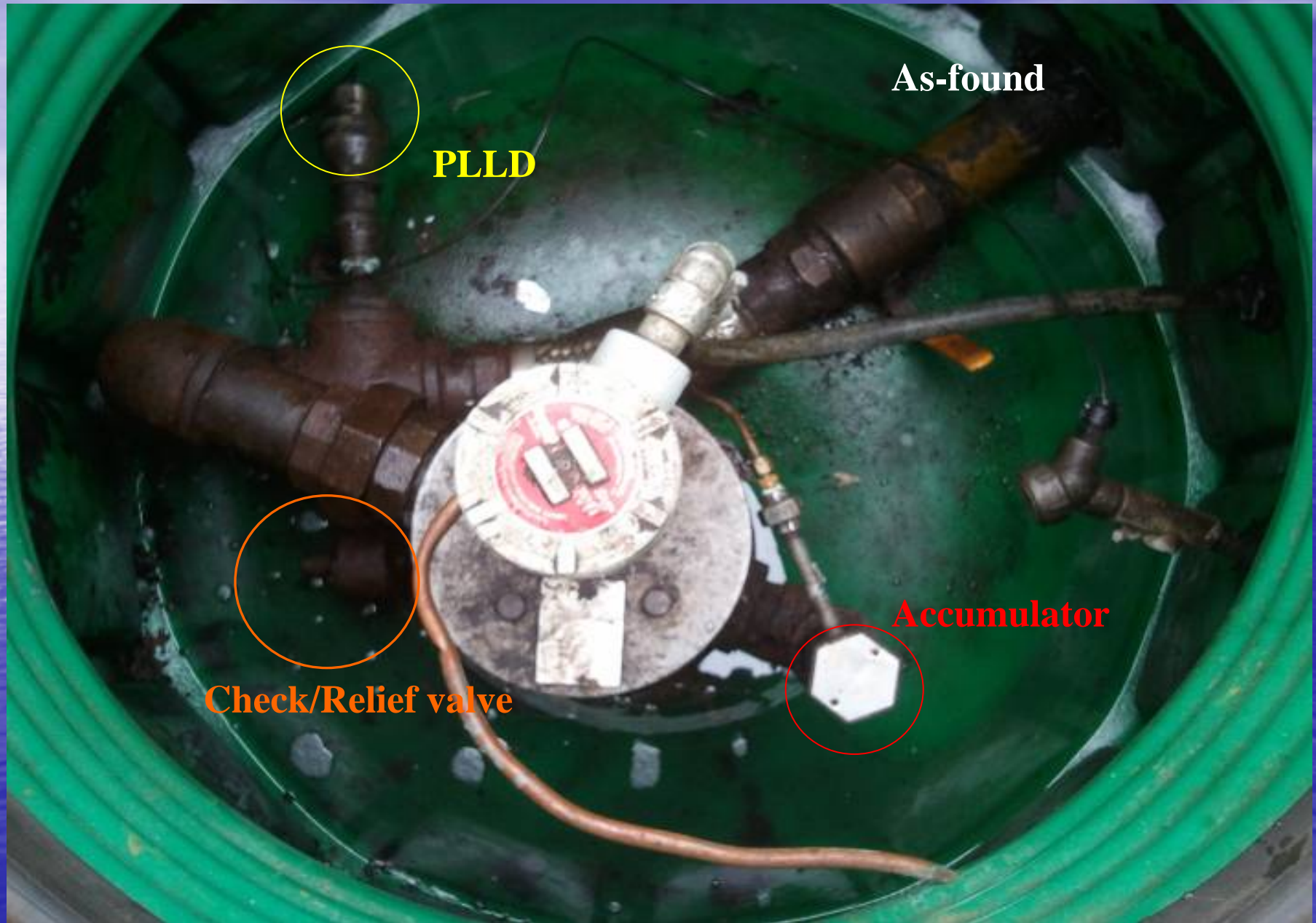
T5: on-road diesel (alternate operation w/T6)

- Manifolded via siphon bar and lines with T6
- RJ Big Flo submersible Model P500H3-2K
- Leak detection: Veeder Root PLLD with legacy RJ Prolink accumulator and Check and Regulating valve installed. Also in-line check valve installed.
- Estimated Line Length (manifolded): 395 ft.
- Estimated Line volume (manifolded): 182 gal.

T6: on-road diesel (alternate operation w/T5)

- Manifolded via siphon bar and lines with T5
- RJ Big Flo submersible Model P500H3-2K
- Leak detection: Monitored via Veeder Root PLLD on T5 with legacy RJ Prolink Check and Regulating valve installed. Also in-line check valve installed.
- Estimated Line Length (manifolded): 395 ft.
- Estimated Line volume (manifolded): 182 gal.

As-Found LLD



As-found

PLLD

Accumulator

Check/Relief valve

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

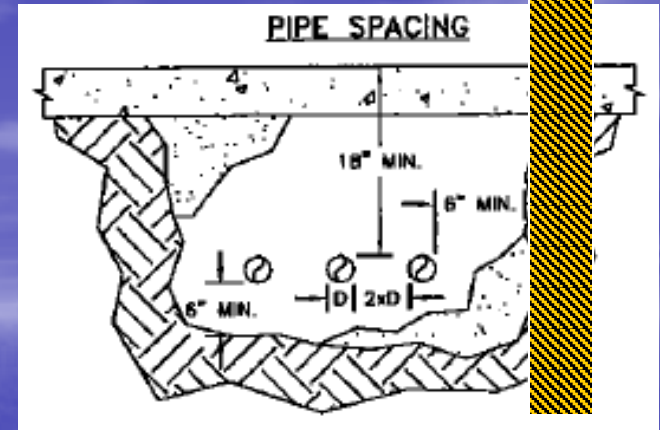
Post-repair



Tank System Layout Post- Repair



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 RJ 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**.



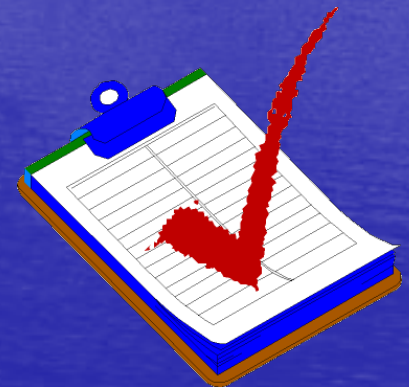
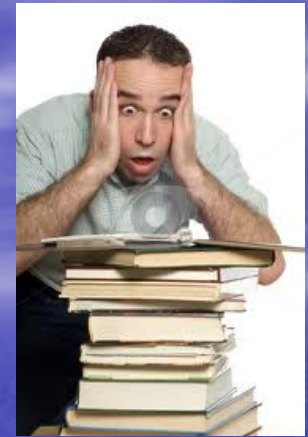
Causal Factor

- 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!**

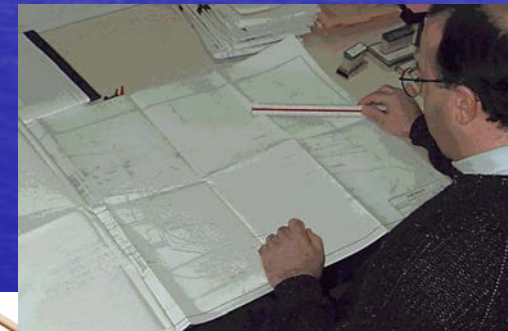
Post-Incident Corrective Actions

- 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.



Q 3: EAST DIESEL
TYP: 2.0/3.0IN FIBERGLASS
2.0IN DIA LEN: 50 FEET
3.0IN DIA LEN: 200 FEET
0.20 GPH TEST: DISABLED
0.10 GPH TEST: DISABLED
SHUTDOWN RATE: 3.0 GPH
LOW PRESSURE SHUTOFF: NO
LOW PRESSURE : 0 PSI
T 6: DIESEL EAST
DISPENSE MODE:
STANDARD
SENSOR: NON-VENTED
PRESSURE OFFSET: 0.0PSI



**WISCONSIN STORAGE TANK
LEAK DETECTION INSTALLATION
OR UPGRADE APPLICATION / NOTIFICATION**

INSTRUCTIONS: This form is to be submitted to the Department of Commerce along with the plan submittal for new installations, or submitted independently for conversions of existing systems from or upgrade of existing methods, equipment or software along with the respective startup tests (ATG) or equipment. Submit this form within five days of installation to the Department of Commerce at the address Refer to Comm Table 2.43 for fee submittal.

Personal information you provide may be used for secondary purposes [Privacy]

OWNER INFORMATION		PROJECT INFORMATION		SU
Customer ID#		Site ID#	Facility ID#	Cur
Contact Name		Facility Name		Sur
Company Name		Site Address		Nu
Number and Street		City	Village	Co
City, State, Zip Code		County		Co
Telephone Number	Fax Number	Fire Dept. Providing Fire Coverage	FDID#	Tel

THIS FORM IS SUBMITTED: ☐ Pre-Installation: Date projected to be installed ☐ Post Installation: Date installed

TANK SPECIFICATIONS: ☐ Underground ☐ Aboveground



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.

