



Impacts of Corrosion in Underground Storage Tanks (USTs) Storing Diesel

And what owners and
inspectors should do about it

Outline

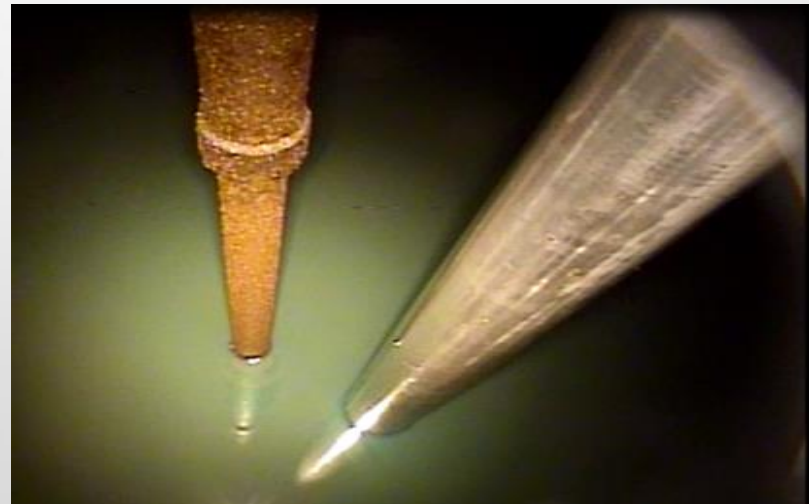
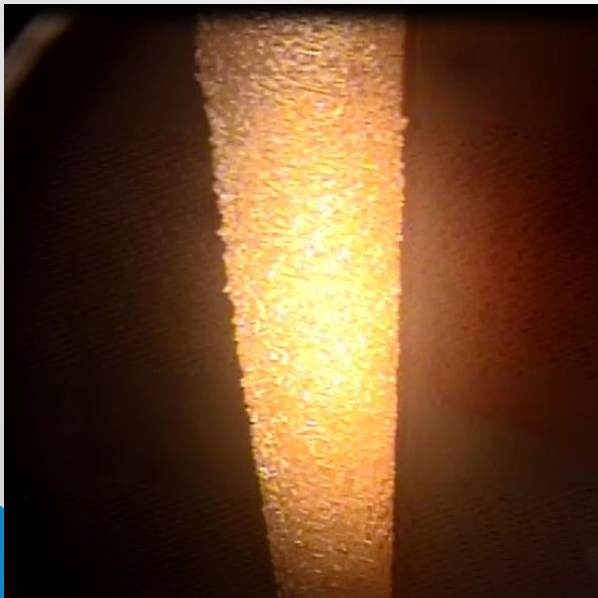
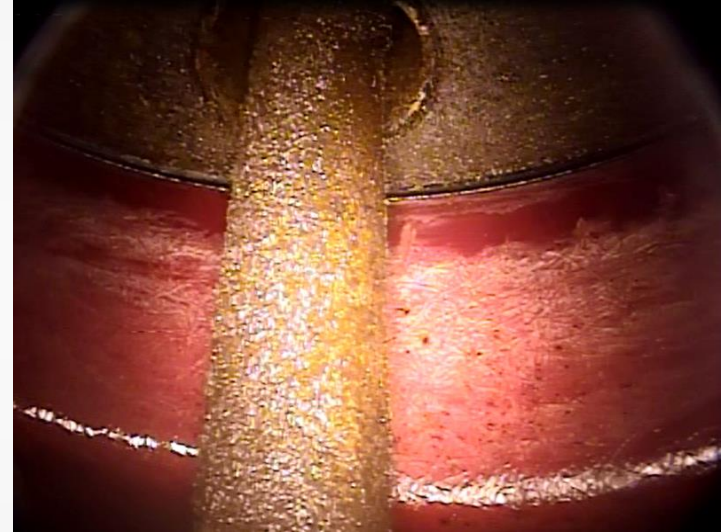
1. Known corrosion **impacts**
2. Potential corrosion **risks** to environment
3. Photo **examples** of specific equipment
4. **Actions** to incorporate risks into inspection routines

Known Impacts of Metal Corrosion for Owners

- Increased pace of **filter changes**
- **More frequent servicing** of equipment
- **Possible shorter lifespan** before **replacement** of equipment
- STP shafts commonly affected by severe corrosion



Common Impacts – STP shafts

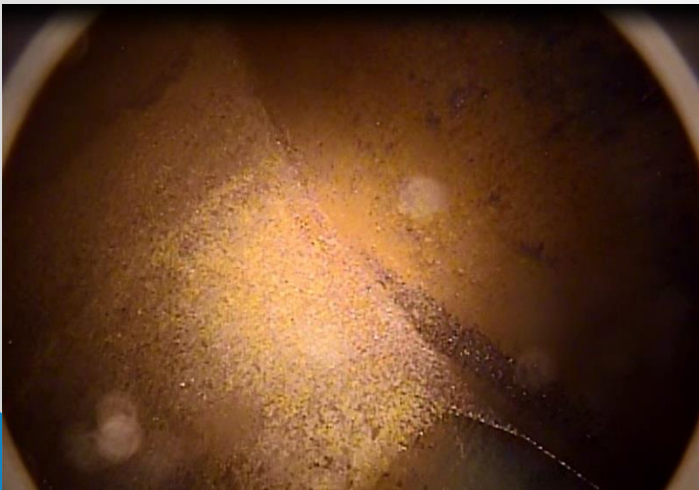
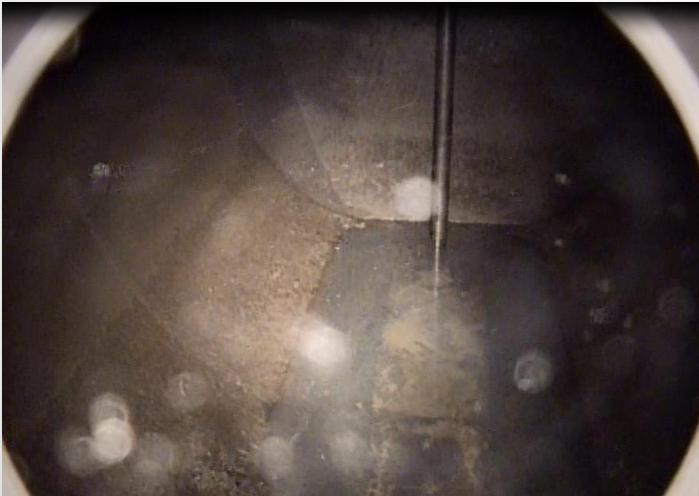


Potential Risks to the Environment

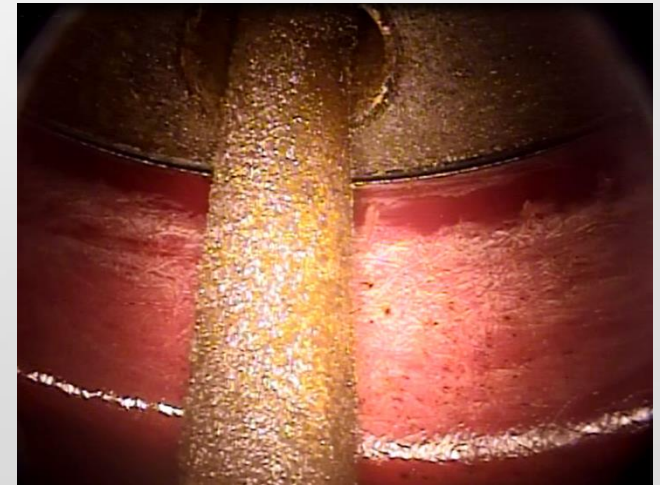
Bottoms of Tanks

- Metal components could potentially corrode through and possibly release fuel to environment
 - Diesel prone to collect water and sludge in bottom of tanks
 - Study results prompted conversations – heard handful of anecdotes of bottom repairs of primary walls of double-wall steel tank bottoms after leak to interstitial - sometimes a lack of leak detection alarms but fluid in interstitial space prompted further inspection
 - Tank tops and bungs often severely corroded

Observed Corrosion Examples – tank walls and bottoms



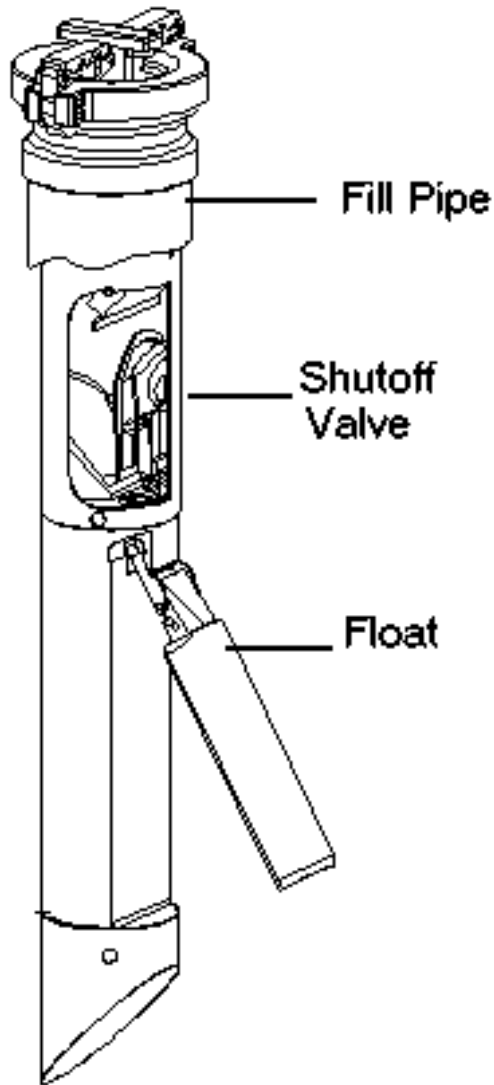
Observed Corrosion Examples – tank top bungs and manways



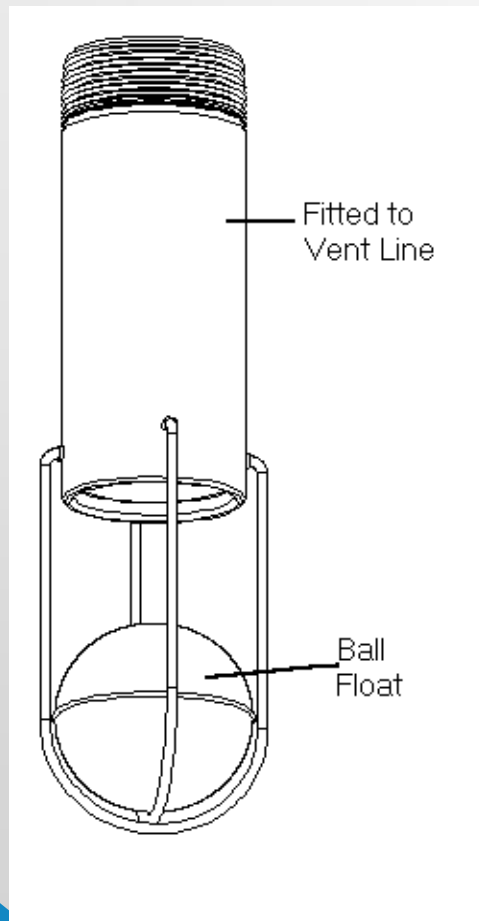
Potential **Risks** to the Environment Overfill, Release Detection, or Emergency Shutoff Failure

- Equipment that must move to function properly could be impeded from doing so by corrosion
 - Automatic shutoff devices (flapper valves)
 - Ball floats
 - ATG floats
 - Line leak detectors
 - Shear valves

Observed Corrosion Examples – overflow prevention – automatic shutoff devices

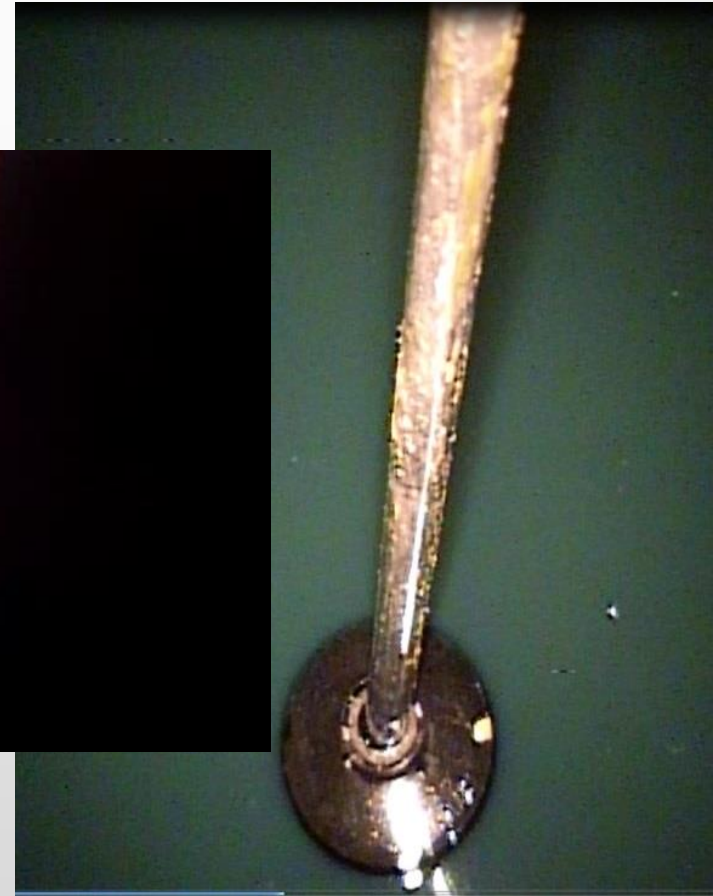
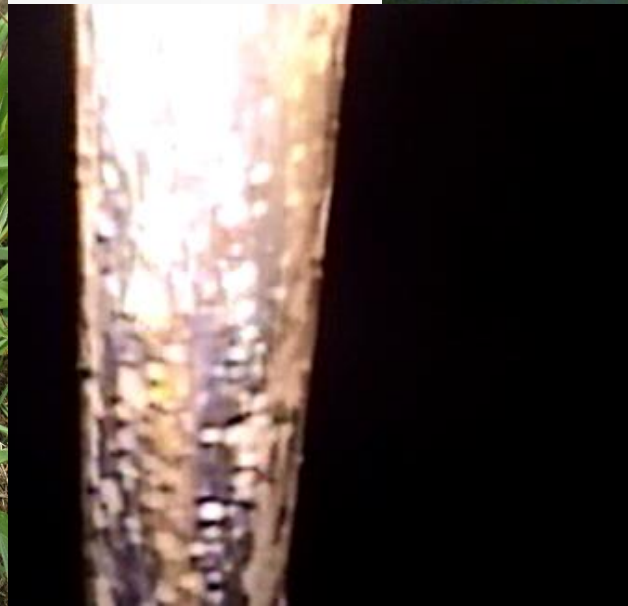


Observed Corrosion Examples – overflow prevention – ball floats



Observed Corrosion Examples – leak detection equipment

- ATGs floats and shafts
- Line leak detectors may be more prone to fail functionality testing



2015 UST regulation and diesel corrosion risks

- Walkthrough inspections
- Emergency generator tanks
- Interstitial monitoring results
- Annual release detection testing
- 3 year overfill prevention equipment testing

2015 UST regulation – Excerpts of New Operation and Maintenance Requirements

- *Periodic walkthrough inspections (began October 13, 2018)*
 - Every 30 Days
 - Check spill prevention equipment
 - Check release detection equipment and records
 - Annually
 - Check containment sumps
 - Check hand held release detection equipment
 - Keep records of the walkthrough inspection for 1 year



Recommendation – Check Drop Tubes



- Corrosion may be obvious
- But sometimes not. These are pictures from UST systems with severe corrosion
- Good practice to inspect here, but doesn't mean system is free of corrosion.

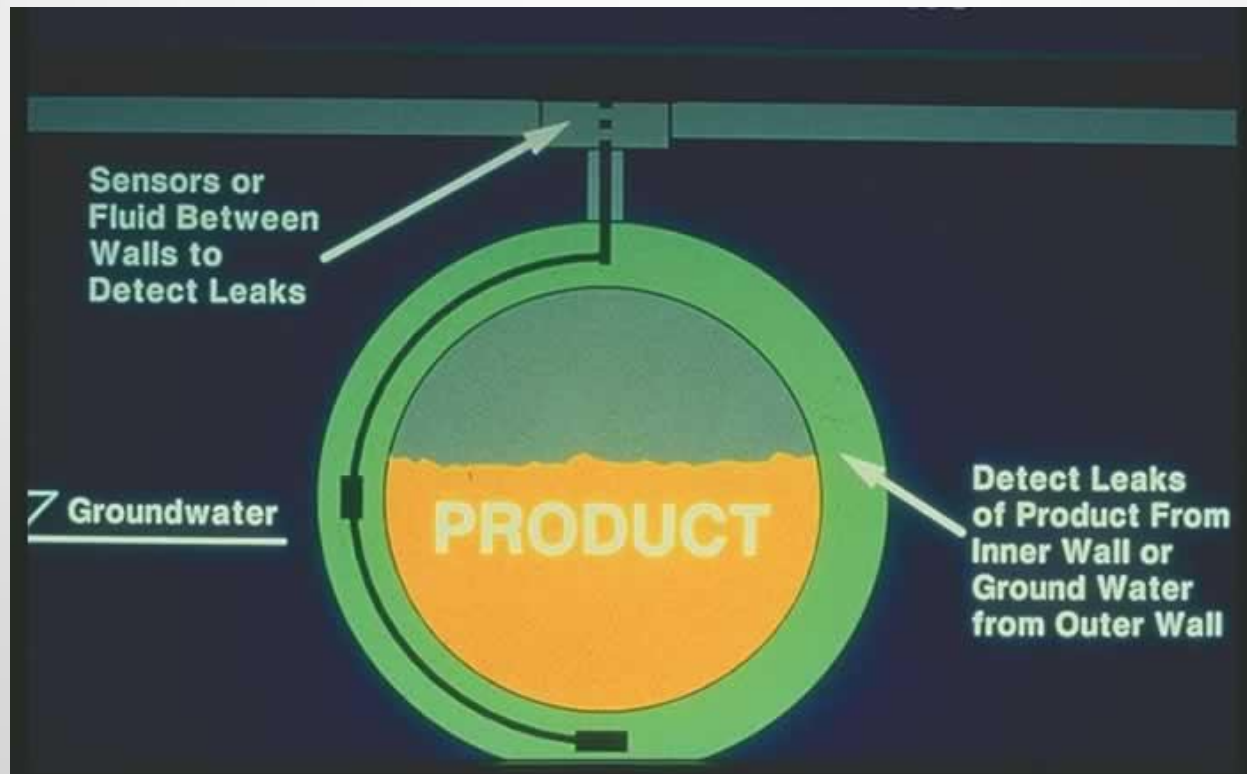
2015 UST regulation - Emergency Generator USTs

- Removes the deferral in the regulation from release detection requirements and requires release detection for Emergency Generator Tanks
 - Required October 13, 2018 for systems installed on or before October 13, 2015
 - Required immediately for UST systems installed after October 13, 2015



2015 UST regulation - Excerpts - Interstitial monitoring results

- 2015 regulation considers an interstitial alarm being an unusual operating condition and added interstitial integrity testing as part of release investigation and confirmation



2015 UST regulation – Excerpts of New Operation and Maintenance Requirements

- ***Annual release detection equipment testing*** to make sure release detection equipment is operating properly
 - Applies beginning October 13, 2018
 - Keep records for 3 years



2015 UST regulation – Excerpts of New Operation and Maintenance Requirements

- ***Three year overflow prevention equipment inspections***
 - Inspect to make sure overflow operates as intended
 - Applies to new installations after October 13, 2015
 - Applies October 13, 2018 for UST systems installed on or before effective date of rule
 - Keep records for 3 years



Takeaways

- **Microbiologically** influenced corrosion (MIC) **likely largely responsible** for the corrosion.
- **Eliminating water** is recognized as a key factor in preventing this corrosion.
- Could also be affecting **Emergency Generator Tanks** and **Aboveground Storage Tanks** – probably similar corrosion
- Owners and inspectors should consult **resources** available from:
 - Coordinating Research Council, Steel Tank Institute, Clean Diesel Fuel Alliance, ASTM, and EPA website.

Wrap up - What owners and inspectors should look for regarding corrosion in diesel:

Inspectors

- Signs of corrosion on equipment
- Water level on ATG reports
- Release Detection results
- Alarm History
- Recommend resources for owners to get more information

Owners

- Check system for corrosion
- Release detection results
- Look inside ports
- Follow maintenance guides
- Alarms on ATG – water level