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NEW LEAKS IN DOUBLEWALL UNDERGROUND STORAGE TANK (UST) DUE TO CORROSION

In 2012, we became aware in 2012 of potential corrosion issues affecting unlined steel tanks.

Our Agency found:

- Four double-walled underground storage tanks (unlined steel primary tank) containing either diesel or 91 grade gasoline failed due to corrosion along the tank bottom.
- Accumulated acidic sludge and water at the bottom of UST is apparently caused corrosion, eventual perforation and failure of the steel primary tank.
- Rapidly clogging filters and water levels over 0.5 inches in a tank indicate sludge may be excessively accumulating. The water float on your in-tank probe will rest on top of the sludge accumulating at the bottom of the tank.

Steps tank owners can take to potentially avoid problems:

- Monitor water and sludge buildup in your tanks. Examine inventory reports and stick tanks with water finding paste.
- Perform proper routine removal of sludge and water from your tanks.
- Verify that your in-tank inventory probe is calibrated, positioned correctly, and is monitoring for water and/or sludge.
- Check for, and replace if necessary, any clogged filters.

Underground Storage Tank Corrosion observations and preliminary conclusions:

- Corrosion and perforations were observed along tank welds, poorly secured striker plates, and on sections of plate metal, once the sludge was removed.
- In all cases, fuel had leaked through the perforations and into the secondary containment of the tanks.
- Repairs were required prior to continuing use of the tanks. The repairs were costly according to the tank owners.
- Corrosion may be due to a combination of bacterial growth and water. Bacteria grow in the water found at the bottom of most USTs and feed on the fuel at the fuel-water interface.
- It appears Ultra Low Sulfur Diesel (ULSD) may be more susceptible to bacterial growth. Over time, the bacteria die and accumulate along the tank bottom, creating an acidic sludge that corrodes metal. In addition, there is evidence that all steel components, including submersible turbine pumps, are experiencing increased rates of corrosion.

    - Although the failed tanks in this county were installed in the late 1980s, problems documented by ongoing research were not always related to the age of the equipment. From as early as 2007, the Petroleum Equipment Institute (PEI) started receiving reports of unusually severe and accelerated corrosion of metal parts associated with storage tanks and equipment dispensing (ULSD).
    - Reports include observations of a metallic coffee ground type substance clogging the dispenser filters and of corrosion and/or malfunctioning of seals, gaskets, tanks, meters, leak detectors, solenoid valves and riser pipes. These observations were reported to be occurring in as little as 6 months. The corrosion was reported on the unwetted, or ullage, portions of the tanks and equipment in addition to the wetted portions of UST equipment.
- Some station operators are carrying less inventory of 91 grade gasoline (e.g.: 1000 gallons stored in a 10,000 gallon tank) due to less demand. Water vapor condenses on the inner walls of the 91 grade tank and accumulates on the bottom, providing an area for bacteria to grow. The water and bacterial action causes corrosion along the tank bottom.
- Research into UST corrosion is still ongoing, that the causes may not yet be fully understood, and that new methods to prevent corrosion may be forthcoming. However, it is also important that good "housekeeping" measures are performed by the facility operators, including:

Links to internet sites for additional information:

Clean Diesel Fuel Alliance
(http://www.clean-diesel.org/pdf/ULSDStoringSystemCorrosion.pdf)

Steel Tank Institute
http://www.steeltank.com/

Steel Tank Institute corrosion issues
http://www.steeltank.com/Portals/0/TTNewsletter/September2012/TankTalk_September2012.pdf

Southwest Research Institute
(http://www.swri.edu/3pubs/brochure/d18/CorrosionFuelSystems/InvestigationCorrosionFuelSystems.pdf)

Shell Oil
(http://www.fluidcare.be/wp-content/themes/delicate/blog/Shell%20Water%20Management%20in%20Storage%20Tanks.pdf)

Tank owners and operators are required to report the presence of fuel in the secondary containment space to this office. These tanks must be either repaired or taken out of service. For future developments will be posted here:

http://www.slocounty.ca.gov/health/publichealth/ehs/services/hazmat/undergroundstoragetanks/ustforms.htm