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Program Letter

Water in Submersible or Tank-top Sumps

Recently a controversy over the legal support or code reference for ordering water out of tank-top sumps has surfaced. This controversy appears to be specific to sumps that do not have leak detection sensors.

Discussion:
As inspectors are experiencing occurrences of water in sumps and subsequently writing orders for the removal of the water various opinions and interpretations by both operators and contractors are challenging the merit of the orders. The opinions express:

- Submersibles are designed to operate in submerged ambient conditions.
- Sumps are constructed of material compatible with water.
- Existing codes and standards do not address water in sumps.
- The reoccurring effort and inability to keep water out of sumps or remove water in sumps.

As early as 1994 PEI RP100 included language that tank sumps should be maintained free of water. The currently adopted edition of PEI RP100-2000 states:

> **7.4 Tank-top Sumps.** Tank-top sumps, also referred to as "piping sumps," are liquid-tight containers designed to contain leaks or spills that involve tank-top fittings and equipment and to isolate metallic pipe fittings from the corrosive underground environment, in addition, tank-top sumps frequently serve as the leak detection point for double-walled piping systems. Any leakage from the primary piping flows by gravity inside the secondary piping to the tank-top sump, where it can be observed easily or detected with sensors.
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> Ensure that tank-top sumps are liquid tight, both to contain spilled or leaked product and to prevent intrusion of groundwater or surface water runoff. Install liquid-tight penetration fittings on all sump entries, including electrical conduit. Complete sump connections to the tank top in accordance with the manufacturer's instructions.
>
> Select and carefully install sump covers designed for the anticipated conditions, such as above or below the water table. Provide adequate clearance between the sump and the access-way installed in the concrete pad at grade. Clearance is necessary to facilitate removal of the sump cover and to allow for drainage of runoff into the backfill. Surround tank-top sumps with permeable backfill to allow for rapid drainage of surface runoff that may penetrate the grade-level access-way cover, or install a water-resistant grade- level cover.

PEI RP100 also includes similar language for dispenser sumps.

> **7.5 Dispenser Sumps**. Dispenser sumps are designed to contain leaks and spills from dispensers and pumps and to isolate metallic pipe fittings from the corrosive underground environment. Shallow dispenser sumps are often referred to as dispenser "pans." Dispenser sumps are typically open to the interstitial space of double-walled piping systems so that leaked or spilled liquid can

drain through the double-walled piping to the tank-top sump, where it can be detected and removed. Alternatively, dispenser sumps can contain their own liquid sensors and be sealed off from the interstitial space of the piping. All dispenser sump entries, including electrical conduit, should he fitted with liquid-tight penetration fittings to prevent the escape of released liquids or the intrusion of water. Dispenser sumps should be designed and installed so that surface water entry is minimized.

Addressing some of the practices that inspectors observe in relation to water in sumps, PEI RP100 also includes the following:

7.6 Sensing Devices. Although secondary containment systems may be monitored visually, sensing devices that monitor for the presence of product or liquids are typically installed. Sensors may indicate only the presence of a liquid or may discriminate between product and water. Sensors should be mounted so that they will respond to even small accumulations of liquid in the sumps where they are placed. The manufacturer's instructions for installation of sensing devices should be followed carefully. Sensors should be checked for proper operation on an annual basis.

Water in a sump of a double-wall pipe system poses significant risk of cold weather related freezing damaging the sump containment, transition fittings and system components within the sump. Likewise, electrical components within the sump are subject to the same influences from the expansion as the water turns to a solid. If water is migrating out of the sump into the pipe interstice via lack of a seal at the transition point in the sump wall the integrity of the interior and exterior pipe are at risk, as well as the reliability of the interstitial leak detection method under these circumstances.

Conclusion:

The PEI RP100 standard very explicitly expresses that one of the purposes of tank-top and dispenser sumps is to prevent the intrusion of water. If water is a constant problem the source of the problem needs to be identified and corrected. The problem may be attributed to:

- Improper system design.
- Improper installation.
- Inadequate maintenance and replacement of deteriorated components.

Additionally, most sumps have electrical connections that may be designed to tolerate moisture; but they are not designed to be submerged.

All of the major sump manufactures have maintenance requirements listed in the installation instructions or warranty that requires station owners/managers to do one of the following:

- Conduct regular or monthly visual inspections checking for the presence of petroleum product or water in every sump.
- Install third party approved liquid sensors in every sump.

The scope of PEI 100 as written by PEI applies to underground liquid storage systems that store and dispenser fuel to motor vehicles at retail, commercial and government facilities. We point out that Comm 10 does not limit this application to highway motor vehicles. Comm 10 applies the PEI RP 100 standard to USTs fueling highway vehicles, off-road vehicles and vehicles confined to operation on tracks or rails.