

ITSD connected to the thief hatch



Streamer delaying air terminals protecting frac tanks



In Tank Static Drain installed



In Tank Static Drain in tank

Lightning Master is a full service, full spectrum static solutions and lightning and transient protection company serving the oil and gas and chemical industries since 1984.

LIGHTNING MASTER IN-TANK STATIC DRAIN

ACCUMULATION OF STATIC CHARGE

Charge dissipates from a fluid into points and sharp edges, not flat surfaces. That is why charge does not readily dissipate into the shell of a metal tank – it is flat. This allows the charge to accumulate at a rate faster than it dissipates. Because the static charge eventually relaxes, an incendive spark is most likely while the charging mechanism is active.

NEW APPROACH

The wild card in tank protection has always been equalizing the bound charge on the stored product. Even in a steel tank, there are no points or edges to help dissipate the bound charge on the stored product. The liquid simply lies against the side of the

tank, and the charge must instinctively couple onto the flat surface. It takes time for the potential to relax, allowing the static charge to accumulate faster than it dissipates.

Lightning Master has designed an in-tank static drain consisting of a **stainless steel cable with stainless steel electrodes inserted into the wind of the cable**. In fixed roof tanks, the drain is installed through the thief hatch, and in floating roof tanks, it is attached to the floating roof and sides or bottom of the tank. The thousands of electrically sharp points provide a low-resistance path for bound charge to leave the liquid and vapor space. It dissipates the charge on the product, allowing it to relax much more quickly. This allows the charge to dissipate faster than it accumulates.



STORAGE CONTAINERS

There are two related causes of ignition in flowback tanks: static from normal tank operations and static from a direct or nearby lightning strike. The mechanism is similar, with static ignition taking place over minutes whereas lightning ignition takes place over a fraction of a second. Fortunately, the solution to preventing both is similar.

Static charge accumulation occurs in the vapor droplets suspended above the stored product. When the charge reaches an incendive level it may arc

to a metal object. If the arc occurs in a flammable mixture, it may cause a fire or explosion.

Lightning ignition is not normally caused by the heating effect of lightning attachment. Unless the lightning discharge attaches to a vent, ignition is usually caused by a secondary effect arcing produced by a direct or nearby strike, therefore controlling static inside the tank is key.

The key to preventing ignition consists of three steps: bonding and grounding; in-tank static control; and structural lightning protection.

RISK ASSESSMENT

In determining and prioritizing the scope of work to be accomplished at a site, at a minimum, the following factors should be considered:

Problematic: sites that have experienced a previous static or lightning event

High Exposure: sites located in exposed locations such as hill tops or historically high-lightning locations

High Consequence: sites located in environmentally sensitive locations

Accessibility: sites with limited or difficult access for remediation and repair

Regulatory: sites where a local/municipal/regional construction code requires

Visibility: facilities that are in a particularly sensitive area (urban or otherwise high-profile, etc)

Operational Considerations: high production or otherwise operationally important sites

Investment: those sites with significant equipment investment

Static Ignition in Storage Tank



Lightning Master Protected Containers



Lightning Master Site Surveyors Perform a Detailed Risk Assessment

