

Lightning Strikes – YIKES!!

September 2022



Figure 1. Tanks ablaze after a lightning strike



Figure 2. Tanks after the fire

In the early morning hours of May 16, 2012, a thunderstorm rolled into a Bristol, Pennsylvania plant that produced acrylic polymers. Lightning struck in the tank farm area. Within seconds, an ethyl acrylate tank exploded and was followed a few minutes later by a butyl acrylate tank explosion. The explosions and ensuing fires destroyed the two tanks and led to a lengthy shutdown. Two people were in the area of the tank farm doing paperwork during the lightning strike; fortunately, there were no injuries.

The tanks were grounded according to industry lightning standards, so why did the explosion occur? While it could not be determined with certainty, the ignition of the atmosphere in the ethyl acrylate tank most likely occurred because an internal component was not bonded to the tank. A spark may have occurred across a small gap and ignited the flammable vapor, similar to the way a spark plug ignites fuel in a combustion engine.

Did You Know?

- Static sparks can occur whenever there is friction between materials during material movement, such as transfer.
- Grounding and bonding can help dissipate an electric charge. To work, they need to be in good condition, be in good contact with the metal container, and be connected to a proper ground.
- Lightning is a massive spark that is created when water droplets, dust, or ice particles move around a cloud, generating static electricity.
- Lightning can strike anywhere - it is just not safe to work outdoors in an electrical storm.
- An electrical current can travel through connected equipment and cause an incident far away from where the lightning actually struck.

What Can You Do?

- Be sure to always ground and bond flammable containers. This includes pails, drums, isotainers, trucks rail cars, and also storage tanks.
- Make sure that grounding clamps bite into the metal to get good contact. If a clamp cannot “bite into the metal,” replace the clamp.
- Report if a connection point is painted; the paint could prevent the good contact with the grounding clamp needed to dissipate the accumulated static.
- If you see that a grounding wire is frayed, corroded, not attached, etc., report it. That grounding cable cannot prevent ignition of a flammable container or storage tank in the event of a lightning strike or other stray electrical current.
- Lightning is unpredictable and can damage even grounded equipment. If you are doing a transfer and a storm comes, stop the transfer, and leave the area until you are given approval to safely resume operations.

Ref.: Kas K. Morrison D. *Process Saf Prog.* 2022; 41 (2): pp. 293-306.

Take precautions against static sparks – especially lightning.