HIGH VALUE LEARNING

High Value Learning

Lube oil tank damage due to overpressure

Who could be interested in this?

- Onshore: e.g. process design engineers, integrity engineers, pressure systems engineers, instrument engineers, electrical engineers, mechanical engineers, rotating equipment engineers, area authorities, process safety engineers, asset managers
  Offshore: e.g. production operations team, OIMs
- Operations that use wet seal compression trains

What is this all about?

Start-up of offshore compression train ancillary systems, following scheduled maintenance work.

During start-up of the ancillary lube oil system, an overpressure event occurred, causing lube oil tank deformation and a minor loss of lube oil to the deck. There was no activation of the fixed fire & gas systems and no further escalation potential. Following a detailed investigation, it was determined that the most likely cause of the overpressure was a combustion event in the lube oil tank.

The compression train has wet seals with ancillary seal and lube oil systems. Lube oil is circulated throughout the compression train and stored in an atmospheric lube oil reservoir tank. The storage tank is located on the deck below the compressors, with a pressure rating of 0.04 bar. The seal and lube oil systems are connected via a common atmospheric vent line. At the time of the incident, the seal oil system was not running.

Air was present in the lube oil tank as it would have been drawn in through the atmospheric vent when the lube oil pumps were started. A flammable atmosphere was created through low levels of hydrocarbon gas migrating into the lube oil tank and/or the formation of flammable mist of lube oil. The most likely ignition source was found to be static discharge from the lube oil.

There have been other static related incidents in industry, most commonly in the marine sector. Static charges can build up in some mineral oils due to turbulent fluid flow. Various studies have shown that, even with earthing / bonding of equipment, static discharge can still occur.

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Some things to consider?

- Consider looking at your operations to see if you have risk of static accumulation in your seal / lube oil.
- Consider using anti-static additives which can help prevent static discharge.
- Consider looking at your system to see if you can reduce the risk of static accumulation through equipment like anti-static filters.
- Consider holistic risk assessments during plant reinstatement, including all pressure sources and interconnections between systems.
- Consider inerting lube oil / seal oil tanks prior to start up.

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