ENERGY SAFETY CANADA

SAFETY ALERT

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Storage tank becomes brittle and cracks

Description:

During a visual inspection of a product storage tank, a trace of solidified product was identified, indicating a crack along the drip ring and the annular bottom plate. The tank specification called for the steel to have a minimum design metal temperature (MDMT) of -40 C but the material became brittle at lower temperatures (-15 C and below), resulting in a crack.

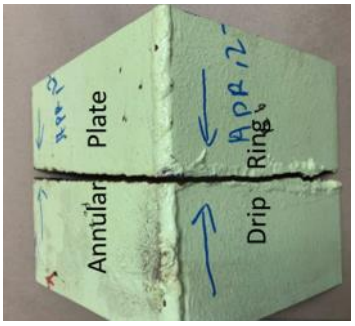
What Went Wrong:

- The supplier substituted a higher quality steel product not knowing that it had a different MDMT.
- A risk assessment using an international standard, such as API 650 *Welded Tanks for Oil Storage*, was not performed.
- The tank material vendors and internal company supply chain both assumed the appropriate tests were conducted, and specifications were met.

Actions Taken/Recommendations:

- Ensure that any steel material tank substitutions are risk assessed in relation to MDMT as part of a management of change process.
- Material vendors and supply chain teams must communicate clearly and in detail about material specifications and design requirements.
- Use the tools provided in the international standards (charts, grades of metals, etc.) to ensure material specifications are met.
- Always consider the impact of temperature variability in the selection or substitution of materials.

Example of a typical tank farm



Failed annular bottom plate

Image of the brittle metal at the point of failure

Tank image source: https://www.krillsystems.com/bunker-monitoring (not related to the incident)

Questions to Consider:

- What is the potential for something similar to happen at my work site?
- How do we verify that new and existing materials meet design specifications?
- Are integrity checks in relation to material specifications part of the existing process?
- What are the potential consequences of not adhering to material specifications in changing temperatures/weather conditions?
- What systems do we have in place for proactive adherence to material specifications? How can we improve?

Help industry by sharing lessons learned from an incident. Submit your Safety Alert.

SHARE AND COLLABORATE

Energy Safety Canada (ESC) works collaboratively with industry to share information aimed at helping companies of all sizes improve safe work performance.