

Process Safety Forum

Safety Alert #011 – Issued on 10/01/2017

Failure of High Density Polyethylene storage tank primary and secondary containments resulting in leakage into a bunded delivery area

This safety alert is shared in order to promote learning and improve safety. You should seek appropriate guidance regarding the relevance, accuracy, and completeness of this alert to your circumstances prior to implementation.

Issue

On the 4th of April 2016, a leak was reported coming from the secondary containment wall of a High-Density Polyethylene (HDPE) storage tank containing Sodium Hypochlorite into its surrounding bunded delivery area. No Sodium Hypochlorite leaked from its final containment into the surrounding environment, however if this had been the case it could have presented an environmental hazard.

As a result of the leak, plant systems using the Sodium Hypochlorite were shut down. Over time this could lead to an increase in the potential of marine growth in various plant systems, resulting in those systems becoming less effective. Once inspected, it became apparent that the leak stemmed from weld failures on both the secondary and primary containments of the tank. A temporary tank was put in place until a permanent replacement was commissioned and installed.

Learning

The HDPE tank was a temporary arrangement and needed to be replaced. There had been no pre-use inspection to check the quality of construction. During initial installation, the primary tank was not adequately fastened to the secondary containment. This resulted in the tank tilting, which may have damaged the secondary containment. The operational regime meant that the tank was subjected to cyclic loading.

For the majority of its design life inspections had been limited to visual checks of the primary and secondary containment. Towards the end of its design life more rigorous inspections were implemented, which did not highlight any cause for concern. On this basis, the strategy for replacement, which was scheduled in the next 2 years, was not changed. The primary containment subsequently failed revealing a defect in the secondary containment.

The inspection of the HDPE secondary containment did not undergo a leak check at any period during its life. A leak check would have been more searching than the visual inspection and would have been more likely to identify any defects.

Had the tank been replaced when originally planned this event would have been avoided.

Further Consideration

Confirm that the risks associated with temporary containment systems are fully understood so that an informed decision can be made relative to replacement and investment.

Ensure all tanks that have a potential environmental risk have appropriate inspection regimes in line with industry and regulatory guidance. Where internal inspections have been performed consider post-inspection leak checks (e.g. static head tests) of containment, including secondary containment if plastic.

References

Advisory good practice references:

1. HSE note PM86 "Thermoplastic tank Integrity management".

<http://www.hse.gov.uk/pubns/guidance/pm86.pdf>

The Process Safety Forum has been set up to provide an industry association platform whereby initiatives, best practice, lessons from incidents and process safety strategy can be distilled and shared across sectors, to influence our stakeholders (including the Regulators), and to drive the process safety management agenda. The Process Safety Forum consists of representatives from UKPIA, TSA, CIA, OGUK, CBA, RSSB, ENA, ECIA, UKLPG, BAMA, EIG, UKOPA, SWA, SDF, and MPA.

The website is www.p-s-f.org.uk. For further details contact: PSF.Secretary@gmail.com.