

Group SHE Learning



Group Learning number: FY18-0003

Operating Entity: Natref

Incident Date: 22 May 2017

KUE: Loss of containment - toxic and/or flammable substances in primary containment

Incident description:

The third stage of the hydrogen reciprocating compressor failed resulting in a release of hydrogen. A vapour cloud explosion occurred which resulted in a fire, property damage and 11 first aid cases (FACs).

Underlying and root causes:

1. Ignition from non-explosion proof motor.
2. Inadequately manufactured piston rod threads.
3. Possible incorrect oil lubrication rate to the valve cylinders due to manual oil filling.
4. Steam tracing on hydrogen suction lines not effective.
5. Temperature of cooling/tempered water to compressor lower than recommended standard.

Key learnings and control improvement recommendation:

1. Formal system to be in place to manage changes to **technical standards** and adoption of **best practices** especially for older equipment. In this incident it was specific to **condition monitoring** and **tempered water** systems.
2. Review **service level agreements** with service providers and lines of internal accountability for critical condition monitoring systems.
3. Ensure thorough **MOC process** on reverse engineered spare parts from **non-OEM or alternative** vendors.
4. Review the systems in place to check motors and other classified equipment for **intrinsically safe requirements** as per Hazard Area Classification.
5. Reinforce the critical control of **liquid carry over/formation** prevention in reciprocating compressors.

To prevent future incidents, it is recommended that this incident learning is appropriately shared and implemented by relevant persons in your Operating Model Entity, where applicable.

Together towards ZERO HARM and SUSTAINABILITY