

Step Change Safety Alert Template



Alert Title

Gas Release from Hydraulic Oil Annulus Returns Tank

What leaked and where from? E.g.: "Lube oil leak from compressor system open vent"

Incident Date

12/07/2013

The date on which the incident occurred, not when this form was completed

Location Type

Fixed Production Platform

E.g. Floating/Fixed Production, Drill Rig, Vessel, etc.

Specific Equipment Involved

Hydraulic Annulus Oil Returns Tank and the hydraulic well annulus controlling the SSSV

Give as much detail as possible about the equipment involved

Description of What Happened

On 12th July 2013 during an operation to remove the Sub-Sea Safety Valve (SSSV) from a well on a fixed production platform an atmospheric hydraulic oil returns tank was allowed to overpressure and fail. The failure caused a gas release to atmosphere and a hydraulic oil spill to sea. It should be noted that the SSSV was controlled through a hydraulic control annulus such that once the SSSV had been removed there was a small orifice connection between production and hydraulic control annulus.

Be as detailed as possible. Give equipment history and approximate time(s) of actions/occurrences related to the incident

Cause of Incident

The direct cause of the incident was that the topsides well control valve was left in an open position after the SSSV had been removed allowing hydrocarbon (gas) communication between the reservoir and the hydraulic oil returns tank (through the control line). Once the hydraulic oil supply had been forced back to the annulus tank, gas from the well migrated through the annulus control line into the annulus returns tank and over a period of approximately 20 minutes pressurised the annulus returns tank until it failed. The annulus returns tank had a vent attached (complete with a flame arrestor), however, through HYSYS (process modelling) simulation it was determined that the capacity of the vent line to relieve the pressure was insufficient, with respect to the flow rate into the returns tank.

Whilst human error was identified as the direct cause of the incident (with the operator failing to close the control valve) there were a number of organisational and management system failures which contributed to the incident, including insufficient management of change, insufficient engineering controls and insufficient management controls. This combination of human and organisational factors ultimately allowed the incident to occur.

Build from OIR/12 checklist

Incident Consequences

A gas release to atmosphere occurred and a loss of hydraulic fluid to the sea. The installation was subsequently shut in pending investigation and technical review of the hydraulic oil annulus returns tank system.

Include the release itself and any subsequent emergency actions/dangerous occurrences

Lessons Learned

- Historic managements of change processes had not taken into account the possibility of gas returns to the hydraulic oil annulus returns tank through seal leakage or gas entrained into the hydraulic fluid.
- The level of independent checks on well operations team procedures and processes (by the production team) were found to be inadequate

Include a few bullet points clarifying what was learned from the incident

Recommendations/Actions

A number of actions resulted from this incident including engineering controls to physically isolate production (including the annulus returns tank) during well operations. The wells team going forward will handle any hydraulic oil and gas returns post SSSV removal through separate PCE (Pressure Control Equipment) equipment isolated from the installations return lines and annulus returns tank. Other actions include:

- Well operations manual to be updated to define the method required for bleeding the SSSV control line and/or hydraulic control annulus to ensure the following:

- a) Sufficient barriers are defined, available and maintained throughout the operation.
- b) The barriers are independently checked and approved prior to pulling the SSSV by someone delegated with sufficient seniority and knowledge of the asset.

- Future Well Operation work packs are to be developed and include:

- a) Detailed method statement and drawings specific to the well and hydraulic controls arrangements present, and a full risk assessment that ensures well control barrier philosophy is met.
- b) Risk assessment to be undertaken with cross functional review and approval
- c) Draft Work Control Certificates to be developed and included with sufficient detail to enable more effective tool box talk
- d) All future well operations will be managed using a dedicated Well Intervention Permit

- Undertake suitable modelling to ensure that all annulus controlled wells do not have the ability to overpressure their respective return tanks

Include a few bullet points stating any recommendations/actions that will be made/taken as a result of the lessons learned

Contact Details (Optional)

If you would like your submission to be anonymous, leave this section blank