SAFETY ALERT

Release of compressive load in volute spring resulting in injury

Photograph of tree without volute spring, cover and retaining nut offshore post incident.

Photograph of Volute Spring and Housing (right rear) offshore post incident.

Description of Process:

Due to hatch size constraints, the Master Valve Actuator Assembly had to be removed to allow the Xmas tree to be lifted from the wellbay area.

Description of Incident:

This actuators assembly is a discrete unit which contains a pre-compressed volute spring which enables the valve to operate as failsafe. During the removal of the actuator, the housing became separated exposing the compressed volute spring with the load contained by the valves stem nut.

This deviation had not been encountered previously during this task which had been performed many times before, although at that stage the compressed volute spring remained in a safe condition. Subsequently, the technician decided he would release tension on the valve actuator volute springs, which retained a compressed load, by

unscrewing the valve stem nut. Co-workers challenged the technician, who gave repeated assurances that it was safe to continue.

During the use of an air driven impact wrench to remove the valves stem nut, the nut released after shearing off the last two threads, thereby releasing the stored compressed energy of the volute spring. This resulted in the technician who was standing directly in front of the spring, to be thrust backwards thereby sustaining injuries.

Good Practice Guidance:

The technician had extensive experience on wellhead equipment but did not understand the inherent risk associated with the compressed volute spring when attempting to remove the stem nut. Such an activity is a safe practice that can be undertaken with most other actuator types but not this type – the removal of the stem nut led to an instantaneous stored energy release from the volute spring under compression.

Consider:

- The adequacy, and availability, of formal work instructions for specific equipment and associated activities for site personnel. Personnel must also be assessed as competent to the approved work method.
- Ensure that Supervision and Operatives are trained on the inherent hazards and risks associated with use or maintenance of specific work equipment.
- Whilst the team involved in the task challenged the situation when the deviation occurred the job was not stopped for reassessment
- Refer to IOGP Life Saving Rules – Specifically with regards to “Energy Isolation” https://lifesavingrules.no/rule4_en.html