Introduction

When a tubing retrievable safety valve (TRSV) fails to operate, an insert safety valve is deployed to land in the nipple profile and straddles the moving parts of the TRSV. This becomes problematic when the TRSV has been corroded or damaged via wireline activity, as standard insert safety valves (ISVs) are unable to seal in this damage, causing a failure of the ISV. This failure can lead to the well being shut-in and loss of production.

Swellable Solution

In 2013, Tendeka developed and released SwellStack, a swellable sealing solution which seals in damage within the bore of a safety valve. SwellStack is installed on an ISV, in place of the existing chevron stack and is fed control line fluid via the TRSV operating control line.

SwellStack is designed using Tendeka’s extensive knowledge of swellable elastomer technology. The swellable element will expand on immersion in oil or water, and activate the back-up system, effectively sealing in any damage in the seal bore. No further intervention is required, and based on fluid and temperature, the seal will set fully within a day.

Easy to install with no further intervention required, the SwellStack can be used in damaged bores of up to 0.060", maintaining a continuous working pressure of 5000psi to successfully regain well production, within a day of installation.

Benefits of the SwellStack system

- Cost-effective solution to extend the life of the existing Downhole Safety Valve (DHSV)
- Provides maximum reliability for the most severely damaged and corroded seal bores, maintaining well integrity
- Removes requirement to workover
- Supplied ready-to-run for installing on valve
- Simple retrofit to existing equipment
- Less than 3000lbs to retrieve seal from a DHSV
- Can be designed to seal in oil and water-based control line fluid
- Can restore lost production
Case Study: SwellStack extends life of surface control sub-surface safety valve (SCSSSV)

Background

The challenge was to design a seal system strong enough to hold 5000psi differential pressure to deal with an estimated 0.060" deep wireline cut in the seal bores and possible corrosion. The system also had to be flexible to be retrieved from the safety valve when required.

Project Results

The resulting SwellStack clearly shows deformation in the seal where the compound had adapted to the damaged seal bore profile. Well integrity was regained and put back on production. The well was flowed briefly to increase the surrounding temperature at setting depth, increasing swell performance and reducing time before the valve held pressure. By installing the SwellStack system, it extended the life of the safety valve and avoided the alternative of an expensive workover that would have involved pulling the completion to replace the entire system.

Case Study: SwellStack regains well integrity without requirement for workover

Background

Client had a damaged SCSSSV, and existing isolation system was damaged and could not stop the leak through the valve. A more robust sealing solution was required to ensure long-term production of the well. The challenge was to design a seal system strong enough to hold 5000psi differential pressure in a damaged seal bore with possible corrosion. The system also had to be flexible to be retrieved from the safety valve when required.

Project Results

Within 24 hours, the SwellStack was installed, activated and was holding the required pressure of 350 bar / 5000psi. By installing the SwellStack system, it extended the life of the safety valve and avoided the alternative of an expensive workover that would have involved pulling the completion to replace the entire system. Well integrity was regained and was placed back on production without the requirement for a workover. The system was subsequently successfully retrieved using 7/32" wireline equipment.