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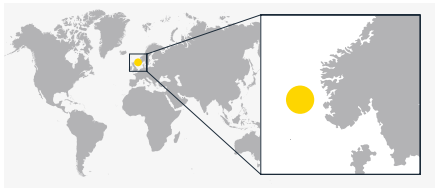
Evaluation of damaged DHSV

enables planning for an optimised remediation

Case study: **SPACE® Panorama**

High resolution evaluation of a damaged DHSV, comprising measurements and 3D images, enables planning for an optimised remediation.



Region: North Sea
Customer: Major international operator
Well Type: Water injector/Oil producer

Case Benefits
- Confirmation of flapper position
- Revelation of extensive damage, hitherto unknown
- Detailed visualisation of damaged components
- Accurate measurement of entire assembly in length and internal diameter allowing precise remediation planning
- Well successfully converted from injection to production

Key Capabilities
- Real-time information from e-line conveyed services
- Full 360° coverage of wellbore circumference
- Millimetre accuracy ultrasound measurements obtained in three dimensions
- 3D rendering to aid understanding available immediately on wellsite

Typical Applications
- Safety valve internal inspection
- Side pocket mandrel inspection
- Evaluation of non-obstructing fish
- Visualisation and evaluation of internal surfaces
- Measurement of internal dimensions of complex completion items

Challenge

A Intially planned as an oil producer in 2007, the well's DHSV failed inflow tests and attempts to set an insert valve were unsuccessful. Because of this, as well as low production rates, the well was converted to a water injector through the locked open DHSV by means of a packer set injection valve above. After operating for a number of years, the well was shut in following failure of the injection valve.

Based on results from several drift runs, it was suspected that the DHSV flapper could have been damaged or stucked in a half open position.

In order to convert the well back to an oil producer, detailed evaluation of the exact status of the DHSV was required to allow planning of a complex intervention program including re-perforation and the setting of a straddle.

Solution

In order to evaluate the flapper position and condition, as well as measure the DHSV assembly in length and diameter, the **SPACE® Panorama** was deployed.

Pre-job workshop tests performed indicated that if the **SPACE®** toolstring were to pass the flapper it could become stuck while pulling out of hole. As a precaution, a no-go was machined and installed on the string to prevent the tool from going too far through the flapper. Several passes were made over the entire assembly.

3-D rendering of ***SPACE® Panorama*** *data from the entire DHSV assembly, showing damage to the flowtube while confirming dimensions and condition of seal bores and profiles.*

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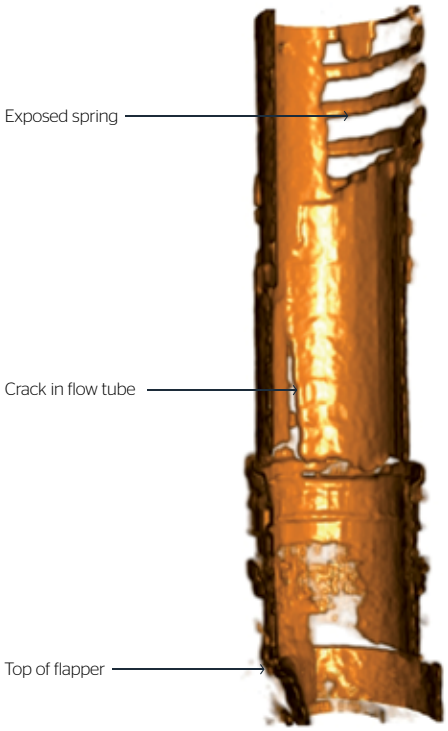
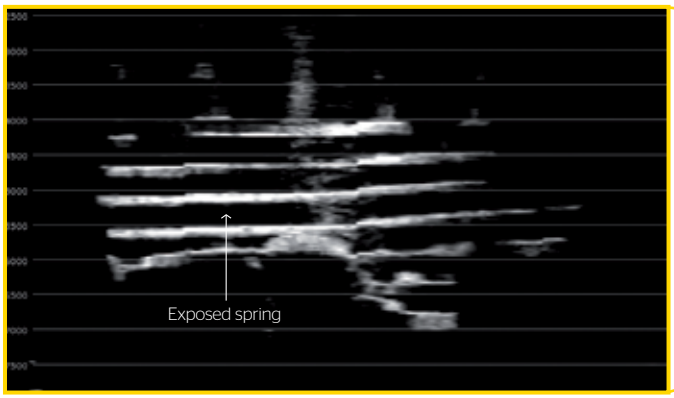
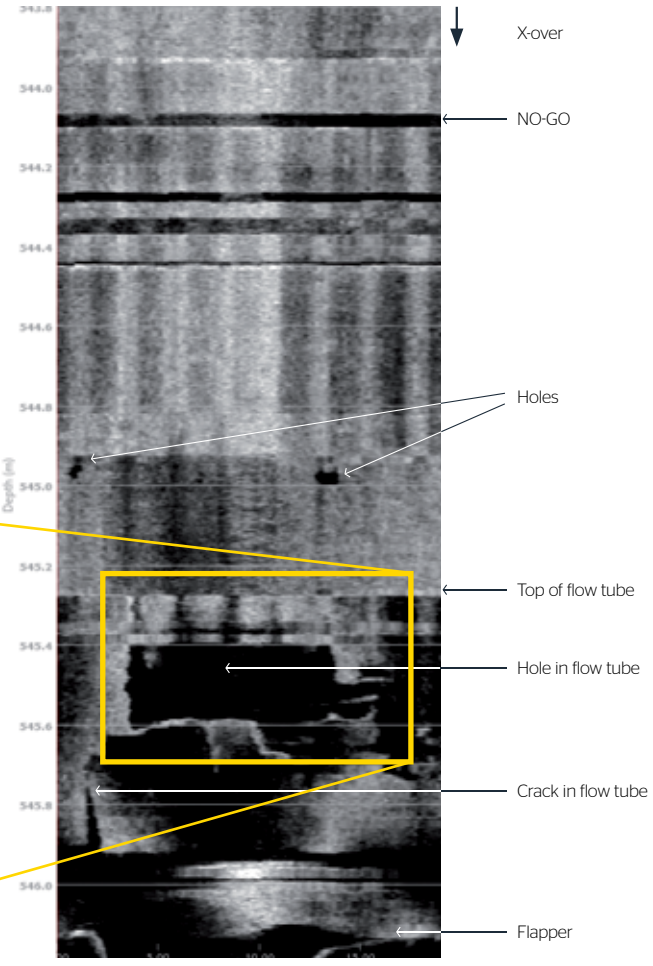
Result

The data revealed not only the flapper position as being partially open, but also that there was considerable damage to the flowtube such that the normally concealed spring was fully exposed to the wellbore. In addition, a number of holes were found to be present. Clearly, the damage was to extensive to consider repair so a straddle solution was designed. The precise internal measurements acquired allowed the design of a straddle to be anchored in the original DHSV upper and middle seals, with a surface-controlled insert safety valve hanging off from it, locking open the original valve. Control of the well was restored and it was successfully converted into a valuable oil producer.



3-D rendering of **SPACE® Panorama** *Viewer data from the DHSV. Severe damage to the flow tube revealed.*





Ability to adjust focal length allows **SPACE® Panorama** *to "see through" the hole in the flowtube and image the spring behind.*

Captured by SPACE®

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