MATURE FIELDS

CASE STUDY

Customer Uses Pressure Wave Technology to Plan Stuck Pig Retrieval

INNERVUE™ PIPESUITE DIAGNOSTICS ACCURATELY PREDICTS STUCK PIG LOCATION

UNITED STATES – NORTH DAKOTA

CHALLENGE

- Pig stuck in pipeline due to wax build-up, blocking and preventing production flow

SOLUTION

- Perform a calibration survey in a system containing the same fluid – to ensure accurate acoustic velocity was known prior to stuck pig survey
- Conduct a InnerVue™ PipeSuite survey – to assess location of the stuck pig in the pipeline

RESULT

- Provided accurate data for assessment and engineering of remediation solution

OVERVIEW

The customer was experiencing a stuck pig in its pipeline, located in North Dakota. This occurred during a routine pigging operation, when a cup pig got stuck in the pipeline—most likely due to the accumulation of paraffin wax in front of the pig. The customer proceeded to cut the line in a few places and, in fact, located the pig and a large quantity of wax before Haliburton's Pipeline and Process Service team arrived. However, it was decided to carry out the planned survey to demonstrate to the client the working and accuracy of InnerVue™ PipeSuite technology.

Figure 1. Shows high-resolution pressure transmitter tied in to the customer's pipeline system, with an operator ready to operate the valve.

The objective was also to evaluate and calibrate the acoustic velocity in the system by using a known reference point of a closed hairpin valve. A two-step process was employed; whereby, a calibration survey of a similar (same fluid) system and a InnerVue PipeSuite survey of the actual pipeline were both performed to gather as much information as possible before attempting to remove the pig.

PROJECT DETAILS

Five InnerVue PipeSuite diagnostic datasets were collected from the launching end of the pipeline. The pulse was generated by a quick opening and closing of a permanent bleed valve. The system response was then measured and recorded, using Halliburton's high-resolution pressure transmitter and data-logger equipment (Figure 1).

Use of the calibration survey confirmed acoustic velocity of the pipeline fluid, which in combination with final results, also verified the InnerVue™ acoustic velocity restraint modelling.

PROJECT OUTCOME

The InnerVue survey was completed in a safe and efficient manner at short notice and with good service execution. It accurately predicted the location of the pig and size of the blockage in front of the stuck pig. This provided valuable data for the client, which helped in their decisions regarding retrieval of the stuck pig.

The customer was duly impressed with the pressure wave predictive capabilities. Suffice it to say, had the surveys been done in the first place, the knowledge gained may have allowed invasive measures, like cutting the pipe, to be avoided.

DID YOU KNOW

The InnerVue PipeSuite diagnostics service is a low risk, fast and accurate technique used to map the quantity and distribution of what may be limiting the throughput of the pipeline system, such as wax, hydrate, stuck pig or tool. A pressure wave is created at one end of the pipeline and travels through its entire length at the speed of sound. A reflected signature wave is returned, which corresponds to actual conditions within the pipeline, including:

» Changes in flow velocity from deposits/debris
» Changes in medium properties, such as density, viscosity and phase

Analysis of critical data collected by the "pressure wave" technology will increase your understanding of a given pipeline transportation system—from end to end—and provide valuable insight for decisive asset performance management. The InnerVue PipeSuite diagnostics service locates pipeline blockages to high accuracies within 0.3% of pipeline length.

HALLIBURTON