



DEEP WATER



MATURE FIELDS



UNCONVENTIONALS

## CHALLENGE

- » Locate a stuck pig
- » Live tracking of stuck pig retrieval

## SOLUTION

- » InnerVue™ blockage location survey
- » InnerVue™ live pig tracking

## RESULT

- » Stuck objects located quickly and accurately
- » Live tracking of pig retrieval
- » Post remediation check to ensure line is clear

# Pig Locating and Real Time Tracking with InnerVue™ Technology

REMOVING THE CHALLENGES OF PIGGING BY KNOWING EXACTLY WHERE THEY ARE

EAST MEDITERRANEAN

## OVERVIEW

Halliburton Pipeline and Process Services successfully executed an extensive pipeline pre-commissioning campaign in the East Mediterranean. During the proceedings a lost-pig occurrence prevented completion of the dewatering workscope of an 18" pipeline. Halliburton Pipeline and Process Services were hired by the EPC contractor to carry out an InnerVue™ survey to locate the lost pig and track its location during recovery.

## CHALLENGE

The lost pig was located within a relatively long subsea pipeline. Surveying with ROV was not practical due to the length of the line and associated cost. A simpler, fast and accurate method of locating the pig was required.

## SOLUTION

To locate the stuck pig a negative pulse InnerVue™ survey was used. A controlled hydrodynamic wave is induced into a pressurised pipeline system and the position of a significant flow impairment such as a blockage or pig can be determined by identifying reflexes visible in the recorded data trace. This method is suitable for use in both fluid and gas systems, though the analytical approach for either is very different.

The InnerVue™ survey provided critical information necessary to develop a pig recovery plan once discovering that the lost pig was located 16.5km from the platform. Working closely with the EPC and Field Operator, a reverse pigging operation, involving Halliburton managing a combination of specialist services onshore, offshore and remote deepwater, was conducted to recover the pig.

A foam pig was launched from the deepwater pipeline end and travelled towards the platform over the course of five days. The propellant was nitrogen gas supplied from a membrane spread transferring N2 gas via a gathering pipeline and a crossover at a subsea manifold.

Pig tracking specific InnerVue™ surveys were performed on board the production platform throughout the reverse pigging operations. In live conditions, pressure waves were transmitted through the system allowing real time monitoring of the now-found-pig location. Once the foam pig reached this location, both pigs in unison began moving towards the



*InnerVue™ Non-Intrusive Pipeline Diagnostics*

Fast, accurate locating of lost objects with non-intrusive technology. Surveys carried out with minimum disruption and maximum accuracy.

platform. Surveying continued throughout and provided a real-time location, speed and estimated time of arrival. Upon pig receipt a final survey was performed to confirm that all pigs had been recovered. The survey results showed that there was still a pig in the line at the subsea isolation valve location, 364m from the platform. Flow resumed until the final pig was received allowing cessation of operations and removal of the temporary topside launcher / receiver.

**RESULT**

Results of the InnerVue™ PipeSuite survey provided the information needed to evaluate and engineer an appropriate remediate plan for removal of the stuck pig. During operations to retrieve the pig, InnerVue™ provided live location tracking of the pig as it progressed back to the pig launcher.

**DID YOU KNOW**

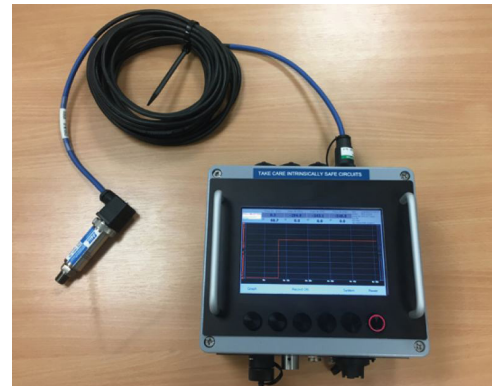
The InnerVue™ diagnostics service is a low risk, fast and accurate technique used to map the quantity and distribution of what may be limiting the throughput of the pipeline flow path, such as wax, hydrates or asphaltenes. A pressure wave is created at the one end of the pipeline which travels through the flow path at the speed of sound. A reflected signature wave is returned, which corresponds to actual conditions within the pipeline, including:

- » Changes in pipeline bore caused by deposits/debris
- » Location of blockages
- » Analysis of critical data collected by the “pressure wave” technology will increase your understanding of a given pipeline system and provide valuable insight for decisive performance management.



**InnerVue™ PipeSuite**

In addition to locating lost objects, InnerVue™ PipeSuite can also be used to quickly and accurately map deposition of wax and other deposits or locate leaks.



The equipment is contained in a small case: 54cm (21in) (l), 36cm (14in) (w), 22cm (9in) (h) and weighs 15 kg (33lbs). A standard unit is composed of one data-logger, a set of pressure transducers with different pressure ranges, cables and chargers. The equipment is ATEX Zone 2 and contains a 65Wh lithium-ion battery.

[www.halliburton.com](http://www.halliburton.com)

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