Case Study: Inspection of a High-Pressure, Multi-Diameter Deepwater Crude Oil Pipeline Using ART Scan

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NDT global was approached by a large energy business to review the possibilities of inline inspection of a new and challenging crude oil pipeline in the Gulf of Mexico. The line is in very deep waters, shows high pressure and high production volumes and includes a diameter change. Upon review of the combination of these challenges, NDT Global concluded that ART Scan technology can address them, although no off-the-shelf tool would meet the requirements. To assure a successful inspection, the tool design was adapted, and an extensive program to test and validate the tool under those challenging conditions was developed and executed.

This paper shows the specific challenges faced by the team, the solutions that were developed to overcome them and the underlying validation concepts. It therefore highlights the capabilities of advanced inline inspection technologies and also provides guidance to the industry to assure reliable inline inspection projects under extreme challenging conditions.

The authors will discuss the high-pressure testing completed on individual components such as cabling, odometers and sensors, which required new dedicated pressure chambers.

Using this setup, various pump trials were executed where the tool could pass the feature spools at elevated speeds. This kind of setup allows a solid combination of both standard testing and blind testing, but it was also used for advanced training and validation purposes.

Safe and reliable passage through the various diameters was able to be confirmed through repeated pump trials, specifically focused on maintaining drive in the larger-diameter section. The compression set of the polyurethane was identified as a potential risk, and this was assessed through full-scale testing and prolonged exposure.

Measurement capabilities of ART Scan technology at high speeds were confirmed and underlie the various capabilities of this inline inspection method.

KEYWORDS: Subsea inspection, deepwater pipelines, challenging inspections

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