

Crack Diagnosis in Blended Natural Gas

EVO Eclipse UCx Service



Challenge

A North American pipeline operator contracted NDT Global to inspect an 18" Natural Gas Liquids (NGL) pipeline for cracks, including hook cracks. The pipeline transported blended NGL, which made the inspection process complicated by the nature of the medium.

Performing ultrasonic crack inspections in a challenging medium such as blended NGL requires a thorough understanding of certain parameters. One of the biggest challenges is determining the sound velocity in the medium as changes in operational and environmental conditions such as pressure and temperature can affect ultrasound propagation angles and lead to measurement degradation.

Typically, when faced with a challenging medium, the inspection tool is deployed in a batch of a standard medium, such as diesel. However, in this instance, the operator sought a solution that could be deployed directly in the NGL product. Working closely with the pipeline operator, an extensive testing and validation process was initiated.



Axial Cracks



Circumferential Cracks



Metal Loss



Geometry Ovalities



Mapping

Solution

The team followed a sophisticated medium assessment process to determine the speed of sound and attenuation of the NGL, which involved utilizing the NGL chemical composition.

To achieve the best data quality, an assessment run was required to validate the angle of incidence (AOI). The team created a set of sensor plates for the inspection system with varying AOIs. After completing the assessment run and reviewing the results from the data quality assessment, the ideal AOI was confirmed. The inspection system was then configured accordingly, and the NDT Global team proceeded with the inspection survey.

Despite the challenges posed by the NGL medium, NDT Global's advanced ultrasonic crack detection technology, EVO Eclipse UCx, was deployed directly in the NGL instead of a batch. The Eclipse service enabled the sizing and diagnosis of complex features, such as hook, tilted, and skewed cracks in their assets, allowing the operator to diagnose the condition of their pipeline.



Results

- After conducting a thorough inspection of the NGL pipeline, the NDT Global team delivered comprehensive results to the operator. The team identified, sized and reported several complex crack-like features, including possible hook cracks. The data analysis process was completed, and the final report was delivered to the operator.
- The inspection data was then validated using NDE measurements by an independent third-party contractor. Supported by NDT Global's field verification team, PAUT was used to characterize complex crack geometries. This validation confirmed the results were accurate and reliable.
- A major breakthrough in this inspection was NDT Global's advancement in ultrasonic crack inspection. This advancement has eliminated the need for batching alternative mediums like oil or refined products, allowing the use of precise ultrasonic crack detection technology in most NGL pipelines. The inspection yielded highly accurate detection and sizing results for challenging crack-like features, including hook cracks.

This technological advancement provides greater insights into the true condition of this pipeline asset.

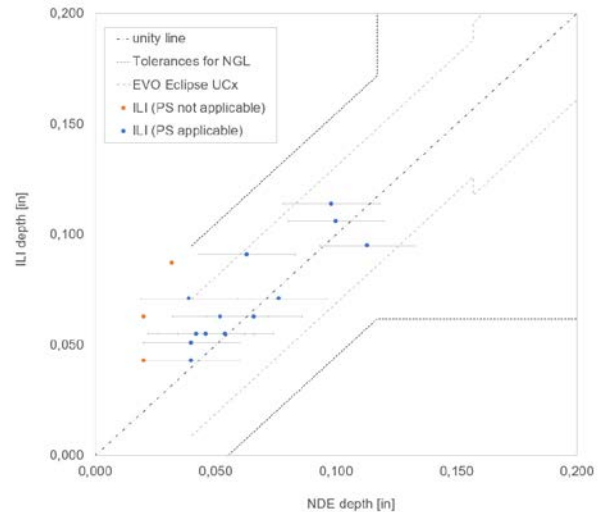


Figure 1 - Unity plot showing NDE field results