

Detailed Ultrasonic Crack Inspection Achieved

By Batching a 12" Natural Gas Line



Challenge

In 2019 a Canadian pipeline operator approached NDT Global to better understand the integrity of two 12" pipeline segments totaling 290 km (180 miles) within their natural gas system. Previous inspections utilizing alternative inspection technologies identified possible cracking threats, but a more detailed inspection was required to confirm the extent of the threats they needed to remediate. By successfully applying ultrasonic inspection technology, the operator could gather a full range of potential indications in both the pipe body and long seam locations.

The challenge with applying a UT based inspection technology in a gas pipeline is the requirement of a liquid coupling medium to ensure compatibility of the UT crack detection technology. Inserting a liquid into a gas pipeline is costly and not an ideal situation for operators. With stringent requirements for their customer's delivered gas, outage times on the system can create impacts to downstream delivery points.

It is also important to consider the type of liquid used as each will have varying degrees of requirements to ensure the return to full gas operation is smooth with no degradation to the product being delivered.

Solution

To successfully inspect the line using ultrasonic technology, pipeline operation and planning is key in managing the flow rates and pressures to ensure that the inspection tool is running at a consistent and optimal speed all while trying to minimize delivery downtime of natural gas to customers along the pipeline system.

To manage these challenges NDT Global reached out to a local partner, In-Line Pigging Solutions. By connecting and building partnerships like this, NDT Global was able to rely on In-Line Pigging Solutions extensive knowledge and experience in setting up this challenging operational scenario to mitigate any operational inconsistencies during this inspection. Working together, an operational plan was developed that ensured the entire inspection program was successfully completed.

A custom designed launching facility supported the seamless insertion of a liquid batch into the gas pipeline. When selecting a suitable medium for use in batching many factors must be considered, such as compatibility with ultrasonics (speed of sound and attenuation of signal), applicability to be inserted into a system that transports natural gas, and cost of the product.



Axial Cracks



Circumferential Cracks



Metal Loss



Geometry Ovalities

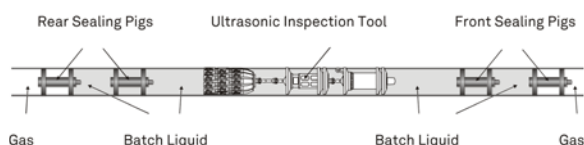


Mapping



To meet all the requirements, a petroleum-based product was selected that had ideal characteristics for an ultrasonic inspection.

Another key factor in the success of managing a batching operation is the control of the flow rate and pressure of the liquid slug to ensure that the column of liquid stays together and runs as smoothly as possible. To achieve this, In-line Pigging Solutions employed the use of automatic pressure control valves to assist the operations team in managing any changing pressures and flow rates due to the ILI tool navigating elevation changes. The addition of a detailed execution and communication plan were key factors in this inspection program being completed with zero unplanned events.



Example of a batch configuration

A custom designed launching facility ensured the seamless insertion of a liquid batch into this gas pipeline.

Results

- **Ultrasonic inspection of a GAS pipeline** – Detailed preparation and planning ensured this project ran smoothly. Each of the batching tools and the ultrasonic crack detection tool maintained a consistent separation and speed throughout the inspections.
- **Customized launching** – NDT Global's close partnership with local batching experts, In-Line Pigging Solutions ensured a customized launching procedure. This relationship ensured outage on the pipeline system was reduced, therefore reducing the downtime of gas deliveries to an acceptable period for downstream customers.
- **Detailed picture of the condition of line** – By successfully collecting data for 100% of the surface area and length of the pipeline segments, the most detailed analysis was achievable, and the operator was provided with actionable insights into the condition of their assets.