HOW TO DETERMINE THE INTEGRITY OF CAVERN CASINGS, A NEW SOLUTION FOUND

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Abstract

A cavern casing forms the connection between above ground pipeline systems with an underground storage cavity. Today, storage cavern operators are strongly committed to protect the environment and performing an inspection will assist in determining the condition of the installation and the cavern casing in particular.

To establish the integrity of long distance trunk lines "free-swimming" internal inspection tools exist for many years. These are propelled by the medium and travel with the flow. However, as cavern casings are open to the cavity such tools cannot be deployed for obvious reasons.

In this paper a new approach for a detailed ultrasonic inspection of the cavern casing is explained, based on the application of an umbilical (cable, tether) operated tool. For many years, such tools are in use for inspection of "unpiggable" loading lines and platform risers but needed to be re-designed for this application. To perform the inspection it was required that the storage cavern is taken out of service and entirely filled with liquid, e.g. brine. The inspection tool provides on-line presentation of results for immediate evaluation. The system uses straight beam ultrasonic sensors for a combined corrosion survey, wall thickness measurements and ID geometry profiling in 3D. This survey is followed by an inspection with ultrasonic angle beam transducers to inspect the circumferential welds for any cracks. Finally, the survey can be supplemented with a tool to record inclination and azimuth to better understand the outcome of the ultrasonic surveys. A complete casing survey can be performed within one day.

Keywords: Well casing, well logging, environment, instrumentation and monitoring, Pipelines and pigging, corrosion, crack detection, inclination, azimuth, evaluation, integrity.