

DETECTION OF ANNULUS FLOODING IN FLEXIBLE PIPES USING THE GAMMA RADIATION TRANSMISSION TECHNIQUE

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Flexible pipes are modular constructions made up of several layers. They are widely used in the oil and gas industry, playing an important role in the production of the Brazilian Pre-Salt. Under specific conditions, seawater can enter the pipeline and its contact with the intermediate metallic layers can lead to a significant reduction in the flexible's useful life, especially due to a mechanism known as CO₂ Stress Corrosion Cracking (SCC-CO₂). Therefore, it is imperative to have a reliable inspection tool, operable by ROV and usable in various scenarios (dynamic sections - risers - and static sections - flowlines - at various depths, from different manufacturers), in order to detect annulus flooding before the flexible pipe failure. This work presents an inspection tool based on gamma radiation transmission technology, developed in partnership between CENPES/PETROBRAS and the Federal University of Rio de Janeiro (UFRJ), which presents real possibilities for overcoming the limitations of other inspection tools available on the market. The reliability of this solution was statistically evaluated, showing that there were no false calls for the samples tested for a prototype suitable for use in shallow waters. Currently, after a public call process, PETROBRAS and Oceaneering are developing the tool for use in ultra-deep waters. The tool is expected to be made available in the first quarter of 2024.