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MANAGING CHLORIDE INDUCED STRESS CORROSION CRACKING (CISCC) IN OPERATING LNG FACILITIES

Several sour gas leaks occurred in lines and Fin-fan coolers tubes associated to the Off-Gas Compressors at several inlet facilities of a Gas production plant. Material failed was austenitic stainless-steel TP 304L, operating at pp H₂S 207 kPa, 55oC, pH 3.5. Metallographic analysis confirmed Internal CISCC at the welds heat affected zone (HAZ), with solids containing Chlorides as high as 4000 ppm on the cracked surface. The chloride content in the production water from slug catchers is 1250- 2400 ppm. Hence it is expected that some chlorides, diluted in the water phase, may travel with the entrapped water in the gas phase after the first separation. It is believed that chlorides concentrated due to repetitive evaporation/condensation cycles. Factors which influence the onset of cracking are the concentration of chloride, temperature, stress level, water pH and oxygen concentration. CISCC threshold levels for each factor are inter-dependent on other factors. Discussion of how to manage the CISCC recurrent failures in an operating facility are included in this paper. Initially, other susceptible equipment under normal, transient and SD conditions in the facility were identified, and their SHE and Financial risk evaluated. Reasoning behind the original material selection, and cost benefit comparisons among different materials including Carbon Steel were also considered. Upgradation to Incoloy 825 was recommended for the equipment under highest risk and for new facilities.

To view the full conference agenda, visit <https://www.lng2023.org/lng-programme-overview>