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## Abstract

Saka Pangkah PSC covers Ujung Pangkah and Sidayu fields, which are located in the offshore East Java Sea, Indonesia. The Sidayu oil and gas and gas condensate field holds most of the reserves. The 2015/2016 Sidayu Pangkah exploration program drilled two exploration wells, which were plugged and abandoned. Due to the success of the exploration drilling campaign and after analysis of production probabilities, a decision was made to repurpose these permanently abandoned exploration wells as production wells instead of drilling new wells as per initial development scenario.

During the P&A procedures on the exploration wells, both the 13 3/8-in. and the 9 5/8-in. casing strings were cut and pulled at the seabed. This required them to be reinstated after the platform and surface facilities were in place. Conventional approaches and technology (e.g., drilling a new well or Mudline suspension system or external casing patch) were either found to be uneconomical, or to be incapable of meeting the full operating parameters, and/or to suffer from premature seal failure leading to well integrity concerns.

The production profile, well design operating parameters, and well integrity criterion required that existing-to-new casing interfaces be capable of withstanding high axial loading conditions and that any proposed connection be gas-tight with no loss of inside diameter. Extensive validations and verifications testing were done to satisfy these criteria and meet local regulatory requirements. This innovative expandable steel, metal-to-metal, gas-tight casing repair technology was implemented on multiple casing sizes to facilitate a gas-tight seal while enabling extreme axial load resistance with no loss of inside diameter. Reestablishing a gas tight connection to the existing cut casing required a novel overshot device. This is placed over the cut and dressed casing stump in the well. The setting tool is then placed inside the existing casing, which is then expanded with high pressure into grooves within the overshot creating multiple metal to metal, gas-tight sealing points.

The economic analysis drove the operator to pursue a novel solution to reinstate the wells as producers. Using this new approach to reinstate wells previously considered economically and technically nonviable, the operator was able to avoid re-drill two new wells, thus avoiding carbon-generating activities and procurement of additional embodied sources of carbon. Carbon-generating

activities were avoided via reduced use of drilling rigs, vessels, and other equipment during offshore well construction and completion activities. By reusing the existing wells previously constructed during the exploration campaign, embodied sources of carbon such as steel used in casings and cement were reused avoiding duplicate procurement. Additionally, the initial drilling was challenging, and reuse of the existing wells avoided significant losses of drilling and completion fluids, which are sources of embodied carbon.