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## **Samarang Pipeline-Replacement Project: Application of an Innovative Approach for Shallow-Water Pipeline Installation**

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### **Abstract**

This paper presents the approach adopted in the replacement of ageing pipelines at offshore Sabah, Malaysia by PETRONAS Carigali Sdn. Bhd. (PCSB), the E&P arm of PETRONAS. Several options were explored to best deliver the project considering the installation difficulties were exacerbated by the congested field, ageing offshore structures, spaghetti pipeline networks, monsoon wind and presence of corals on the seabed. On top of these, the field's shallow water provides further complexity to the construction and installation works. The paper also shares the means engaged to mitigate the challenges and lessons learnt during the project's planning and executing stages.

Subsequent to the preventive inspection findings, a project was initiated in 2006 - as part of PCSB's commitment to rejuvenate ageing offshore facilities, sustaining the field's integrity and assuring reliability of supply. The Samarang pipeline replacement project was initiated to address these issues and espouse the integrated field development within its block. As a fast track project, the construction method engaged has to be sound and capable for expeditious work completion to avoid jeopardizing production. Through a thorough evaluation process, an innovative pipeline installation approach utilizing a shallow draft work barge was chosen for the project.

The project was completed with the successful installation of all four pipelines in December 2007. Despite many challenges, the project progressed smoothly without major setbacks. It was successfully completed ahead of schedule, within budget and recorded zero LTI and zero TRCF. The new construction method which requires assimilation of both the conventional and new approaches for offshore installation, has demonstrated its effectiveness hence proving the plausibility of the method for other projects with similar circumstances.

In the pursuit of sustaining and revitalizing old offshore facilities, pipeline replacements are inevitable to prolong intra and interfield operation flow of hydrocarbon. The unique and uncertain offshore environment, particularly at the shallow water areas introduces many installation challenges. Although proven methods are available, exploring a new approach to pipeline installation is essential to safely and effectively deliver projects with minimum costs. By selecting a suitable approach for pipeline installation, new networks of hydrocarbon flow facilities can be developed, thus allowing continuous production for decades to come.

### **1.0 Introduction**

A pipeline replacement project was initiated by PETRONAS Carigali Sdn. Bhd. as a response to in-field integrity pipeline inspections and concerns on the ageing offshore facilities. Once installed, the replacement pipelines shall serve as the new arteries for intra-field production flow. The inherent offshore environment and the state of the existing facilities introduced constructability constraints which warrant the adoption of a new approach in pipeline installation.