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Observing Dynamic Well Behaviour During Gas Lift with Slickline Deployed Distributed Fiber Optic Sensing Helps Diagnose Well Performance Issues in the White Tiger Field Vietnam

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Abstract

Surveillance of dynamic well performance is problematic using conventional sensors as only one location can be observed. But during gas lift, multiple points of gas entry may be active over large distances in a well.

This paper presents a case study using a Distributed Fiber Optic Sensing (DFOS) enabled Slickline to monitor the entire length of the well over the whole duration of the survey to enhance well performance diagnostics.

Conventional logs measure events local to the sensor as its pulled uphole. Many dynamic events affect the entire wellbore and can be intermittent in nature. The diameter of conventional logging tools may disturb what they try to measure or are recorded over restricted rates for safety reasons.

A DFOS Slickline system was deployed in a gas lifted well to diagnose well performance. Data was recorded over the entire well for the duration of the survey flowing at conventional production rates. This data was processed at wellsite and a quicklook provided within hours of survey.

This is a case study from a gas lifted well in the White Tiger field in Vietnam. Results show the behaviour during both an annulus bleed phase and gas lift injection phase over all 7 side pocket mandrels simultaneously providing evidence showing which mandrel was faulty. The results provided clear evidence of an inefficient gas lift system with a significant reduction in drawdown with consequential loss of production.

An intervention to resolve the issue resulted in a significant enhancement of the wells production. The survey provided critical information to help plan remediation and restoration of stable production resulting in an over 300% increase in oil production.

The use of slickline DFOS allowed for the continual monitoring over all gas lift valves simultaneously during kickoff and production of the well. This increased confidence in the diagnosis and remediation needed to restore production.
