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Novel Single-Trip Upper Completion System Saves Rig Time in Deepwater Offshore Brazil

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Abstract

This paper outlines the mechanism and functioning of One Trip Upper Completion System using an hydraulic tubing compensating device (HTCD), the UST (Upper-Completion Single-trip System) that enables the integration of all equipments of an upper production string in order to run in hole in one single trip.

The UST with HTCD is an upper completion system that integrates safe production string running in hole and simplified hydraulic release after connecting the lower completion equipment to the upper completion system.

This paper also emphasizes the difference amongst few systems from conventional dual trip upper completion until other types of tubing seals receptacles used for single trip upper completion, stating all mechanical differences and their peculiarities. This document describes field experiences of Upper-Completion Single-trip (UST) installations using Single Trip Hydraulic Tubing Compensating Device (HTCD) system and establishes a comparative analysis of rig time savings and operation differences using conventional methods compared to the UST with HTCD.

Introduction

In 2004 first single trip production string was installed. This first successful experience was achieved using a mechanical single trip mechanism and the main objective of this method is to reduce rig time during upper completion installation procedure. The average rig time saving since first deployment of a upper completion single trip has been 24 hours. ⁽¹⁾

The reasons upper completion single trip technique has increased in Campos Basin are as follow:

- Horizontal deep water completions;
- Use of large bore Completions;
- Pressure and Temperature Gauges in the production string;
- Increased number of well control parameters therefore the necessity of larger number of control lines;
- Chemical injection mandrels and injection lines;
- Electric Cable and protection clamps;

Upper completion string lay out has become complex and therefore deployment limitations has been the challenge. Features as horizontal lower completions; prohibitive rotation of upper completion string and the minimum tolerance between casing ID and some equipments of the production string as clamps and tubing hanger are the main application for upper completion single trip methods as the technique minimizes production string deployment and maximize rig time saving. (See Figure 1)

First hydraulic actuated upper completion single trip was run in Campos Basin in Brazil in August 2005 using HTCD. Since 2005 more than 25 hydraulic actuated upper completion single trip has been run in Brazil successfully.