

## **Feasibility study of the deployment and operation of coiled tubing using a subsea lubricator and dynamically positioned work vessel**

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### **ABSTRACT.**

Subsea well intervention allows increased oil recovery from subsea wells by optimizing production. A method of subsea well intervention that can perform tasks economically and effectively is highly desired in the oil and gas industry. The present study investigated the novel concept of using a dynamically positioned work vessel to perform subsea well intervention through a subsea lubricator and a riserless configuration. The feasibility of the conceptual system was investigated and compared to typical subsea well intervention systems, emerging conceptual systems and those already used in the industry. The concept was determined to be technically feasible, as it is well placed against other concepts and new intervention technology.

**KEY WORDS:** well intervention; subsea; coiled tubing; feasibility

### **INTRODUCTION**

Well Intervention involves operations which restore and increase production from producing wells. Subsea well intervention is simply well intervention operations performed offshore on subsea wells. Subsea well intervention may be performed by a number of different vessel types including monohull vessels, multi-purpose vessel and rigs. Interventions that can be performed from a monohull vessel, instead of a rig are beneficial due to their lower cost. This lower cost stems from lower daily hire rates, reduced mobility times and length of operations.

Well intervention is typically performed using one of two methods: coiled tubing (CT) or wireline (WL). Coiled tubing is a continuous and flexible steel pipe which can be inserted into a well bore to convey various well servicing tools and to circulate fluids (Khurana, DeWalt and Headworth 2003). Wireline is a single strand or multi-strand wire or cable that can similarly be inserted into a well bore to convey well servicing tools. CT is able to perform a wider scope of operations than WL due to its circulation potential; it can convey a

number of specific CT tools in addition to the standard WL tools for well servicing. Examples of intervention tasks that can be performed by CT include: Well cleaning, fishing, milling, zone isolation, stimulation, sidetracking and re-entry.

The present study investigated the concept of a subsea well intervention system using the following major components: A dynamically positioned (DP) monohull vessel, a subsea lubricator, an active heave compensation system, a subsea blowout preventer (BOP), a surface gooseneck and a surface injector deployed through a moonpool with riserless CT. A system configuration including a CT reel, gooseneck and injector head which can be skidded onto the vessel deck is shown in Fig 1.



Fig. 1 CT reel, gooseneck and injector head (Schlumberger 2006)