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Feasibility of Deepwater Drilling in South China Sea by Applying ABS unit

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ABSTRACT

COSL (China oilfield Services Ltd.), the biggest offshore drilling company in China, owns three semi-submersible rigs which can operate in water depth up to 470 meters. COSL is constructing a deepwater drilling rig recently, and it will be completed in 4-5 years. COSL needs to find out a way to modify semi submersibles to explore oilfield in water of 1,500 m during these years. COSL noticed the Artificial Buoyancy Seabed (ABS) unit, which may be matched to semi-submersible platform to perform drilling operation in deepwater up to 1500 m. The main principle of concept is to set a tank of buoyancy (the ABS unit) under 300m below sea surface, which is as a base of the semi-submersible rig. The ABS unit could utilize its buoyancy force to support the weight of BOP and other facilities such as risers, and the BOP will be set in a short distance from the sea surface. Since June 2004, COSL has carried out a series of tests to prove the feasibility of the new concept to deepwater drilling, and acquired a lot of data on the limited conditions for ABS unit. These data are, for example, the maximum loading forces, the maximum currents to resistance and the window of time to operation and so on. The tests were taken from both the pool of the lab and the lake in the main land of China, except for a model test in a pool. COSL had researched the test results for ABS unit, including a test of ABS unit in the sea near a city of Norway in 2002, and thought ABS unit is an accepted concept to do in the deepwater drilling. The paper describes not only the base structure, the procedure of testing about the feasibility by COSL, and showed some preliminary conclusions about this new concept. The summary of the paper strongly supports the application of the ABS unit, and points out that COSL will drill the first trial well in South China Sea at the summer of 2007 to prove the feasibility. If the trial well has been succeeded the ABS unit will be used in the explored well in the end of 2007 or primary of 2008.

KEY WORDS: ABS unit, deep water, model test, feasibility, the maximum loading forces

INTRODUCTION

China has been producing and importing lots of oil/gas every year to satisfy the domestic consumption. The big oil companies and service companies have found out more ways to explore new oilfields both offshore and onshore, to increase the production of oil and gas. A deepwater gas field was discovered in Liwan, deeper up to 1470 m in South China Sea by both CNOOC and Husky Co. in the summer of 2006. Big or gas fields are discovered in the areas of deepwater in China, especially South China Sea.

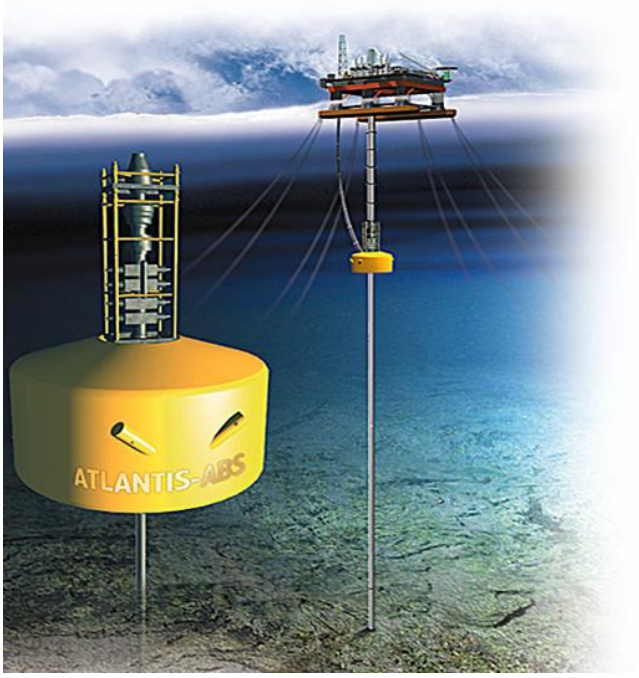

Fig. 1 Principle of concept of ABS

There are many difficulties in entering the deepwater oilfield in China. One of them is short of deepwater platforms or ships. As the biggest service companies of the petroleum industry in China, COSL (China oilfield services Ltd.) have only three semi submersibles which could operate in maximum water depth of 475 m. However, the water depth in Liwan gas field is 1470 m.

To drill in the deepwaters, a new platform of COSL, the sixth generation drilling rig, was in construction in 2006. COSL selected two ways to step to deepwaters. One is to build a deepwater semi submersible in cooperation with other company, the other is to modify and add some equipments to existing semi submersibles to become the deepwater drilling rigs. It needs long time for fabricating the platform