Low Motion Floating Production Storage Offloading (LM-FPSO): Evolution of Offloading Production Systems

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1 Introduction

Oil & Gas industries have moved in ***deeper***, ***more remote*** and ***technically demanding regions*** in the last 30 years. With increasing technical complexity of the extraction facility, the fixed cost of the Oil & Gas upstream complex also increases, but in the persistent lower-for-longer price environment there is continuing pressure to develop these fields safely while reducing CAPEX and OPEX costs.

FPSO technology seems to be promising in offering a flexible solution to explore remote Oil fields while in maintaining competitive costs. Nonetheless, Semisubmersible units, SPAR platforms and tension-leg platforms (TLPs) are also common in deepwater regions. TLPs, in particular, find application in up to 1,500m-deep water wells, but FPSO has the advantage to offer the required onboard storage capacity and offloading capability without employing a separate storage vessel or

infrastructure.

The ***high dynamic motion***, generated by the rough sea condition to which FPSO units are exposed when operating in remote sea areas, makes the ***Riser System*** design more challenging. In fact, it plays a fundamental rule in determining the feasibility of the extraction of hydrocarbons exploiting remote region resources. Thus, the development of a ***low-motion FPSO*** enables the utilization of conventional riser systems (such as *steel catenary risers* and *top-tensioned risers*). The use of conventional riser technologies, is also able to improve the life-cycle and reliability of a FPSO facility: the realization of a simple and effective installation (by the means of an additional facility structure) that is able to ***oppose*** to the high dynamic forces that rough sea environment exerts on the floating structure, is a technological step change, needed to open up less accessible or economically cost-prohibitive fields.