Integrity Assessment and Redeployment of Existing Mobile Offshore Production Unit for a Marginal Field Development

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ABSTRACT

Redeployment of existing idle or close to end of lease mobile production units can provide a viable option to address financial and delivery time challenges for development of marginal field or revitalisation of the end of life for production assets. The deployment of an existing MOPU readily meets these requirements with a potentially faster upgrade, integrity assessment and modification project timetable as opposed to conventional new build Facility. It also typically will have a simpler installation procedure and minimal abandonment costs. There are examples of this type project being delivered from formal project kick off to production in less than a year.

The challenges for this type of project are managing the technical aspects of integrity assessment and modification of topside layout, fast track delivery of either new or refurbished long lead equipment packages and structural integrity and refurbishment of the existing unit to a site specific fixed structure under a specific class notation. The requirements for the site specific structure are location dependent and may include environmental and geotechnical conditions that the original MODU structure and initial conversion to MOPU was not intended to operate in.

This paper provides an overview of the challenges and discusses various aspects of a redeployment project represented risk to the integrity of a facility and the required inspection and repair and verification requirements for assessment and maintaining the facility integrity. This paper also provides an overall view in using the inspection and site specific characteristic data for calibrations/validations of the original design and then initial conversion to maintain the safety level as ALARP. Integrity assessment, application and cost benefits assessments of a deployment project of an existing MOPU is presented for a gas export project marginal field development.

KEY WORDS: Re-deployment; Mobile Oil Production Unit; Marginal Field; Fast Track; Integrity Assessment, Structural Integrity

INTRODUCTION

Since 1960, mobile offshore units have been operational mainly for the offshore oil and gas industry and specifically as Mobile Drilling Units (MODU). A wide variety of proven technology and design techniques has been applied for these units to be operational in the dynamic environment of open seas and deep waters. In the last 50 years, many concepts developed for converting MODUs to self-installing and reusable production jack-ups or MOPU’s. All are based upon the proven jack-up and topsides design technologies available within the oil and gas drilling industry.

For many years, but especially in more recent years, mobile production units have proven to be capable of providing flexible and cost effective solutions for the development of oil and gas fields around the world. In more shallow waters, converted older jack-ups have been used to provide fast track and cost-effective mobile production units (MOPU’s) Because that shallow water marginal field development demands a cost effective solution with expedient delivery and commissioning of production assets in order that field development plans and concession development obligations are met.

MOPU developments have allowed fast track development to be achieved with a range of financial and operational leasing options. Also important is the fact that the MOPU can be installed and removed without the need for expensive installation vessels.

Most of the MOPU’s in service in SE Asian are retired MODU’s which had become available due to the consolidation of the offshore drilling companies and the rapid construction of new replacement MODU’s. These units were potentially available at a cost slightly above scrap value. There were also special cases in remote locations where a self-erecting facility is important as it avoids the requirement of mobilising a high cost installation barge. Origin’s Yolla facility in Bass Strait, Australia is an example of a new Build MOPU installed in a very remote location.

MOPU’s are sometimes also used as Early Production facilities.