

CASE STUDY

MPD SYSTEM CLASSIFICATION: ADVANCING DEEPWATER DRILLING

MPD SYSTEM CLASSIFICATION

Over the past decade, managed pressure drilling (MPD) techniques have gained wider acceptance for deepwater applications. The extension of MPD to deepwater applications has left many operators with questions about reliability, barriers, riser gas management (RGM) and general pressure protection issues.

As a leading class society, ABS developed the *ABS Guide for Classification and Certification of Managed Pressure Drilling Systems* (ABS MPD Guide) that includes the latest safety standards applicable to MPD systems. The guide's framework for standardization of the equipment, distinctive rig-up challenges, and operation of MPD packages for floating drilling rigs, arose from extensive offshore integration experience and consultation with MPD equipment providers and regulatory agencies.

Class notations and certification for MPD drilling systems provides offshore operators and regulators an increased level of confidence in the safety and integrity of the systems commissioned for drilling challenging wells.

SEADRILL WEST CAPRICORN - THE HEART OF SUCCESS

Seadrill turned to ABS for guidance on obtaining the ABS MPD™ class notation for *West Capricorn*, a 6th generation ultra-deep water semi-submersible. Seadrill's *West Capricorn* features an advanced MPD control system that includes a series of tools and technologies to improve safety and operational capability. Pressure control valves protect the wellbore from unintended high pressure that



can lead to fracturing, and a combined integrated choke/valve control system allows easier control, access and visualization for those present onboard and remotely. The classification process involved a joint effort by the MPD equipment provider, drilling contractor and ABS.

The MPD provider, drilling contractor and ABS jointly applied the risk assessment methodologies to identify and manage hazards. Once the risks were identified, the equipment provider mitigated risk to an acceptable level where the primary barrier control for the well is at least as effective as, or better than conventional well drilling practices.

THE ABS SOLUTION - FOCUS ON THE RIGHT QUESTIONS

The ABS MPD Guide addresses several significant challenges such as mechanical integrity, reliability and safety aspects. In addition, the integration of an MPD package on a mobile offshore drilling unit (MODU) designed with a conventional open-to-atmosphere circulating system requires a fail-safe system with full redundancy.

The ABS MPD Guide also addresses the temporary and permanent conversion of rigs from conventional drilling equipment to pressure control systems suitable for MPD. The MPD installation on *West Capricorn* is a permanent installation and had multiple levels of safety assessment performed including: hazard identification (HAZID); hazard and operability analysis (HAZOP); and failure mode, effects and criticality analysis (FMECA).

THE ABS VALUE - PROVIDE INSIGHT FOR IMPROVING SAFETY

ABS conducted an assessment of the equipment and processes using the *ABS Guide for Classification and*

Certification of Managed Pressure Drilling Systems. As a result, Seadrill's *West Capricorn* is the first Column Stabilized Drilling Unit to receive the ABS MPD™ notation complete with the Maltese Cross, which denotes survey attendance throughout the process, from vendor fabrication to on-board installation.

The system has redundancy in the form of PRV's, PCV's and electrical chokes. The mass flow meters on each mud-pump and on flow-out measures both density and volume of flow in and flow out. The

system can handle both high and low flow rates with use of 6" and 3" electric chokes.

THE ABS VALUE - A TRUSTED ADVISOR

Currently, Seadrill is in the process of attaining ABS MPD™ notation on two additional drillships as per the ABS MPD Guide. ABS acts as a trusted advisor in a joint effort with Seadrill and the MPD provider to further explore how new safety standards can be adopted by industry stakeholders to improve overall system safety.



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