

Title: **Retrofit and Design of a DP-2 Medium Voltage Protect Relay and Control System**

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Abstract

This paper will discuss results of a major retrofit of electrical protection and generation control systems on the DPS Class 2 Ensco 7500 drilling unit. Originally constructed in 2000, the E7500 has successfully operated around the world; however, upgrades to modern technology for the DP Control and Protection system have increased reliability, and addressed several common cause failure modes. Focusing on more elaborate protective relaying, alarming, and diagnostics the additional changes ensure faster fault clearing and better selectivity to keep more propulsion online. Implementation of these features in the protection/automation system instead of the PMS is a new application of the technology allowed for the desired results in a very short implementation.

Advanced time domain simulation of the power plant also allowed for proving of the protection design. Finally, the future system upgrade considerations that were designed into this system will be discussed along with new applications in marine power plant protection and management.

Index Terms—Offshore vessel, power management system (PMS), common-mode failure, advanced generator protection, exciter, governor, automatic transfer, black start, synchrophasor, automatic synchronizer, real-time digital simulations, data management system (DMS), vessel control and annunciation system.

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