

ODI Connection Technology: Providing Field Proven Deepwater Electrical Interconnect Capabilities for Kizomba A

Known as the world leader in subsea electrical and fiber-optic interconnect technology, Ocean Design, Inc. (ODI) deploys connection systems worldwide for oil and gas, defense, homeland security, oceanographic and research applications.

The Ormond Beach, Florida-based company's wet-mateable connector line includes signal and high-power electrical, fiber-optic and electro-optical products, which are based on patented oil-filled, pressure-balanced technology. These rugged components can be used at any ocean depth and in the harshest environments. ODI's patented and field-proven Nautilus product has been extensively used throughout the Kizomba A Project. Since 1988, over 40,000 Nautilus connectors have been deployed worldwide in a variety of applications. This is evidence of a proven and reliable product range.

Example of Electrical Distribution Unit (EDU)



The Kizomba A project, located in Block 15 offshore Angola, is a major landmark project and is certainly one of the most exciting projects in which the company has been involved during its 15-year history. Kizomba A operator, ExxonMobil along with the co-owners, took on this challenging multi-field development in 4,000 feet of water. Multiple subsea water and gas injections trees, manifolds, a dry production tree TLP and an FPSO are all elements contributing to one of the largest subsea developments to date. ODI was subcontracted by Cameron Offshore Systems to help develop the subsea electrical architec-

ture and provide an innovative suite of components and systems for complete subsea connectivity from the incoming umbilical to the most remote tree.

Cameron's subsea control system consists of 5 electro-hydraulic subsea distribution units that control the 23 trees and 5 manifolds. System connectivity starts at the umbilical termination head where ODI provided all umbilical terminations fitted with Nautilus wet-mateable connectors. From the termination head, pressure-balanced, dielectric oil-filled jumpers fitted with ROV operated Nautilus connectors, known as EFL's (Electrical Flying Leads), are run to the electrical distribution units (EDU's) located on the subsea distribution structure. The EDU is a pressure-balanced, dielectric fluid-filled, modular unit, pictured here. These EDU's have a compact footprint and are easily reconfigured to support multiple modes of operation. This standard footprint EDU can accommodate up to 23 wells and/or distribution units.

As each injection string control system consists of multiplexed dual-redundant power and communication trains, a unique way of dealing with channel pull-down had to be addressed. To prevent a single well from pulling down a whole power and communications channel, ODI developed subsea retrievable fuses to isolate each output channel at the EDU. This addition to the distribution scheme also has an added benefit as the outlet port may be used as a centralized diagnostic port to fault-find electrical problems up and down stream of the EDU.

Dual ROV operated EFL's are run from EDU's to bulkhead connectors mounted to the subsea control modules (SCM's) located on the trees. Stab-plate operated Nautilus connectors mounted in the SCM and its mounting base (SCMMB) are

used to interface the SCM to the tree instrumentation. Each tree-mounted instrument is fitted with a high-pressure Nautilus penetrator, terminated to a pressure-balanced, dielectric fluid-filled hose that terminates at the SCMMB.

ODI manufactured all electrical interconnect assemblies at the Ormond Beach facility in Florida. Before shipment from ODI, each major component assembly undergoes required project quality control measures and full FAT. ODI also helped to manage third-party sensor manufacturers and integrated over 150 such instruments. In total, ODI delivered over 1,000 connectors and over 200 harnesses on this project.

ODI's Field Service technicians were dispatched from ODI's US and UK facilities to Moss, Norway, to terminate the infield and main umbilicals. They were also utilized for required assembly and test programs at site locations.

ODI is pleased to be chosen to participate in this program, allowing the company to showcase its high reliability underwater products and services, and would like to thank ExxonMobil and Cameron Offshore Systems for the opportunity to participate in this milestone project.

ODI advanced technology systems

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