New Communication Technology Advances Deepwater Production Capability

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

The Ormond Beach, Fla.-based company's wet-mateable connectors include signal and high-power electrical, fiber-optic and hybrid electro-optical products, which are based on patented oil-filled, pressure-balanced technology. Companion dry-mate submersible connectors also complement the wet-mate lines. These rugged components can be used at any ocean depth and in the harshest environments. In addition to standard product lines, Ocean Design, Inc. (ODI) prides itself on top-quality custom-engineered solutions for any subsea networking challenge.

The **Canyon Express** project, in the deepwater Gulf of Mexico, is a major landmark project and is probably the most exciting and challenging project in which the company has been involved during its 15-year history. Canyon Express operator TotalFinaElf E&P USA, along with co-owners Marathon, BP, Pioneer Natural Resources and Nippon took on this challenging multi-field development in about 7,200ft (2,196m) of water and used several new and exciting technologies to achieve a successful installation.

ODI was pleased to be chosen to participate in this program, allowing the company to showcase some of its more recent technical developments, like the new 19-way Nautilus electrical connector and revolutionary wet-mate optical and hybrid (optic and electric) connection systems.

The company's range of subsea connectivity solutions was supplied to many of the project's prime contractors, including Kvaerner Oilfield Products (KOP), ISA and Flow Control. The solutions can be found on almost all subsea installed structures and deepwater workover systems across the project's three fields – **Camden Hills, Aconcagua** and **King's Peak** – that make up the Canyon Express development.

ODI's 19-way wet-mate Nautilus remotely operated vehicle and stab-plate connectors were introduced on this project, where they provide electrical power and signal connectivity at the infield subsea umbilical terminations, subsea control modules and choke assemblies. More than 25 pairs of these connectors were supplied.

In 1997, ODI was the first company to develop and install multi-channel wet-mate fiber-optic and hybrid connectors for the subsea oil and gas industry.

The Canyon Express installation is the largest single project using fiber-optic communications. King's Peak uses only fiber-optic communication with a direct, redundant, unrepeated fiber link back to the Williams Canyon Station platform about 40 miles (64 km) away. About one-third of the more than 280 jumper assemblies ODI supplied for Canyon Express include optical fiber. These jumpers distribute the communications from the 22 optical field installable and testable assemblies (FITAs) that breakout the fibers from the main and infield umbilicals through the more than 200 optical wet-mate connectors to the control modules at the many wellhead and manifold locations.

On completion of the optical fiber systems installation, the Canyon Express project team told ODI it was pleasantly surprised by the performance of the optical system, which had been delivered and installed significantly under specification. It also was providing a quality of communication, as measured by the system bit error rate, orders of magnitude lower than previously had been measured on electrical communication systems.

More than 500 pairs of Nautilus and stab-plate electrical connectors and more than 3,000ft (915m) of pressure-balanced oil-filled jumper assemblies were delivered to the Aconcagua and Camden Hills fields.

Taken during site integration testing, this Ocean Design, Inc. technician checks the hybrid connectors installed on a King's Peak subsea junction box (KOP).

The team of 12 field service technicians and their engineering support worked closely with KOP umbilical's engineers and technicians at their Moss facility for about 4 months, while carrying out the installation of more than 50 termination assemblies onto the many main and infield umbilicals. This field installation, the most intensive in ODI history, concluded with final installation work being carried out at the Port Fouchon facility in southern Louisiana.

ODI would like to thank TotalFinaElf E&P USA, BP and Marathon along with the Canyon Express project team for the opportunity to participate in this milestone project.

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