OneSubsea
A Schlumberger Company

Case Study: Subsea Production

Location: Gulf of Mexico, USA

Aligned with United Nations Sustainable Development Goals:
12—Responsible consumption and production,
13—Climate action.

Proprietary Connection System for Subsea Jumpers Cuts Installation Time by 50%, Deepwater Gulf of Mexico

Reduced time spent by support vessel onsite decreases environmental impact

Emissions Reduction:
Reduced CO_2e emissions by 40% or 189 metric tons

Early technical engagement with bp on the Mad Dog Phase 2 project resulted in viable project economics and expedited installation of subsea clamp connection systems, simultaneously reducing greenhouse gas emissions.

Streamline development of subsea production system

bp's Mad Dog Phase 2 project is located in water depths of 4,200 to 7,100 ft [1,280 to 2,164 m] in the Green Canyon area of the Gulf of Mexico. It encompasses 14 oil producers, 7 water injectors, and a new floating production platform with a capacity of up to 140,000 BOE/d. The company wanted to maximize efficiency through an integrated approach to the subsea development and chose Subsea Integration Alliance—which combines the capabilities of OneSubsea® and Subsea 7—to engineer, procure, construct, install, and commission capital-efficient, modular subsea solutions with increased delivery and deployment assurance. One element of this challenge was streamlining the connection of various subsea infrastructure components.

Install innovative tie-in system

The solution proposed was the OCS-V* vertical clamp connection system, part of the Schlumberger Transition Technologies portfolio. Smaller and lighter than conventional technologies, the OCS-V system expedites installation and minimizes operational sequences. It replaces conventional connection systems, which have large, complex, and expensive installation or intervention tooling, elastomer secondary seals, and extensive maintenance and storage requirements. Suitable for 4- to 20-in nominal pipe size (NPS), the OCS-V system features

- compact design and reduced hub-to-hub distance that lower weight and cost
- minimal tie-in tooling, requiring only an ROV-operated torque tool
- ROV fly-to-place tooling that enables use of smaller vessels for installation and intervention operations, hence reducing emissions and energy consumption, and eliminates use of downlines
- proprietary gasket with two metal-to-metal seals, providing both primary and secondary barriers to withstand HPHT conditions and deliver reliable sealing
- backseat-testing capability.

The OCS-V system's inboard receiver structure is mounted to the subsea host structure, and the outboard receiver connector is mounted to the end termination of a rigid or flexible jumper.

Reduced operating time, opex, and environmental impact

OCS-V systems greatly reduced jumper installation time, decreasing opex and HSE risk. Each jumper was landed and locked with just an ROV fly-to-place Class 7 torque tool. Once the jumper was fully landed, each clamp was torqued and locked within 30 min, 50% faster than with a conventional system.

Because a surface vessel was not required onsite to deploy and retrieve the running tools, greenhouse gas emissions were reduced by 13.5 metric tons of CO_2e per jumper—a 40% reduction compared with legacy systems. For the 14 jumpers installed, this amounts to eliminating 189 metric tons of CO_2e. Seven additional jumpers with OCS-V systems are planned for installation.

Subsea jumpers deployed for the Mad Dog Phase 2 project are fitted with an OCS-V clamp connection system (yellow) at each end.

*Mark of Schlumberger

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