

New vessel targets mature offshore fields

Hybrid vessel combines the best of liftboats, jackups and liftbarges.

Greg Salerno, Remedial Offshore

Elevating Support Vessel (ESV) technology provides step-change improvements in vessel reliability and offshore support capabilities, resolving logistical deployment issues that have plagued offshore well servicing for years. By providing an elevated work platform with high deck-load capacity, the proprietary ESV approach makes complex well intervention and/or workovers feasible in a safe operational work environment. Remedial Offshore's innovative concept meets environmental (wind and wave) criteria and is targeted for remedial activities in mature offshore oil and gas fields.

While little of the technology is new, innovation comes in its configuration. The industry understands that jackups are expensive, yet more capable than liftboats, workboats or barges for heavy well intervention. This new concept offers versatile capabilities with an electric workover package (250 t/227 metric ton (mt) derrick), a large open deck (~14,000 ft²/1,300 m²), and an integral high-capacity (308 ton/280 metric ton) pedestal crane mounted on a moveable substructure, Fig. 1.

ESV technology brings a fundamental economic shift in offshore well intervention and remedial work. These self-elevating rig/vessel hybrids improve personnel safety, extend "weather windows" and optimize onboard crane-lift capacity. ESV operations include all manner of well intervention, workovers, sidetracking and abandonment, as well as facility upgrades, brownfield rejuvenation projects and small field developments.

WHAT IS AN ESV?

The hybrid design combines a jackup drilling rig with an ocean-going vessel. The concept is compatible with

advanced well intervention methods and facilitates mature field rejuvenation. Each vessel:

- Is self-propelled (7 knots, DP-1)
- Can transport more than 3,000 tons/2,722 mt variable load
- Carries a high-capacity crane
- Includes an electric 500-kip "doubles" workover rig.

The hybrids are newbuilds, designed and purpose-built for well intervention. They employ advanced marine and rig technologies, such as sonar systems to scan for "can holes" and other subsea hazards, as well as programmable medium-voltage (4,160 v) switchgear to enable space- and weight-saving motors, state-of-the-art pro-

tection and remote communications.

Rich Altman, Remedial's CEO, has in-depth experience with Coiled Tubing (CT), liftboat and well intervention operations with BJ Services, Superior Energy Services and Halliburton. In these roles he encountered disparities between the technology that could be applied onshore vs. offshore due to space, weight and logistical constraints with available vessels or well structures.

CT requires rig-up space and crane capacity. Safely managing a live CT conduit from a floating barge or workboat is problematic. Liftboats have deck space and load-carry limitations, and cannot be scaled up to satisfy environmental demands in international markets. Small well structures limit heavy well intervention work, yet there are marked differences between what can be done for a well on a thru-tubing basis vs. what is possible after production tubing has been pulled.

The new vessel type addresses these issues. Each ESV unit jacks itself up to service the wellhead platform. This simplifies personnel transfers and gives crane operators line-of-sight for improved safety. Elevation also minimizes the effects of sea-state or weather. Including a high-capacity main crane combines a jackup's line-of-sight safety with the heavy-lift capacity of a liftbarge, since a 300-t crane is seldom found on a liftboat or drilling rig.

Open deck space is scarce on jackups, so rigging up third-party equipment can be difficult. The new design maximizes open-deck area, placing the main crane on an elevated, moveable structure to minimize/eliminate obstructions. The large open-deck and below-deck storage speeds rig-up



Fig. 1. The self-propelled ESV hybrid jackup can position itself with DP-1 capability. The onboard moveable pedestal crane can hoist 110–300-ton (100–272 metric ton) loads within a 160-ft (48-m) radius. A workover derrick may be deployed on cantilever or on well-platform beams.

and increases in-field endurance. Also, the below-deck storage of a jackup design is an improvement over a liftboat's hull tanks.

After long deployments, liftboats often leave their spud cans behind at GOM and West Africa locations because they settled too deeply into soft seabed. Minimal well structures often cannot support liftoff rigs and require cantilever-supported rigs. Experiences and limitations like these led to the design of new vessels on a jackup "foundation" with provisions for a workover rig to operate in either liftoff or cantilever-supported modes. Extra-large spud cans (50 ft/15 m diameter) enhance stability in subsea soils.

The new DP-1 rigs do not require tugs or anchor-handling boats. This saves time, simplifying logistics and scheduling. The main onboard crane is not subject to wave action, so lift operations may continue during weather conditions when floating vessels must suspend work. The modular electric workover rig can skid on capping beams or be stationed on a fixed cantilever. Ample, redundant onboard power generation (7.5 MW) supports simultane-

ous well operations and can power entire platforms during construction.

WELL SERVICE FLEXIBILITY

The new vessels enable operators to use best-in-class specialized well services in more efficient ways. Each vessel carries a crew of mariners and its own well operations team, plus customer personnel and third-party contractors. This allows one ESV operation to support a broad range of activities, including:

- Well intervention: coiled tubing, hydraulic workovers, E-line, slick-line, stimulation, cementing, sidetracking or P&A
- Facility upgrades: expanding water-handling and compressor upgrades
- Maintenance: sandblasting, painting, wellhead repair and pneumatic system upgrades
- Construction: platform installation, commissioning/decommissioning, tie-ins, pipeline repairs/pigging/tie-ins and brownfield development.

Insights from Michael Brown, Remedial's VP of engineering, and Altman are the creative forces behind the new design. Brown has been modifying jackup rigs and building cantilevered and/or liftoff drilling derricks for many years.

Together they realized the best way to deploy advanced remedial services and heavy well intervention offshore would be to merge the liftboat concept with the more robust capabilities of a 300-class jackup.

Two ESV units (325-ft/100-m nominal water depth-rated) are under construction in China, one at Yantai Raffles Shipyard Ltd. and another at COSCO (Nantong) Shipyard. Sea trials are scheduled for late summer 2008.

Remedial Offshore, founded in 2006, is based in Limassol, Cyprus, and maintains an engineering and procurement office in Houston, Texas. **WO**

THE AUTHORS



Greg Salerno is Vice President - Corporate Media for Remedial Offshore. He has 25 years' experience in technical and business media and joined Remedial after managing advertising and public relations for BJ Services. He earned his journalism degree from

the University of Missouri and worked as a reporter and trade magazine editor before entering the oilfield services industry.