As seen in the July 2008 issue of E&P

New vessel concept simplifies intervention

Unique combination of proven technologies makes heavy well intervention offshore feasible and more cost-effective.

AUTHORS

Rich Altman, Mike Brown, Greg Salerno, *and* ***Kevin Wilson****; Remedial Offshore*

For wells and platforms in water depths to 325 ft (100 m), heavy well intervention and remedial work soon will be simpler and easier.

A proprietary Elevating Support Vessel (ESV) concept from start-up company Remedial Offshore (Remedial Cyprus PCL) efficiently combines proven technologies from liftboats, derrick barges, jackup rigs, and motor vessels in a single unit. ABS is certifying these unique combination units as "MODU class, where applicable," an indication of their strength and reliability. Designed and purpose-built for well intervention and remedial activities in mature offshore fields, the first-ever ESV unit will enter sea trials in late summer 2008. Two vessels are under construction.

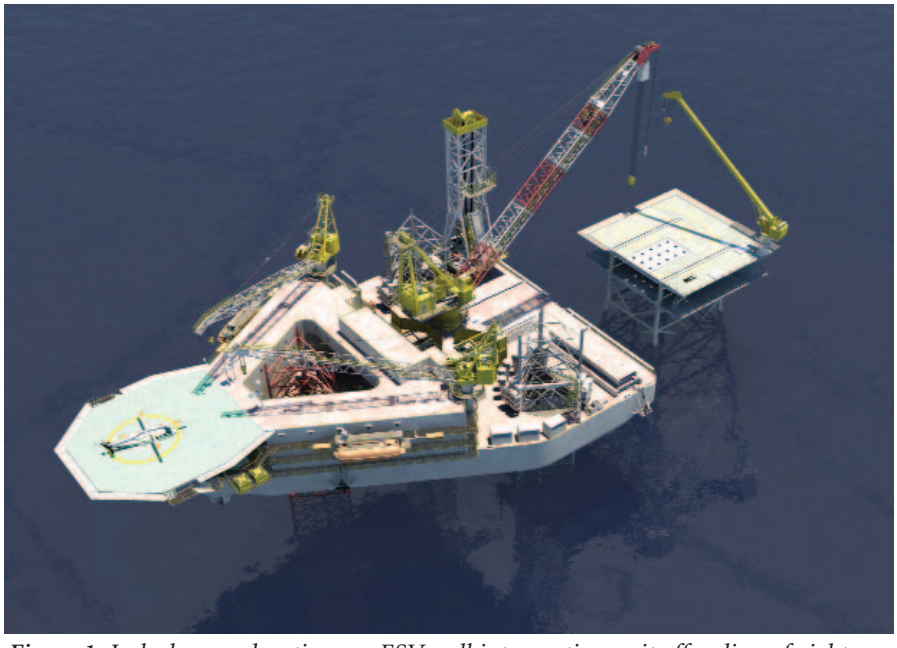

Figure 1. *Jacked-up on location, an ESV well intervention unit offers line-of-sight operations for crane lifts and a stable work platform virtually unaffected by sea states or winds. (Images courtesy of Remedial Offshore)*

Simplified offshore logistics

The ESV concept promises to resolve logistical issues that often stymie offshore well servicing. The ESV approach makes intervention, workovers, and re-completions more feasible by providing a safe operational work environment — a large, elevated work platform with high deck-load capacity (~3,000 tons/2,722 metric tons of variable load). ESV technology also offers significant economic advantages.

Based on a "300 class" jackup rig foundation, ESV units satisfy demanding environmental (wind and wave) criteria. They are built to withstand 54-ft (16-m) waves and 100-knot (115 mph or 185 km/h) winds. Their air-gap alone will reduce weather-related downtime compared to floating barges or boats.

ESV units are unencumbered by large conventional drilling packages, leaving ample open deck space and load capacity for rigging up specialized well servicing equipment, from logging suites to coiled tubing packages. Their leg length, tank volume, and deck area easily outperform the largest liftboats in the world today.

Unlike conventional jackup drilling rigs, ESV units are self-propelled, so they can make in-field moves more easily. To enhance safety during approach and jacking operations, they are DP-1 certified and equipped with multi-band sonar to scan for pipelines, "can holes," and other subsea hazards. They also have four anchors to further ensure safety around a platform. Survey vessels, tug boats, and anchor handlers are unnecessary for an ESV move, so scheduling intervention and workovers is simplified. Logistical efficiency improves in other ways, too, since equipment aboard an ESV-type vessel travels in a near-working configuration and arrives on location with minimal additional rig-up required.

True heavy intervention capability

Many well service technologies routinely applied on land are seldom used offshore due to cost and time hurdles. The foremost cost barrier is the day-rate for a jackup drilling rig — if one were available — because a rig typically is required for "heavy" well intervention. (When a well problem can be solved with wireline alone, it is "light" intervention, and while much can be accomplished via wireline, one cannot pump through it). Drilling rigs are most economical and efficient when used for drilling and well construction, the purposes for which they are designed.

Pulling tubing is an obvious difference between light and heavy intervention,

and pulling tubing is a simple matter for ESV well services teams. Each unit carries a 500-kip workover rig that can be deployed in either lift-off mode or by cantilever, depending on a platform's load capacity. This is a key differentiator for ESV operations compared to working from barges, lift-boats, or work boats and is on par with jackup rigs in terms of intervention capabilities.

Added service options

An ESV unit's open deck space (~14,000 sq ft or ~1,300 sq m), large onboard accommodations (for up to 120 persons) and plentiful electrical power (>8 megawatts) enable concurrent well operations. Multiple service companies can be rigged up and working from this stable platform. Simultaneous multiwell intervention programs can be performed around the clock.

The high-capacity main crane (308 ton/280 metric ton), pedestal-mounted on a skidding substructure, can safely lift heavy equipment like compressors (or other modules) onto well platforms. This may eliminate the need for a derrick barge and leapfrog crane. It also means ESV operations can include facility upgrades, brownfield rejuvenation projects, and small field developments. Two smaller 55-ton/50-metric ton cranes can be used to optimize deck operations and shipments to and from the ESV unit.

Mission endurance

ESV units are based on a "300 class" jackup rig foundation. (The two ESV units under construction modified the Super M2 jackup design under license from Friede & Goldman.) This "designed for drilling" heritage ensures each ESV unit can stay on location as long as necessary.

Extra-large spud cans (50 ft/15 m diameter) minimize settling and enhance stability in subsea soils. Onboard separation systems handle rainwater runoff, sewage, and treating well fluids for discharge or disposal. Water-making units ensure potable water supplies. Programmable medium-voltage (4,160v) switchgear enabled ESV designers to use space- and weight-saving motors and provide state-of-the-art protection and remote communications (troubleshooting) capabilities.

Figure 2. Construction of the first ESV combination rig/vessel well intervention unit continues at Cosco (Nantong) Shipyards.

Air-conditioned hotel facilities can house 80 to 90 third-party contractors or operating company personnel (beyond the ~40-person ESV crew). Facilities include fiber-optic network, offices, conference rooms, private and semi-private staterooms, four-person suites, fitness room, two galleys, and triage clinic.

Fundamental economic shift

The ESV approach offers a fundamental shift in economics for offshore well intervention. These units will be less capital-intensive than a comparable drilling rig, yet much more capable than the largest liftboats.

An ESV operation is altogether more efficient than any method involving floating vessels alone. Some have tried to approximate ESV capabilities with a flotilla of barges, for instance, since barges are perceived as less expensive. But careful analysis reveals hidden costs that quickly translate into ESV benefits. For instance, an ESV unit:

- Provides more work space than multiple barges;
- Moves on its own, without multiple tug boats and anchor handlers;
- Performs its own bottom-scan sweeps before anchoring — eliminating survey vessels;
- Carries its own derrick and blowout preventer (BOP) stack — this may offset the need for a hydraulic workover unit;
- Has rig-grade circulating systems (versus assembling tanks and pumps ad hoc);
- Offers onboard power and lighting, eliminating cost of portable light plants and generators;
- Accommodates 24/7 operations — more productivity, plus personnel on-site, rested and ready to work; and
- Suffers virtually no weather-related downtime — compare with 33% (conservative) downtime due to sea states or wind with floating alternatives.

ESV technology also offers a key "hidden" benefit: standby availability. For example, any operator with sufficient offshore assets can recover the cost of an ESV charter with a handful of successful workovers each year. Better yet, when something shuts in production from an important well, a nearby ESV crew can suspend operations, move to the affected well, and take corrective action. This opportunity to restore production from a key producer in a timely manner can pay for the vessel in a few days. E&P