

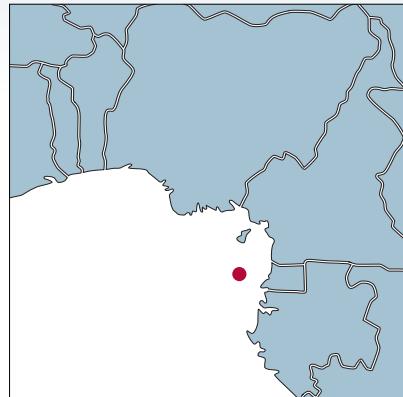
Helix Performance Profile

Well Enhancer West Africa Well Intervention Project



OBJECTIVE

From December 2011 through March 2012, Helix Energy Solutions Group, Inc.'s Helix Well Ops (U.K.) Limited well intervention group successfully carried out a subsea well intervention campaign on multiple wells offshore West Africa, representing the first work of this kind performed in the region from a mono-hull vessel. Completed in the Gulf of Guinea, the project was the first African mobilization for Helix's *Well Enhancer* intervention vessel. The campaign itself represented a first for the business in the region, as the well operations were undertaken in the vessel's deepest water depths to date.



Quick Stats

Operations: Three phase well intervention program

Project duration: 66 days, versus estimated 90 to 100 with MODU

Wells serviced: 7

Project notes: First of its kind for mono-hull vessel in this region

SCOPE OF WORK

The campaign consisted of three distinct phases involving a variety of subsea well operations. The first phase involved installing a deep set plug to isolate the lower wellbore in the first well, Gas Lift Valve (GLV) change-outs in the following two wells, with another deep set plug installed in the fourth and final well of the first phase. Following a mobilization to shore (Malabo, Equatorial Guinea – the only port-of-call during the entire campaign), the *Well Enhancer* transited back to the field to complete the second phase consisting of a conventional horizontal-tree change out. The third and final phase of the campaign consisted of additional GLV change-out operations.

OPERATIONS HIGHLIGHTS

Phase One	
Intervention Requirement	Well integrity and maintenance issues needed to be addressed at four wells
Objectives	Set pre-abandonment plugs and replace GLVs with higher reliability units to secure production
Outcome	<ul style="list-style-type: none"> Completed barrier testing and removed tree cap by ROV Deployed and tested SIL Slickline drifted all wells with memory gauges E-line set permanent bridge plugs to suspend the well and provide a barrier protection to the reservoir Replaced two GLVs with two new GLVs reconfigured for on-going production enhancement
Phase Two	
Intervention Requirement	Existing subsea horizontal tree had become faulty due to wear and tear overtime and raised concerns over reservoir integrity and production performance
Objectives	Change out a horizontal tree with a new one to ensure production and performance level achieved
Outcome	<ul style="list-style-type: none"> Barrier testing completed and removed tree cap by ROV Deployed and tested SIL Drifted memory gauges, set plugs on production and annulus side for barriers prior to tree recovery Retracted flowline and unlocked and recovered subsea tree Installed and tested new subsea tree, removed plugs Installed tree cap by ROV
Phase Three	
Intervention Requirement	Change out GLV configuration in order to support and enhance current production levels
Objectives	Remove GLV sand, reconfigure to suit production and well model
Outcome	<ul style="list-style-type: none"> Barrier testing completed and removed tree cap by ROV Deployed and tested SIL/TRT and conducted light well intervention Drifted well memory gauges Replaced GLVs



EQUIPMENT UTILIZED

Subsea Intervention Lubricator		Third Part Equipment
Maximum Bore Diameter	• 7 ½-in. production bore	Slickline
Maximum Working Pressure (MWP)	• 10,000 psi	E-line winch and logging cab
Maximum Working Depth (MWD)	• 10,000 ft (EH control)	Cement Spread
Surface Equipment	<ul style="list-style-type: none"> • Hydraulic Power Unit (HPU) • Hydraulic Control Panel (HCP) • Flushing Skid • Main Umbilical • Choke Manifold 	Pumping Spread

PROJECT TIME ANALYSIS

Operational Phase	Wireline Runs	Water Depth	Duration	Uptime Percentage
Phase One (4 wells)	42	423 – 1,100 ft	30 days	91.7%
Phase Two (1 well)	7	1,545 ft	23 days	93.8%
Phase Three (2 wells)	20	1,375 ft	14 days	99.9%

CONCLUSION

The success of the West African well intervention campaign was in part due to over a year of extensive planning and collaboration between all the involved parties. A dedicated Helix Well Ops (U.K.) engineer from Aberdeen, Scotland, Neil Greig, was relocated to Houston in the early phases of the campaign design in order to work directly with the operator's team. As well as the project planning phase, the logistical requirements of both the vessel and personnel were a key feature in the front-end planning phase, in order for this to be a success for all parties. Having a Helix Well Ops (U.K.) engineer on the ground in Houston provided the client with familiarity of the operational processes involved with a multi-well campaign.

Helix Well Ops (U.K.) also had on the ground engineering support for the client in Malabo in the build-up to the campaign, throughout and following the completion of the campaign. The campaign close-out occurred in both Equatorial Guinea and Scotland.

Based on previous experiences with well intervention in the region and with a mobile-offshore drilling unit (MODU), the client estimated the campaign would take 90 to 100 days to complete.

The campaign's in-field operational time across the seven well campaigns totaled 66 days. Additional cost savings were a result of the *Well Enhancer*'s self-sufficiency as no support vessels nor anchor handlers were required to be contracted and the vessel required significantly less logistical support than typically associated with a MODU.

The *Well Enhancer* completed the multi-service campaign in its deepest water depth of 1,545 fsw (471 m) to date.





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