

Droshky #4 Plug and Abandonment

Well Ops - Q5000



The **Droshky #4 Plug and Abandonment** which Helix performed as our schedule permitted, allowed Helix to increase asset utilization with the **Q5000** between already scheduled projects.



Project Overview

In January 2019, Helix Energy Solutions acquired the Droshky Prospect on Green Canyon Block 244, along with related infrastructure from Marathon Oil Corporation. As part of the transaction, Helix performed the required plug and abandonment operations through Deepwater Abandonment Alternatives (DAA). DAA enables Helix to own, operate and abandon satellite wells and subsea infrastructure that are located in the Gulf of Mexico.

In November 2019, DAA executed a rigless abandonment program on Droshky #4 including the following scopes of work:

- decommission the well in compliance with CFR 30 Part 250 Subpart Q, meeting the applicable requirements,
- isolate the current completion/perforation intervals as necessary,
- recover subsea tree, flowline jumper and tubing hanger to surface,
- isolate any annular space that communicates with open hole and extends to the mud line,
- abandon the well with wellhead and all casings “in place” above the mudline, due to the water depth being greater than 800 meters.



Experience

Performing abandonment campaign in Hurricane season required thorough planning, with regards to coming up with multiple solutions to various hurdles we could encounter at different stages in the project. Onshore testing of the perforating system gave us a good understanding of what we could expect during the actual runs in the well.



Innovation

Following the best practices time after time and executing the recurring activity better each time, is nothing short of a new method.



Value

Performed P&A under budget meeting the regulations as necessary. Increased asset utilization by filling the gap in the schedule.

About the Q5000

The Helix Q5000 DP3 Well Intervention Vessel is a second-generation design based on the successful Q4000 MODU. This multi-service vessel provides a stable platform for a wide variety of tasks, including subsea well intervention, field and well decommissioning, installation and recovery of subsea equipment, well testing as well as subsea construction activities.

The Q5000 features a 750 (ST) tower capable of fulfilling all traditional derrick roles, plus a deepwater crane with lifting capacity to 440 ST and a work crane rated to 176 ST.

The Q5000 includes a 81-ft x 26-ft moon pool and 23-ft x 22-ft mechanized fully opening rig floor door, a 7-3/8" intervention riser system, two 10,000 ft heavy-weather ROV systems and an overall VDL of 4,000 mT. The open deck space allows for quick and efficient loading and offloading of project supplies and equipment in a single lift.

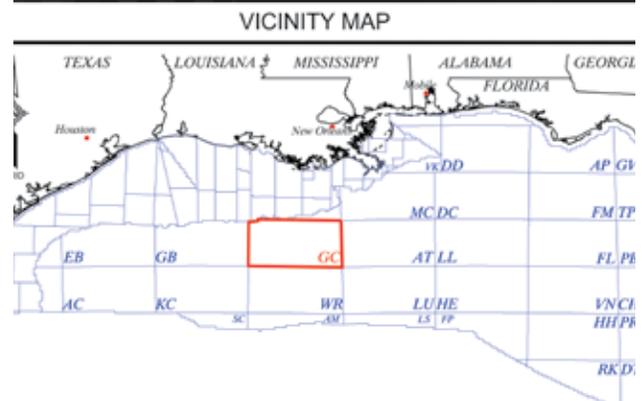
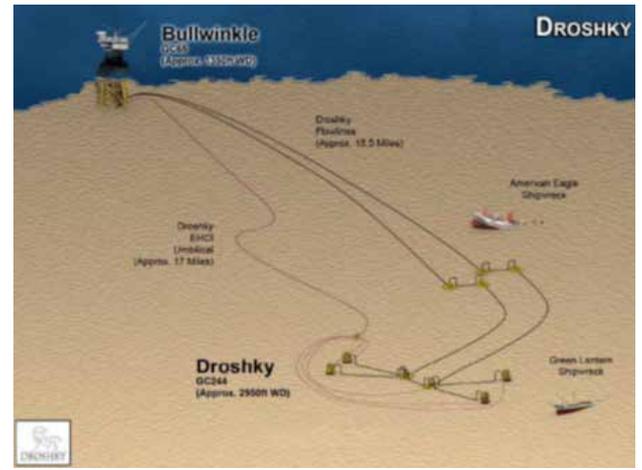
The larger moon pool will allow the Q5000 to keep its intervention riser system (IRS) in the water at well depth while moving aside to let drill pipe or other equipment be lowered to the same well for another task. This ability to keep the IRS in the water while performing separate operations on the same location will save hours and enhance the vessel's overall efficiency.

Well History

Droshky GC 244 #4 was drilled in 2009 and placed on production as a subsea producer in July 2010. In July 2013, the well experienced an anomalous flow event in which the total flow rate increased suddenly. Downhole pressure readings indicated that a slug of heavy brine or sand-rich fluid had entered the wellbore. Following this flow event, the well was shut in and secured.

In June 2015, an attempt was made to return the well to production. Flow operations were aborted, and the well was again shut in the well for about 4 hours over a period of three days. Flow was erratic, and there were indications of sand production and flow cutting of the production choke on the tree. Slugs of sand were observed at the host platform.

In December 2015, several unsuccessful attempts were made to conduct the semi-annual SCSSV test. Leakage exceeding the allowable rate was observed upon each attempt to test the valve, indicating that the



Environmental Conditions	
Hurricane Season	
Water Depth	2,953'
Water Temperature at Surface	93°F
Water Temperature at Seabed	43°F
BHP	13,928 psi
Mudline	8,991 psi
Surface/Q4000	8,105 psi

Breakdown of Project Timeline					
Q5000-Droshky #4 Activity	Planned* in Days	Actual in Days	Savings in Days	NPT in Days	Comments
Mobilization, landing, latching & testing IRS	6.88	8.1		-0.44	All 3rd party services to be mobbed, installed & tested. First time hanging off IRS on Q5K. Pulled ITC w/IRS hung-off.
Lower Abandonment	14.62	19.5		-4.88	Unplanned run-wellbore issue not expected. Hard sand section encounter.
Redeployment landing, latching & testing IRS for Upper Abandonment	3.65	4.95		-1.30	Review deploying wireline over the side like the Q4K. WOW.
Upper Abandonment	6.4	5.9	0.5	-0.88	WOW
Demobilization	3.2	1.3	2.0	0.0	
			2.5	-7.5	
Total	34.75	39.75	**Planned Time is P10, doesn't account for contingency time		

SCSSV flapper is not fully closing or sealing. Prior to attempting the SCSSV test, successful tests of the USV (designated as the tree production wing valve, PWV) and the flowline isolation valve (FLIV) were obtained, with successful inspection records filed as appropriate.

In April 2016, Marathon submitted, and BSEE approved, a plan to remediate the failed SCSSV by mobilizing the Helix Q4000 intervention vessel and installing a pump-through plug.

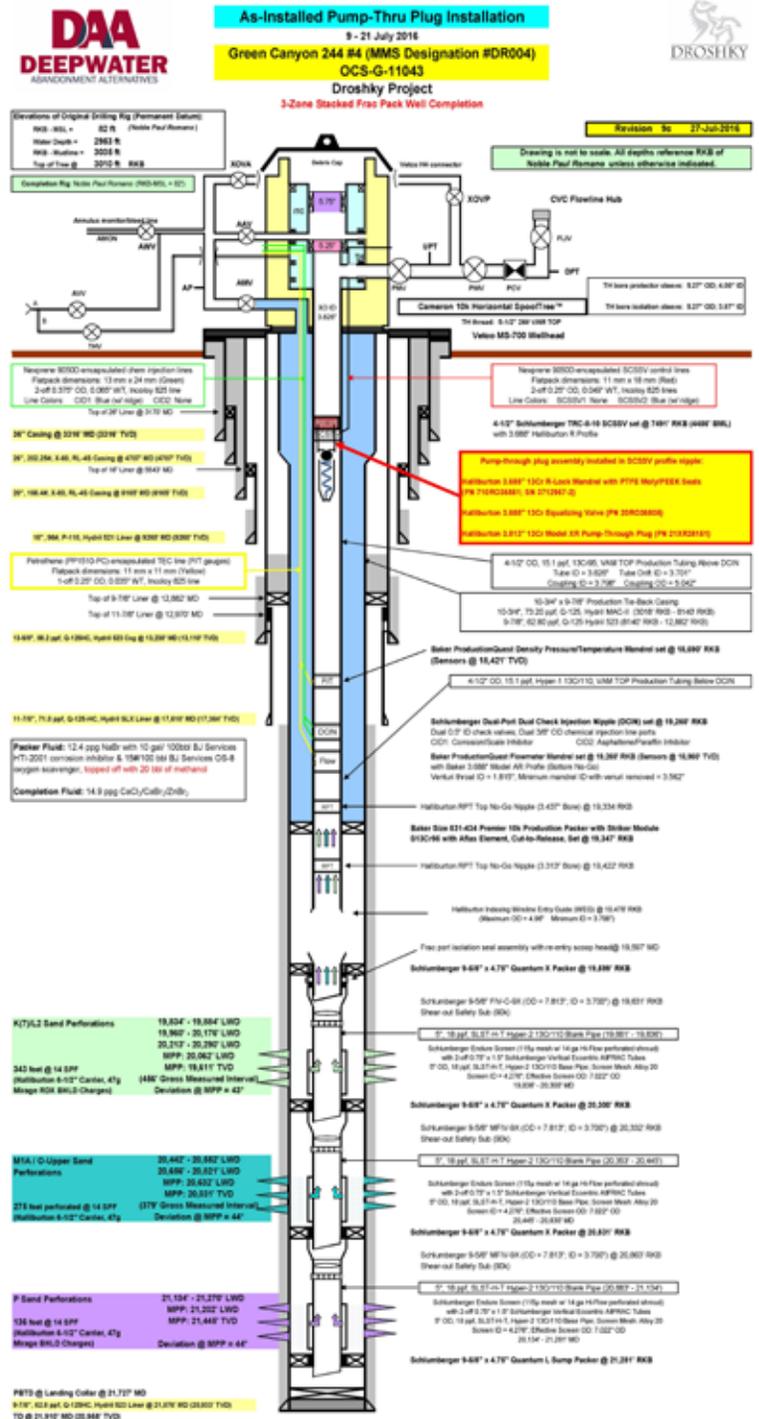
In July 2016, through-tubing intervention was performed to clean out fill in the production tubing down to the depth of the SCSSV and a pump-through plug was installed in the SCSSV nipple.

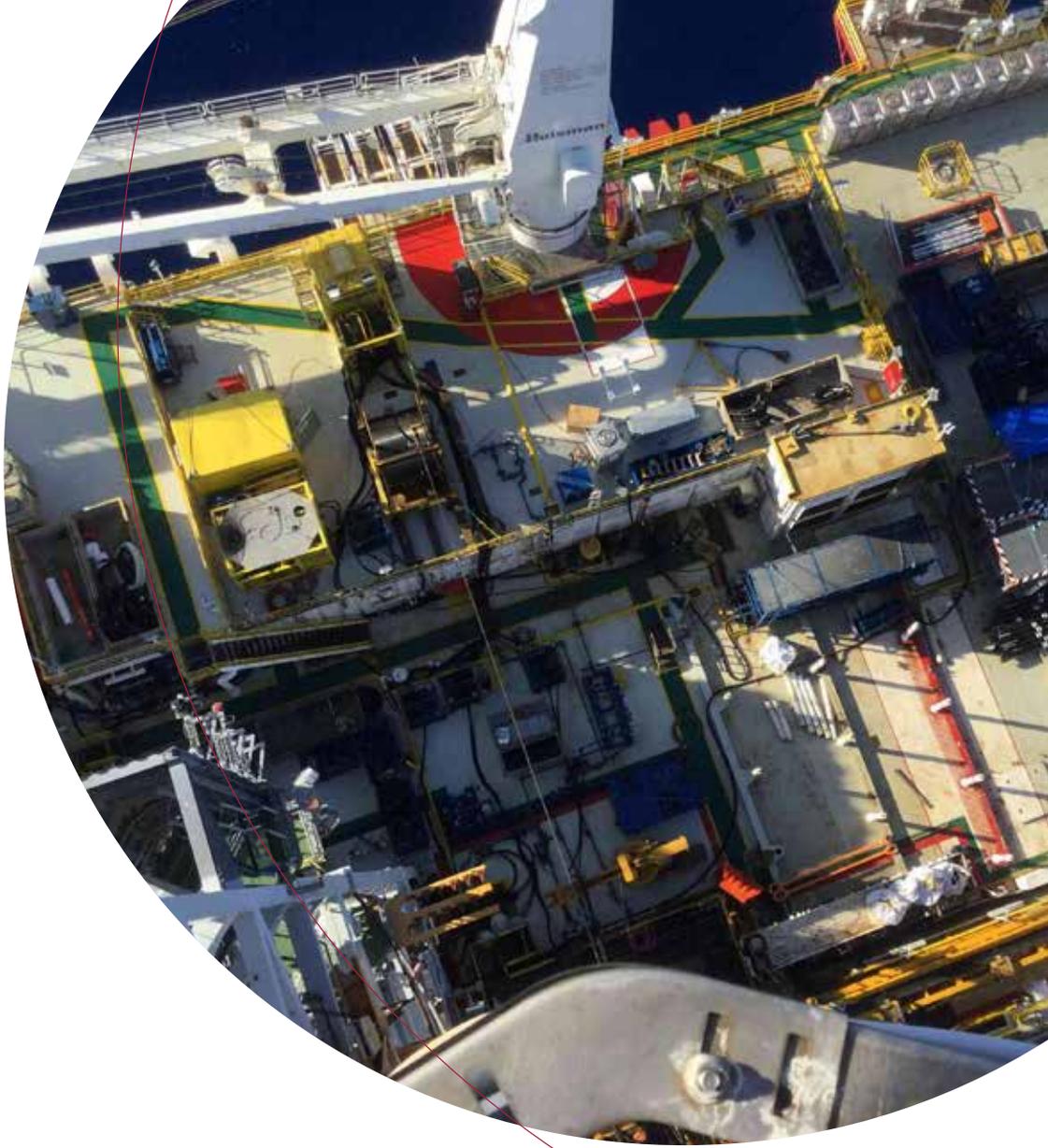
Following the wellbore intervention, In July 15, 2016 in preparation of replacement of the subsea choke insert, the DR004 subsea tree was flushed with 11.4 ppg CaCl₂ brine. To potentially facilitate removal of the jumper during future subsea infrastructure decommissioning operations, the tree to flowline jumper was also flushed with 6 bbl. of 11.4 ppg CaCl₂ brine (~2 times the jumper volume). The failed production choke insert on the subsea tree was replaced with a new insert to facilitate future testing of the pump-through plug.

Marathon had kept the well shut in since 2016 with the intent to abandon it when the Droschky field would deplete. DAA requested permission from BSEE to abandon DR004 in Q3 2019. DAA accelerated the abandonment operation as a prudent step towards insuring that the wellbore was made safe in November 2019.

Conclusion:

- Zero LTI
- Successfully abandoned deepwater high pressure oil well with original BHP 13,928 psi.
- Project completed in Hurricane Season.
- Reduction in NPT by 4 days compared to Droschky#5.
- Project completed under budgeted AFE.
- End of Well Report approved from BSEE. Bond release requisition sent to BOEM.
- Concurrently changed out SCM on Droschky # 2 well.
- The Helix-Schlumberger subsea services alliance and other vendors like Oil States International, TAM international & J Connor Consulting played a major role in making the project cost effective and improve efficiency.





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