

Beaufort Sea Island Extended-Reach Well Completed 24 Days Ahead of Planned AFE Saving USD 8.4 Million

Implementation of Extended-Reach Drilling Practices and Field Drilling Supervisors

CHALLENGE

Drilling optimization in extended-reach well with the use of Managed Pressure Drilling (MPD) and under-reamed hole sections.

SOLUTION

Use of onsite extended-reach drilling specialists to monitor and provide optimization techniques via the use of ERDPro® drilling optimization software.

RESULTS

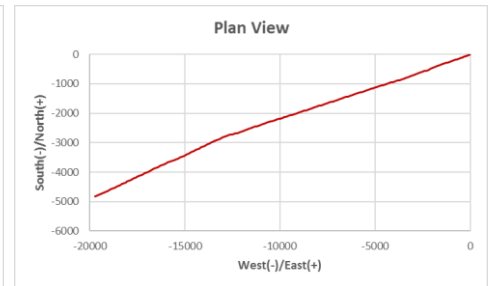
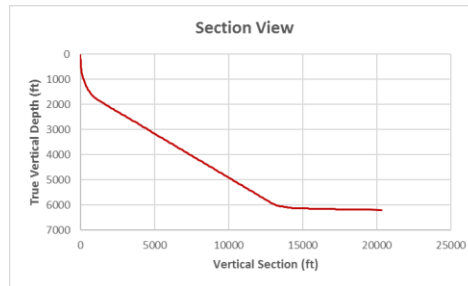
Completed the well 24 days ahead of schedule saving the operator USD 8.4 Million.



Drilling optimization in complex extended-reach well

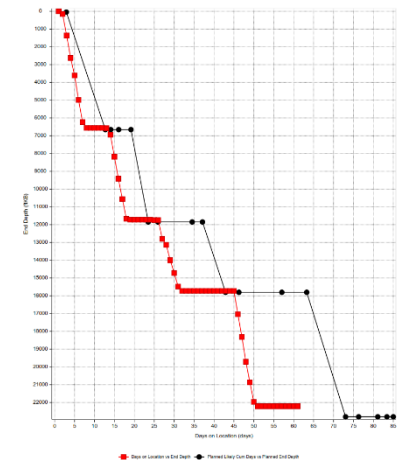
This island project is in the near-shore of Alaska’s Beaufort Sea and consists of a 6-acre man made gravel island drill site approximately 5 mi (8 km) offshore in 4.5 ft (1.4 m) of water. The drill site consists of 48 extended-reach wells on 7 ft (2.1 m) centers.

This well in particular was drilled to a total measured depth of 22,208 ft (6,769 m) at a true vertical depth of 6,167 ft (1,880 m) with a horizontal section of 6,509 ft (1984 m) equating to a 3.6 ERD ratio.



Bit hydraulics optimization

As with most pad drilling scenarios drilling on tight center-to-center spacing’s, 7 ft (2.1 m) in this case, anti-collision is always a concern. On Alaska’s North Slope this problem is made worse by the thawing and unconsolidated nature of the permafrost. Maintaining directional control and build rates in the surface section is paramount to successfully executing these wells. This had been a major challenge throughout the development. Additionally, Non Productive Time (NPT) in the surface section was mounting in attempts to maintain control and as a result, keeping the bit on bottom was an issue. In review of offset wells and attention to detail at the rig site it was determined that excessive washout at the bit was hindering directional control. Through the use of HXR’s software ERDPro® the bit hydraulics were optimized by increasing the Total Flow Area (TFA) reducing the Jet Impact Force (JIF) while maintaining enough bit hydraulic horsepower (HSI) to effectively clean the bit resulting in a substantial increase in ROP, finishing the section 5 days ahead of schedule.



Flat time optimization

True optimization is often realized when the bit is not on bottom. Tripping while coming off bottom or while running casing is a major source of NPT for most operations. By monitoring drilling parameters on the rig floor, adhering to tripping roadmaps and training drillers in proper drilling practices HXR’s Field Drilling Specialists were able to successfully get out of the hole trouble free saving the operator 15 days. Additionally, through the use of ERDPro®’s advanced surge/swab hydraulics modeling capabilities, casing and liner run trip speeds were increased significantly further reducing time and cost.

Wellbore stability, casing point optimization and MPD utilization

The operator in this case had traditionally tried to push their intermediate 1 hole section deeper to put a particularly troublesome turbidite formation behind pipe. The typical method of remediation included increasing back pressure with the MPD system to minimize borehole breakout. Casing runs in this section were not successful and usually resulted in poor cement jobs. HXR's Field Drilling Specialists were able to correctly identify the presence of tabular cavings seen at the shakers as a form of wellbore instability due to the presence of preexisting planes of weakness typically associated with turbidites. From HXR's contribution, the intermediate 1 casing seat was moved further up the hole allowing for successful casing runs and successful cement jobs.

From offset well analysis it was determined that not only were we able to successfully modify the casing point selection of the intermediate 1 hole section but MPD utilization was able to be minimized in the following intermediate 2 hole section.

Through careful inspection at the rig site HXR's Field Drilling Specialists were able to show that the early section of the wellbore transiting the turbidite formation was able to be drilled without the use of MPD. By reducing the need for MPD the section was able to be drilled **4 days** ahead of plan.

HXR's Field Drilling Specialists trim 24 Days saving USD 8.4 Million

Through the use of HXR's drilling optimization software **ERDPro®** and Field Drilling Specialists, HXR was able to save this operator 24 days equating to USD 8.4 Million in cost savings. More importantly, the optimizations realized on this well will be implemented on future wells providing substantial time and cost savings for the project on the whole.

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