

Pelles A-71: Exploring in the Deepwater Flemish Pass Basin

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Summary

The Pelles A-71 Exploration well was drilled in the Flemish Pass Basin, offshore Newfoundland by CNOOC in 2021. The well targeted the Lower Cretaceous reservoir play in a large 3-way structural closure overlying the proven Upper Jurassic source rock interval in a generative kitchen. The high amplitude reservoir package had a seismic response supporting high quality sands and possible indications of hydrocarbon response. The well penetrated the primary Pelles Sands and secondary Castle Hill Sands and encountered wet reservoirs in both intervals.

The post well analysis of Pelles A-71 and subsequent relinquishment of the EL 1144 licence in 2022 marked the end of the current phase of continuous exploration efforts by CNOOC spanning nearly 10 years and numerous evaluation teams.

The presentation will present a brief overview of the exploration campaign in the Flemish Pass basin that ultimately led to the drilling of the Pelles A-71 well.

Licence Entry

A New Ventures regional evaluation of Atlantic Canada concluded in 2015, pursuing frontier-emerging basins along the western margin of the North Atlantic Upper Jurassic source rock trend analogous to proven, prolific basins such as the North Sea and the Jeanne D'Arc basin. The Flemish Pass basin was established as a strategic opportunity based on: proven Jurassic source rock, Upper Jurassic reservoir fairways with upside in Cretaceous and Lower Jurassic reservoir trends, large untested structures. The AVO-supported discoveries at Mizzen O-16 in 2009 and Bay du Nord C-78 (2013) resulted in significant excitement in the exploration potential of the Flemish Pass.

CNOOC high-graded multiple blocks in the C-NLOPB 2015 Call for Bids (CFB) based on regional petroleum systems evaluations and regional mapping based on 2D seismic data. CNOOC was successful in acquiring EL 1144 in the 2015 CFB, and subsequently acquired EL 1150 in the 2016 CFB.

Block Evaluation and Prospectivity

Two multi-client 3D broadband GeoStreamer® surveys were acquired by PGS and processed by TGS over EL 1144 (EFP 3D) and EL 1150 (EFP PH2) in 2016 and 2017, respectively. The EFP survey was merged with the previously acquired SFP Survey to provide full data coverage over EL 1144 with a merged area of 2,344km².

Evaluation of the prospectivity on the 3D seismic data began in 2017 as data arrived in-house. Maturation of prospectivity focused on: source rock interval mapping, reservoir mapping, rock

physics/AVO, and trap geometries (structural/strat). Two trends were established above source rock kitchens based on standalone sized leads: dominantly structurally controlled traps in Upper Cretaceous reservoirs, and a second trend with Lower Cretaceous stratigraphic traps.

The Pelles structure emerged as the leading drill-worthy opportunity as the prospect contained stacked high-amplitude Lower Cretaceous sands with positive AVO in a robust structural trap with a clear path to commercial development. Pelles remained the front-runner prospect when the Stena IceMAX was signed to a rig contract in 2019 with the well planned to be drilled in 2020. The COVID pandemic resulted in a one-year delay of drilling to 2021 and Pelles A-71 was ultimately drilled in 2021 by the sister ship Stena Forth.

Well Results

Pelles A-71 targeted commercial volumes on the eastern flank of the Pelles structure. The well was successfully drilled to target stratigraphic TD with minimal operational issues. The seismic well tie was very good, with a high cross-correlation, supporting the quality of the seismic response data across the Cretaceous prospective section of the well. The well came in ~250m shallower than expected due to slower velocities in a previously undrilled Cretaceous interval. The primary Pelles sands were wet with no shows, with net sand in line with pre-drill estimates, but with more cementing present than anticipated, which affected the overall reservoir quality. Secondary Upper Cretaceous Castle Hill Sands were also wet, with reservoir results in-line with pre-drill expectations of a thinly bedded, variably cemented sandstone.

Post-well Analysis

Post well studies focused on remaining prospectivity on EL 1144 and EL 1150, as well as evaluating the mechanisms for the lack of a discovery at Pelles A-71 location. Studies were commissioned to focus on understanding source and charge into the Pelles structure including structural evolution of the Pelles structure, Rock Physics evaluation, and cementation. Results from some of the studies will be presented.

Conclusions

The Pelles A-71 exploration well campaign provides a snapshot of the evaluation process in deepwater offshore emerging basins. Although many of the geological features expected at Pelles A-71 were in fact encountered, hydrocarbons were unfortunately not discovered in the target reservoirs. Despite the disappointing result, safety first was a top priority and was at the very heart of CNOOC's planning and execution of the Pelles A-71 well. This concerted effort resulted in best-in-class HSE performance with no lost time injuries, Covid-19 cases, or regulatory exceedances during the drilling of the 61-day Pelles well. This operational success was achieved by drawing on the strengths of CNOOC's integrated team using experienced local and international staff while leveraging CNOOC's distinctive competencies and capability.

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References

None Currently - Update as necessary