

Exploring the Tithonian Fluvial Play in the Central Ridge, Offshore Newfoundland and Labrador: The Harp L-42 Case Study

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The Harp L-42 exploration well was drilled by a joint-venture partnership comprising ExxonMobil, Equinor and Suncor on exploration license EL1135 between October 2019 through April 2020 (Figure 1). The well was drilled using the Seadrill West Aquarius semi-submersible rig in ~300 m water depth. The well was planned to take 90 days to reach a maximum TD of 4,852 m measured depth and was designed to evaluate the hydrocarbon-bearing potential of Tithonian fluvial sandstones within the Jeanne d'Arc Formation. The decision to drill the Harp prospect was underpinned by offset discoveries within the Tithonian Play combined with promising reservoir indications from mapping and analysis of 3D seismic acquired in 2015 by PGS (Southern Flemish Pass 3D). Early drilling operations were encumbered by a hard water bottom comprising granitic glacial moraine, which required deployment of a heavy-duty array of anchors to stabilize the rig. The well was permanently plugged and abandoned after 211 days of operations, reaching a depth of 3,829 m MD and experiencing 126 days of weather-related non-productive time (NPT). Excellent quality, water-wet Tithonian fluvial reservoirs were encountered in the primary objective. Operations were significantly impacted by challenging metocean conditions and one of the harshest winter storm seasons in recent years. These challenges precluded the well from evaluating a secondary reservoir target and reaching maximum TD. The absence of retained hydrocarbons is likely caused by seal failure, migration timing or possibly a migration shadow within a heavily faulted structure that has complex juxtaposition relationships. Whilst disappointing, the well results are consistent with the pre-drill risk assessment and are a humbling reminder of the challenges of hydrocarbon exploration. Modeling of the expected reservoir seismic response suggests that subtle Direct Hydrocarbon Indicators (DHI) should be observed in 3D seismic attributes. Unfortunately, DHI detectability at Harp is encumbered by the presence of multiples and relatively poor signal:noise at the target interval that result from an exceptionally hard and indurated seafloor. With improved seismic data quality, the Harp results should be viewed as encouraging for the ability to use quantitative seismic analysis to pursue the Tithonian play in this area.

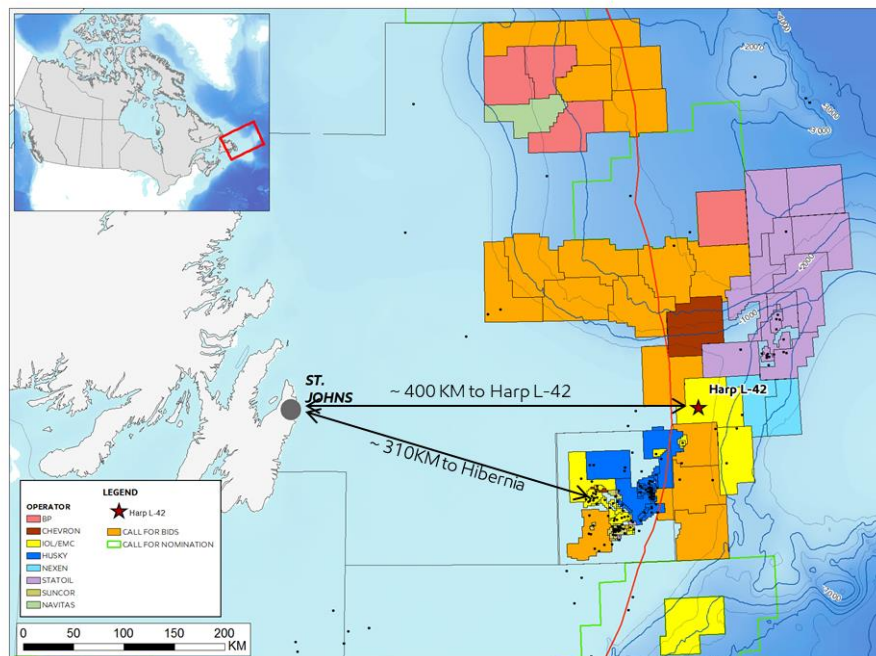


Figure 1: Location of the Harp prospect referenced against 2019 industry acreage positions.