

PL879 Relinquishment Report

Relinquishment of PL879, parts of block 34/8, 34/9, 34/11 and 34/12

AU-EXP NUKE NS-00148

Summary

Reference is made to the letter sent to MPE dated February 10th, 2019 (our reference: AU-EXP NUKE NS-00140) regarding the relinquishment of production license 879 (PL879). This report outlines the key license history, database, prospect and evaluations of PL879 and fulfils the requirement by the NPD for a license status report.

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Reasons for license relinquishment

The Livarot prospect is the main prospects identified in the license, belonging to the mid-Jurassic Brent Group. The Livarot area is structurally complex and HPHT conditions are expected. The reservoir is expected to be marginal with uncertain lateral communication. The chance of success is low due to the high reservoir risk and the structural compartmentalization. Total Pg is 0.2 for the prospect.

2 DATABASE

2.1 Seismic data

PL879 prospect evaluation is based on the newly licensed CGG16001 NVG and CGG18M01 NVG (Pre SDM EFT). The overall seismic quality is good, and the structural image of the target is improved in comparison with the original licence data.

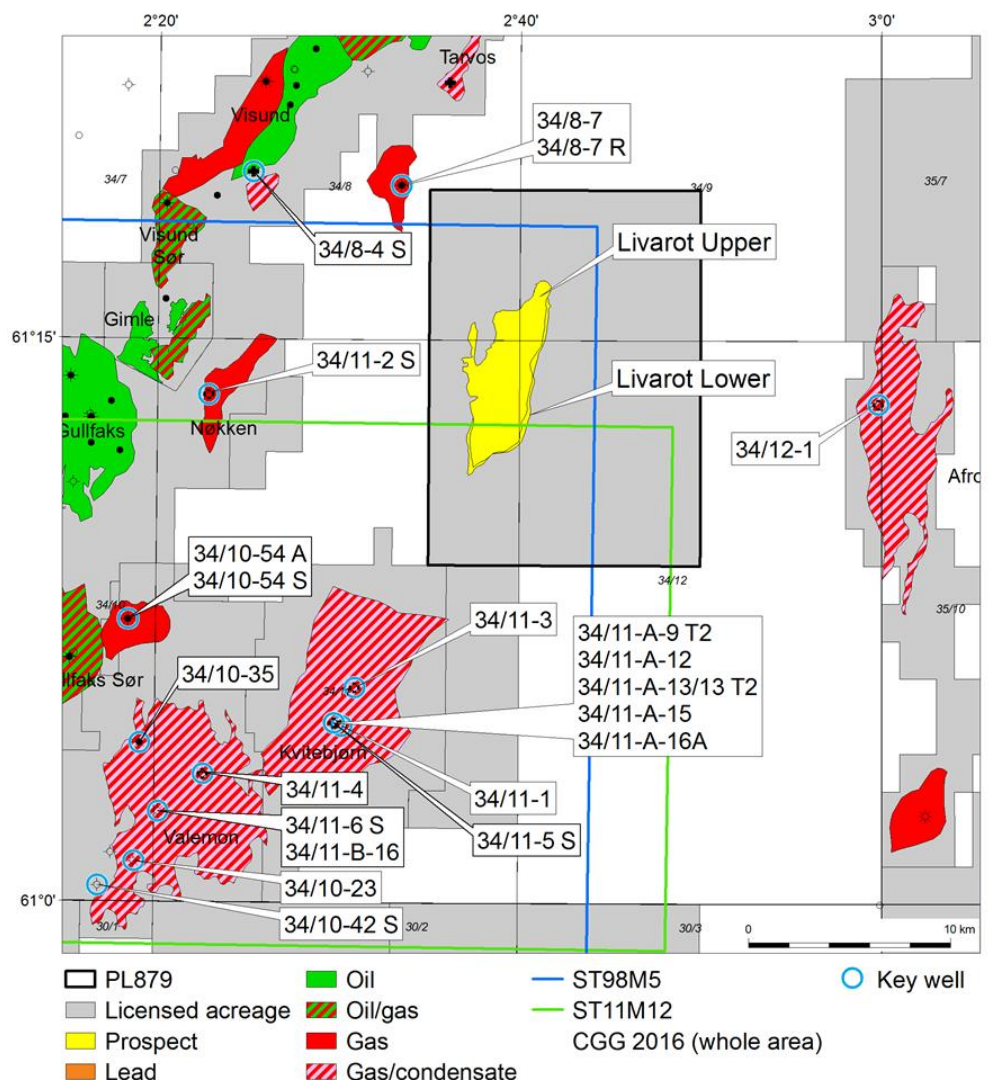


Figure 2.1 – Seismic and well database, PL879. CGG 16001 NVG and CGG18M01 NVG is covering the whole map area.

Table 2.1: List of seismic surveys in the PL879 common database

Seismic survey	Survey type	Processing type	NPDID	NPDID
ST98M5	3D	Pre-STM	ST9607 NVG05	3832 4296
ST11M12	3D	Pre-STM	ST9607 ST9801	3832
CGG 16001 NVG	3D	Pre-STM	CGG16001	8332
CGG17M01 NVG PSTM CGG 18M01 NVG PSDM	3D	Pre-STM Pre-SDM	CGG16001	8332

2.2 Well data

The well database used in the evaluation of PL879 is given in Table 2.2.

Table 2.2 - Well database for PL879

	Year	Drilling operator	Present License/Unit	Status	Age at TD	NPDID
34/8-4 S	1991	Norsk Hydro AS	PL120	Oil/Gas/cond	Late Triassic	1683
34/8-7, 7 R	1992	Norsk Hydro AS	Open	Gas/condensate	Late Triassic	1941
34/10-23	1985	Statoil Petroleum As	Valemon Unit	Gas/condensate	Early Jurassic	476
34/10-35	1992	Statoil Petroleum As	Valemon Unit	Gas/condensate	Early Jurassic	1874
34/10-42 S	1999	Statoil Petroleum As	Valemon Unit	Water	Early Jurassic	3816
34/10-54 S	2014	Statoil Petroleum As	Valemon Unit	Oil/gas/condensa	Early Jurassic	7253
34/10-54 A	2014	Statoil Petroleum As	Valemon Unit	Gas/condensate	Early Jurassic	7254
34/11-6 S (B-11)	2017	Statoil Petroleum As	Valemon Unit	Gas/condensate	Middle Jurassic	8059
34/11-1	1994	Statoil Petroleum As	PL193	Gas/condensate	Late Triassic	2377
34/11-2 S	1996	Statoil Petroleum As	PL193	Gas/condensate	Early Jurassic	2733
34/11-3	1997	Statoil Petroleum As	PL193	Gas/condensate	Early Jurassic	2866
34/11-4	1999	Statoil Petroleum As	Valemon Unit	Gas/condensate	Early Jurassic	3314
34/11-5 S	2006	Statoil Petroleum As	Valemon Unit	Gas/condensate	Early Jurassic	5248
34/11-A-9 T2	2009	Statoil Petroleum As	PL193	Gas/condensate	Early Jurassic	5849
34/11-A-12	2007	Statoil Petroleum As	PL193	Gas/condensate	Early Jurassic	5560
34/11-A-13, -13 T2	2007	Statoil Petroleum As	PL193	Gas/condensate	Early Jurassic	5451
34/11-A-15	2005	Statoil Petroleum As	PL193	Gas/condensate	Early Jurassic	5092
34/11-A-16 A	2015	Statoil Petroleum As	PL193	Gas/condensate	Early Jurassic	7759
34/11-B-16	2017	Statoil Petroleum As	PL193	Gas/condensate	Middle Jurassic	8256
34/12-1	2008	ENI Norge As	PL293	Gas/condensate	Early Jurassic	5684

3 REVIEW OF GEOLOGICAL AND GEOPHYSICAL STUDIES

The following work have been performed since the license was awarded:

- Remapping of key horizons (BCU, Intra Heather inconformity, Top Brent Gp, Top Dunlin Gp. and Top Statfjord) and key faults
- Semi-regional seismic interpretation including the PL879 area
- Updated Depth Conversion
- Updated prospect evaluation and lead evaluation
- Deeply buried reservoir evaluation (evaluation of petrophysical properties in sands buried deeper than 4000 meter)
- Systematic screening of the license

The extended screening work included stratigraphic levels ranging from sea floor to Jurassic.

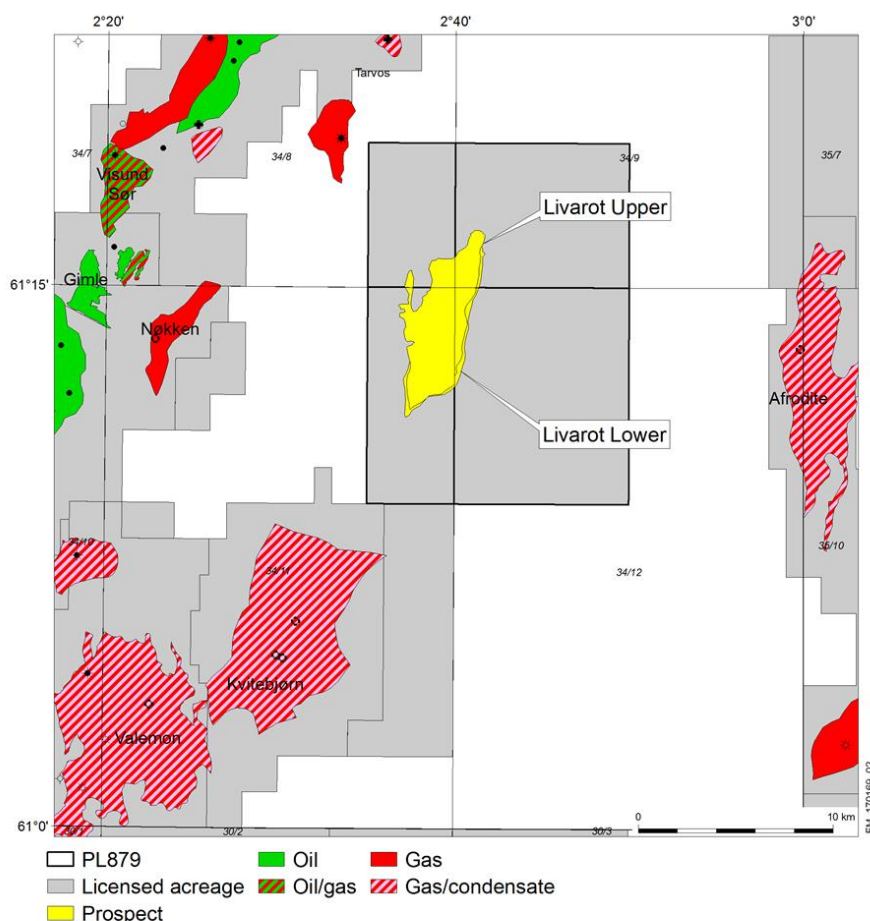


Figure 3.1 – PL879 licence map with evaluated prospects

4 PROSPECT UPDATE

The APA application was based on the Brent Group prospect, Livarot. The PL879 prospect evaluations are based on the CGG 16001 NVG Pre-STM and CGG 18001 NVG Pre-SDM EFT. The interpreted reservoir horizons are tied to exploration well 34/8-7 and 34/11-2 S. The seismic interpretation has good confidence. The mapped hc-potential is in the Brent Group, Livarot prospect. The prospect is a segmented 4-way structural closures, partly deeply eroded by the Intra Heather unconformity. The estimated reservoir depth is covering the interval from 5000 to 5200 m MSL which is approx. 1000m deeper buried than relevant analogue fields. The reservoir is expected to be marginal with uncertain lateral communication. The Livarot source kitchen is comparable to the Kvitebjørn East Flank discovery, and dry gas is expected. The main uncertainty for the prospects is related to reservoir diagenesis, this concerns both the reservoir risk and the reservoir parameters.

Screening of the Cretaceous and Upper Jurassic stratigraphy shows no hydrocarbon potential which can combined with the Livarot prospect. One deep lower Cretaceous lead has been mapped partly inside the PL879. This lead need further maturation and has at present too high risk to defend a drill decision.

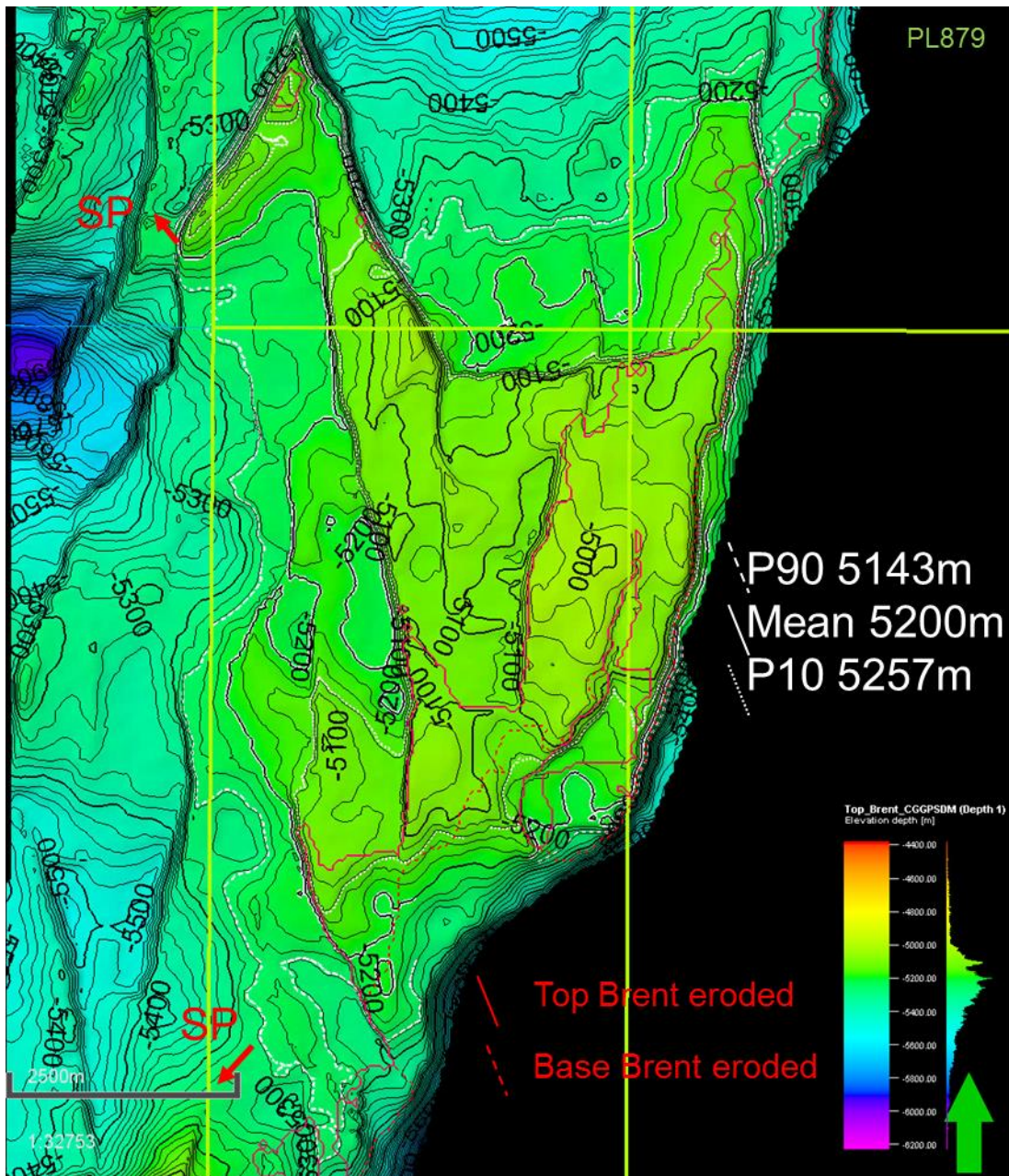


Figure 4.1 – Top Brent structural depth map (CI 20m) showing Livarot GWC outlines in white, and top and base reservoir erosion lines in red. Interpreted on CGG 18001 NVG EFT broadband survey. Mapped spill point indicated by red arrows.

Table 4.1 – PL879 Volume and risk summary

Prospect	Formation Group	Prospect Lead	Mean In-Place mill Sm3 o.e.	Rec mill Sm3 o.e.			Pg	Riskd Rec. mill Sm3 o.e.
				P90	Mean	P10		
Livarot	Brent	P	19.9	2.6	5.9	9.9	0.2	1.2

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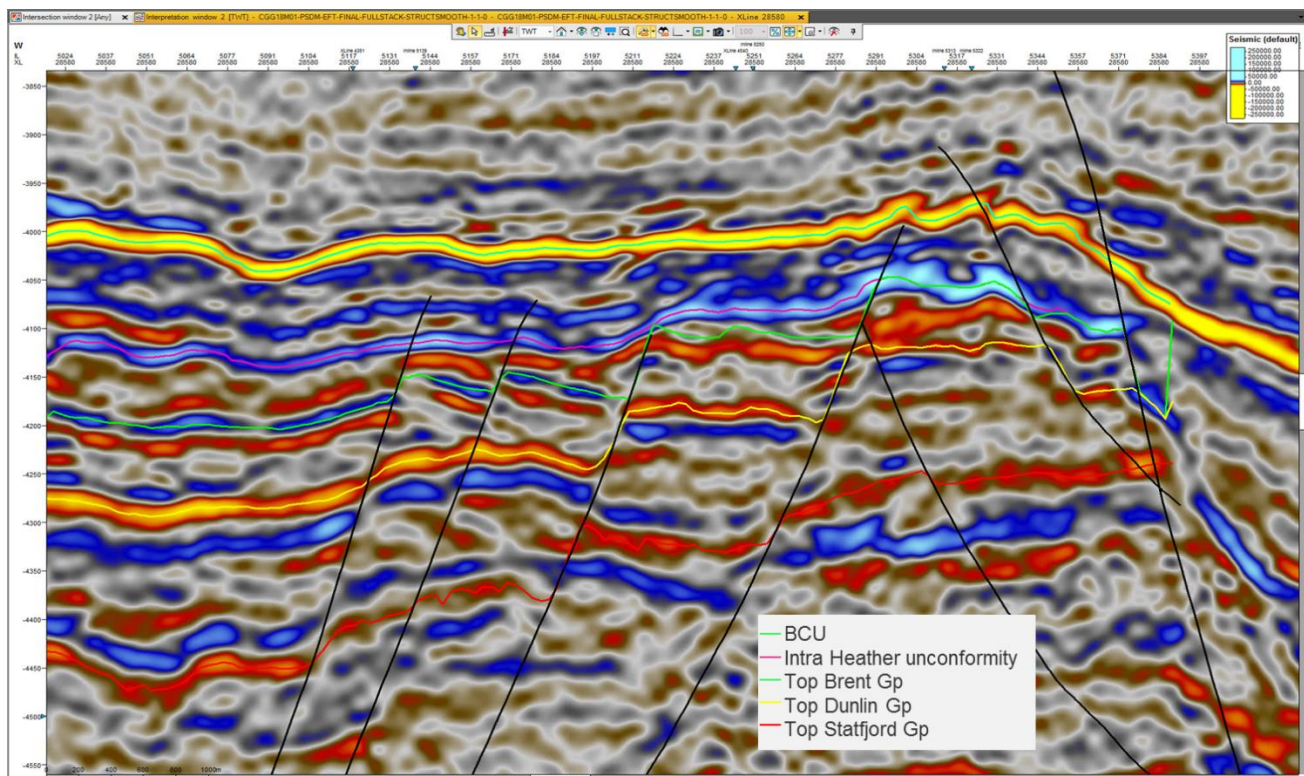


Figure 4.2 – W-E seismic cross section through central parts of the Livarot Prospect (Pre-SDM EFT Full)

5 TECHNICAL EVALUATIONS

The Livarot prospect is structurally complex and HPHT conditions are expected. Based on the prospect depth and the fault segmentation, the producibility is expected to be low.

A Livarot prospect valuation screening study was performed in 2018. Development solution was tie-in to Kvitebjørn from a 4-slot template with 4 gas producers. The economy was negative. Due to the fault segmentation, approx. 50% of the volumes will be undrained or having uncertain drainage.

A commercial development of the PL879 Livarot prospect is not likely.

6 CONCLUSIONS

The identified prospect in PL879 show low probability of success. The partners in PL879 agree that there is not enough value in the license to continue with a drill decision in 2019. The license is consequently dropped.