



WELLESLEY
PETROLEUM

Relinquishment report

PL 1052




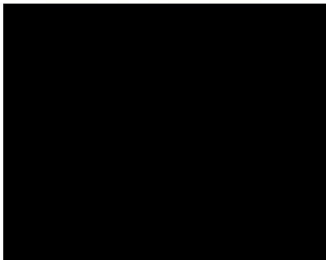
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1 History of the production licence

PL1052 was awarded on February 14th, 2020, in the APA 2019 licensing round to Wellesley Petroleum AS (operator, 40%), Aker BP ASA (20%), Neptune Energy Norge AS (20%) and Wintershall Dea Norge AS (20%).

The license is located on the Uer Terrace and covers 484.7 km² within blocks 35/9, 35/12 and 36/10, as shown in Fig. 1.1.

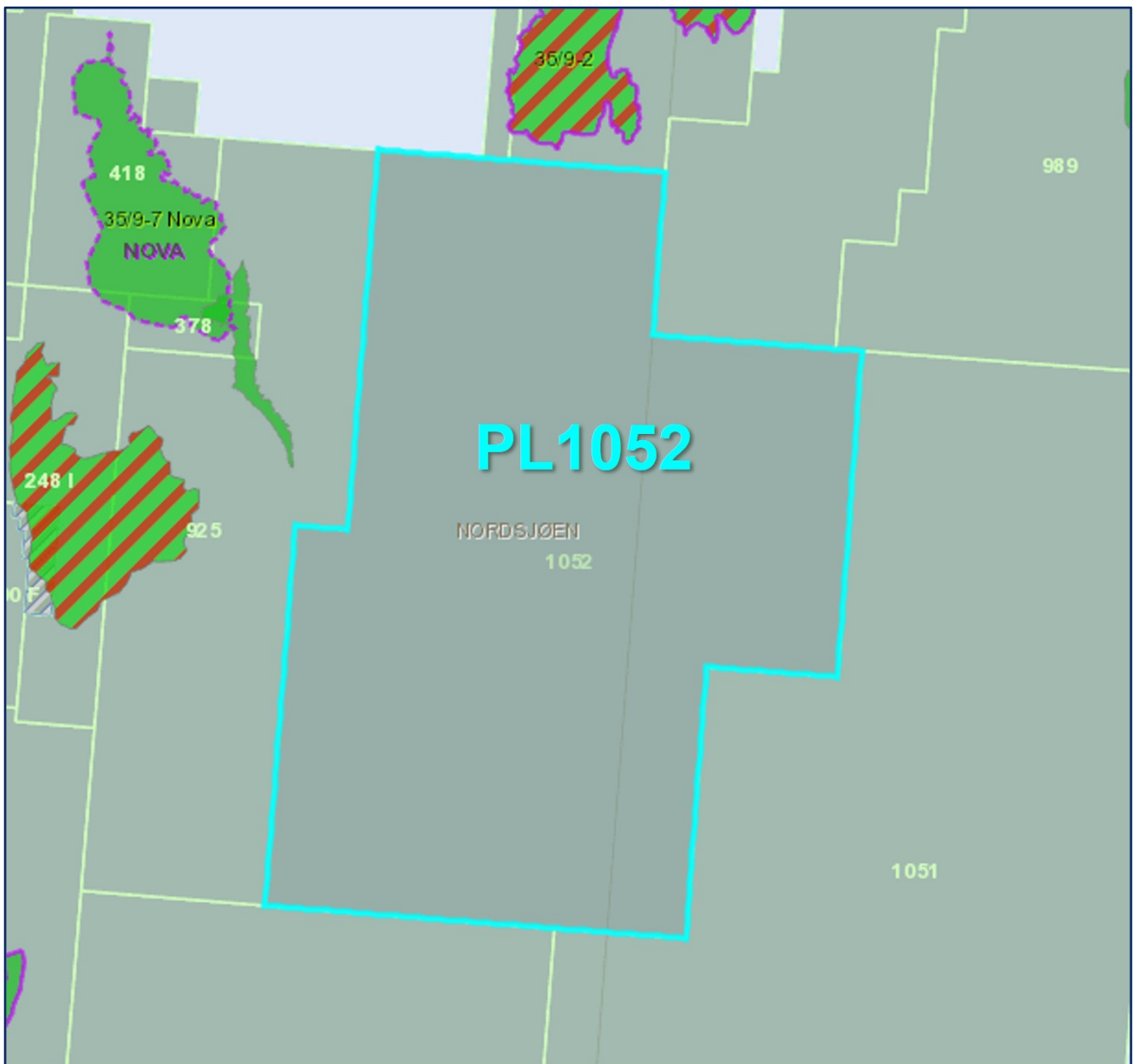


Fig. 1.1 Location and outline of PL1052

The PL1052 work commitment was to obtain and reprocess modern 3D seismic data and perform geological and geophysical studies.

Wellesley Petroleum has, on behalf of the license group, fulfilled the work obligation.

The seismic work programme consisted of:

- Purchase of PSDM 3D survey CGG14003WPR19
- Conditioning of PSTM survey CGG17M01 for de-noise/resolution/AVO
- Feasibility study of CRAM migration

Relevant geological and geophysical studies were carried out.

The license decision gates for PL1052 are presented in Table 1.1.

Table 1.1 PL1052 License decision gates

Work obligation	Decision	Task status	Expiry date
Acquire and reprocess modern 3D seismic and G&G studies		Completed	
	Decision to drill	Completed	14.02 2022
Drill exploration well			
	(BoK) Decision to concretize	N/A	14.02 2024
Conceptual studies			
	(BoV) Decision to continue	N/A	14.02 2026
(PDO) Prepare plan for development			
	(PDO) Submit plan for development	N/A	14.02 2027
	Decision to enter extension period	N/A	14.02 2027

During the duration of the license, a number of meetings took place which were documented on License2Share (L2S). These are listed below.

License meetings

EC/MC meeting: 19.03.2020

EC work meeting: 15.04.2020

EC work meeting: 18.06.2020

EC/MC meeting: 12.11.2020

EC work meeting: 09.02.2021

EC meeting: 24.06.2021

EC/MC meeting: 19.10.2021

Reason for relinquishment

After an extensive review of the prospectivity of the entire stratigraphic interval, it has been unanimously agreed by the joint venture partnership to drop the licence as no drillable prospect was identified within the acreage. The main risk for the prospectivity is considered to be related to absence of local mature source rocks and hydrocarbon migration.

Two Jurassic prospects were identified by the partnership. The resource potential for the Crossbill Up-dip Prospect (Viking Gp reservoirs) is limited and the Brambling Prospect (Brent and Viking groups reservoirs) remains a high risk opportunity despite attempting to de-risk through a significant work programme.

It was not possible to sufficiently de-risk any of the additional identified leads.

2 Database overviews

2.1 Seismic data

The seismic data used in the APA evaluation of the prospects was the CGG Broadseis survey CGG17M01. As part of the work program this was conditioned by Sharp Reflections for denoise, resolution and AVO (CGG17M01_PL1052_CONDITIONED_Q). In addition the partnership purchased the eastern part of the PSDM survey CGG14003WPR19 which was processed by WesternGeco in 2019. A feasibility study of CRAM migration was also carried out (by Neptune Energy, 2020) in a swath over the Crossbill Prospect, but the test was not considered positive enough to justify a full remigration of the data set.

The seismic database within the license is shown in Table 2.1

Table 2.1 Seismic database

Seismic survey	Year	Size, km2	Processed by	Comment	Proprietary	NPDID
CGG14003WPR19	2019	139	WesternGeco	Purchased PSDM	x	
CGG17M01_PL1052_CONDITIONED_Q	2020	385	Sharp Reflections	Gather conditioning (denoise/resolution/AVO)	x	
CGG14003	2020	35	Neptune Energy AS	CRAM feasibility test	x	7984
CGG17M01	2017	385	CGG			

2.2 Well data

The common well database for the license is presented in Table 2.2

Table 2.2 Common Well database

Well	Completion	Petrophysics	Depth conversion	Geology	Rock physics	Biostratigraphy	NPDID
35/9-12 S	2014	x	x	x		x	7552
35/12-1	1992	x	x	x	x	x	1881
35/12-3 S	2011	x	x	x	x	x	6516
35/12-5 S	2015	x	x	x	x	x	7683
35/12-6 A	2018	x	x	x		x	8488
35/12-6 S	2018	x	x	x		x	8431

3 Results from geological and geophysical studies

Several studies and evaluations have been carried out in-house and by external companies to address the geological and geophysical understanding of the license prospectivity. An overview is given below.

The seismic survey CGG17M01 was licensed and used for the common seismic database. In order to enhance the data quality seismic conditioning of the gathers addressing denoise, AVO and enhanced resolution was performed by Sharp Reflections. The part of the PSDM survey CGG14003WPR19 extending into PL1052 was also acquired by the partnership for inclusion into the common database. On behalf of the partnership Neptune Energy did a test of CRAM-migration of CGG14003. Although providing uplift to the data it was concluded that it would not lead to a changed seismic interpretation of the prospectivity and the methodology was thus not pursued any further.

A biostratigraphic review of wells in the common database was carried out by PetroStrat Ltd through multiple studies the Operator commissioned in the area (PetroStrat 2019, PetroStrat 2020^{1,2}). The results facilitated a consistent understanding of the stratigraphy and was key to align well data with the seismic interpretation. The integrated and revised interpretations from these studies led to a change in the understanding of the reservoir succession in the Crossbill Up-dip Prospect and the evaluation was significantly different from the one presented in the licence application.

Fluid inclusions and core extracts from Well 35/12-1 were analysed in order to better understand the local hydrocarbon systems in the license (Karlsen 2020, Karlsen 2021^{1,2}). It was concluded that no recent (late Miocene to present) oil charge had taken place at the location of well 35/12-1. Identified and analysed fluid inclusions and core extracts from the Sognefjord Fm indicate a paleo-column with possible oil charge in the Cretaceous-Paleocene followed by Middle Miocene uplift, generation shut-off and gradual de-migration. There are some evidence of a Paleozoic origin of the oil, but not strong enough to significantly de-risk prospectivity dependent on a local source kitchen on the southern Uer Terrace. Extracts from Heather Fm sandstone samples exhibit the signature of early oil-window generation in the Heather Fm near the well (more or less in-situ) which is in line with petroleum system modelling of Viking Group source rocks on the Uer Terrace showing limited expulsion due to low maturity of a moderately rich type II/III source rock.

Rock physics modelling of the Sognefjord Fm indicates that the reservoir is not particularly sensitive to changes in pore fluid, but that a visible seismic anomaly could be expected in a gas accumulation. For the Fensfjord Fm lithological changes are modelled to dominate over fluid changes.

4 Prospect update report

Prior to award the PL1052 partners had identified two prospects with Viking Group reservoirs and numerous leads in the Brent Gp, intra-Draupne Fm and Agat Fm. The identified prospectivity from the application of the Operator is presented in Fig. 4.1. Subsequent to the license work program all leads have a small resource potential and/or a high risk on source presence/migration or reservoir presence and were thus not considered any further.

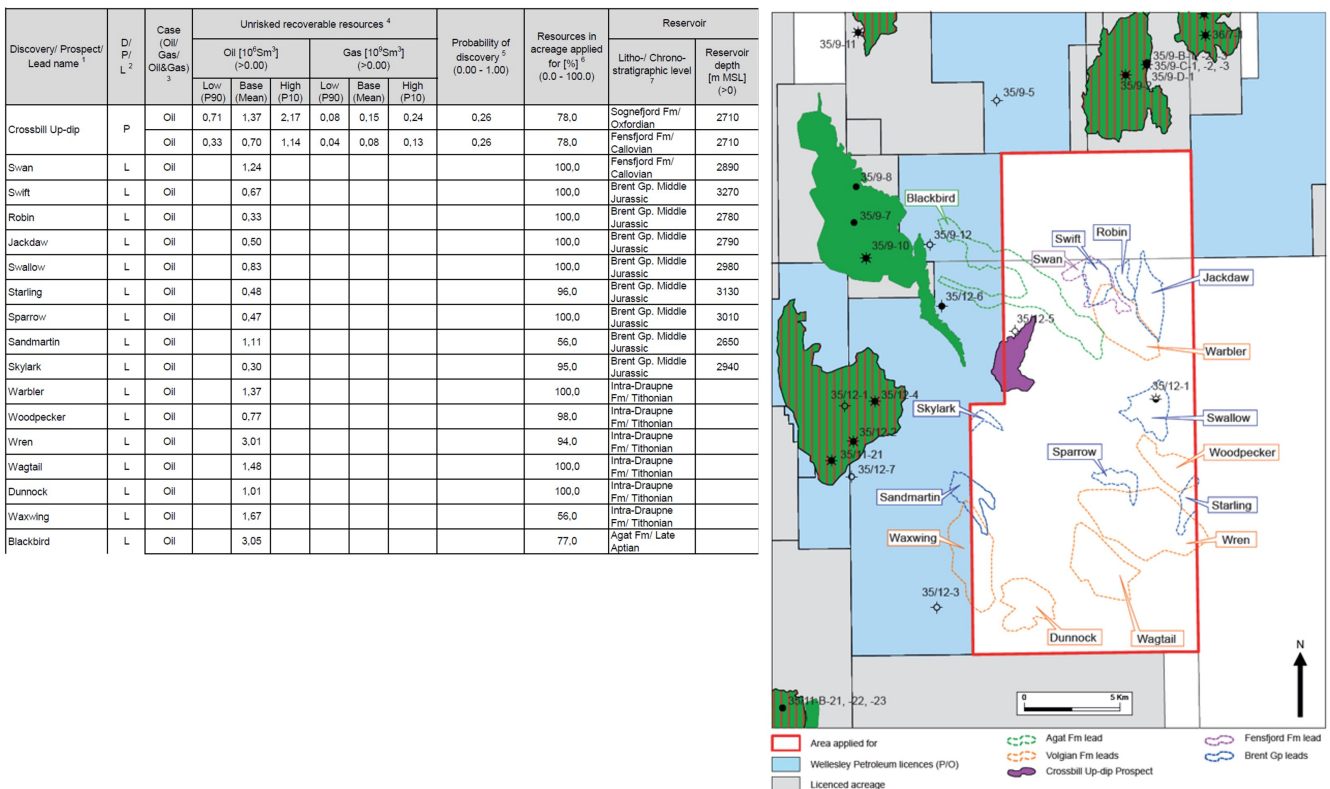


Fig. 4.1 Wellesley APA prospectivity and resource assessment
 Location map and resource assessment of prospectivity included in the APA 2019 application from Wellesley.
 The Brambling Prospect was included in the application from Wintershall.

The two identified prospects Crossbill Up-dip and Brambling (Fig. 4.2) have been evaluated in detail.

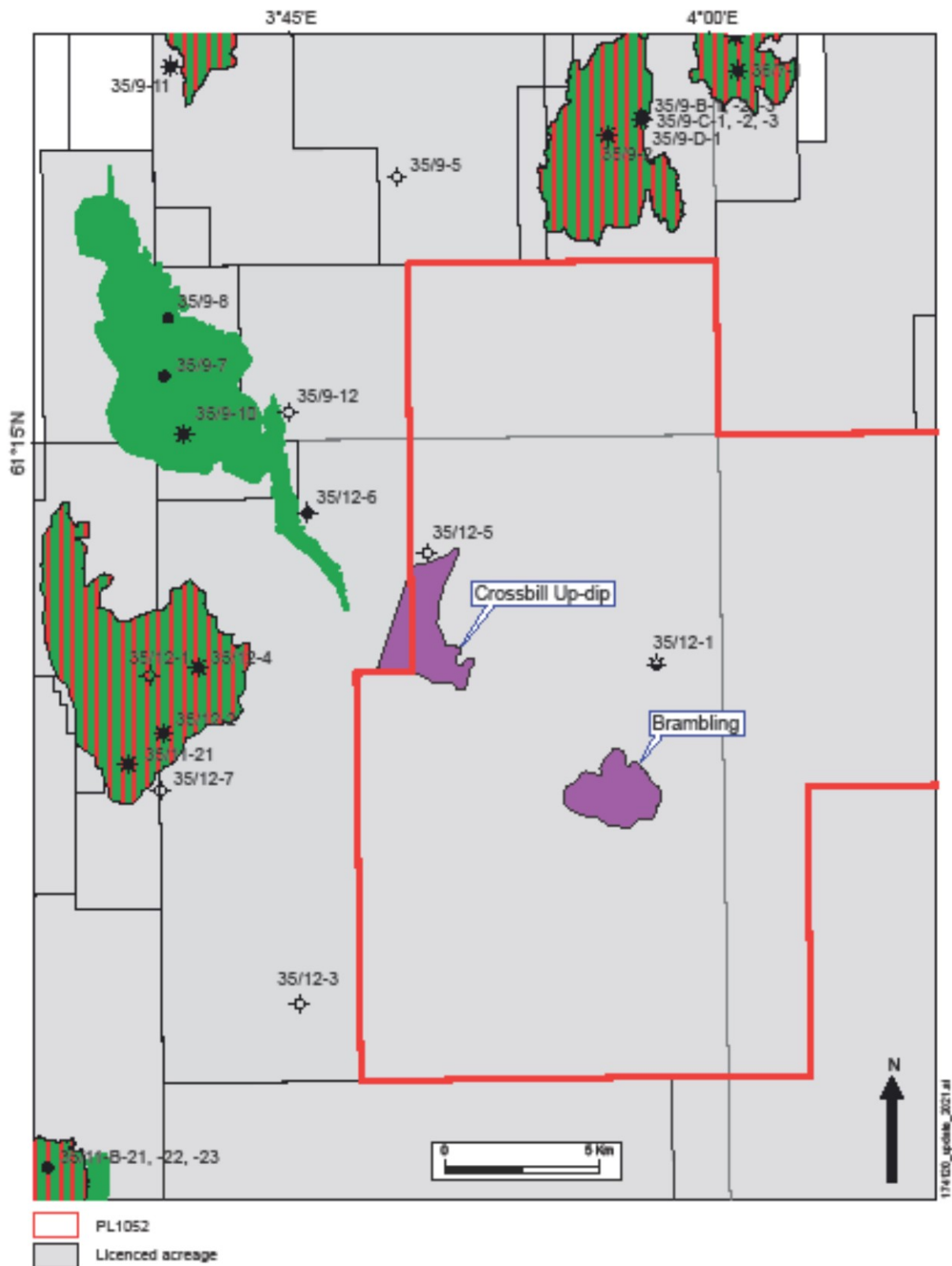


Fig. 4.2 PL1052 Prospects
 The outline of the two identified prospect in the license are displayed on the map.
 Note that Crossbill Up-dip is partly outside the license.

Crossbill-Up-dip is a truncated horst with three-way dip-closure up-dip of well 35/12-5 S as shown in Fig. 4.3. The primary reservoir is the Middle Jurassic shallow marine Fensfjord Fm. This is divided into two units as the down-dip well data is ambiguous as to whether they are in communication or not. An erosional remnant down-dip on the structure may contain shallow marine upper Jurassic sediments of the Sognefjord Fm and this provides some additional upside resource potential as illustrated in Fig. 4.4. Multiple resource scenarios were evaluated by the partnership reflecting vertical communication, or lack thereof, between the two Fensfjord Fm reservoir units and possible juxtaposition scenarios across the fault in the eastern part of the Prospect. The mean STOIP of the the Fensfjord Fm is 25 mmbbl (base case scenario), with additional mean 18 mmbbl STOIP in the Sognefjord Fm. In a base case scenario the potential resources are split approximately 60:40 between licenses PL1052 and PL925.

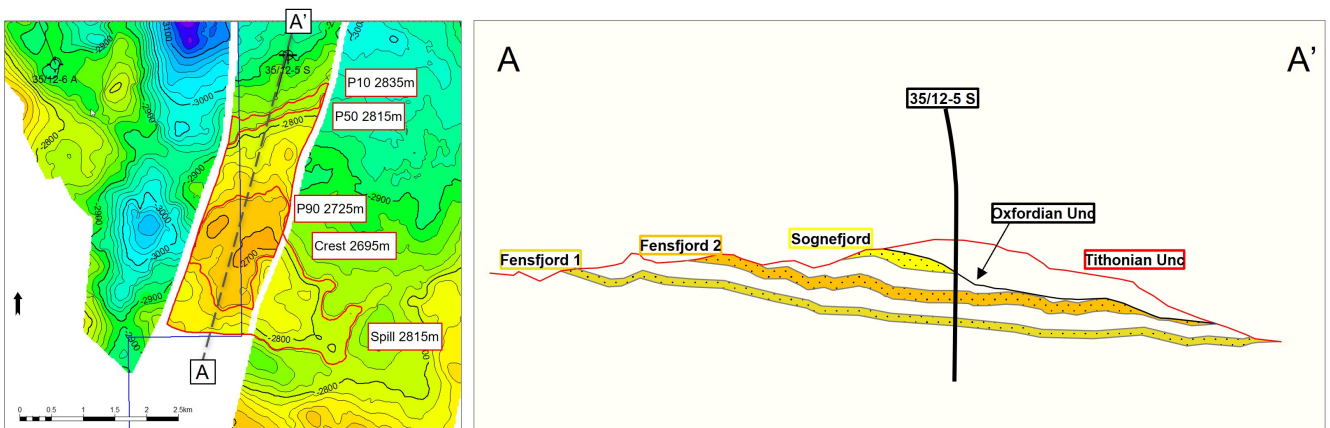


Fig. 4.3 Crossbill Up-dip

Geoseismic section along the Crossbill horst showing the erosional truncation by the Tithonian unconformity across the top of the prospect, and also truncation by the Oxfordian unconformity in the down-dip parts of the structure. Base case scenario cross-fault juxtaposition and associated spillpoint indicated on map.

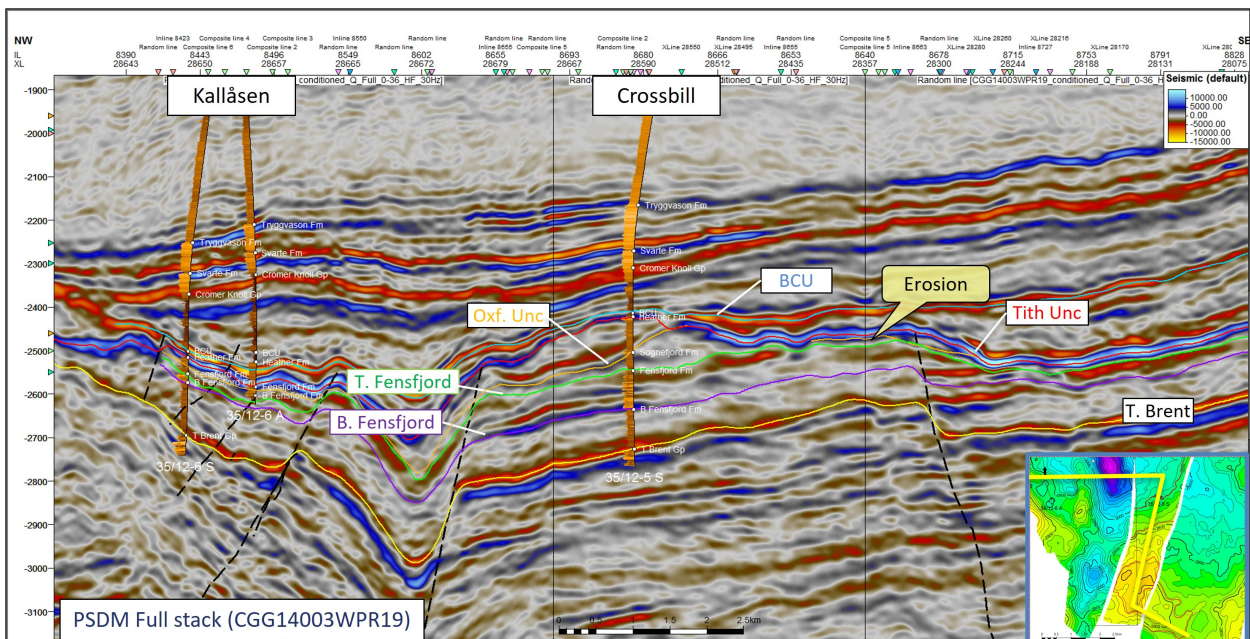


Fig. 4.4 Crossbill Up-dip seismic section

Seismic line illustrating the geometry of the Prospect and the erosion of the top of the Fensfjord Fm in the crestal areas. Also note the erosional remnant of Sognefjord Fm strata up-dip of the dry well 35/12-5 S.

The probability of success for the Fensfjord Fm is estimated to 38% with hydrocarbon migration considered to be the main risk.

The probability of success for the Sognefjord Fm is estimated to 18% with reservoir presence and hydrocarbon migration considered to be the main risks.

The Brambling Prospect is a robust 4-way dip-closure below the Tithonian Unconformity as illustrated in Fig. 4.5 and Fig. 4.6 . The main reservoir is the Sognefjord Fm with a mean STOIP of 18 mmbbl. There are also closures at deeper levels and mean STOIP is 11 mmbbl Fensfjord Fm. An overview of updated prospectivity, resource potential and risk is presented in Table 4.1

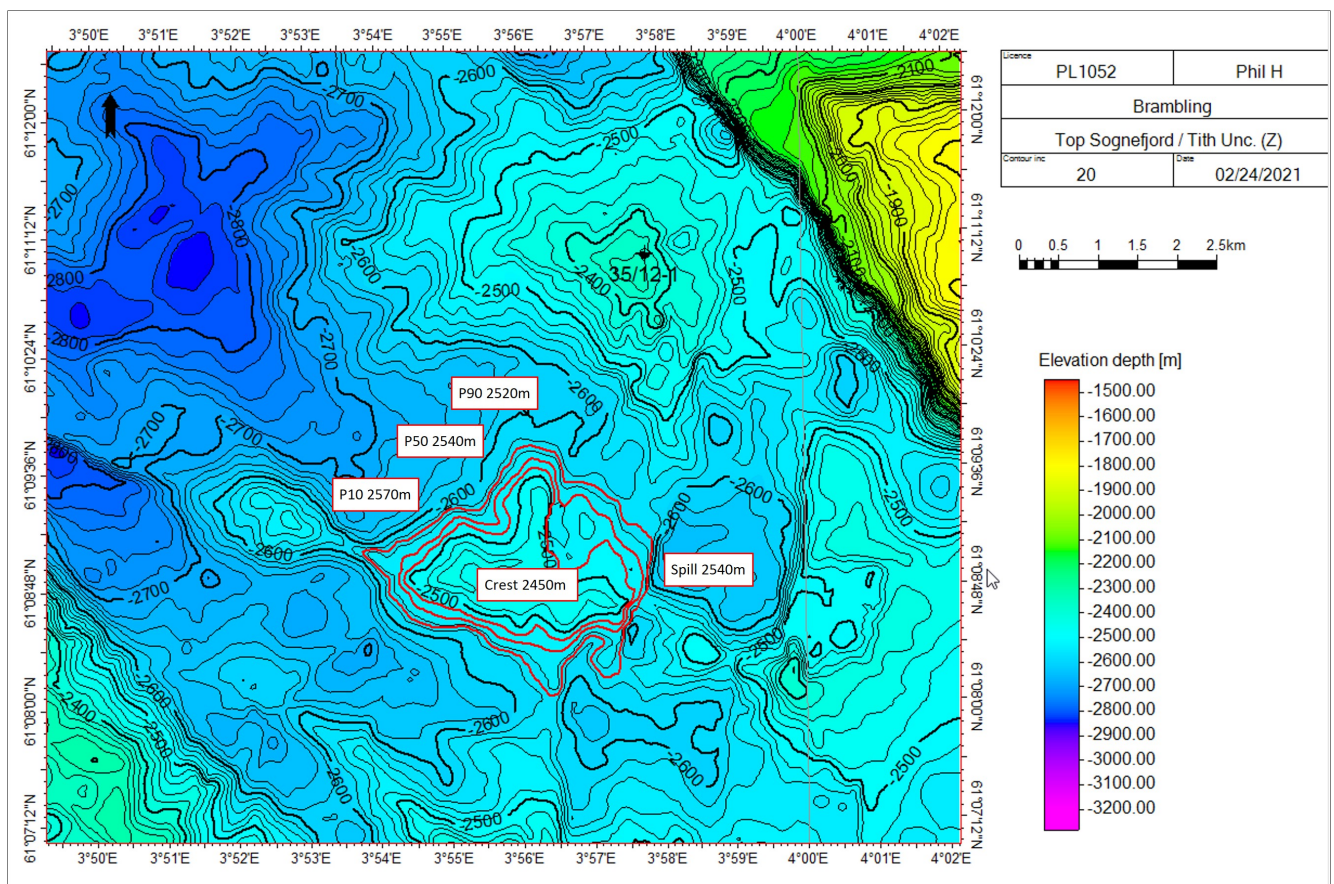


Fig. 4.5 Brambling Prospect structural depth map
 Top reservoir depth map over the Brambling Prospect.
 Spillpoint towards the 35/12-1 structure or across the eastern bounding fault indicated on map along with depths used for resource estimations.

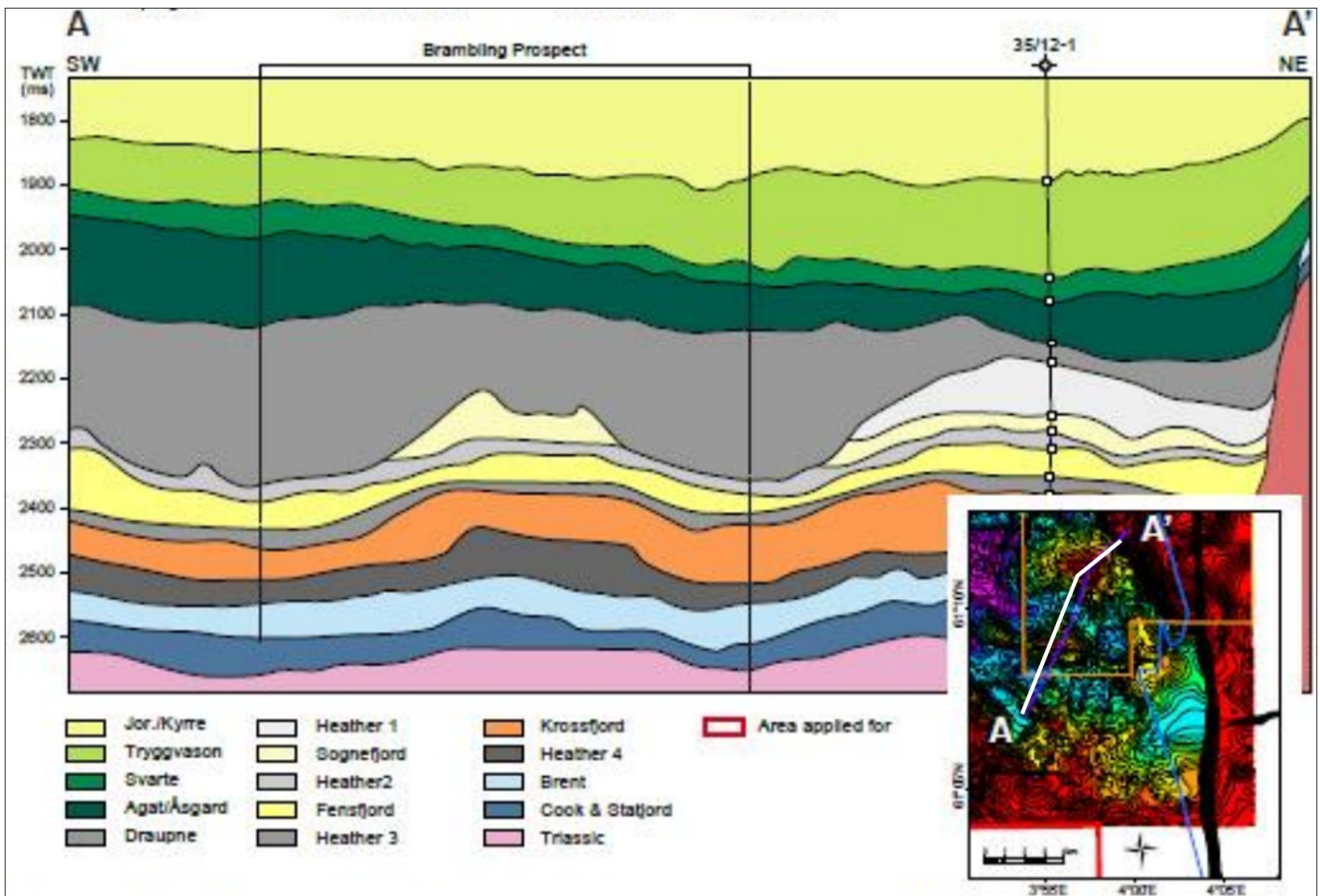


Fig. 4.6 Brambling Cross-section
Geoseismic cross-section through the Brambling Prospect.

Table 4.1 Updated overview of prospectivity. All volumes in mmSm³

Prospect	Reservoir	P90 STOIP	P50 STOIP	P10 STOIP	P90 Rec.	P50 Rec.	P10 Rec.	CoS
Crossbill Up-dip	Fensfjord 2	1.61	3.68	6.81	0.45	1.11	2.36	0.38
Crossbill Up-dip	Fensfjord 1	0.47	1.01	1.67	0.13	0.30	0.340	0.38
Crossbill Up-dip	Sognefjord	1.90	2.78	3.99	0.49	0.86	0.93	0.18
Brambling	Sognefjord	3.93	6.00	8.83	1.03	1.86	3.19	0.16
Brambling	Fensfjord	0.49	1.29	2.69	0.11	0.32	0.76	0.16

Hydrocarbon system modelling and geochemical studies indicate that no local mature source rocks can be expected and that long distance migration from the north-northwest is required to charge the prospect. Based on current mapping and understanding of migration pathways and carrier beds this can only be achieved via fill-spill of Crossbill Up-dip. Migration risk is thus high for all reservoir levels and the probability of success is estimated to be 16%.

5 Technical evaluation

Crossbill Up-dip Fensfjord and Sognefjord formations can not be tested or produced by the same wellbore as the Sognefjord erosional remnant is laterally offset from the trap at the Fensfjord Fm level. Furthermore, due to expected permeability contrast between the two reservoir units in the Fensfjord Fm they could not be commingled in production. Hence, the assumption is that only the upper Fensfjord Fm unit could be produced with associated recoverable reserves estimated to 8 mmbbl, which is too small to be considered economically viable.

The resource potential of the Brambling Prospect is larger, but the associated risk is considered too high to warrant any further pursuit as the partnership believes the only way of de-risking the prospect would be by proving Crossbill Up-dip to be filled to spill point.

6 Conclusion

After an extensive review of the prospectivity of the acreage, including prospects and leads ranging from Early Cretaceous to Middle Jurassic in age it has been unanimously agreed by the Joint Venture to drop the licence.

7 References

Karlsen Keros Consulting, 2020. Evidences from Petroleum Inclusions and core extracts (ROS) from the dry well 35/12-1.

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PetroStrat 2019. Biostratigraphic review of selected wells from the Grosbeak Area, Norwegian North Sea; 9 wells from Blocks 35/9, 35/11 and 35/12.

PetroStrat 2020¹. Biostratigraphic Review and Interpretation of vintage data from the Viking Group sections in twenty client selected wells in the Northern North Sea, Norway, Q35 and Q36. Report produced for Wellesley Petroleum AS

PetroStrat 2020². Biostratigraphic Review and Interpretation of vintage data from the Viking Group sections in two client selected wells in the Northern North Sea, Norway, Q35