wintershall dea

Relinquishment report

PL1020

equinor

OMV

New Document

Table of Contents

List of Figures

List of Tables

1 History of production license

PL1020 was awarded 01.03.2019 to Wintershall Dea Norge AS, Equinor Energy and OMV Norge AS. Wintershall Dea was granted the operatorship with 40% equity, while Equinor and OMV had 35% and 25%, respectively. The following gives an overview of the key terms and conditions, as well key events in the license.

General info:

- Date of award: 01.03.2019 (following APA 2018)
- License blocks: 6707/1, 6707/2, 6707/3 and 6707/5
- License area: 1304km^2
- License period: Expire 01.03.2028 (Acquire 3D or Drop 01.03.2023)
- License group:
  - Wintershall Dea Norge AS (Op) 40%
  - Equinor Energy 35%
  - OMV Norge AS 25%

Work program:

- First phase: Acquire a dense high resolution 2D broadband seismic and G&G studies, which should highlight all leads and prospects of any size.
- Second phase: Acquire a subsequent 3D seismic survey placed over the most prospective areas or drop the licence.

Work performed:

- 2019:
  - License start-up
  - Tender for 2D acquisition. 2D acquisition autumn 2019.
  - Processing started 5th December 2019
- 2020:
  - Processing of 2D seismic data
- 2021:
  - Applied for 1 year extension from 01.03.2021 to 01.03.22.
  - Processing of 2D seismic data completed by end of March 2021.
  - Technical evaluation.
  - G&G work: Seismic interpretation and mapping
- 2022:
  - Applied for 1 year extension from 01.03.22 to 01.03.23.
  - G&G work: Further seismic interpretation and mapping, technical evaluation and maturation of prospectivity, AVO feasibility study, and sedimentological and biostratigraphy update/study.
  - Decision made to drop the license.

Formal Management and Exploration Committee Meetings:

- 11-04-2019 EC/MC License startup meeting
- 29-05-2019 EC/MC Acquisition work meeting
- 08-11-2019 EC/MC Annual meeting
- 08-06-2020 EC work meeting
- 29-10-2020 EC/MC Annual meeting
- 26-11-2021 EC/MC Annual meeting
- 28-11-2022 EC/MC Annual meeting

Reason for surrender of license:
Due to low volumes and high risk, the partnership PL1020 does not consider that there is a viable path forward to justify a 3D seismic acquisition in the license. Imaging is very complex with seismic disturbance from predominantly magmatic events at several levels and a subordinated Upper Tertiary slide. A 3D seismic feasibility study has indicated that imaging will not be improved with the available processing techniques, thus not helping to reduce the risk.

2 Database overviews

2.1 Seismic database

The seismic database contains multiple 2D and 3D surveys from within and around the license area (Fig. 2.1). Pre-license the main lead Brearve and most of the area had only sparse 2D seismic data coverage of generally poor quality. The partnership has acquired and processed 51 seismic lines, comprising of 2242-line kilometers of new full fold 2D seismic data (WIN19001) covering the whole license (Fig. 2.2). The Snøarve lead is covered by the EM00-01 and EM001-WIN17R01 3D surveys. This lead lies predominantly in the neighbouring PL1167 license, but it also extends into the application area.

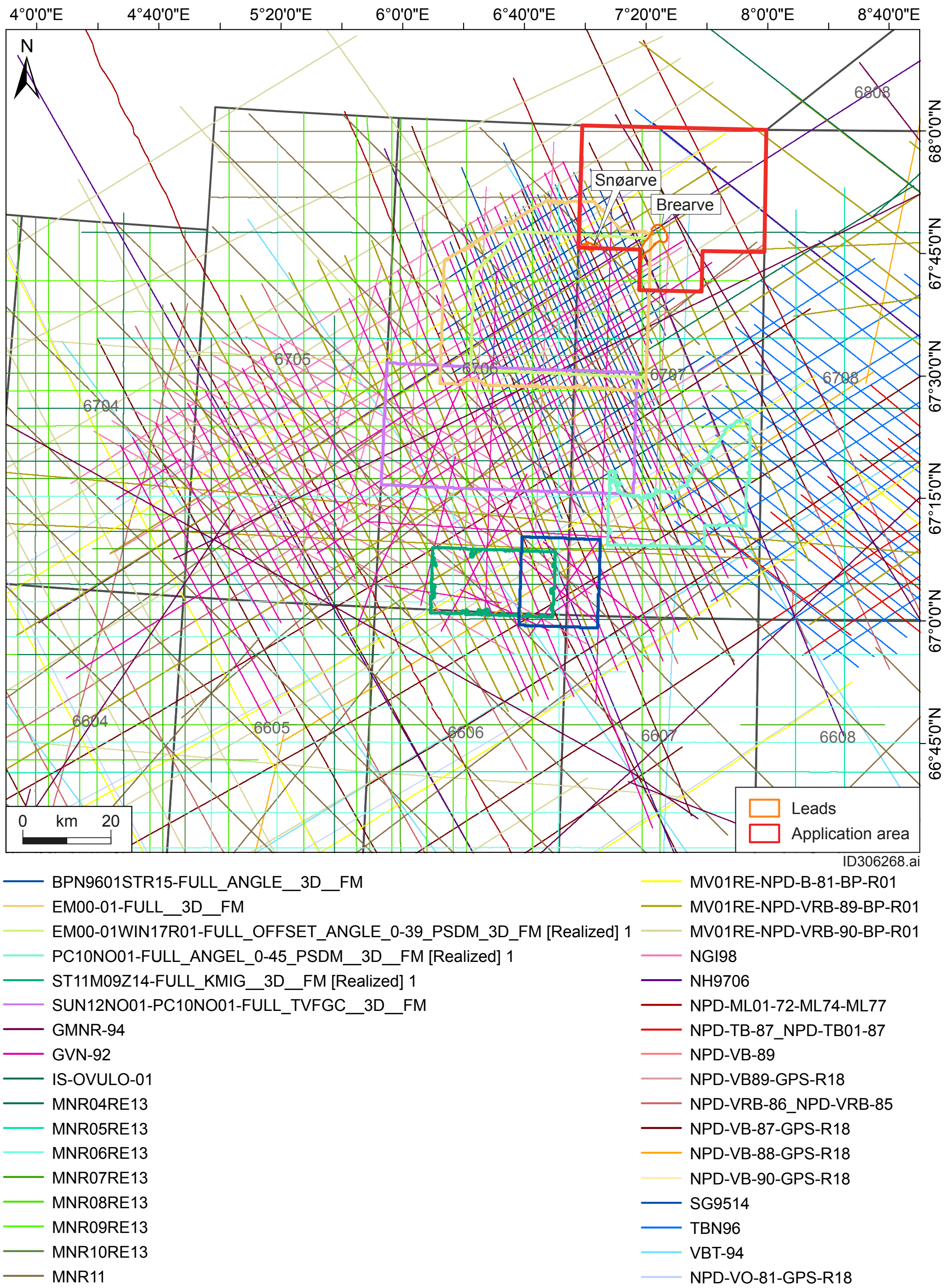

Fig. 2.1 Seismic database pre-license

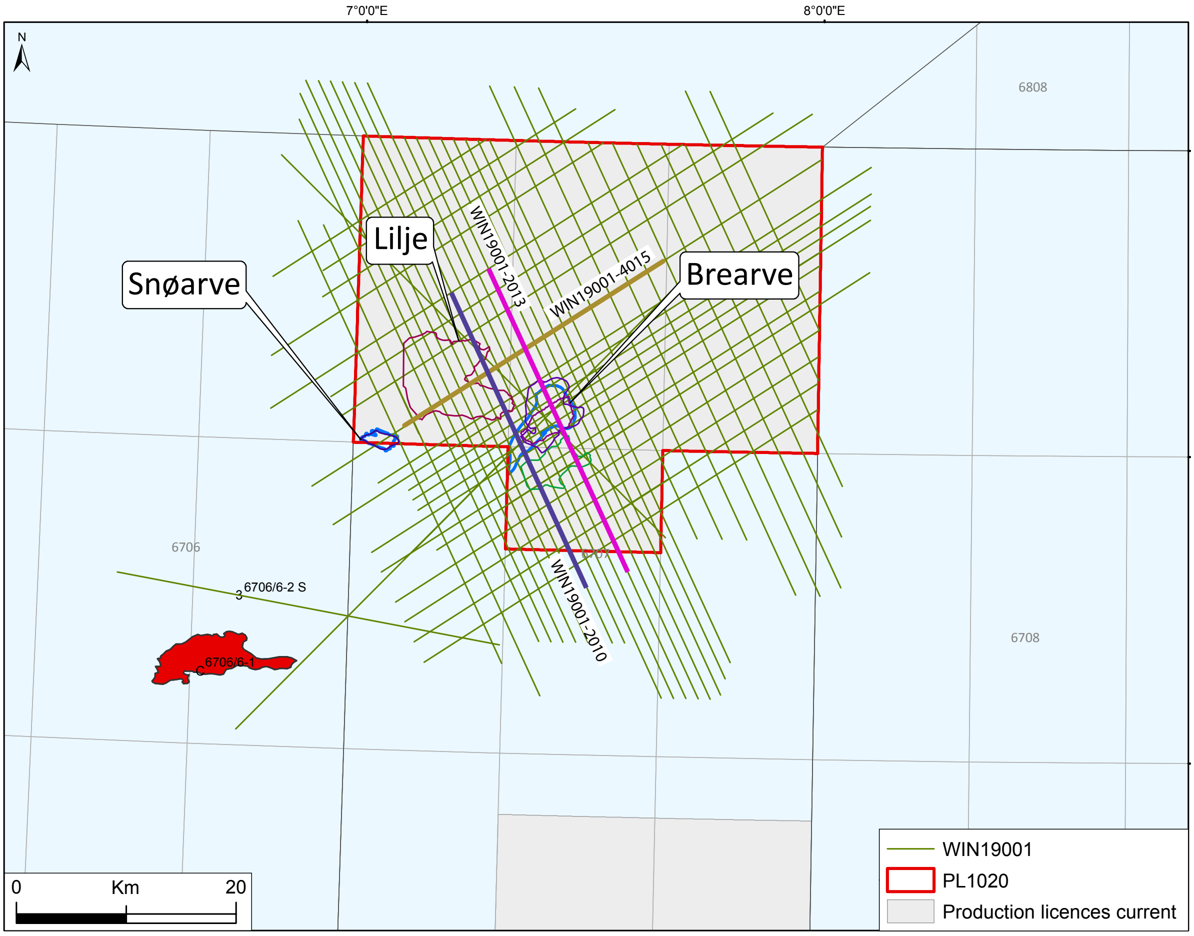

Fig. 2.2 Newly acquired WIN19001 2D seismic and updated leads/prospects

Table 2.1 3D seismic database

Survey	NPDID	Volume	Domain	Year	Quality	Status
EM0001-WIN17R01	4040	Full stack	3D time	2017	Good	Public
		Angle stacks	3D time	2017	Good	Public
SUN12NO01-PC10NO01	7576	Full stack	3D time	2012	Moderate-Poor	Public
PC10NO01	7240	Full stack	3D time	2010	Moderate	Public
ST11M09Z14 (ST9603+ BPN9601)	3830+3755	Full stack	3D time	2009	Moderate	Public
EM0001	4040	Full stack	3D time	2001	Moderate	Public
BPN9601STR15	3755	Full stack	3D time	1996	Moderate	Public

Table 2.2 2D seismic database

Survey	NPDID	Volume	Domain	Year	Quality	Status
WIN19001	9011	Full stack	2D time	2019	Moderate-Poor	Public
MNR04RE13	4252	Full stack	2D time	2004	Poor-Moderate	Public
MNR05RE13	4298	Full stack	2D time	2005	Poor-Moderate	Public
MNR06RE13	4364	Full stack	2D time	2006	Poor-Moderate	Public

Survey	NPDID	Volume	Domain	Year	Quality	Status
MNR07RE13	4450	Full stack	2D time	2007	Poor-Moderate	Public
MNR08RE13	4571	Full stack	2D time	2008	Poor-Moderate	Public
MNR09RE13	7001	Full stack	2D time	2009	Poor-Moderate	Public
MNR10RE13	7224	Full stack	2D time	2010	Poor-Moderate	Public
MNR11	7389	Full stack	2D time	2011	Poor-Moderate	Public
MV01RE-NPD-VRB-90-BP-R01	3338	Full stack	2D time	2001	Poor-Moderate	Public
MV01RE-NPD-B-81-BPR01	2443	Full stack	2D time	2001	Poor-Moderate	Public
MV01RE-NPD-VRB-89-BP-R01	3263	Full stack	2D time	2001	Poor-Moderate	Public
NPD-VB89-GPS-R18	3263	Full stack	2D time	2018	Poor-Moderate	Public
NPD-VB88-GPS-R18	3145	Full stack	2D time	2018	Moderate-Poor	Public
NPD-VB90-GPS-R18	3338	Full stack	2D time	1990	Moderate-Poor	Public
NPD-VB87-GPS-R18	3007	Full stack	2D time	1987	Moderate-Poor	Public
NPD-VB86-GPS-R18	2866	Full stack	2D time	1986	Moderate-Poor	Public
NPD-VO81-GPS-R18_2D	2443	Full stack	2D time	1981	Moderate-Poor	Public
NPD-VRB-86_NPD-VRB-85	2866-2765	Full stack	2D time	1985-1986	Poor-Moderate	Public
NPD-ML01-72-ML74-ML77	2046-2102-2236	Full stack	2D time	1972-1977	Poor-Moderate	Public
NPD-TB-87_NPD-TB01-87	3005-3006	Full stack	2D time	1987	Poor-Moderate	Public
NPD-VB-89	3263	Full stack	2D time	2001	Poor-Moderate	Public
GMNR-94	3650	Full stack	2D time	1994	Poor-Moderate	Public
GVN92	3513	Full stack	2D time	1992	Poor-Moderate	Public
IS-OVULO-01	4104	Full stack	2D time	2001	Poor-Moderate	Public
NGI98	3858	Full stack	2D time	1997	Poor-Moderate	Public
NH9706	3863	Full stack	2D time	1997	Poor-Moderate	Public
SG9514	3734	Full stack	2D time	1995	Poor-Moderate	Public
TBN96	3743	Full stack	2D time	1995	Poor-Moderate	Public

Survey	NPDID	Volume	Domain	Year	Quality	Status
VBT-94	3701	Full stack	2D time	1994	Poor-Moderate	Public

2.2 Well database

The well database (Table 2.3) consists of all surrounding wells which penetrated the Springar Formation and Nise Formation sandstones. The most relevant wells for the license are 6706/6-1 (Hvitveis), 6704/12-1, 6606/11-1 (Vema), 6706/11-2 (Gymir), 6706-12-1 (Snefrid S), 6706/12-2 (Snefrid N), 6706/12-3 (Roald Rygg), 6707/10-1 (Luva) and 6707/10-3S and 6706/6-2S (Marisko). These wells were used to build the regional understanding of the sandstones reservoirs. The 6706/6-1 and the latter incorporated 6706/6-2S wells provides the most important well to seismic tie. The age of the sandstones in the 6706/6-1 well is dated to be Paleocene by the NPD. In the application it was interpreted to be Campanian (Nise Fm.) age (Ichron 2015) and consequently impacted the structural and stratigraphic understanding of the area. The reservoir sandstones in the later Marisko well were also interpreted to be Campanian in age. Reinterpretation of the 6706/6-1 and 6706/6-2So wells during 2022 revealed that the reservoir sandstones are Paleocene Selandian to Danian in age.

Table 2.3 Well database

Well	Year	NPDID	Comments	TD (mTVDMSL)	TD Fm
6706/6-1 Hvitveis	2003	4705	Selandian to Danian sandstones. Gas Discovery	3414	Tang Formation
6706/6-2S Marisko	2019	8580	Selandian to Danian sandstones. Dry	3916	Tang Formation
6706/11-1 Vema	1998	3202	Nise Formation sandstones. Dry	4280	Lange Formation
6706/11-2 Gymir	2015	7709	Nise Formation sandstones. Gas discovery	2556	Nise Formation
6706/12-1 Snefrid S (Aasta Hansteen)	2008	5867	Nise Formation sandstones. Gas discovery	3992.5	Kvitnos Formation
6706/12-2 Snefrid N (Aasta Hansteen)	2015	7651	Nise Formation sandstones. Gas/oil discovery	2714	Nise Formation
6706/12-3 Roald Rygg	2015	7666	Nise Formation sandstones. Gas discovery	3295	Kvitnos Formation
6707/10-1 Luva (Aasta Hansteen)	1997	3075	Nise Formation	5001.5	Kvitnos Formation

Well	Year	NPDID	Comments	TD (mTVDMSL)	TD Fm
			sandstones. Gas discovery		
6707/10-2S Haklang (Aasta Hansteen)	2008	5918	Nise Formation sandstones. Gas discovery	3332.5	Nise Formation
6707/10-3S Ivory	2014	7550	Kvitnos Formation sandstones. Gas discovery	4265	Lange Formation
6704/12-1Gjallar	1999	3759	Springar and Nise Formation sandstones. Dry	4079	Kvitnos Formation
6705/7-1Stordal	2018	8133	Nise and Kvitnos Formation sandstones. Dry	3249	Lysing Formation

3 Results of geological and geophysical studies

Acquisition and processing of new 2D seismic data

The work program in phase 1 was to acquire new 2D seismic. The anticipated start of the acquisition was May 2019. Due to limited available 2D seismic acquisition vessels and delays of the dedicated vessel in a previous project, seismic operations started on 21st September 2019. The acquisition was planned for 24 days but took 45 days due to severe weather conditions and unexpected technical downtime. De-mobilization was on 3rd November 2019. The partnership acquired 2242 km of new, full fold 2D broadband seismic data (WIN19001) (Fig. 2.2).

The seismic processing started on 5th December 2019. Covid-19 and multiple phases of lockdown required time to adjust to the new way of working, both at the Wintershall Dea and TGS locations. Additional testing during seismic processing was required because the input data was noisier than anticipated, and the velocity estimation was challenging. The geology is very complex and includes multiple types of magmatic rocks disturbing the seismic signal and velocity field. Therefore, the completion of the seismic processing was delayed until the end of March 2021. Due to the delay in the seismic processing the PL1020 partnership applied for extension, which was granted by the authorities.

Seismic interpretation and prospectivity mapping

The main objective of acquiring a new dense high resolution 2D seismic survey was to improve the seismic coverage and seismic imaging. The dense nature of the survey should highlight all potential leads and prospects to sufficiently substantial size. The quality of newly acquired and processed broadband WIN19001 2D seismic was noisier than expected. The geology is characterised by severe magmatism, landward flow, lava deltas, inner flows, sills, and dykes, as well as a large-scale sediment slide, diatomite ooze and extensive faulting (Fig. 3.1and Fig. 3.2). Two new leads, named Lilje and Brearve, were identified in the Upper Paleocene. They have both been identified in areas where there is relatively little seismic distortion in the overburden. The area from Danian level and below is covered by features that distort the seismic imaging, making it challenging to interpret with confidence. Fig. 3.3 shows the subsurface stratigraphic coverage of magmatics and the base slide above the Top Tang and Top Danian levels. Due to the tendency of magmatic intrusions to follow the stratigraphic layering or zones of weakness (fault zones) it was possible to interpret and identify several rotated fault blocks, as well as graben, and horst structures.

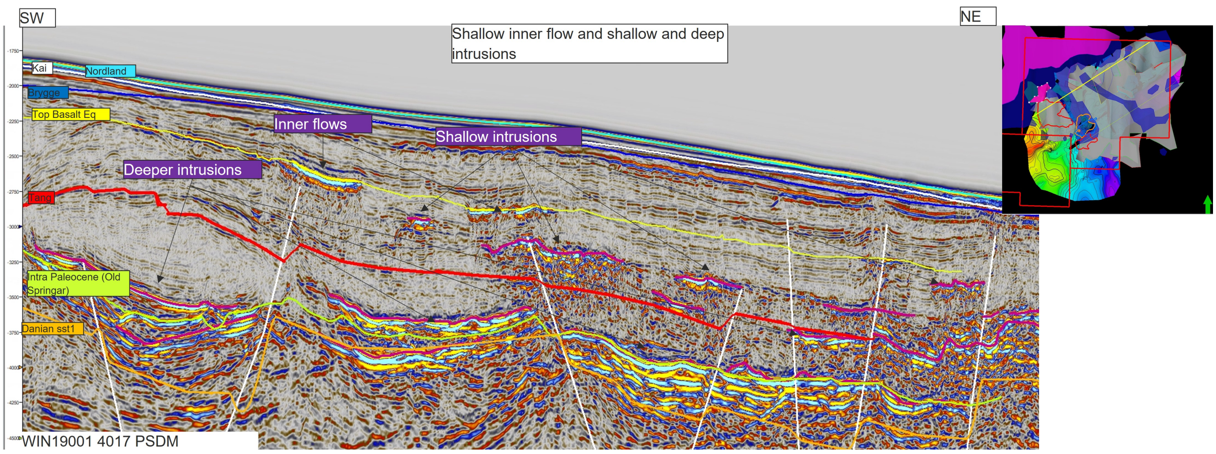

Fig. 3.1 Magmatics; -Inner flows, shallow and deeper intrusions

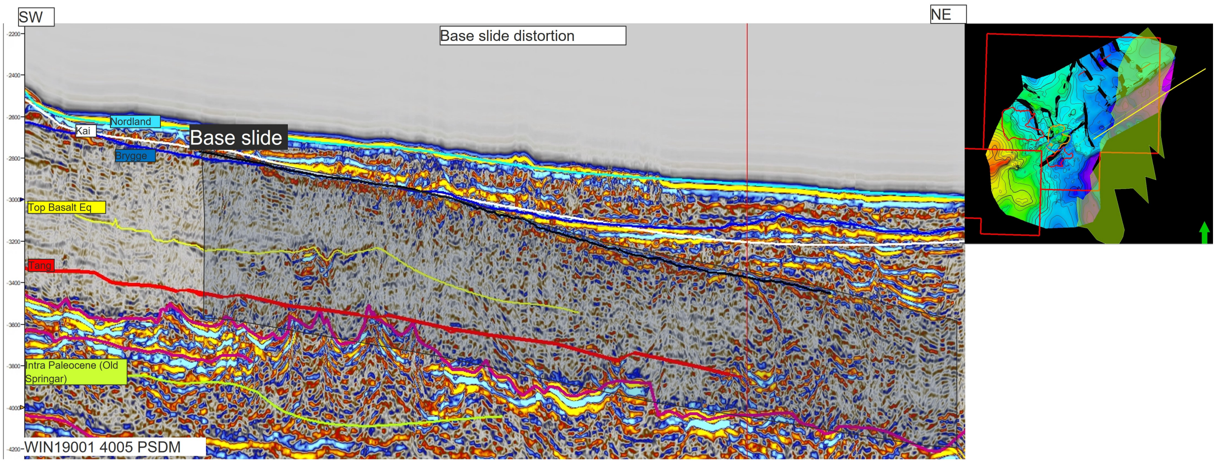

Fig. 3.2 Base slide seismic distortion

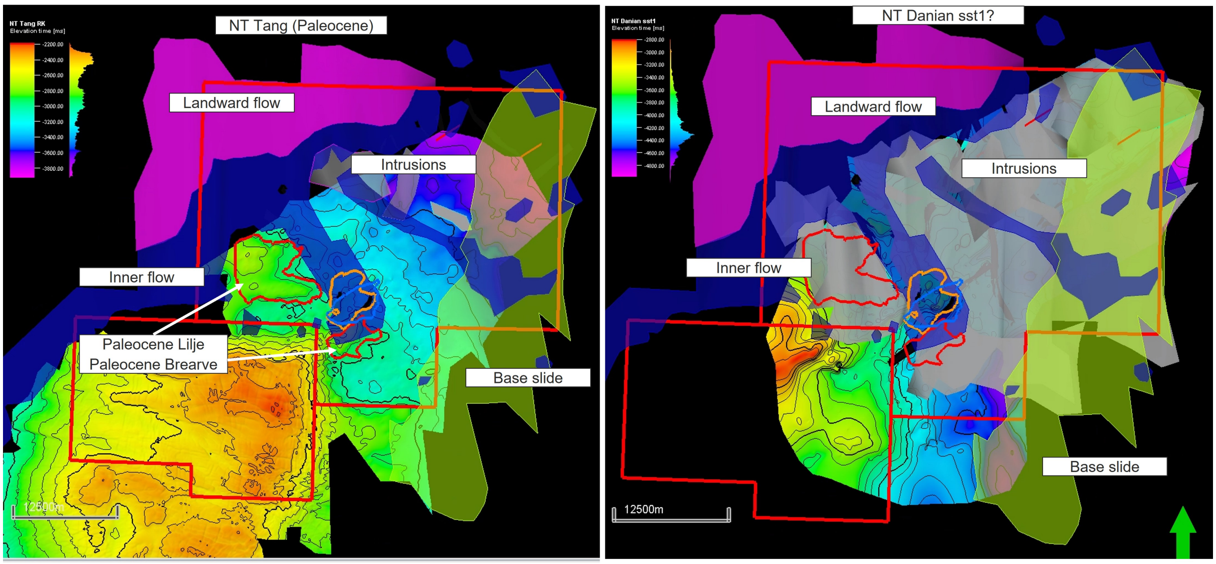

Fig. 3.3 Magmatics and base slide subsurface stratigraphy coverage for the a)NT Tang and b) NT Danian surfaces

AVO feasibility study

An AVO feasibility study was carried out. No DHI or flat-spots were identified. After reviewing the near to far stacks for the Paleocene leads, there is no conclusive AVO analysis. This is due to the quality, sparsity and the exclusively 2D seismic data.

Sedimentological study

There is poor well control in the area. The biostratigraphy dating is ambiguous and required additional work to identify the reservoirs in the closest wells, 6706/6-1 and 6706/6-2 S. For these reasons, more time was required than anticipated to interpret this complex 2D seismic dataset, and the license was extended by another year in 2022.

Two biostratigraphy reports for the 6706/6-2S Marisko well exist with different ages for the Marisko reservoirs. Ichron has interpreted the reservoir sand to be the Campanian age Nise Formation, while Petrostrat has interpreted the reservoir sandstone to be the Selandian to Danian age intra-Tang Formation. A sedimentological study of the reservoir sandstones examined the mismatches between several "soft indicators" other than the biostratigraphy and concluded that the reservoir sandstones are unlikely to be from the Nise Formation. The "soft indicators" defined for this study are: grain size, chemostratigraphy, heavy mineral apatite and garnet, inoceramos shells, planktonic foraminifera and glauconite (Table 3.1). Additional age indicators used in the sedimentological study support either the Springar or Tang Formation for the Marisko reservoir sandstones. The chemostratigraphy supports the Springar Formation interpretation, while most other indicators support the Tang Formation interpretation. Given that the PetroStrat biostratigraphy report also supported the interpretation of the sand as belonging to the Tang Formation, Wintershall Dea now follows the interpretation that the reservoir of wells 6706/6-1 and 6706/6-2S is most likely to be the Selandian to Danian age Tang Formation (i.e., Lower Sandstone = Early Paleocene Danian; Upper sandstone = Middle Paleocene Selandian).

Table 3.1 Age indicators for contested dating of the Marisko and Hvitveis wells

Method	Marisko (Hvitveis)	Nise	Springar	Tang
Biostratigraphy reports		Ichron		PetroStrat
Grain size	Low (fine sand)	Too low compared to Nise in Aasta Hansteen	Similar to Springar in Vigrid syncline	No data
Chemostratigraphy (Hvitveis XRF)	Characteristic trends, but stable Ti/Al	Nise in Aasta Hansteen with different patterns	Same element curves as Springar of Luva (6707/10-1)	No typical Tang / ? Tare Ti/Al excursion as seen in most Vigrid Synclinal wells
Apatite HM	Very high (Hvitveis)	Far too high compared to Nise in Aasta Hansteen	Either Springar or Tang	Either Springar or Tang
Garnet HM*	Absent	Far too low compared to Nise in Aasta Hansteen	Similar low values as Springar in Vigrid Syncline	Very few data (2 Gjallar samples with high Garnet)
Inoceramos shells**	Low	Untypically low for Cretaceous	Untypically low for Cretaceous	Low count matches Tertiary
Planktonic foraminifera***	None	Absence matches Nise	Too low for Springar	Absence matches Tertiary
Glauconite****	Very high (Lower sandstone)	Too high for Nise	Too high for Springar	Matches bestTang

*Problem of Garnet dissolution with burial depth (deep paleo-burial Marisko versus shallow Aasta Hansteen)
**Inoceramos typically high in Cretaceous aged intervals
*** Planktonic foraminifera typically high in Springar Formation
**** Tertiary reported with high Glauconite in biostratigraphy reports, Gjallar core and Tang Formation of Træna Basin. Present in Nise and Springar formations, but with lower counts.

The primary target reservoirs in the application were sandstones of the Upper Cretaceous aged Nise Formation, with secondary targets in sandstones of the Springar and Kvitnos Formations. With the new dating of the reservoir sandstones in the 6706/6-1 Hvitveis and 6706/7-2S Marisko wells, the primary target reservoirs are now better understood to be sandstones of Selandian - Danian age. Consequently, the Springar and Nise formations are buried much deeper. Fig. 3.4 shows a geoschematic section from the 6706/11-2 Gymir well across the Hel Graben towards the Hvitveis and Marisko wells. The black horizon line within the red Tang Formation section was previously interpreted to be Top Springar Formation and the top Danian sandstones 1 was previously interpreted to be Top Nise Formation.

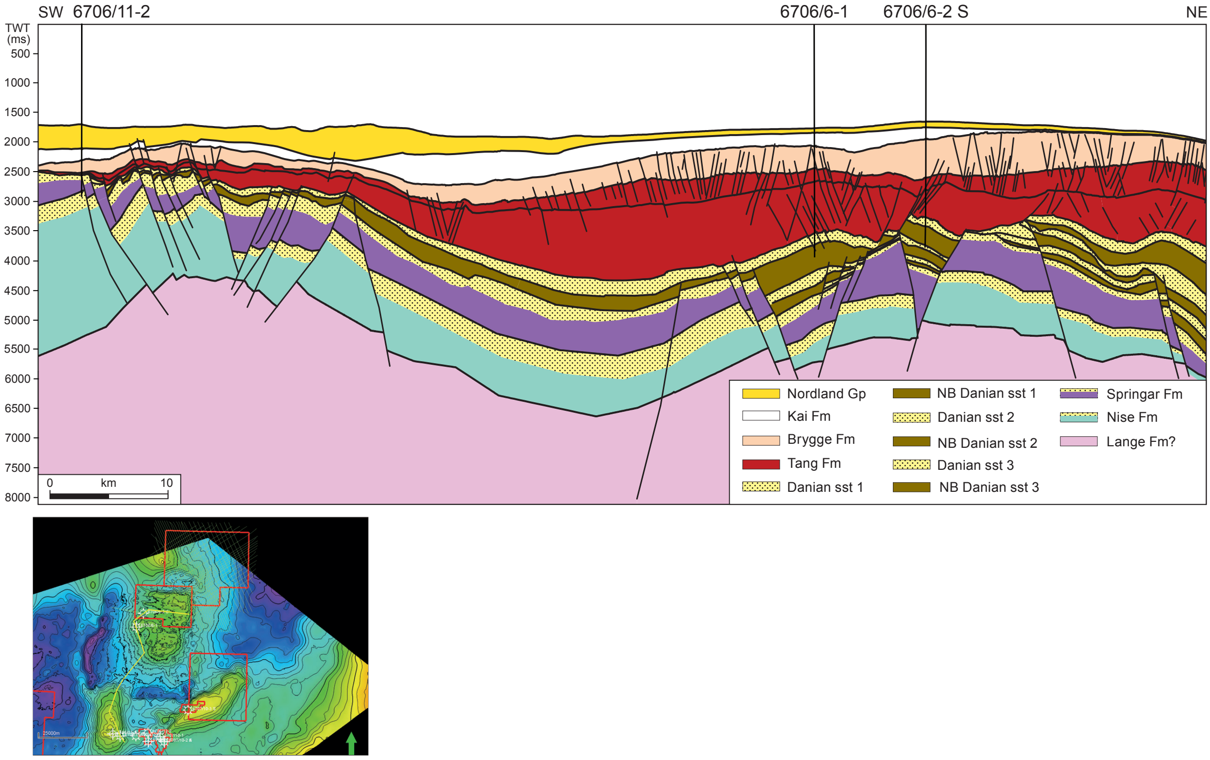

Fig. 3.4 Geoschematic section from Gymir across Hel Graben to the Hvitveis and Marisko wells

4 Prospect update report

The PL1020 is located in the northeastern part of the Naglfar Dome within the Hel Graben. This area has previously not been licensed and had a sparse seismic coverage of old vintages. The mapping of the license area indicated that there are similar extensional structures as mapped in the former PL847 (today PL1167) license. However, a dedicated dense 2D seismic data was required to resolve the structural imaging within an area affected by magmatic intrusions.

In the application, two leads Brearve and Snøarve were identified within the Upper Cretaceous Nise Formation sandstone play (Fig. 4.1). Brearve was the main lead in the application. The resource potential for the Brearve lead at the time of the APA application is shown in Table 4.1. The Snøarve lead was also identified and is located in a position straddling the PL847 licence (today PL1167) to the south. Snøarve is defined on 3D seismic data, but is considered as a lead due to minimal resources and the limited present day economical potential. The interpretation of both leads was tied to the 6706/11-1 and 6706/11-2S wells. New biostratigraphic dating revealed that the main reservoir sand in the wells is the Selandian to Danian aged Tang Formation.

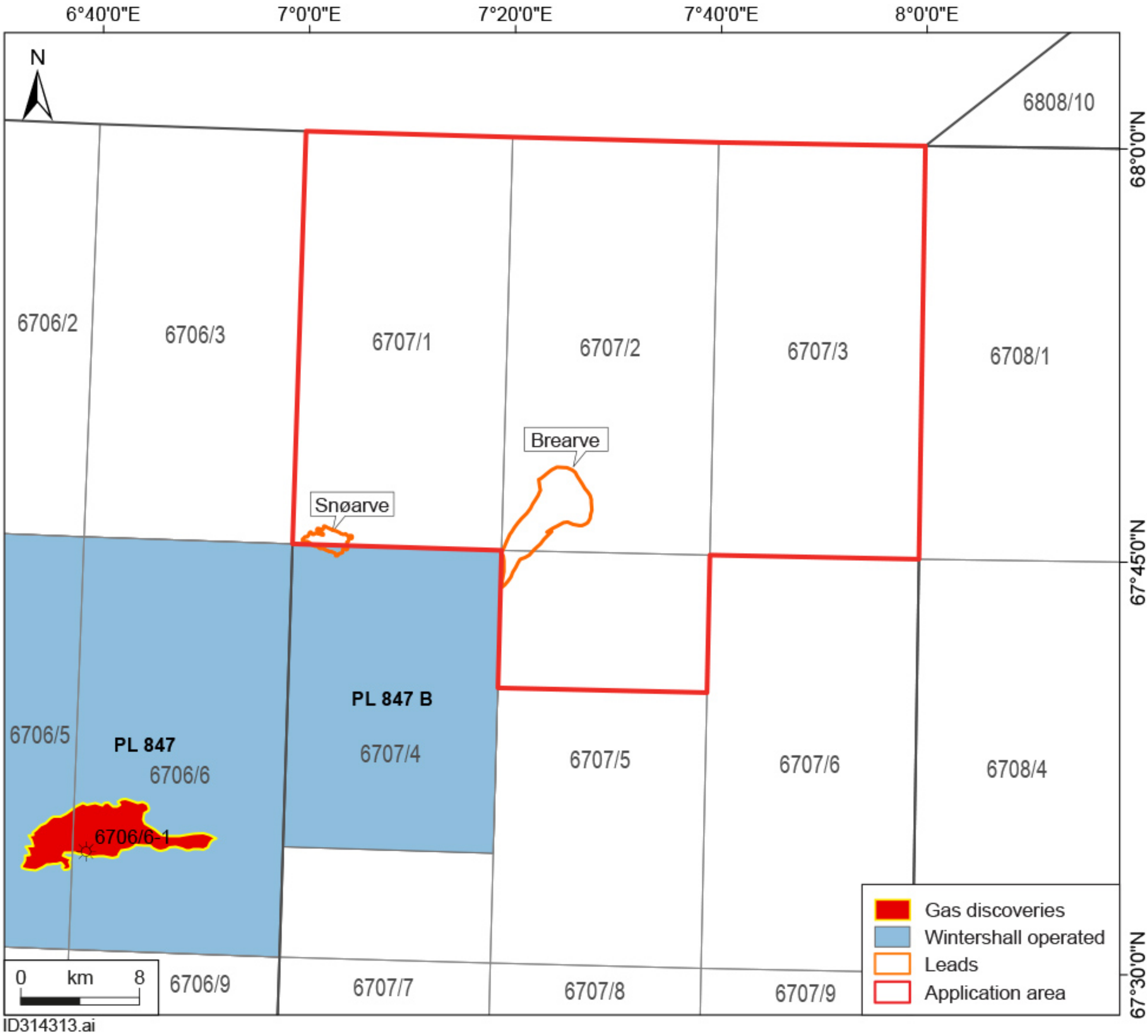

Fig. 4.1 Application area and identified leads

Table 4.1 Resource Potential

Discovery/ Prospect/ Lead name [1]	D/ P/ L [2]	Case (Oil/ Gas/ Oil&Gas) [3]	Unrisked recoverable resources [4]						Probability of discovery [5] (0.00 - 1.00)	Resources in acreage applied for [%] [6] (0.0 - 100.0)	Reservoir		Nearest relevant infrastructure [8]	
			Oil [$10^6 Sm^3$] (>0.00)			Gas [$10^9 Sm^3$] (>0.00)					Litho-/ Chrono-stratigraphic level [7]	Reservoir depth [m MSL] (>0)	Name	Km (>0)
			Low (P90)	Base (Mean)	High (P10)	Low (P90)	Base (Mean)	High (P10)						
Brearve	L		0.07	0.60	1.40	2.67	19.00	42.60		100.0	Nise Fm/ Upper Cretaceous	2820	Aasta Hansteen	90

Prospects and leads

All the opportunities identified in the license are still considered to be leads, and therefore no NPD table 4 is submitted. The data coverage in PL1020 consists mainly of 2D seismic data and hence the volume calculations have significant uncertainties.

Two new leads have been identified on the new 2D seismic survey, meaning that in total 4 leads in the Paleocene, including the Brearve lead from the application, were mapped across the licence. These leads are (Fig. 4.2):

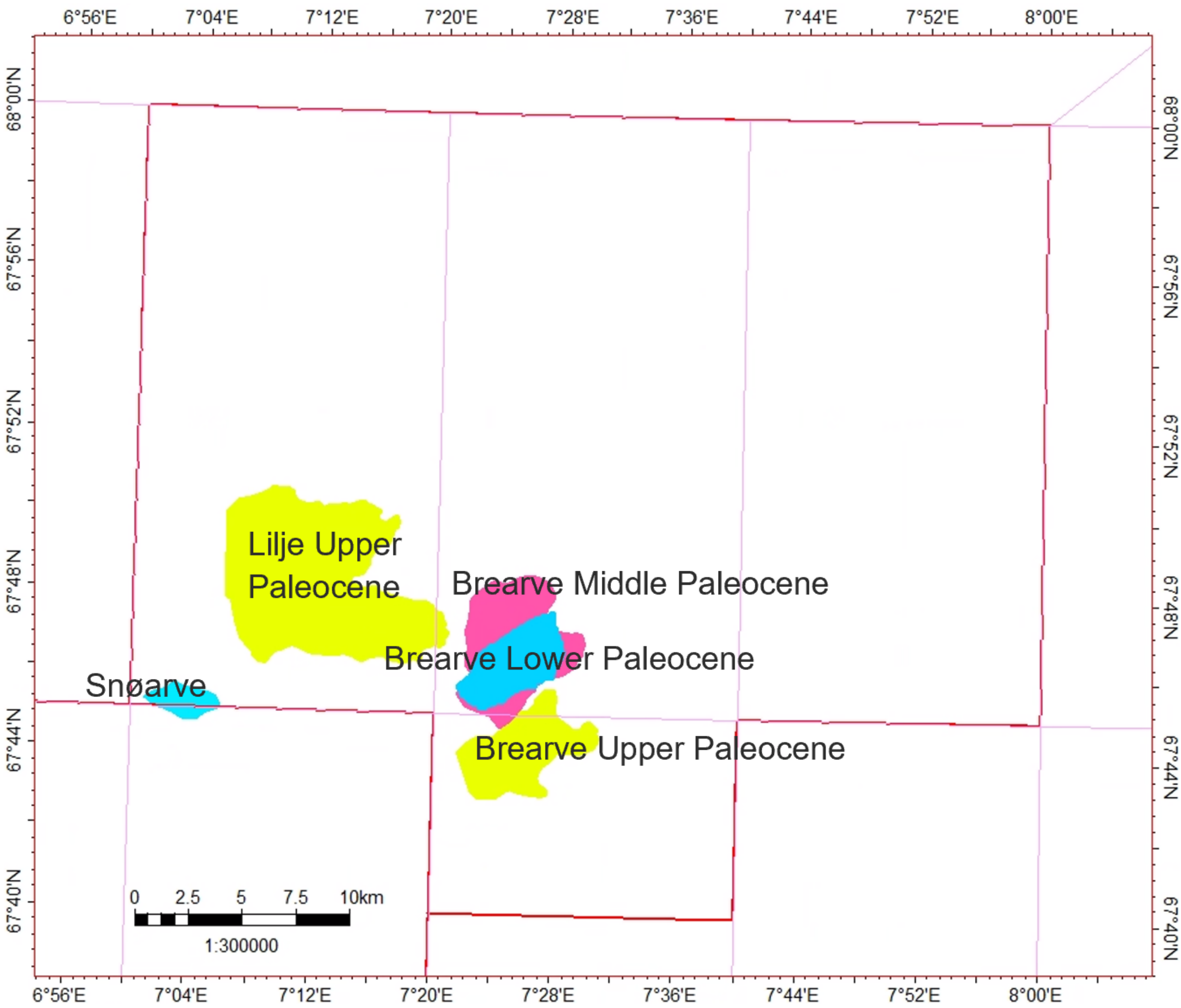

Fig. 4.2 PL1020 leads overview

1. Brearve Upper Paleocene
2. Brearve Middle Paleocene
3. Brearve Lower Paleocene
4. Lilje Upper Paleocene

Key risks and uncertainties

All four leads carry what would likely be considered a high degree of risk for a relatively low degree of 'reward'. Key risks for the two Upper Paleocene leads in PL1020 are reservoir effectiveness and trap effectiveness. For the Middle and Lower Paleocene leads the key risks are reservoir presence, reservoir effectiveness, trap presence and trap effectiveness.

The Paleocene sandstones are deep marine gravity flow deposits either sourced from the Danmarkshavn Basin from Greenland in the NW, from local erosion of the Naglfar Dome, or derived from the Lofoten area and redirected along the Bivrost Lineament (Fig. 4.3). Based on biostratigraphy dating only two wells in the Vøring Basin has penetrated Paleocene reservoir and those are the Hvitveis and Marisko wells. Both these wells encountered sandstones in the middle and lower Paleocene. Upper Paleocene sandstones have not yet been encountered in any wells in the Vøring Basin, but seismic data indicate that there might be sandstone present at the Upper Paleocene level. The seismic reflector is mappable and there are internal amplitude variations and possibly small gas hats.

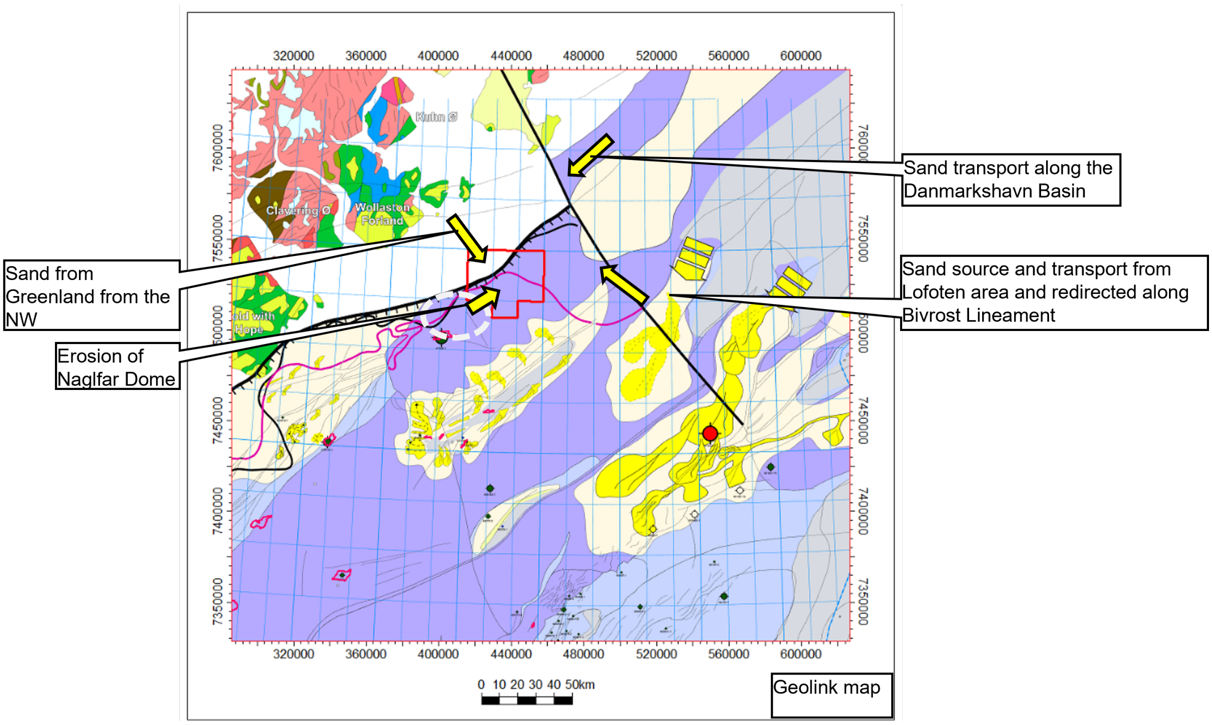

Fig. 4.3 Geolink sand distribution map Selandian Tang Formation

Trap presence and trap effectiveness are the other key risk in the area. All leads have crestal faulting, and there can potentially be fault sealing issues and the risk for leakage across or along these faults due to later reactivation.

Brearve Upper Paleocene

The Brearve Upper Paleocene lead (Fig. 4.4) has an estimated mean recoverable resource potential of 2.02 MSm^3 oe and high risk with a POSg 6.9%. The trap is a fault bounded three-way closure, located to the South of the Lower and Middle Paleocene Brearve leads. The lead is in a slightly inverted late Paleocene Basin. The seismic reflectors can be mapped with internal amplitude variations that give a low risk on reservoir presence. Reservoir effectiveness, on the other hand, is considered a high risk due to the previously mentioned variables. The 6706/6-1 and 6706/6-2S wells penetrated the Upper Paleocene with the same seismic character, and only muddy reservoirs were found there. Trap effectiveness risk is high due to crestal faulting and risk of sand - sand juxtaposition.

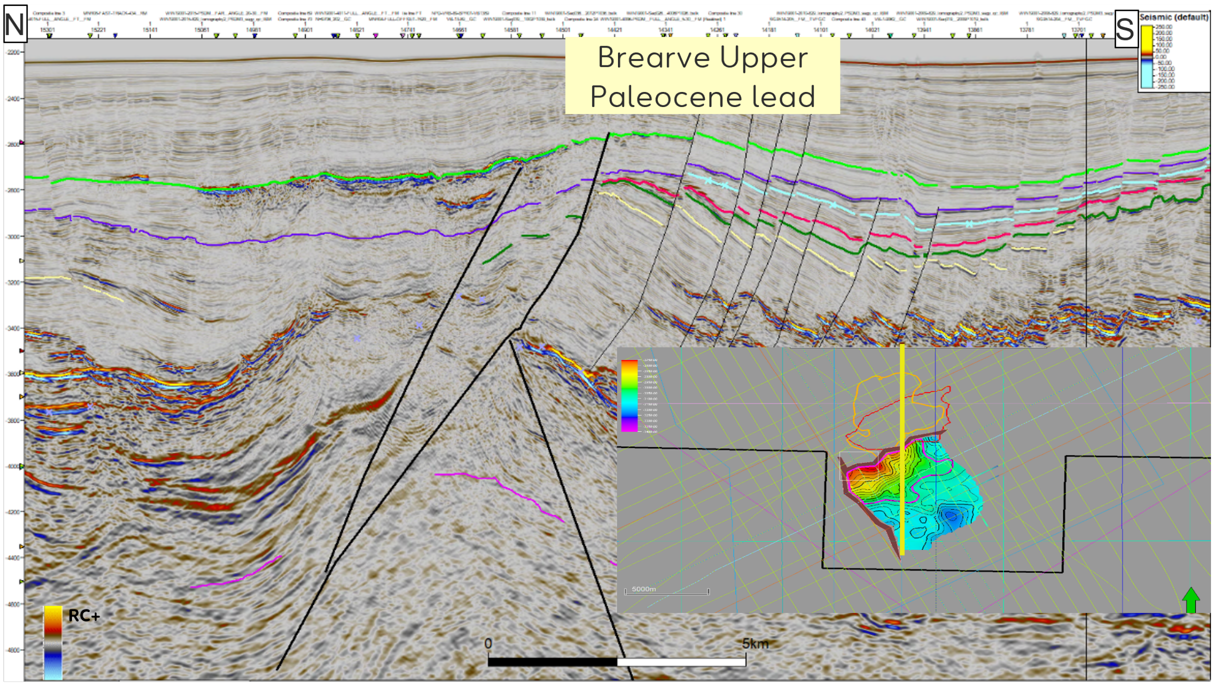

Fig. 4.4 Seismic line WIN19001 2010 PSDM across the Upper Paleocene Brearve lead.
The Upper Paleocene time structure map shows the seismic line direction across the Upper Paleocene Brearve lead.

Brearve Middle Paleocene

The Brearve Middle Paleocene lead is a fault-bound horst structure with partially mappable seismic reflectors (Fig. 4.5). There is a risk for top seal breach due to hydrothermal venting since the lead is surrounded by sills and dykes. Both overburden inner-flows and magmatic intrusions at the reservoir level distort the seismic data making it exceedingly challenging to interpret the top reservoir. Many faults and poor seismic data quality makes the lateral closure unknown. The chance for trap effectiveness is set to 40% due to crestal faulting and the risk of sand- sand juxtaposition. The mean recoverable resources are 3.81 MSm^3 oe. and POSg 9.2%.

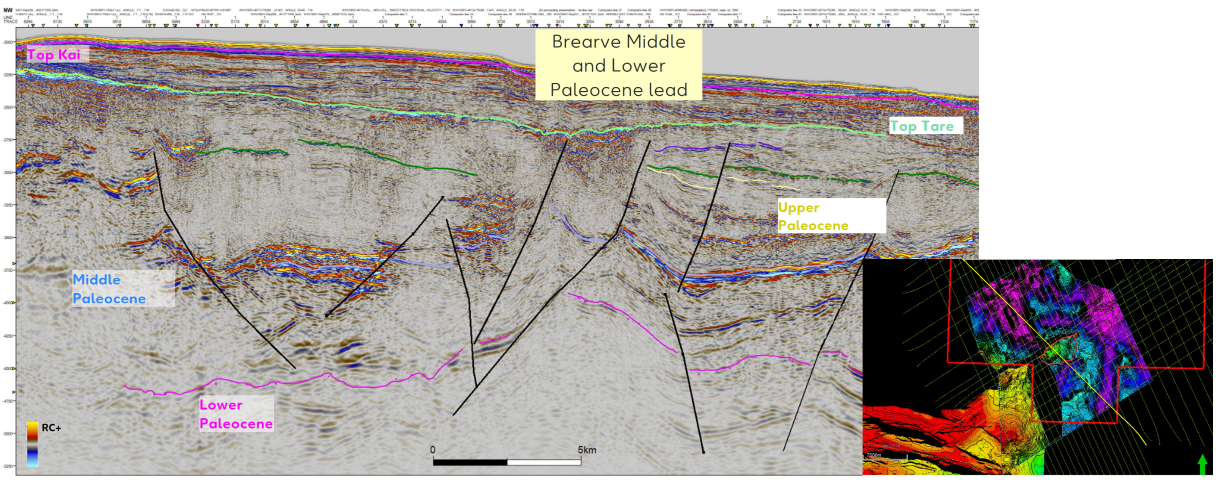

Fig. 4.5 Seismic line WIN19001-1002 PSDM across the Middle and Lower Paleocene Brearve lead
The Middle Paleocene time structure map shows the seismic line direction across the Brearve lead.

Brearve Lower Paleocene

The Brearve Lower Paleocene lead is stratigraphically below and part of the same structure as the Brearve Middle Paleocene lead (Fig. 4.5). The main risks are the same as for the shallower lead, but it has been risked to reflect additional uncertainty with regard to reservoir effectiveness due to possible clay mineral diagenesis triggered by volcanism. The mean recoverable resources are 4.46 MSm^3 oe and POSg 7.2%.

Lilje Upper Paleocene

The Lilje lead is a potential 4-way closure, located in a slightly inverted Paleocene basin (Fig. 4.6). It is not possible to delineate the northern boundary for the seismic interpretation due to magmatic intrusions. The Lilje lead contains the same main risks as for the Brearve Upper Paleocene lead and the Lilje Upper Paleocene lead has mean recoverable resources of 5.65 MSm^3 oe and a POSg 8%.

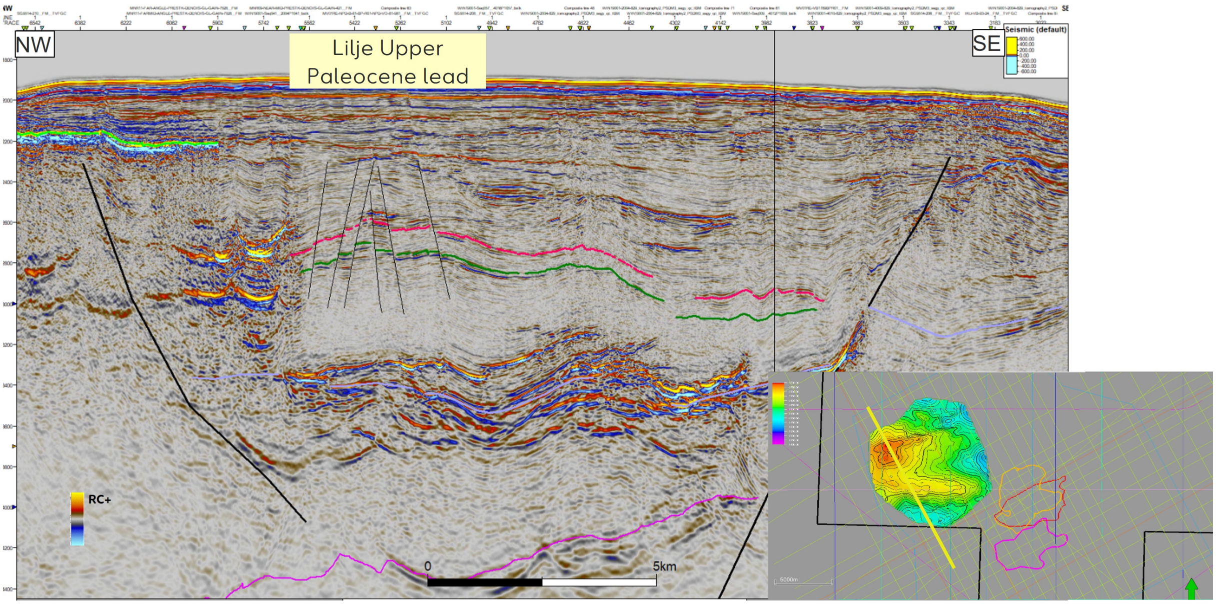

Fig. 4.6 Seismic line WIN19001-2004 PSDM across the Upper Paleocene Lilje lead

The Upper Paleocene Lilje time structure map shows tje seismic line direction across the Upper Paleocene Lilje lead. Note the northern termination of the Upper Paleocene interpretation against the intrusions.

The volumetrics and GPOS of the leads in the PL1020 are shown in Table 4.2

Table 4.2 Remaining volume potential PL1020 in million cubic meters oil equivalent

PL1020 In place volumes	**Million Sm^3 oe**	**Million Sm^3 oe**	**Million Sm^3 oe**	**Million Sm^3 oe**	
Lead	**Mean**	**P90**	**P50**	**P10**	**POSg**
Brearve Upper Paleocene	3.87	0.41	2.44	8.86	0.069
Brearve Middle Paleocene	7.31	1.03	4.73	16.4	0.092
Brearve Lower Paleocene	7.16	0.14	2.37	20.8	0.072
Lilje Paleocene	10.8	0.77	5.2	27.1	0.08
PL1020 Recoverable volumes	**Million Sm^3 oe**	**Million Sm^3 oe**	**Million Sm^3 oe**	**Million Sm^3 oe**	
Lead	**Mean**	**P90**	**P50**	**P10**	
Brearve Upper Paleocene	2.02	0.21	1.25	4.67	
Brearve Middle	3.81	0.52	2.39	8.56	

PL1020 In place volumes	**Million Sm^3 oe**	**Million Sm^3 oe**	**Million Sm^3 oe**	**Million Sm^3 oe**	
Paleocene					
Brearve Lower Paleocene	4.46	0.09	1.44	13	
Lilje Upper Paleocene	5.65	0.39	2.67	14.2	

5 Technical assessment

The lead outlines and volumetric assessments have been updated with respect to the APA2018 analysis based on the additional G&G maturation and interpretation of the newly acquired 2D seismic data. Due to the low volume and high risk of these leads and the new identified, no technical economic evaluation was carried out. Thus there have been no updates to the technical development solutions made for this period.

6 Conclusion

Wintershall Dea and the partnership have completed the work commitment of phase 1. This was to acquire a dense high resolution 2D broadband seismic and conduct G&G studies, which would highlight all leads and prospects of any size.

The Phase 2 of the work program was to acquire a subsequent 3D seismic survey placed over the most prospective areas or drop the licence. Due to the afore-described low volumes and high risk, the partnership PL1020 does not consider that there are viable prospects to justify a 3D seismic acquisition in the license. Imaging is complex due to seismic disturbance from both magmatic events at several levels and the presences of a large-scale Upper Tertiary slide. A 3D seismic feasibility study has indicated that imaging will not be improved with currently available processing techniques, thus not helping to reduce the risk.

The partnership has unanimously decided to drop the license.