AkerBP

PL 978

Relinquishment Report

Partner:

vår energi

Relinquishment Report PL978

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1 Introduction

1.1 License Group

Aker BP ASA 60 % (Operator)

Vår Energi AS 40 %

1.2 Award and work program

Production license 978 was awarded 01.03.2019 as part of the APA 2018, with a commitment to perform G&G studies in the prospect area. Within two years of award, a drill or drop decision had to be made.

In PL777, the Hornet Prospect was drilled in May 2019. The dry well 15/6-16 S on the Middle Jurassic play resulted in increased risk on the remaining prospectivity within PL978.

ECMC meetings held:

27.03.2019

07.11.2019

16.06.2020

26.11.2020

As the work obligations have been fulfilled, a unanimous decision was made in PL978 to relinquish the license at the DoD gate 01.03.2021.

1.3 Identified prospectivity

One prospect is defined within PL978 (Fig. 1.1). The Skagestølstind Prospect is a Middle Jurassic inverted fault block structure, located southwest of and partly below the shallower Glitne Field. The structure has dip closure to the west and northwest, and fault closure towards the northeast, east and south.

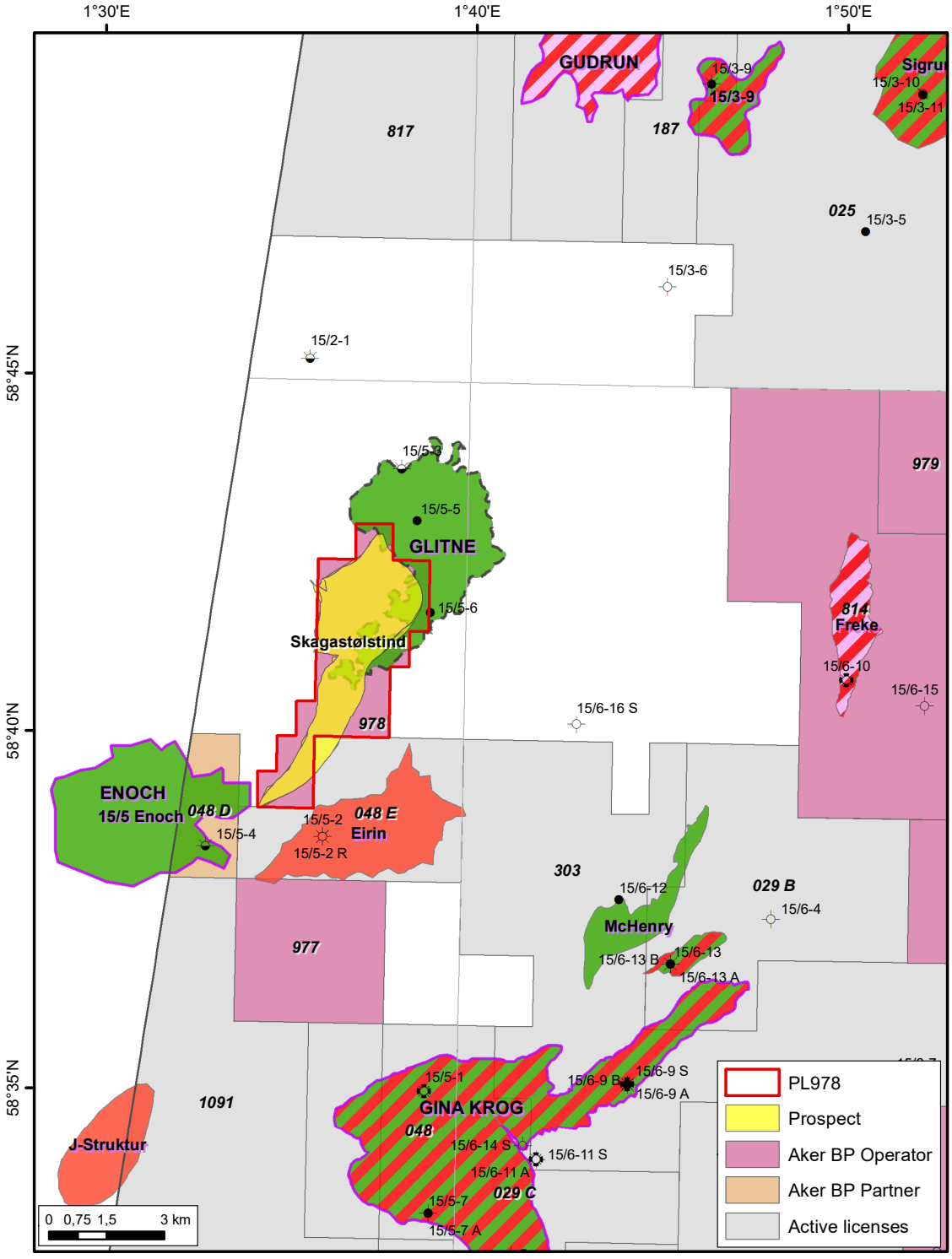

Fig. 1.1 Overview of PL978 and the remaining Skagastølstind Prospect.

The reservoir in Skagastølstind Prospect is the Middle Jurassic Sleipner Formation, with fluvial sandstones deposited in a deltaic/coastal plain environment, and continental/fluvial sandstones of the Upper Triassic Skagerrak Formation. A seismic line showing the prospect is shown in Fig. 1.2.

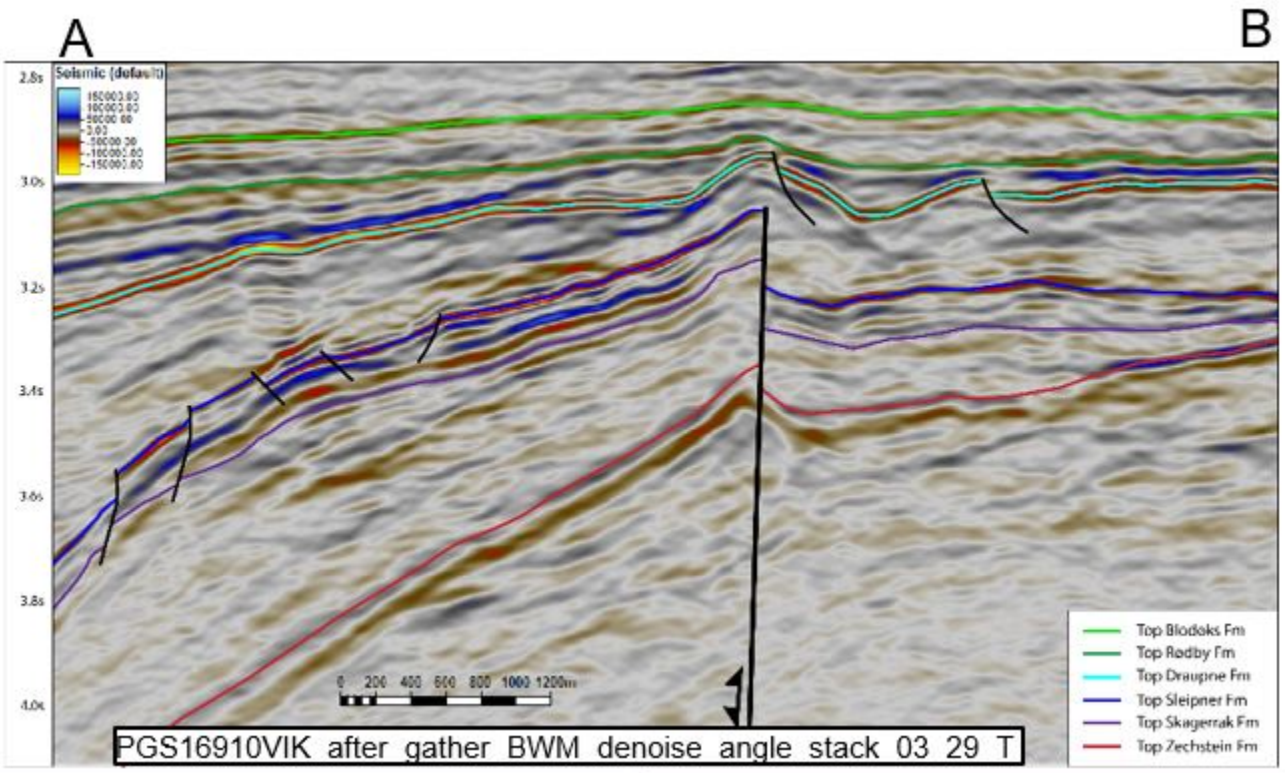

Fig. 1.2 Random seismic line through the Skagastølstind Prospect. *See Fig. 1.3 for location of line.*

Top seal and source rock are provided by the Upper Jurassic Heather (main source) and Draupne formations.

Migration is inferred to be directly from the Ve Sub-basin in the west and the Vilje Sub-basin in the northwest.

The chance of success for the Sleipner and Skagerrak formation prospect segments are estimated to 20 %. Due to the high burial depth, with top Sleipner at 3770 m MSL, reservoir quality is considered the main risk. Top Sleipner and top Skagerrak reservoir maps are shown in Fig. 1.3 and Fig. 1.4.

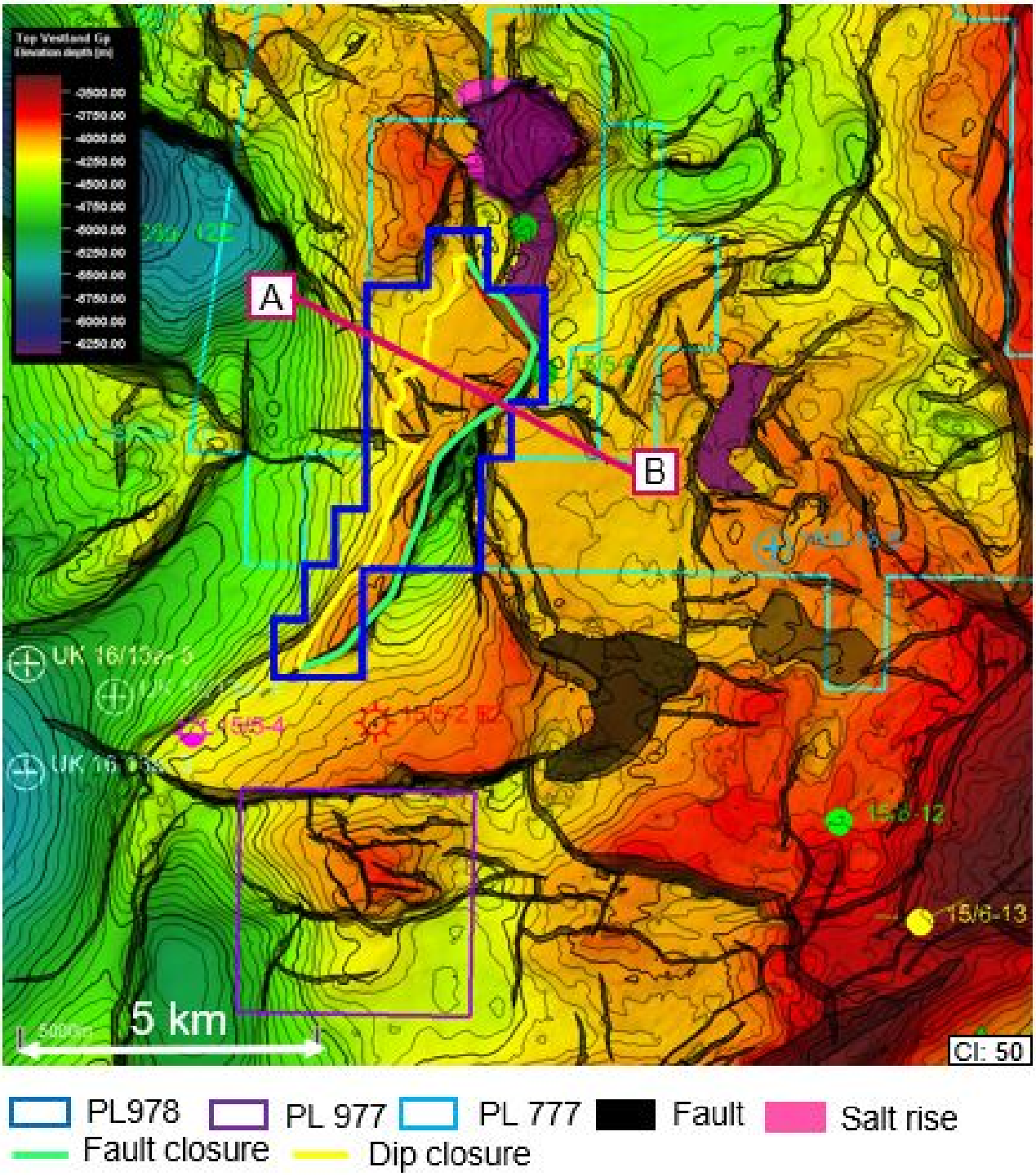

Fig. 1.3 Top Sleipner reservoir depth map including the Skagastølstind Prospect.

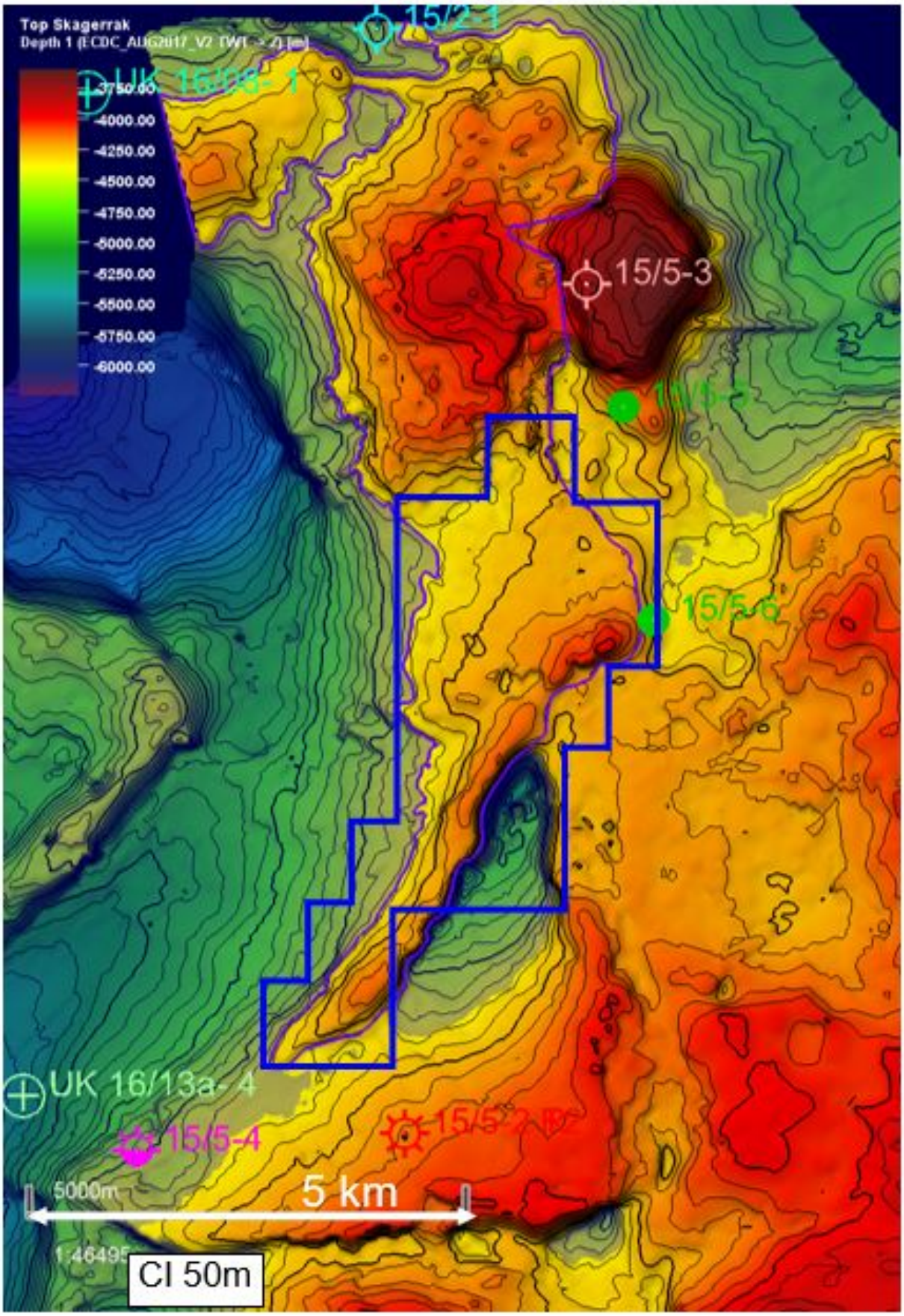

Fig. 1.4 Top Skagerrak reservoir depth map. *PL978 outline in blue.*

2 Database

2.1 Seismic data

To interpreted the Skagastølstind regional area, several seismic cubes were utilized prior to the APA 2018. For further prospect maturation the main 3D seismic data used is the PGS16910VIK (Fig. 2.1 and Table 2.1).

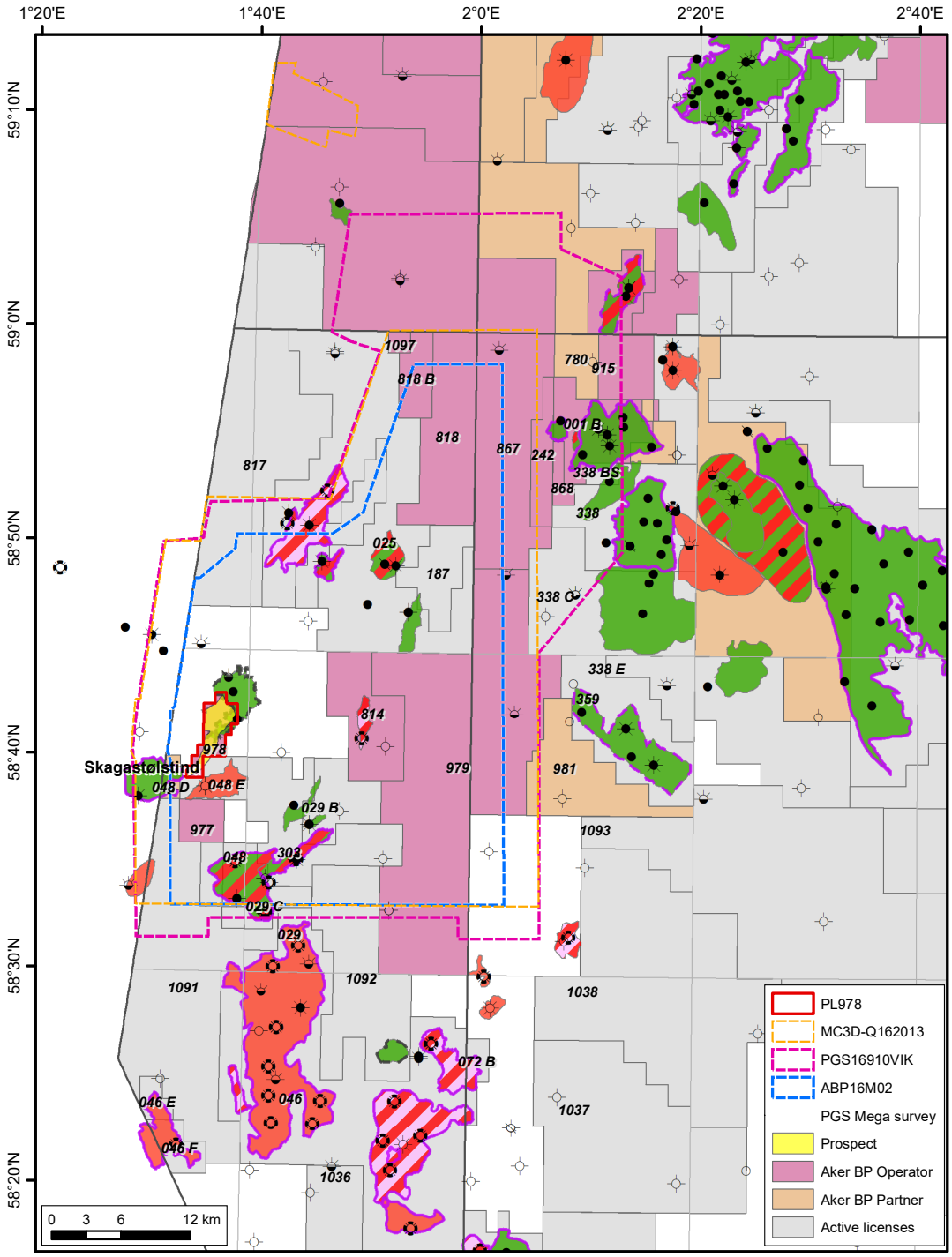

Fig. 2.1 Common seismic database in PL978.

Table 2.1 Seismic database and survey details

3D Seismic survey	Survey type	Year	Offset data	Comment	NPDID
PGS16910VIK	Reprocessed 3D	2018	x	PGS reprocessing of the multiclient MC3D-Q162013.	7782 (MC3D-Q162013) 7004 (LN0902) 7571 MC3D-Q16UK2012 8322 (PGS16002) 7378 (MC3D-SVG11)
ABP16M02	Reprocessed 3D	2017	x	Multi-azimuth reprocessing of MC3D-Q162013, MC3D-Q15 and NH9302. Both individual cubes for the involved surveys with corresponding angle stacks, and a MAZ full stack were produced	7782 (MC3D-Q162013) 3659 (MC3D-Q15) 3600 (NH9302)
MC3D-Q162013	Original 3D	2013	x		7782 (MC3D-Q162013)
PGS Megamerge	Reprocessed 3D			Available on the UKCS & NCS	

2.2 Well Data

The wells utilized and defined in the PL978 common database are shown in Fig. 2.2 and listed in Table 2.2.

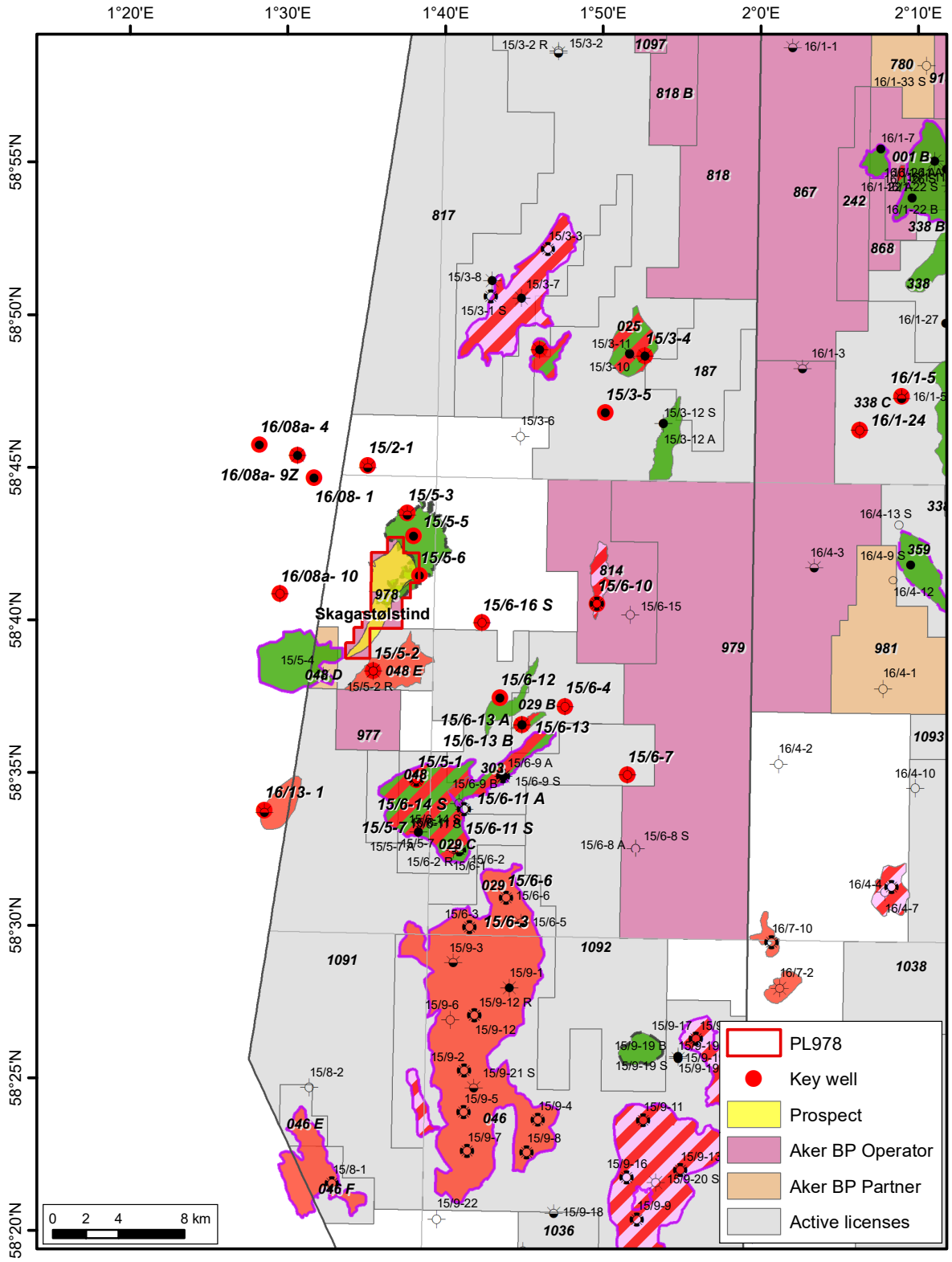

Fig. 2.2 Common seismic database in PL978.

Table 2.2 Common well database in PL978. *Key wells are highlighted in grey. * No cores, ** No cores in relevant intervals.*

Well	NPDID	Status	Year	TD (MD) [m]	TD Stratigraphy	CPI	Biostratigraphy	Cores studied
15/2-1	308	Oil/gas shows	1982	4600	Late Permian - Zechstein Gp	Yes	Yes	Yes
15/3-1 S	309	Gas/condensate	1975	5129	Middle Jurassic - Hugin Fm	Yes	Yes	No**
15/3-3	313	Gas/condensate	1979	5115	Triassic - Skagerrak Fm	Yes	Yes	No**
15/3-4	314	Oil/gas	1982	4259	Triassic - Skagerrak Fm	Yes	Yes	Yes
15/3-5	52	Oil	1984	4130	Middle Jurassic - Sleipner Fm	Yes	Yes	No
15/3-6	3250	Dry	1999	2793	Late Cretaceous - Jorsalfare Fm	Yes	Yes	No
15/3-7	4055	Oil/gas	2001	4818	Middle Jurassic - Sleipner Fm	Yes	Yes	No
15/3-9	6354	Oil/gas	2010	4654	Middle Jurassic - Sleipner Fm	Yes	Yes*	Yes
15/5-1	315	Gas/condensate	1978	3800	Late Triassic	Yes	Yes	Yes
15/5-2	316	Gas	1979	4322	Triassic	Yes	Yes	No*
15/5-3	207	Dry	1980	5042	Devonian	Yes	Yes*	No*
15/5-4	1762	Oil shows	1991	2300	Paleocene - Heimdal Fm	No	No	No
15/5-5	2635	Oil	1995	2645	Paleocene - Ekofisk Fm	Yes	No	No
15/5-B-1H	4272	Dry	2001	2376	Paleocene - Heimdal Fm	Yes	No	No*
15/5-6	3113	Oil	1997	2725	Paleocene - Ekofisk Fm	Yes	Yes	No
15/5-7	5842	Oil	2008	4037	Triassic - Skagerrak Fm.	Yes	Yes	Yes
15/6-3	318	Gas/condensate	1974	3795	Late Triassic	No	Yes	No
15/6-4	319	Dry	1976	3505	Triassic - Skagerrak Fm	Yes	Yes	Yes
15/6-6	38	Gas/condensate	1982	3760	Late Triassic - Skagerrak Fm	Yes	Yes	No
15/6-7	2084	Dry	1993	3540	Triassic - Smith Bank Fm	Yes	Yes	No**
15/6-10	6030	Gas/condensate	2009	3700	Late Triassic - Skagerrak Fm	Yes	Yes	No*
15/6-11 A	6526	Gas/Condensate	2011	4305	Early Jurassic - Statfjord Gp	Yes	Yes	Yes
15/6-11 S	6488	Dry	2010	4042	Early Jurassic - Statfjord Gp	No	Yes*	No*
15/6-12	6518	Oil	2011	3930	Late Triassic - Skagerrak Fm	Yes	Yes	No*
15/6-13	7667	Oil	2015	3577	Late Triassic - Skagerrak Fm	Yes	Yes	Yes
15/6-13 A	7668	Dry	2015	3925	Late Triassic - Skagerrak Fm	No	No	No*
15/6-13 B	7718	Oil/gas	2015	3773	Late Triassic - Skagerrak Fm	No	No	No*
15/6-16 S	8747	Dry	2019	4203	Late Triassic - Skagerrak Fm	Yes	Yes	No*
16/1-3	84	Oil shows	1982	2460	Pre-Devonian - Basement	Yes	Yes	No**
16/1-5	3279	Dry	1998	2460	Pre-Devonian - Basement	Yes	Yes	Yes
16/1-24	7616	Dry	2015	2299	Late Jurassic - Hugin Fm	Yes	Yes*	No*
UK16/07a-30Z		Oil	1987	5255	Middle Jurassic - Pentland Fm	No	No	No
UK16/07a-33		Oil	1993	6141	Middle Jurassic - Pentland Fm	No	No	No
UK16/08-1		Oil	1972	4883	Middle Jurassic - Pentland Fm	No	Yes	No**
UK16/08a-4		Gas/condensate	1986	4910	Middle Jurassic - Heather Fm	No	Yes	No
UK16/08a-9z		Oil	1988	5165	Middle Jurassic - Pentland Fm	No	Yes	No
UK16/08a-10		Dry	1988	4907	Middle Jurassic - Pentland Fm	No	No	No*
UK16/12b-10		Dry	1986	4707	Late Jurassic - Brae Fm	No	No	No
UK16/13-1		Oil	1977	4502	Middle Jurassic - Pentland Fm	No	No	No
UK16/13a-3		Oil	1985	5206	Middle Jurassic - Pentland Fm	No	No	No
UK16/17-8A		Oil	1979	4596	Middle Jurassic - Pentland Fm	No	No	No

The 15/6-16 S Hornet well, drilled in May-June 2019, has been an important well for de-risking the reservoir presence and quality.

2.3 Special studies

No special studies were performed in the license.

Study included in common database:

Surface Geochemical Survey using ORG sub-sea sampling and analysis within the Sleipner area (ORG Engineering AS, 2017).

3 Remaining prospectivity

Skagastølstind is the only prospect defined within PL978 (Fig. 1.1, Fig. 1.2, Fig. 1.3 and Fig. 1.4). In the APA 2018 application, a Ringstind Lead with reservoir in the Hermod Formation was mapped. However, this lead is almost completely outside of the license area, and has not been evaluated further in the license. After APA award, the work performed in the license to mature the Skagastølstind Prospect was:

- Seismic mapping and prospect maturation
- Paleogeographic reconstruction of the semi-regional area for better understanding of the depositional system, especially during the Jurassic
- Petroleum system analysis including basin modelling and sedimentology
- Well studies of the 15/6-16 S Hornet well for update of the Skagastølstind Prospect

The above listed studies has confirmed that any Hugin Formation sandstones deposited and preserved in the prospect area is very unlikely. The Hornet well contributed to valuable reservoir data input to de-risking Skagastølstind and to update the reservoir parameters for the resource calculations of the Sleipner and Skagerrak reservoir segments. The Hornet well, drilled in May-June 2019 after award of PL978, encountered poor reservoir quality in both reservoir formations. Pre-APA 2018, volume and risk assessment indicated a marginal potential. The updates performed, has not strengthened the robustness of the prospectivity. The disappointing results of the Hornet and Freke-Garm wells have contributed to a downgrading of the larger area for the PL978 partnership.

Depth to apex of the Sleipner and Skagerrak formations in Skagastølstind are 3780 and 3970 m MSL, respectively. Reservoir thickness are mapped to be in a range from 75 to 150 m. Mean gas/condensate columns are 325 and 277 m.

Average (mean) N/G for the Sleipner reservoir used is 0.21 with a porosity of 13 %. Skagerrak reservoir properties used is a N/G of 0.37 with a mean porosity of 12 %.

Overall probability (Pg) for the prospect post APA 2018 has increased. Updated possibility of migration into the trap has increased the Pmig, however, the risk of reservoir quality has increased after the Hornet and Freke-Garm wells.

The latest volumes and risk calculations in the license is summarized in Table 3.1.

Table 3.1 Remaining resources within PL978.

Prospect name (H-class)	Fluid phase	STOOIP [10^6 Sm^3] P90 – P50 – Mean – P10	Rec. Resources [10^6 Sm^3] P90 – P50 – Mean – P10	GCOS
Skagastølstind Sleipner (H2)	Gas/cond.	1.08 – 3.94 – 4.49 – 8.65	0.61 – 2.63 – 2.59 – 5.05	0.20
Skagastølstind Skagerrak (H2)	Gas/cond.	0.70 – 3.21 – 3.99 – 8.35	0.40 – 1.82 – 2.31 – 4.91	0.20

4 Conclusion

The main prospect in the license PL978 was the Skagastølstind Prospect. The license was awarded with a 2 year work commitment to perform G&G studies prior to a drill or drop decision. The Skagastølstind Prospect, with reservoir in the Vestland Group and the Skagerrak Formation, was further matured during the license period. Results of exploration wells in the neighbouring PL777 (15/6-16 S Hornet) and PL814 (15/6-15 Garm), resulted in downgrading the reservoir properties in the Sleipner and Skagerrak reservoirs, hence a reduction of the initial volume estimates of Skagastølstind. The above work and well results leaves the Skagastølstind Prospect with a considerable risk on reservoir quality and with a limitied HC-volume potential. The current resource estimate in the license is estimated to be below minimum economic field size, and hence is not of commercial interest by February 2021. There are no other prospectivity mapped in the license area.

As the G&G work obligations have been fulfilled, a unanimous decision was made in PL978 to relinquish the license at the DoD gate 01.03.2021.

5 References

ORG Geophysical AS, 2017: Surface Geochemical Survey Report, ORG17100- Sleipner Area

Aker BP ASA, 2019: Well 15/6-16 S Final Well Report. License PL 777

RPS, 2019: Petrographic Analysis of Well 15/6-16 S

Stratum Reservoir (NOR) AS, 2019: Composition Analysis of RDT Samples from Well 15/6-16 S

APT, 2019: Fluid and Gas Analysis Well 15/6-16 S

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