PL870 License Surrender Report

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1 License history

License: PL870

Location: Blocks 25/6, 25/9 and 26/7

Awarded: 10.02.2017 (APA 2016 application)

License period: Expired 10.02.2020

License group: Equinor Energy AS 80% (Operator)
DNO AS 20%

License area: 449.74 km^2

Work obligations:

- Study of geology and geophysics
- Drill or drop decision date: 10.02.2018

Meetings held:

28.04.2017	EC/MC startup meeting
12.07.2017	MC meeting
02.05.2018	EC workmeeting
06.06.2018	EC/MC meeting
04.09.2018	EC workmeeting
02.06.2019	EC meeting – Pabow pre-well meeting
13.09.2019	EC meeting
22.01.2020	EC/MC meeting

Work performed:

2017:	Seismic interpretation, depth conversion, basin modelling update, G&G evaluations Pabow G&G QC and technical-economic evaluation
2018:	Decision to drill Pabow well 25/6-6 S Well planning
2019:	Drilled Pabow well 25/6-6 S, entered 28.03., completed 22.04.2019 Post-well analyses, evaluations and reporting
2020:	Decision to surrender the license

Reason for surrender

The PL870 was awarded in February 2017 with a requirement of performing relevant geological- and geophysical studies in addition to a drill or drop decision within a one year period of work program. The drill decision was taken 10.02.2018. The Pabow prospect was the main prospect in this license and the well was defined as a “game changing well”. The motivation for accessing the unmatured Stord basin and the license was the large volume potential and play opener opportunity that was [redacted]

Pabow represented a robust faulted rollover anticlinal trap with Statfjord Group reservoir. The structural closure was formed by fault activity during an Early Jurassic tectonic phase. The Top Statfjord reservoir map was constructed by shifting the intra Statfjord Group coal seismic horizon up 135 m to fit the seismic to well tie in 26/4-1, assuming the stratigraphic layering is uniform. Top seal was represented by the marine shales of the Dunlin Group. There were three smaller upside prospects in the same license with the same reservoir and source concept which could be de-risked by the Pabow well.

The Pabow well result came out negative, confirming no hydrocarbons at any stratigraphic levels. Extended data acquisition was performed [redacted]. As there is still a high risk on the presence of source and the well did not confirm the maturation [redacted], the license is believed to be of limited interest. The PL870 partnership decided to relinquish the license before the BoK deadline 10.02.2020.

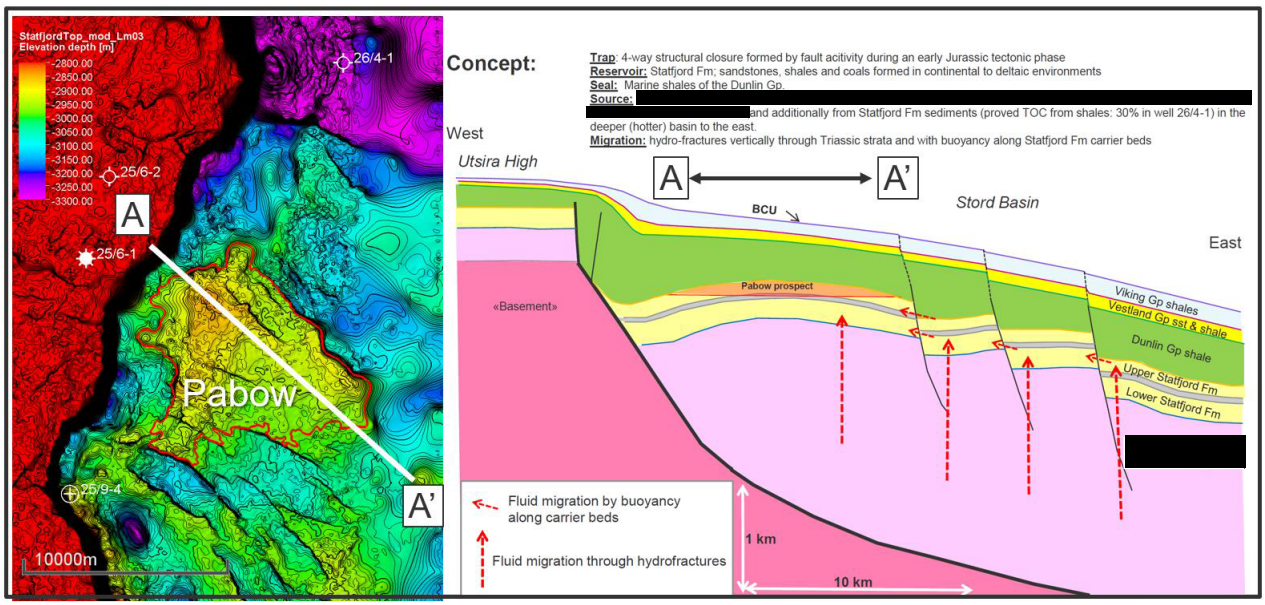

Figure 1 Statfjord depth map (left) and migration model (right) including both the conventional model with Statfjord Gp source rock [redacted]

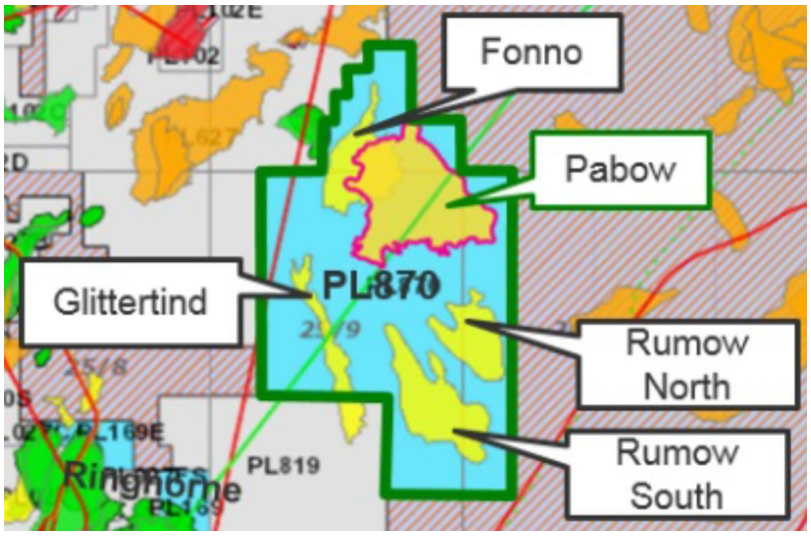

Figure 2 Prospects and leads in PL870.

2 Database overviews

2.1 Geophysical data

Table 1: List of seismic surveys in the common license database (see also Figure 3 and Figure 1). The NO07M01 Raw stack data was used as the main data set for seismic interpretation for Pabow together with 2D data NSR06 and NSR08.

Seismic survey	2D/3D	Year	Quality
UHN98 (ST0325)	3D	2009	Good
ST9707 (ST0325)	3D	1997	Good
EN0101 (ST0325)	3D	2001	Good
NO07M01	3D	2007	Moderate-Good
NSR06	2D	2005	Moderate-Good
ST8301	2D	1983	Moderate
CNST86	2D	1986	Moderate

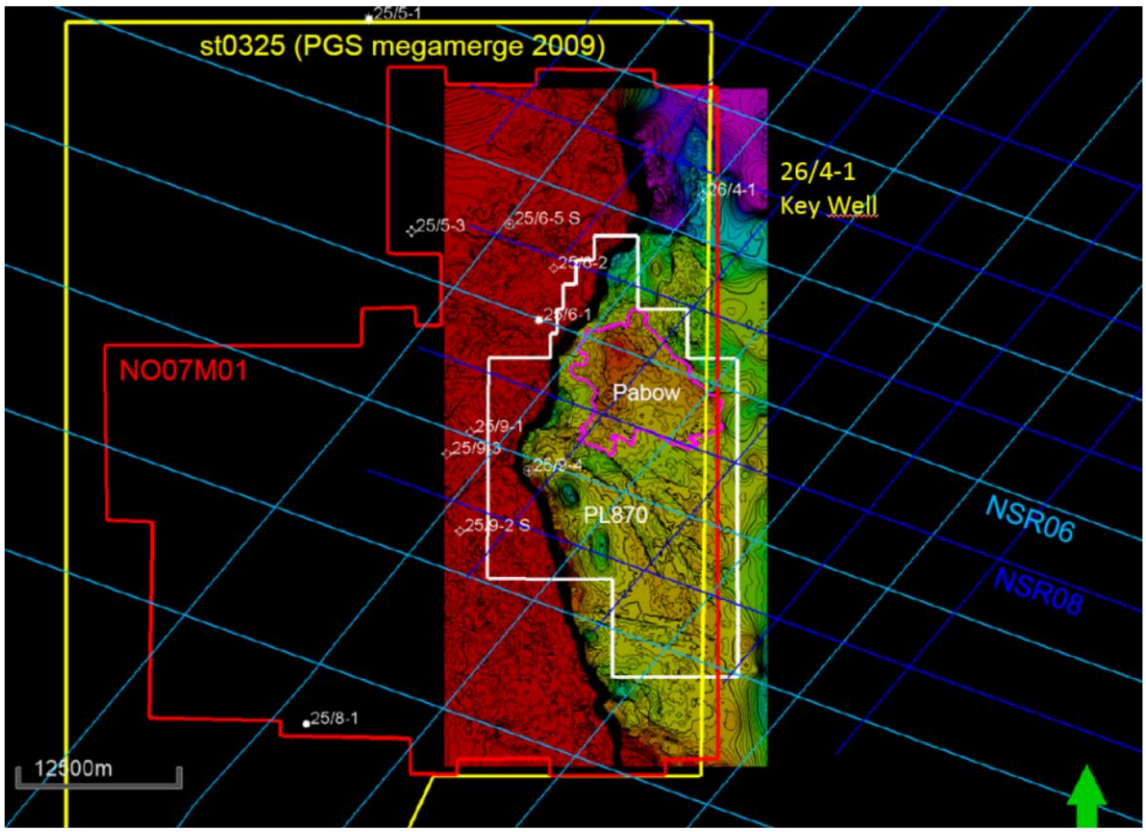

Figure 3 Seismic Database. NO07M01 Raw stack used as main data set for seismic interpretation.

2.2 Well data

Table 2 List of wellbores in the common license database (see also Figure 4).

Well	Year	Drilling operator	Present license	Status	Age at TD	Use
31/6-3	1983	Norsk Hydro Produksjon AS	Open Area	Dry	Triassic	D, M
30/6-18	1985	Norsk Hydro Produksjon AS	PL053	Oil/Gas	Late Triassic	D, R
25/3-1	1989	Elf Petroleum Norge AS	Open Area	Dry	Late Triassic	D, M
25/2-14	1991	Elf Petroleum Norge AS	PL364	Dry	Early Jurassic	D
25/5-1	1987	Elf Petroleum Norge AS	PL364	Oil/Gas	Triassic	D, R
25/5-3	1990	Elf Petroleum Norge AS	PL102	Gas/ Condensate	Triassic	D, P, R
26/4-1	1987	BP Norway Limited U.A.	PL678 SB	Dry	Triassic	D, M, R, GM, T, DC, P
25/6-1	1986	Saga Petroleum	PL627	Oil	Pre-Devonian	D, T, P, R
25/9-1	1995	Amerada Hess Norge AS	PL627	Dry	Late Triassic	D, P, R
25/9-3	2009	Norwegian Energy Company ASA	PL627	Dry	Early Jurassic	D
25/9-4	2014	Statoil Petroleum AS	Open Area	Dry	Middle Jurassic	D
25/8-1	1970	Esso Exploration & Production Norway AS	PL027	Oil	Early Permian	D
17/6-1	2011	Norwegian Energy Company ASA	PL781	Oil Shows	Late Triassic	D, M
17/9-1	1973	Esso Exploration & Production Norway AS	Open Area	Dry	Middle Jurassic	D, M
17/4-1	1968	Elf Petroleum Norge AS	PL816	Dry	Early Permian	D, M
17/3-1	1995	Elf Petroleum Norge AS	PL781	Gas	Pre-Devonian	D, M

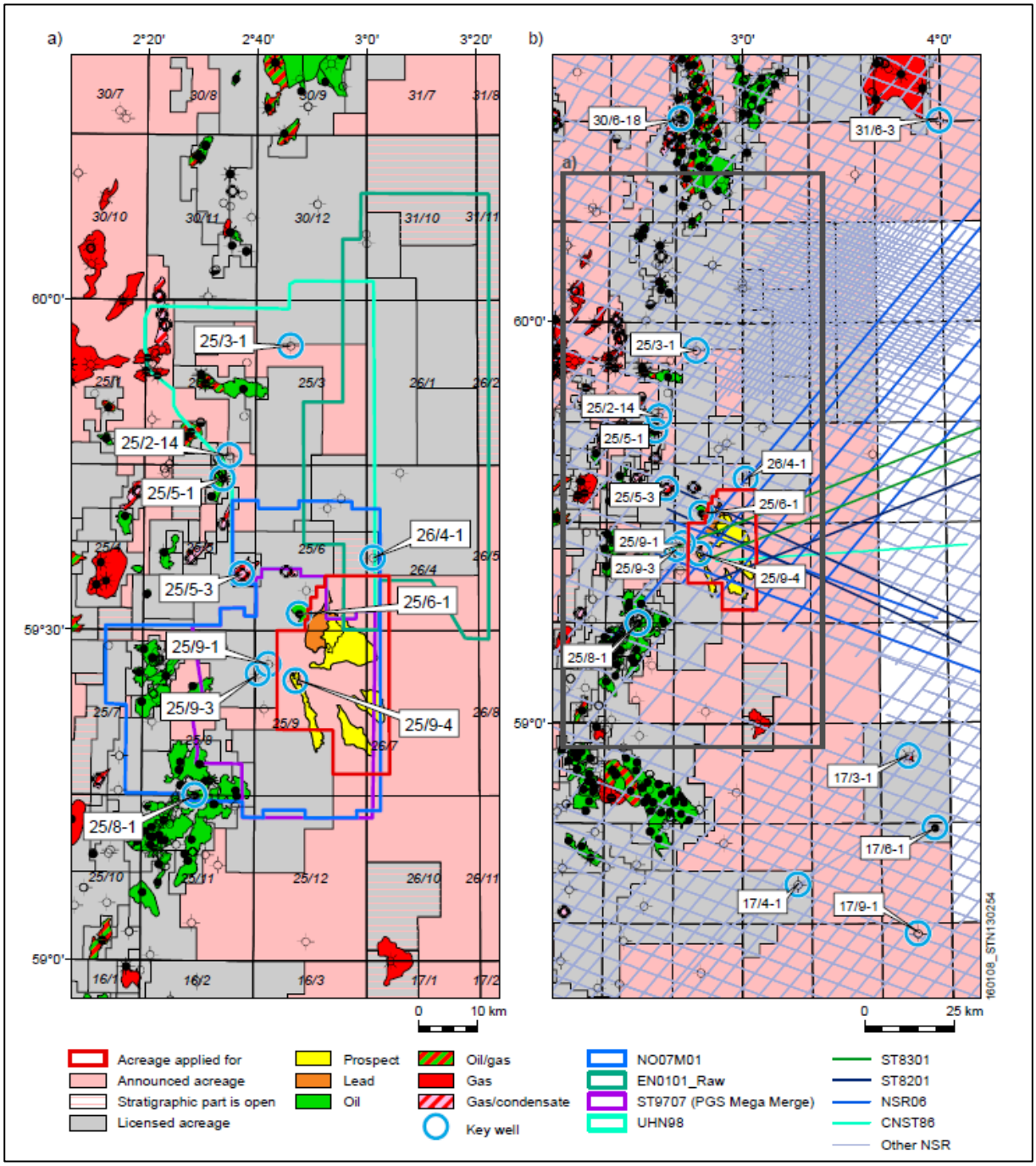

Figure 4: Seismic and well database.

3 Results of geological and geophysical studies

The main prospect in PL870 was the Pabow prospect with reservoir of the Statfjord Gp. G&G work in the license period thus focused on maturing Pabow as a drilling candidate.

The following G&G studies have been performed:

- Seismic data quality and conditioning study
- Seismic interpretation on NO07M01 Raw stack and 2D lines
- Depth conversion study
- Basin modelling study

The seismic interpretation and depth conversion work performed resulted in a more detailed top reservoir depth map, particularly with improved definition of faults, and with higher confidence of the depth conversion (Figure 5). Overall, the structure was very similar compared to the map from the APA application and the GRV did not change substantially.

The existing Stord Basin petroleum system basin model was revisited, and sensitivities were investigated to better understand the potential hydrocarbon volume range from a conventional Statfjord Gp source rock, [redacted] The study showed that only limited amounts of hydrocarbons (wet gas) were expected to be generated from conventional source rock modelling and migration loss was expected large due to complicated migration route. From this, the expectation was that the Pabow structure was likely underfilled if sourced from a conventional Statfjord Gp source rock.

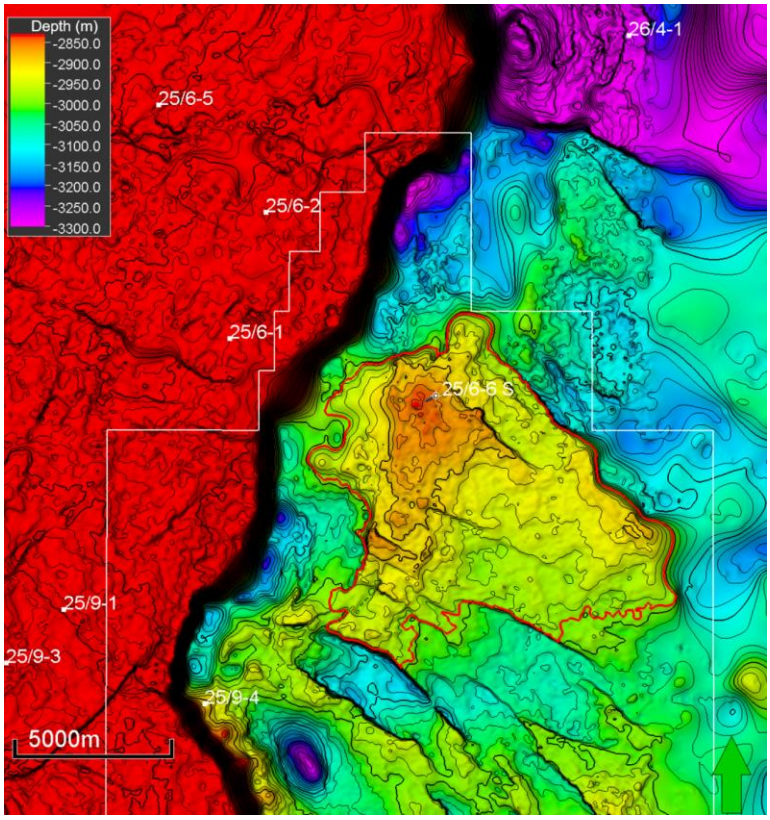

Figure 5 Pabow prospect top reservoir depth map with location of the 25/6-6 S well.

4 Prospect update report

The Pabow prospect was evaluated as a combined case with contributions from both a conventional Statfjord Gp source rock [redacted]

- [redacted]
- [redacted]

[redacted]

The Pabow prospect had a geological risk Pg of 0.21. The main risk was related to presence of source and migration:

- Play risk source 0.5 (source not proven in Stord Basin)
- Prospect risks source 0.8 and migration 0.7

Given that the main risk was associated with hydrocarbon source while trap and reservoir carried no or only minor risks, the Pabow prospect was a good opportunity to test [redacted]

The Pabow well 25/6-6 S drilled in 2019 was dry with no shows. The well penetrated the primary target Statfjord Gp close to the apex of the Pabow prospect proving 80 m of moderate to good quality reservoir within a 330 m gross interval. Reservoir properties were as expected. The net-to-gross in the upper part of the Statfjord Gp was lower compared to the reference well 26/4-1. The secondary objective Hugin Fm was not penetrated in a structural closure, thus not optimal for finding hydrocarbons, proving 30 m of good quality reservoir within a gross of 45 m. Pressure data indicated that the Hugin Fm was depleted (-13 bars) and very likely in communication with the Statfjord Gp on the Utsira High, where widespread pressure depletion is recorded in many wells as a result of production. The Statfjord Gp is slightly overpressured compared to hydrostatic (+8 bars) proving the seal capacity of the Dunlin Gp.

Given the negative well result where neither [redacted] was proven, source and migration were still high risks for the other smaller prospects in the license. Thus, the remaining prospectivity was considered small.

Table 3 Recoverable resources for all prospects in the licence, August 2017. Volumes for Pabow were updated in November 2017 (Table 4).

[redacted]

Table 4 Volumes and risk Pabow November 2017, pre-well 25/6-6 S.

[redacted]

5 Technical evaluation

The Pabow prospect was evaluated as a potential subsea tie-back to the Heimdal platform, which is located approximately 40 km to the northwest of Pabow. The development solution assumes drainage by pressure depletion and 3-5 producers. Post-well 25/6-6 S, the remaining prospectivity in the license is small and currently not economical interesting.

6 Conclusion

The work program for PL870 has been completed with extensive G&G work and drilling of the Pabow prospect with well 25/6-6 S in April 2019. The negative well result did not reduce the risk of the other, smaller prospects in the license. The remaining potential is considered not interesting at present, thus, the decision to relinquish the license.