

PL 612 Licence Status report

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1 Key licence history

License: PL612 - blocks 7318/8, 7318/9, 7319/7

Awarded: May 13th 2011

License period: Expires May 13th 2018
Initial period: 7 years

License group: Statoil Petroleum AS 80% (Operator)
Petro AS 20%

License area: 891.441 km²

Work program: Reprocess 2D seismic data within license. Acquire 3D seismic. Drill or drop decision 13.11.2017. Original drill or drop 13.05.2015. Extended to wait on well results in PL 716.

Meetings held:

22.06.2011	ECMC startup meeting
30.08.2011	Workshop
17.11.2011	ECMC
14.09.2012	Work meeting
06.11.2012	ECMC
26.11.2013	ECMC
18.06.2014	ECMC
16.10.2014	EC
28.11.2014	ECMC
08.06.2015	Workshop
05.10.2016	ECMC
23.10.2017	ECMC - DoD decision

Work performed:

2011:	License awarded and license start-up.
2012:	2D reprocessing
2013:	Seismic 3D acquisition and processing
2014:	Prospect evaluations
2015:	New DoD granted 13.11.2016 (awaiting well results in PL 716).
2016:	New DoD granted 13.11.2017 (awaiting well results in PL 716). Change of company name from GDF Suez E&P Norge AS to ENGIE E&P Norge AS.
2017:	Evaluating well results in PL 716. Decision made to surrender license. Transfer of operatorship from ENGIE E&P Norge AS to Statoil Petroleum AS. Transfer of 50% shares from ENGIE E&P Norge AS to Statoil Petroleum AS.

Reason for surrender:

PL612 is surrendered due to minor volume potential and high risk. None of the mapped prospects are regarded as drillable prospects. Recent wells in nearby PL 716 and PL 718 (Figure 1) were classified as dry and showed little to no reservoir potential.

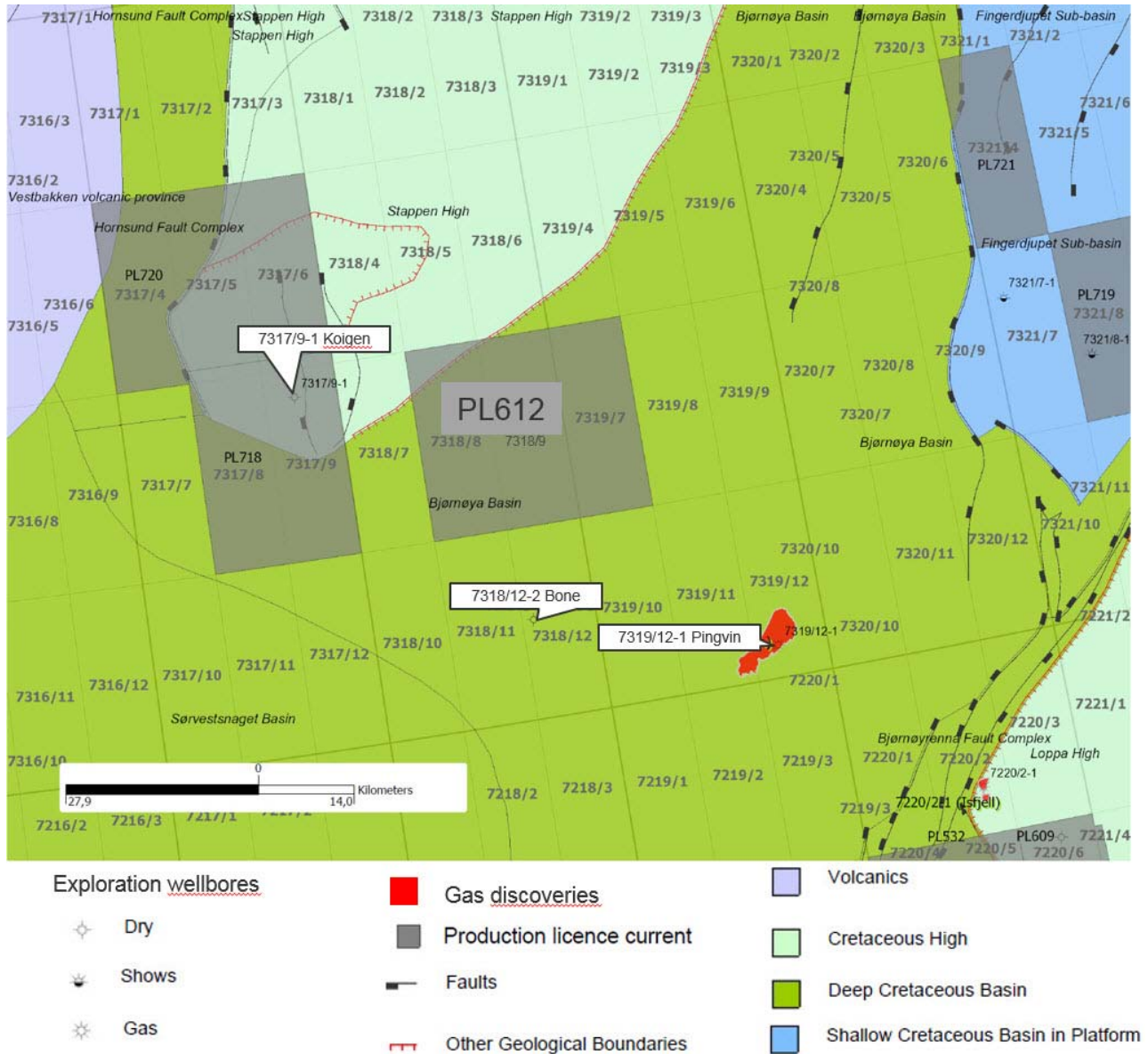


Figure 1. Area map displaying the location of PL612, and structural elements, wells, licenses and discoveries in the vicinity.

2 Database

2.1 Seismic

The seismic data coverage available to the operator is shown in Table 1 and Figure 2. The 3D seismic data used for prospect evaluation and well planning was SWB12.

Table 1. Common seismic database in PL 612.

Survey name	NPDID	Survey year	Seismic type	Seismic operator	Market available
SWB12	7569	2012	3D	Fugro Multi Client Services AS	Yes
BARE05		2005	2D	Fugro Multi Client Services AS	Yes
NBR06/NBR06RE10	4365	2006/2010	2D	Fugro/TGS	Yes
NBR07	4451	2007	2D	Fugro/TGS	Yes
NBR08	4573	2008	2D	Fugro/TGS	Yes
NBR09		2009	2D	Fugro/TGS	Yes
NPD-BJRE-84-GDF-R05	2643	2005	2D	GDF Suez	Yes
GEBB-88	3114	2005	2D	Western Geco	Yes

2.2 Wells

Table 2. Common well database in PL 612.

Well name	Year drilled	Age TD	Operator	Content
73217-1	1988	Middle Triassic (Snadd Fm.)	Mobil	Gas shows
7321/8-1	1987	Permian (Røye Fm.)	Norsk Hydro	Shows
7321/9-1	1988	Middle Triassic (Snadd Fm.)	Norsk Hydro	Shows
7316/5-1	1992	Paloecene (Torsk Fm.)	Norsk Hydro	Gas
7219/9-1	1988	Middle Triassic (Snadd Fm.)	Norsk Hydro	Shows
7219/8-1 S	1992	Middle Jurassic (Stø Fm.)	Saga	Dry
7220/6-1	2005	Basement	Norsk Hydro	Oil shows

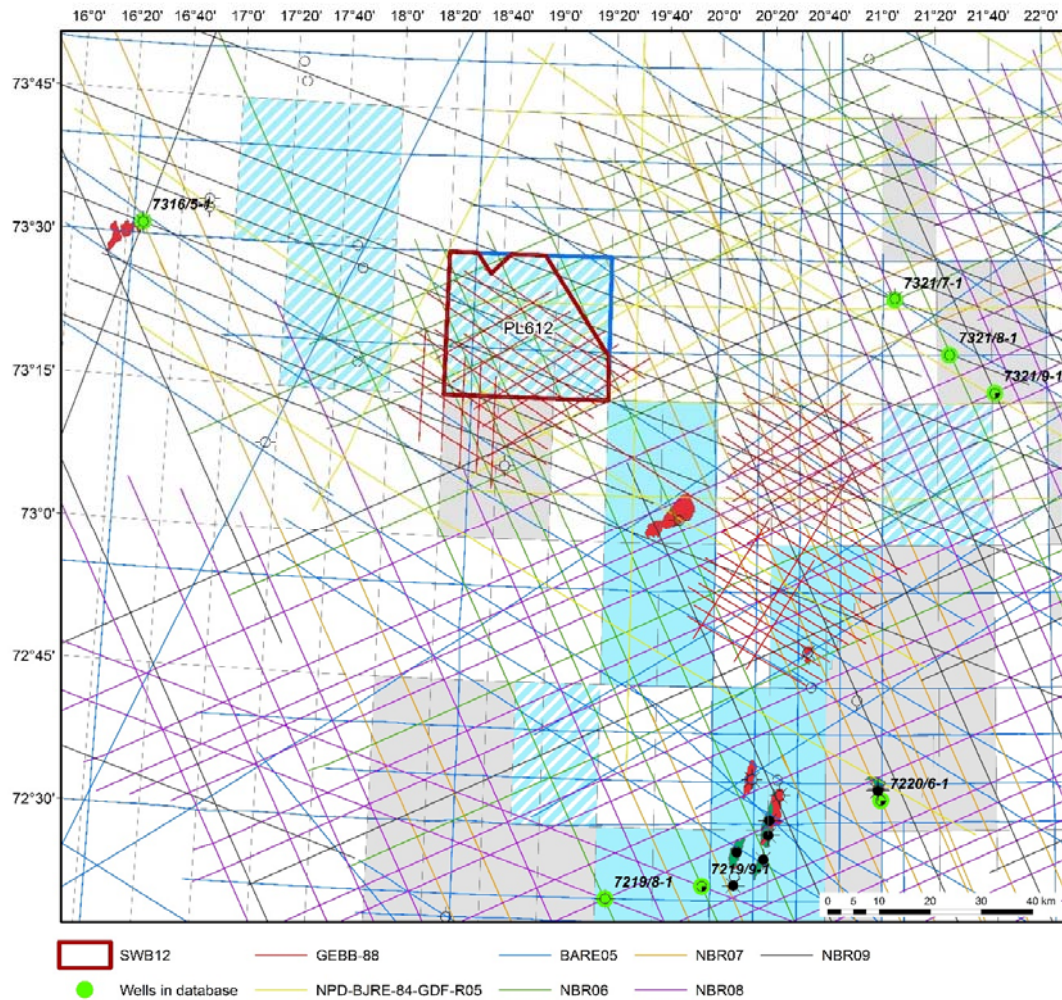


Figure 2. Common database with 2D lines, wells and 3D survey over the license area.

2.3 Special studies:

Special studies that were primarily used to evaluate the prospectivity within the license include mapping of the Middle Jurassic sequence and seismic AVO analysis. Other studies include: Reservoir study (TGS), 2D restoration study (Badley), Tectonic evolution of the PL612 area and Fault seal analysis (GDF SUEZ Paris), PSDM processing (CGG) and Seismic amplitude analysis (GDF SUEZ Germany). Sharp Reflections also assessed whether the seismic data acquired over PL 612 (SWB12) are fit for an AVO study.

3 Review of geological framework

The detailed regional geological framework is described in the application for blocks 7317/9, 7318/7, 8, 9 and 7319/7 from the 21st concession round. PL 612 is located in the northwestern Bjørnøya Basin, south of the Stappen High (Figure 1), approximately 80 kilometres from the Johan Castberg discovery well 7220/8-1.

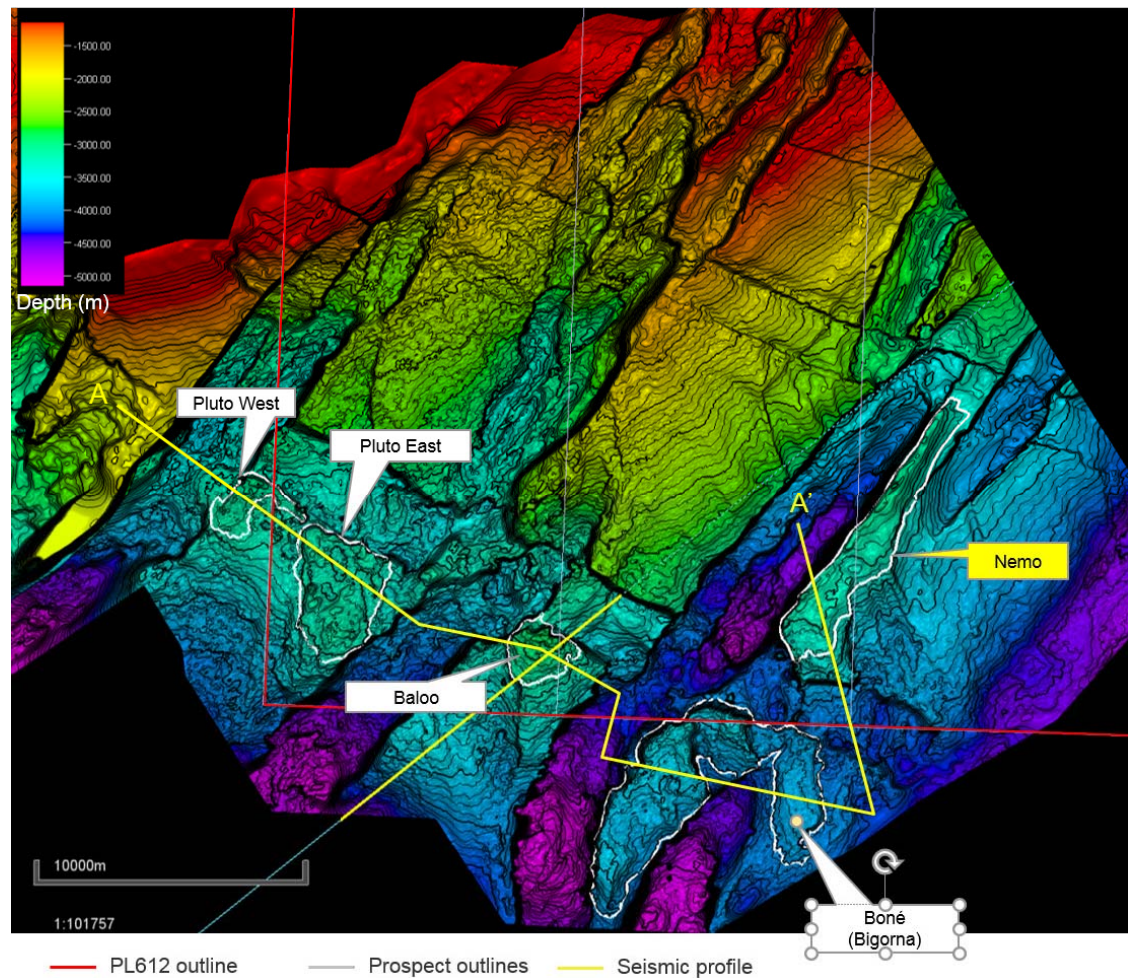


Figure 3. Structure map at Top Realgrunnen Subgroup (top reservoir) level, mapped using SWB12 full-stack data, with the main prospects within PL612 outlined in white. The seismic profile A-A' marked on the map can be found in Figure 4.

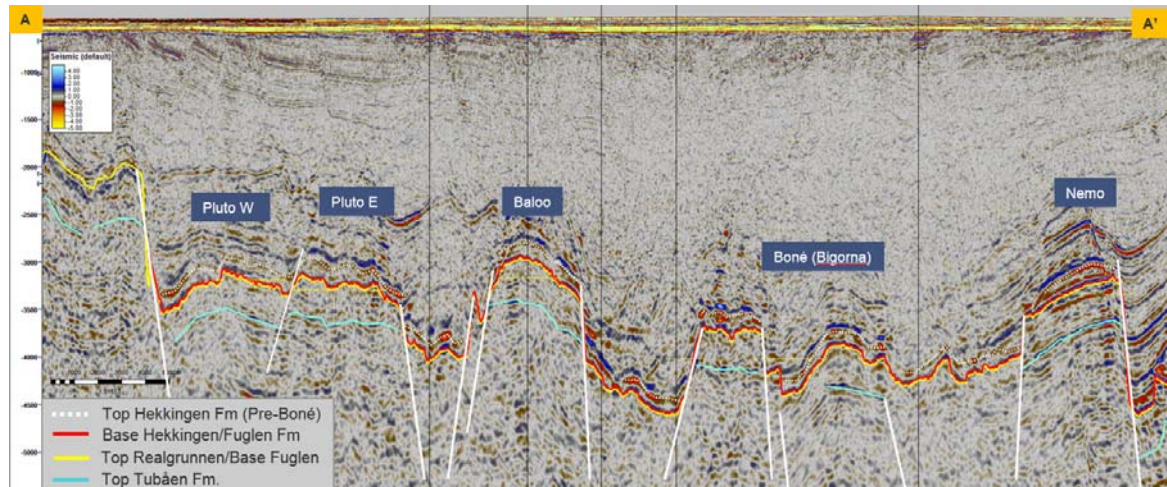


Figure 4. Composite seismic section of SWB12 full-stack data across the main prospects in PL612. Orientation of the composite section is shown in Figure 3.

The main prospectivity in the license is related to the Late Triassic – Middle Jurassic play (Figures 3 & 4). The closest reference wells targeting this play are 7321/7-1, 7321/8-1, and 7321/9-1 in the Fingerdjupet Sub-basin and the recent wells 7318/12-2 (Boné) and 7317/9-1 (Koigen Central) drilled in 2017. The three wells in the Fingerdjupet Sub-basin were all dry with shows. Wells 7318/12-2 and 7317/9-1 were classified as dry with limited shows.

The evaluation in the license application was based on 2D seismic data. The prospectivity of the license was firmed up during the prospect evaluation performed on 3D seismic data (Figure 3) in 2014. Given the uplift and erosion history of the southern Stappen High area (Figure 5), reservoir quality was always the main risk in the license. Wells 7318/12-2 and 7317/9-1 encountered reservoir sands with poor to no reservoir potential in Realgrunnen Subgroup targets likely to have experienced the same burial as the PL 612 prospects. Following these results, JV 612 sees very limited potential for Realgrunnen Subgroup sandstone with reservoir quality in PL 612.

4 Prospect update

The current prospectivity in PL 612 is attached to the Lower-Middle Jurassic play. All prospects are buried at a depth of about 3000 m and experienced an uplift of 1100-1600 m during the Cenozoic (Figure 5). Updated recoverable volumes and discovery probabilities for each of the prospects within the license can be found in Table 3.

Located approximately 3 km upflank of the Boné prospect (PL 716) that was drilled in 2017, the Nemo prospect has the largest potential. Both these prospects are fault-dependent three-way closures with a Realgrunnen Subgroup reservoir, a Fuglen/Hekkingen formation top seal and Kolje/Kolmule formation lateral seal. The expected reservoir interval correlates with high confidence to the Johan Castberg area. Well 7318/12-2 (Boné) encountered 115 m thick clean sandstone (Stø and Nordmela formations). The presence of a thick reservoir section represented by the Stø, Nordmela and Tubåen formations seems probable. Nonetheless, reservoir is regarded as the main risk for all PL 612 prospects due to maximum burial depths of between 4300-4600 m.

Wells 7318/12-2 (Boné) and 7317/9-1 (Koigen Central) encountered poor to no reservoir quality within the Realgrunnen Subgroup. These wells have experienced similar burial to the prospects in PL 612, effectively reducing the Realgrunnen prospectivity in the license.

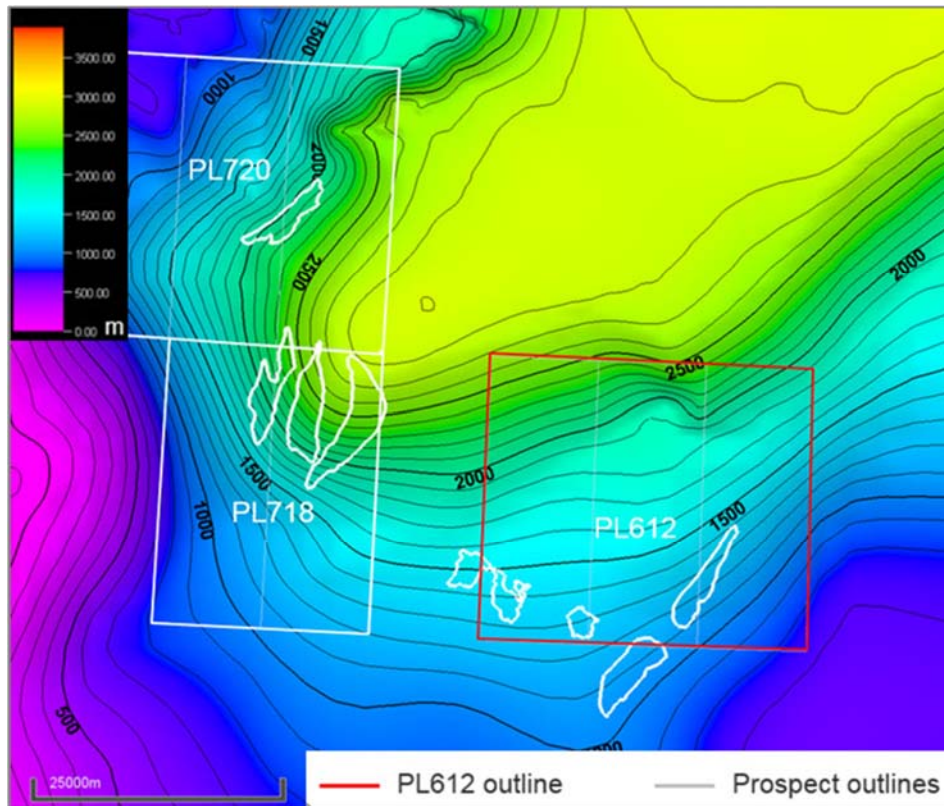


Figure 5. Statoil's net erosion map showing estimates for PL612 and surrounding region.

Both Nemo and Boné are located in favorable positions for hydrocarbon migration. The Upper Jurassic Hekkingen Formation source rock is present in the drainage area for the Nemo prospect, and has been mapped with high confidence. The Hekkingen Formation is juxtaposed to the Realgrunnen Subgroup reservoir interval. Lateral fill-spill from Boné has also been modelled. On the negative side, Statoil's net erosion model indicates a gas case as most likely. Boné was classified as dry, indicating either migration or trap failure.

The amplitudes of the prospects are not fully understood (Figure 7). The seismic data (SWB12 PSDM) have high noise contamination, but studies performed by then-operator GDF Suez indicate that the deep maximum burial inhibits visible HCW contacts and AVO analysis. Bright amplitudes at reservoir level most likely represent gas in a tight reservoir.

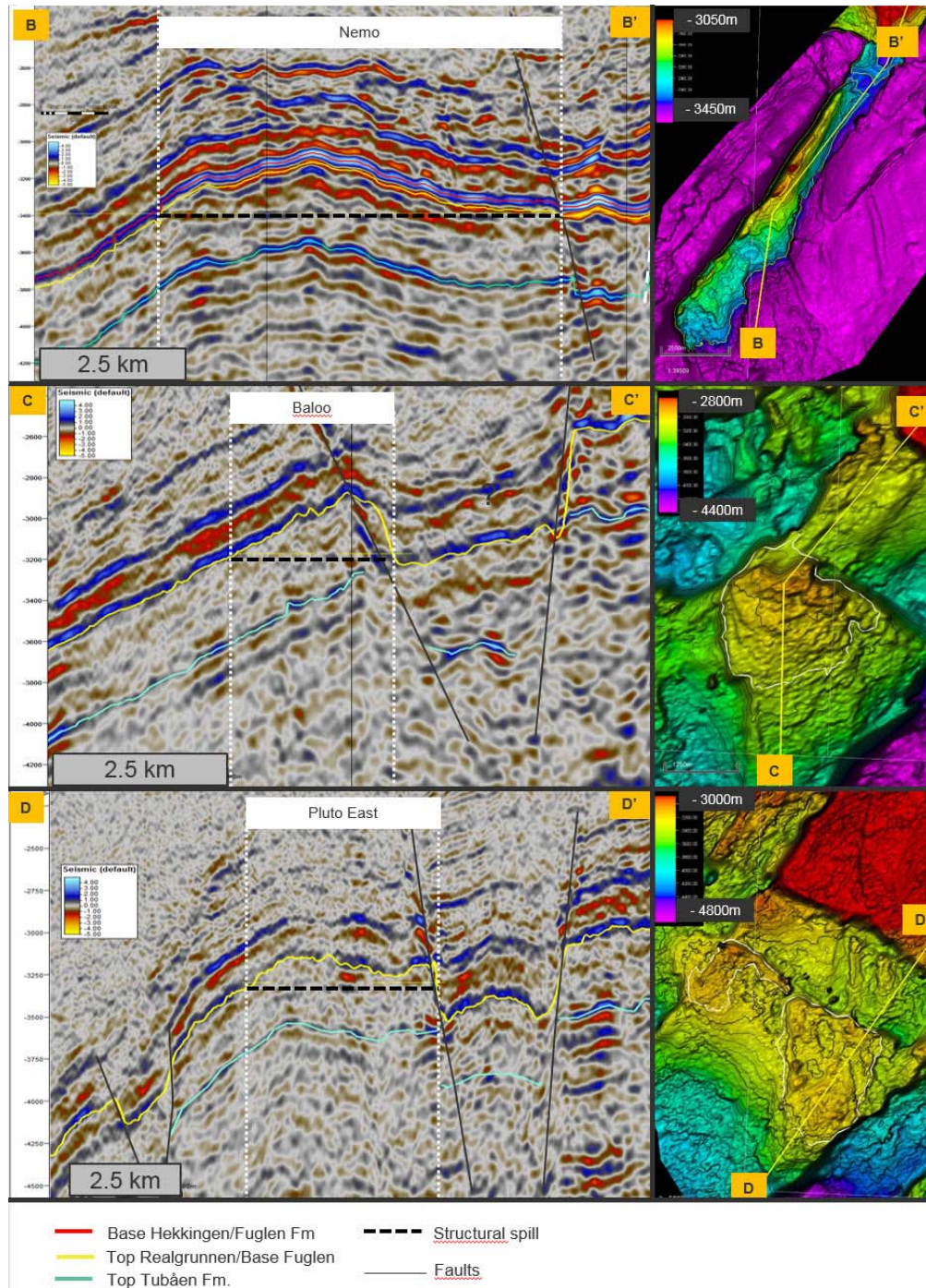


Figure 6. Seismic sections through the Nemo, Baloo and Pluto East prospects. To the right of each section is a corresponding structure map in depth for each prospect at Top Realgrunnen Subgroup level. The location of each section is indicated on the respective map. The spill depth for each prospect is marked with a black dashed line. Sections are shown using SWB12 full-stack data.

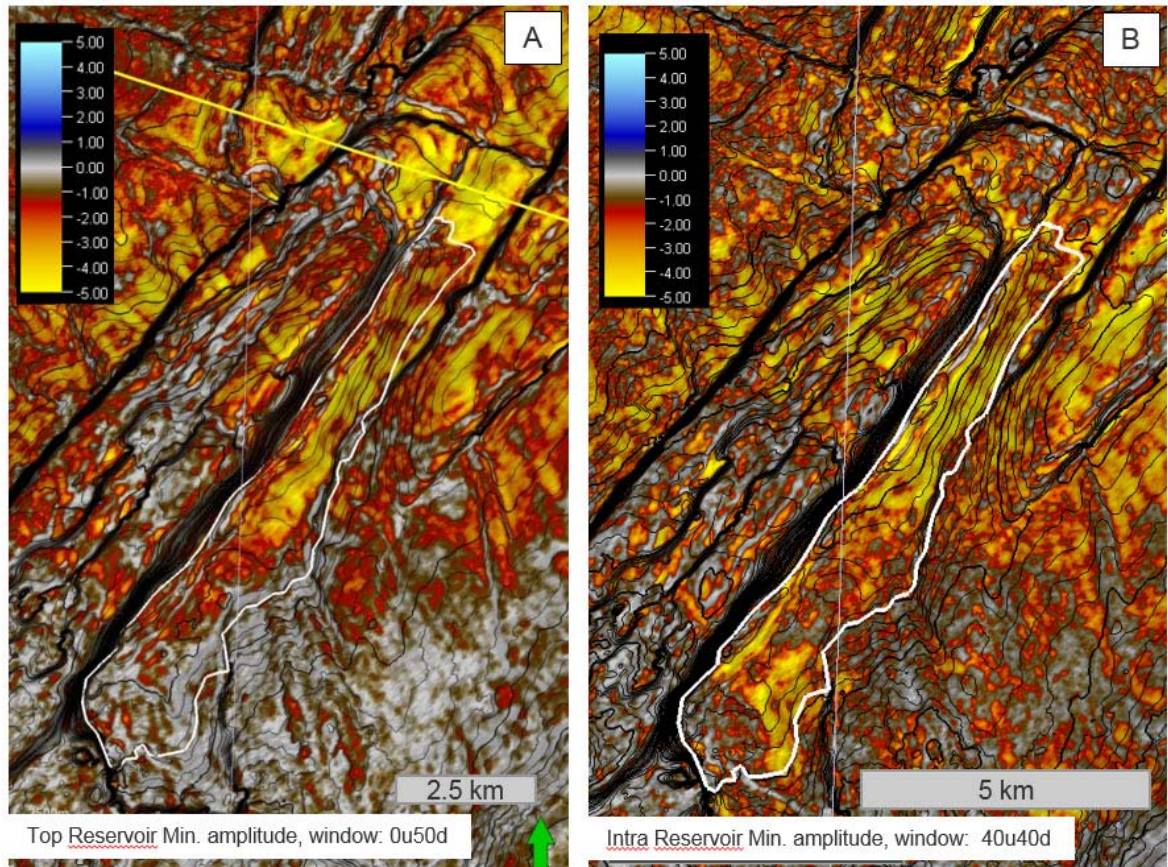


Figure 7. Minimum amplitude maps of the Nemo prospect at A) top reservoir level, from 0 to 50 ms below Top Realgrunnen Subgroup, and B) intra-reservoir level, 40 ms above to 40 ms below the highly reflective intra-Realgrunnen Subgroup trough (Figure 6, section B-B'). The strong negative amplitudes visible on the Nemo structure may indicate gas within a tight reservoir, however are poorly distinguished from noisy amplitudes outside the structure and are part of a complex seismic picture.

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 license [%] ⁶ (0.0 - 100.0)	Reservoir	
			Oil [10 ⁶ Sm ³] (>0.00)			Gas [10 ⁶ Sm ³] (>0.00)					Litho- / Chrono- stratigraphic level ⁷	Reservoir depth [m MSL] (>0)
			Low (P90)	Base (Mean)	High (P10)	Low (P90)	Base (Mean)	High (P10)				
Nemo	P	Oil	1.80	6.75	12.30	0.37	1.35	2.60	0.02	100.0	Realgrunnen Subgroup / Norian - Bajocian	3060
		Gas	0.35	1.19	2.23	1.75	6.01	11.39	0.14	100.0	Realgrunnen Subgroup / Norian - Bajocian	3060
		Oil&Gas	1.57	4.60	8.17	0.04	1.88	5.15	0.07	100.0	Realgrunnen Subgroup / Norian - Bajocian	3060
Baloo	P	Oil	0.23	1.27	2.52	0.04	0.25	0.49	0.02	100.0	Realgrunnen Subgroup / Norian - Bajocian	2850
		Gas	0.01	0.18	0.41	0.03	0.91	2.01	0.15	100.0	Realgrunnen Subgroup / Norian - Bajocian	2850
		Oil&Gas	0.23	1.27	2.52	0.04	0.25	0.49	0.05	100.0	Realgrunnen Subgroup / Norian - Bajocian	2850
Pluto East	P	Oil	0.29	2.18	4.58	0.05	0.43	0.96	0.02	100.0	Realgrunnen Subgroup / Norian - Bajocian	3100
		Gas	0.05	0.36	0.80	0.23	1.84	4.02	0.12	100.0	Realgrunnen Subgroup / Norian - Bajocian	3100
		Oil&Gas	0.26	2.01	4.21	0.05	0.40	0.83	0.05	100.0	Realgrunnen Subgroup / Norian - Bajocian	3100
Pluto West	P	Oil	0.36	1.11	2.14	0.07	0.22	0.42	0.03	10.0	Realgrunnen Subgroup / Norian - Bajocian	3000
		Gas	0.06	0.17	0.33	0.30	0.86	1.64	0.18	10.0	Realgrunnen Subgroup / Norian - Bajocian	3000
		Oil&Gas	0.26	0.99	1.95	0.00	0.11	0.29	0.08	10.0	Realgrunnen Subgroup / Norian - Bajocian	3000

Table 3. Remaining prospectivity in PL 612 (evaluated on 3D seismic).

5 Technical evaluations

- Screening economics based on tie-in distances have been performed. The prospects were only economically interesting as tie-in candidates to Boné in PL716 or Koigen Central in PL718. A more detailed valuation has not been performed due to the negative result in both wells.

6 Conclusions

The current prospectivity in PL 612 is attached to the Lower-Middle Jurassic play. Wells 7318/12-2 and 7317/9-1 proved that the reservoir potential is very limited at this level. At present, there are no drilling candidates in the license. There is alignment in the partnership that the license will be surrendered at DoD 13.11.2017.

7 References

Statoil 2010. Application for blocks 7317/9, 7318/7, 8, 9 and 7319/7. 21st Concession Round Application, 61 pp.