

Licence relinquishment report

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## Licence Relinquishment Report PL 360

Reference is made to the letter from the MPE dated 23.05.2014 regarding relinquishment of production licence 360 (PL 360). This report outlines the key license history, database, prospects and technical evaluations for PL360 and fulfils the requirement by the NPD for a license status report within 6 months of relinquishment.

### 1 KEY LICENCE HISTORY

The PL 360 (Fig. 1) was awarded to Statoil Petroleum AS on 6th of January 2006 (APA 2005). The initial period for PL 360 expired on 6th of January 2016.

The licence partners at the time of relinquishment were as listed:

- Statoil Petroleum AS (operator) 50%
- DONG E&P Norge AS 20%
- Noreco Norway AS 15%
- Wintershall Norge AS 15%

The PL 360 is located on the southern Utsira High in blocks 16/5, 16/6, 16/8 and 16/9 (Fig. 1). Work obligations were to purchase a minimum 1100 km<sup>2</sup> of 3D seismic data and to decide on a drill or drop within three years. The seismic survey ST11012 was acquired and in 2009. In 2013 well 18/8-3 was drilled in the southern part of the license testing the Lupin structure. The well proved to be dry and the southern part of the license was relinquished in 2013 due to lack of further prospectivity (Fig. 1).

### 2 DATABASE

The technical work has been focusing on the prospectivity in the remaining part of PL 360. The technical work was performed on 3D seismic data predominantly on survey ST11012. The seismic survey is regarded of good quality.

### 3 REVIEW OF GEOLOGICAL FRAMEWORK

The PL360 license is located in the Ling Graben and on the southern Utsira High. The closest discovery is the Johan Sverdrup oil discovery located approximately 8 km north of the license. In addition, the Luno II oil discovery is located approximately 20 km northwest of the license. (Fig. 1).

One structure has been drilled within PL360. This is well, 16/8-3 S (Lupin) drilled in 2013 (Fig. 2). The main objectives of the well were to test the Rotliegendes Play in the Ling Graben. The well proved to be dry with no indications of hydrocarbons. In addition, well 16/4-7 (Biotitt extension) was drilled in 2013 in the neighbouring PL544 (Fig. 2). The main

target was Jurassic reservoir, but the Paleocene had earlier been proven in the structure. The well was dry with no shows probably due to failing migration. The well results are very important for understanding the eastward migration (or lack of migration) from the Viking Graben via fill to spill through the Biotitt structure and further on to the southern Utsira High. The well results form an integrated part of the prospect evaluation in PL360.

#### 4 PROSPECT UPDATE

Five prospects are identified in Hugin Formation reservoir in PL360 (Fig. 3 and 4). The western prospects are Portugiserkloven, Lausingen, Spannholmane Sør, while the eastern prospects are Spannholmane Nord and Ve. The prospects are a combination of pinch-out and fault depending closures (Fig. 3). These are fairly well defined on 3D seismic data with a top reservoir reflector that is easy to interpret. The base reservoir reflector is however not a continuous reflector and therefore the reservoir thickness has been modelled. The main hydrocarbon phase is oil and the key volume uncertainty is related to depth to HCWC. All prospects are located below the OWC in the Johan Sverdrup and Luno II discoveries.

The key risk identified is hydrocarbon migration (Figure 5). The western and eastern prospects are separated by a large sealing fault. In addition, source presence is regarded high risk for the eastern prospects (Ve and Spannholmane Nord) as only a marginal mature source has been proven in the Åsta Graben. For the western prospects, long distance migrations from the Sleipner/Freke area through the dry Biotitt are required, therefore as of today regarded as high risk (Fig. 5).

All the prospects are located below the regional hydrocarbon contact of the southern Utsira High and must therefore be sealed off from the up flank discoveries. The main expected hydrocarbon phase is oil. The volumes are robust but the risk is in general high. The key risk is related to source presence and migration of hydrocarbons, but trap seal and reservoir presence are also considered high risk (Fig. 5). No DHI is observed.

A summary of the estimated resources and risk in PL360 is shown in Figure 5.

#### 5 TECHNICAL EVALUATIONS

The economic evaluation is divided into two: 1) PL 360 West: Lausingen, Portugiserkloven and Spannholmane Sør assuming filling from west. 2) PL 360 East: Spannholmane Nord and Ve assuming filling from east.

The field development solution for the PL 360 West prospects includes a full processing platform (+subsea templates tied in to the platform) with tie-in to Johan Sverdrup's pipelines to Mongstad and Kårstø, assume subsea tie-in via hot-tap. A total of 14 oil producers and 9 water injectors are included in the costs. Production start-up is expected in 2026. One appraisal well for each prospect is included.

The field development solution for the PL 360 East prospects includes a full processing platform (and 2 subsea templates) with tie-in to Johan Sverdrup's pipelines to Mongstad and Kårstø, assume subsea tie-in via hot-tap. A total of 12 oil producers and 7 water injectors are included in the costs. Production start-up is expected in 2026. One appraisal well is assumed in Spannholmane Nord (no appraisal in Ve mean case due to smaller closure).

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The expected prospect economics (ENPV) are positive for both cases. Despite this the prospects are not regarded as interesting drilling candidates as the geological risk is too high.

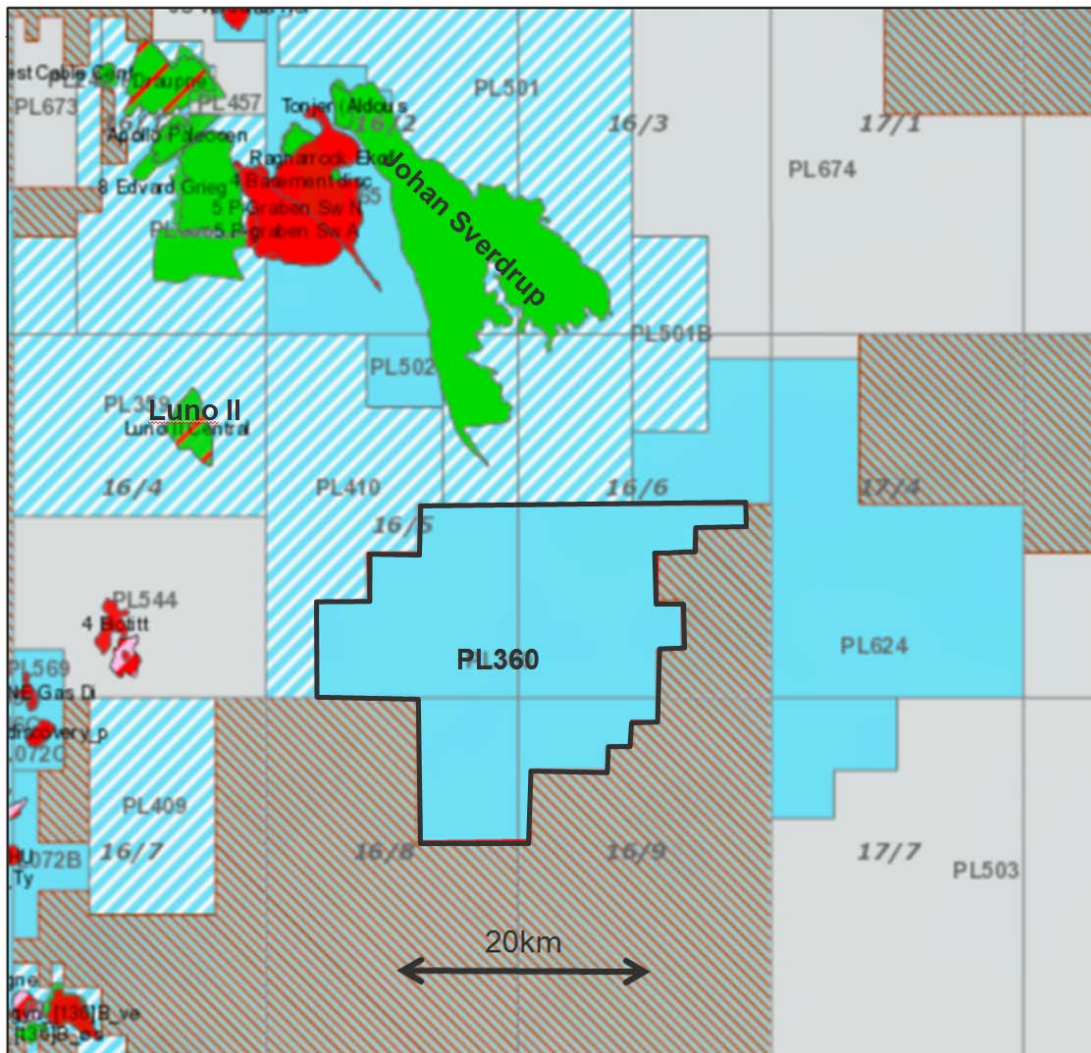
## 6 CONCLUSIONS

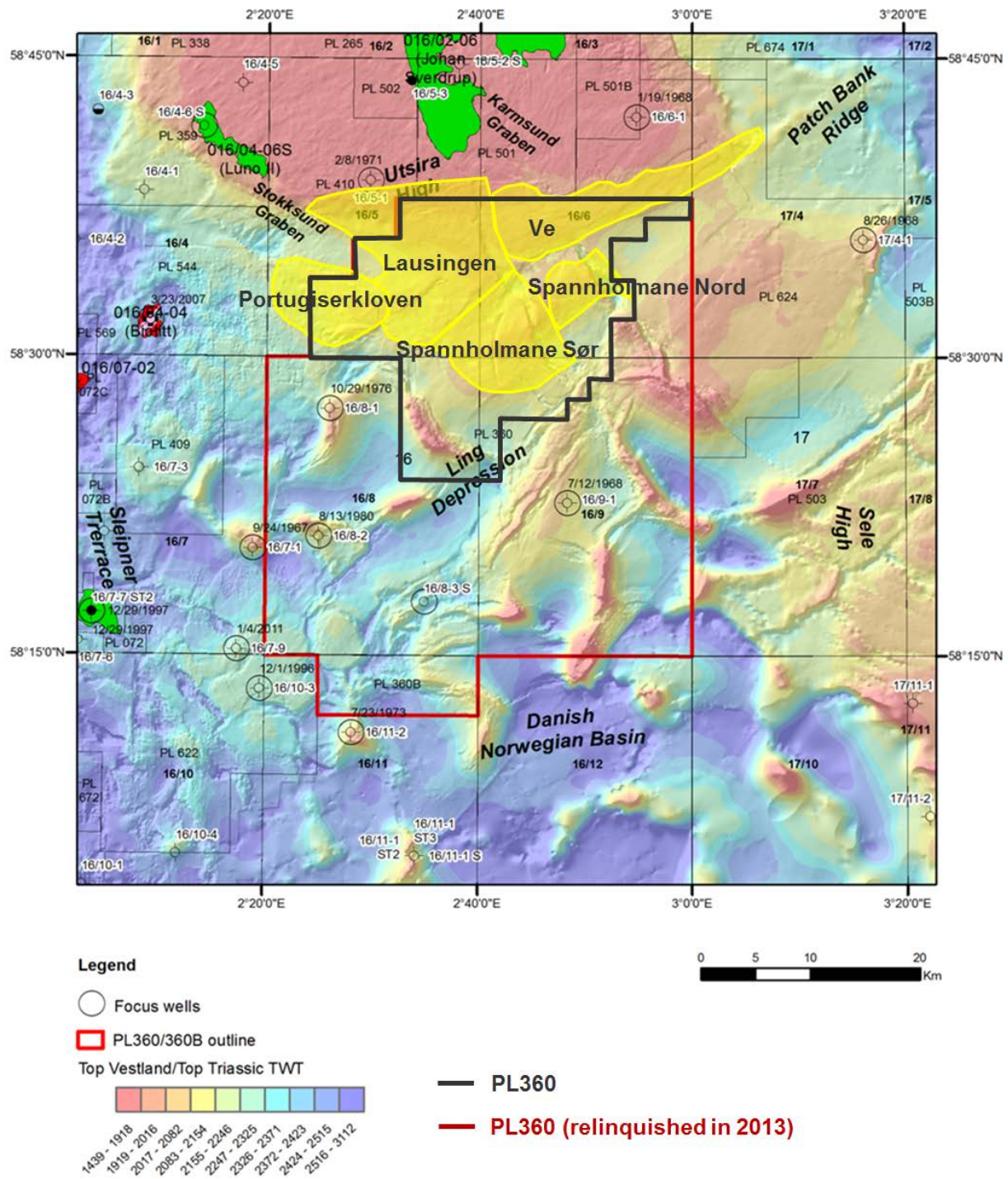
The work programme for the initial period of PL360 has been fulfilled. The seismic data acquisition was acquired within the specified time and the Lupin well (16/8-3) was drilled in 2013.

The technical evaluation of the prospectivity in PL360 concluded that even though the license has a considerable volume potential the high risk nature of the prospects does not justify for further exploration in the license. The license is therefore fully relinquished.

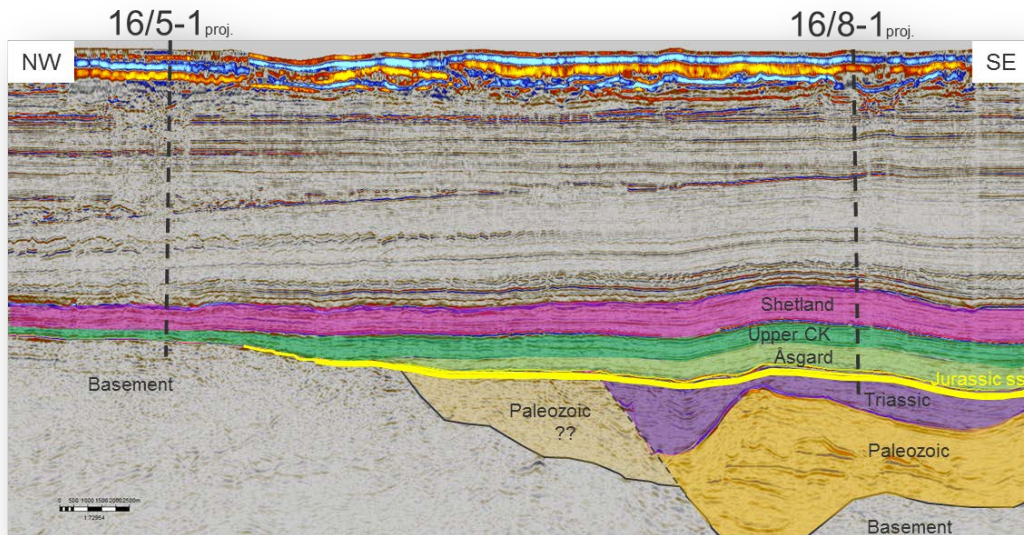
## 7 Figures

**Figure 1.** Map showing the location of PL360

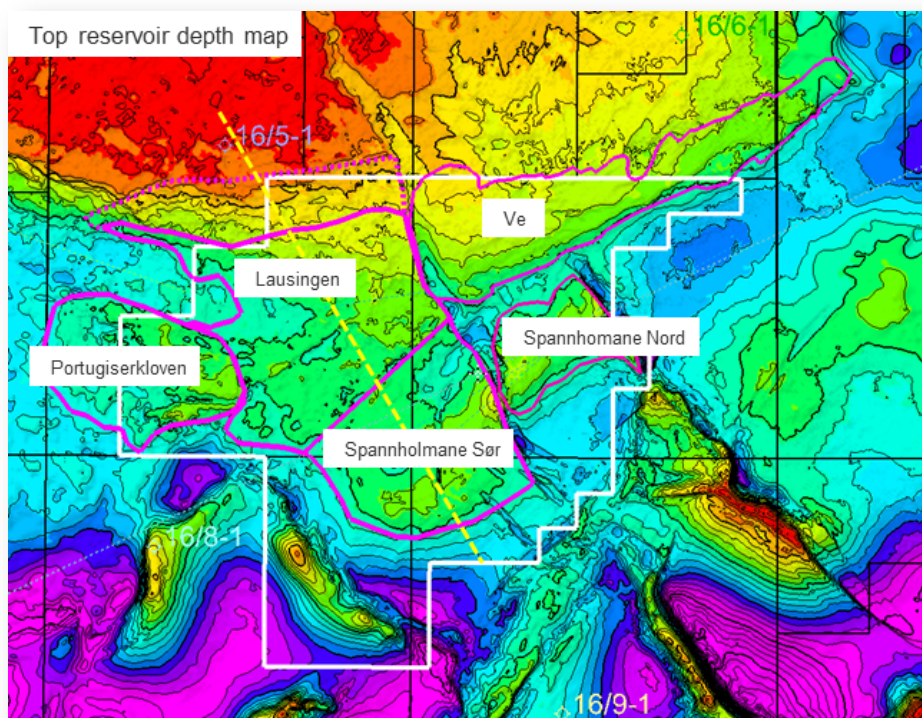


**Figure 2.** Identified prospectivity in PL360.


**Figure 3.** Geoseismic section (NW-SE) accross the Lausingen and Spannholmane Sør prospects. Line location is shown in figure 4 (yellow dotted line)



**Figure 4.** Top reservoir map showing the identified prospects in PL360



**Figure 5.** Volumes and risk assessment

Prospect segments	In-place res. (MSm <sup>3</sup> oe) 100%, Total Structure			Recoverable res. (MSm <sup>3</sup> oe) 100%, Total Structure		
	P90	Mean	P10	P90	Mean	P10
Portugiserkloven	8,1	17,8	30,5	3,5	7,4	12,6
Lausingen	11,1	26,9	49,1	4,7	10,8	18,9
Spannholmane Sør	15,9	24,2	67,0	1,9	9,7	26,3
Spannholmane Nord	3,5	23,6	60,6	1,4	9,4	24,1
Ve	9,1	43,2	102,6	3,2	15,2	35,4
Jurassic reservoir for all prospects						

Prospect segments	P-Play			P-Prospect/Segment							Discovery	
	Reser v.	Sourc e	Seal	Reservoir		Source			Trap		Pg	Pg (DFI)
				pre- sence	produc- ability	pre- sence	migra- tion	hc- phase	geo- metry	seal		
Portugiserkloven	1	1	1.00	0.70	1.00	1.00	0.30	1.00	0.80	0.80	0.13	N/A
Lausingen	1	1	1.00	0.60	1.00	1.00	0.30	1.00	0.80	0.50	0.07	N/A
Spannholmane Sør	1	1	1.00	0.80	1.00	1.00	0.15	1.00	0.90	0.80	0.09	N/A
Spannholmane Nord	1	1	1.00	0.80	1.00	0.40	0.16	1.00	0.90	0.80	0.04	N/A
Ve	1	1	1.00	0.60	1.00	0.40	0.40	1.00	0.80	0.40	0.03	N/A