



**Status Report
for
License PL809**

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PL809 Status Report

1. KEY LICENSE HISTORY

PL809 was awarded February 5, 2016 as part of the APA 2015 licensing round to: Total E&P Norge (50%, operator), and Statoil (50%).

The license commitments were to acquire and/ or reprocess 3D seismic, and mature the license towards a Drill or Drop decision February 5, 2018.

The work commitment has been fulfilled by licensing parts (573.7km²) of the PGS Geo-streamer Broadband PSDM. The total area of the 3D seismic covers the license area.

It was agreed to drop the license in the MC meeting November 2017 and confirmed unanimous in the license through the partner resolution dated January 18, 2018.

A Notification on License Decisions was submitted to authorities January 2, 2018

Overview of license meetings:

Date	Meetings		
	MC	EC	WM
13.04.2016	X		
14.09.2016		X	
24.11.2016	X		
07.06.2017		X	
16.11.2017	X	X	

2. DATABASE

The common license database, agreed by the license partners, consists of 3D seismic data and well data. The common license database is itemized in Figure 1. All wells in the vicinity of the Faering basin have been used for calibrating seismic data.

Seismic interpretation and key well seismic ties have been achieved on latest seismic cube (2016) PSDM PGS Broadband.

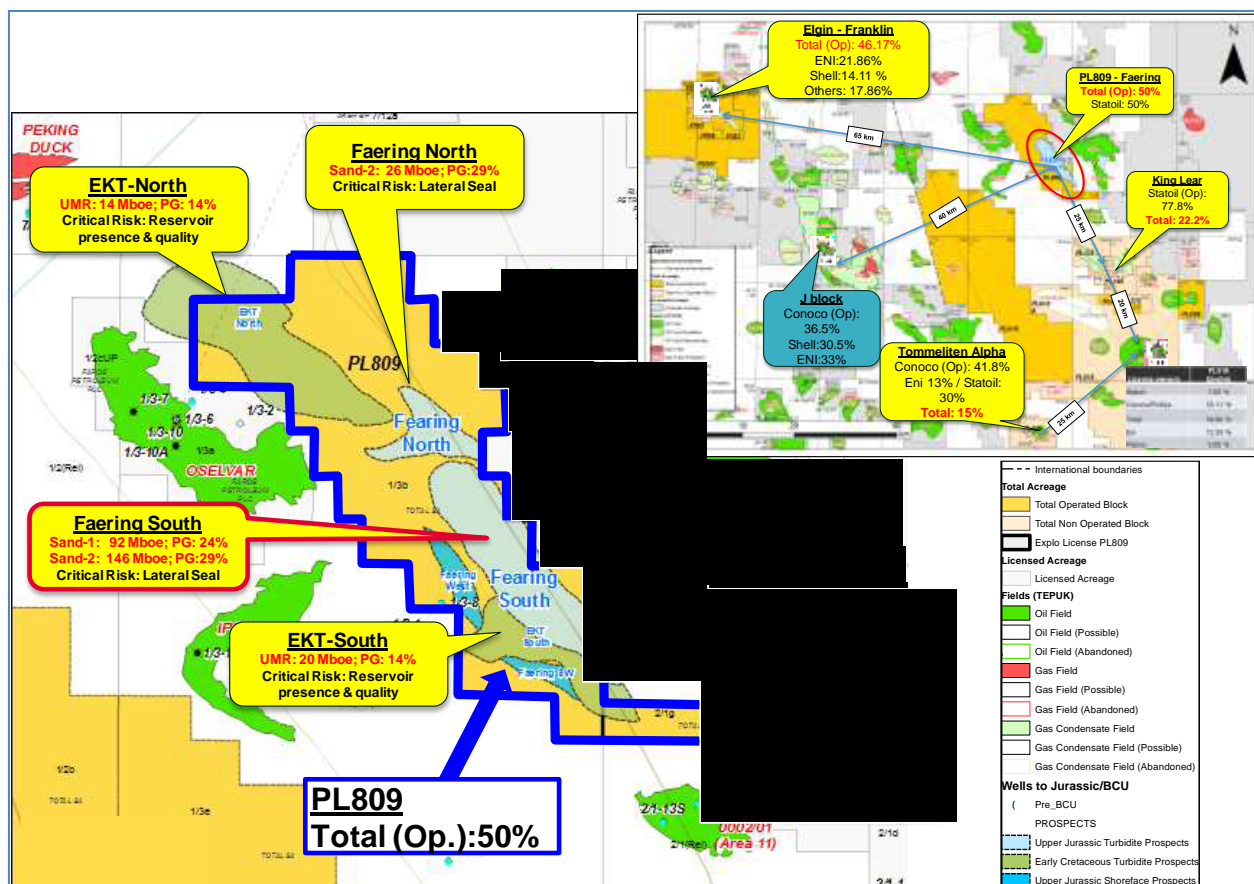
3. REVIEW OF GEOLOGICAL FRAMEWORK

PL809 is located in the Greater Ekofisk Area in the Central North Sea and mainly covers the Faering mini-graben which is located on the Cod terrace to the West of Sorvestlandet High.

The main prospectivity was identified at Upper Jurassic (Faering North and South prospects) and Lower Cretaceous (EKT North and South prospects).

The main prospect (Faering South) lies in the Faering mini-basin located to the north of King Lear Farsund turbidite discovery which is considered as a main analogue.

The central graben regional source rock is marine Type II with some contribution of terrestrial material (Type II-(III)) with the Farsund Mandal formation being the main contributor. Analysis of both gas and condensate fractions in nearby fields and discoveries shows the thermal maturity of its source to be in the wet gas window. Therefore, the source rocks in the area are within the rich gas maturity window. The play envisaged is a compact system, where the upper Jurassic turbiditic sands are embedded within the Farsund source rock.



4. PROSPECT UPDATE

Evaluation of PL809 was performed with an objective to assess the hydrocarbon prospectivity at all the stratigraphic levels. Three potential exploration plays were evaluated: Kimmeridgian & Early Cretaceous turbidite prospects within the Faering mini-graben (in PL809) and Ula shoreface prospect (outside PL809).

Faering South prospect

Faering South prospect within the License PL809 has been the subject of main focus. The latest evaluation on the new PGS Broadband seismic confirms the same conclusions as previous interpretation.

Faering South is a strati-structural combined prospect identified at the Upper Jurassic Farsund turbidite level within the Faering mini-graben (Figure 2). Upper Jurassic Kimmeridgian turbidites are anticipated to be deposited within the Faering mini-graben. These turbidites are interpreted to be disconnected from the up-dip shoreface to the East by stratigraphic termination (pinch-out) and fault compartmentalization.

South & West facies terminations have been defined on seismic RMS amplitude maps. Current evaluation indicates volumes at Upper Jurassic Turbidite (Sand 1: MUR 92Mboe with POS 24% Sand 2: MUR 146Mboe with POS 29%).

Main uncertainties associated with this Upper Jurassic turbidite play are:

- Limited well evidences sampling UJ-turbiditic sands (HC bearing)
- Lack of seismic visibility i.e., thickness below seismic resolution limit.
- Geologic models which are built based on theoretical concepts derived from limited seismic support, Wireline logs & core sedimentology. Thus no control on the lateral reservoir continuity, compartmentalization & thickness variation.
- High uncertainty is associated with the trap geometry (pinch-out or erosion) and reservoir extension limit. The lateral sealing needs a stratigraphic shaling out in all directions and is difficult to de-risk. The eastern flank of the trap is steep, and thus would imply potential high columns and potential leakage (seal breach or absence of bypass due to reservoir continuity).
- Reservoir quality is highly dependent on the sediment provenance. Each mini-basin confining the deposition of the marine turbidites is therefore assumed to be sourced independently from the proximal emergent highs or focused fairways.
- Unpredictable pressure regime as these turbidites are embedded within the late oil to gas mature Heather/Farsund & Kimmeridge Clay/Mandal formations where each turbiditic unit behaves as an isolated pressure cell (high pressure regime).
- The dynamic behavior of the UJ turbidites is not proven with test

Table 5: Prospect data (Enclose map)

Block	1/31 & 2/11	Prospect name	Faering South	Discovery/Prop/Leas	Prospect	Trap ID (or Name)	NPC will invest value	NPC approved (Y/N)	
Play name	NPC will insert value	New Play (FIR)		Outside play (Y/N)					
Oil, Gas or O&G case	O&G/Gas	Reported by company	Total E&P Norge	Reference document	P1800 relinquishment report to NPC			Assessment year	2017
This is cable no.		Structural identifier	Faering mini-graben	Type of trap	Strat-structural	Water depth [m MSL] (<0)	100	Seismic database (2D/3D)	2D
Resources IN PLACE and RECOVERABLE		Main phase			Associated phase				
Volumes, this case		Low (P90)	Base, Mode	Base, Mean	High (P10)	Low (P90)	Base, Mode	Base, Mean	High (P10)
In place resources	Oil (10 ⁹ Sm ³) (>0.00)	7.30	16.00	22.20	41.50	0.60	23.00	27.10	50.60
Recoverable resources	Oil (10 ⁹ Sm ³) (>0.00)	3.70	8.70	11.40	21.30	3.90	10.20	12.10	22.90
Reservoir Chrono (from)	Upper Jurassic	Reservoir litho (from)	Farsund Fm	Source Rock, chrono primary	Upper Jurassic	Source Rock, litho primary	Farsund Mandal Fm	Seal, Chrono	Upper Jurassic
Reservoir Chrono (to)	Upper Jurassic	Reservoir litho (to)	Farsund Fm	Source Rock, chrono secondary		Source Rock, litho secondary		Seal, Litho	Farsund Fm
Probability (fraction)		Oil case (0.00-1.00)	0.00	Gas case (0.00-1.00)	0.00	Oil & Gas case (0.00-1.00)	1.00		
Reservoir (P1) (0.00-1.00)	0.60	Trap (P2) (0.00-1.00)	0.80	Charge (P3) (0.00-1.00)	1.00	Retention (P4) (0.00-1.00)	0.00		
Parameters:		Low (P90)	Base	High (P10)	Comments				
Depth to top of prospect [m MSL] (< 0)	9950		8100	5150					
Area of closure [km ²] (> 0)	11.0		19.0	23.0					
Reservoir thickness [m] (> 0)	50		100	300					
HC column in prospect [m] (> 0)	300		450	500					
Grain rock vol. [10 ⁹ m ³] (> 0.000)	1430.000		2588.000	3372.000					
Net / Gross [fraction] (0.00-1.00)	0.30		0.50	0.70					
Porosity [fraction] (0.00-1.00)	0.13		0.16	0.20					
Permeability [mD] (> 0)	5.0		40.0	100.0					
Water Saturation [fraction] (0.00-1.00)	0.20		0.30	0.50					
Bq [Sm ³ /Sm ³] (< 1.0000)	0.0038		0.0033	0.0029					
Ullu [Sm ³ /Sm ³] (< 1.00)									
GOR, free gas [Sm ³ /Sm ³] (> 0)	0.00		1.00	125.0					
GOR, wt [Sm ³ /Sm ³] (> 0)									
Recov. factor, oil main phase [fraction] (0.00-1.00)									
Recov. factor, gas main phase [fraction] (0.00-1.00)									
Recov. factor, gas main phase [fraction] (0.00-1.00)	0.45		0.50	0.60					
Recov. factor, liquid ass. phase [fraction] (0.00-1.00)	0.58		0.40	0.60					
Temperature, top res [°C] (< 0)	170				tempp. at geolog.int.	NPC will insert value	Registration - lit.	NPC will insert value	Well operat.ref
Pressure, top res [bar] (< 0)	1100				Date:	NPC will insert value	Registration Date	NPC will insert value	Well date
Cut off criteria for N13 calculation	1. vch < 0.25	2. PHE < 0.9	3. Sfr < 0.4					Well nr.	NPC will insert value

Faering North prospect

Similar as Faering South, this prospect is a strati-structural combined prospect within Upper Jurassic Kimmeridgian. Current evaluation indicates smaller resources (MUR 26Mboe with POS 29%). As for Faering South, the critical risk identified is on the lateral seal effectiveness with high uncertainty on trap geometry and reservoir extension limit.

EKT North and EKT South prospects

The lower Cretaceous prospectivity, consists of possible basinal turbidite sandstones believed to be sourced from reactivated structural highs, stratigraphically trapped and then charged from Upper Jurassic source rocks. This Early Cretaceous turbidite play has not been proven within the area.

EKT North and EKT South prospects have been assessed as stratigraphic traps based on RMS amplitude layer extracted above BCU level within the iso-proportionate slice between the Pleanus Marl and BCU. Current evaluation indicates respectively limited volumes of (MUR 14Mboe with POS 14%) & (MUR 20Mboe with POS 14%). Critical risk is on reservoir presence.

Faering East (Ula) prospect

Upper Jurassic Ula Fm: Potential development of the shoreface is anticipated on the tilted Triassic pod to the East of the Faering South prospect outside the license PL809. A prospect, Faering East is defined by the pinch-out of the Upper Jurassic Ula shoreface and/or erosional truncation at BCU to the East & NE. Current evaluation indicates volumes of MUR 136Mboe with POS 34%. Critical risk is on structural geometry. No prospectivity is identified at Upper Jurassic Ula level within the license PL809.

5. TECHNICAL EVALUATIONS

The business case that supported the possible development of Faering considered the positive sanction of the Central Graben Gas Hub solution. This gas hub development within Ekofisk complex was investigated for Tommeliten Alpha (PL044) and King Lear/Julius (PL146-PL333) discoveries. This solution would make the exploration for gas in the area more attractive by adding synergies and reducing risks for exploration development. But, at present there is no positive sanction of a Central Graben Gas Hub.

In this current context, the business case of Faering is not economically attractive anymore. For reference, the economical threshold of a standalone solution in the area is approximately 350Mboe, which is far from the prospective resources evaluated within the PL809 license.

6. CONCLUSIONS

As a result of the license work, the PL809 partners have concluded that there are not economically viable prospects in the license area, and the unanimous decision was to drop the license at the Drill or Drop deadline.

Geological and geophysical work focused on assessing prospectivity at the Upper Jurassic and Lower Cretaceous levels.

Main target, Faering South, is an Upper Jurassic (Farsund) HP/HT (5027m burial & 1100 bar/170°C) prospect with prospective resources (aggregate UMR) of 146Mboe. This prospect lies north of the King Lear Farsund turbidite discovery which is considered as a main analogue. Other prospectivity has also been highlighted in the Lower Cretaceous (EKT turbidite prospects).

Due to conflicting development option between partners and knowing that economical threshold of a standalone solution in the area is approximately 350 Mboe, the business case of Faering is not economically attractive.

Attachments:

Figure 1 – PL809 Common license database

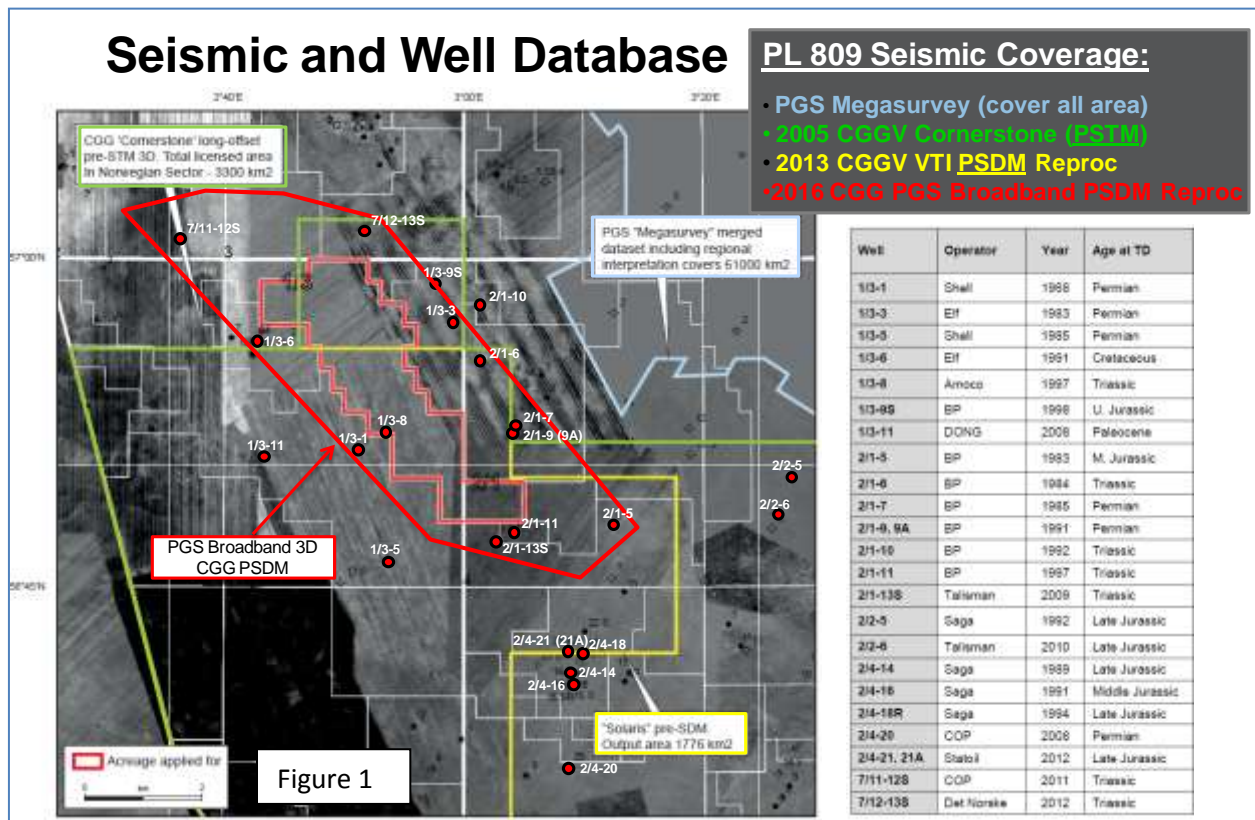


Figure 2 – Faering South prospect summary

