

# PL 025B License Surrender Report

Parts of block 15/3

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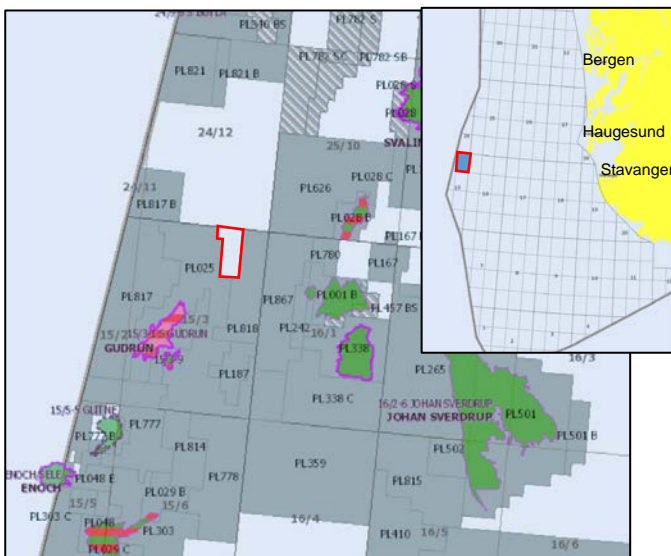
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## License surrender report PL 025B

Reference is made to the letter sent to MPE dated 03.02.2017 (our reference: AU-EXP NUKE ANS-00034) regarding the surrender of production license 025B (PL 025B). This report outlines the key license history, database, prospects and evaluations of PL 025B and fulfills the requirement by the NPD for a license status report.

### 1 KEY LICENSE HISTORY

Production license 025B is located north of the Gudrun discovery in block 15/3 (Figure 1.1) and was awarded 7<sup>th</sup> of February 2015 as a license extension as a part of the 2014 APA round. Statoil Petroleum AS was awarded the operatorship with 51 % equity, with OMV (Norge) AS (24 % and ENGIE E&P Norge AS (GDF SUEZ E&P Norge AS pre 13.01.2016) with respectively 24 % and 25 % share. In December 2015 Statoil Petroleum AS farmed down to Repsol Norge AS with 15 %. Work obligations were G&G work and decide on a Drill or Drop within 06.02.2017. The partnership has made a unanimous drop decision for PL 025B.



**Figure 1.1** – Location map for PL 025B in the North Sea. Block 15/3 and PL 025B shown in red.

### Work commitment

Work obligations were to:

- G&G work: 06.02.2017
- Drill or Drop Decision: 06.02.2017
- BoK: 06.02.2019
- BoV: 06.02.2021
- PDO: 06.02.2022

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### **Management and Exploration committee meetings**

PL 025B has been handled together with PL 025/187 licenses and the following Management and Exploration committee meetings have been held:

- 25.02.2015: MC meeting
- 26.02.2015: EC meeting
- 23.09.2015: MC meeting
- 19.11.2015: MC meeting
- 24.02.2016: MC meeting
- 15.06.2016: EC meeting
- 29.09.2016: MC meeting
- 20.10.2016: EC meeting
- 24.11.2016: MC meeting
- 22.02.2017: MC meeting

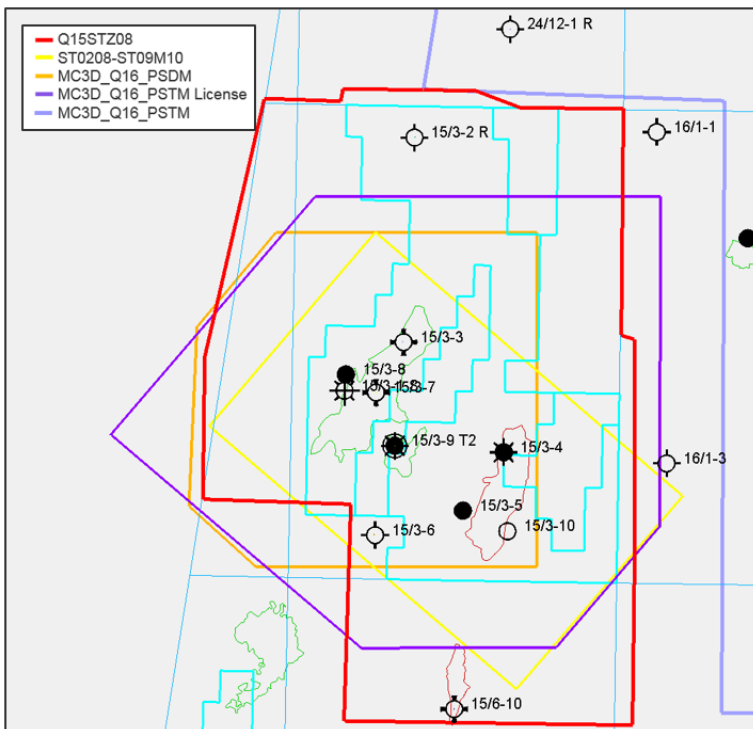
### **Reasons for license surrender**

The Mju Deep prospect covering the PL 025B is complex with a comparatively low chance of success. The trap type in combination with the depositional concept is under-explored in the area. Partners in PL 025B does not see enough value in the Mju Deep prospect to continue with a drill decision in 2017.

## 2 DATABASE

### 2.1 Seismic data

Mju Deep prospect is evaluated on the Q15STZ08 survey. Q15STZ08 is a reprocessing from 2008 by Ion-GXT based on the MC3D-Q15 and ST0208 surveys. The later acquired MC3D Q16 has been used for sensitivity but is not a part of the common database for the Mju Deep area.



**Figure 2.1** – Outline of Q15STZ08 shown in red. Turkeys outline show the PL 025/187 and 025B outline. PL 025B is located towards the upper right corner.

**Table 2.1:** List of seismic surveys in the common database.

Survey/Dataset	Type	Data owner	Year	NPDID	Market available
Q15STZ08	Reprocessed	License	2008	3659	NO
ST0208/ST09M10	Reprocessed merge	License	2010	4192	NO
MC3D_Q162013 *	Geostreamer	PGS	2013	7782	NO

\* License owning parts of MC3D\_Q162013, see map Figure 2.1

## 2.2 Well data

The well database used in the evaluation of PL025B is given in Table 2.2.

**Table 2.2** - Well database for PL 025B

Well	Oldest penetration	Drilling operator	Content	Completion year	NPDID
15/3-1S	Middle Jurassic	Elf	Oil/Condensate	1975	309
15/3-2R	Middle Jurassic	Elf	Shows	1977	311
15/3-3	Triassic	Elf	Gas/Condensate	1979	313
15/3-4	Triassic	Elf	Oil/Gas	1982	314
15/3-5	Middle Jurassic	Elf	Oil	1983	52
15/3-7	Middle Jurassic	DNO	Oil/Gas	2001	4055
15/3-8	Late Jurassic	Statoil	Oil/Gas	2005	5175
15/3-9T2	Middle Jurassic	Statoil	Oil/Gas	2010	6354
24/12-1R	Triassic	DNO	Oil shows	1978	513

## 2.3 Special studies

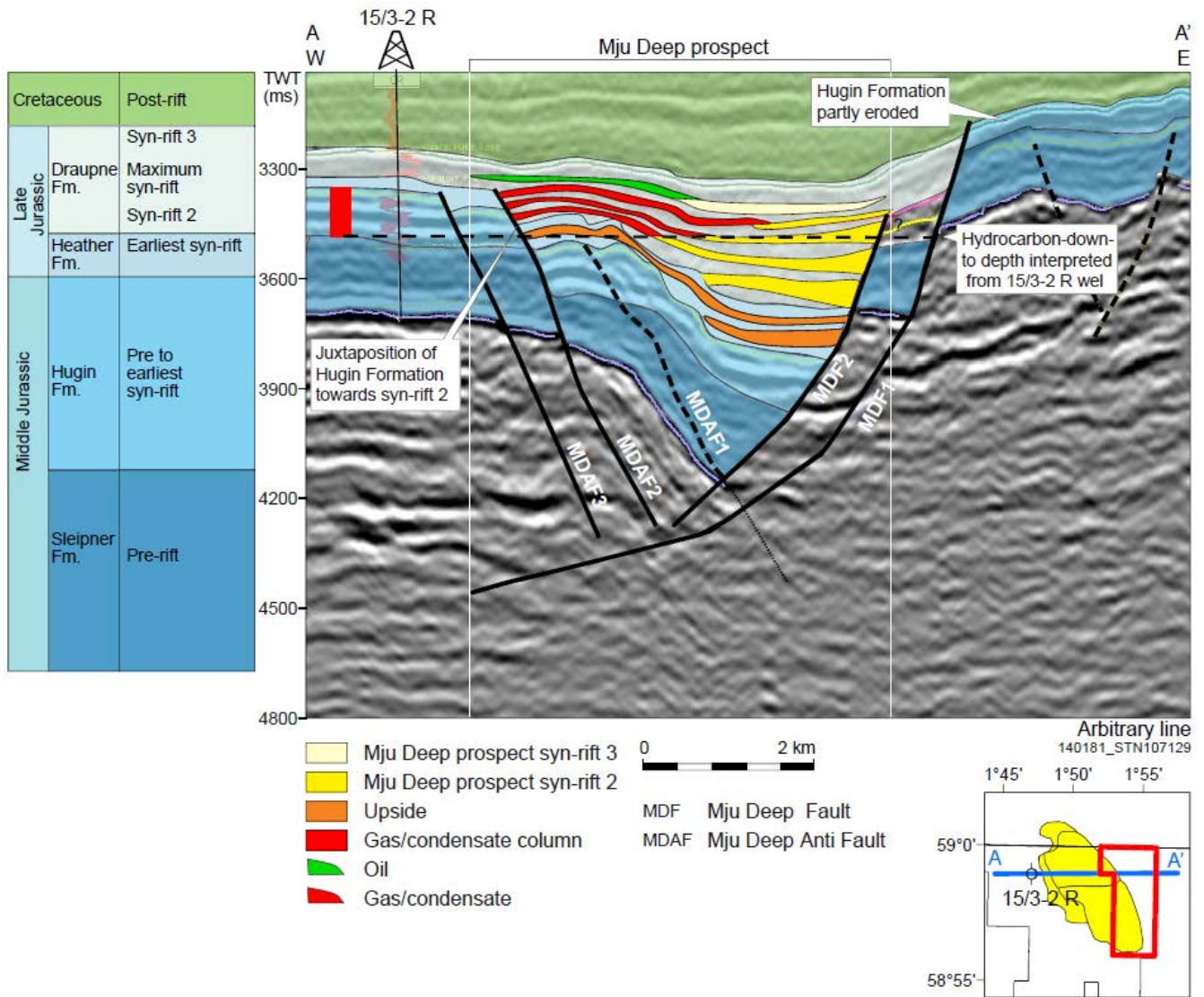
The following work have been performed since the license was awarded:

- Source rock study (maturity in the main kitchen area) and calculation of expelled HC
- Seismic mapping and sensitivity check towards newer seismic

## 3 REVIEW OF GEOLOGICAL AND GEOPHYSICAL STUDIES

The following observations and conclusions were made from Source rock study described in paragraph 2.3 Special studies.

In the APA 2014 application, Mju Deep was assessed with 30% chance of finding oil and 70% chance of finding gas/condensate. This was based on the 15/3-2R data assuming migration from the middle Jurassic Hugin Formation juxtaposed to Upper Jurassic Draupne Formation in the Mju Deep area (Figure 3.1).



**Figure 3.1** Conceptual geological model for the Mju Deep prospect

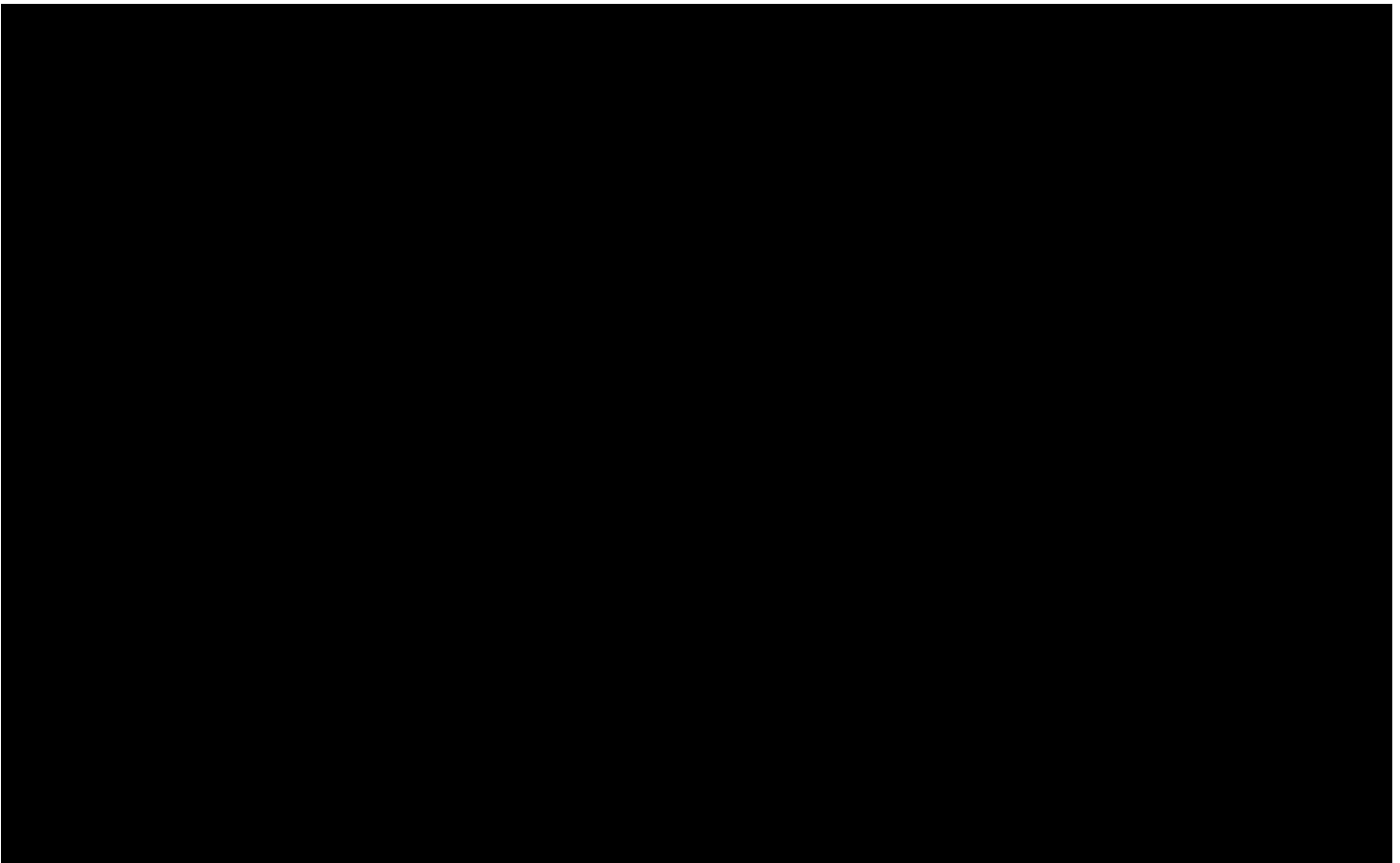
A maturity assessment was carried out for the Mju Deep mini-basin based on a petroleum system basin modelling done using the software PetroMod v.2015.

Five source rocks levels were considered in the basin modelling which were applied to the Draupne and the Heather formations. The Draupne Formation was subdivided in four sublayers corresponding to Upper Draupne 1 and 2, Middle Draupne and Lower Draupne. The separation was mainly done using gamma-ray, resistivity and density logs. Specifically, the division of Upper Draupne 1 and 2 was done due to facies changes that were applied for an area south from Mju Deep Basin; therefore, since this do not apply for the area of interest in this study these two sublayers can be considered as one. Based on the basin model results all source rocks have reached very high transformation ratios (TR) equivalent to late oil and gas conversion (higher than 60%) within the Mju Deep mini-basin. The vitrinite reflectance (VR) maps from basin modelling correlates well with the TR results and indicate that

for the kitchen area in the Mju Deep mini-basin all source rock levels have reached high values equivalent to the late oil window to wet gas (from 1.0 to 2.0%VR), figure 3.2)

For this basin model a kinetics model of a type II kerogen or oil prone source rock was used for the Draupne Formation; while a type II/III kerogen or oil- and gas-prone source rock was considered for the Heather Formation. In general, all five source rock levels indicate that generation and possibly expulsion of hydrocarbons took place during Paleocene and Eocene time. It is expected based on the maturity evolution up to present-day that oil was generated first followed by the generation of gaseous hydrocarbons, as expected.

A volume assessment was carried out using the tool QuickVol 3D (internally developed by Statoil) where the VR maturity maps from different time steps were also used; together with total organic carbon (TOC) and hydrogen index (HI) values, total thickness maps and kinetics models (same as for the basin model). The estimated total cumulative oil and gas volumes generated and expelled within the Mju Deep mini-basin (considered as the drainage area) is regarded as sufficient to fill the reservoirs evaluated in Mju Deep.



**Figure 3.2** Vitrinite reflectance maps for the Mju Deep basin area. Modelling indicates that all source rock levels have reached high values equivalent to the late oil window to wet gas.



## 4 PROSPECT UPDATE

Mju Deep prospect consists of three segments of the Upper Jurassic Draupne Fm: *Mju Deep syn-rift 2 North* and *South* segments defined as combined structural and stratigraphic trap, whereas the third and stratigraphic younger *Mju Deep syn-rift 3* segment is defined as a stratigraphic trap (APA 2014, our reference AU-EXP NOR-0002). Mju Deep Syn-rift 2 north segment is the driving segment with respect to volumes and probability of success. Segment apex is located within PL 025 towards the 15/3-2R high and only minor area, to the east, is extending into the surrendered PL 025B, Figure 4.

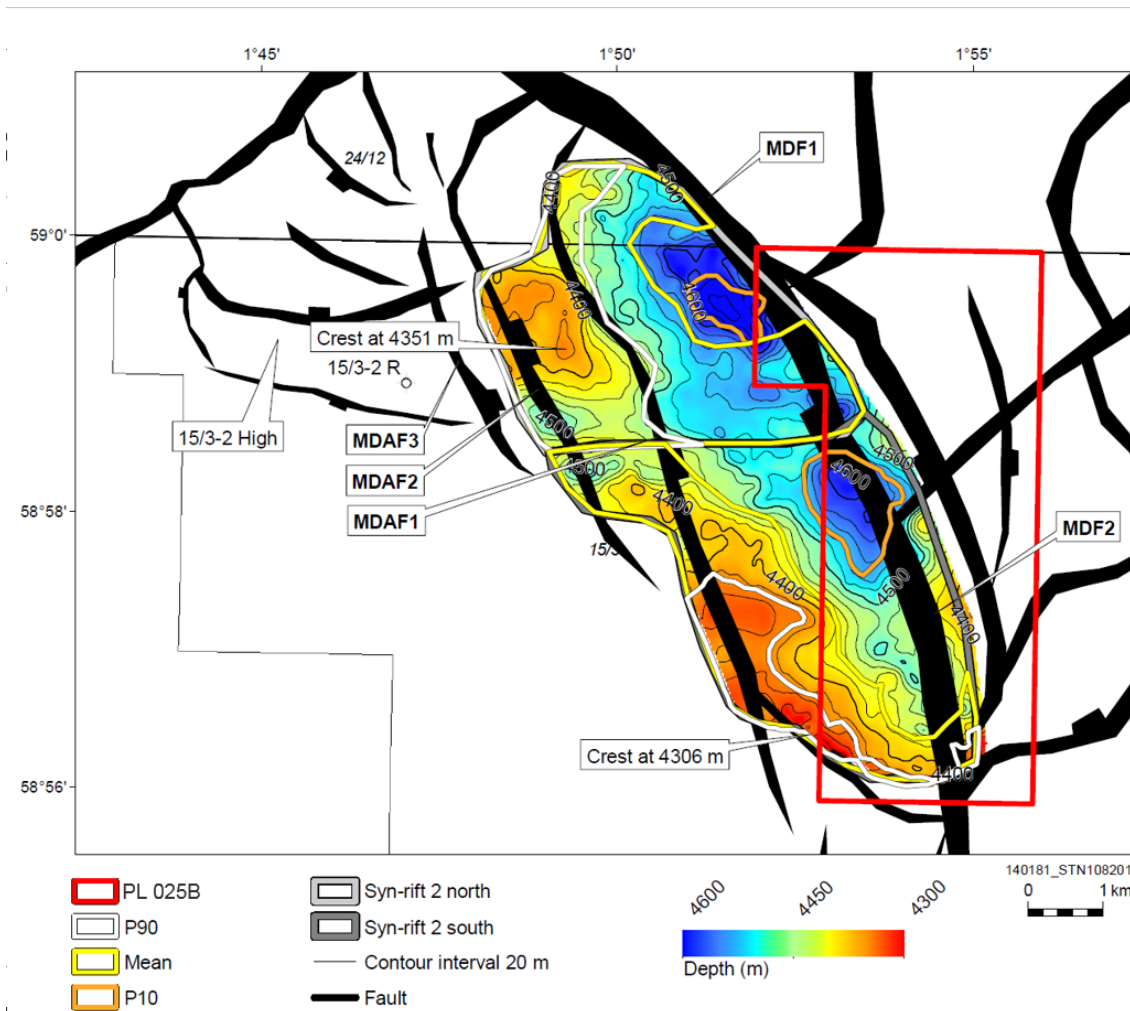


Figure 4

No other prospects have been mapped in PL 025B. Mju deep prospect is not updated since the evaluation for the APA 2014. The work that has been done after 2014 does not affect the Mju Deep assessment in such a way that the volume or probability of success has changed.

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## **5 TECHNICAL EVALUATIONS**

No updated technical evaluation has been performed, volume and risk remains the same.

## **6 CONCLUSIONS**

PL 025B partners see potential in the Mju Deep prospect but has not been able to de-risk the prospect for a drill decision in 2017. Mju Deep apex and main parts of the prospect are in PL 025 licensed by the same partnership. A decision to drop the production license PL 025B, covering only the upside of the Mju Deep prospect, has therefore been made within the license.