# Relinquishment report PL504BS

Document last updated 24-03-2015 13:20 CET

**Relinquishment report PL504BS**

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# 1 INTRODUCTION

## 1.1 Licence owners

The owners of the PL 504BS are:

- **Det norske oljeselskap ASA 83,571 % (operator)**
- Spike Exploration Holding 12,143 %
- Petoro AS 4,286 %

**Voting Rules :** Majority and minimum 50%

# 1.2 Award and work program

The initial production license, PL 504 was awarded 23.01.2009 (APA2008) to a partnership consisting of Det norske (operator), Dana and Petoro. The PL504BS license was awarded as a stratigraphic split license, as additional acreage to PL504 and the same license group. The work commitment in PL504 should also apply to PL504BS. NPD has confirmed that the well commitments are fulfilled in PL504. Further commitments have been fulfilled by the Jette project.

The license outline and nearby fields and discoveries are seen in Fig. 1.1. A geoseismic section across the Brandhaug prospect, Jette Field and the Eitri discovery (25/8-16S) are shown in Fig. 1.2

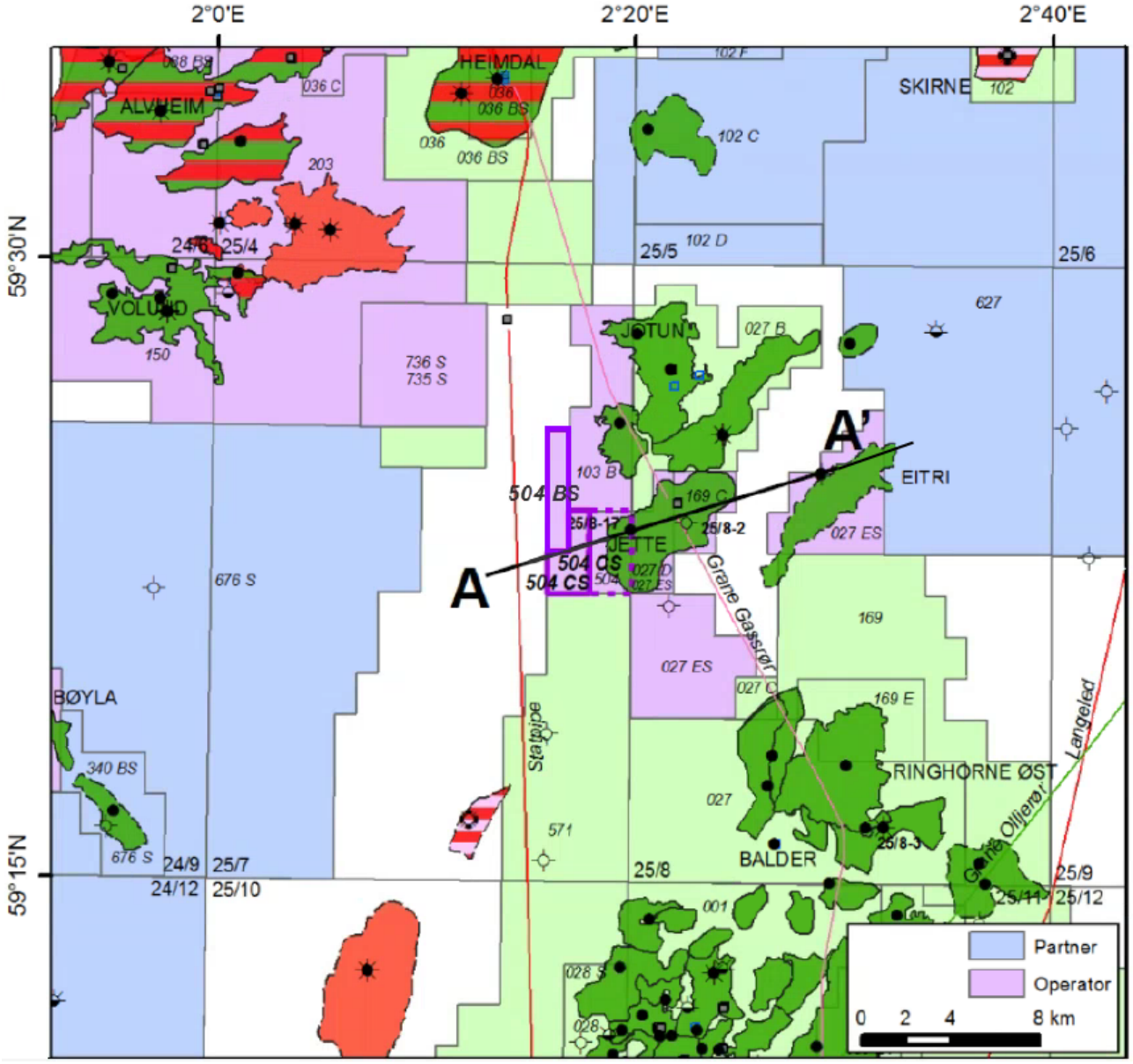


Fig. 1.1 PL504BS License outline. *The figure shows the location of the PL504BS (and the PL504CS) with position of geoseismic section indicated*

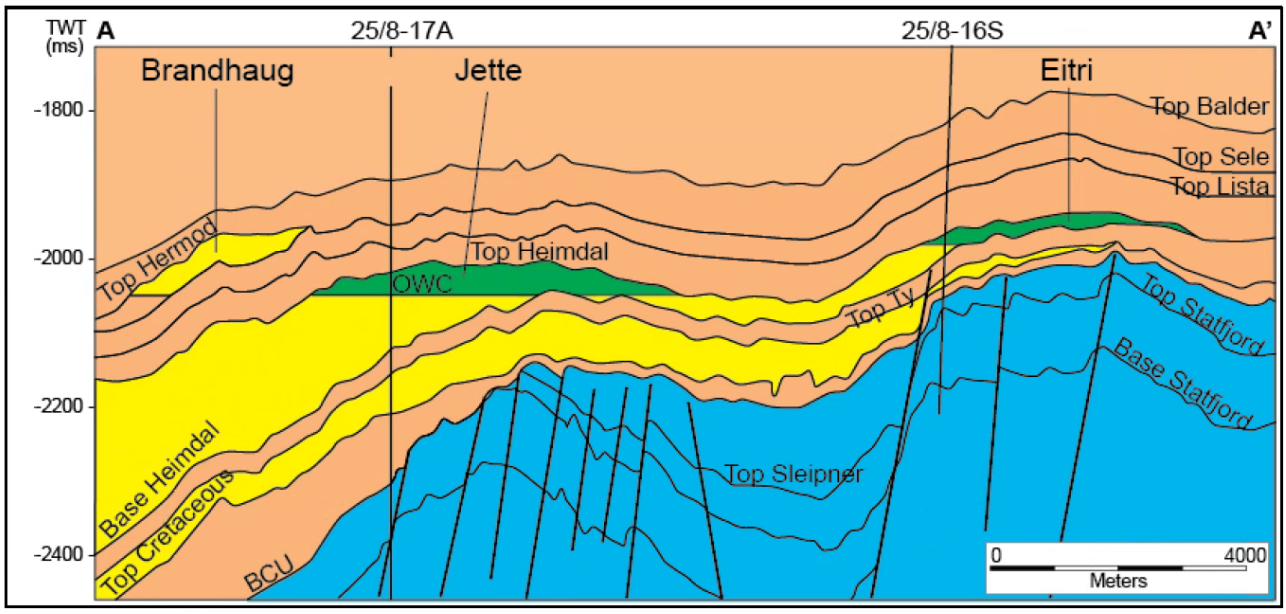


Fig. 1.2 Geoseismic section. *Section across the Brandhaug prospect, Jette Field and the Eitri discovery.*

## 1.3 Pre-drill prospectivity

The Jetta Prospect is located in the western part of Block 25/8 and eastern part of Block 25/7, and is a potential extension of the Jotun Tau. The prospect consisted of a target in the Paleocene Heimdal Formation, see Fig. 1.3 for the prospect location. Jetta was not mapped to have an extension into PL504BS.

The Paleocene target was a combined stratigraphic and structural trap, Fig. 1.4 shows two schematic cross sections which illustrates the prospect concept.

The source rock for the prospect is Draupne shale, which is proven to be mature in the basin to the west. The main risk of the prospect was the probability of reservoir (P1= 0.63).

The Jetta Prospect and the well results from wells 25/8-17 & 17A is fully described in the PL504CS Relinquishment Report.

However the Brandhaug prospect is partly located in PL504BS. The Brandhaug prospect has been an amplitude driven prospect in Hermod Formation. The Brandhaug prospect is now degraded from prospect to lead, this is described in Chapter 4 REMAINING PROSPECTIVITY.

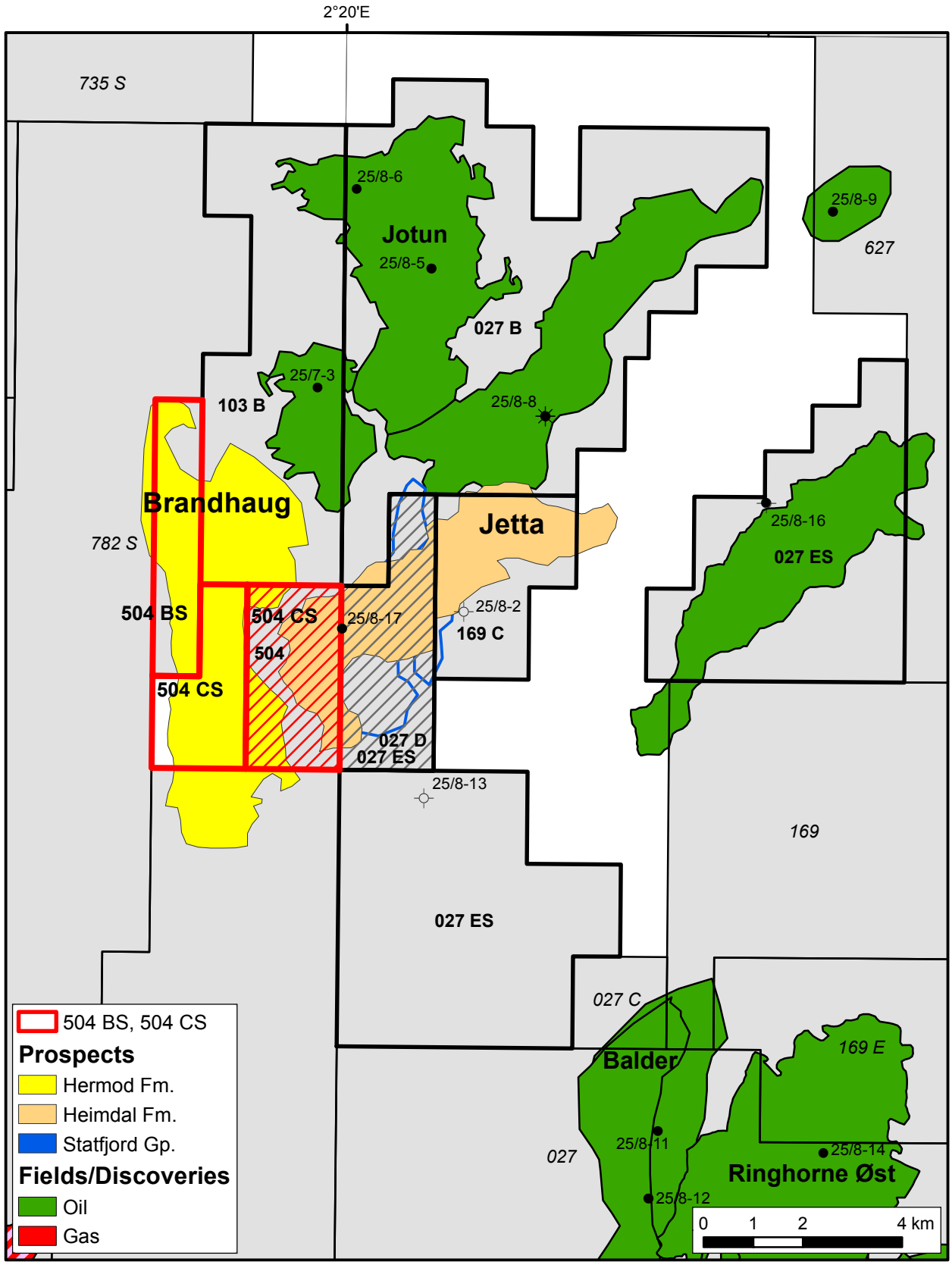


Fig. 1.3 The Jetta Prospect and Brandhaug Lead location

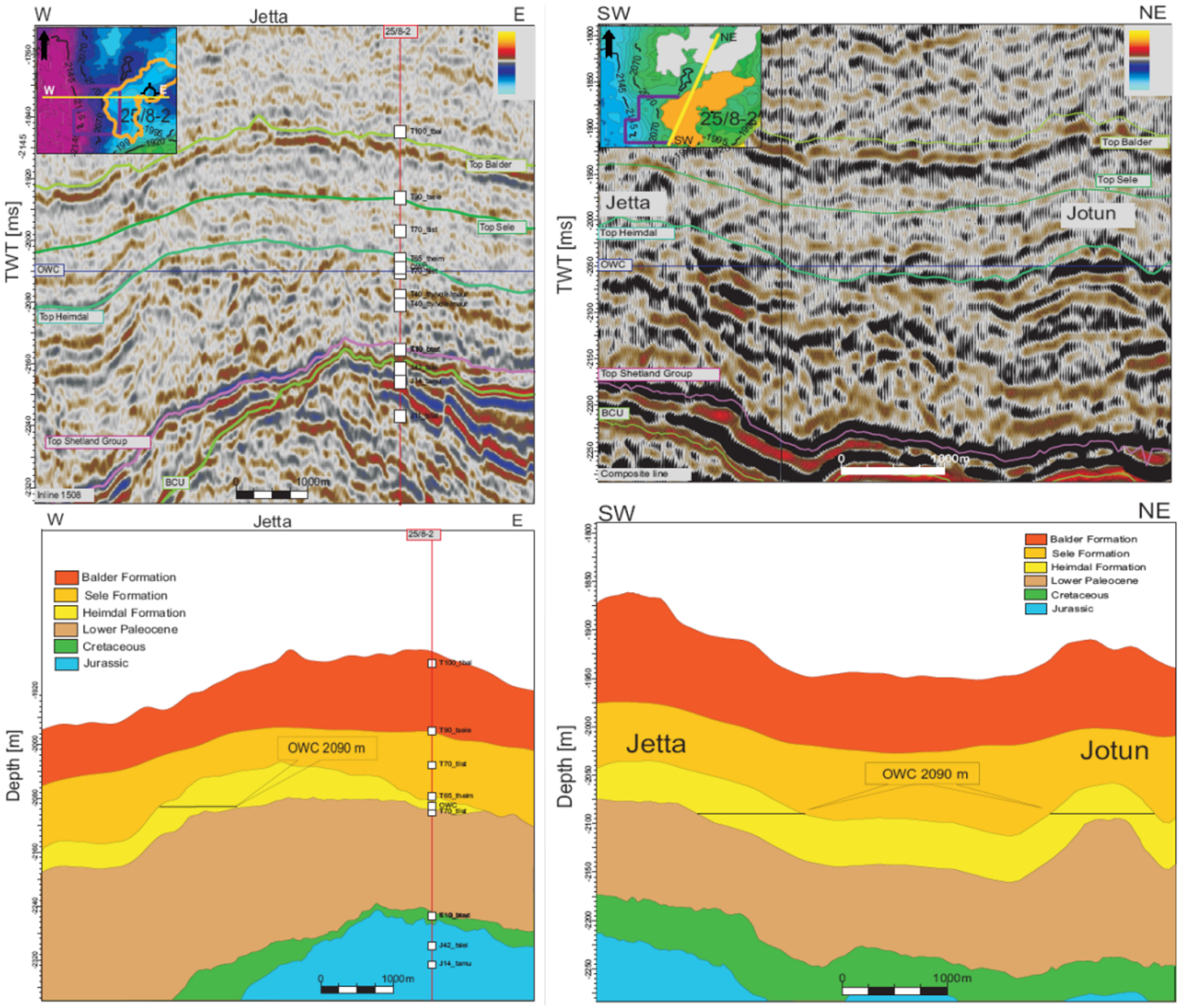


Fig. 1.4 Seismic lines and schematic cross sections trough the Jetta Prospect

# 2 DATABASE

## 2.1 Seismic database

The common seismic database is shown in Fig. 2.1 and in Table 2.1

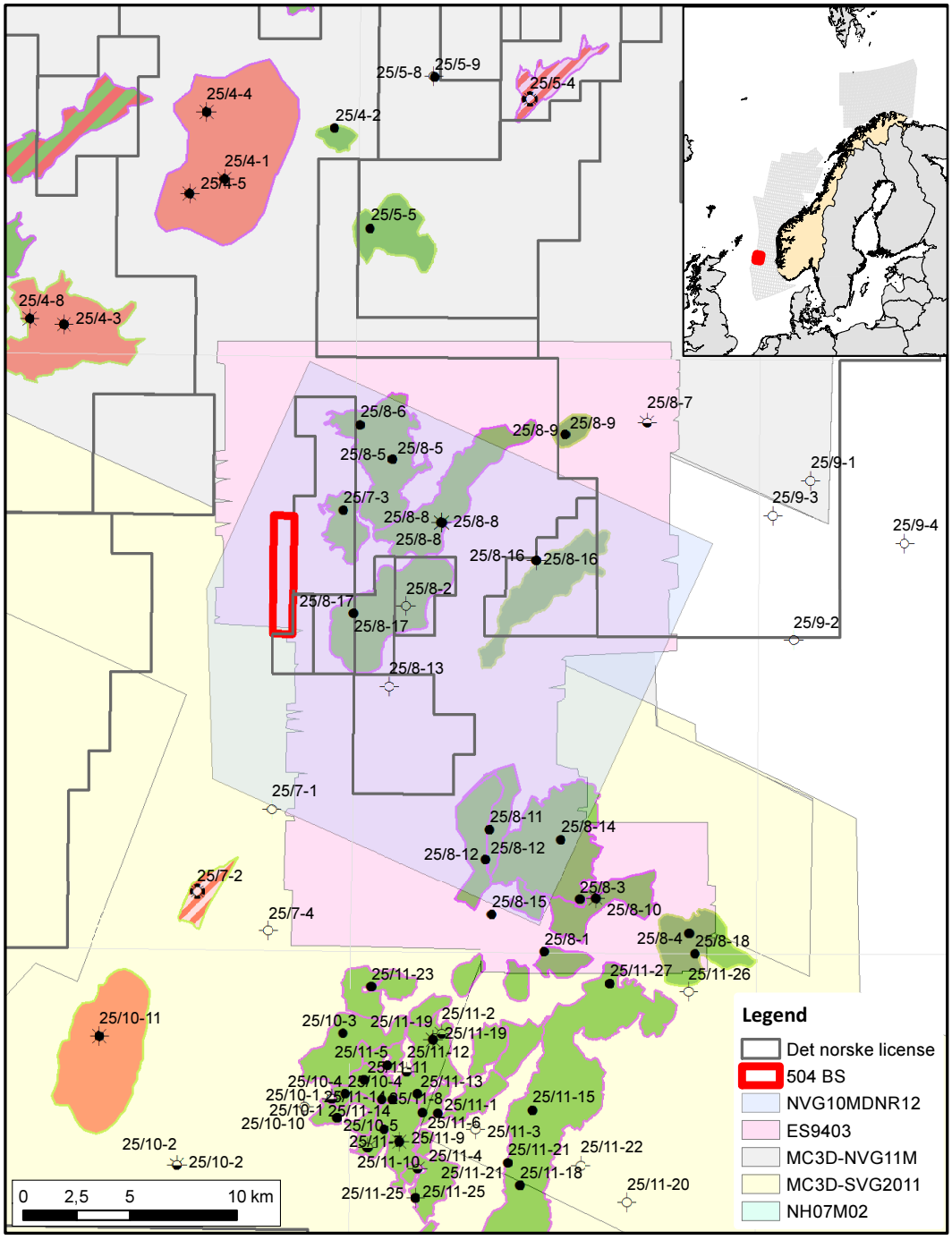


Fig. 2.1 Common seismic database

Table 2.1 Common seismic database

| 3D data | Year | Offset data | Latest reprocessing |
|---|---|---|---|
| NVG10MDNR12 | 2010 | x | 2012 |
| MC3D-NVG11M (NVG10M) | 2011 (2010) | x | |
| MC3D-SVG 2011 | 2011 | x | |
| NH07M02 | 2007 | x | |
| ES9403 | 1994 | x | |

## 2.2 Well data

The common well database is shown in Table 2.2 and in Fig. 2.2

Table 2.2 Common well database

| Well | Field/Discovery, Name | Comp. Year | TD depth (MD) [m] | TD Formation/Group |
|---|---|---|---|---|
| 24/6-1 | Peik Field | 1985 | 4937 | Statfjord Formation |
| 24/9-6 | Not yet developed | 1994 | 2255 | Heimdal Formation |
| 25/1-10 | Dry | 1988 | 4739 | Ness Formatiom |
| 25/4-1 | Heimdal Field | 1972 | 4060 | Smith Bank Formation |
| 25/4-3 | Not yet developed | 1974 | 2714 | Jorsalfare Formation |
| 25/4-5 | Heimdal Field | 1981 | 4355 | Smith Bank Formation |
| 25/4-6S | Vale Field | 1991 | 4170 | Statfjord Formation |
| 25/5-5 | Not yet developed | 1995 | 2600 | Våle Formation |
| 25/7-1 ST2 | Dry | 1985 | 3592 | Pre Devonian |
| 25/7-2 | Not yet developed | 1990 | 4850 | Slepiner Formation |
| 25/7-3 | Jotun Field | 1995 | 2540 | Tor Formation |
| 25/7-4 S | Dry | 1997 | 2560 | Tor Formation |
| 25/7-5 | Not yet developed | 1997 | 2736 | Våle Formation |
| 25/7-6 | Not yet developed | 2000 | 2250 | Heimdal Formation |
| 25/8-1 | Ringhorne Field | 1970 | 2606 | Early Permian |
| 25/8-2 | Dry | 1975 | 2578 | Late Triassic |
| 25/8-3 | Balder Field | 1981 | 1868 | Paleocene |
| 25/8-5 S | Jotun Field | 1994 | 3395 | Smith Bank Formation |
| 25/8-6 T2 | Jotun Field | 1995 | 2577 | Heimdal Formation |
| 25/8-8A | Jotun Field | 1995 | 2601 | Heimdal Formation |
| 25/8-8B | Jotun Field | 1995 | 2510 | Heimdal Formation |
| 25/8-8S | Jotun Field | 1995 | 2592 | Heimdal Formation |
| 25/8-B2 | Jotun Field | 1999 | 2552 | Heimdal Formation |
| 25/8-B04 | Jotun Field | 2000 | 5134 | Heimdal Formation |
| 25/8-B10 | Jotun Field | 2000 | 3297 | Heimdal Formation |
| 25/8-B21 | Jotun Field | 2002 | 2400 | Heimdal Formation |
| 25/8-B22 | Jotun Field | 2000 | 5642 | Heimdal Formation |
| 25/8-11 | Balder Field | 1997 | 1994 | Statfjord Formation |
| 25/8-12A | Balder Field | 1999 | 2156 | Heimdal Formation |
| 25/8-12S | Balder Field | 1999 | 2096 | Smith Bank Formation |
| 25/8-13 | Dry | 2001 | 2276 | Smith Bank Formation |
| 25/8-17A | Jette Field | 2009 | 2495 | Ty Formation |
| 25/8-17 | Jette Field | 2009 | 2233 | Ty Formation |
| 25/8-16S | Eitri | 2009 | 2550 | Statfjord Formation |

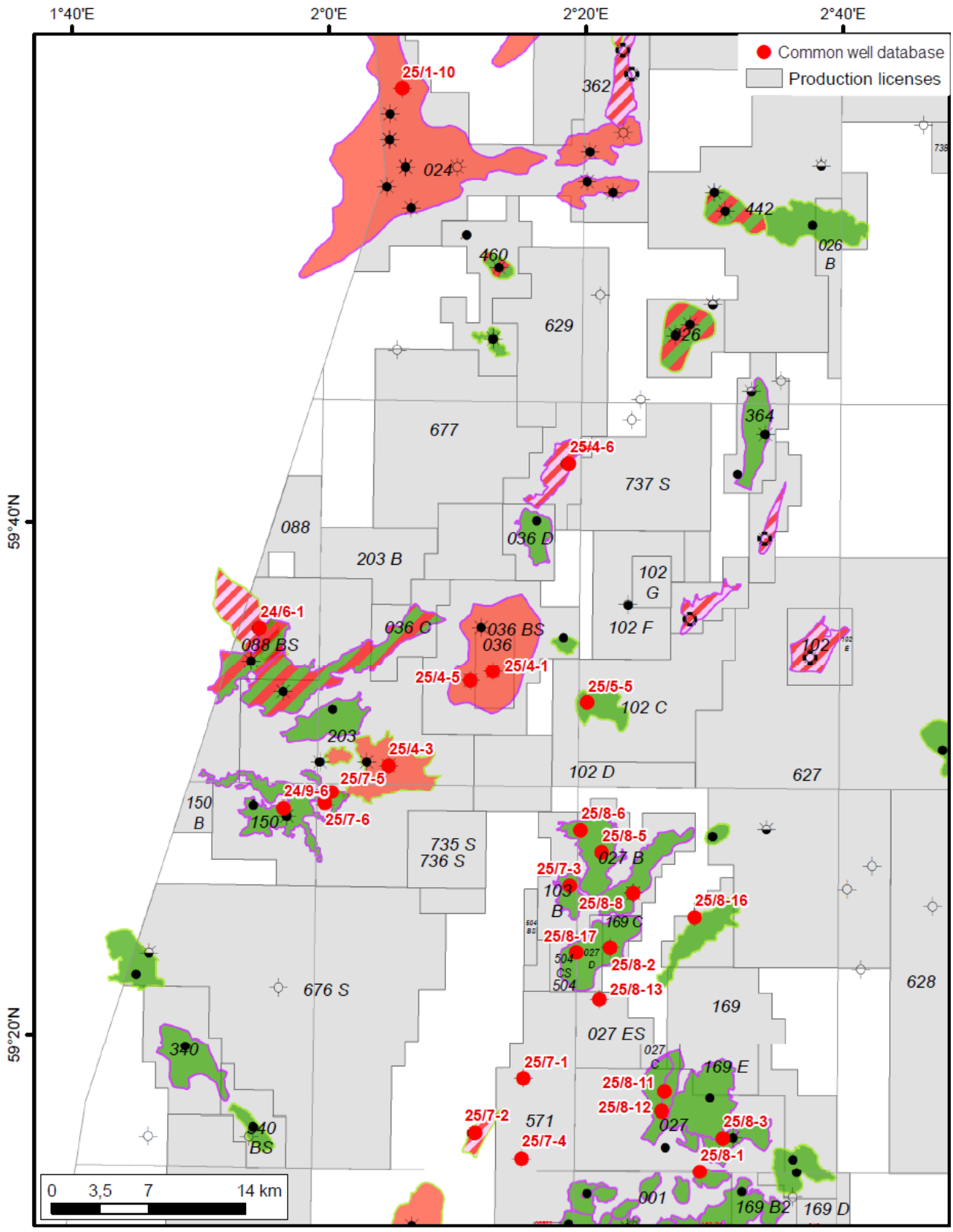


Fig. 2.2 Common well database

# 2.3 Special studies

A special study has been carried out in-house to address the geological uncertainties of the PL504 and PL027D prospectivity. This study is:

**Special geophysics study**
An internal study has been done on special geophysics. Several cubes have been created to improve the prospect evaluation in the area. These cubes are listed in Table 2.3

Table 2.3 Special geophysic study. Created cubes

| Cubes | Comment |
|---|---|
| Improved Near | PSDM reflectivity 0-12 degrees after PSPRO, noise removal and AVO conditoning |
| Improved Mid | PSDM reflectivity 12 -24 degrees after PSPRO, noise removal and AVO conditioning |
| Improved Far | PSDM reflectivity 24-35 degrees after PSPRO, noise removal and AVO conditioning |
| CI Near | PSDM relative inversion 0-12 degrees after PSPRO, noise removal and AVO conditioning |
| CI Mid | PSDM relative inversion 12 -24 degrees after PSPRO, noise removal and AVO conditioning |
| CI Far | PSDM relative inversion 24-35 degrees after PSPRO, noise removal and AVO conditioning |
| Intercept | Intercept with 2 terms approach |
| Gradient | Gradient with 2 terms approach |
| Relative P-impedance | Relative P-impedance |
| Relative S-impedance | Relative S-impedance |
| Relative AVO impedance | Relative AVO-class-strength-impedance. Relative AVO class 4 strength. Relative Extended Elastic Impedance, 22 degrees Chi, AVO-anomaly/Fluid anomaly. |

# 3 EXPLORATION WELLS

According to the work commitment the licensees should within three years after award, drill two exploration wells, one of which was contingent. The licensees were free to drill wells in production license 027D or 504. Both the exploration wells 25/8-17 (Jetta prospect) and 25/8-16 (Eitri prospect) were drilled in PL027D during 2009. NPD has confirmed that the work commitment has been fullfilled. No wells are drilled in the PL504BS, the wells drilled in PL504 and PL027D are described in these licencees.

# 4 REMAINING PROSPECTIVITY

The PL504 CS & BS operator has carried out an evaluation of the remaining prospectivity in the license and has evaluated one prospect (Brandhaug). The Brandhaug prospect is now degraded from prospect to lead.

The outline of the prospect is seen in map view in Fig. 4.1 and in two cross sections going north-south Fig. 4.2 and west-east Fig. 4.3

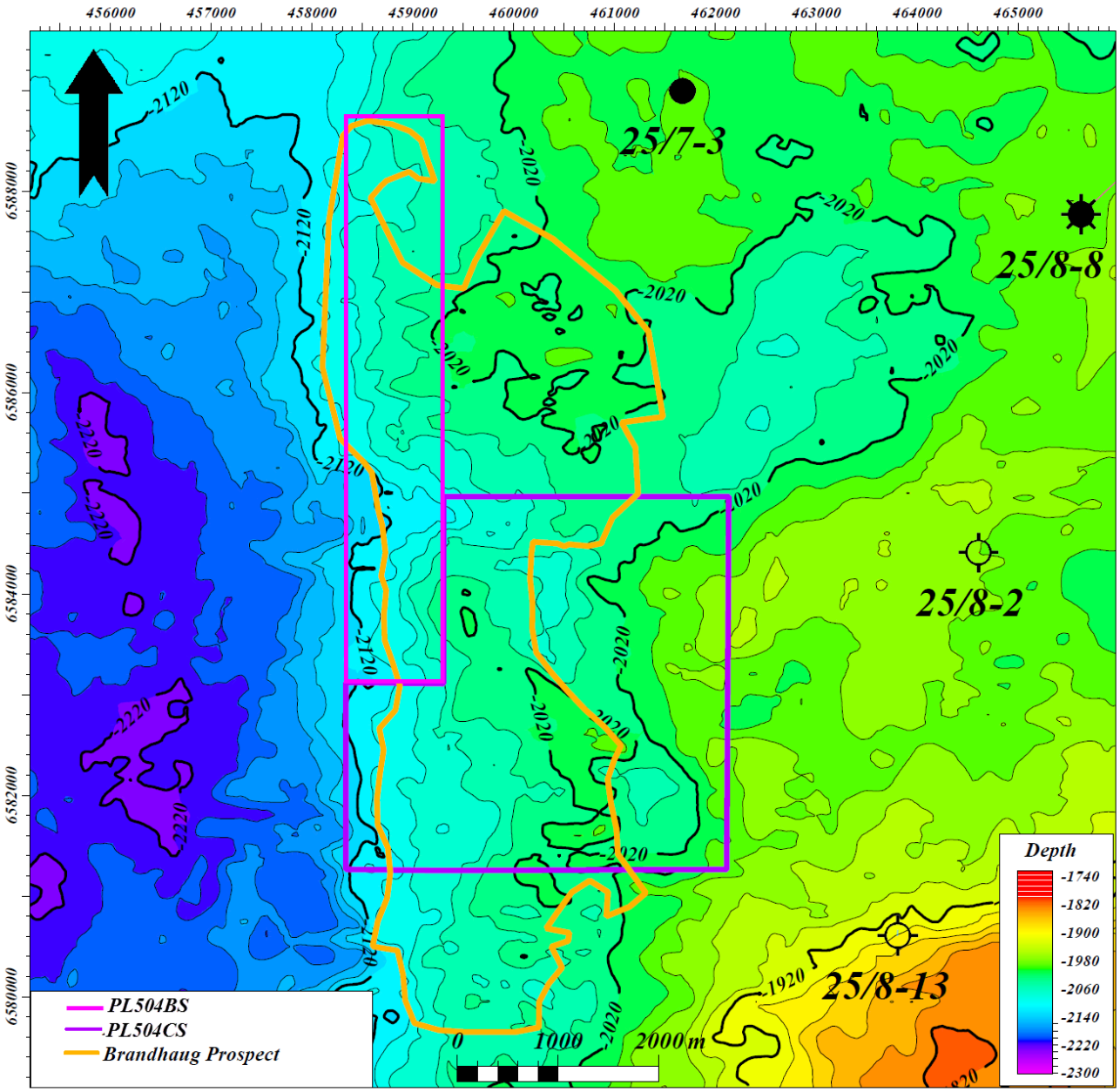


Fig. 4.1 Brandhaug map outline. *Top Hermod depth structure map. C.i. 20 m.*

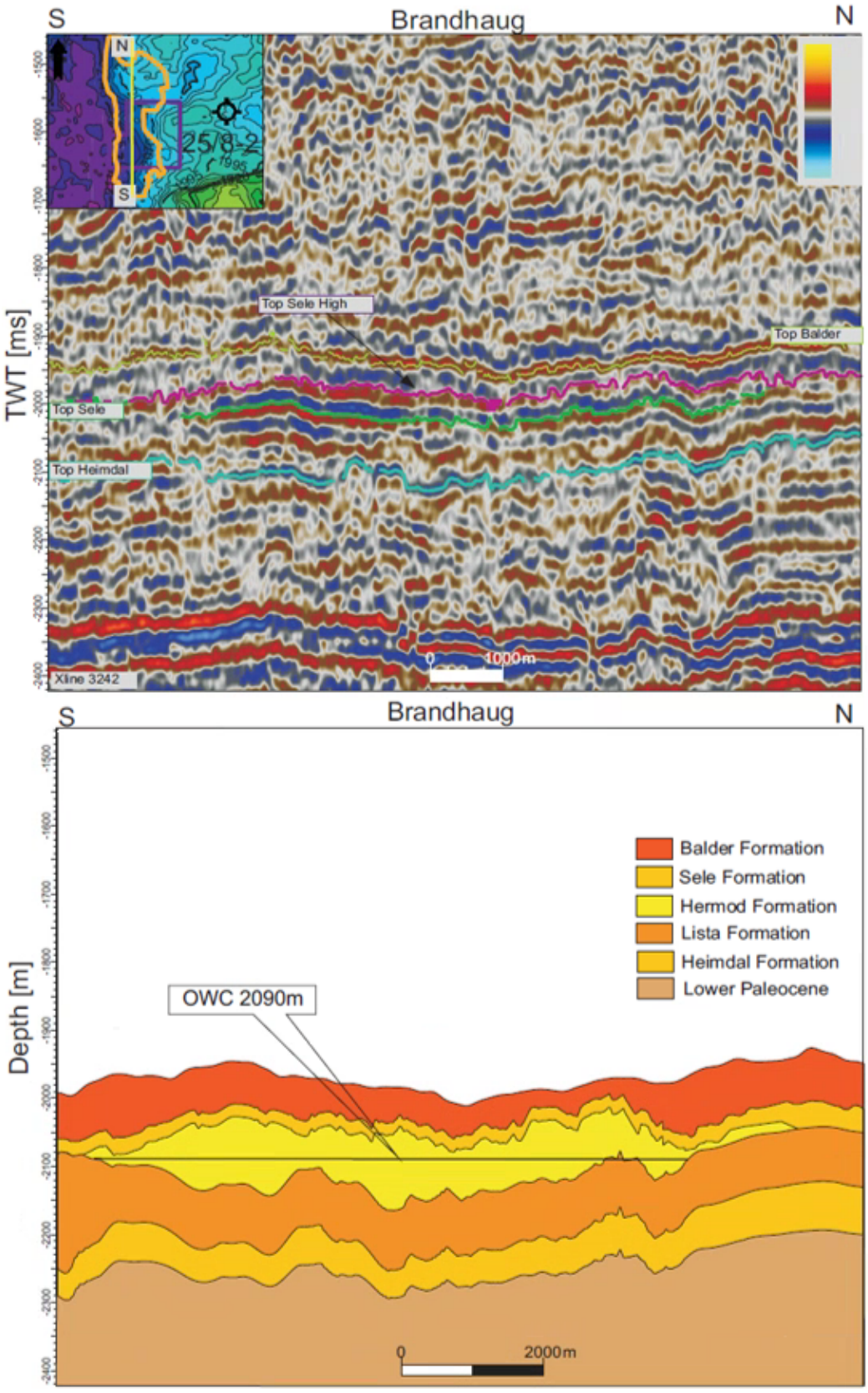


Fig. 4.2 North-South cross section across Brandhaug. *Xline 3242 (PD06M01)*

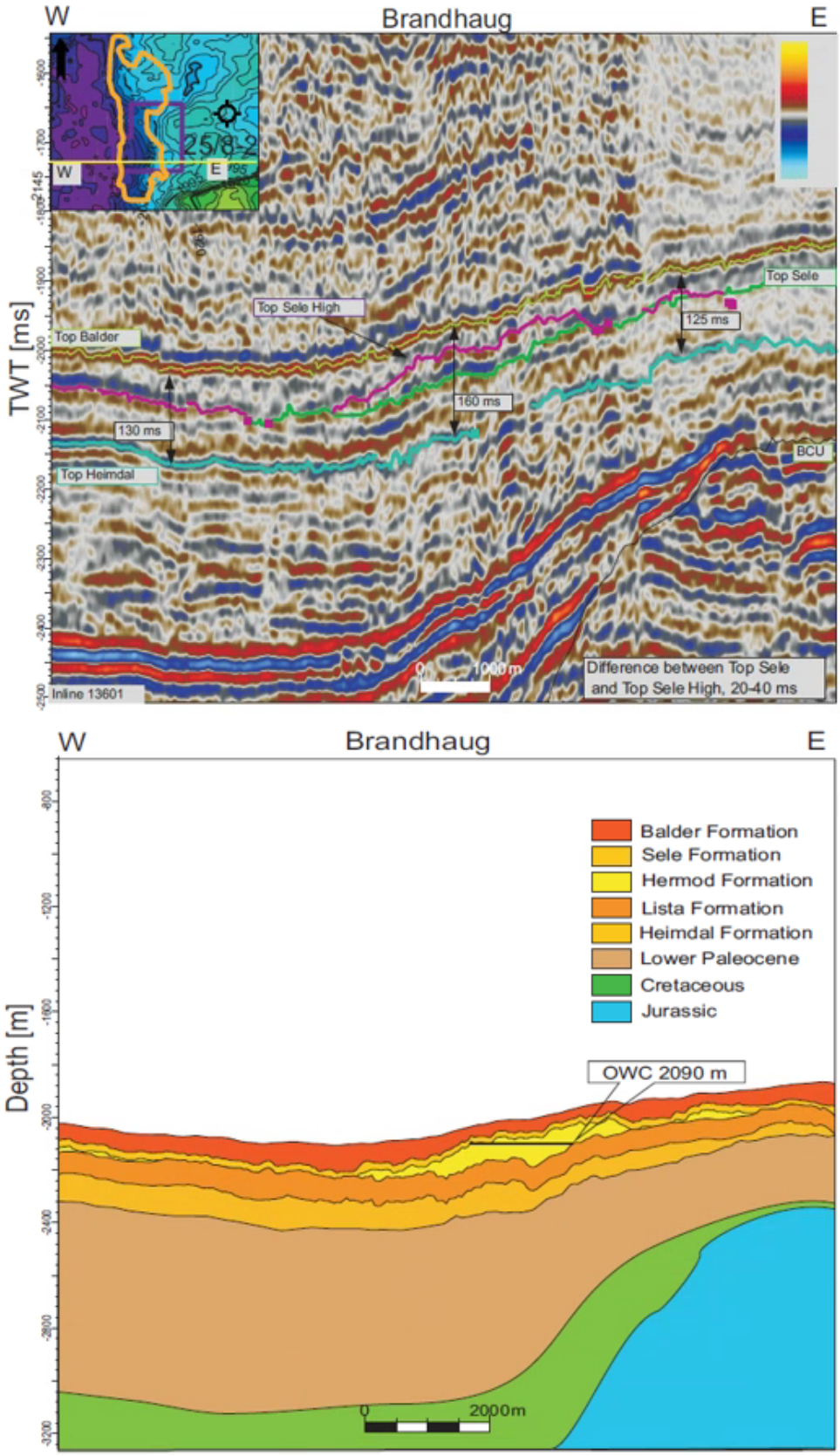


Fig. 4.3 West-East cross section across Brandhaug. *Inline 13601 (PD06M01)*

The Brandhaug prospect has been an amplitude driven prospect in Hermod Formation. It is located at the distal part of the depositional system of submarine fans of the Hermod Fm. No structural/stratigraphic trap is observed, it seems like the Hermod sand continues southeast to the Ringhorne/Balder complex. The postulated source rock for this prospect is the Upper Jurassic shales of the Draupne and Heather formations, which are mature in the Viking Graben to the west of this area. Migration into the Paleocene rocks is poorly understood, but proven to work in this area.

The main risk of the prospect is the trap. The Brandhaug Porpsect is left with no indications of sand in a closure, and no indications of hydrocarbons. The Brandhaug Prospect had an overall probability for a discovery of 0.26 from earlier risking (APA 2008), this is now re-evaluated to 0.03 because of a much higher risk on the trap. The Hermod sands in the area give a classic AVO response, with a strong far trace response to oil. Brandhaug has no such indications of hydrocarbons as shown in Fig. 4.4.

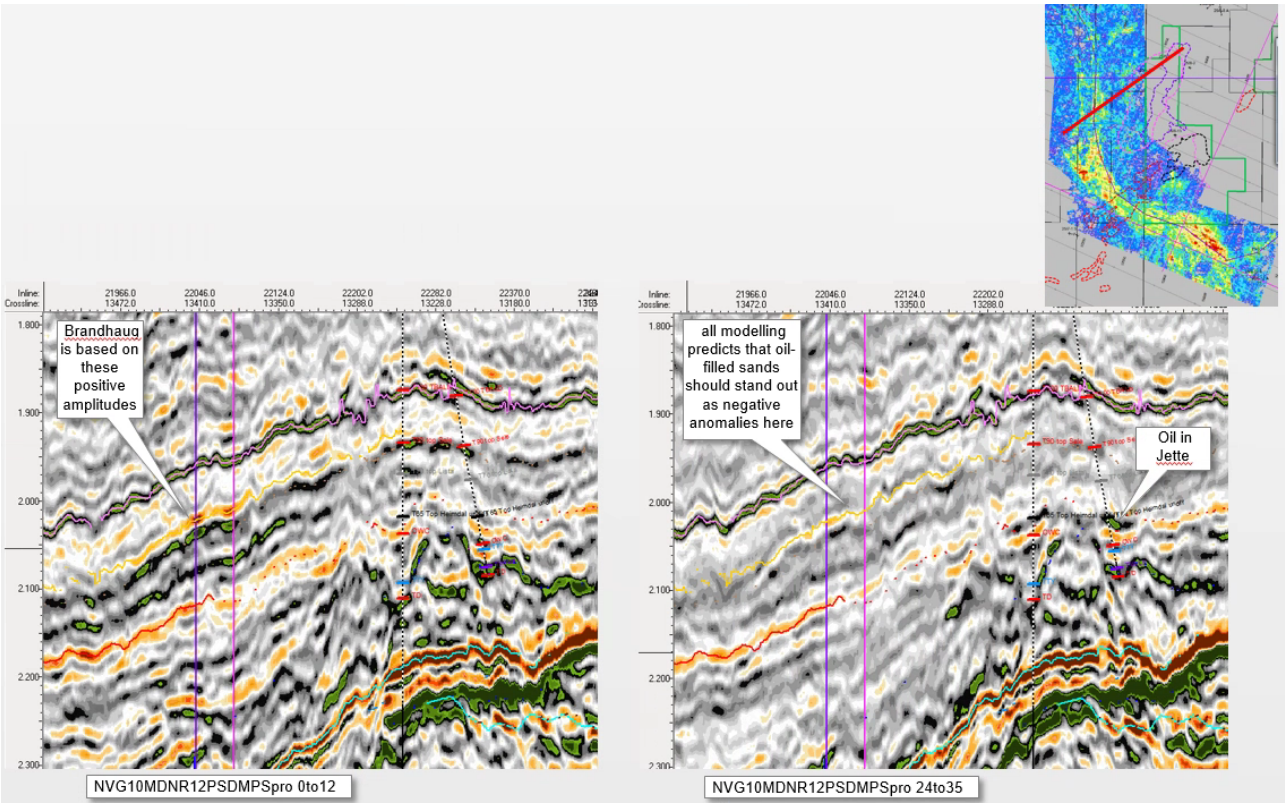


Fig. 4.4 Seismic line NVG10MDNR12PSDMPSpro across Brandhaug. *The geophysical modelling asserts that we should see the change from oil-filled to water filled Hermod sands. There is no sign of this.*

The Brandhaug Prospect has not reached the quality level for a drilling candidate. The prospect has been thoroughly assessed with separate evaluations providing similar conclusion. The prospect was believed to share an OWC with the Jette Field, where the reservoir sand extends partly above the OWC in the field. Final evaluation did not confidently identify sand above the Jette OWC, and no indications of hydrocarbons.

Other prospectivity levels in the license has been evaluated and not found interesting.

No prospects are identified and therefore no economic evaluations have been done.

The final conclusion on the evaluation of the prospectivity in the license is therefore that it is not found any prospects which have reached the quality level for a drilling candidate, this is the reason for relinquishment of the PL504BS.