

# Relinquishment Report for PL432+B

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# 1 INTRODUCTION

## 1.1 License owners

Det norske oljeselskap ASA (100%)

## 1.2 Award and work program

The license was awarded on 16th February 2007 for an initial period of 6 years (3+2+1) following APA Licensing Round 2006.

Within the first 3 years the license had an obligation to acquire 400km<sup>2</sup> 3D seismic over the license area and perform further G&G studies leading to a drill or drop decision. The license has fulfilled these obligations and has decided to relinquish PL432+B.

The Nebba prospect (Fig. 1.1) was considered to be of the most interest as a first drilling target. As of today, the prospect is considered to be too uncertain to carry the commitments that a positive drill decision would have brought forward.

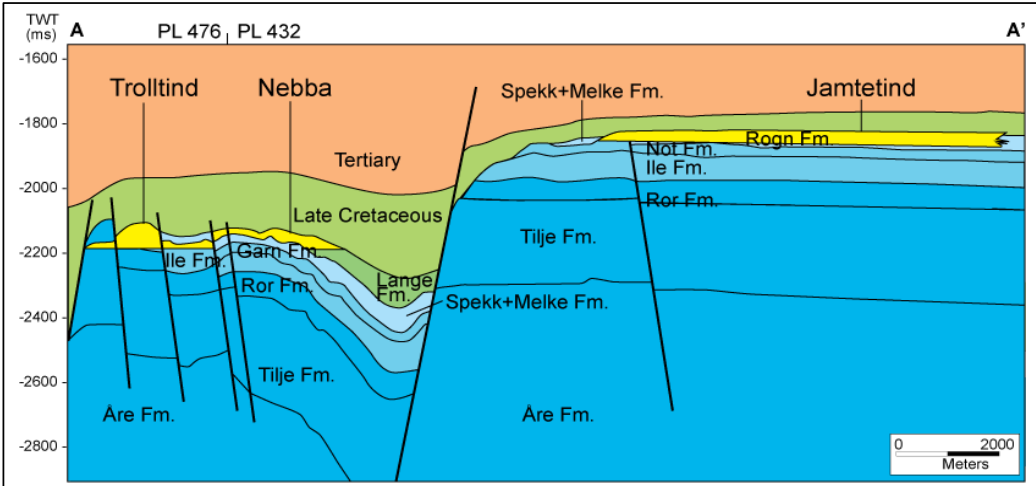
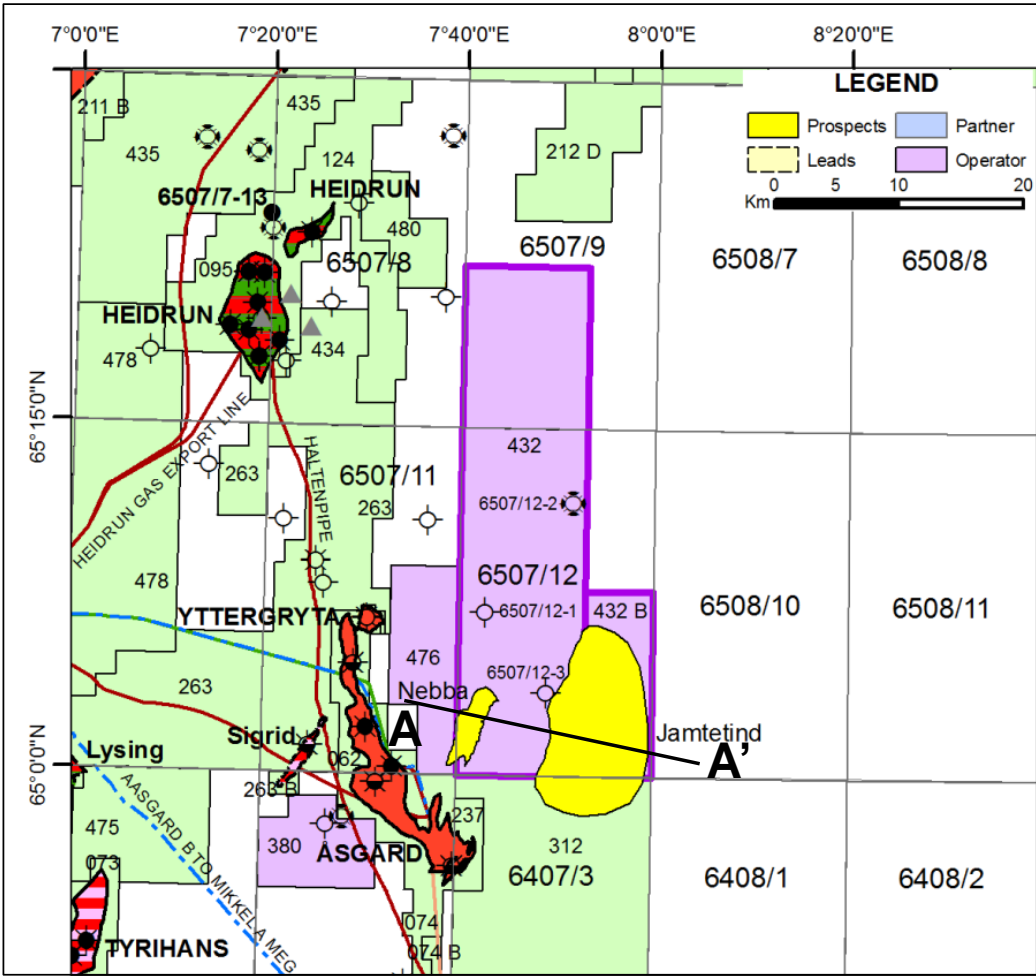


Fig. 1.1 Location of PL432+B license area and prospects. Top - Location map of license area (shown in purple) and prospects (shown in yellow). Bottom - Schematic section through license area and prospects (Nebba to West and Jamteting to East).

### 1.3 PL432+B prospectivity

As part of the 2006 APA license application, one prospect and two leads were identified within the proposed license area. The Nebba prospect is defined as a new play model containing Early Cretaceous sandstones of the Lange Formation. In addition, an upper Jurassic syn-rift lead and a Jurassic pre-rift lead were mapped which are situated further to the North from the Nebba prospect.

During the 2008 APA license application, the operator applied for an additional license area East of PL432. In this PL432B area, Jamtetind, a new prospect was mapped as the result of an AVO study in the PL432 area.

A table showint the expected recoverable reserves (gross) of the two prospects in the area is presented below.

Table 1.1

Table 1.1 Summary of estimated recoverable reserves (gross).

PL432+B					GROSS RECOVERABLE RESERVES/RECOURCES					
					Low		Base		High	
CATEGORY	RESERVOIR LEVEL	HC	RF(%)	POS (%)	Cond (MSm <sup>3</sup> )	Gas (GSm <sup>3</sup> )	Cond (MSm <sup>3</sup> )	Gas (GSm <sup>3</sup> )	Cond (MSm <sup>3</sup> )	Gas (GSm <sup>3</sup> )
PROSPECTS										
Nebba	Cretaceous (Lange Fm)	gas	70	13	1.7	6.8	3.0	8.3	4.8	10.1
Jamtetind	L. Jurassic (Rogn Fm)	gas	60	12	0.1	10.0	2.9	44.4	5.0	60.0

## 2 DATABASE

### 2.1 Seismic database

The seismic coverage of the license area is shown in (Fig. 2.1). The DN0701 survey provides 3D coverage over the entire PL432, including a well-tie with the 6507/11-2, 6507/12-1, 6507/12-2 and 6507/12-3 wells. PL432B is only partially covered by the DN0701 survey. Both licenses are in addition covered by 2D lines SG8258, SG8158, SG8045, SG8558, SG8271, ST7701 and GMT84, see Table 2.1.

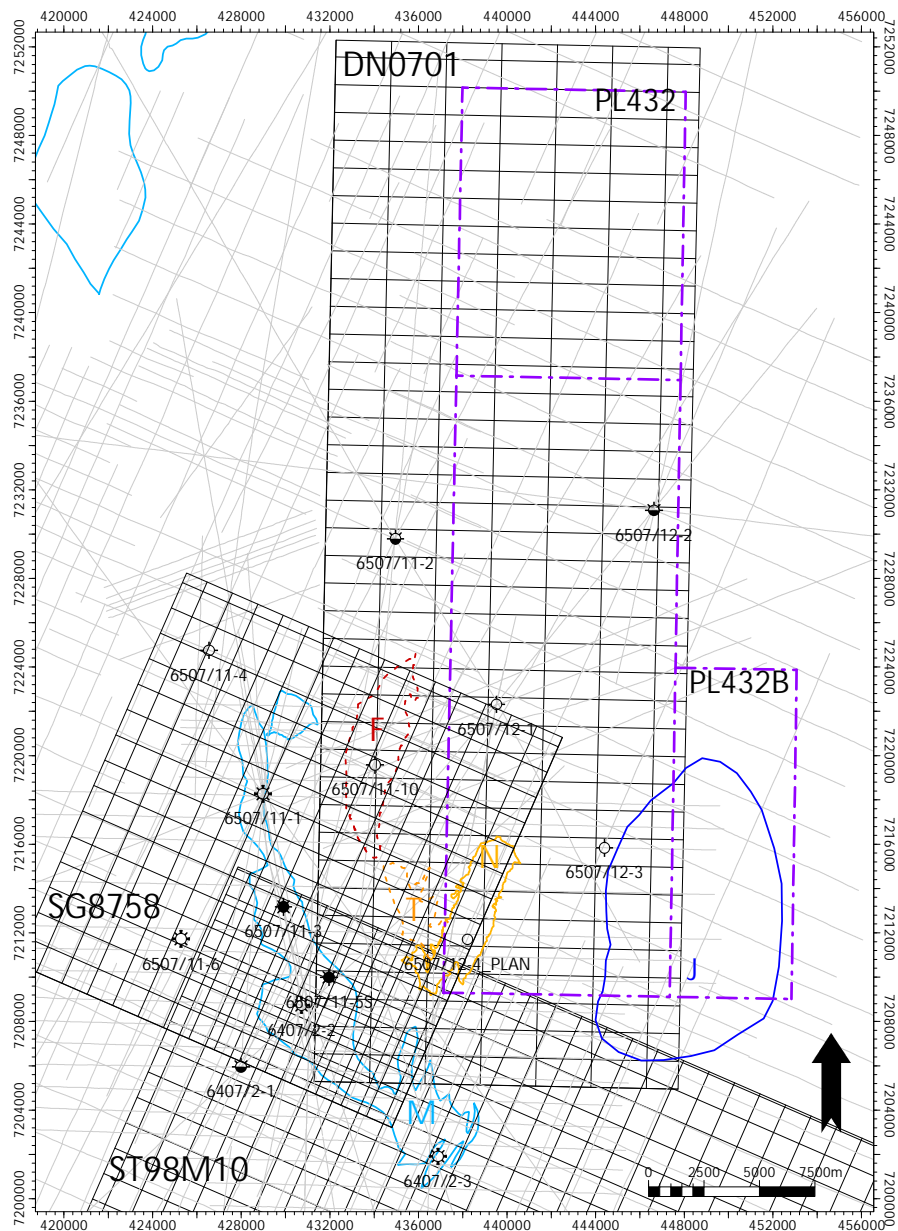


Fig. 2.1 Seismic survey and reference well database. F - Frusalen, T - Trollind, N - Nebba, J - Jamtetind, M - Midgard Field.

Table 2.1 Seismic database.

Survey name	Suvey type	Survey status	Seismic class
DN0701	3D	Multi client	Final mig. + near & far offset
ST98M10	3D	Multi client	Final mig.
SG8258	2D	Public	Final mig.
SG8158	2D	Public	Final mig.
SG8045	2D	Public	Final mig.
SG8558	2D	Public	Final mig.
SG8271	2D	Public	Final mig.
ST7701	2D	Public	Final mig.
GMT84	2D	Public	Final mig.

## 2.2 Well data

Fig. 2.1 shows the wells in the license area as well as the wells closest to the area. A list of the wells in the common database is presented in Table 2.2 and includes information on when the wells were drilled, waterdepth, total depth, oldest penetrated formation, location, and availability or not of final well report.

Table 2.2 Well data base

Well	Year drilled	Water depth (m)	TD (m)MD/Fm	Location/Field	Final well report available
6407/2-2	1983	258	3351/ Grey Beds	Midgard	Yes
6407/2-3	1987	250	3050/Åre Fm	Midgard	Yes
6507/11-1	1981	298	3139/Grey Beds	Midgard	Yes
6507/11-2	1982	243	2905/Grey Beds	Norwegian Sea	Yes
6507/11-3	1985	290	3250/Grey Beds	Midgard	Yes
6507/11-4	1987	288	3045/Tilje Fm	Norwegian Sea	Yes
6507/11-8	2007	301	2773/Åre Fm	Yttergrytta	Yes
6507/11-10	2010	269	2319/Tilje Fm	Norwegian Sea	Yes
6507/12-1	1980	225	3720/Red Beds	Norwegian Sea	Yes
6507/12-2	1981	261	5008/ Red Beds	Norwegian Sea	Yes
6507/12-3	1985	240	2600/Åre Fm	Norwegian Sea	Yes
6506/11-2	1991	297	4813/Åre Fm	Lange	Yes
6406/3-3	1986	303	4419/Åre Fm	Smørbukk Sør	Yes
6506/12-3	1985	301	4360/Tilje Fm	Smørbukk Sør	Yes
6506/12-8	1988	296	4335/Tilje Fm	Smørbukk Sør	Yes

The license area is located east-north-east of the Midgard Field discovered in 1981 by well 6407/11-1. Thereafter a number of appraisal wells were drilled on the Field (e.g. 6407/2-2, 6407/2-3 and 6507/11-1) and these have been used in the study of PL432.

Wells 6507/12-1, 6507/12-2 and 6507/12-3 are located in the license area and are all dry. These wells were used as well-ties to the 3D seismic survey DN0701.

## 2.3 Special studies

To improve the understanding of the geology in both PL432 and PL476 a combined AVO study was performed by CGG Veritas.

## 3 NEBBA PROSPECT

### 3.1 Nebba prospect evaluation

The Nebba prospect is located in the Ellingråsa Graben on the eastern parts of the Halten Terrace. (Fig. 3.1). It is a stratigraphic trap located between Jurassic to Early Cretaceous rotated faultblocks to the West and the Bremstein fault complex to the East. The reservoir consists of the Lower Cretaceous Lange Formation sandstone (Fig. 3.2). The base seal is provided by the shales off the Upper Jurassic Spekk- and Melke formations, while the top seal consists of the Upper Cretaceous shales of the Shetland Group. Crossline 1164 (Fig. 3.3 ) and inline 1028 (Fig. 3.4 ) cross the proposed well location and give an overview of the Nebba prospect in the Ellingråsa Graben.

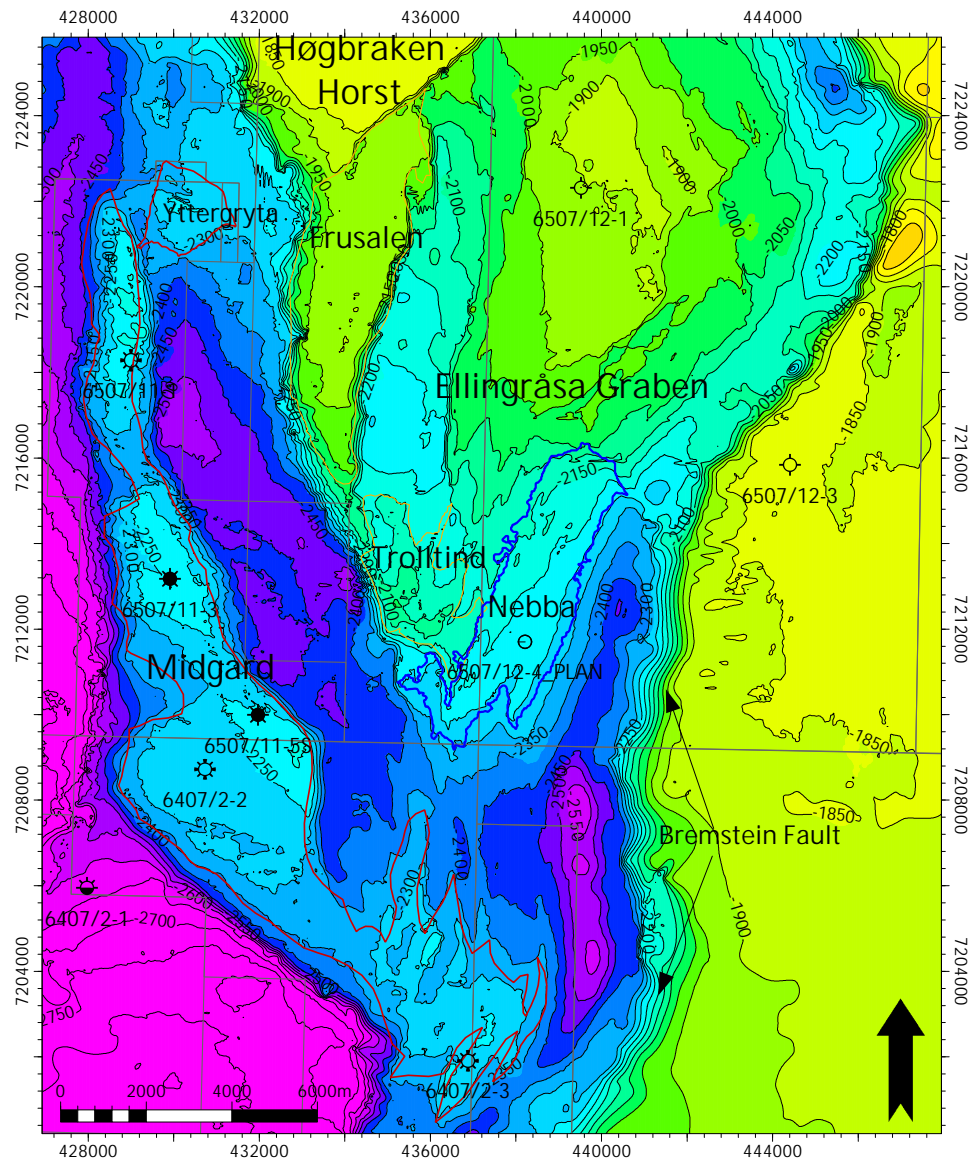


Fig. 3.1 BCU time-structure map. Contour interval is 50ms. The Nebba prospect is outlined in dark blue.

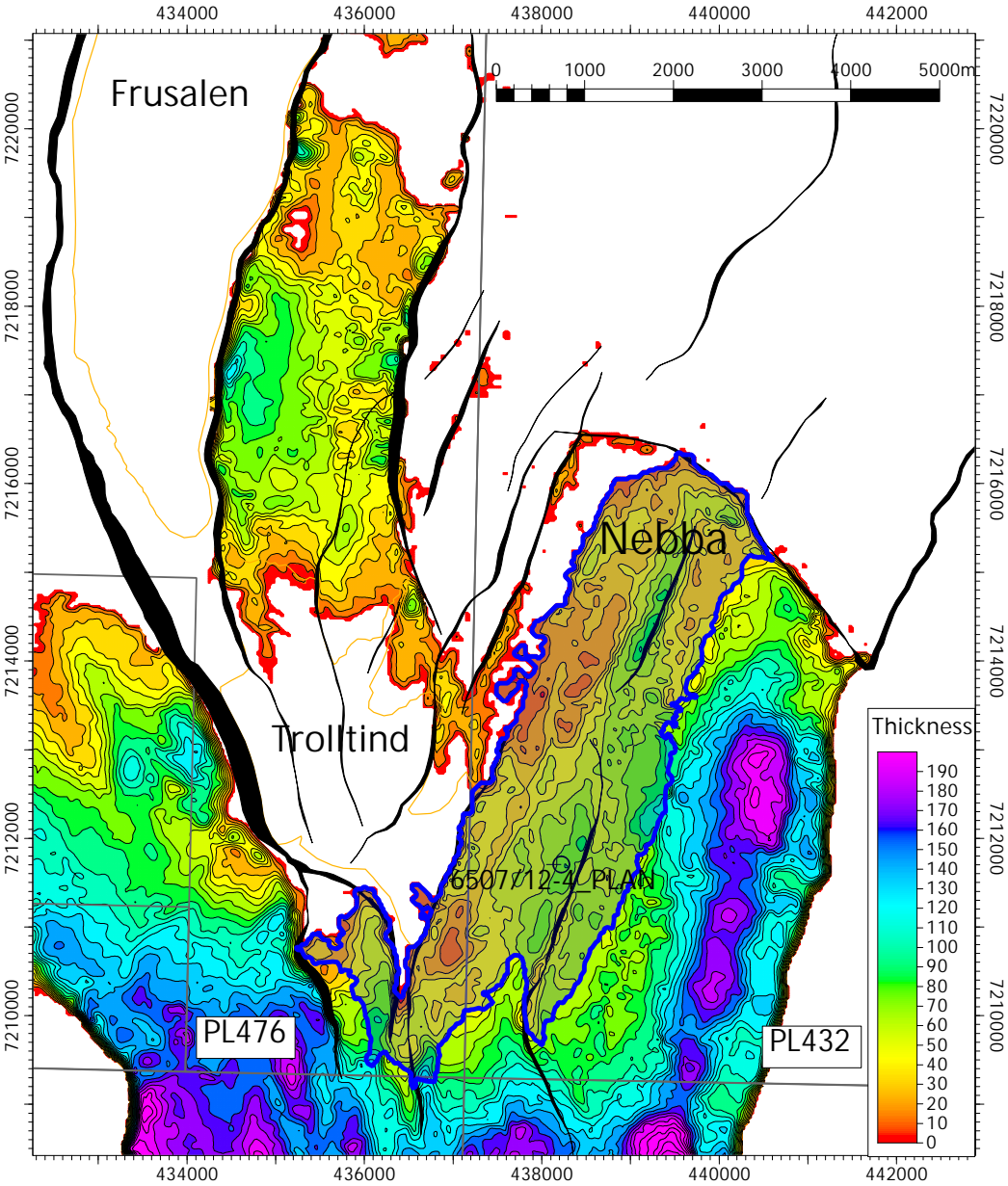


Fig. 3.2 Thickness map (m) between BCU and intra Cenomanian unconformity (Lange Formation). Black lines indicate faults.

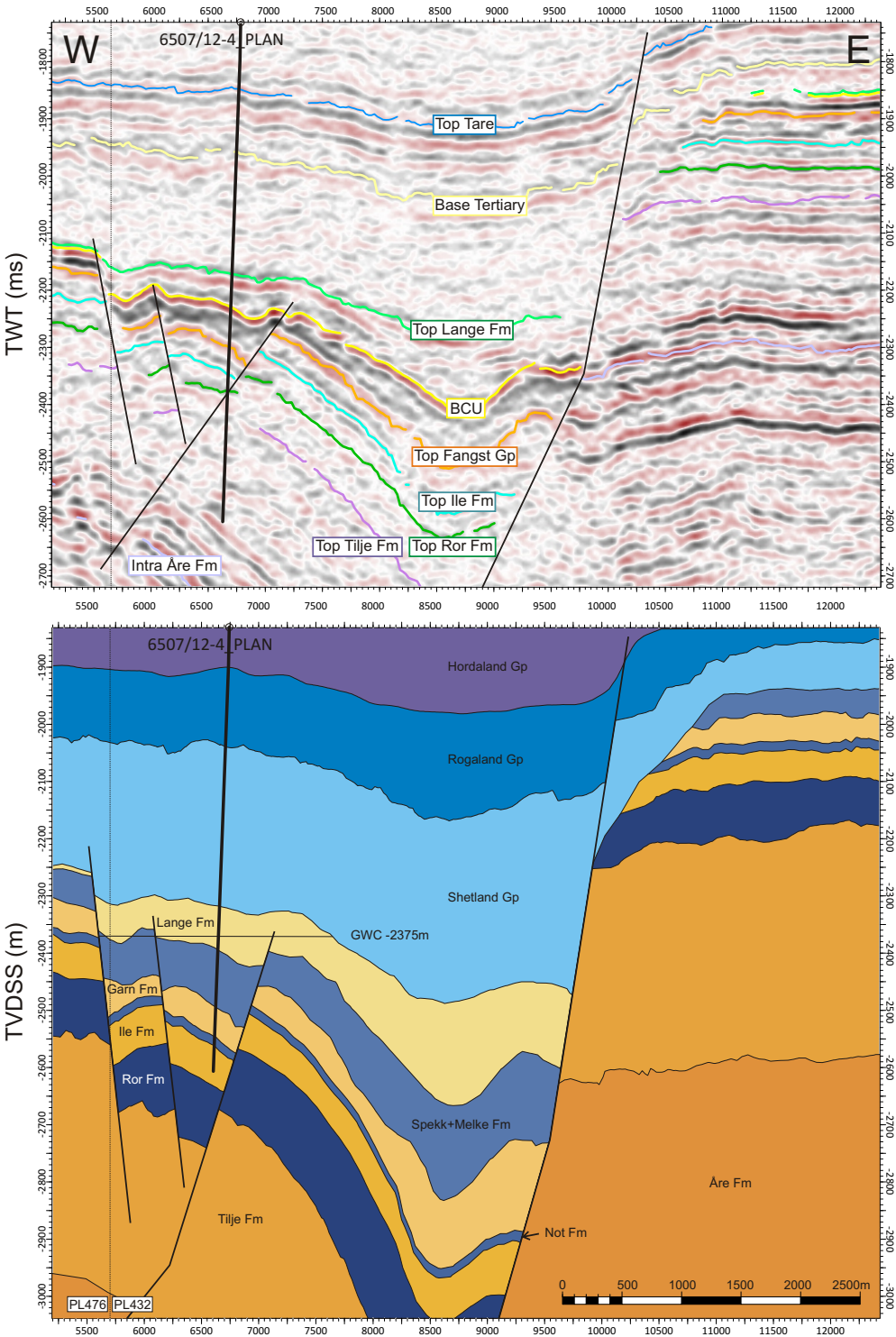


Fig. 3.3 Seismic section crossline 1164 and geosection.

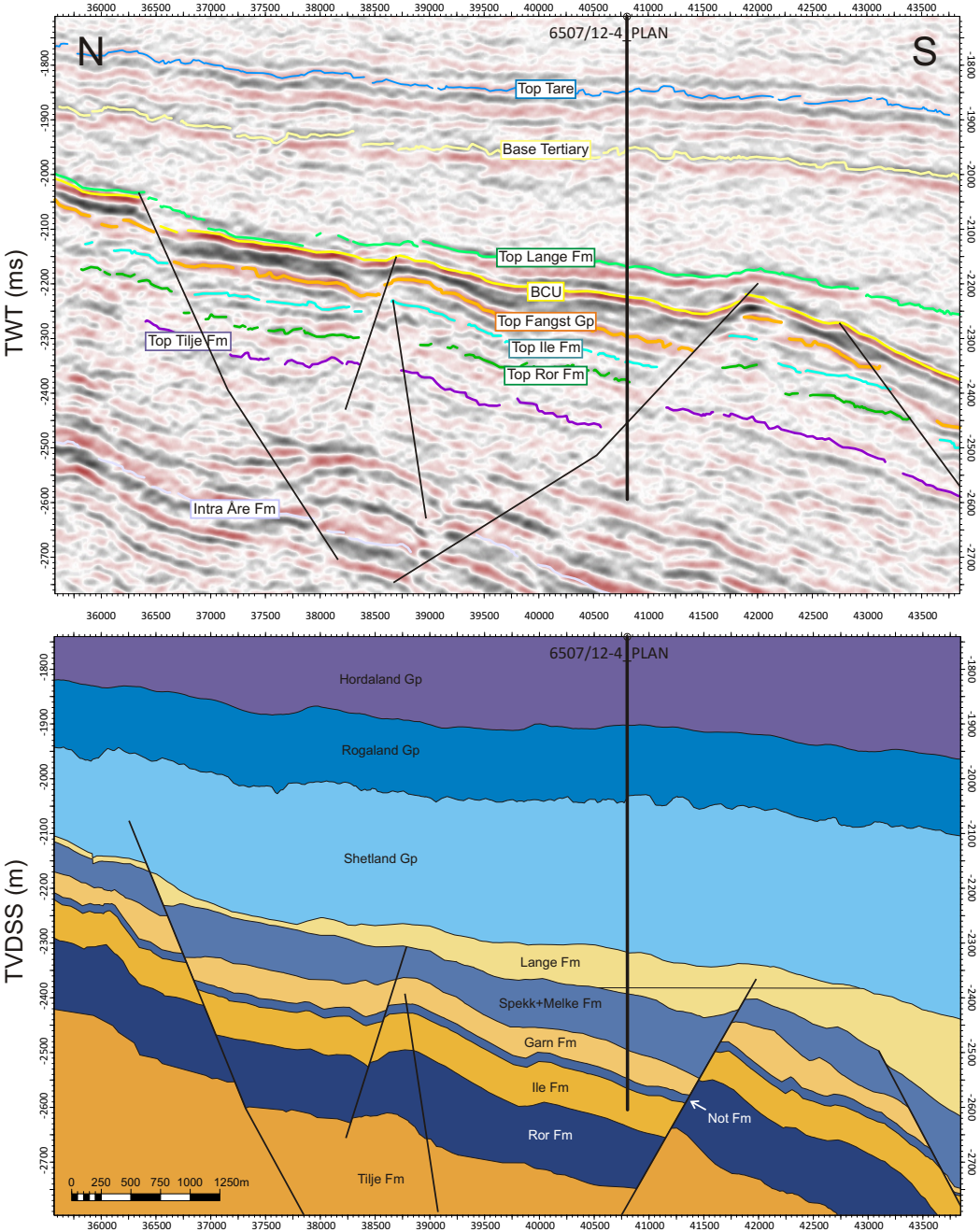


Fig. 3.4 Seismic section inline 1028 and geosection.

The reservoir sands are believed to be derived from the Middle Jurassic sandstones of the Høgbraken Horst area that have been eroded and re-deposited in the prospect area during the Early Cretaceous. The Nebba prospect is assumed to be charged with hydrocarbons that spilled from the southern parts of the Midgard Field and migrated up-dip into the Upper Jurassic sandstones of the Trollind prospect in PL476 and consequently into Lower Cretaceous sequences of the Ellingråsa Graben to the North, the Nebba prospect.

### 3.2 Well 6507/11-10 results in PL476

At the onset of 2010, exploration well 6507/11-10 was drilled in neighbouring PL476 to investigate the hydrocarbon potential of the Middle Jurassic Fangst Group. The well was plugged and abandoned as a dry well.

N/G values in the Ile Fm of the Middle Jurassic Fangst Group in well 6507/11-10 were not as high as previously anticipated. This effects the chances of encountering sands in the Early Cretaceous Lange Formation further to the East in a negative sense as these sands are believed to have been derived from this area.

A future new and more detailed geophysical modelling, seismic interpretation incorporating the results of this well should give a better understanding of the prospectivity in the area.

## 4 REMAINING PROSPECTIVITY

The Nebba prospect is interesting, but an increased understanding of the geology and prospectivity in the area, particularly in PL476, would be required in order to mature the prospect for drilling. Migration of hydrocarbons into the prospect and the presence of a sandy reservoir are the main challenges.

The Jamtetind prospect is situated in PL432B on top of the Trøndelag Platform (Fig. 1.1). Jamtetind is an equivalent to the Draugen Field situated further to the South on top of the Trøndelag Platform. The prospect is assumed to consist of Late Jurassic sandstones. This prospect is only partially covered by the DN0701 3D seismic survey and some 2D survey lines. In order to mature this prospect for drilling, acquiring a 3D seismic survey over the entire prospect would be recommended in order to gain a better geological understanding of the prospect.

The Upper Jurassic syn-rift and Jurassic pre-rift leads in the northern part of the license area are both still very immature, further seismic interpretation and understanding of the area would be required in order to mature the leads into prospects.

In neighbouring PL476 another interesting prospect is situated, Trolltind, and the operator has planned to mature this prospect towards a possible drill decision in the course of 2010. A possible well in this area would give a valuable contribution to the geological understanding of the area. Proven migration of hydrocarbons into this prospect would significantly increase the chances of success of migrating hydrocarbons into the Nebba prospect.