

Relinquishment Report for PL483 S

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1 INTRODUCTION

1.1 License owners

Det norske oljeselskap ASA (40%)
Dana Petroleum Norway AS (30%)
Discover Petroleum AS (30%)

1.2 Award and work program

The license was awarded on 29th February 2008 for an initial period of 5 years following APA Licensing Round 2007 and applies to all formations below base Cretaceous. Work obligations include:

- drilling one well within 3 years (29.02.11)
- making a decision about continuation within 3 years, and
- preparing a plan for development and operation within 5 years (29.02.13).

The largest prospect, Trolla (Fig. 1.1), was drilled in September 2009 by the Songa Delta drilling rig, but the well was dry.

Fig. 1.1

1.3 PL483 S pre-drill prospectivity

As part of the 2007 APA license application, three prospects and a number of leads were identified within the proposed license area. Early Jurassic sandstones with good potential reservoir properties (Tilje and Åre Formations) had already been recorded along the NW flank of the Helgeland Basin and several interesting structures were clearly defined by the available 2D seismic. The key uncertainty was considered to be the presence and proximity of fully mature source rocks, although potential candidates were known to exist within the Late Jurassic, Early Jurassic and Permo-Triassic intervals (i.e. Spekk Formation shales, Åre Formation coals and coaly claystones, and Upper Permian shales equivalent to the Ravnefjeld Formation of East Greenland). The NPD play NHJL, JM-2, although successful to the W of the Nordland Ridge is, as yet, unproven in the Helgeland Basin. Similarly, NPD play NHJL, JM-3, requiring a Lower Jurassic to possible Permian source, has not been proven in the Helgeland Basin.

A table showing the expected recoverable reserves (gross) of all three prospects is presented below.

Table 1.1

Table 1.1 Summary of estimated recoverable reserves (gross)

PL 483 S					GROSS RECOVERABLE RESERVES / RESOURCES					
					Low		Base		High	
CATEGORY	RESERVOIR LEVEL	HC	RF (%)	POS (%)	Oil (Mbbl)	Gas (GSm ³)	Oil (Mbbl)	Gas (GSm ³)	Oil (Mbbl)	Gas (GSm ³)
PROSPECTS										
Trolla	Tilje & Åre Fm's	oil	40	19	22		45		77	
Skarfjell	Tilje & Åre Fm's	oil			7		13		21	
Vinnufjell	Tilje & Åre Fm's	oil			0,8		1,7		2,9	

2 DATABASE

2.1 Seismic database

The seismic coverage of license area is shown in Fig. 2.1. The MC3D-NNE2000 survey provides 3D coverage of the northern half of the license area, including the 6609/10-1 and 6609/11-1 tie wells, and the Nordland Ridge to the N. The resolution and imaging quality is high but, as the data was purchased as part of the PGS mega-merge, it did not include velocity information and variable offset data. The southern part of PL483 S was covered by several 2D surveys of rather mixed quality.

Fig. 2.1

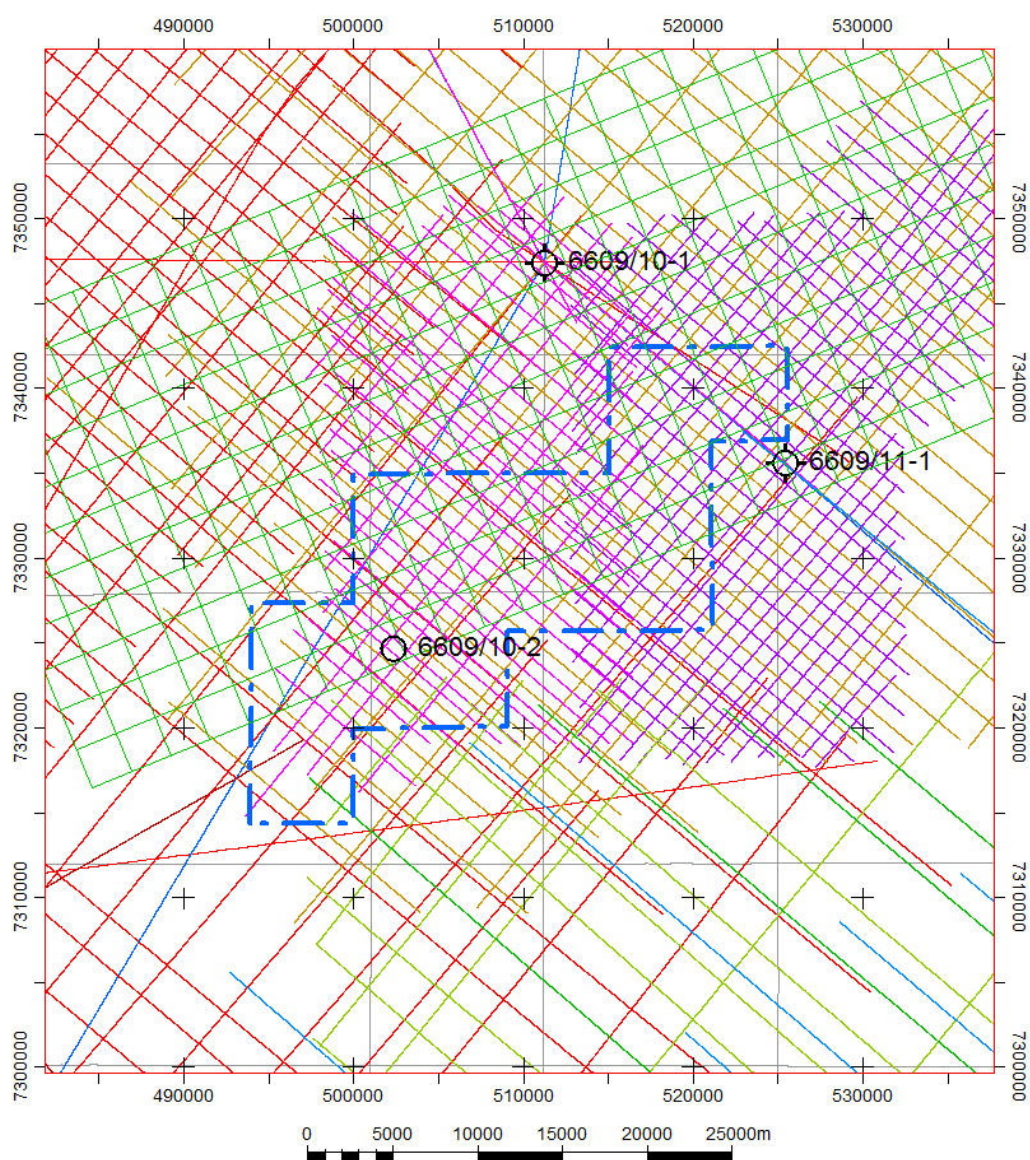


Fig. 2.1 Seismic coverage of license area

Table 2.1

Table 2.1 Common seismic database

Survey name	Survey type	Survey status	Seismic class
MC3D-NNE2000	3D	Multi client	Final mig.
MNR05	2D	Multi client	Final mig. + near & far offset
MNR06	2D	Multi client	Final mig. + near & far offset
MNR07	2D	Multi client	Final mig. + near & far offset
NH8102-R98	2D	Public	Final mig.
NH8301	2D	Public	Final mig.
NRGS84R98	2D	Public	Final mig.
SG8374	2D	Public	Final mig.
ST8708NHR01	2D	Public	Final mig.
ST8808NHR01	2D	Public	Final mig.
GMNR94-Merge	2D	Public	Final mig.
GMT84	2D	Public	Final mig.
B-83-R98	2D	Public	Final mig.
VIWT93	2D	Public	Final mig.

2.2 Well data

Fig. 2.2 shows the closest wells to the license area. A list of the wells in the common database is also presented in Table 2.2 and includes information on when the well was drilled, water depth, total depth and oldest penetrated formation, location with respect to Helgeland Basin or existing fields, and availability or not of final well report.

The closest tie wells to the planned 6609/10-2 well location are the 6609/10-1 and 6609/11-1 wells, which were drilled 24 km to the NE and 25 km to the ENE, respectively. At a distance of 69 km, the 6510/2-1 R well on the SE side of the Helgeland Basin is the furthest tie well from the planned well location.

Since the early 1980's, when a series of exploratory wells were drilled to investigate the hydrocarbon potential of the area, the Helgeland Basin has received little interest. The 6609/10-1 and 6609/11-1 wells were two of the earliest wells to be drilled in the area in 1983 and although dry, confirmed the presence of good quality reservoir sands within the Early Jurassic to late Triassic Tilje and Åre formations (i.e. N/G ratio's up to 0.85 and average porosities up to 0.26). In 1987, A/S Norsk Shell tested the south-western part of the basin with the 6508/5-1 well, but once again, the well encountered high quality reservoirs (i.e. Ile, Tilje, Åre and Red Bed formations) but no hydrocarbons.

There then followed a gap in activity until 1992 when the IKU recovered oil-stained sandstones and mudstones with source rock potential from two shallow stratigraphic boreholes (6611/09-U-01 and -02) drilled along the eastern flank of the Helgeland basin. The boreholes tested the Upper Permian and lowermost Triassic interval and the presence of

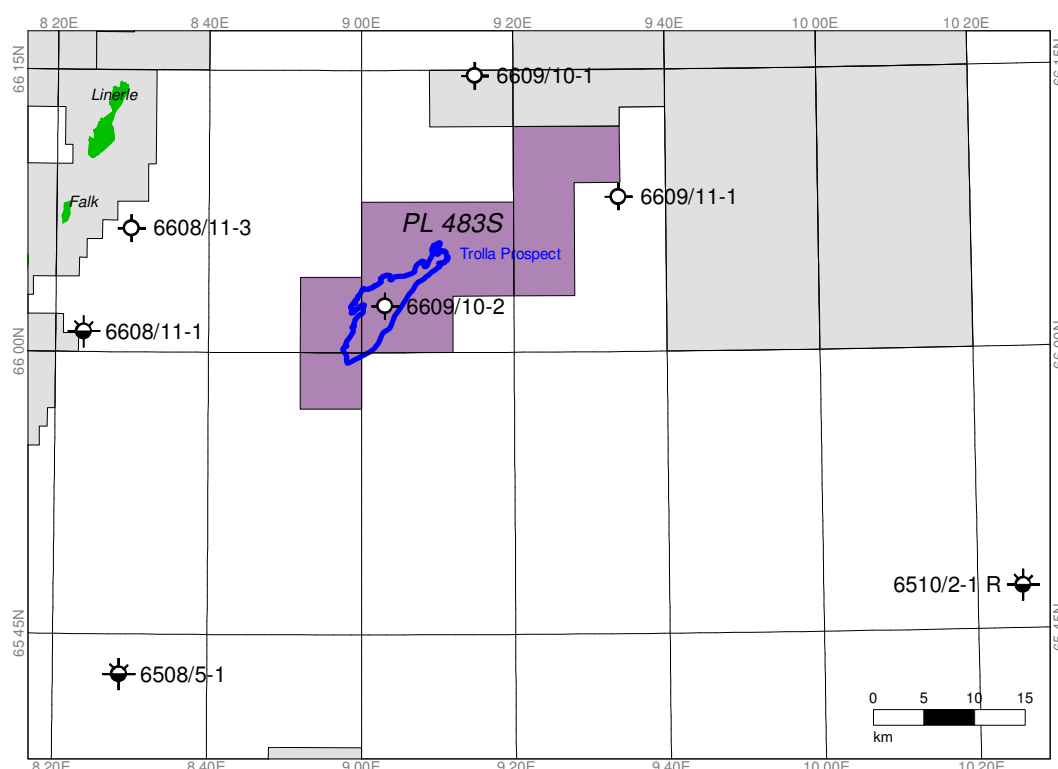


Fig. 2.2 Reference wells. The nearest reference well (6609/10-1) is located 24.5km NE of 6609/10-2.

Table 2.2 Wells in common database

Well	Year drilled	Water depth (m)	TD (m) MD/Fm	Location/Field	Final well report available
6508/5-1	1987	411	2586/Red Bed Fm	W Helgeland Basin	Yes
6510/2-1 R	1997	325	4707/Grey Bed Fm	E Helgeland Basin	No
6608/11-1	1986	382	1620/Red Bed Fm	East of Norne	Yes
6608/11-2	2000	351	2215/Grey Bed Fm	North of Urd	No
6608/11-3	2002	374	2031/Grey Bed Fm	East of Urd	No
6609/10-1	1983	262	2167/Red Bed Fm	NW Helgeland Basin	Yes
6609/11-1	1983	238	3068/Åre Fm	NW Helgeland Basin	Yes

hydrocarbons led to renewed interest in the area. In 1997, A/S Norsk Shell drilled the 'Vega prospect' along the SE flank of the basin. Early Jurassic sands were the primary target but the well also planned to drill the top Permian. The well was drilled to a total depth of 4707m MD with penetration of all formation tops within the range of prognosis, except for Top Permian, which was not present. Also, the Early Jurassic target proved to be developed in a more proximal facies than expected, consisting predominantly of shale with interbedded coals and thin sands. The well was plugged and abandoned as a dry well.

2.3 Special studies

Given the high quality of the MC3D-NNE2000 and simple geometry of the Trolla prospect, no additional 3D seismic was acquired. Instead, a larger than normal site survey was acquired over the crest of the structure to allow for greater flexibility in choosing a drilling location. Also, to comply with the license obligations, a detailed survey of the seabed was carried out, including visual inspection of potential deep water coral sites.

To test for the presence of hydrocarbons within the prospect, EM data was collected across the Trolla prospect by Discover Petroleum AS. The data was however, collected independently and was not released to partners.

3 TROLLA EXPLORATION WELL 6609/10-2

3.1 Trolla pre-drill prospect evaluation

The Trolla structure is a simple 4-way closure (Fig. 3.1) found within a major footwall block bordering the Helgeland Basin. The prospect is bound to the SE by a major basement fault, displaying more than 1000m of vertical displacement and by a series of more minor faults to the NE and NW. Towards the SW, the structure has a simple dip closure. The top of the structure lies at a depth of 2010m and Ror Formation, Viking Group and Cretaceous claystones and shales provide both top and lateral seal. The probability of encountering good quality reservoir sands was considered high.

Fig. 3.1

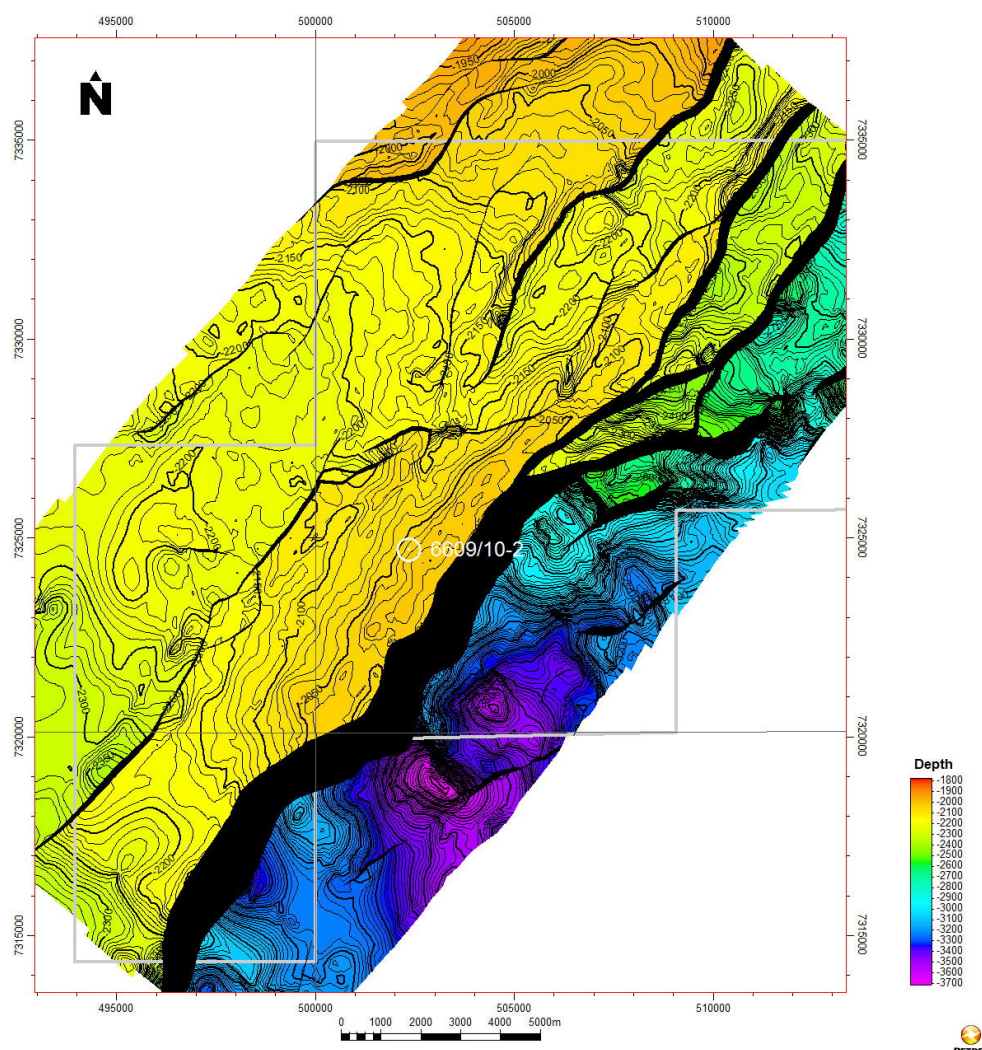


Fig. 3.1 Top Tilje reservoir depth map

3.2 Well 6609/10-2

3.2.1 Objectives

Exploration well 6609/10-2 was the first well to be drilled in PL483 S. The main objective was to investigate the hydrocarbon potential of the lower Jurassic Båt Group with Tilje and Åre formation sands providing the main reservoir. Sands within the mid Jurassic Fangst Group, if present, would provide additional reservoir potential. Secondary objectives were to test the reservoir potential of the Paleocene Tare Formation, Cretaceous Lysing Formation and Triassic Grey Beds and Red Beds.

The Trolla prospect occurs along NW flank of Helgeland Basin along a shallow terrace between the Nordland Ridge and the deepest part of the basin in the SW. The structure is a four-way closure with a major basement fault to the SE and more minor faults to the N and W. To the SW, the structure has a dip closure.

The probability of a discovery (oil and gas case) was calculated to be 0.19 with the highest risk associated with the proximity of fully mature source rocks and charge of prospect. There were also concerns about fault leakage and thief sands within the overlying Cretaceous.

3.2.2 Well results

The well penetrated high quality reservoir sands within the early Jurassic Båt Group as prognosed, but no hydrocarbons were found. Drilling continued for 19 days down to a depth of 2499m below sea level where the well was terminated in the Late Triassic Red Beds. The well was plugged and abandoned as a dry well.

The prognosed stratigraphy vs actual is presented below (Fig. 3.2) together with CPI logs for both the Fangst Group interval (Fig. 3.3) and Båt Group (Fig. 3.4).

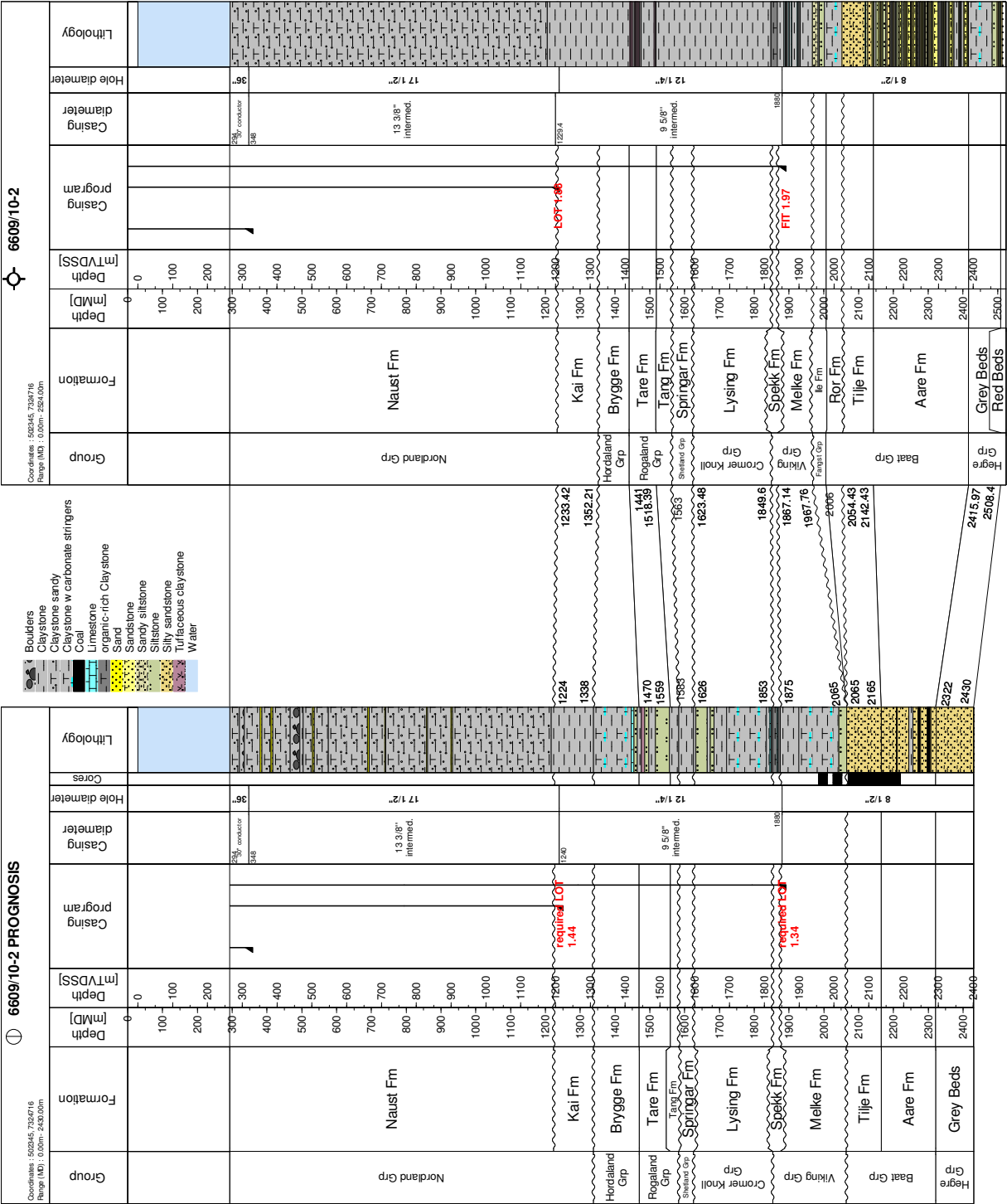


Fig. 3.2 Prognosed stratigraphy vs actual.

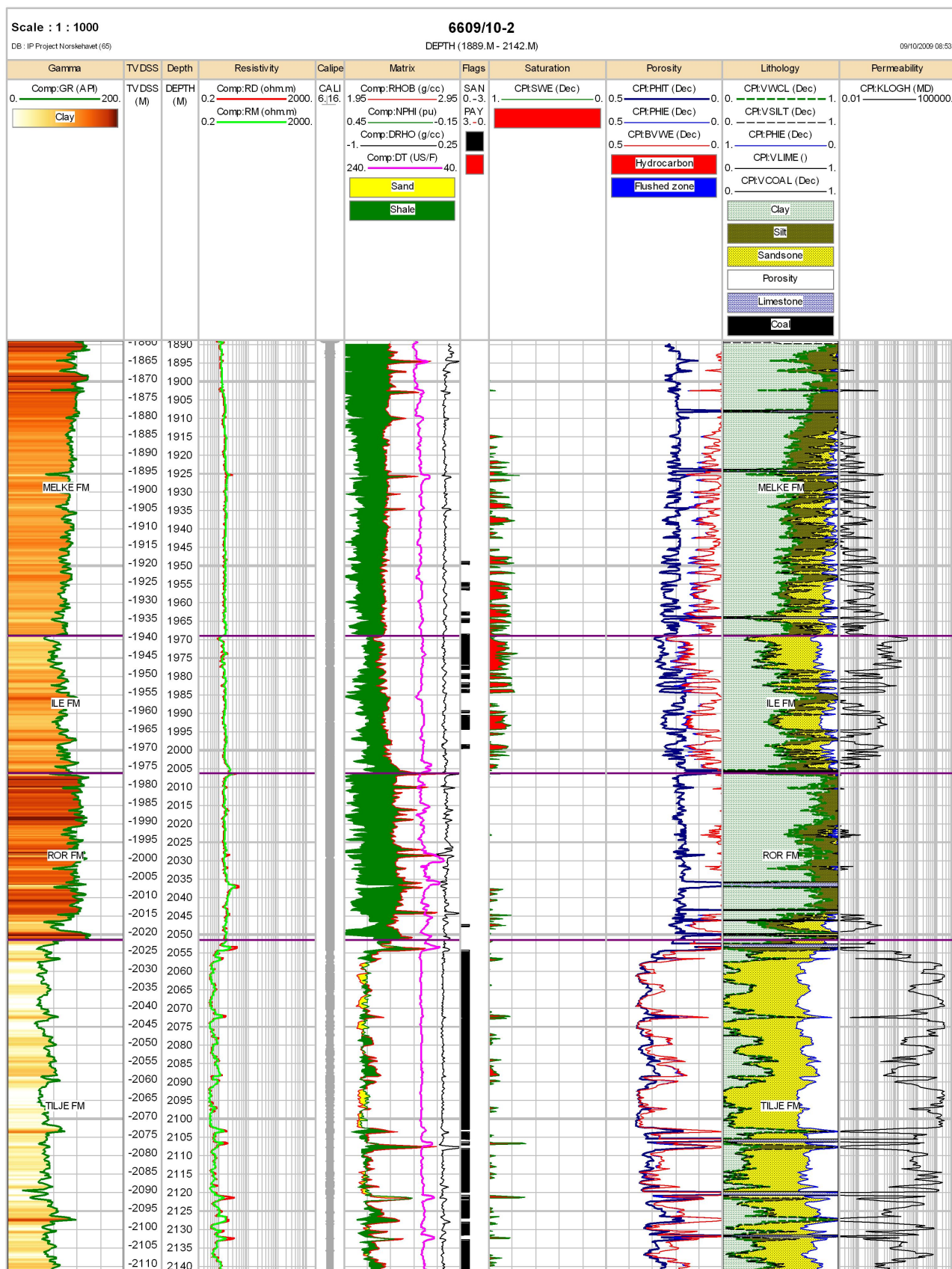
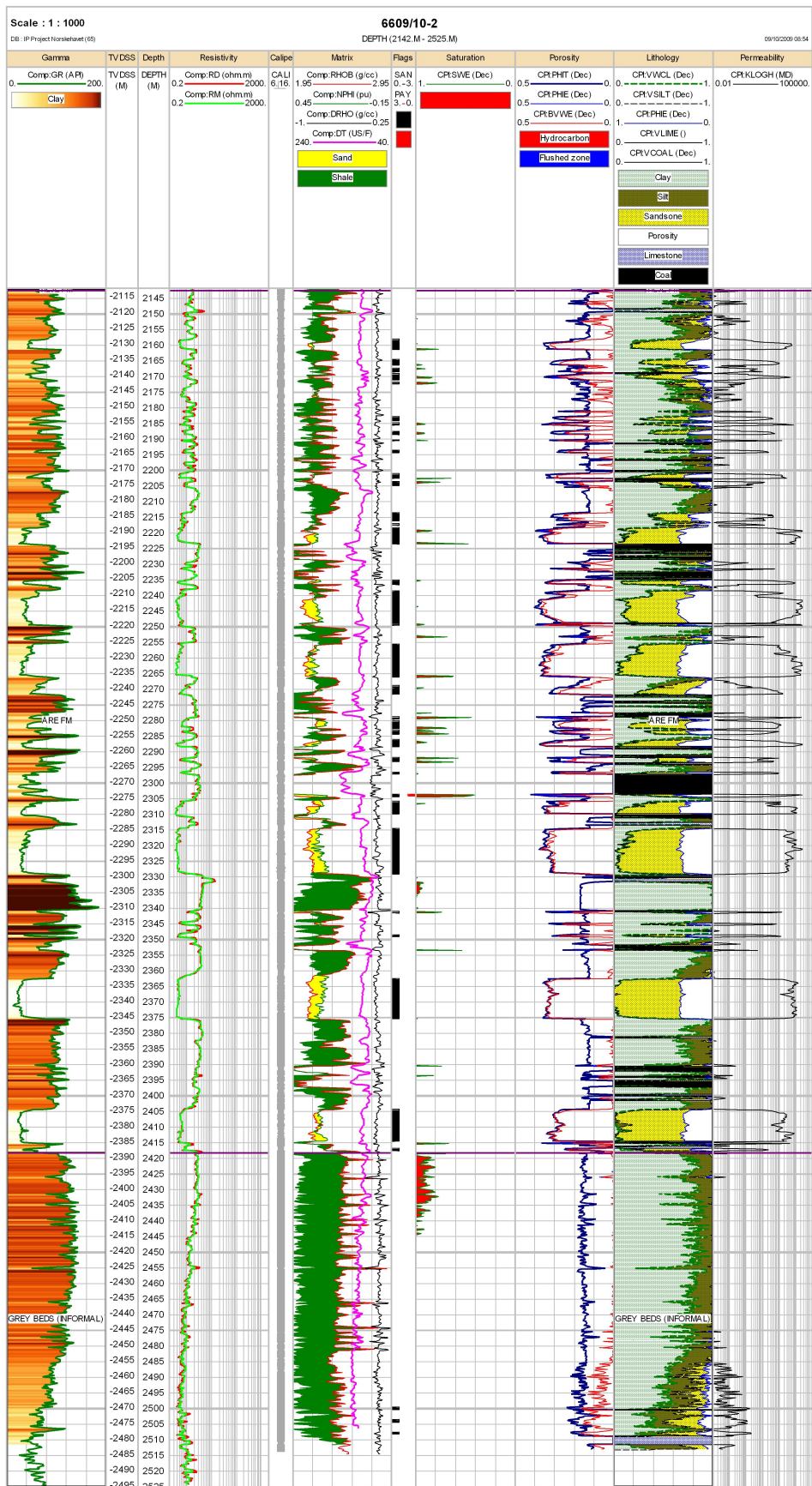


Fig. 3.3 CPI log for Fangst Group, well 6609/10-2.



4 REMAINING PROSPECTIVITY

Three prospects, Trolla, Skarfjell and Vinnufjell, were identified within the PL483 S license area (Fig. 4.1). The Trolla prospect was the largest and commercially most viable and, given its close proximity to the deepest part of the Helgeland Basin in the SW, was considered to be in the best position to receive hydrocarbons. The lack of hydrocarbons within Trolla is considered to be due to the absence of a mature source in the adjacent basin. Skarfjell and Vinnufjell are similarly, expected to be water-bearing.

Fig. 4.1

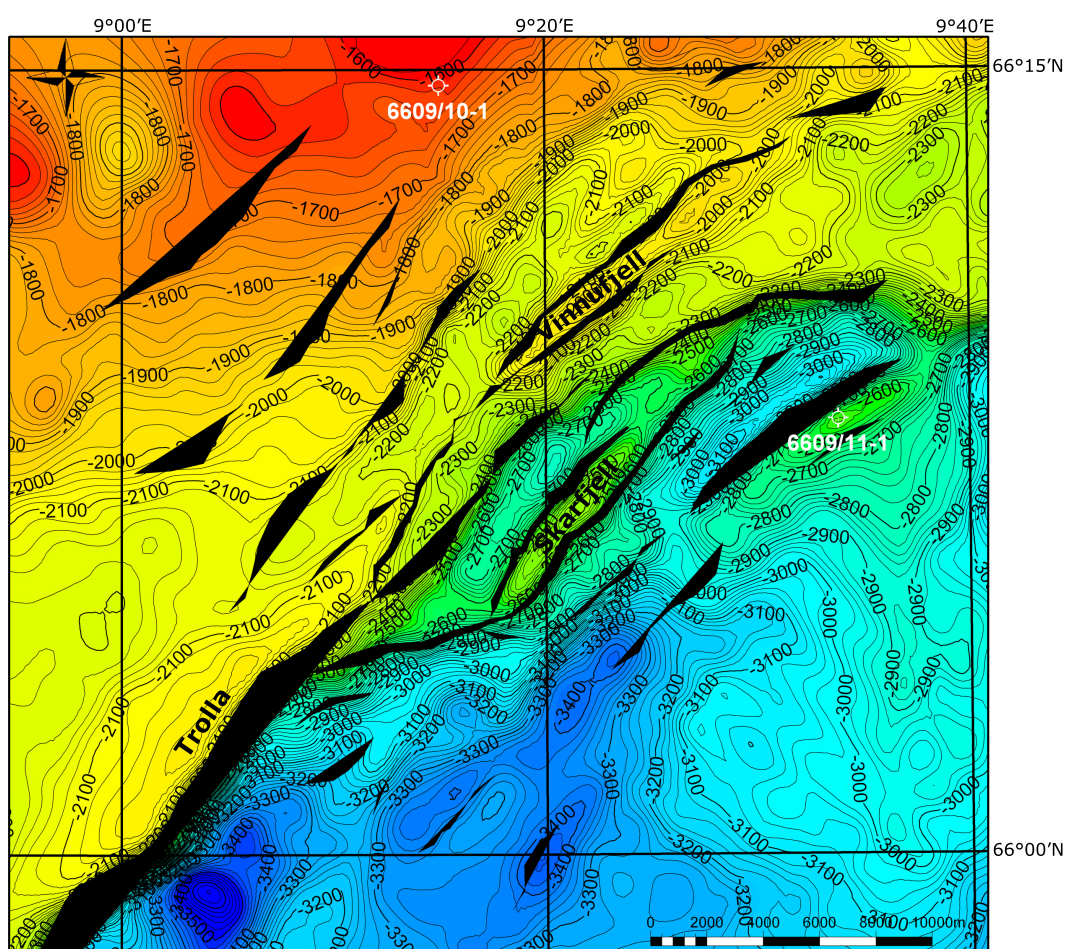


Fig. 4.1 Location map for Trolla, Skarfjell and Vinnufjell prospects

In our judgment, there are no commercial accumulations of hydrocarbons within PL483 S, so consequently, we deliver the license back.