

Relinquishment Report for PL548S

Relinquishment Report for PL548S

| | |
|----------------------------------|-----------|
| 1 INTRODUCTION | 1 |
| 1.1 License Owners | 1 |
| 1.2 Award and Work Program | 1 |
| 1.3 Pre-drill Prospectivity | 4 |
| 2 DATABASE | 6 |
| 2.1 Seismic Database | 6 |
| 2.2 Well Data | 7 |
| 2.3 Special Studies | 9 |
| 3 REMAINING PROSPECTIVITY | 10 |

List of figures

| | | |
|-----|--|----|
| 1.1 | Lisence location | 2 |
| 1.2 | Seismic database on map | 3 |
| 1.3 | Prospect location | 4 |
| 1.4 | Geomodel | 5 |
| 2.1 | 3D seismic covering the lisence area | 6 |
| 2.2 | Map of wells in common database | 7 |
| 2.3 | Seismic Modelling | 9 |
| 3.1 | Høvringen Amplitude Reponse | 10 |

List of tables

- 1.1 Predrill prospectivity 5
- 2.1 3D surveys in common database 7
- 2.2 Well database..... 8

1 INTRODUCTION

1.1 License Owners

- Det norske oljeselskap ASA (40%), operator
- Dana Petroleum Norway AS (30%)
- Bridge Energy Norge AS (30%)

1.2 Award and Work Program

The PL548 S was awarded on the 19.02.2010 as an APA 2009 application, it is valid to 19.02.2016. The license has a stratigraphic limit that apply to all levels above the top Cretaceous. The license outline and nearby fields and discoveries are seen in Fig. 1.1.

The workprogram for this award included:

- Reprocess 3D-seismic
- G&G studies within 2 years
- Drill or drop decision within 2 years
- DOC within 4 years
- PDO within 6 years

New 3D seismic became available after the license award, the license decided to purchase the MC3D-NVG10M as part of the work program. The survey covers most of the prospects within the license area. The rest of the license will be covered by the MC3D-NVG11 when it becomes available. The partnership took the decision to relinquish the license before the NVG11 was available as the main prospect was covered by the NVG10M survey and the rest of the license has full 3D coverage trough the PD06M01-5 (Fig. 1.2).



<http://www.npd.no/factmaps>

For map as WMS check <http://npdwms.npd.no>

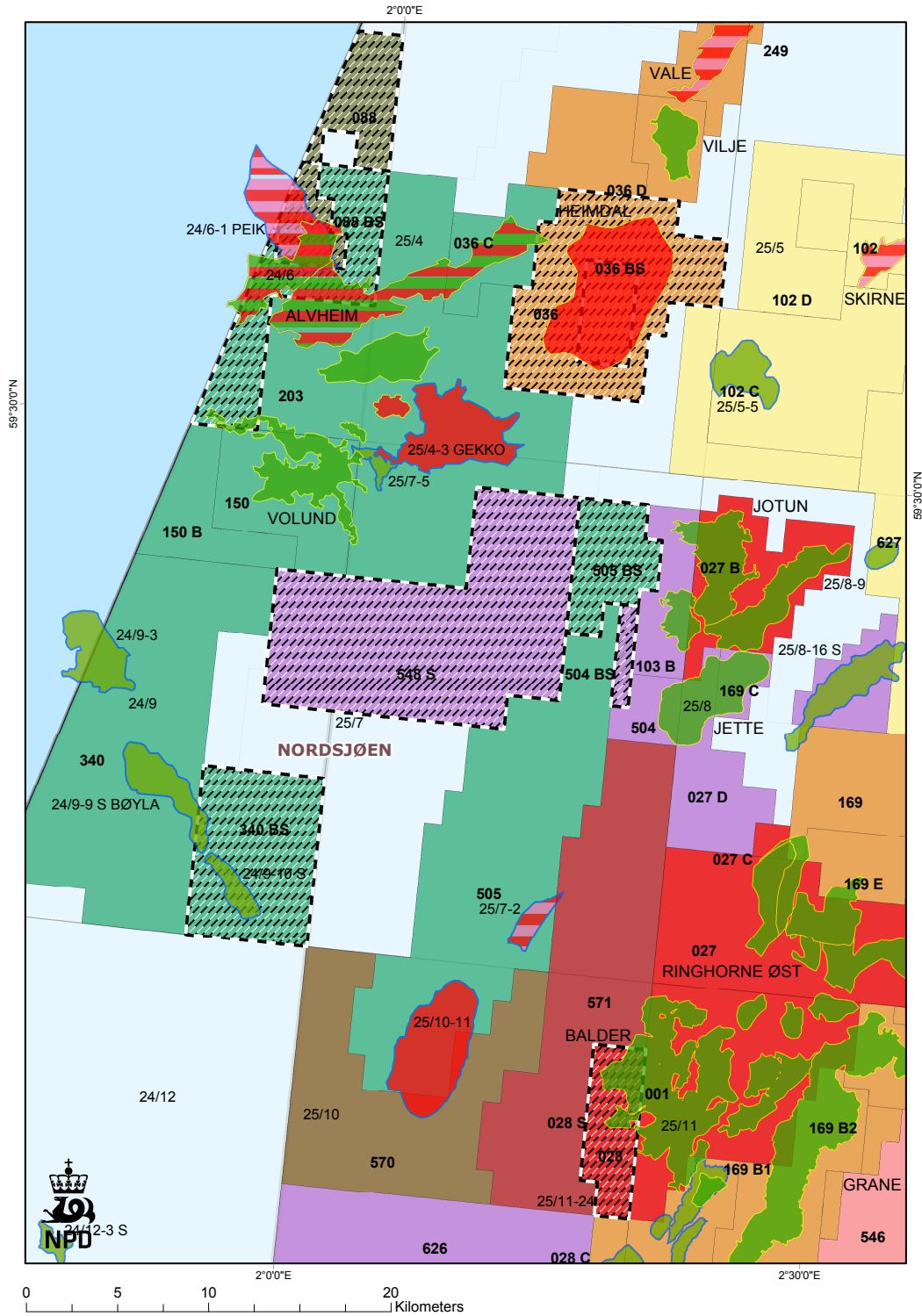


Fig. 1.1 Lisence location

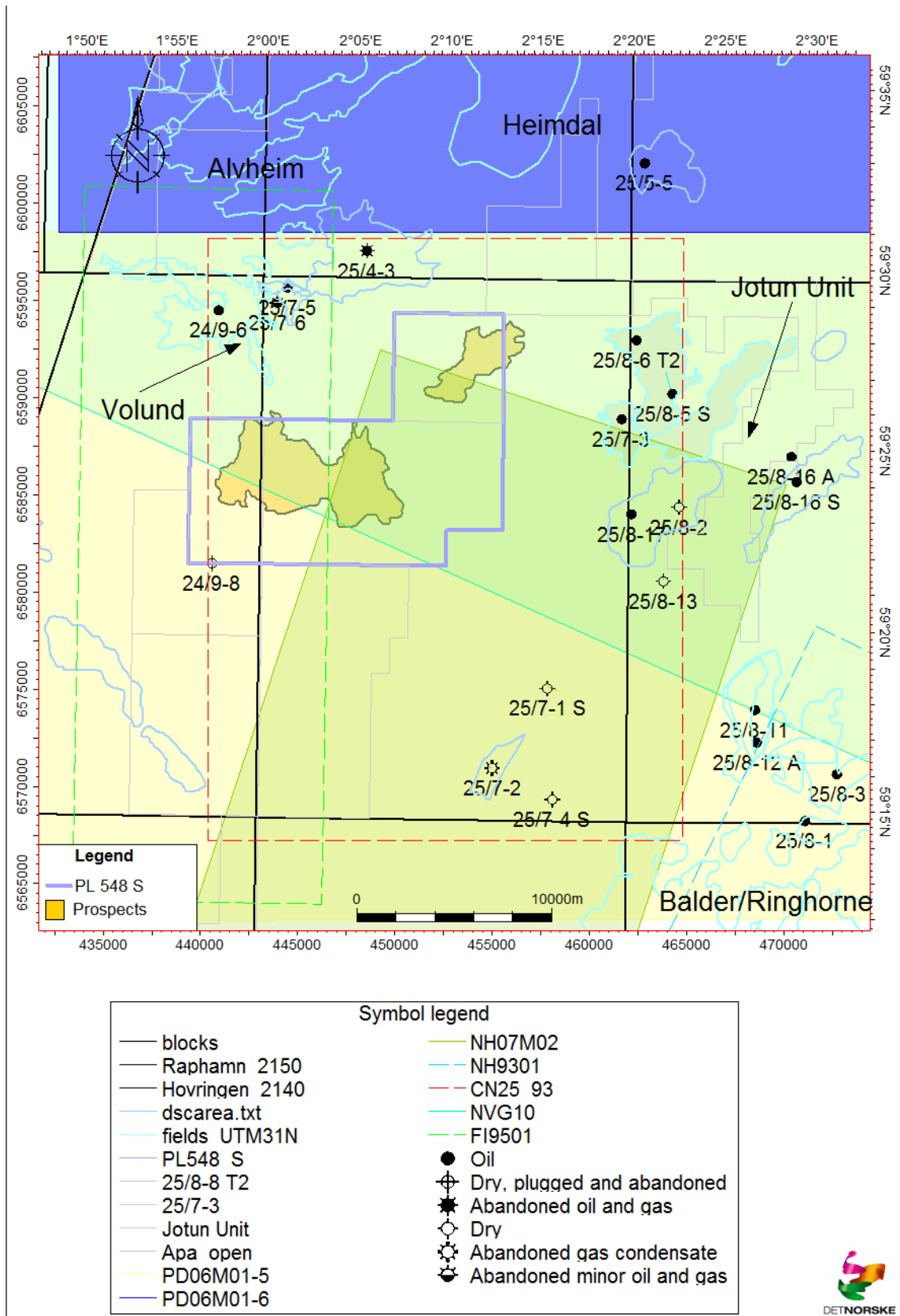


Fig. 1.2 Seismic database on map

1.3 Pre-drill Prospectivity

PL458 S is situated in the Vana Sub-basin between the East Shetland platform to the west and the Utsira High to the east, see Fig. 1.3. This is a well proven hydrocarbonsystem with several discoveries like Volund, Gekko and Heimdal to the north and Jotun, Jette, Ringhorne and Balder to the west.

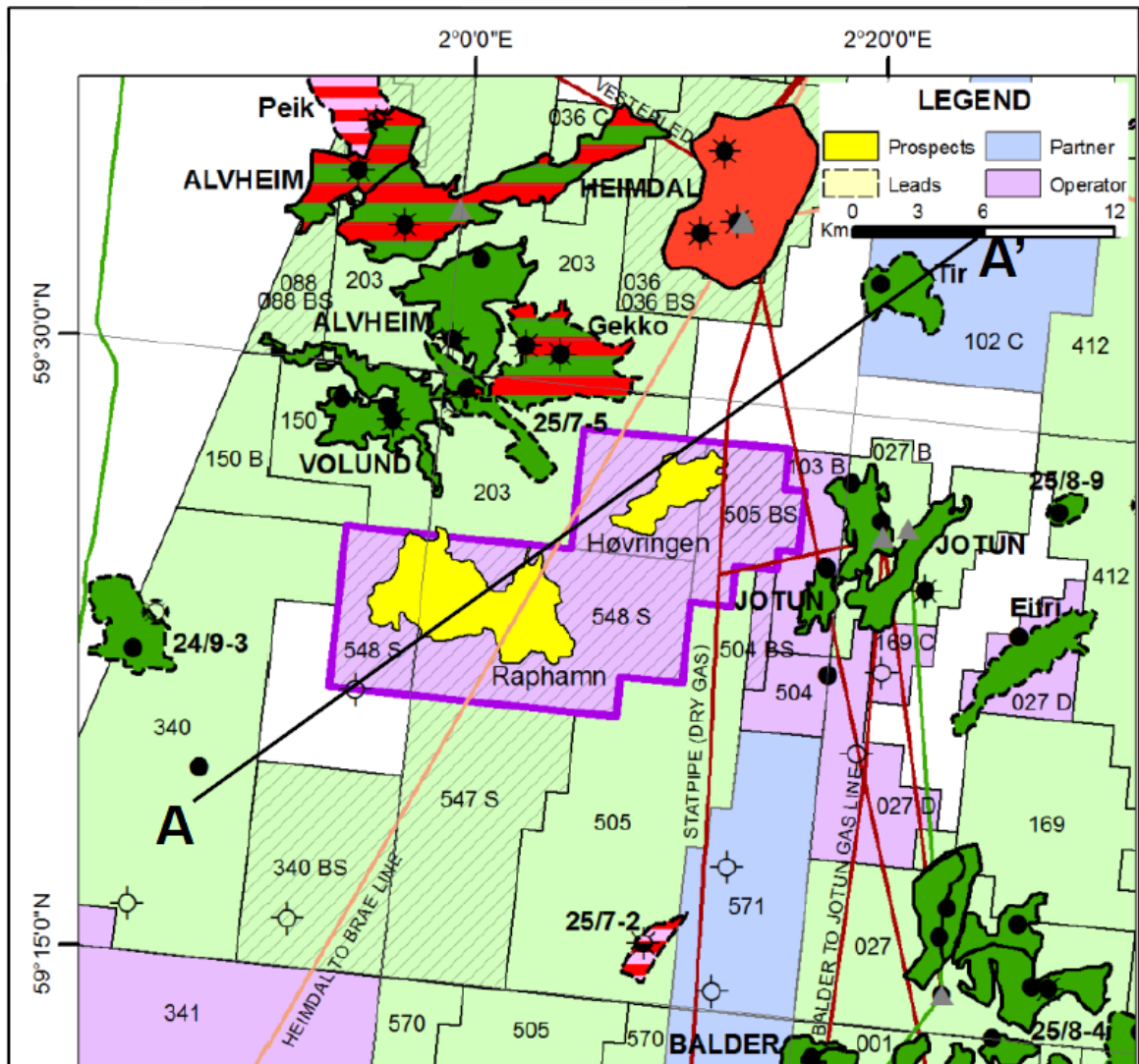


Fig. 1.3 Prospect location

The main objective of this license was to mature the two Paleocene prospects Høvringen and Raphamn. Both of the prospects are defined as Heimdals sands within four-way closures in the Lista Formation, see Fig. 1.4.

A table showing the expected recoverable reserves (gross) of both the prospects is presented below. Table 1.1

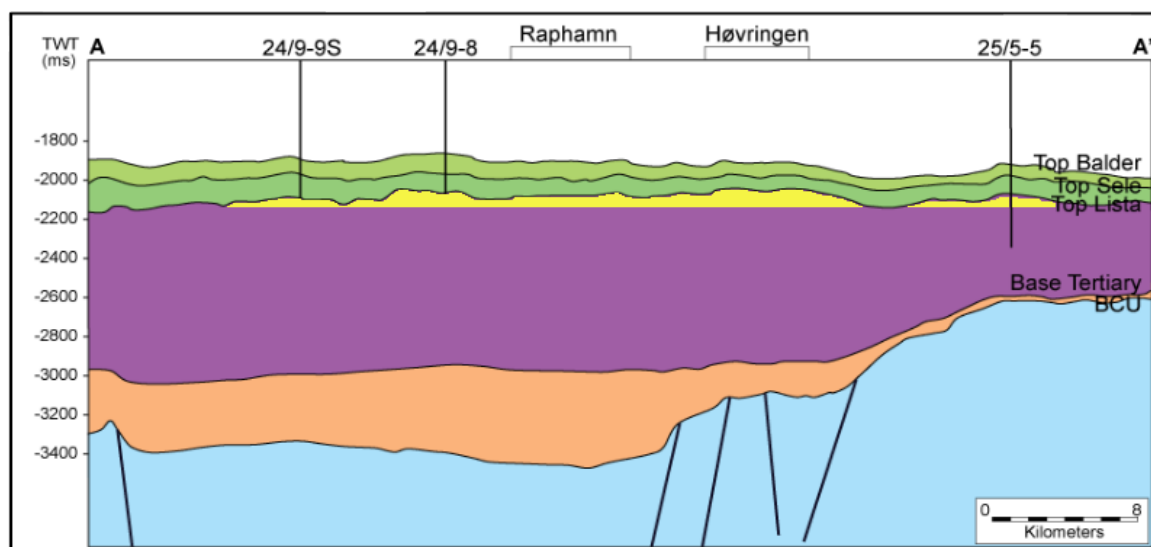


Fig. 1.4 Geomodel

Table 1.1 Pre-drill prospectivity

| PL 548S | | | | | GROSS RECOVERABLE RESERVES / RESOURCES | | | | | |
|------------------|------------------------|-----|--------|---------|--|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| | | | | | Low | | Base | | High | |
| CATEGORY | RESERVOIR LEVEL | HC | RF (%) | POS (%) | Oil (MSm ³) | Gas (GSm ³) | Oil (MSm ³) | Gas (GSm ³) | Oil (MSm ³) | Gas (GSm ³) |
| PROSPECTS | | | | | | | | | | |
| Høvringen | Thanetian, Heimdal Fm. | oil | 0,35 | 0,168 | 0,84 | | 2,32 | | 4,8 | |
| Raphamn | Thanetian, Heimdal Fm. | oil | 0,35 | 0,112 | 0,76 | | 2,64 | | 6,35 | |

2 DATABASE

2.1 Seismic Database

The PL548 S is fully covered by 3D seismic, see Fig. 2.1. The seismic survey PD06M01 covered the whole license area but without any offset-stacks it was not suitable for AVO analysis. Through the workprogram the license was committed to reprocessing old 3D seismic for the whole license. Instead of merging a new survey from 5 different, it was decided to buy the new MC3D-NVG10. The survey was meant to cover the whole license but PGS was not able to shoot the whole survey within the available timeframe. The last part of MC3D-NVG10 was therefore incorporated into the MC3D-NVG11 survey. The main prospect, Høvringen, is fully covered by the MC3D-NVG10 survey with off-set stacks. Whereas the prospect Raphamn is partially covered by MC3D-NVG10, the rest is covered by PDM0601. For additional information about the seismic database see Table 2.1 below.

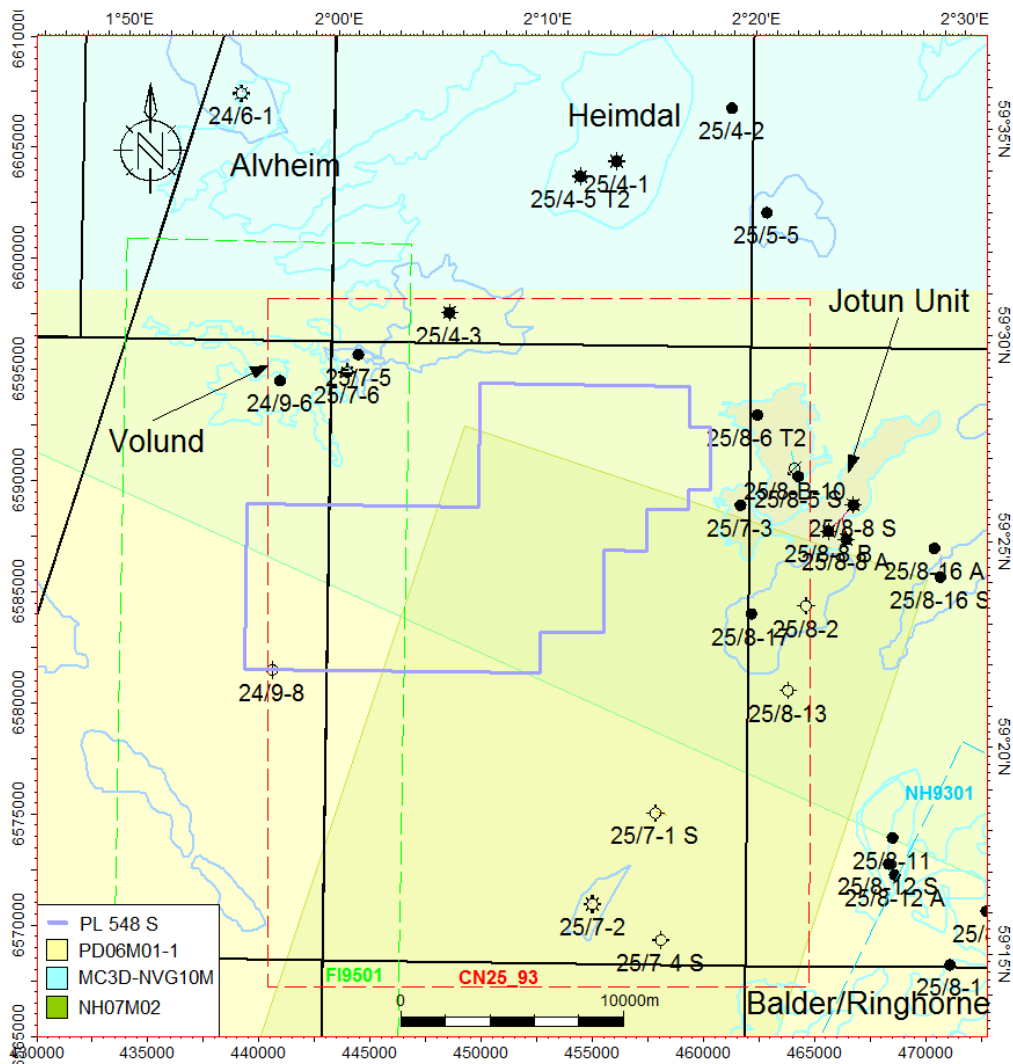


Fig. 2.1 3D seismic covering the license area

Table 2.1 3D surveys in common database

| Survey Name | Acquisition Year | Seismic class | Phase | Acoustic impedance increase |
|---------------------------|------------------|---------------|------------|-----------------------------|
| CN25_93 (PD06M01) | 1993 | 3D | Zero phase | Trough |
| FI9501 (PD06M01) | 1995 | 3D | Zero phase | Trough |
| NH9301 (PD06M01) | 1993 | 3D | Zero phase | Trough |
| NH07M02 (full, far, near) | 2007 | 3D | Zero phase | Peak |
| MC3D-NVG10M | 2010 | 3D | Zero phase | Trough |

2.2 Well Data

Fig. 2.2 shows the wells in the common license database. The wells are also presented in Table 2.2 which includes information on which fields or discovery the well belongs to, when it was drilled, total depth and which formation or group it ended in.

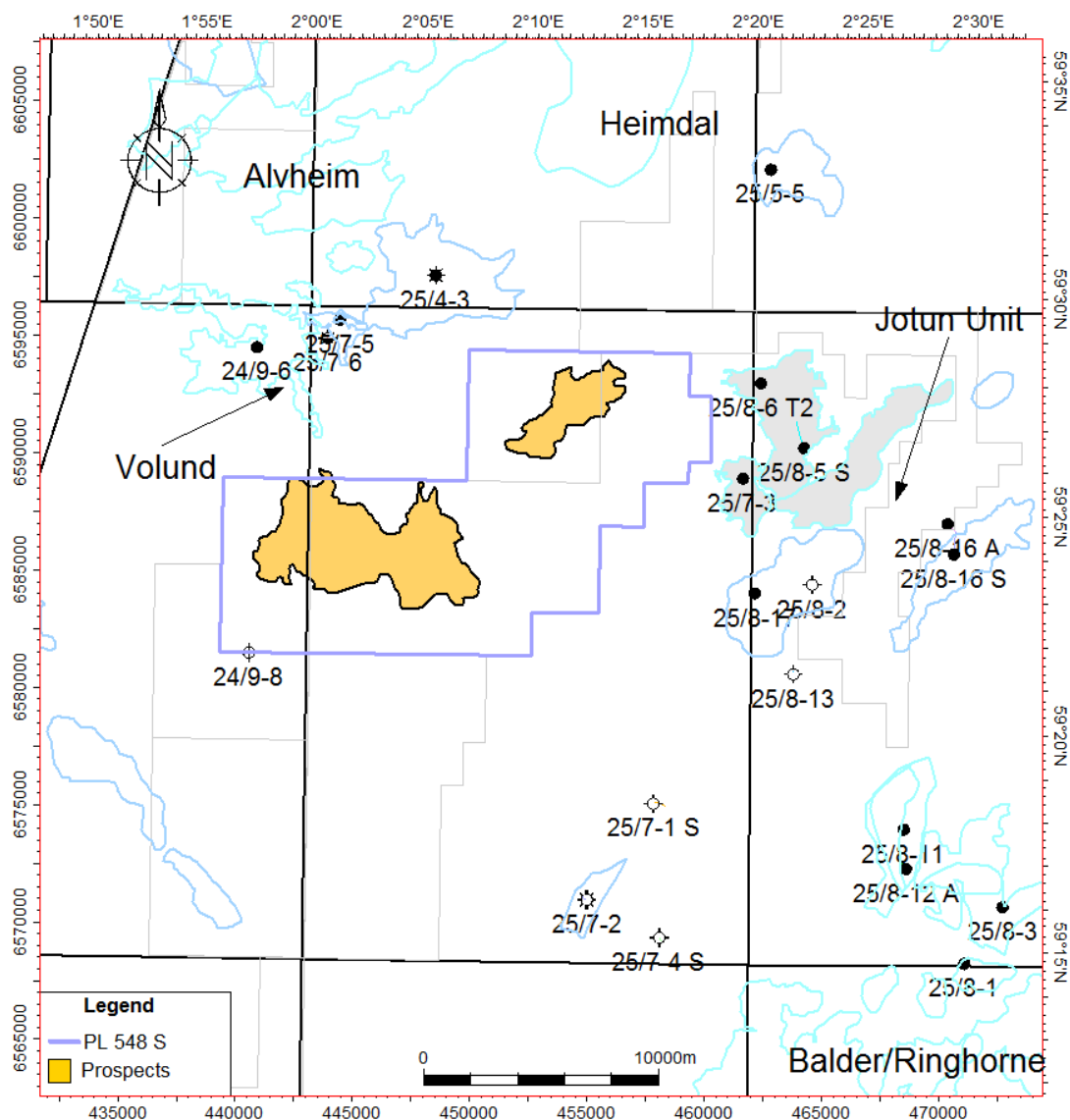


Fig. 2.2 Map of wells in common database

Table 2.2 Well database

| Well | Field/disc. 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 |
| 24/9-8 | Dry | 2007 | 2190 | Paleocene |
| 25/1-10 | Dry | 1988 | 4739 | Ness Formation |
| 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 |
| 25/4-6 S | Vale Field | 1991 | 4170 | Statfjord Formation |
| 25/5-5 | Not yet developed | 1995 | 2600 | Våle Formation |
| 25/7-1 ST2 | Dry | 1986 | 3592 | Pre Devonian |
| 25/4-2 | Not yet developed | 1990 | 4850 | Sleipner 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 | Heimdal Formation |
| 25/8-6 T2 | Jotun Field | 1995 | 2577 | Heimdal Formation |
| 25/8-8 A | Jotun Field | 1995 | 2601 | Heimdal Formation |
| 25/8-8 B | Jotun Field | 1995 | 2510 | Heimdal Formation |
| 25/8-8 S | 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 |
| 25/8-12 A | Balder Field | 1999 | 2156 | Smith Bank Formation |
| 25/8-12 S | Balder Field | 1999 | 2096 | Smith Bank Formation |
| 25/8-13 | Balder Field | 2001 | 2276 | Statfjord Formation |
| 25/8-17 | Jette Field | 2009 | 2233 | Heimdal Formation |
| 25/8-17 A | Jette Field | 2009 | 2945 | Ty Formation |

The wells closest to the Raphamn prospects are the 24/9-8 well located 4 km to the SW, the well main objective was to test the hydrocarbon potential in the Heimdal Fm. sands in the Lista Fm. The well was reported dry with no shows, and did in fact test the Raphamn prospect. The Høvringen prospect was tied to the 25/7-5 and 25/7-6 S drilled on the Volund discovery 7 km to the NW. The acoustic impedance is gradually increasing giving a complex wavelet on top Heimdal which makes the reflector weak and unreliable in some areas.

2.3 Special Studies

As part of the workprogram the license bought the 3D survey MC3D-NVG10 instead of reprocessing several old seismic surveys. Unfortunately the processing of the survey was not optimized for the Palaeocene prospects and some in-house processing steps were done to improve resolution. Besides that, seismic modelling and gather analysis has been done to better reduce the risk on the two prospects. Seismic modelling in Fig. 2.3 shows that it is expected to see hydrocarbons as a brightening in the Heimdal sands.

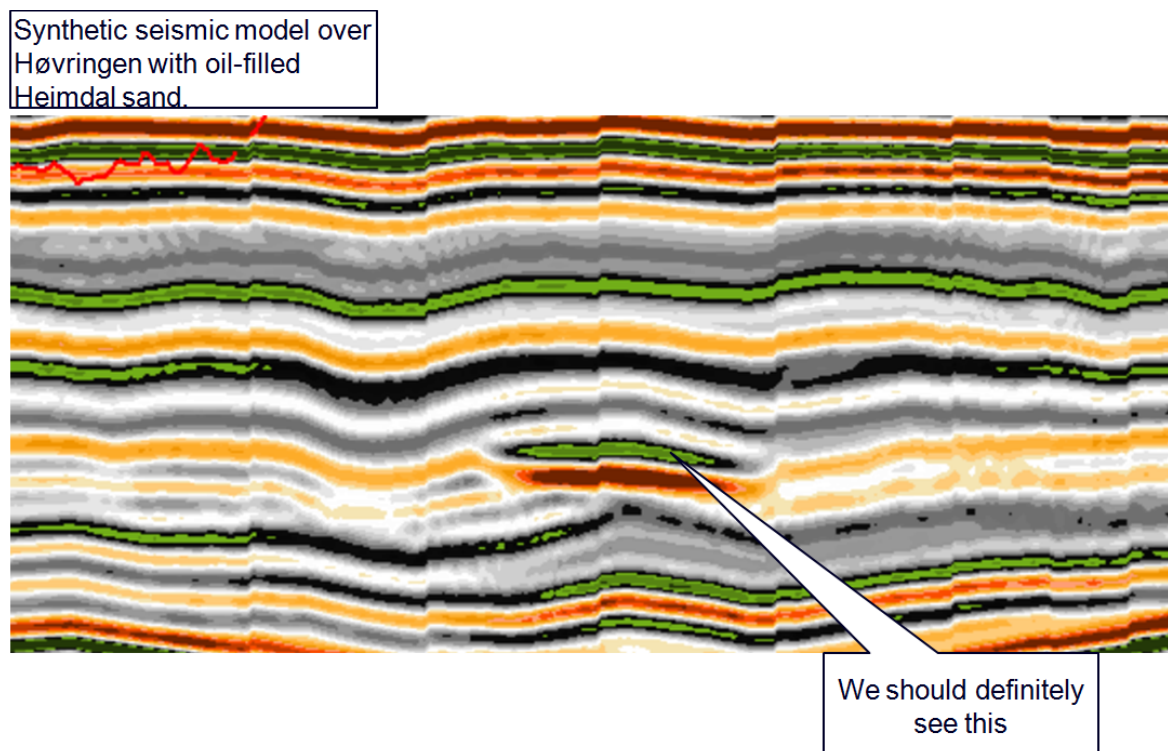


Fig. 2.3 Seismic Modelling. *The model shows that a phase shift or at least a far trace response in Heimdal sands are expected if hydrocarbons are present.*

3 REMAINING PROSPECTIVITY

The main prospect Høvringen is shown on the amplitude map below in Fig. 3.1. The amplitude response shows that the prospect is most likely underfilled and are considered to be smaller than anticipated in the application. Further G&G work on the new seismic has reached the conclusion that Høvringen is located south of the saddle point on the migration route between Gekko Discovery and Jotunt unit. The similar conclusion is drawn for Raphamn as well, the structure is in general to low in relief and the amplitude response to small to be economically interesting. The license is hereby relinquished to the NPD.

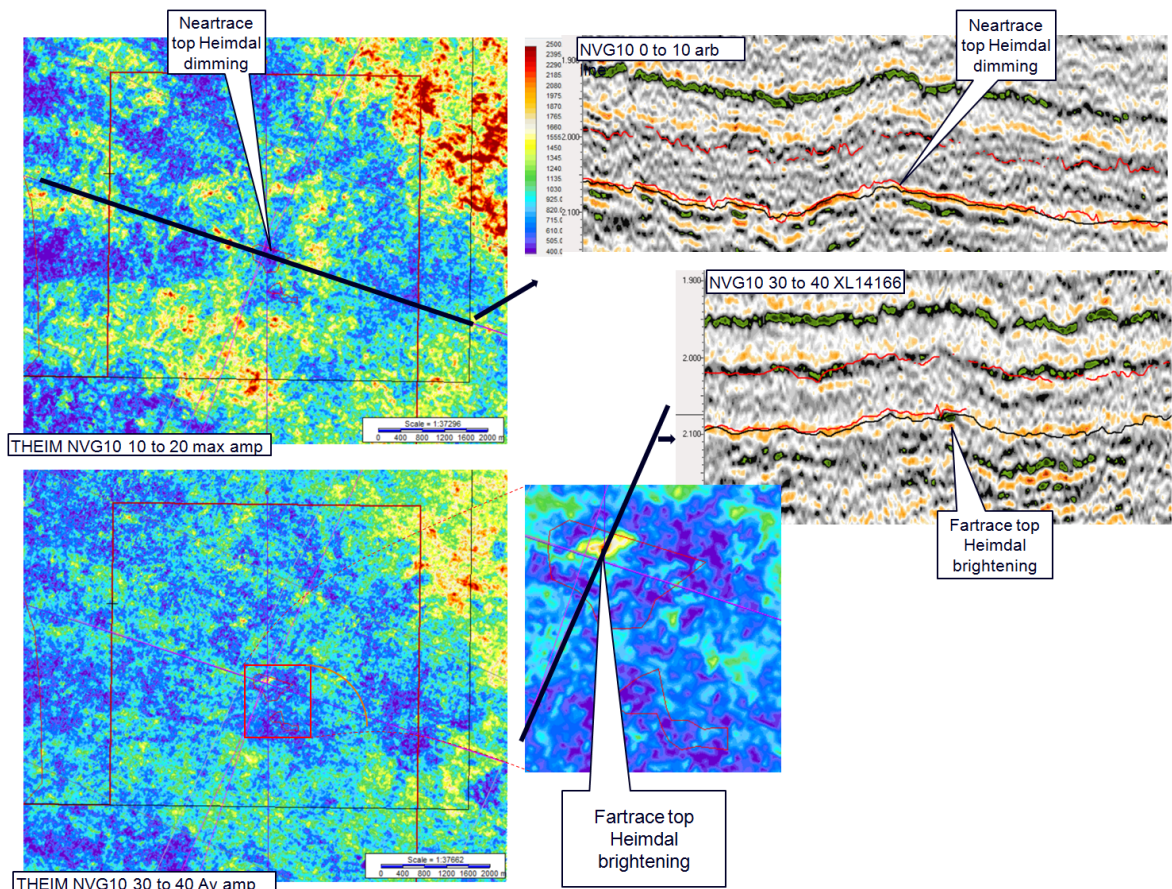


Fig. 3.1 Høvringen Amplitude Reponse. The NVG10 data shows a similar picture to the NH07M02 data, though the precision and the areal exyent is less. But the brightening is very distinct and it is very likely related to hydrocarbons. Unfortunately this also indicates that there are no hydrocarbon effects in the rest of the structure.