

RELINQUISHMENT REPORT OF LICENCE PL 629 IN BLOCKS 25/1, 2, 4 & 5

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I GENERAL

Introduction

This report documents the full relinquishment of PL 629 blocks 25/1 and 25/2 in the Norwegian North Sea (Fig. 1.1)[FIG013199).

2 KEY LICENSE HISTORY

Centrica Energy applied for PL 629 part acreage in blocks 25/1 and 25/2 in APA 2011 in an AMI with Faroe Petroleum. The License was granted in 2012 with additional partners Concedo and Bridge with Bridge as Operator. Centrica requested to take operatorship March 2014 post a Spike and Bridge merge. The current License Group comprises:

- Spike Exploration Holding AS (40%)
- Concedo ASA (20%)
- Centrica Resources AS Norge- Operator (20%)
- Faroe Petroleum Norge AS (20%)

The work commitments and work periods for the license were: Within 2 years from license award (by 2nd February 2015)

- Reprocess 3D seismic
- G&G studies
- Decision to drill an exploration well or relinquish the license

A six-month extension on the DoD was applied for and granted in 2014 due to a delay in the delivery of the MC3D-NVG11M reprocessed seismic survey.

In 2014, a subsequent six-month license extension was applied for and granted to the license in order to run an inversion of the NVG11M-BER13 reprocessed seismic data.

All license commitments were completed at the time of relinquishment.

Overview of Meetings All license meetings are summarised in Table 1.1.

2012	2013	2014
19-03-2011 MC - Kick off Meeting Partner introductions and Scope of work	11-08-2013 - EC/MC Meeting Reprocessing update of MC3D-NVG11M presented and approved by partners	25/4-2014 - EC/MC Meeting Review current work and progression of inversion work
01-11-2013 EC/MC Meeting Approval of license partners to reprocess Seismic Survey MC3D_NVG11M	08-11-2013 EC/MC Meeting additions to the common database discussed. Rock Physics study suggested by Operator Interpretation on MC3D-NVG11 dataset presented	04/12-2014 EC/MC Meeting Discuss results of rock physics work undertaken at Centrica

Reason for Relinquishment

The PL 629 Group reached agreement to relinquish the license at the EC/MC meeting on 4th December 2014, with MC approval following via L2S. The basis for the decision was the downgrading of the Nothfred and Midfred Prospects due to a reduction in the prospective resources.

3 DATABASE

Seismic Database

The PL 629 license is covered by a number of 2D and 3D seismic surveys. These surveys have been merged and reprocessed and the most recent of these NVG11-BER13 was used to map and redefine the prospect/lead boundaries, Northfred, Midfred and Cornfred in the PL 629 license . Key surveys and wells are shown in Fig. 3.1

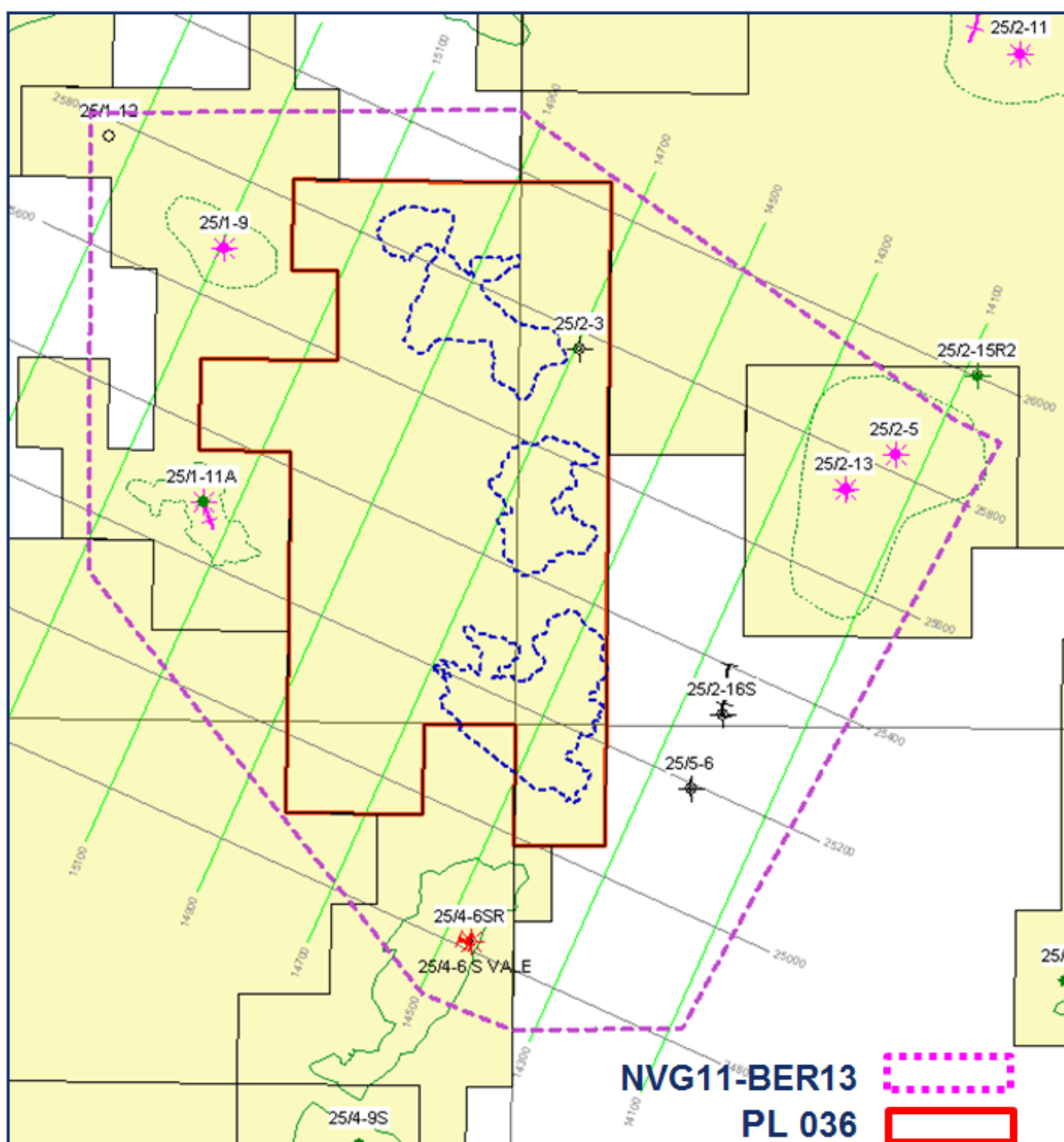


Fig. 3.1 Seismic Database

Well Database

All released and traded wells in the area were included in the common database. Key wells are listed in the table below.

Well name	Content	TD	Oldest penetrated Fm.
25/2-13	OIL/GAS	3908	SMITH BANK FM
25/1-5	OIL/GAS	2262	FRIGG FM
25/4-9	OIL	2297	HEIMDAL FM
25/2-3	DRY	2795	HARDRÅDE FM
25/2-9	OIL/GAS	2297	BALDER FM
25/1-9	OIL/GAS	2807	JORSALFARE FM
25/4-6	GAS/CONDENSATE	4136	STATFJORD GP
25/2-16	DRY	4013	DUNLIN GP
25/4-6	GAS/CONDENSATE	4170	STATFJORD GP
25/5-6	DRY	2446	HEIMDAL FM
25/1-11-R	OIL	2338	FRIGG FM

4 REVIEW OF GEOLOGICAL FRAMEWORK

An evaluation of the prospects within the PL629 License was undertaken leading up to the drill or drop decision deadline on 2nd February 2015 as shown in Fig. 4.1.

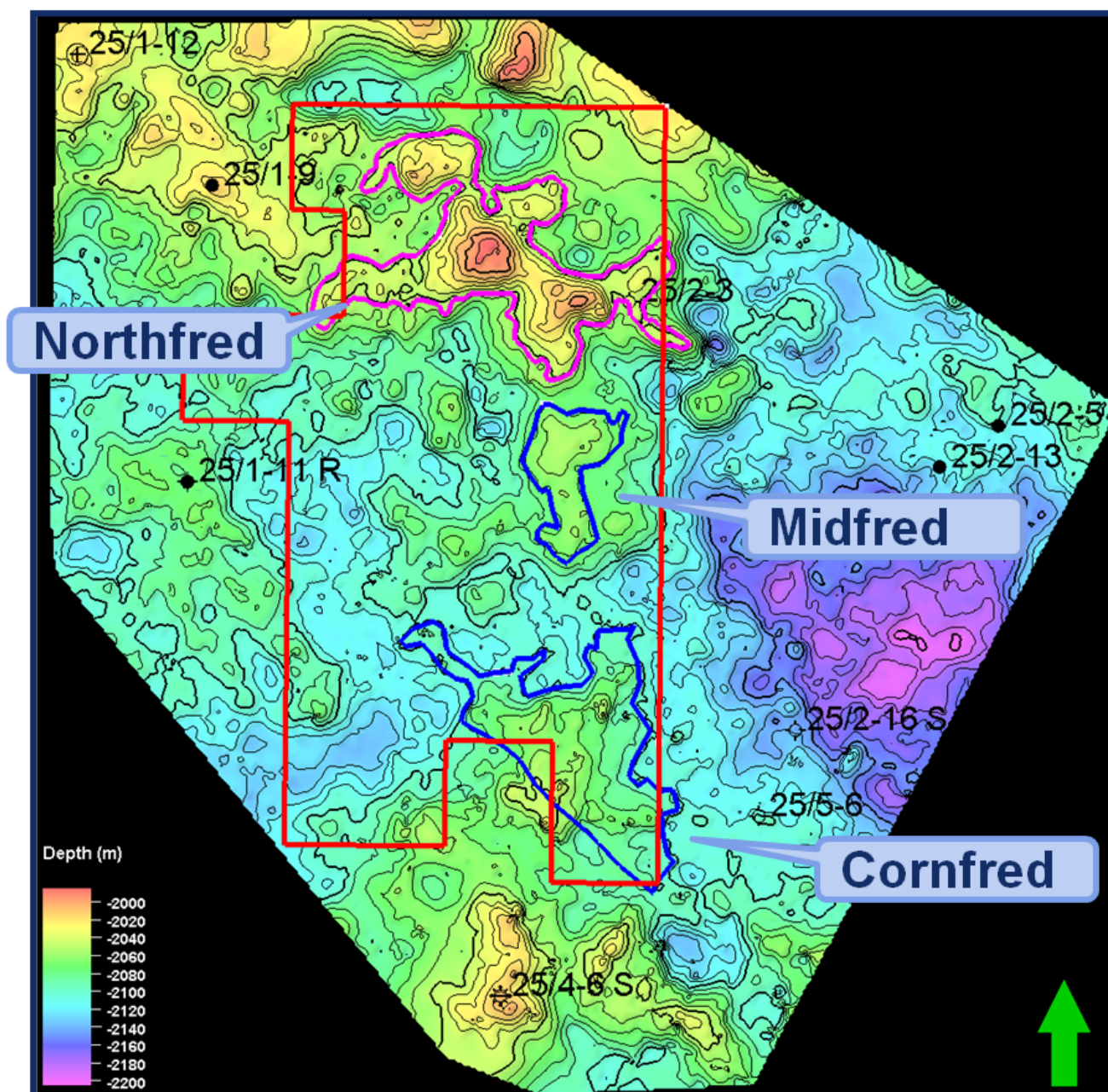


Fig. 4.1 Prospect Map.

The Northfred Prospect is a 4-way structural dip closure located to the east of Well 25/1-9 and has a mapped spill point at top Frigg Fm towards the well at around 2075 m TVDSS. The 25/3-2 well is located at the edge of the closure.

The Midfred Prospect is a small 4-way structural dip closure at Top Frigg level to the south of Northfred and was originally described as the 'Darling' prospect in the 2011 APA Application for the blocks. The Midfred Prospect is mapped significantly smaller than the original interpretation.

The Cornfred Prospect in the southern part of the Licence is a 3-way pinchout trap. The prospects in this area are on the edge of the main Frigg sand system. See Fig. 4.2. Well 25/1-9 Fig. 4.3 and Well 25/5-6 shows that for the in-situ reservoir thicknesses a HC driven AVO response should be expected. The weak AVO response observed in the 25/1-9 well is a function of the reservoir thickness and quality, and thickening this package to approximately 10m thickness strengthens the AVO response substantially. In general, hydrocarbon presence will result in a brightening on the seismic, especially on the far traces. The exception to this is in the case of thin sands (<10-12m).

- Closures at the Top Frigg level
- Objective: Intra-Frigg sandstone

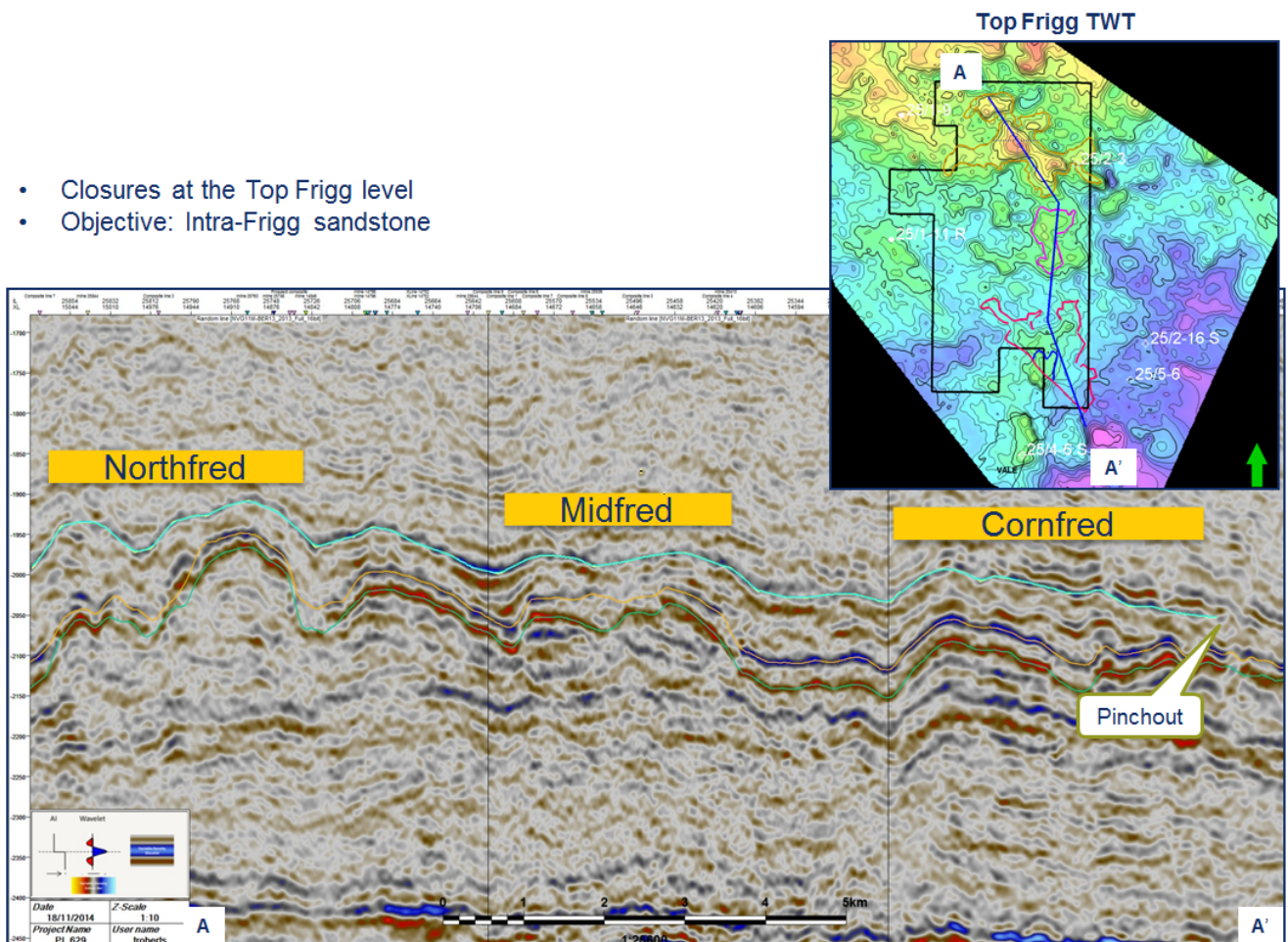


Fig. 4.2 Regional Seismic Line. Three main prospects were identified and mapped: Northfred, Midfred and Cornfred. Northfred and Midfred are 4-way dip-closed structures at Top Frigg level, whilst Cornfred is a combination structural-stratigraphic trap at the same interval

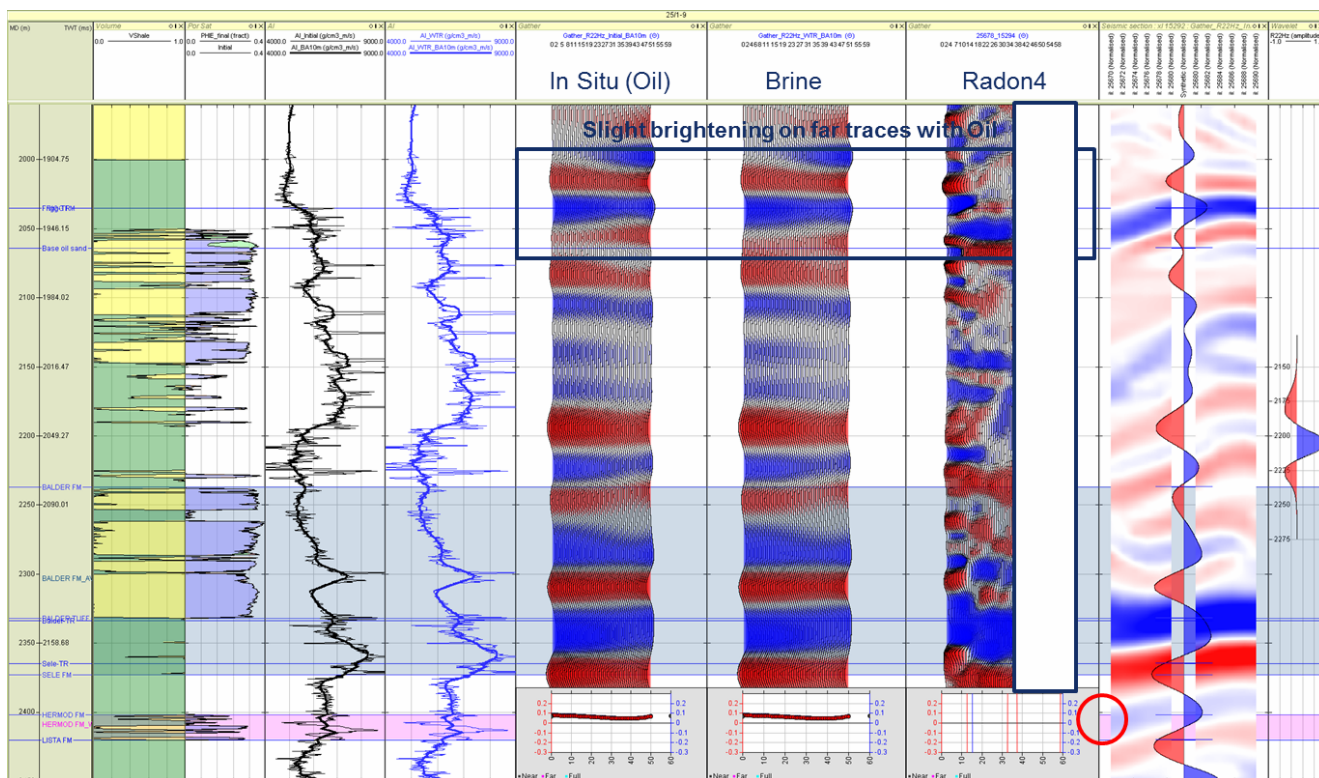


Fig. 4.3 25/1-9 - Frigg Fm. Well 25/1-9 shows a very subtle AVO response with oil filled Frigg sand, which is due to a combination of:

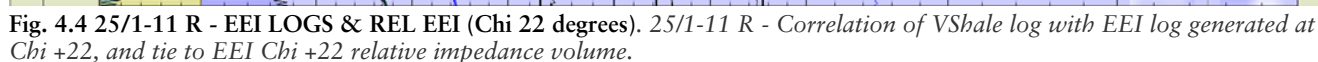
The Frigg sand in this area is more consolidated (cemented) than the sand found in the 25/1-11R (Storkklakken) well, which reduces the expected seismic fluid response.

The Top Frigg hard seismic event interferes with the top sand response which complicates / reduces the seismic AVO response.

The good quality oil filled Frigg sand is only 6m thick compared to 12m thick in the 25/1-11R well, and thickening this zone to ~10m strengthens the seismic AVO response so that it should be observable.

There are some risks related to reservoir presence, thickness and quality of the Frigg sands particularly in the area of the Cornfred Prospect. Extended Elastic Impedance (EEI) at a Chi angle of +22 degrees, which appeared to give a good correlation to the V_{shale} log, was therefore used as a proxy sand indicator in order to map Frigg sand presence. Fig. 4.4 shows the correlation of the EEI (CHI +22deg) log with the V_{shale} log and the tie between the EEI (Chi +22deg) seismic volume and the EEI (Chi +22deg) log convolved with a 22Hz Ricker wavelet shown in Fig. 4.4

The EEI (CHI +22deg) volume was used to help define the prospects in the license. The stacked Frigg sands seen in well 25/1-9 were more easy to interpret and in addition, a more apparent pinchout of the Frigg sand in the Cornfred prospect was more accurately mapped as shown in Fig. 4.5.



Trap and Seal and Reservoir

The Frigg sand is the main Tertiary hydrocarbon-bearing reservoir in this part of the Viking Graben and is the main reservoir within the Frigg Field and its satellites. The Top Frigg is overlain by Hordaland Gp claystone which act as a regional seal. The sandstones are strongly channelised. The Frigg sand channels appear to inherit the distribution and pattern of the Balder sandstones below and more or less overlies the older channels. Frigg sandstones are considered both an opportunity and a risk to the prospectivity in the area applied for as the Frigg sandstones and their distribution have a significant impact on the top seal potential and trapping potential of older Tertiary reservoirs. There are no Balder or Hermod discoveries in the area.

Owing to the results from the inversion study it is assumed that the Frigg reservoir sands if present are likely to be thin in the Northfred and Midfred Prospects (<10m)

The Cornfred Prospect is distal from the Frigg sand entry point and there remains some ambiguity with regard to the pinchout of the Frigg sands at the southern end of the prospect.

In the original application the GRV was considered to be much larger and hence greater volumes were anticipated.

Risking and Uncertainties

In the original APA Application, charge was considered to be the highest risk and that continues to hold the highest risk and there is deemed to be limited upside on all of the prospects. No DHI was mapped over the PL 629 licence which is possibly due to the limited column height. No DNME anomalies are seen over the prospects and an EM line over Cornfred did not reliably indicate the presence of resistive reservoir at the Frigg sand level. Understanding from the Frigg Gamma-Delta area suggests that the MEFS for PL629 would be around 50 mmbo. The resource cases for each of the identified prospects are significantly below the expected MEFS.

Although a risking session was formally held, the GCOS for the prospects was agreed to be around 27%. This does not include any geophysical risking, however the lack of any mapped DHI would result in a reduction from the GCOS of 27%. The GCOS carried by the previous operator (Bridge/Spike) for the Cornfred prospect was 17%.

Prospect Data

The Centrica determined volumes for the Northfred and Cornfred prospects are given below. See Fig. 5.2

The Prospect Data for Northfred is tabulated in Table 5.1.

The Prospect Data for Cornfred is tabulated in Table 5.2.

The Midfred Prospect is considered too small and a prospect evaluation is not included in this report.

Northfred Volumetrics	Gross STOIIP (mmbo)	Gross Resources (mmbo)
P90	7	2
P50	24	8
P10	82	29

Cornfred Volumetrics	Gross STOIIP (mmbo)	Gross Resources (mmbo)
P90	2	1
P50	12	4
P10	71	25

Fig. 5.2 Centrica deterministic Volumes

Table 5.1. Northfred Prospect Data. Details of the input used for volume calculation and reserves calculations for the Northfred Prospect

Block	25/1, 2	Prospect name	Northfield	Discovery/Prospl/Lead	Prospect	Prosp ID (or New)	NPD will insert value	NPD approved (Y/N)	
Oil, Gas or O&G case:	Oil	Reported by company	Centrica	Reference document		Water depth (m MSL) (>0)			
		Structural element		Type of trap					
This is case no.:		Associated phase							
		Main phase	Base, Mode	High (P10)	Low (P90)	Base, Mode	Base, Mean	High (P10)	High (P10)
Resources IN PLACE and RECOVERABLE		Oil [10 ⁶ Sm ³] (>0.00)							
		Gas [10 ⁶ Sm ³] (>0.00)							
Volumes, this case		Oil [10 ⁶ Sm ³] (>0.00)							
		Gas [10 ⁶ Sm ³] (>0.00)							
In place resources		Oil [10 ⁶ Sm ³] (>0.00)							
		Gas [10 ⁶ Sm ³] (>0.00)							
Recoverable resources		Oil [10 ⁶ Sm ³] (>0.00)							
		Gas [10 ⁶ Sm ³] (>0.00)							
Reservoir Chrono (from)		Reservoir litho (from)				Source Rock, litho primary		Seal, Chrono	
		Reservoir litho (to)				Source Rock, litho secondary		Seal, Litho	
Probability [fraction]									
		Oil case (0.00-1.00)				Oil & Gas case (0.00-1.00)			
Technical (oil + gas + oil & gas case) (0.00-1.00)		Trap (P2) (0.00-1.00)				Charge (P3) (0.00-1.00)		Retention (P4) (0.00-1.00)	
		Base				High (P10)			
Parameters:		Comments							
		2005							
Depth to top of prospect [m MSL] (> 0)		10							
		40							
Area of closure [km ²] (> 0.0)		85							
		130							
Reservoir thickness [m] (> 0)		25							
		40							
HC column in prospect [m] (> 0)		0.020							
		0.050							
Gross rock vol. [10 ⁶ m ³] (> 0.000)		0.23							
		0.40							
Net / Gross [fraction] (0.00-1.00)		0.27							
		0.30							
Porosity [fraction] (0.00-1.00)		0.12							
		0.20							
Permeability [mD] (> 0.0)		0.45							
		0.74							
Water Saturation [fraction] (0.00-1.00)		0.80							
		0.76							
Bg [Rm ³ /Sm ³] (< 1.0000)		0.20							
		0.35							
GOR, free gas [Sm ³ /Sm ³] (< 1.00)		0.20							
		0.35							
GOR, oil [Sm ³ /Sm ³] (> 0)		0.20							
		0.35							
Recover. factor, oil main phase [fraction] (0.00-1.00)		0.20							
		0.35							
Recover. factor, gas ass. phase [fraction] (0.00-1.00)		0.20							
		0.35							
Recover. factor, gas main phase [fraction] (0.00-1.00)		0.20							
		0.35							
Recover. factor, liquid ass. phase [fraction] (0.00-1.00)		0.20							
		0.35							
Temperature, top res [°C] (> 0)		75							
		75							
Pressure, top res [bar] (> 0)		1							
		1							
Oil off criteria for N/G calculation		2							
		2							
Kart no		3							
		3							
Kart no		3							
		3							

Table 5.2. *Confirmed prospect Data. Details of the input used for volume calculation and reserves calculations for the Cornifed Prospect*

Oil, Gas or O&G case: This is case no.:	Block 25/I, 2 Play name	Prospect name New Play (Y/N)	Confirmed	Discovery/Prospl.lead Outside play (Y/N)	Prospect	Prospect ID (or New)	NPD will insert value	NPD approved (Y/N)	
Resources IN PLACE and RECOVERABLE									
Volumes, this case									
In place resources									
Recoverable resources		Oil [10 ⁶ Sm ³] (>0.00)	Base, Mode	Base, Mean	High (P10)	Low (P90)	Base, Mode	Base, Mean	High (P10)
Reservoir Chrono (from)		Gas [10 ⁶ Sm ³] (>0.00)	Base, Mode	Base, Mean	High (P10)	Low (P90)	Base, Mode	Base, Mean	High (P10)
Reservoir Chrono (to)		Gas [10 ⁶ Sm ³] (>0.00)	Base, Mode	Base, Mean	High (P10)	Low (P90)	Base, Mode	Base, Mean	High (P10)
Probability [fraction]									
Technical (oil + gas + oil & gas case) (0.00-1.00)									
Reservoir (P1) (0.00-1.00)		Oil case (0.00-1.00)	Trap (P2) (0.00-1.00)	Charge (P3) (0.00-1.00)	Oil & Gas case (0.00-1.00)	Retention (P4) (0.00-1.00)			
Parameters:									
Depth to top of prospect [m MSL] (> 0)		Area of closure [km ²] (> 0.0)	Reservoir thickness [m] (> 0)	HC column in prospect [m] (> 0)	Gross rock vol. [10 ⁹ m ³] (> 0.000)	Net / Gross [fraction] (0.00-1.00)	Porosity [fraction] (0.00-1.00)	Permeability [mD] (> 0.0)	Water Saturation [fraction] (0.00-1.00)
Bg [Rm3/Sm3] (< 1.0000)		J/Bo [Sm3/Rm3] (< 1.00)	GOR, free gas [Sm ³ /Sm ³] (> 0)	GOR, oil [Sm ³ /Sm ³] (> 0)	Recov. factor, oil main phase [fraction] (0.00-1.00)	Recov. factor, gas ass. phase [fraction] (0.00-1.00)	Recov. factor, gas main phase [fraction] (0.00-1.00)	Recov. factor, liquid ass. phase [fraction] (0.00-1.00)	
For NPD use:									
Temperature, top res [°C] (>0)		Pressure, top res [bar] (>0)	Cut off criteria for N/G calculation	Innapp. av. geolog-init: Date:	NPD will insert value	Register - init: Register Date:	NPD will insert value	Kart oppdatert: Kart dato	NPD will insert value
1.	2.	3.							

6 CONCLUSIONS

Two main prospects Northfred and Cornfred in license PL 629 were re-evaluated and are now deemed to be non economic due to the low volumes and the associated risk due to a lack of DHI.

Nearby offset wells provide good control on the Frigg sand extent and indicates that thinner reservoir exists in PL 629 than seen in the main Frigg channel system which pinches out to the south before the Vale structure. No DHI is identified on these prospects. Modelling indicates that oil sands could still exist but with limited column height (<10m).

The PL 629 have agreed that a decision to drill would be unfeasible and therefore a decision to relinquish the entire acreage was reached.