

PL547S RELINQUISHMENT REPORT

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I KEY LICENCE HISTORY

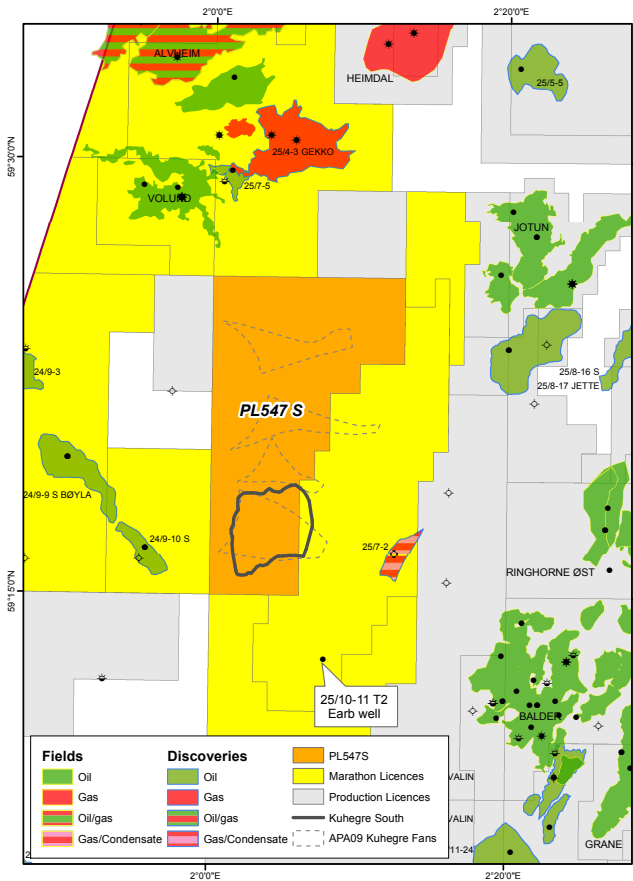


Figure 1.1 PL547S Location Map

Production licence 547S is a part of block 25/7 in the southern part of Viking Graben in the North Sea, see Figure 1.1. The licence was awarded in the APA 2009, on February 19th 2010. The partners in the licence are; Marathon Oil Norge AS as operator with 40% interest, Lundin Norway AS 30%, VNG Norge AS 20% and GDF SUEZ E&P Norge AS with a 10% working interest.

PL547S is a stratigraphically divided licence and it applies to all levels below top Cretaceous. Initial work obligations were to perform geological and geophysical work, reprocess 3D seismic and decide to drill one exploration well or drop within 2 years. Further obligations were Decision on Continuation within 4 years, and within 6 years submit a PDO or licence will lapse. The initial licence duration was 6 years (2+2+2) with an extension period of 20 years. The licence was relinquished January 5th 2012 after unanimous agreement to do so in the partnership. Activity timeline for the life of the licence in Figure 1.2.

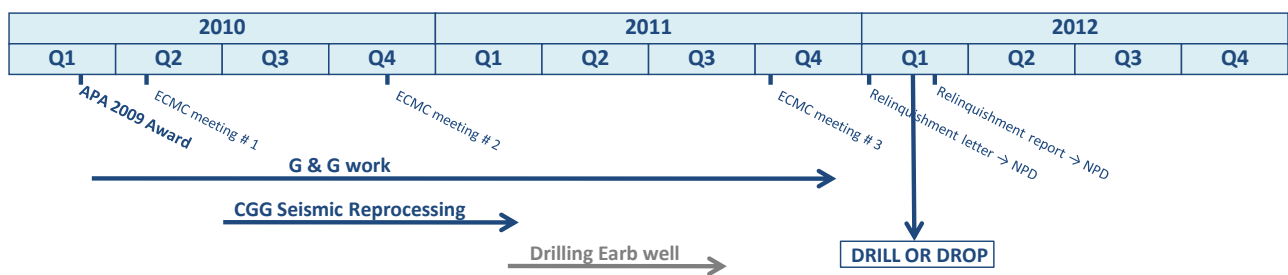


Figure 1.2 Activity Timeline. 2 first years of exploration

There are several reasons for licence relinquishment, with the main critical factors being low chance of finding adequate reservoir quality and lack of closure. A key datapoint for evaluating the prospectivity in this licence was the 25/10-11 T2 Earb well in the neighbouring production licence 505. This well did not penetrate any Upper Jurassic reservoir. The well could therefore not de-risk the reservoir quality in PL547S.

2 DATABASE

The common database was established at the first partner meeting, to include all released Upper Jurassic wells in the area, all relevant public released seismic and seismic survey MA06M02. The reprocessed survey CN2593r10 was also included in the common database when completed.

CGGVeritas did the reprocessing of Raw Field data from the vintage data CN25_93 (Figure 2.1), and

was focused on a comprehensive De-noise and De-multiple (including Shallow Water Demultiple) pre-processing sequence, as well as using a full regularisation and pre-stack merge scheme prior to Depth (PSDM) imaging.

For the Depth imaging, CGGVeritas used CBM algorithm for velocity model building and Kirchhoff PSDM as well as Amplitude Preserving CBM for structural imaging and AVO products.

The objectives with the processing were:

- To better image the identified Upper Jurassic fan bodies (Kuhegre Fans) in PL547s.
- Preserve amplitude variation as best as possible to improve section and map view interpretation.
- Position features in accurate relative depths to assess amplitude to contour conformance.
- Improve signal to noise for best chance of correlating down-dip fans with up-dip well control and assess up-dip trapping potential and configuration.

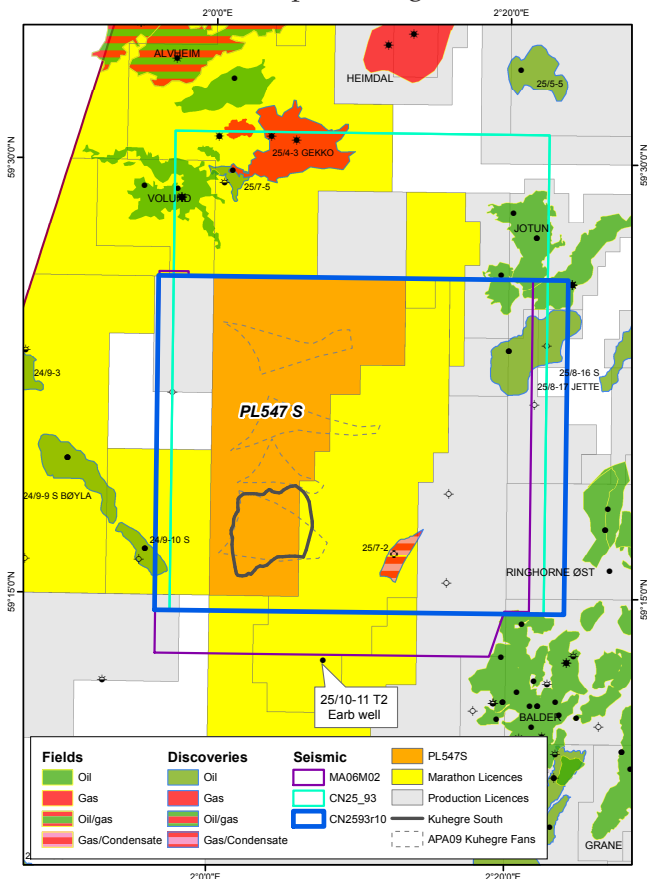


Figure 2.1 PL547S Seismic Database

The new dataset has a better image quality, with less multiple than in the vintage data.

The 25/10-11 T2 Earb well drilled in early-mid 2010 had no impact on the Upper Jurassic prospectivity in the PL547S licence, and was therefore not included in the common well database.

3 REVIEW OF GEOLOGICAL FRAMEWORK

Inversion Feasibility Study

CGGVeritas & Marathon Upstream Technology compiled an Inversion Feasibility Study. The aim of any inversion would have been to increase the resolution, particularly of stratigraphic traps, and aid in lithologic discrimination. The feasibility studies show that near, or at, well inversions did not match the well data sufficiently. Therefore an inversion of the entire dataset would be unreliable and potentially misleading. The spectral shaped coloured inversion study shows the data to not be adequate for the exercise. The wedge models show that sands could be highlighted simply by their tuning amplitude, compounding the difficulties of determining reservoir presence, especially good reservoir presence. Thick reservoirs could potentially not stand out as an anomalous amplitude. Therefore without further well control the dominate determination of trap and reservoir has to be structural interpretation and depositional model based respectively.

South Viking Graben Regional Study

Early 2010 Marathon completed an internal "South Viking Graben Regional Study". The results of this study states that the remaining Upper Jurassic prospectivity exists along the graben edges rather than in the middle of the basin. The critical geological risk factor for the upper Jurassic potential are reservoir presence and quality. We believe that there are sands in the Kuhegre system, but reservoir quality, specifically porosity, is a concern as the depth range for the prospective reservoir is from 4600m to 5000m.

Results of PL 547S Block Evaluation

A new seismic interpretation was done using the CN2593r10 CBM full offset cube. Even with a better seismic image over the prospective area, it is difficult to define a trap. The Kuhegre Top Sand reflector seems to be connected to the up-dip Earb system, see Figure 3.1.

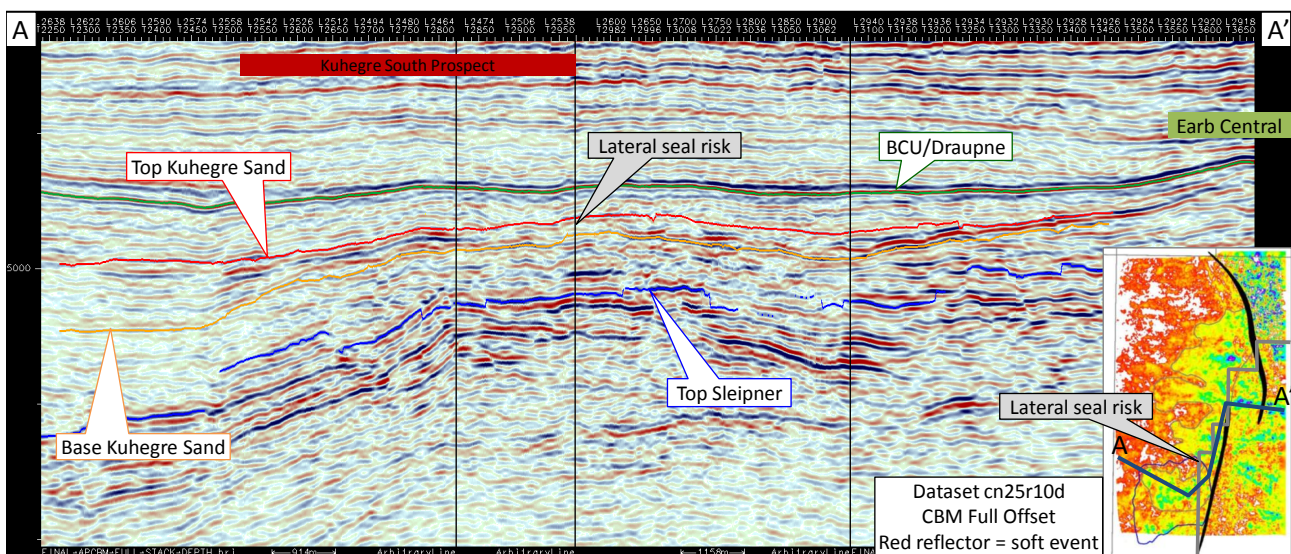


Figure 3.1 Interpreted Seismic Line. *Arbitrary line across prospect area.*

The amplitude map, Figure 3.2 shows dimming up-dip of the fault suggesting sand bypass and potential seal in the East-West direction, while in the lateral North-South direction there is only partial dimming, with no complete separation of the Kuhegre South amplitude from the rest of the Kuhegre system. The result of the block evaluation is that the prospectivity in PL547S is to risky.

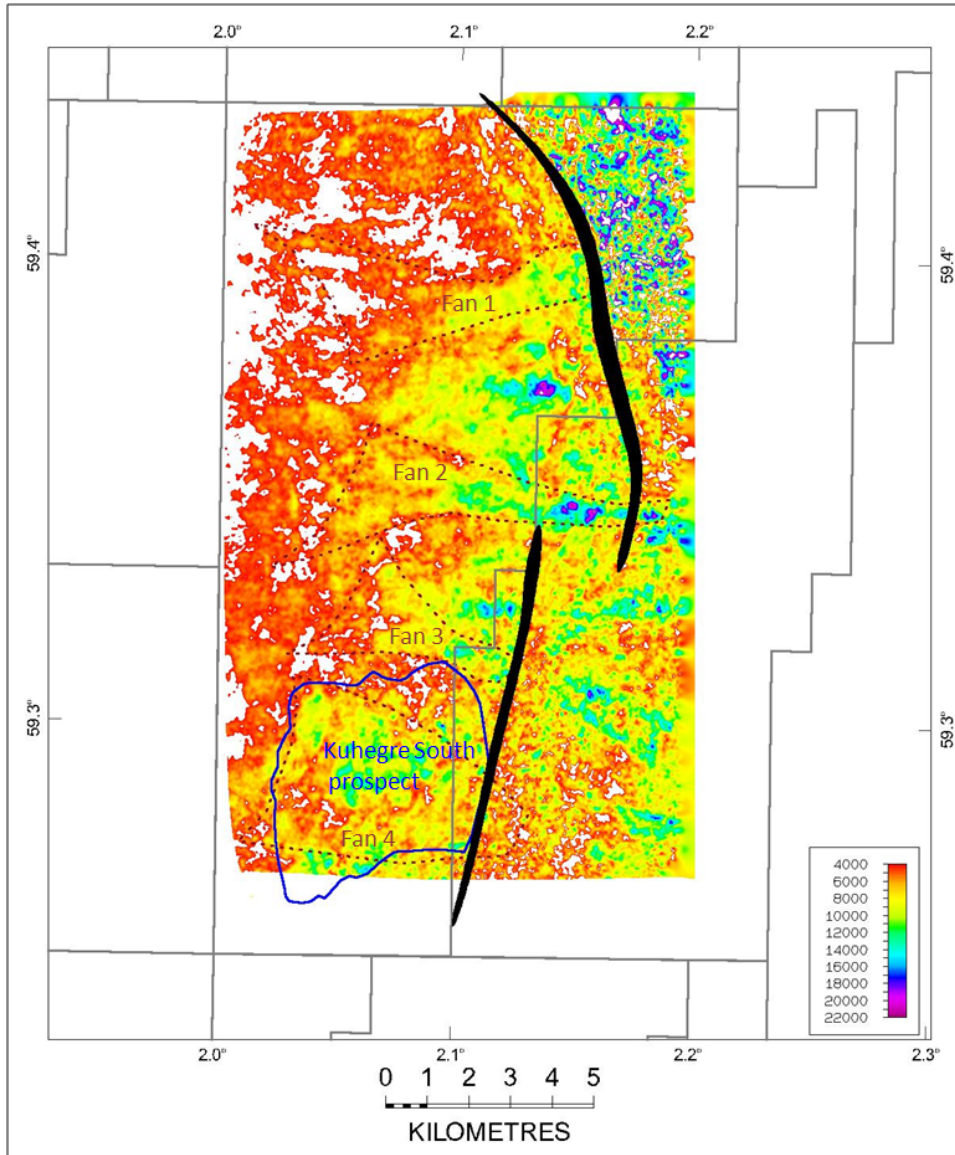


Figure 3.2 PL547S Amplitude Map. CN2593r10 Kirchoff Full RMS Amplitude, in the interval between Top Kuhegre Sand and Base Kuhegre Sand (see figure 3.1).

4 PROSPECT UPDATE

Summary of prospectivity from APA2009 application

Key to the upper Jurassic prospectivity are high impedance discrete dispersive fan-shaped geometries with more linear features up-dip identified on the 3D survey MA06M02. The interpreted fans have lateral thickness variation and pinchout. Four fans are identified along strike from each other. The southern and northern fan, Fan 1 and Fan 4 respectively, had a fairly abrupt up-dip pinchout at a base of slope position that is apparently controlled by an underlying fault. The two central fans, Fan 2 and Fan 3, lacks this abrupt up-dip termination and appear to continue up-dip across a lower throw portion of the same fault into linear features on the bypass-slope, which are interpreted to be their feeder channel systems. Upper Jurassic Fan 1 was elevated from a lead to a prospect for the purpose of the APA09 application, and was presented in more detail. Fan 1 was outlined primarily on the RMS amplitude, taken between what was interpreted to be top and base of the reservoir section. The reservoir is expected to range depositionally from proximal or mid fan up-dip to mid-fan or distal fan down dip. Overall, the lithologies are thought to be dominantly sandy as the acoustic response implies. Description of the reservoir facies and parameterisation of these fans for volumetric estimation is very uncertain, this might be improved by better seismic imaging and drilling in the graben margin play - Earb.

Hydrocarbon seal would be mudstones of the Draupne formation on top of, beneath, and laterally, with mudstones of the Heather formation perhaps assisting beneath where Draupne might be thin. For more information about the prospectivity, see the APA 2009 application.

New seismic, new interpretation

The new seismic 3D processing provided a better image and understanding of the Kuhegre Fan system. The previously interpreted 4 separated fans are now believed to be a bigger and more connected system. A wide depositional system with channels/fans overlapping and interfering as amalgamated, stacked channels/fans, makes the reservoir architecture and distribution complex. The new Kuhegre South prospect (previous Fan 1) is our best chance prospect with a probability of discovery of 6.4%. Probability of discovery for Fan 1 in the application was 11%. The major change to the probability estimates is the lack of a sealing trap. See Figure 4.1 for the complete comparison of probability estimates.

At the Sleipner formation level, we can clearly see a mappable fault pattern. But these faults are generally interpreted to die out before reaching the upper Jurassic Kuhegre interval. The Kuhegre sand interval thins updip to the east, but the chance of being a continuous bypass zone along the width of the amalgated Kuhegre feeder channel is very low. No North-South structural closure has been identified in the Kuhegre South prospect, and a stratigraphic trap to the North and South is required for this to work. The highest lateral stratigraphic trap risk is to the South. The seismic features within the mapped Kuhegre interval indicate a sandy depositional environment, but the seismic amplitude to sand correlation is unclear.

Changes in resource volumes - Table 4.1.

	Kuhegre Fan 1 APA2009 application	Kuhegre South prospect, Q4 2011
EXPLORATION PROSPECT Chance Success	Ratings (0.00-1.00)	Ratings (0.00-1.00)
SOURCE COMPONENTS	<i>Confidence of P1 Reserves: 34.73 BCF</i>	<i>Confidence of P01 Resources: 6.69 BCF</i>
Quantity/Volume (include Monetizable Product)	0.99	1.00
Quality/Richness	0.99	1.00
Maturation	0.99	1.00
MINIMUM FACTOR	0.99	1.00
TIMING/ MIGRATION COMPONENTS	<i>Confidence of P1 Reserves: 34.73 BCF</i>	<i>Confidence of P01 Resources: 6.69 BCF</i>
Timing of Closure / Trap	0.99	1.00
Timing of Expulsion	0.99	1.00
Effective Migration Pathway	0.99	1.00
MINIMUM FACTOR	0.99	1.00
RESERVOIR COMPONENTS	<i>Confidence of P10 Net Pay: 17.4 Metres</i>	<i>Confidence of P10 Net Pay: 10.60 metres</i>
Presence	0.90	0.90
Quality	0.20	0.33
Reservoir Performance	0.20	0.30
MINIMUM FACTOR	0.20	0.30
CLOSURE COMPONENTS	<i>Confidence of P10 Area: 2.69 Sq Km</i>	<i>Confidence of P10 Area: 2.00 sq km</i>
Map Reliability & Control	0.75	0.75
Presence	0.90	0.30
Data Quality	0.75	0.80
MINIMUM FACTOR	0.75	0.30
CONTAINMENT COMPONENTS	<i>Confidence of P1 Reserves: 34.73 BCF</i>	<i>Confidence of P01 Resources: 6.69 BCF</i>
Top / Base Seal Effectiveness	0.80	0.80
Lateral Seal Effectiveness	0.75	0.70
Preservation from Spillage or Depletion	0.75	0.75
Preservation from Degradation	0.75	0.75
MINIMUM FACTOR	0.75	0.70
EXPLORATION PROSPECT Chance of Success (calculated)	11.0%	6.3%
EXPLORATION PROSPECT Chance of Success OVERRIDE		
FINAL Chance of Success	11.0%	6.3%

Figure 4.1 Probability Estimates. *The major difference between the two are closure components - presence; confidence that a structural/stratigraphic trap exists.*

Table 4.1 NPD Resource Volumes

Block	Prospect name	Discovery/Prosp/Lead	Prosp ID (or New!)	NPD approved?		
25/7	Kuhegre South prospect	Prospect	<i>NPD will insert data</i>	<i>NPD will insert data</i>		
Play (name / new)	Structural element	Company/ reported by / Ref. doc.		Year		
<i>NPD will insert data</i>	Viking Graben	Marathon Oil Norge AS		2012		
Oil/Gas case	Resources IN PLACE					
Gas	Main phase			Ass. phase		
	Low	Base	High	Low	Base	High
Oil 10 ⁶ Sm ³	-	-	-	-	-	-
Gas 10 ⁹ Sm ³	0.37	4.2	10.8	-	-	-
	Resources RECOVERABLE					
	Main phase			Ass. phase		
	Low	Base	High	Low	Base	High
Oil 10 ⁶ Sm ³	-	-	-	-	-	-
Gas 10 ⁹ Sm ³	0.25	2.2	5.4	-	-	-
Which fractiles are used as:		Low:	P10	High:	P90	
Type of trap	Water depth (m)	Reservoir Chrono (from - to)		Reservoir Litho (from - to)		
Stratigraphic	121	Kimmeridgian to Tithonian		Draupne Fm		
SourceRock, Chrono	SourceRock, Litho	Seal, Chrono		Seal, Litho		
Kimmeridgian	Draupne Fm	Ryazanian		Draupne Fm		
Seismic database (2D/3D):		3D - all relevant released, MA06M02, CN2593r10				
Probability of discovery:						
Technical (oil+gas case)		0.072		Prob for oil/gas case		30/70
Probability (fraction):		Reservoir (P1)	Trap (P2)	Charge (P3)	Retention (P4)	
		0.30	0.4	1	0.6	
Parametres:		Low	Base	High		
Depth to top of prospect (m)		4700	4600	4500		
Area of closure (km ²)		2.3	7	12		
Reservoir thickness (m)		11	31	57		
HC column in prospect (m)		240	310	400		
Gross rock vol. (10 ⁹ m ³)		0.07	0.462	1.128		
Net / Gross (fraction)		0.15	0.3	0.5		
Porosity (fraction)		0.09	0.12	0.17		
Water Saturation (fraction)		0.15	0.25	0.35		
Bg. (<1)		0.00323	0.00298	0.00279		
Bo. (>1)		-	-	-		
GOR, free gas (Sm ³ /Sm ³)		0.00028	0.00058	0.00095		
GOR, oil (Sm ³ /Sm ³)		-	-	-		
Recovery factor, main phase		0.61	0.69	0.77		
Recovery factor, ass. phase		0.61	0.69	0.77		
Temperature, top res (deg C) :		147	Pressure, top res (bar) :			
For NPD use:						
Innrapp. av geolog:		Registrert:		Map OK:		Nr:
Dato:		Dato:		Dato:		

5 TECHNICAL EVALUATIONS

No new evaluation has been performed regarding a development plan of any discovery or remaining prospects. The most likely development strategy for potential hydrocarbons in block 25/7 would be a subsea development with tieback to existing or future infrastructure (Heimdal/Gudrun). It is assumed that High Pressure High Temperature (HPHT) technology would be required, and special considerations would also be given to well design, drilling sequence, concept selection and potential technology qualification programs.

For more information regarding technical assumptions and development plan, please see the APA2009 application.

6 CONCLUSIONS

As already mentioned in the key licence history, there are several reasons for relinquishment. The major concerns being reservoir quality and closure. The Kuhegre system seems to be connected with the up-dip Earb system, and the lateral trap mechanism is dependent on a stratigraphic component working in both the North and South direction. The drilling of the Earb well was needed to derisk the Kuhegre prospectivity, but unfortunately it had no impact. After reevaluating the Upper Jurassic prospectivity on the newly reprocessed seismic, no drillable prospects were identified. No confident trap could be determined, therefore no prospect could be confidently outlined. Additionally, the leads identified do not have associated volumes large enough to warrant drilling a well.