

PL 1107

Relinquishment report



Table of contents

1 History of the production licence	1
2 Database overviews	2
2.1 Seismic data	2
2.2 Well data	4
3 Results of geological and geophysical studies	5
4 Prospect update report	7
5 Technical evaluation	12
6 Conclusion	14

List of figures

2.1	Seismic and well database	3
4.1	Prospects and Leads from the APA2020 Application	7
4.2	Top Statfjord Group	9
5.1	Whaler development concept	12
5.2	Location map.....	13

List of tables

1.1	Key license information.....	1
1.2	Status Work Programme	1
1.3	License meeting overview	1
2.1	Seismic database	2
2.2	Common Well database	4
3.1	Summary of Work Programme Scope and outcome.....	5
4.1	Resource potential of the Nordlandsbåt and Vårønn prospects.....	8
4.2	Resource potential of Clipper, Whaler, Baboon and Bull prospects.....	10
4.3	NPD table.....	11
5.1	Whaler development dates	13

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1 History of the production licence

PL 1107 is located on the Tampen Spur, covering parts of Blocks 34/2 and 34/5, and was awarded 19.02.2021 to a license group consisting of Neptune Energy (O), Wintershall DEA and Petrolia NOCO. The 2021 Awards in Predefined Areas (APA 2020) application was delivered by Neptune Energy.

General License Information

Table 1.1 Key license information

PL 1107	
Awarded	19.02.2021
DOD (Drill or Drop)	19.02.2024
License period	7 years (initial)
License area	192 km ²

One license extensions have been granted over the licence period:

- 1 year extension application to fully integrate Phase II of the newly acquired CGG21DAZ broadband seismic data into the prospect evaluation.

Work Programme

Table 1.2 Status Work Programme

Work Programme Items	Status
Purchase and reprocess 3D seismic	Fulfilled
Electromagnetic feasibility study	Fulfilled
G&G studies	Fulfilled

License Meetings

During the period of the license, the following meetings took place as documented in License2Share (L2S).

Table 1.3 License meeting overview

Date	Management Committee Meeting	Exploration Committee Meeting
07.04.2021	X	X
24.11.2021	X	X
23.08.2022		X
16.11.2022	X	X
17.10.2023	X	X
21.11.2023	X	X
22.01.2024		X

Reason for Surrendering

The geological and geophysical evaluation conducted during the initial licensing period did not reveal any prospects demonstrating the risk and volume potential necessary to meet the technical and economic criteria for justifying a positive drilling decision.

2 Database overviews

The PL1107 license common database was approved after ECMC meeting #1.

2.1 Seismic data

The seismic database is listed in Table 2.1 and shown in Figure 2.1.

The initial database utilized for APA 2020 interpretation was BG1102, covering nearly the entire PL1107 license area, with only full-fold data available within the license. The survey orientation is 119 degrees relative to the CGG17 N-S dataset.

CGG17M01 survey covering 60-70% of PL1107; however, it lacks coverage of any wells located east of the license area.

CGG18M01 was employed to map the faults and key horizons within PL1107, providing complete coverage of the license area. Additionally, it extends into neighbouring licenses to the south and southwest.

The results from CGG23M01 DAZ 3D have demonstrated a substantial enhancement in structural and fault imaging across all levels, accompanied by improvements in signal-to-noise ratio, event coherence, seismic bandwidth, and resolution. Increased wavelet stability and stationarity further support accurate seismic-to-well ties, while enhanced amplitude fidelity provides greater confidence in reservoir characterization. These advancements have led to a more refined interpretation of the deep Pre-BCU targets.

Table 2.1 Seismic database

Seismic survey	NPDID	Type	Quality
BG1102	7390	3D	Moderate
CGG17M01	8332, 7984, 8128, 8179, 8194, 8252	3D	Good
CGG18M01	7984, 8128, 8179, 8194, 8195, 8196, 8252, 8332	3D	Good
CGG22 Phase-1 NVG DAZ	7984; 8128; 8179; 8194; 8195; 8196; 8252; 8332; 20001; 21001	3D	Good
CGG23M01_NVG21PH2	7984; 8128; 8179; 8194; 8195; 8196; 8252; 8332	3D	Very Good

* Reported in DISKOS

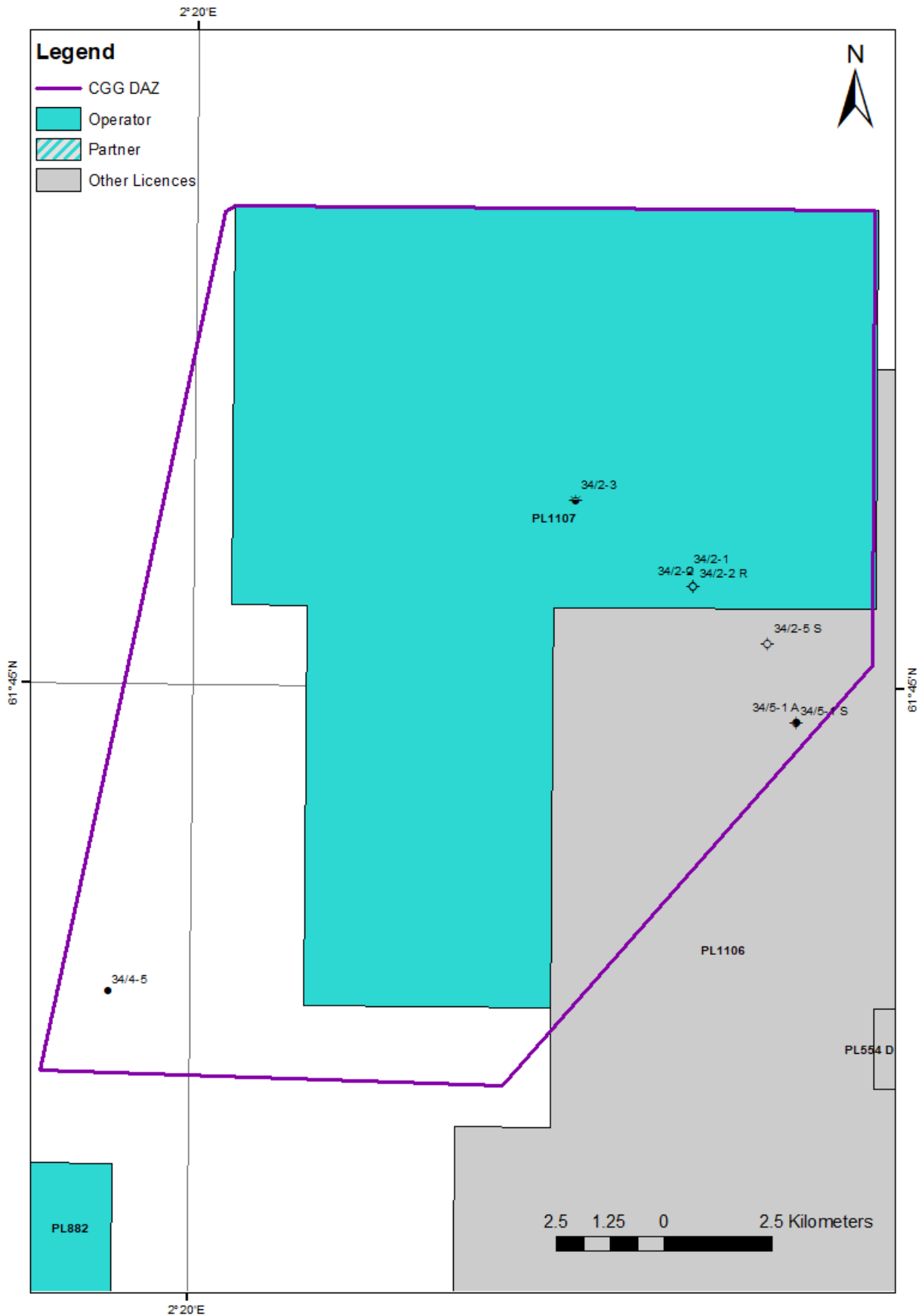


Figure 2.1 Seismic and well database

2.2 Well data

The wells presented in Table 2.2 have been used for studies and evaluation of the prospectivity in PL1107.

Table 2.2 Common Well database

Well Name	NPDID	Purpose (Bio=Biostrat, R=Rock Physics, FIS=Fluid inclusion, G=Geology, GC = Geochemistry)
34/2-2 R	497	B, G, R, GC
34/2-3	421	B, G, R, GC
34/2-4	467	B, G, GC
34/2-5 S	8335	B, G, R, GC
34/3-1 S	5811	B , G, GC
34/4-1	422	G, GC
34/4-5	37	B, G, R, GC
34/5-1 S	6307	B, G, GC
34/5-1 A	6352	B, G, GC
34/5-2 S	8448	B, G, GC
34/6-1 S	4561	G, GC
34/6-2 A	7059	G, GC
34/6-2 S	6971	G, GC
34/6-3 A	7587	G,GC
34/6-3 S	7468	G, GC

3 Results of geological and geophysical studies

A number of G&G studies were undertaken prior to the autumn of 2023. Table 3.1 summarizes the license plans and G&G studies performed.

A number of G&G studies were performed in the licence. Table 3.1 provides a summary.

Table 3.1 Summary of Work Programme Scope and outcome

Action	Comments	Outcome
Reprocessing/Seismic conditioning	Full reprocessing of the CGG survey NVG (dual azimuth)	Very significant improvement in imaging
Electromagnetic Feasibility	Proprietary study by Geonautika	Low chance of success that CSEM will significantly derisk prospectivity
Rock physics and AVO modelling	Proprietary study of key wells with IKON Science	Database of calibrated seismic responses in all potential reservoirs
Basin modelling	Proprietary study by DSP Geoscience	Interaction of Marulk and Pancake Basins. Timing of HC expulsion
Lower Jurassic Stratigraphy and depositional environment	Proprietary study by Skolithos	Improved understanding of distribution and facies of Lower Jurassic reservoirs
Top Seal Strength	Proprietary study by Merlin Energy Resources	Mechanical fracturing is not the cause of Top Seal Failure in the area
Structural Study	Proprietary study by Haakon Fossen (UIB)	Structural model for Whaler prospect
Seismic interpretation	Detailed interpretation of all potential reservoir intervals	Prospects with small GRV
Prospect Evaluation	Volumes and risks	Main risk in the area is Top Seal where seal is Lower Cretaceous

Reprocessing of the CGG 3D North Viking Graben (NVG) seismic which was acquired between 2014 and 2020 was arguably the most important contribution of the work program and the prospect evaluation. Most of the prospects identified require some element of side and base seal, for which a good understanding of stratigraphy is necessary. The improved temporal resolution and more focussed imaging gave significant insight into the stratigraphic juxtapositions which were needed for proper evaluation of the geological risks. The reprocessing included derivation of a detailed seismic velocity model for depth migration. The same model was used for depth conversion and computation of Gross Rock Volume.

Basin Modelling. The main structural element in PL 1107 is the so called 'Amoco High', penetrated by well 34/2-3 in 1981. The well was dry with shows in the reservoir and through the whole overburden, indicative of a failed top seal. The Basin modelling study provided useful insight into the timing of initial charge of the Amoco High from which an estimate of the likely timing of breach could be made.

Lower Jurassic Stratigraphy. The main Lower Jurassic reservoirs are within the Dunlin and Statfjord Gp. Deposition of the Cook Fm in the Dunlin is restricted geographically and hence the understanding provided by the reservoir study was important for evaluation of Cook Fm prospects.

The top seal strength study showed that the top seal failure on the Amoco High was probably not due to mechanical failure, but rather due to capillary leakage of a gas phase. This led to the conclusion that any re-sealing of the blown trap was unlikely to be sufficient to withhold a commercial hydrocarbon column.

4 Prospect update report

Prospects and Leads Applied for APA2020

Several prospects and leads were identified at multiple stratigraphic levels in the APA2020 application Figure 4.1 .

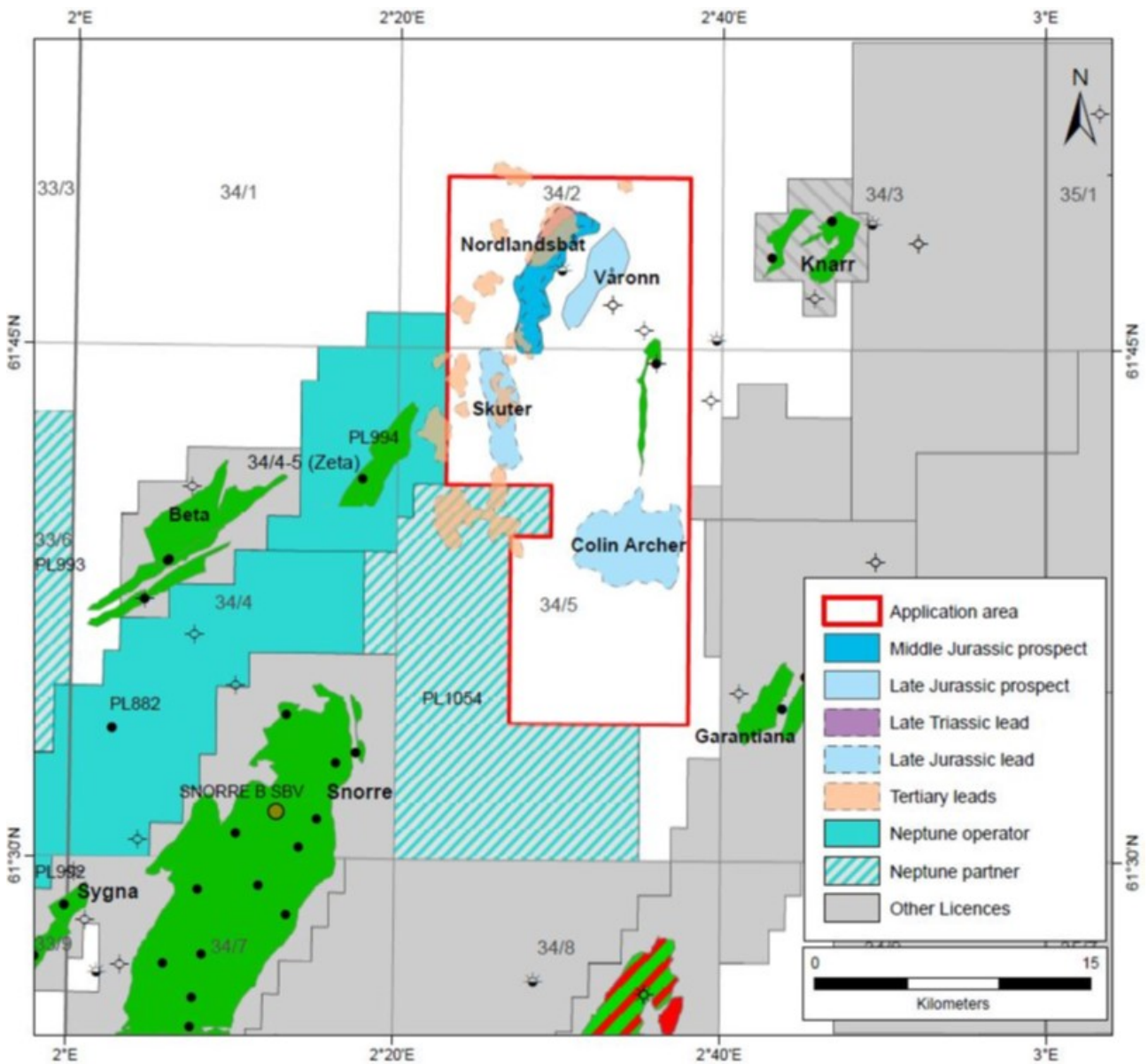


Figure 4.1 Prospects and Leads from the APA2020 Application
Structural and Stratigraphic traps in Triassic, Jurassic and Tertiary strata.

The PL1107 application focused on the Jurassic and Triassic Nordlandsbåt and Vårønn prospects on Amoco High Figure 4.1. Table 4.1 lists the resource potential of the Nordlandsbåt and Vårønn prospects as evaluated in 2020.

Table 4.1 Resource potential of the Nordlandsbåt and Vårønn prospects

Prospect/Lead	Effective reservoir	Closure definition	Timing and Migration	Seal and Retention	gPOS	Rec oe. Mmboe		
						P90	Mean	P10
Nordlandsbåt (Statfjord)	0,7	0,7	0,85	0,6	25%	25	60	90
Vårønn (Lunde Fm)	0,7	1	1	0,1	7%	2	10	20

■ Lower Jurassic
 ■ Hegre Gp

During the work program the gPos of both has been reduced significantly for the reasons described below.

Nordlandsbåt was interpreted to be a stratigraphic trap in Lower Jurassic (Statfjord Gp) on the west flank of the Amoco High. The prospect is downdip of the dry well 34/2-3, which entered Triassic Lunde Fm directly below Lower Cretaceous shales. There are good oil shows in the Lunde Fm and the well is believed to have penetrated a blown trap. After re-mapping of Nordlandsbåt on the new seismic, CGG2301, it was concluded that there is no Statfjord Gp reservoir at Nordlandsbåt, and that the underlying Triassic is most likely in direct pressure communication with well 34/2-3. Nordlandsbåt is reduced to status of Lead.

Vårønn is a dip closure at the crest of the Amoco High, up-dip of the same well, 34/2-3. Re-mapping on new seismic showed that Vårønn is in Triassic Lunde Fm and not in the Mime Fm as believed at the time of application. The Top Seal Integrity Study from 2022 showed that it is unlikely that the top seal failure at this well will have subsequently healed and be capable of withholding a hydrocarbon column. For this reason, the gPos of Vårønn has been reduced from 26% (APA2020) to 7%.

The two leads in the Upper Jurassic, Colin Archer and Skuter Figure 4.1, could not be further matured and remained as leads. Defined by seismic amplitude anomalies within a thickened Upper Jurassic package, seismic data analysis (SDA) found no evidence of reservoir development within the Upper Jurassic and the seismic anomalies were interpreted to be due to a soft shale.

The Tertiary injectites were the subject of detailed seismic modelling and interpretation. The models showed that hydrocarbon bearing porous sands within the Eocene at these depths would be seismically soft. Seismic interpretation showed that the sands are hard compared to the encasing shales, from which it was concluded that the sands are either tight and/or water bearing. The main risk element for this play is top seal; vertical migration is a further significant risk element.

Prospects Mapped after Award

The prospects mapped after award are shown Figure 4.2. They are all in Lower Jurassic stratigraphy, and the reservoirs are within the Dunlin and Statfjord groups.

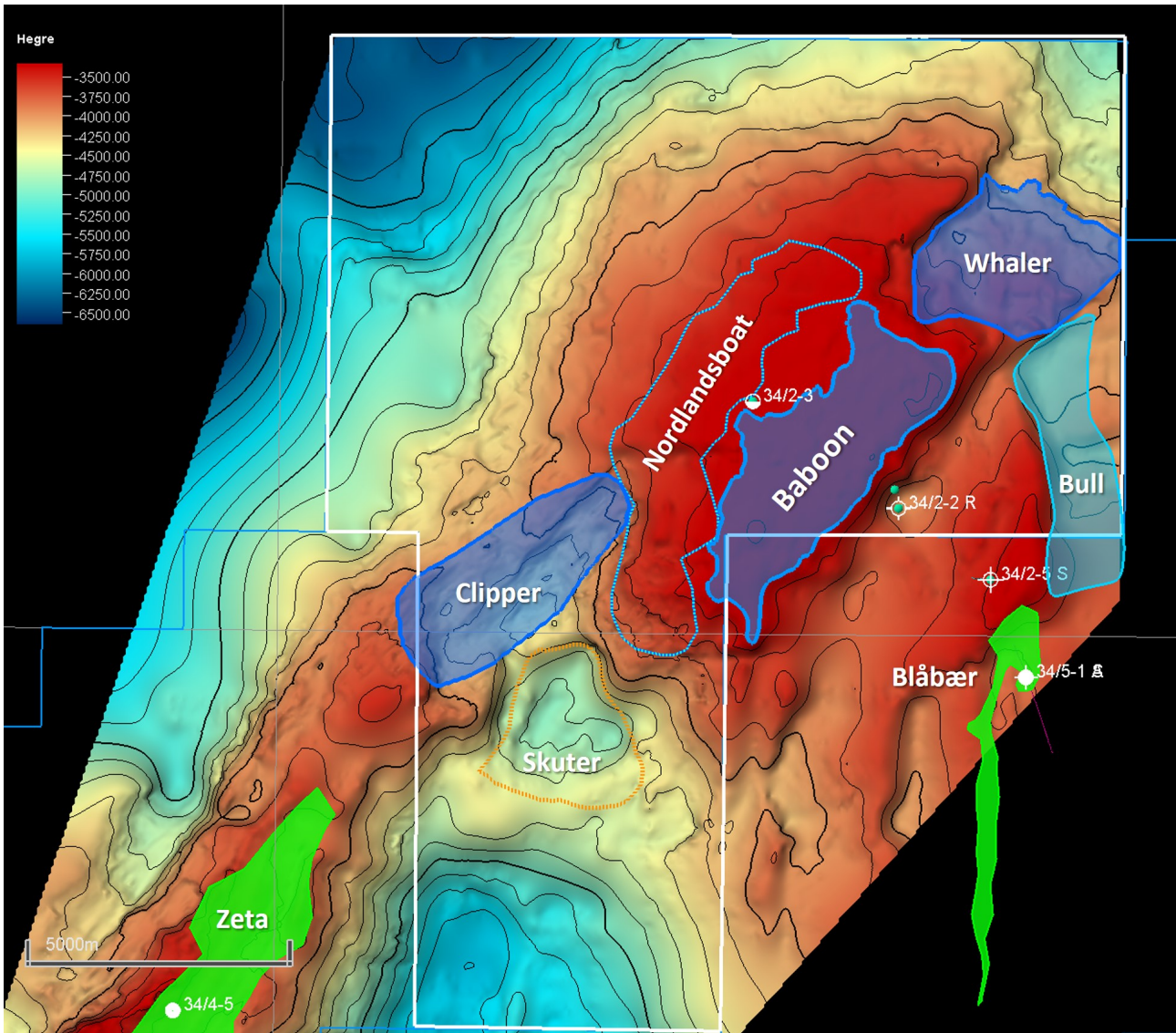


Figure 4.2 Top Statfjord Group

Figure 4.2 shows a map of the top of the Statfjord Group, with the outlines of the three prospects, Clipper, Whaler, Baboon and Bull. Table 4.2 presents the resource potential of Clipper, Whaler, Baboon, and Bull prospects as evaluated post-award.

Table 4.2 Resource potential of Clipper, Whaler, Baboon and Bull prospects

Prospect/Lead	Effective reservoir	Closure definition	Timing and Migration	Seal and Retention	gPOS	+SAAM	Rec oe. Mmboe			
							P90	P50	Mean	P10
Whaler (Statfjord)	0,9	0,7	0,8	0,5	25%	n/a	1.4	8.6	9.4	18.4
Clipper East (Cook & Statfjord)	0,8	0,8	0,7	0,5	22%	n/a	6	12.5	13	24.5
Bull (Statfjord)	0,8	0,8	0,5	0,5	16%	n/a	7		21	40
Baboon	0,7	1	1	0,1	7%	n/a	2		10	20

■ Lower Jurassic
 ■ Hegre Gp

Clipper is interpreted to be a complex detachment of Lower Jurassic strata with both Dunlin and Statfjord reservoirs. It lies down-flank from the saddle between the Mort Horst in the south-west, and the Amoco high to the north-east. Although the gross rock volume of Clipper is relatively large, the steep dips and the small column heights which the Lower Cretaceous shales are likely to withhold result in non commercial resources. Side and Base seal are also important risk elements for Clipper.

Whaler is a Statfjord Group prospect on a relay ramp structure on the north-east flank of the Amoco High. The trap is well defined, but relies upon side and base seal against the Triassic. There is uncertainty with respect to the stratigraphy of the Triassic at this location, but it is known that the Lunde Formation present in offset wells is a porous sand of reservoir quality and unlikely to be an effective side-seal. Whaler appears to be juxtaposed deeper Triassic stratigraphy, for example Lomvi or Teist formations, which are believed to be non reservoir at this location and might therefore form an effective seal. Although evaluated as a Statfjord prospect, there may be accommodation space for some Cook formation reservoir at Whaler, but the interval is thin and Cook formation is certainly absent at the crest.

Bull prospect is a down-thrown faulted trap, to the east of the dry Raudåsen structure penetrated by well 34/2-5 S. The reservoirs are in the Dunlin and Statfjord groups. Bull relies upon fault seal to the west along the whole structure, and charge is a risk given that Raudåsen was interpreted by the operator to have failed due to absence of charge.

Whaler prospect may not have the largest volume, but its higher POS, makes it the primary focus within PL1107 for our Tech ec evaluation (Table 4.3).

Table 4.3 NPD table
Whaler Statfjord Prospect

Block 34/2 & 34/5		Whaler Statfjord		Discovery/Prospect/Lead		Prospect		Prospect ID (or New)		NPD approved (Y/N)	
Play name		Whaler Statfjord		Outside play (Y/N)		Prospect		Prospect ID (or New)		NPD will insert value	
NPD will insert value		Var Energi		Reference document		Structural/stratigraph		Water depth (m MSL) (>0)		Assessment year	
Oil		Lampen Spur		Type of trap		Structural/stratigraph		Water depth (m MSL) (>0)		Seismic database (2D/3D)	
1 of 1		Stafford Gp		Source Rock, chrono primary		High (P10)		Associated phase		High (P10)	
Main phase		Base, Mode		Source Rock, chrono primary		Base, Mean		Low (P50)		Base, Mean	
Low (P50)		4.00		Source Rock, chrono primary		4.39		0.11		0.73	
Oil [10^8 Sm^3] (>0.00)		1.95		Source Rock, chrono secondary		1.28		0.02		0.21	
Gas [10^8 Sm^3] (<0.00)		Stafford Gp		Source Rock, litho primary		3.31		Source Rock, litho secondary		0.58	
Oil [10^8 Sm^3] (<0.00)		Stafford Gp		Source Rock, litho secondary		0.25		Oil & Gas case (0.00-1.00)		Retention (P4) (0.00-1.00)	
Gas [10^8 Sm^3] (>0.00)		0.70		Charge (P3) (0.00-1.00)		0.80		0.50			
Oil [10^8 Sm^3] (>0.00)		High (P10)									
Oil [10^8 Sm^3] (>0.00)		34.30									
Oil [10^8 Sm^3] (>0.00)		2.4									
Oil [10^8 Sm^3] (>0.00)		0.9									
Oil [10^8 Sm^3] (>0.00)		50									
Oil [10^8 Sm^3] (>0.00)		165									
Oil [10^8 Sm^3] (>0.00)		0.366									
Oil [10^8 Sm^3] (>0.00)		0.439									
Oil [10^8 Sm^3] (>0.00)		0.292									
Oil [10^8 Sm^3] (>0.00)		0.19									
Oil [10^8 Sm^3] (>0.00)		0.32									
Oil [10^8 Sm^3] (>0.00)		0.16									
Oil [10^8 Sm^3] (>0.00)		0.19									
Oil [10^8 Sm^3] (>0.00)		0.40									
Oil [10^8 Sm^3] (>0.00)		0.30									
Oil [10^8 Sm^3] (>0.00)		0.75									
Oil [10^8 Sm^3] (>0.00)		0.65									
Oil [10^8 Sm^3] (>0.00)		100									
Oil [10^8 Sm^3] (>0.00)		158									
Oil [10^8 Sm^3] (>0.00)		248									
Oil [10^8 Sm^3] (>0.00)		0.20									
Oil [10^8 Sm^3] (>0.00)		0.28									
Oil [10^8 Sm^3] (>0.00)		0.20									
Oil [10^8 Sm^3] (>0.00)		0.28									
Oil [10^8 Sm^3] (>0.00)		0.40									
Oil [10^8 Sm^3] (>0.00)		0.20									
Oil [10^8 Sm^3] (>0.00)		0.28									
Oil [10^8 Sm^3] (>0.00)		0.40									
Oil [10^8 Sm^3] (>0.00)		120									
Oil [10^8 Sm^3] (>0.00)		620									
Oil [10^8 Sm^3] (>0.00)		Porosity > 0.13									
Oil [10^8 Sm^3] (>0.00)		Vehale < 0.4									
Oil [10^8 Sm^3] (>0.00)		3.									
Oil, Gas or O&G case:		Prospect name	Whaler Statfjord	Discovery/Prospect/Lead	Outside play (Y/N)	Prospect		Prospect ID (or New)		NPD approved (Y/N)	
This is case no.:		Reported by company	Var Energi	Reference document						Assessment year	2023
Resources IN PLACE and RECOVERABLE		Structural element	Lampen Spur	Type of trap		Structural/stratigraph		Water depth (m MSL) (>0)	340	Seismic database (2D/3D)	3D
Volumes, this case		Main phase		Associated phase							
In place resources		Low (P50)		Base, Mean		High (P10)		Low (P50)		Base, Mode	
Recoverable resources		Oil [10^8 Sm^3] (>0.00)	4.00	4.39		3.31		0.11		0.68	1.47
Reservoir Chrono (from)		Gas [10^8 Sm^3] (<0.00)	1.95	1.28				0.02		0.18	0.58
Reservoir Chrono (to)		Oil [10^8 Sm^3] (>0.00)	Stafford Gp	Source Rock, chrono primary		Tithonian		Source Rock, litho primary		Drainage Fm	Barremian
Probability (fraction)		Rhaelian	Stafford Gp	Source Rock, chrono secondary		Oxfordian		Source Rock, litho secondary		Heather Fm	Asgard Fm
Total (oil + gas + oil & gas case) (0.00-1.00)	0.90	Oil case (0.00-1.00)	0.25	Gas case (0.00-1.00)				Oil & Gas case (0.00-1.00)			
Reservoir (P1) (0.00-1.00)		Trap (P2) (0.00-1.00)	0.70	Charge (P3) (0.00-1.00)				Retention (P4) (0.00-1.00)	0.50		
Parameters:		Base									
Depth to top of prospect (m MSL) (> 0)			34.30								
Area of closure [km^2] (> 0.0)			2.4								
Reservoir thickness [m] (> 0)			4.1								
HC column in prospect [m] (> 0)			50								
Gross rock vol. [10^8 m^3] (> 0.000)			165								
Net / Gross fraction (0.00-1.00)			0.366								
Porosity fraction (0.00-1.00)			0.439								
Permeability [mD] (> 0.0)			0.292								
Water Saturation [fraction] (0.00-1.00)			0.19								
Bg [Rn3/Sm3] (< 1.0000)			0.16								
f/Bo [Sm3/Sm3] (< 1.00)			0.30								
GOR, free gas [Sm ³ /Sm ³] (> 0)			0.75								
GOR, oil [Sm ³ /Sm ³] (> 0)			0.65								
Recov. factor, oil main phase [fraction] (0.00-1.00)			100								
Recov. factor, gas ass. phase [fraction] (0.00-1.00)			158								
Recov. factor, gas main phase [fraction] (0.00-1.00)			248								
Recov. factor, liquid ass. phase [fraction] (0.00-1.00)			0.20								
Temperature, top res [°C] (>0)			0.28								
Pressure, top res [bar] (>0)			0.40								
Cut off criteria for N/G calculation											

5 Technical evaluation

Whaler prospect development solution for the P50 Volumetric case (Figure 5.1 Figure 5.2)

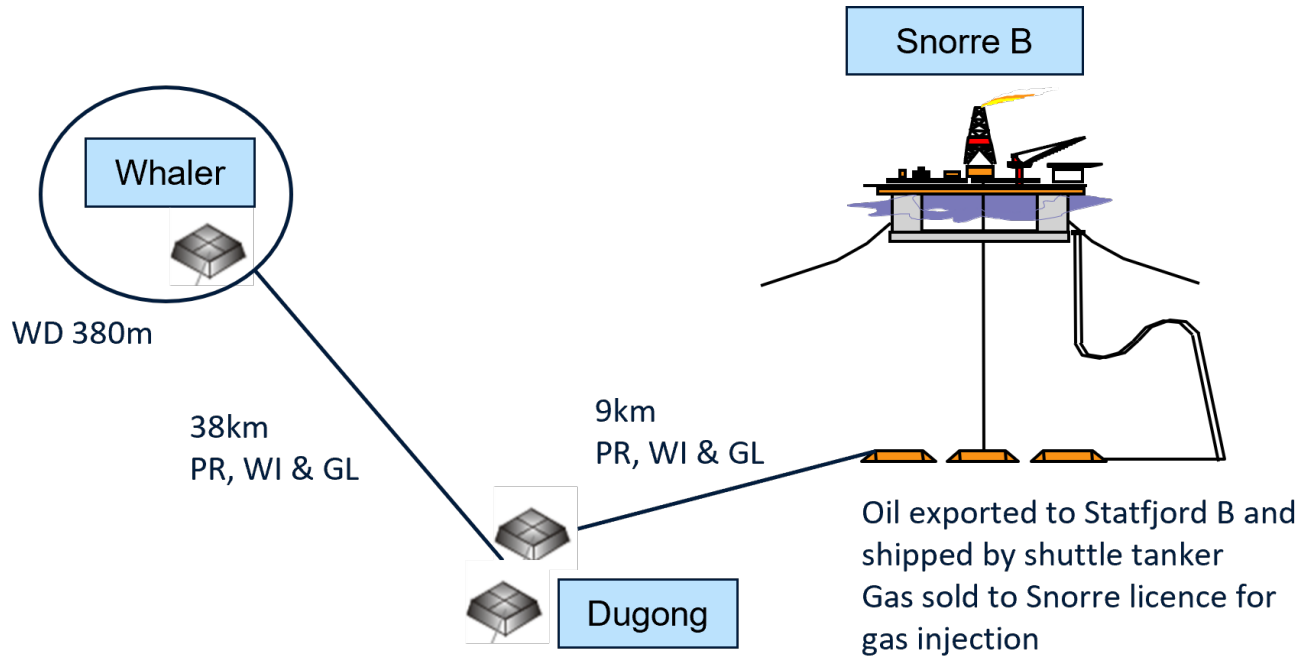


Figure 5.1 Whaler development concept

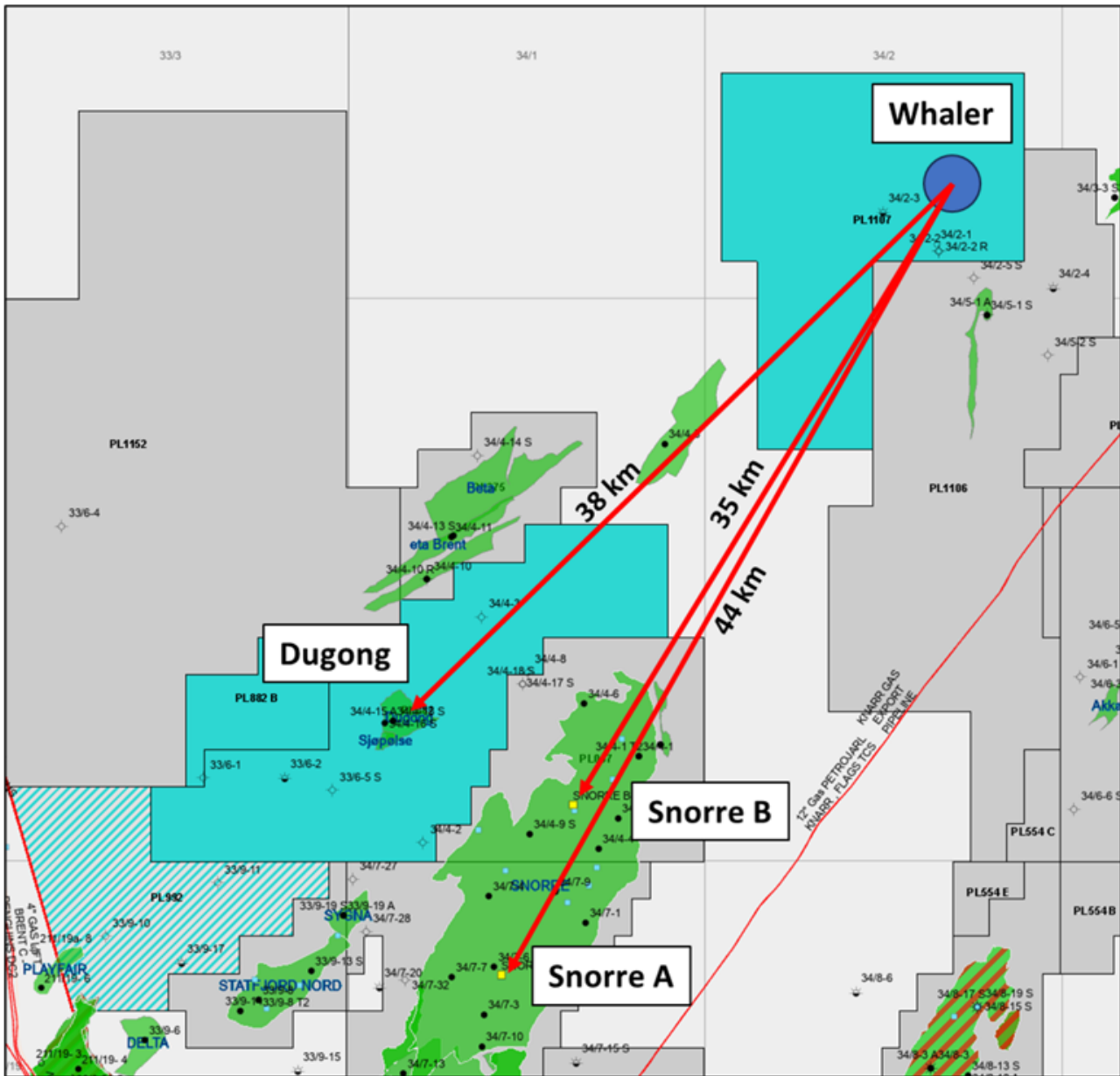


Figure 5.2 Location map

- One off 4-slot template with 1 OP and 1 WI; gas lift
- Subsea tieback via Dugong SPS to SNB (Snorre B host platform)
- Whaler start-up 1Q 2030 (9 years of production)
- CAPEX based on Dugong estimates

Key risks/opportunities

- Dugong development/SNB lifetime extension/PfS cost on Snorre B

Key dates (years from exploration well):

Table 5.1 Whaler development dates

	Exploration	FID	1st Production
P50	2025	Q2 2026	2030

6 Conclusion

The prospectivity within PL1107 has been thoroughly evaluated with the highest quality seismic data and a significant number of studies performed. All leads and prospects identified in the APA and during the license period have been evaluated and the volume potential of the identified prospects shows limited recoverable resources and the technical economical evaluation shows poor metrics even with optimistic G&G input parameters & an assumed tie-back via Dugong.

The Whaler prospect exhibits characteristics of a truncation trap within the Lower Jurassic strata. Its primary reservoir is in Statfjord Group, although there is a possibility of Cook erosion or absence. The setting is characterized by a relay ramp, indicating a complex structure that is faulted, thus posing a risk of compartmentalization. Estimated resources range from 0.98 to 24.7 million barrels of oil equivalent (P90 to P10), with a Gross Prospective Oil Initially In Place (GPOS) of 25%.