Relinquishment report

PL 965

Lundin Energy Norway

In cooperation with Lundin Energy Norway

SPIRIT ENERGY

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1 License history

PL 965 comprises 586 km^2 in blocks 7323/5 and 6. The license is located in the Hoop area northwest of the Wisting discovery.

PL965 was awarded as part of the 24th Licensing Round on June 22nd in 2018, with a six years initial license period to Lundin Energy Norway (60% and Operator) and Spirit Energy Norway AS (40%).

The work commitment was to acquire new 3D-seismic, perform EM feasibility studies and decide on drill or drop within 3 years (22.06.2021).

The 24th Round application identified one main prospect named Medoc. The prospect had Cretaceous, Jurassic and Triassic reservoir targets, with main target in the Realgrunnen SGp. The application also comprised several leads with reservoirs of Triassic and Jurassic age in the area applied for.

All work commitment in the license have been fulfilled. The Medoc prospect has been evaluated as not attractive enough (volume vs risk) for a positive drill decision. No drilling candidates have been identified in the license acreage, and the license partnership decided to relinquish the area in June 2021.

Meetings held are listet below in Table 1.1.

Table 1.1 License Committee meetings held in PL965.

Committee	Date
MC/EC combined	10.10.2018
MC/EC combined	15.11.2018
EC work meeting	12.02.2019
MC/EC combined	15.11.2019
MC/EC combined	17.11.2020
MC/EC combined	08.06.2021

2 Data base overview

2.1 Seismic data

The common seismic database is listed in Table 2.1 and 3D seismic coverage shown in Fig. 2.1. The common 3D seismic database for the license consist of Hoop3D data inside the PL965 license. The license also acquired the LN19001 survey in 2019 targeting the Medoc prospect. LN19001 data was processed by DUG.

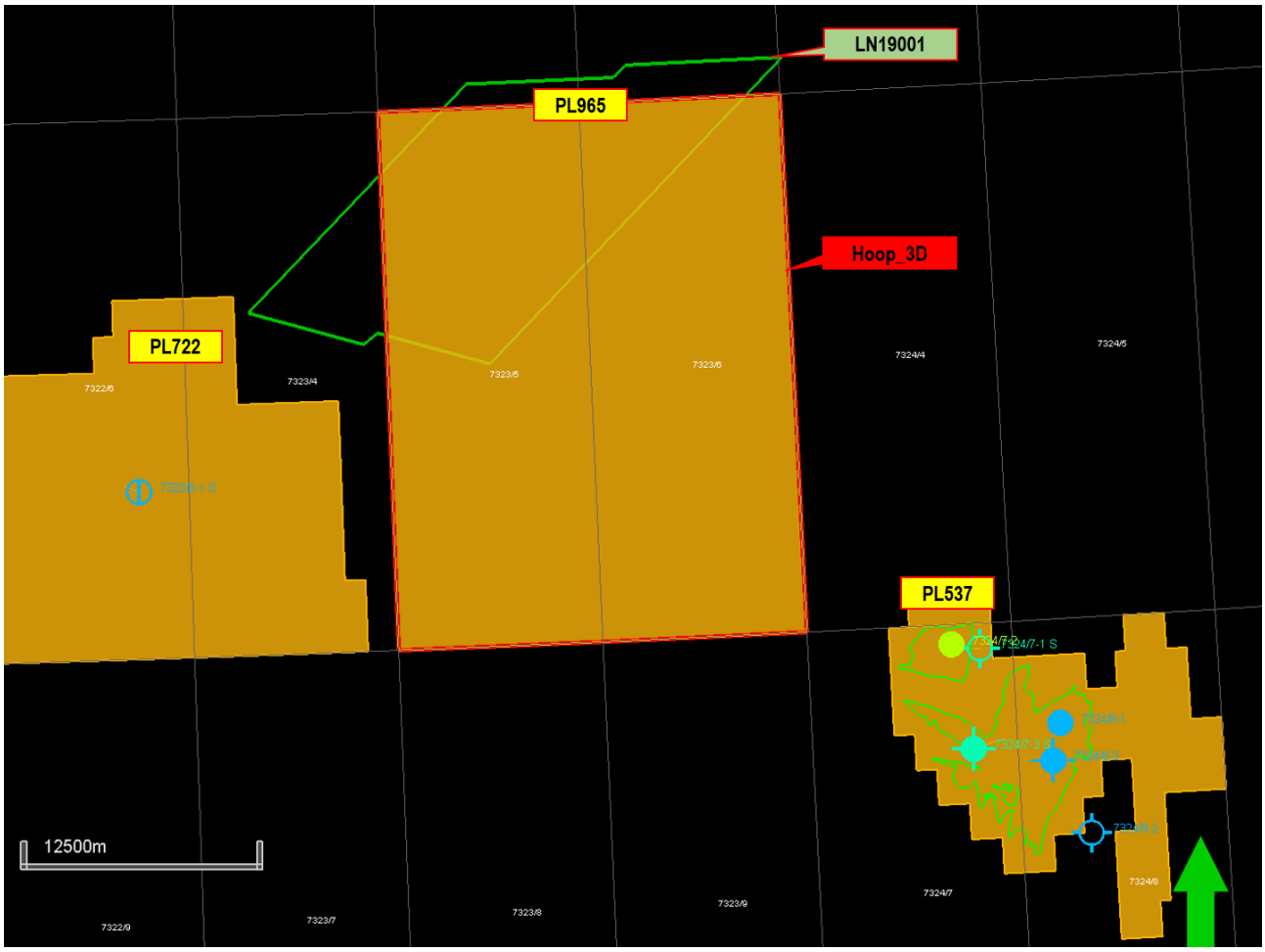

Fig. 2.1 License common 3D seismic database.

Table 2.1 Seismic database PL965.

3D seismic surveys	NPD ID	Area (sqkm) included	Marked available (multiclient)	Processing year
Hoop3D merge underlying survey: Hoop Fault Complex 3D	7424	586	Yes	2016
LN19001	9045	192	No	2019-2020

2.2 Well data

The common well database is listed in Table 2.2. The wells have been used for seismic tie, correlation, reservoir property evaluation, geochemical and structural analysis studies.

Table 2.2 PL965 well database.

Well	Name	PL	Operator	Year	Status	NPDID
7321/7-1	Fingerdjupet	140	Mobil	1988	Gas shows	1284
7321/8-1	Fingerdjupet	141	Hydro	1987	Shows	1070
7321/9-1	Fingerdjupet	141	Hydro	1988	Shows	1339
7222/1-1	Aurelia	226	Eni	2016	Dry	7987
7324/8-1	Wisting	537	OMV	2013	Oil	7221
7324/7-2	Hanssen	537	OMV	2014	Oil	7450
7324/8-2	Bjaaland	537	OMV	2015	Shows	7681

7324/9-1	Mercury	614	Statoil	2014	Gas	7527
7324/10-1	Alpha	162	Statoil	1989	Shows	1411
7325/4-1	Gemini North	855	Statoil	2017	Oil/Gas	8211
7324/2-1	Apollo	615	Statoil	2014	Dry	7481
7325/1-1	Atlantis	615	Statoil	2014	Gas	7501
7322/7-1	Scarecrow	852	Spirit Energy	2018	Dry	8498
7324/7-1 S	Wisting Alternative	537	OMV	2013	Shows	7222
7221/12-1	Svanefjell	659	Aker BP	2018	Gas discovery / oil shows	8441
7324/6-1	Sputnik	855	Equinor	2019	Oil	8741
7324/3-1	Intrepid Eagle	615	Equinor	2018	Gas	8568

3 Geological and geophysical studies and results

CSEM feasiblity study

A CSEM feasibility study has been conducted as part of the license work program. EM feasibility studies concluded that the Medoc prospect was not suited for de-risk with CSEM acquisition due to geologically complex overburden.

LN19001 aquisition and processing

The license acquired a high-resolution 3D seismic dataset covering the Medoc prospect in autumn 2018. The data was processed by DUG and final deliveries were received and approved by the license partnership in June 2019. High resolution imaging of reservoir architecture was achieved as well as improved fault imaging in the shallow sections. No conditioning was needed prior to AVO analysis on the dataset. PSDM was tested on LN19001 but option was not activated.

LN19001 seismic interpretation

Medoc prospect defining horizons were re-interpreted on LN19001 data. A strong soft reflector (interpreted on Hoop3D seismic as Reke Mb reservoir) in the Medoc block was re-interpreted on LN19001 as a Snadd Norian reservoir reflector, this led to re-definition of the Medoc prospect (4 Prospect update report).

AVO and rock physics analysis

An AVO feasibility study has been conducted for the license by DIG Science. Results indicate that the observed soft amplitudes on seismic data (Hoop3D and LN19001) in the two prospects (Medoc Stø and Medoc Snadd Norian) can be explained by diagenesis.

Medoc fault seal and caprock analysis

Fault seal analysis has been conducted on the Medoc prospect. A structural model was generated in Petrel and critical faults have been investigated. Juxtaposition between Stø and Snadd Norian reservoir containers has been identified on seismic, and fault seal would be required for HC fill deeper than structural spill in Stø Fm.

Fault seal analysis study prognosed Stø Fm to be filled until the spill point due to the presence of juxtaposition seals (Stø against Upper Jurassic and Early Cretaceous shales). For the Snadd Norian target the weakest fault leakage point was identified close to apex of structure, and across fault leakage into Stø Fm reservoir was prognosed to occur for hydrocarbon columns higher than 140 m oil and 80 m gas.

Maximum injection pressure for Stø and Snadd Norian reservoir targets has been investigated and drilling across faults is deemed to be permissible.

4 Prospect update report

The primary prospectivity from the 24th Round application was one Upper Triassic to Middle Jurassic prospect named Medoc. The outline of the identified prospect and leads is shown in Fig. 4.1 , and the prospect and leads resource potential at time of application is given in Table 4.1. Table 4.2 lists the revised license resource potential at time of relinquishment.

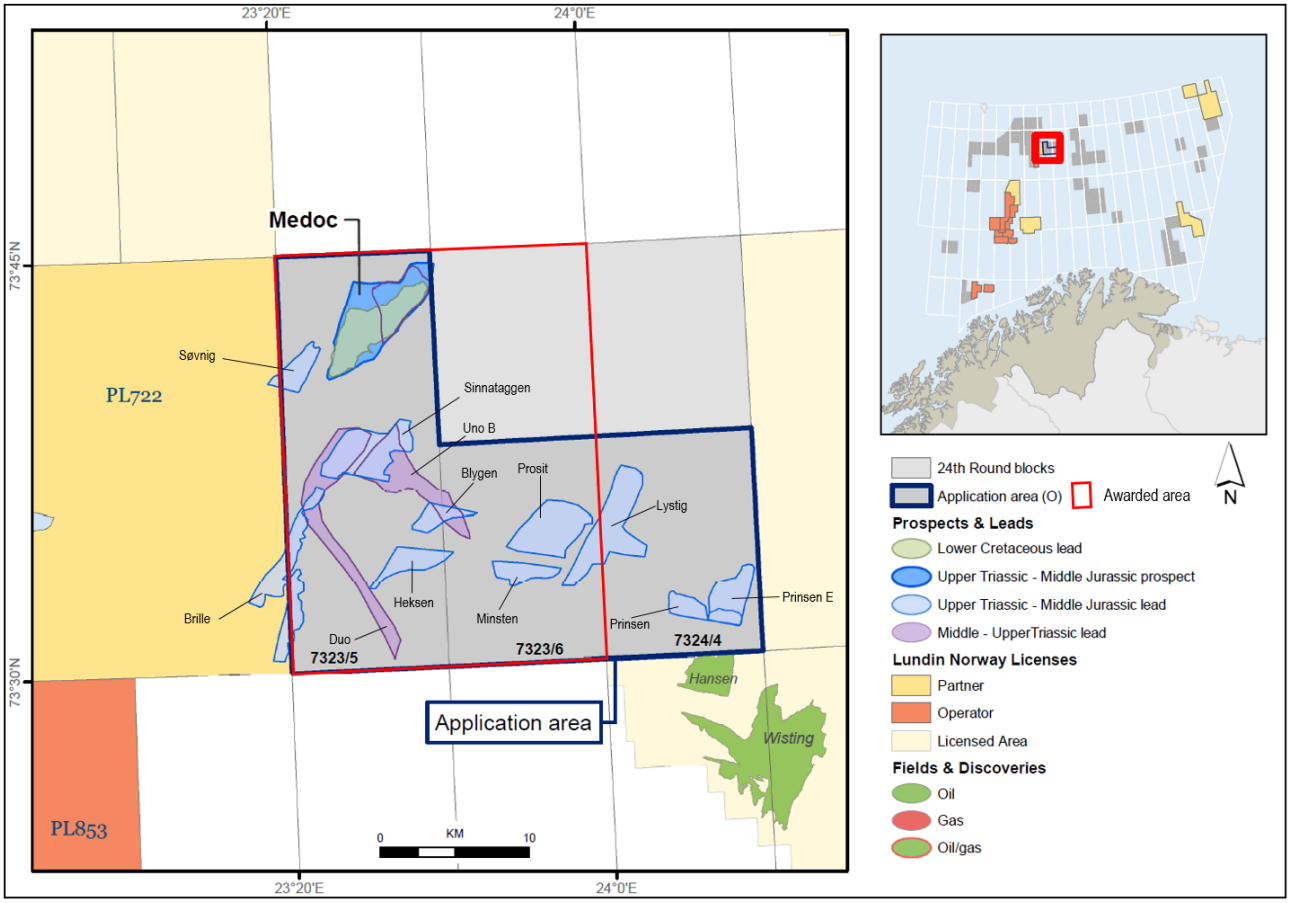

Fig. 4.1 Prospect and lead outlines at time of application.

Table 4.1 Resource potential (NPD table 2, 24R).

Discovery/ Prospect/ Lead name [1]	D/ P/ L [2]	Case (Oil/ Gas/ Oil&Gas) [3]	Unrisked recoverable resources [4]						Probability of discovery [5] (0.00 - 1.00)	Resources in acreage applied for [%] [6] (0.0 - 100.0)	Reservoir		Nearest relevant infrastructure [8]	
			Oil [10^6Sm^3] (>0.00)			Gas [10^9Sm^3] (>0.00)					Litho-/ Chrono-stratigraphic level [7]	Reservoir depth [m MSL] (>0)	Name	Km (>0)
			Low (P90)	Base (Mean)	High (P10)	Low (P90)	Base (Mean)	High (P10)						
Medoc	P	Oil	13.00	32.00	58.00				0.19	100.0	Stø Fm/mid Jurassic	790	Snøhvit	250
Blygen (Stø)	L	Oil	0.10	3.00	6.00				0.24	100.0	Fruholmen Fm/mid Jurassic	720	Snøhvit	250
Brille (Stø)	L	Oil	0.04	2.00	4.00				0.24	50.0	Stø Fm/mid Jurassic	650	Snøhvit	250
Brille (Fruholmen)	L	Oil	0.04	2.00	4.00				0.24	50.0	Fruholmen Fm/mid Jurassic	730	Snøhvit	250
Heksen (Stø)	L	Oil	0.04	2.00	4.00				0.24	100.0	Stø Fm/mid Jurassic	740	Snøhvit	250
Lystig (Fruholmen)	L	Oil	0.04	4.00	10.00				0.24	100.0	Fruholmen Fm/mid Jurassic	850	Snøhvit	250
Lystig (Stø)	L	Oil	0.10	1.00	3.00				0.24	100.0	Stø Fm/mid Jurassic	785	Snøhvit	250
Minsten (Stø)	L	Oil	1.00	2.00	4.00				0.24	100.0	Stø Fm/mid Jurassic	805	Snøhvit	250
Prinsen East (Fruholmen)	L	Oil	1.00	4.00	7.00				0.24	100.0	Fruholmen Fm/mid Jurassic	850	Snøhvit	250
Prinsen (Stø)	L	Oil	2.00	3.00	5.00				0.24	100.0	Stø Fm/mid Jurassic	780	Snøhvit	250
Prosit (Fruholmen)	L	Oil	0.04	1.00	1.00				0.24	100.0	Fruholmen Fm/mid Jurassic	850	Snøhvit	250
Prosit (Stø)	L	Oil	0.04	1.00	1.00				0.24	100.0	Stø Fm/mid Jurassic	756	Snøhvit	250
Sinnataggen (Fruholmen)	L	Oil	0.07	2.00	5.00				0.24	100.0	Fruholmen Fm/mid Jurassic	750	Snøhvit	250
Sinnataggen (Stø)	L	Oil	0.10	3.00	6.00				0.24	100.0	Stø Fm/mid Jurassic	670	Snøhvit	250
Søvning (Fruholmen)	L	Oil	0.07	1.00	2.00				0.24	100.0	Fruholmen Fm/mid Jurassic	880	Snøhvit	250
Søvnig (Stø)	L	Oil	1.00	4.00	7.00				0.24	100.0	Stø Fm/mid Jurassic	810	Snøhvit	250
Medoc Carnian	L	Oil	1.00	3.00	4.00				0.09	100.0	Snadd/ Carnian	1000	Snøhvit	251
Uno	L	Oil	1.00	4.00	7.00				0.09	100.0	Snadd/ Carnian	900	Snøhvit	253
Duo	L	Oil	3.00	6.00	9.00				0.09	100.0	Snadd/ Carnian	1500	Snøhvit	254

Table 4.2 Resource potential (NPD table 2, 2021).

Discovery/ Prospect/ Lead name [1]	D/ P/ L [2]	Case (Oil/ Gas/ Oil&Gas) [3]	Unrisked recoverable resources [4]						Probability of discovery [5] (0.00 - 1.00)	Resources in acreage applied for [%] [6] (0.0 - 100.0)	Reservoir		Nearest relevant infrastructure [8]	
			Oil [10^6Sm^3] (>0.00)			Gas [10^9Sm^3] (>0.00)					Litho-/ Chrono-stratigraphic level [7]	Reservoir depth [m MSL] (>0)	Name	Km (>0)
			Low (P90)	Base (Mean)	High (P10)	Low (P90)	Base (Mean)	High (P10)						
Medoc Stø	P	Oil	6,30	14,20	25,60				0,11	100,0	Stø Fm/Bajocian	810	Hanssen	32
Medoc Snadd Norian	P	Oil	6,80	13,50	21,70				0,12	100,0	Snadd Fm/Norian	860	Hanssen	32

Medoc Prospect

The Medoc structure is defined as a fault delineated 4-way dip closure at top Kolje to top Kobbe fms level. The structure is dipping toward the NW. The Medoc prospect was first defined on Hoop3D seismic dataset with prospectivity in upper Triassic to mid Jurassic Realgrunnen SGp in the Stø and Fruholmen fms. The areal closure and depth to seafloor at Top Stø Fm level is 25km^2 and 455 m respectively. Hekkingen/Fuglen Fm constitute the top seal whereas lateral seal is provided by Cretaceous shales across the prospect main bounding faults. The prospect was amplitude driven, with a structurally conformant amplitude shut off observed in Fruholmen Fm reservoir strata. The amplitude response at top Stø Fm level was relatively dim with general decrease in amplitude response downflank on the structure. The reservoir sequence used in resource estimate was Stø Fm and the Reke Member in a shared container. Targets in the Cretaceous strata and Carnian strata were defined as leads.

The license acquired a high-resolution 3D seismic dataset (LN19001) covering the Medoc prospect in autumn 2018. The prospect was redefined on LN19001 with targets in Stø and Snadd fms in separate reservoir containers Fig. 4.2. The updated reservoir model for the Medoc Snadd Norian prospect resulted in a downgrade of prospect volumes due to prognosed thinner reservoir and reduced reservoir properties.

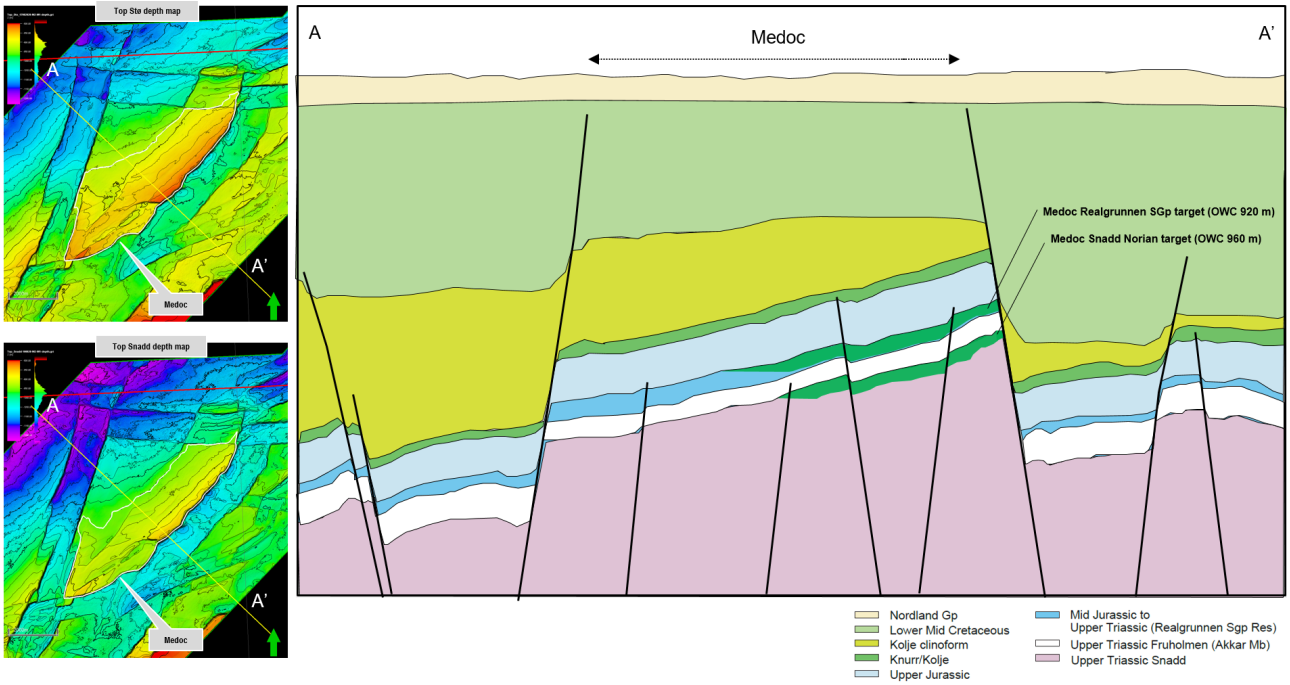

Fig. 4.2 Medoc prospect top reservoir depth map (Stø and Snadd fms) and geo-section trough the Medoc prospect.

Additional targets in the Medoc trap also experienced increased risk due to nearby well results in the Hoop/Fingerdjupet area (several unsuccessful wells testing the lower Cretaceous play did not encounter reservoir and poor reservoir quality encontered in the Snadd Carnian).

Additional prospectivity

The 24th Round application also comprised several DHI supported small structures in the Realgrunnen SGp located in the southern part of the license. Due to limited volume potential none of these leads were considered as potential drilling candidates.

5 Technical evaluation

Technical-economical evaluation of Medoc Stø and Medoc Snadd Norian prospects was performed. These prospects have been evaluated as tie-in candidates to the Wisting field.

6 Conclusion

All work commitments in the license have been fulfilled. The Medoc prospect has been evaluated on newly acquired high resolution 3D seismic dataset as not attractive enough (volume vs risk) for a positive drill decision. Remaining Jurassic and Triassic leads are small. No drilling candidates have been identified in the license acreage. The partnership decided to relinquish the area in June 2021.