

Edison Norge AS Exploration PL1023

Expiry Report February 2021



Table of Contents

1 History of the Production License.....	1
2 Database Overview	3
2.1 Seismic Data	3
2.2 Well Data	4
3 Results of Geological and Geophysical Studies.....	5
4 Prospect Update Report.....	7
5 Technical Evaluations	11
6 Conclusions.....	13

List of Figures

2.1 PL1002 seismic and well database.....	3
4.1 PL1023 prospectivity map.....	7
4.2 Structural maps over Jupiter Prospect.....	8
4.3 Seismic sections over Jupiter Prospect.....	9
4.4 Variance map over Jupiter Prospect.....	9

List of Tables

1.1 Overview of meetings.....	1
2.1 Seismic database.....	4
2.2 Well database.....	4
4.1 Resource potential – NPD Table 2 from application in 2018.....	8
4.2 Resource potential - NPD Table 2, updated 2021	10

1 History of the Production License

PL1023 was awarded 01.03.2019 as a result of APA 2018 to the partnership of Edison Norge AS (Operator) 50%, and Lundin Energy Norway AS 50%.

The license covers an area of 1295 km² within blocks 7123/6, 7124/1, 7124/2, 7124/4, 7124/5, located in the Nysleppen Fault Complex in the Southern Norwegian Barents Sea west of the Bamse Discovery (7124/3-1) and close to the Nucula Discovery (7125/4-1). The average water depth in the license is 300 m.

Within 2 years, the initial phase of the work program in the license, was to perform G&G work, acquire a 3D seismic data and conduct CSEM feasibility study before Drill or Drop decision 01.03.2021.

Within 4 years from award, drill exploration well and decide to concretize (BoK) or drop on 01.03.2023.

Within 6 years from the award, perform conceptual studies and decide on continuation (BoV) or drop before 01.03.2025.

Within 7 years from award, prepare development plan and decide to submit PDO or drop before 01.03.2026.

The PL1023 JV was formally established following a start-up meeting held on 10.05.2019. Several EC & MC meetings during the last 2 years have been organized by the operator, and all the minutes of meetings have been posted on L2S, Table 1.1.

Table 1.1 Overview of meetings

Kick-Off meeting	10.05.2019
EC & MC meeting nr. 1	12.11.2019
EC & MC meeting nr. 2	18.11.2020

Edison Norge AS has as the operator of the former licenses PL595, PL770 and PL850 and as partner PL952 conducted several studies covering the greater Nucula area.

The combined learnings from these licenses has given Edison in depth knowledge of the geology and the prospectivity in this region.

In PL1023 the main exploration potential is seen in the Jupiter prospect, a structural horst block dipping toward west with reservoir section in Realgrunnen SubGp, and secondary targets in the Snadd Fm. Additionally, several small leads have been identified with reservoir in Realgrunnen SubGp.

The work program included selected de-risking studies to address the uncertainty related to the Jupiter Prospect, mainly retention of hydrocarbons and reservoir effectiveness. Even after careful evaluation of the Jupiter Prospect the potential hydrocarbon volumes and associated risk remained below Edison's economic threshold. Therefore, the operator recommended to the partner to drop the license.

The decision was unanimously supported by Lundin Energy Norway.

2 Database Overview

2.1 Seismic Data

The seismic database used for license evaluation and prospect assessment is defined by the common database, and is given in Table 2.1 and Fig. 2.1. It was early identified that the main prospect would be the Jupiter, therefore, the extent of the common database was limited to the northern part of the license area only, covering around 350 km². In the northern part of license, the POL1101 (Bjarmeland 3D) has the best coverage and is of good quality. The southern part is covered by publicly available seismic surveys, i.e. Fruholmen-3D and DOL14007. The SSHS1101 2D lines were used for ties to the wells adjacent to the license area. Additionally, publicly available 3D&2D seismic data has been used to support the regional understanding of the area.

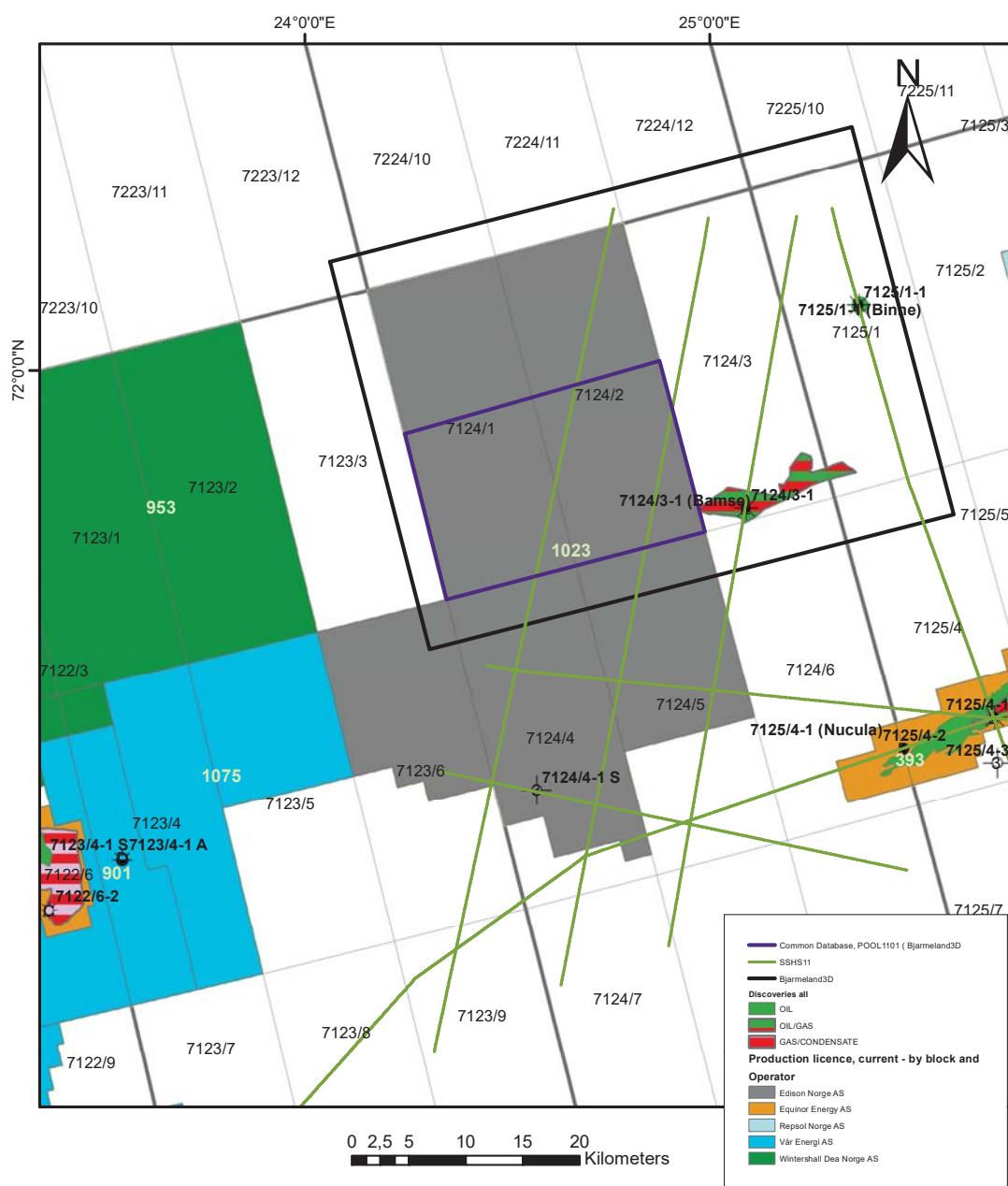


Fig. 2.1 PL1002 seismic and well database. Relevant 3D survey is marked with purple polygon and additional 2D lines are highlighted in green

Table 2.1 Seismic database

Survey name	2D Lines	NPDID	Availability
3D			
POL1101 (Bjarmeland 3D)		7505	TGS Multiclient
2D			
SSHS1101	119, 121, 122, 123, 444, 452 & 996	7431	Multiclient (Searcher Seismic)

2.2 Well Data

The common database consists of all publicly available well data from the five most important wells in close proximity for the license area, Table 2.2. All other public available well data was also considered for the evaluation of the prospectivity in the licenses.

The multiclient study, done by Ichron, provided lithostratigraphic information for the key wells, used for well correlations and prediction of reservoir development. Fluid inclusion reports from the five key wells were also included in the common database.

Table 2.2 Well database

Wellbores	NPDID	Status
7124/3-1	1066	Released
7124/4-1S	6678	Released
7125/1-1	1350	Released
7125/4-1	5450	Released
7125/4-2	5944	Released

3 Results of Geological and Geophysical Studies

The work obligations for PL1023 included an EM feasibility study. In addition, several de-risking activities has been carried out as part of the G&G work programme. From previous evaluation in PL595 several studies were already carried-out giving the basis for the geological framework: basin modelling by IGI and in-house, geological and sedimentological framework, petrophysical analysis, rock physics and inversion study, structural validation, fault seal analysis and pore pressure evaluation.

Additional work done by PL1023

CSEM feasibility study

A CSEM feasibility study was performed on the Jupiter Prospect. The background resistivity model was build using nearby wells, and well 7124/3-1 was used as the main reference. Also, sensitivity with two different sources was also considered and used to build the model.

Results: Both source systems will have high CSEM sensitivity for any of the P10-P50-P90 cases in Realgrunnen SubGp. with an ATR above 1500 Ωm^2 (which corresponds to 50 meters pay and 30 Ωm in pay resistivity). Based on the discovery wells in the area, with reservoir in Realgrunnen level, very high resistivity values in the pay zone are expected. The conclusion is that area is very suitable for a CSEM survey.

Update of petrophysics

Edison pre-award evaluation of the key wells was based on stratigraphic information from NPD FactPages. A re-evaluation of petrophysical properties of prospective intervals (Realgrunnen SubGp, Snadd and Kobbe fms) was carried out based on the stratigraphic information from Ichron multiclient reports which are included the common database.

Shallow Gas indicator

Gas escape features have been highlighted over the Jupiter Prospect. By extraction of RMS amplitude at sea level and at different stratigraphic levels above the structure.

Results: The presence of the shallow gas anomalies gives a strong indication of an active hydrocarbon system in the area of the Jupiter Prospect.

Petroleum system

A semi regional source rock evaluation study was carried out in the area.

Results: The geochemistry of the oil accumulations in the Nysleppen&Måsøy Fault Complex, and the Hammerfest & Nordkapp Basins indicate an eastward long distance migration within a Jurassic petroleum system (Tornerose-Binne). Similarities in the oils found in the Bamse and the Nucula accumulations indicate a north-south migration route. Additionally, charge from an unknown Triassic petroleum system and a pre-Triassic petroleum system are inferred by isotropically light values in samples from the Nysleppen/Måsøy Fault Complex.

Results of work done in PL1023

The Jupiter Prospect has since the application been revised with minor changes to the volumetric potential, but with a significant decrease in chance of success (from 29% to 19% for Realgrunnen SubGp. and for Snadd Fm. from 16% to 14%).

4 Prospect Update Report

As presented in the application 1 prospect and 5 leads are identified in PL1023, see Fig. 4.1. The outline of prospect and leads are the same as in the application time.

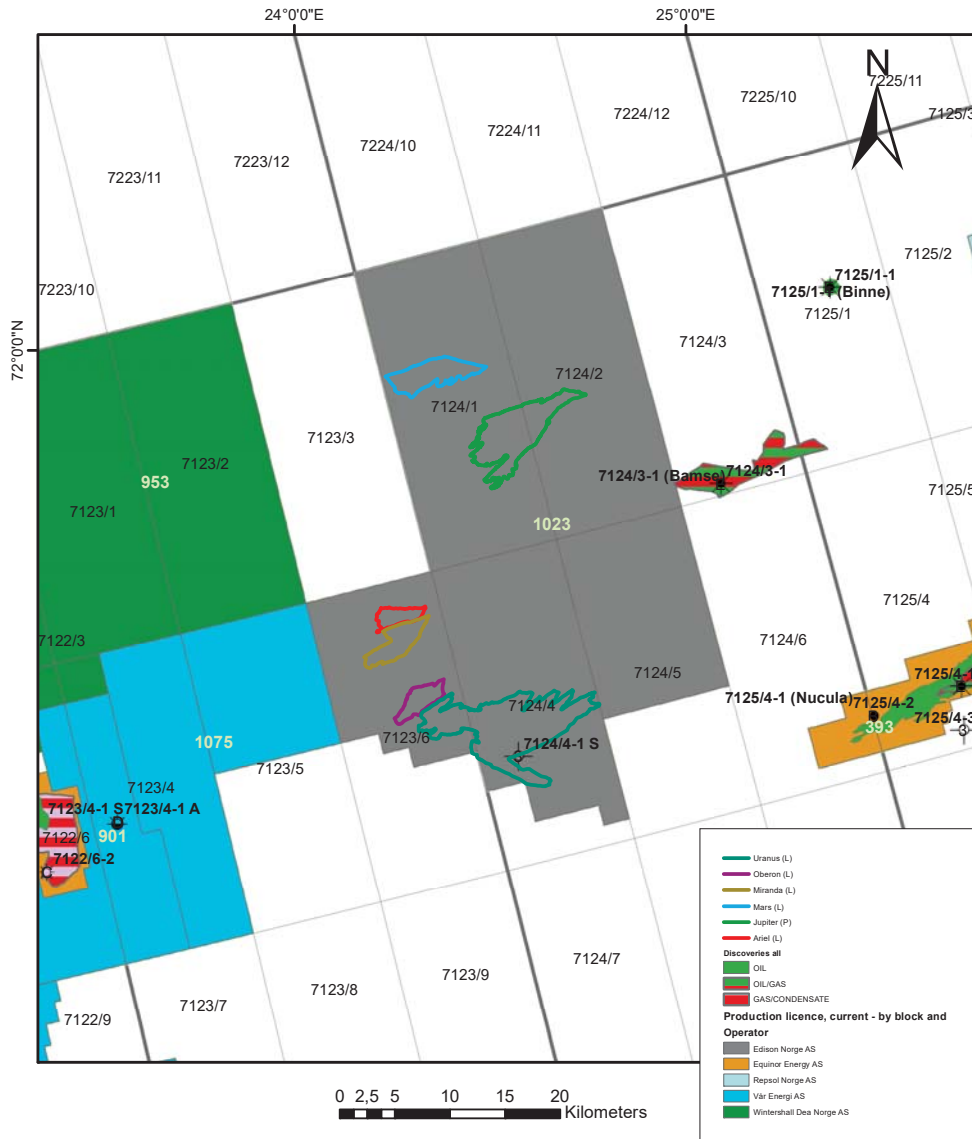


Fig. 4.1 PL1023 prospectivity map The main prospect Jupiter is marked in green.

Table 4.1 presents the resource potential from APA2018 application

Table 4.1 Resource potential – NPD Table 2 from application in 2018

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 ⁶ Sm ³] (>0.00)			Gas [10 ⁶ Sm 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)						
Jupiter (Jurassic)	P	Oil	10,30	23,20	39,60	0,62	1,39	2,37	0,29	100,0	Realgrunnen SubGp.	1390	Goliat	80
Jupiter (Triassic)	P	Oil	0,34	1,42	2,90	0,02	0,08	0,17	0,16	100,0	Snadd Fm.	1480	Goliat	80
Mars	L	Oil	0,75	2,93	6,14	0,04	0,17	0,36	0,08	100,0	Realgrunnen SubGp.	1380	Goliat	80
Uranus	L	Oil	4,49	21,30	46,10	0,58	3,48	7,72	0,05	100,0	Realgrunnen SubGp.	1190	Goliat	80
Oberon	L	Oil	0,69	3,40	7,48	0,09	0,55	1,25	0,05	100,0	Realgrunnen SubGp.	1390	Goliat	80
Miranda	L	Oil	0,38	4,44	11,00	0,04	0,72	1,82	0,05	100,0	Realgrunnen SubGp.	1620	Goliat	80
Ariel	L	Oil	1,01	4,23	8,13	0,12	0,69	1,47	0,50	100,0	Realgrunnen SubGp.	1780	Goliat	80

The main prospect, Jupiter, is a structural and stratigraphic controlled trap with the reservoir interval in the Realgrunnen SubGp where Stø and Upper Fruholmen fms. are considered to be the primary reservoir sections. Fig. 4.2 displays the structure at top reservoir level. Fig. 4.3 is a north-south and west-east seismic lines over the structure. Secondary reservoir target within Snadd channels were identified within the Jupiter structure.

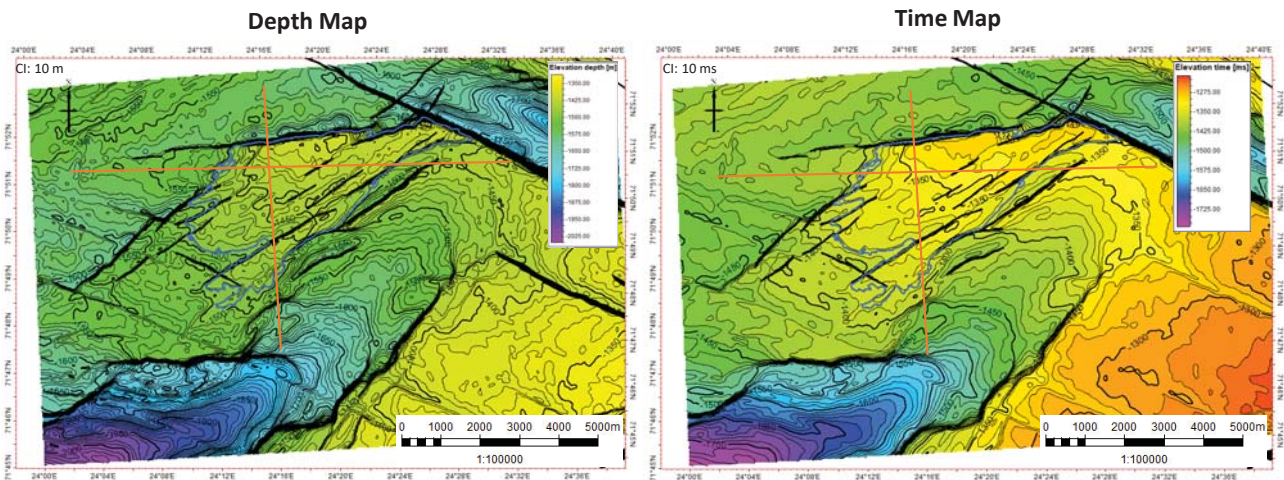


Fig. 4.2 Structural maps over Jupiter Prospect Top Realgrunnen SubGp depth(left) and time(right) maps over Jupiter Prospect (marked as a blue polygon). Orange lines represent the seismic sections shown on Figure 4.3

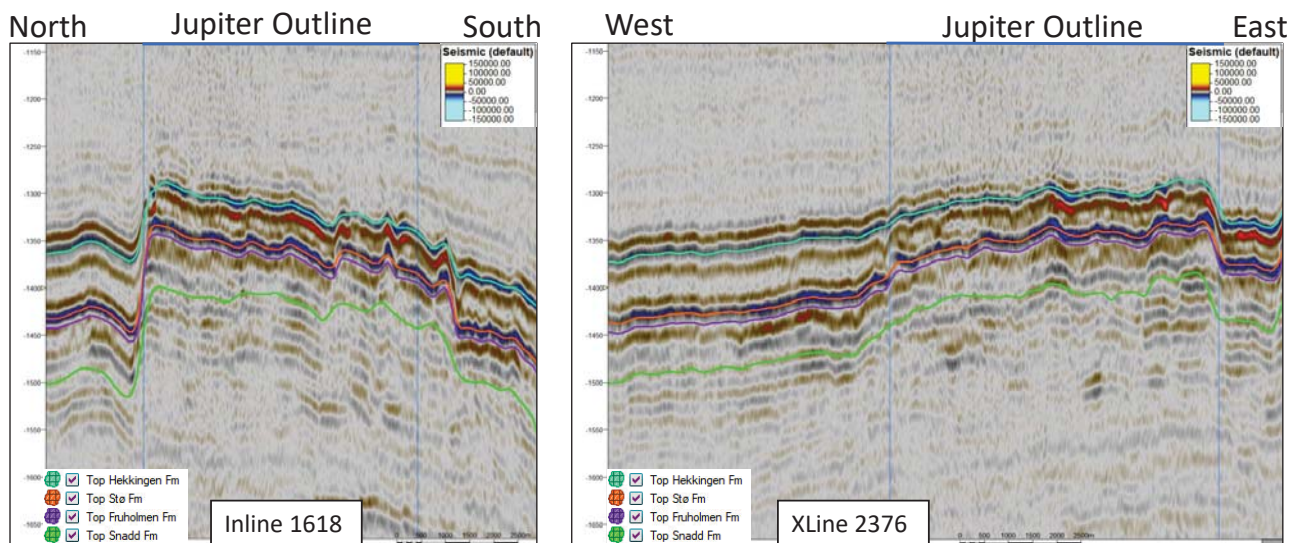


Fig. 4.3 Seismic sections over Jupiter Prospect North-South Inline (to the left) and West-East Xline (to the right) are presented. The seismic is the Bjarmeland 3D.

The other leads identified, all of them in Realgrunnen SubGp., have after the re-evaluation not been matured into prospects.

With the work done in the neighbouring licenses Edison has built up a better understanding of the stratigraphical intervals from wells that helped guide the interpretation over Jupiter Prospect. Revised petrophysical updates based on the updated stratigraphic interval gave a much better control over the reservoir parameters.

Seismic mapping over the reservoir intervals was challenging due to quality and seismic resolution. Efforts to improve the seismic quality was made by removing the low- and high- end of the frequency spectrum. Unfortunately, this work did not resolve the problem in distinguishing the reservoir and non-reservoir lithologies of the Stø and Upper Fruholmen fms.

The main risk with Jupiter prospect is the retention of hydrocarbon and reservoir effectiveness.

The variance map in Fig. 4.4 illustrates the complexity of the fault pattern.

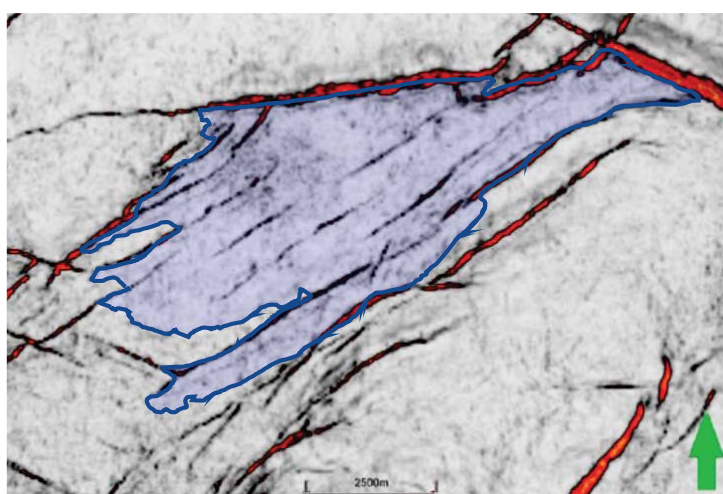


Fig. 4.4 Variance map over Jupiter Prospect. Map extracted at top of reservoir unit, Stø Fm. The fault pattern is shown as red. Blue polygon is the Jupiter prospect.

The previous fault study (PL595) identified areas with relay ramps considered to be of high risk with regard to sealing capacity. To further investigate this, extractions of seismic amplitudes at a shallower levels above the prospect were interpreted as evidence that the trap is leaking.

The position of the gas cloud could indicate that the prospect is spilling at a shallower contour than expected, increasing the uncertainty of the spill point.

The revision of work done previously confirmed the high risk related with minor fault displacement and associated fault sealing capacity.

With regards to reservoir presence, there is still uncertainty related to the stratigraphy in the area, and given the observed thickness differences of the Realgrunnen SubGp over the Jupiter Prospect and the nearby 7125/1-1 well, there is a high risk that the Stø Fm has been eroded over the Jupiter prospect, leaving only the primary reservoir interval to consists only of the Fruholmen Fm. Based on Petrophysical analysis of the key wells, the Fruholmen reservoir is expected to be of poorer quality compared to the Stø reservoir.

In the application the total recoverable volumes in Jupiter were Pmean 24,6 million Sm³ o.e. in Realgrunnen SubGp. with a COS of 29%.

New volumetric calculation for the Realgrunnen SubGp for Jupiter Prospect are 24,3 million Sm³ o.e. with a COS of 19%.

For Snadd target the volumetrics remain unchanged at Pmean of 1,5 million Sm³ o.e. but with a revised COS from 16% to 14%.

The final resource potential for PL1023 is summarized in Table 4.2, with only small adjustments to the Jupiter volumes and risks.

Table 4.2 Resource potential - NPD Table 2, updated 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	
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Jupiter (Triassic)	P	Oil	0,34	1,42	2,90	0,02	0,08	0,17	0,14	100,0	Snadd Fm.	1480	Goliat	80
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5 Technical Evaluations

The Nysleppen Fault Complex in the Norwegian Barents Sea is underexplored, with few exploration wells, small discoveries and no existing infrastructure.

[REDACTED]

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The technical and economical evaluation of Jupiter has therefore failed to meet the needed criteria for continued work.

6 Conclusions

The Operator of PL1023 has completed the technical work concluding with the geological and commercial risk of the prospectivity being too high to support a positive drilling decision. It is the JV's view that additional G&G studies will not improve the chance of success significantly or redefine the volumetric potential.

The PL1023 partnership has unanimously decided to relinquish the license.