



PL 091 F License Status Report

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Summary

PL 091 F is located on the central Halten Terrace in the Norwegian Sea, to the west of the Tyrihans Field and south of the Trestakk Field. The license was awarded in March 2022 as an extension to PL 091 following an application in APA2021. The rationale was to secure open acreage containing the Alpha Downflank prospect. The license has completed a geological and geophysical revaluation of the Alpha Downflank prospect using more recently available PGS18M05 seismic dataset. In conclusion the license finds no requirement to retain the PL 091 F acreage. The partnership has therefore unanimously decided to drop PL 091 F.

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1 Key license history

PL 091 F is located on the central Halten Terrace in the Norwegian Sea, to the west of the Tyrihans Field and south of the Trestakk Field (Figure 1-1).

The license was awarded in on 11.03.22 as an extension to PL 091 following an application in APA2021. The rationale was to secure open acreage containing the western segment of the Alpha Downflank prospect in the event of a drill decision on the prospect being taken in PL 091.

The partnership is the same as in PL 091 comprising Equinor Energy AS (59.1%, OP) and Vår Energi AS (40.9%). The work commitment is geology and geophysical studies with a drill or drop decision to be taken within 11.03.2023.

1.1 License meetings held

Table 1-1: License meetings held

Date	License Meeting
06.05.2022	MC Meeting
19.05.2022	EC Work Meeting
17.06.2022	EC Work Meeting
11.10.2022	EC Work Meeting

1.2 Reasons for surrender

The license has completed a geological and geophysical revaluation of the Alpha Downflank prospect using more recently available PGS18M05 seismic dataset. In conclusion the license was unable to support a drill decision on Alpha Downflank at the current time and find no requirement to retain the PL 091 F acreage. The partnership has therefore unanimously decided to drop PL 091 F.

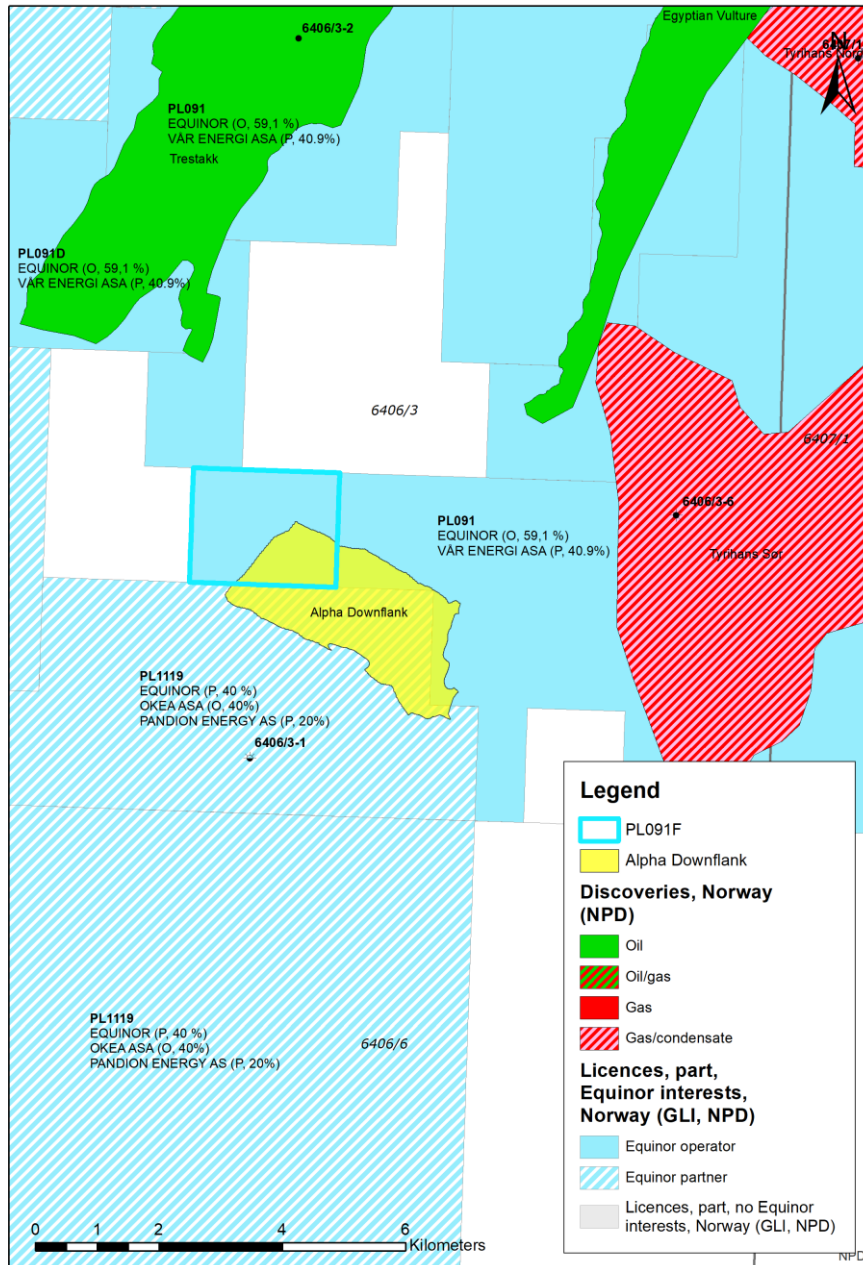


Figure 1-1: Location map for PL091 F with licenses, prospects, fields, and wells.

2 Database overview

2.1 Seismic data

Table 2-12: 3D common seismic database (Figure 2-1)

Survey	Year	Acquisition	Processing	Migration	Domain	Stacks	Area (km ²)	Quality
MC3D-HVG2013EQZ18	2019	Merge of HVG2013, HVG2011 and ST9905	DUG	Anisotropic PSDM	Depth Time	Raw and final full and angle stacks, gathers, anisotropy and velocity data	291.8	Good
PGS18M05	2019	Merge of PGS15005, PGS14005, HVG2013, PGS14002	PGS	KPSDM	Depth Time	Raw and final full and angle stacks, and velocity data	337.4	Good

2.2 Well data

Table 2-23: Common well database

Well	Year	Name	Status	Formation at TD	TD (TVDSS m)
6406/2-1	1995	Lavrans	Gas and condensate discovery	Åre	5283
6406/2-2	1996	Lavrans	Gas and condensate discovery	Åre	5351
6406/2-3	1997	Kristin	Gas and condensate discovery	Åre	5256
6406/2-4 S	1997	Lavrans	Shows	Melke	4457
6406/2-5	1997	Kristin	Dry	Åre	5438
6406/2-6	1998	Ragnfrid	Gas and condensate discovery	Åre	5257
6406/2-8	2015	Imsa	Oil discovery	Åre	4680
6406/2-9 S	2019	Ragnfrid Nord	Gas and condensate discovery	Tilje	4919
6406/3-1	1984	Mistral	Dry, with gas shows	Red Beds	4874
6406/3-2	1986	Trestakk	Oil discovery	Åre	4500
6406/3-3	1986	Smørbokk Sør	Shows	Åre	4416
6406/3-4	1987	Trestakk	Oil appraisal	Tilje	4381
6406/3-5	1988	Maria	Dry, with oil shows	Tilje	4252
6406/3-6	2002	Tyrihans Sør	Oil and gas appraisal	Ile	4150
6406/3-7	2006	Antares	Dry	Åre	4507
6406/3-8	2010	Maria	Oil discovery	Tilje	4109
6406/3-D-2 H	2010	Tyrihans Sør	Gas	Garn	3917
6406/5-1	2002	Presidenten	Gas/condensate	Tilje	4684
6406/6-1	1985	N/A	Shows	Tilje	4708
6406/6-2	2007	Onyx Sørvest	Dry	Tilje	4669
6406/6-3	2013	Mjøsa	Gas discovery	Åre	4395
6406/6-4 S	2015	Tvilling Sør	Gas and condensate discovery	Tilje	4468
6406/6-6 S	2018	Jasper	Gas	Ror	4818
6407/1-2	1983	Tyrihans Sør	Gas and condensate discovery	Grey Beds	4529
6407/1-3	1984	Tyrihans Nord	Oil and gas discovery	Grey Beds	4438
6407/1-4	1996	Tyrihans Nord	Oil and gas appraisal	Not	3780
6407/1-5 S	2012	Maria	Oil and gas discovery	Tilje	4164
6407/1-6 S	2013	Rodriguez	Dry	Ror	4051
6407/1-A-3 BH	2021	Tyrihans Nord	Oil and gas discovery	Åre	3960
6407/1-B-3 H	2008	Tyrihans Sør	Gas	Garn	3868
6407/4-1	1985	Spinell Sør	Gas and condensate discovery	Åre	4807
6407/4-2	2011	Spinell Sør	Shows	Ile	4229

3 Results of geological & geophysical studies

The following G&G studies were carried out in the license evaluation:

- Seismic interpretation and mapping
- Geophysical observations and AVO assessment
- Prospect evaluation

3.1 Seismic interpretation and mapping

Seismic interpretation of key horizons was re-evaluated using the PGS18M05 data set. Locally, faults were verified or remapped. This resulted in a new set of time and depth structure maps. Interpretation was cross-evaluated using the additional MC3D-HVG2013EQZ18 seismic dataset. The maps were used to calculate prospect gross rock volumes and create amplitude extractions to look for features to aid the interpretation of reservoir and/or hydrocarbon presence. The updated structure maps did not significantly impact the prospects and leads outlines or gross rock volumes.

3.2 Geophysical observations and AVO assessment

The high reservoir depths for the prospect are a challenge for direct fluid indication from seismic. Fluid substitution modelling at relevant wells for the prospect and AVO analysis using the raw migrated angles stacks was conducted. Fluid, S-impedance and AVO cubes were derived. The results of the AVO analysis are quite stable. S-impedance cubes show good quartz sand response within the prospect. Based on AVO modelling in the wells, the fluid response is weak and expected to be difficult to detect on the seismic. Some fluid anomalies can be seen in the prospect but with no clear depth conformance. In summary the results from the geophysical assessment are inconclusive to support hydrocarbon presence.

4 Prospect update report

PL 091 F contains part of the Alpha Downflank prospect comprised the Bathonian Garn Fm. sandstone reservoir. The trap at Top Garn Fm. level is complex, a hanging-wall anticline downfaulted relative to the surrounding Garn Fm. that relies on an effective lateral fault seal (Figure 4-1). Trap/seal thus forms one of the key risks to the prospect segment. The top seal is provided by shales of the Melke and Spekk fms. The Melke Fm. (largely gas-prone) forms the primary source rock candidate for charging the prospect, with some potential contribution from the Spekk (oil) Fm. Charge is considered a key risk to prospect given the downfaulted nature and limited direct source-reservoir juxtaposition. In conclusion from the prospect evaluation, the Alpha Downflank segment was found to high risk with only limited resource potential and not attractive enough to be matured a drilling candidate.

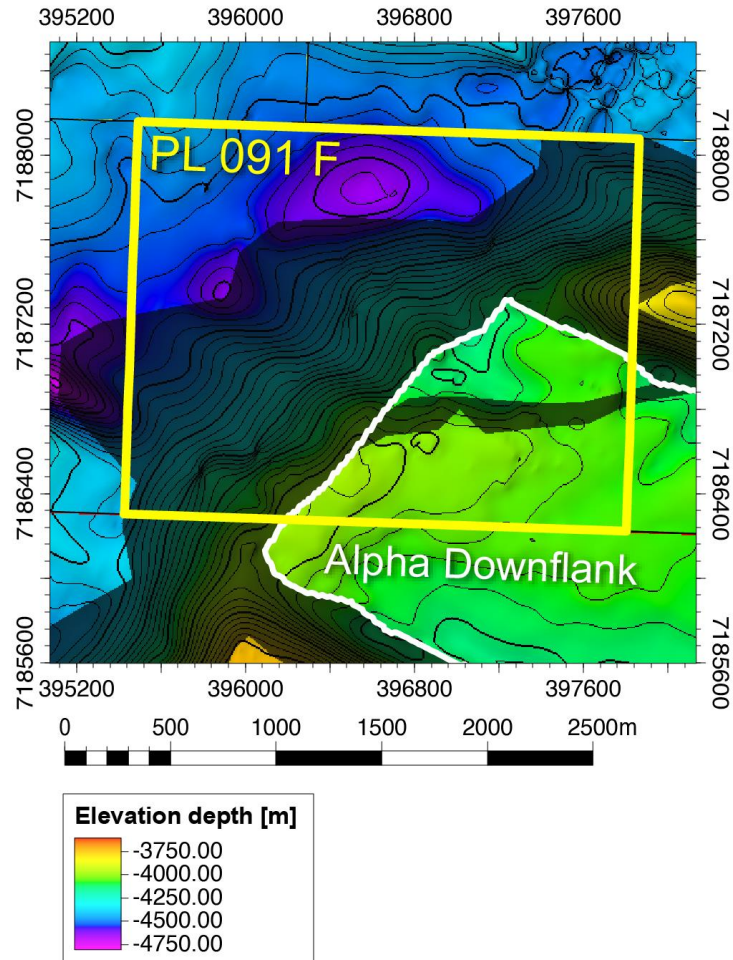


Figure 4-1: Top Garn Fm. depth map showing the area of PL 091 F and the Alpha Downflank segment.

5 Technical evaluation

A technical economic evaluation of the Alpha Downflank resulted in negative value and thus the prospect not sufficiently attractive to be matured as a potential drilling candidate for an exploration well.

6 Conclusion

The work programme of geological and geophysical studies for PL 091 F has been fulfilled. The license has completed a geological and geophysical reevaluation of the Alpha Downflank prospect including the western Alpha Downflank prospect within PL 091 F using more recently available PGS18M05 seismic dataset. In conclusion the license was unable to support a drill decision on Alpha Downflank at the current time and find no requirement to retain the PL 091 F acreage. The partnership has therefore unanimously decided to drop PL 091 F.

7 Appendix

Table 7-1 Alpha Downflank prospect data (High Pressure, Gas Case)

Block	6406/3	Prospect name	Alpha Downflank	Discovery/Prosp/Lead	Prospect	Prosp ID (or New!)	NPD will insert value	NPD approved (Y/N)	
Play name	NPD will insert value	New Play (Y/N)		Outside play (Y/N)					
Oil, Gas or O&G case:	Gas	Reported by company	Equinor Energy AS	Reference document				Assessment year	2022
This is case no.:	1 of 1	Structural element	Halten Terrace	Type of trap	Structural	Water depth [m MSL] (>0)	273	Seismic database (2D/3D)	3D
Resources IN PLACE and RECOVERABLE Volumes, this case		Main phase			Associated phase				
		Low (P90)	Base, Mode	Base, Mean	High (P10)	Low (P90)	Base, Mode	Base, Mean	High (P10)
In place resources	Oil [10 ⁶ Sm ³] (>0.00)					0.56	0.83	1.99	4.01
	Gas [10 ⁹ Sm ³] (>0.00)	0.65	0.76	1.91	3.65				
Recoverable resources	Oil [10 ⁶ Sm ³] (>0.00)					0.22	0.32	0.79	1.61
	Gas [10 ⁹ Sm ³] (>0.00)	0.39	0.48	1.14	2.18				
Reservoir Chrono (from)	Bathonian	Reservoir litho (from)	Garn Fm.	Source Rock, chrono primary	Callovian	Source Rock, litho primary	Melke Fm.	Seal, Chrono	Callovian
Reservoir Chrono (to)	Bathonian	Reservoir litho (to)	Garn Fm.	Source Rock, chrono secondary	Oxfordian	Source Rock, litho secondary	Spekk Fm.	Seal, Litho	Melke Fm.
Probability [fraction]									
Total (oil + gas + oil & gas case) (0.00-1.00)	0.27	Oil case (0.00-1.00)		Gas case (0.00-1.00)	0.27	Oil & Gas case (0.00-1.00)			
Reservoir (P1) (0.00-1.00)	0.80	Trap (P2) (0.00-1.00)	0.70	Charge (P3) (0.00-1.00)	0.49	Retention (P4) (0.00-1.00)	1.00		
Parametres:	Low (P90)	Base	High (P10)	Comments					
Depth to top of prospect [m MSL] (> 0)			3964						
Area of closure [km ²] (> 0.0)									
Reservoir thickness [m] (> 0)	48.7	72.5	101.5						
HC column in prospect [m] (> 0)	92	123	156						
Gross rock vol. [10 ⁹ m ³] (> 0.000)	0.184	0.269	0.363						
Net / Gross [fraction] (0.00-1.00)	0.65	0.75	0.86						
Porosity [fraction] (0.00-1.00)	0.12	0.15	0.17						
Permeability [mD] (> 0.0)	10.6	107.9	279.3						
Water Saturation [fraction] (0.00-1.00)	0.73	0.78	0.82						
Bg [Rm3/Sm3] (< 1.0000)	0.0029	0.0031	0.0033						
1/Bo [Sm3/Rm3] (< 1.00)									
GOR, free gas [Sm ³ /Sm ³] (> 0)	691	961	1698						
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)	0.55	0.60	0.65						
Recov. factor, liquid ass. phase [fraction] (0.00-1.00)	0.35	0.40	0.45						
Temperature, top res [°C] (>0)	144			Innrapp. av geolog-init:	NPD will insert value	Registrert - init:	NPD will insert value	Kart oppdatert	NPD will insert value
Pressure, top res [bar] (>0)	705			Dato:	NPD will insert value	Registrert Dato:	NPD will insert value	Kart dato	NPD will insert value
Cut off criteria for N/G calculation	VSH<0.4	KLOGH>0.1mD	3.					Kart nr	NPD will insert value

Table 7-1 Alpha Downflank prospect data (Normal Pressure, Oil Case)

Block	6406/3	Prospect name	Alpha Downflank	Discovery/Prospect/Lead	Prospect	Prospect ID (or New!)	NPD will insert value	NPD approved (Y/N)	
Play name	NPD will insert value	New Play (Y/N)		Outside play (Y/N)					
Oil, Gas or O&G case:	Oil	Reported by company	Equinor Energy AS	Reference document				Assessment year	2022
This is case no.:	2 of 2	Structural element	Halten Terrace	Type of trap	Structural	Water depth [m MSL] (>0)	273	Seismic database (2D/3D)	3D
Resources IN PLACE and RECOVERABLE Volumes, this case		Main phase			Associated phase				
		Low (P90)	Base, Mode	Base, Mean	High (P10)	Low (P90)	Base, Mode	Base, Mean	High (P10)
In place resources	Oil [10 ⁶ Sm ³] (>0.00)	0.87	0.88	2.84	5.60	0.19	0.20	0.62	1.23
	Gas [10 ⁹ Sm ³] (>0.00)	0.47	0.49	1.45	2.85	0.16	0.25	0.51	1.01
Recoverable resources	Oil [10 ⁶ Sm ³] (>0.00)	0.26	0.28	0.85	1.69	0.05	0.06	0.19	0.37
	Gas [10 ⁹ Sm ³] (>0.00)	0.28	0.31	0.87	1.69	0.06	0.10	0.21	0.41
Reservoir Chrono (from)	Bathonian	Reservoir litho (from)	Garn Fm.	Source Rock, chrono primary	Callovian	Source Rock, litho primary	Melke Fm.	Seal, Chrono	Callovian
Reservoir Chrono (to)	Bathonian	Reservoir litho (to)	Garn Fm.	Source Rock, chrono secondary	Oxfordian	Source Rock, litho secondary	Spekk Fm.	Seal, Litho	Melke Fm.
Probability [fraction]									
Total (oil + gas + oil & gas case) (0.00-1.00)	0.27	Oil case (0.00-1.00)	0.00	Gas case (0.00-1.00)	0.27	Oil & Gas case (0.00-1.00)	0.00		
Reservoir (P1) (0.00-1.00)	0.80	Trap (P2) (0.00-1.00)	0.70	Charge (P3) (0.00-1.00)	0.49	Retention (P4) (0.00-1.00)	1.00		
Parametres:	Low (P90)	Base	High (P10)	<i>Comments</i>					
Depth to top of prospect [m MSL] (> 0)			3964						
Area of closure [km ²] (> 0.0)									
Reservoir thickness [m] (> 0)	48.7	72.5	101.5						
HC column in prospect [m] (> 0)	92	123	156						
Gross rock vol. [10 ⁹ m ³] (> 0.000)	0.184	0.269	0.363						
Net / Gross [fraction] (0.00-1.00)	0.56	0.69	0.84						
Porosity [fraction] (0.00-1.00)	0.12	0.15	0.17						
Permeability [mD] (> 0.0)	10.6	107.9	279.3						
Water Saturation [fraction] (0.00-1.00)	0.26	0.34	0.41						
Bg [Rm3/Sm3] (< 1.0000)	0.0037	0.0039	0.0040						
1/Bo [Sm3/Rm3] (< 1.00)	0.55	0.58	0.62						
GOR, free gas [Sm ³ /Sm ³] (> 0)	2343	2827	3544						
GOR, oil [Sm ³ /Sm ³] (> 0)	173	219	274						
Recov. factor, oil main phase [fraction] (0.00-1.00)	0.25	0.30	0.35						
Recov. factor, gas ass. phase [fraction] (0.00-1.00)	0.25	0.30	0.35						
Recov. factor, gas main phase [fraction] (0.00-1.00)	0.55	0.60	0.65						
Recov. factor, liquid ass. phase [fraction] (0.00-1.00)	0.35	0.40	0.45						
For NPD use:									
Temperature, top res [°C] (>0)	144			Innrapp. av geolog-init:	NPD will insert value	Registrert - init:	NPD will insert value	Kart oppdatert	NPD will insert value
Pressure, top res [bar] (>0)	415			Dato:	NPD will insert value	Registrert Dato:	NPD will insert value	Kart dato	NPD will insert value
Cut off criteria for N/G calculation	VSH<0.4	KLOGH>1mD						Kart nr	NPD will insert value