PL 1087 Status Report

License Surrender

Part of blocks 2/2 & 2/5

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1.0 History of the production licence

Award date and licensees and operator

The PL 1087 located on the Steinbit Terrace in the Central Graben, northeast of the Tor Field (Figure 1). The license was awarded to a license group consisting of Chrysaor Norge AS (Op.) 50% and Lundin Energy Norway AS 50% in February 2021 (APA 2020). Chrysaor Norge AS has been renamed Harbour Energy Norge AS in 2022 without any changes to the Norway company structure. Lundin Energy Norge AS has been acquired by AkerBP in 2022 who have taken over all responsibilities related to this Petroleum License.

Work obligations with deadlines

The work obligations for Phase 1 have been fulfilled comprising 3D seismic reprocessing and G&G work. The original drill or drop deadline was by 22.02.2023 but was subsequently extended by 1 year to 22.02.2024.

Applications for and decisions to extend deadlines

The license applied for a 1-year extension to the original drill or drop deadline to perform detailed seismic data analysis of the prospectivity to try to further de-risk and mature the prospects for a drill or drop decision.

Overview of meetings held

The MC and EC meetings held during the licence period are listed below.

- 25.03.2021 ECMC start-up meeting
- 18.08.2021 EC Workshop
- 17.11.2021 ECMC Meeting
- 18.02.2022 EC Workshop
- 13.09.2022 EC Workshop
- 14.11.2022 ECMC Meeting
- 26.05.2023 ECMC Meeting
- 27.11.2023 ECMC Meeting

Brief substantiation for surrender/lapse/expiration

The Cretaceous Hidra/Rødby prospect (originally called Tromøya) which was identified in the original license application as the main target has been re-evaluated resulting in the volumes being reduced, and the risks increased. In particular, the reservoir risk is high and petroleum system analysis indicate that a filled-to-spill scenario is unlikely because of seal failure and charge limitations. Seismic reprocessing enhanced the seismic quality and provided more accurate well ties and confident mapping of both top and base reservoir, which resulted in reduced volumes.

The Chalk MTC prospect (upper Tor Fm) was identified as a lead in the original license application. The prospect is a structural/stratigraphic trap that is defined by the lateral extend of an upper Tor seismic event and a northern boundary defined by a regional deep fault. Re-evaluation of the original lead has resulted in volumes being reduced significantly and the risk increased. The critical risk is the seal as all adjacent stratigraphic levels have been affected by post-depositional displacement which is believed to compromise the sealing capacity. Displacement is not observed on the north boundary fault which results in high fault seal risk as well. Petroleum system analysis indicate that a filled-to-spill scenario is unlikely because of charge limitations which has reduced the volume potential.

The Jurassic prospectivity was initially identified for the licensing round application and loosely described as a series of leads of Upper and Middle Jurassic age on the main structural high within the license. The work to evaluate this Jurassic potential started in the one-year extension phase of the license and the focus was directed at the crestal hanging-wall trap area (Topaz). The evaluation work was carried out on the original PGS data since the reprocessing was not including the sub-BCU section. The prospect initially looked promising

from a first pass volumetric standpoint, yet risky with seal being the main risk. Upon completion of the fault seal evaluation, the prospective potential was significantly reduced and did not warrant continuation.

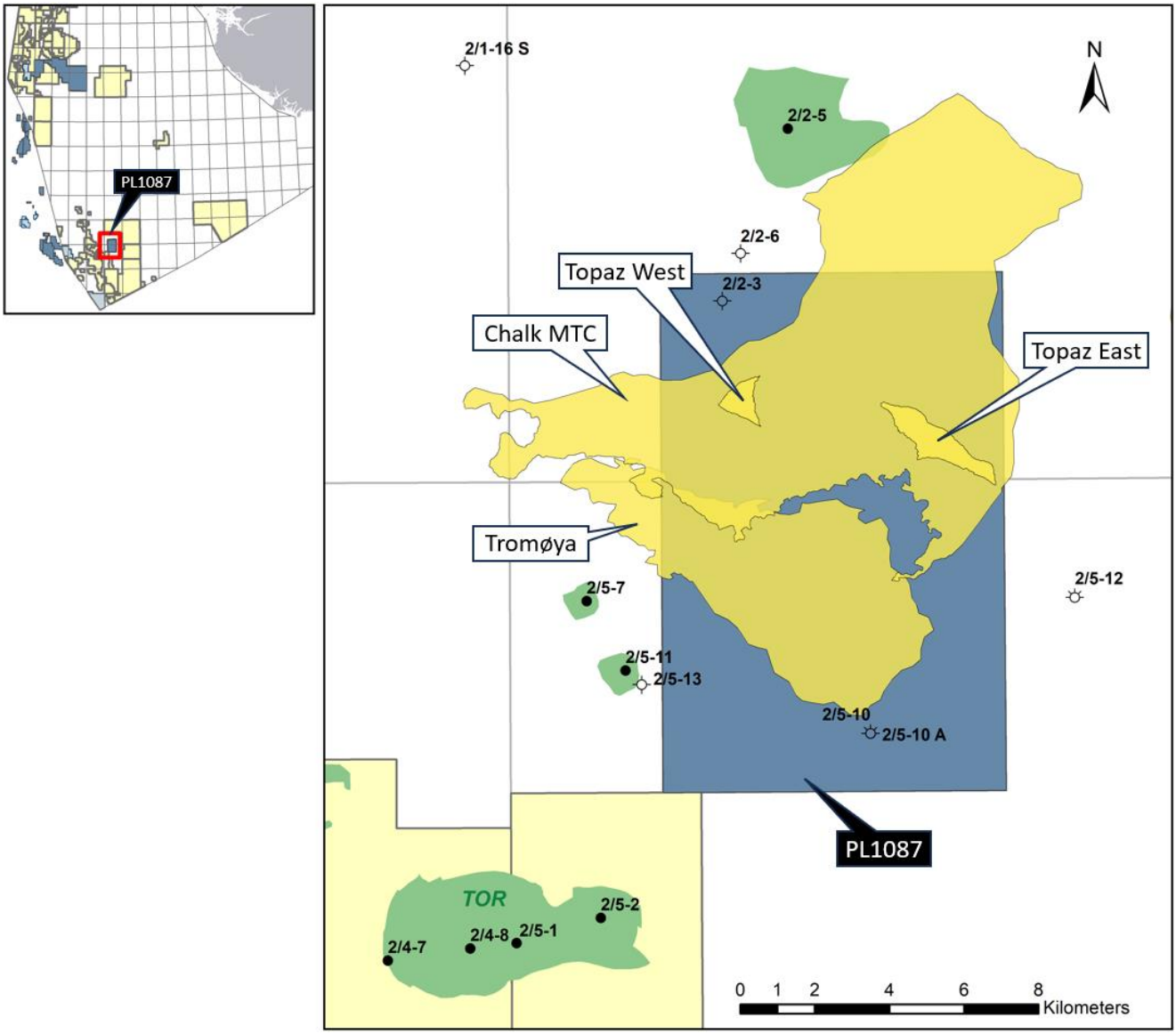

Figure 1: Location map. PL 1087 is in blue and the prospects in yellow.

2.0 Database overview

2.1 Seismic data

The common seismic database consists of the PGS multiclient 3D survey PGS18M09CGR (127.691 km2). The dataset is based on broadband acquisition for surveys PGS15008 with 8 km maximum offset and MC3D-CGRN13 with 6 km maximum offset. As a part of the work programme the license performed a reprocessing project with DUG covering the key prospectivity, offset wells and fields adjacent to the license. A data gap over the Tor field was infilled with 3D survey VGCNS050 (44.1 km2). The proprietary reprocessed dataset with the official name CHR21M01 covers an area of 460 km^2 with fully migrated data (Figure 2). In addition, Harbour performed an inhouse seismic Common Reflection Angle Migration (CRAM) imaging reprocessing project for the license covering an area of approximately 460 km^2. Processed shot gathers from the reprocessed data (CHR21M01) were used as input for this project. The seismic database is listed in Table 1 and shown in Figure 2.

3D Survey Name / Project Name	NPDID	Public	Area km^{2*}	Dataset / Comments
Input to reprocessing: PGS15008 MC3D-CGRN13 VGCNS0501	 8184 7904 4334	 Commercial Commercial Commercial	460	*Area (km^2) is full fold shot input.
PGS Reprocessing: CHR21M01	n/a	N	460	-Kirchhoff PSDM Full Offset & Angle Stacks in Time & Depth Raw. -Kirchhoff PSDM Full Offset & Angle Stacks in Time & Depth Final -Velocity Models -CRAM Full Offset & Angle Stacks in Time Final -CRAM Full Offset in Depth Final
CHR21M01	n/a	N	460	-CRAM Full Offset & Angle Stacks in Time Final -CRAM Full Offset in Depth Final

Table 1: Seismic database. The official name for the PL1087 seismic reprocessing is CHR21M01.

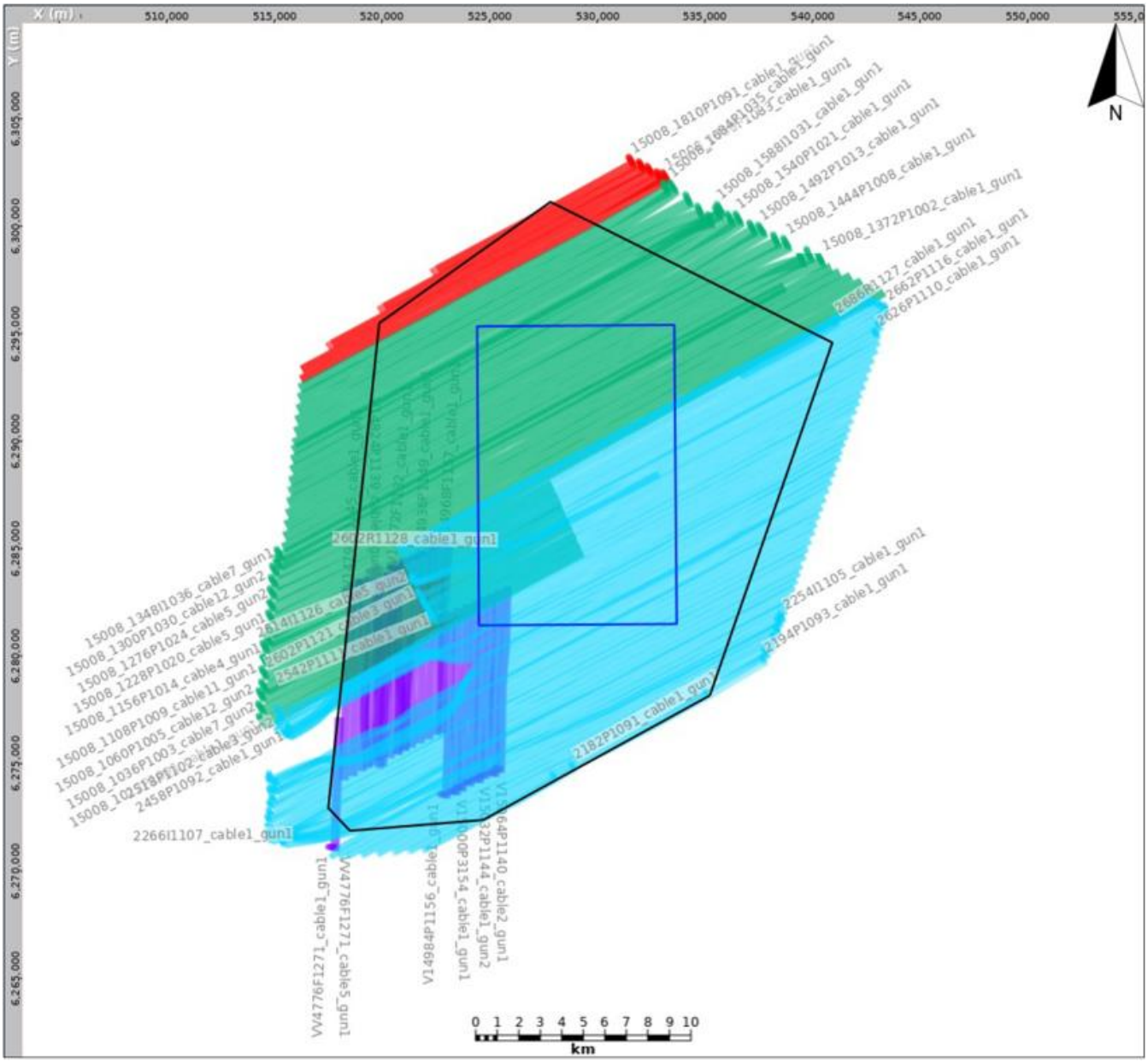

Figure 2: Map view of the three surveys. PGS15008 Atlas (green) / Challenger (red), MC3D-CGRN13 (blue), VGCNS0501 (purple). Black polygon denotes the output area, and the blue polygon denotes the license area.

2.2 Well data

Data table showing analytical techniques performed per study well (JK= late Jurassic – Cretaceous, J – Jurassic, chalk = Ekofisk and Tor formations).

Wellbore	NPD ID	Biostratigraphy	XRD	ICP-AES	QEMSCAN	d13C, d18O	CPI
1/3-12 S	6260	JK					
1/3-5	223	JK					
1/5-2	238	JK					
1/5-5	7874	JK					
1/6-7	1928						J
2/1-9 A	1867						J
2/1-10	1865	JK					
2/1-13 S	5975	JK					
2/1-14 S	5995	JK					
2/1-17 S	8851	JK, chalk	K	K	K		chalk
2/1-3	251						J
2/1-5	63	JK	K	K	K		
2/1-7	137		K	K	K		
2/1-8	459	JK	K	K	K		
2/2-1	46	JK, chalk					J, chalk
2/2-2	80	JK					
2/2-3	3	JK, chalk	K	K	K, chalk	chalk	J, chalk
2/2-4	1188	JK, chalk	K	K	K, chalk		J, chalk
2/2-5	1846	JK					J, chalk
2/2-6	6346	JK					
2/3-1	162	JK	K	K	K		chalk
2/3-3	198			K	K		chalk
2/3-4	129						J
2/4-7	196						chalk
2/4-11	255	JK			K		chalk
2/4-17	1792	chalk					J, chalk
2/4-18 R	2253	chalk					chalk
2/4-20	5556						J
2/4-21 A	6933	JK					
2/4-23 S	7657	chalk					J, chalk
2/4-B-4	1409						chalk
2/4-K-4	670						
2/4-8	252	JK, chalk	K	K	K, chalk		chalk
2/5-1	178	JK, chalk	K	K	K, chalk	chalk	chalk
2/5-3	258						chalk
2/5-7	25					chalk	J, chalk
2/5-10 A	2194	JK					J, chalk
2/5-11	3084					chalk	chalk
2/5-12	4433	JK					

2/5-13	5948	JK					
2/7-15	225	JK					
2/7-16	232	JK					
3/7-3	293	JK					
8/10-1	166	JK					
8/10-4 A	6737	JK					
8/10-5 A	7419	JK					

Table 2: Well database

3.0 Results of geological and geophysical studies

Several proprietary studies have been undertaken as a part of the license work to evaluate the prospectivity in the PL1087. All study results were integrated with the license interpretation to reach a conclusion. These studies are described briefly below.

Biostratigraphy

I. Jurassic & Early Cretaceous with PL1089 - Merlin Energy
II. License specific Jurassic & Cretaceous - Merlin Energy
III. Late Cretaceous chalk - Merlin Energy/Network Stratigraphic

Timing of the calcareous sandstone deposition and their correlation on a regional scale was the focus of the regional study together with license PL1089. The overall conclusions based on well reports were that sandstones do not occur in a single stratigraphic interval; the newly determined ages of the Ran/Hidra sandstones are from the Volgian to the Cenomanian. The license specific work recognized several consistent unconformities in studied wells indicating possible erosion and redeposition during the Valanginian, across Barremian-Aptian, Aptian-Albian, and Albian-Cenomanian boundaries. The calcareous sandstones in the well 2/5-1 were determined to be of Albian and Cenomanian age and therefore renamed as Rødby Fm and Hidra Fm respectively.

Biostratigraphic work on chalk using newly sampled core and cuttings enabled us to recognize and date several mass transport complexes occurring during the latest Maastrichtian to Danian time, which enabled us to map them more confidently using seismic data.

Petrography – Stratum
Petrographic microscopy was done on cuttings of the Cretaceous calcareous sandstones of the well 2/5-1. The predominant grains are quartz and bioclasts within a marly matrix and cemented by calcite. Quartz grains are very fine to fine-grained and subangular, whereas 0.2 mm large unfragmented foraminifera dominate the bioclastic component.

Mineralogy and Inorganic Geochemistry

I. XRF and XRD of siliciclastic - Q mineral
II. QEMSCAN - Rocktype
III. C, O isotopes in chalk - Q mineral

Mineralogical characterization of cuttings of Cretaceous calcareous sandstones and mudstones was done by XRD and QEMSCAN analyses of 10 wells. For calcareous sandstones, presence of plagioclase/albite indicated two different source areas. QEMSCAN indicated no single sand grains in mudstones. Core and cuttings of chalk were analysed for C- and O-isotope analyses in 4 wells confirming the reworking of chalk recognized by nannoplankton biostratigraphic work.

Organic geochemistry

I. Standard – APT
II. NMR spectroscopy - Exploro

Out of three potential source rocks relevant for the license, the Haugesund Fm was analysed with conventional geochemical methods in order to provide input data for the petroleum system modelling. The Haugesund Fm was resampled in wells 2/2-3 and 2/5-10 A. The Farsund-Mandal Fms had sufficient existing datasets.

The main goal of the NMR spectroscopy was to test whether the oil in well 2/2-5 could be sourced from the lacustrine Bryne Fm penetrated by wells 2/2-1 and 2/2-4. Source rocks in 3 wells were analysed by NMR spectroscopy, cuttings in Bryne Fm in wells 2/2-1 and 2/2-4 together with Farsund core and Mandal cuttings in well 2/2-5. The analyses indicate a marine source rock for the 2/2-5 oil.

Petrophysics and Rock Physics – IKON

A petrophysics study focusing on the Hidra sandstones was carried out using analysis of data from 5 wells to determine if there is any variation in the formation fluids and geological rock properties from the study wells. Further, a rock physics study was performed to determine the rock properties of the Hidra reservoir and non-reservoirs and their sensitivities to lithology and fluid variations. The study shows that it is difficult to relate amplitudes directly to porosity as it looks like changes in lithology and thickness of Blodøks Fm/overburden controls the seismic response on top of the Hidra reservoir.

Structural Restoration – Petroleum Experts

Structural analysis was carried out to investigate the interplay between tectonics and salt movement to help identify paleo-highs which are thought to have been sources for Late Cretaceous Hidra reservoir sandstones. The study assessed the validity of the seismic interpretation, improved the understanding of timing and development of structures and identified the distribution of paleo-highs through time.

Pressure Study – Explocrowd

A Joint 1089 & 1087 study where the objective was to understand the magnitudes and distribution of reservoir overpressure at all stratigraphic intervals in the defined area of interest in the Central Graben.

Long Distance Migration – IGI

The aim of the study was to combine the use of existing high quality fluid compositional data and various types of hydrocarbons shows to better understand migration and charge in the area.

Petroleum System Analysis – APT

An integrated source rock, maturation and charge migration model was developed for the area. The basin model shows that excess volumes of hydrocarbons have been generated and trapped within the area. The model predicted that all three prospects are likely charged with hydrocarbons but underfilled. All three prospects are modelled as oil-bearing with undersaturated oil, but the Jurassic Topaz prospect might contain undersaturated gas depending on fluid properties of the charge fluid. Good oil quality with gravity between 32° and 48° API is anticipated in all prospects. Therefore, the charge and migration risks are considered to be low for the prospects.

CRAM reimaging project – Harbour In-house

Harbour undertook an inhouse seismic CRAM depth imaging project. The input seismic data was pre-processed shot gathers from the reprocessed survey CHR21M01 and the project aim was to obtain an improved seismic image of Hidra and Rødby Fms sandstones.

The project was performed using Common Reflection Angle Migration (CRAM) which is part of the software suite from Paradigm. CRAM offers several advantages over standard Kirchhoff migrations as well as other accurate techniques e.g., wavefront reconstruction and beam migration. The CRAM algorithm does not require regularized data at the surface. It tracks rays from gridded subsurface points to any given surface coordinate, coupling all possible source-receiver pairs. In this project Q compensation was applied within the migration algorithm to accurately measured ray-paths.

The interpretation and SDA work using the CRAM data gave the same results as using the PGS data.

Petrophysics – In-house

Porosity was calculated for 24 wells analogous to the Jurassic, Cretaceous and/or the chalk prospect. For the main Tromøya prospect a wide range of porosities was determined, from 5 to 21 %; the upper part of the range reflects the Jurassic in Central Graben at prospect depth whereas the lower part reflects Hidra and Rødby Fm porosities in well 2/5-1 containing abundant carbonate cementation. For the chalk, the reworked Tor was estimated to have porosities ranging from 17 to 35 %.

4.0 Prospect update report

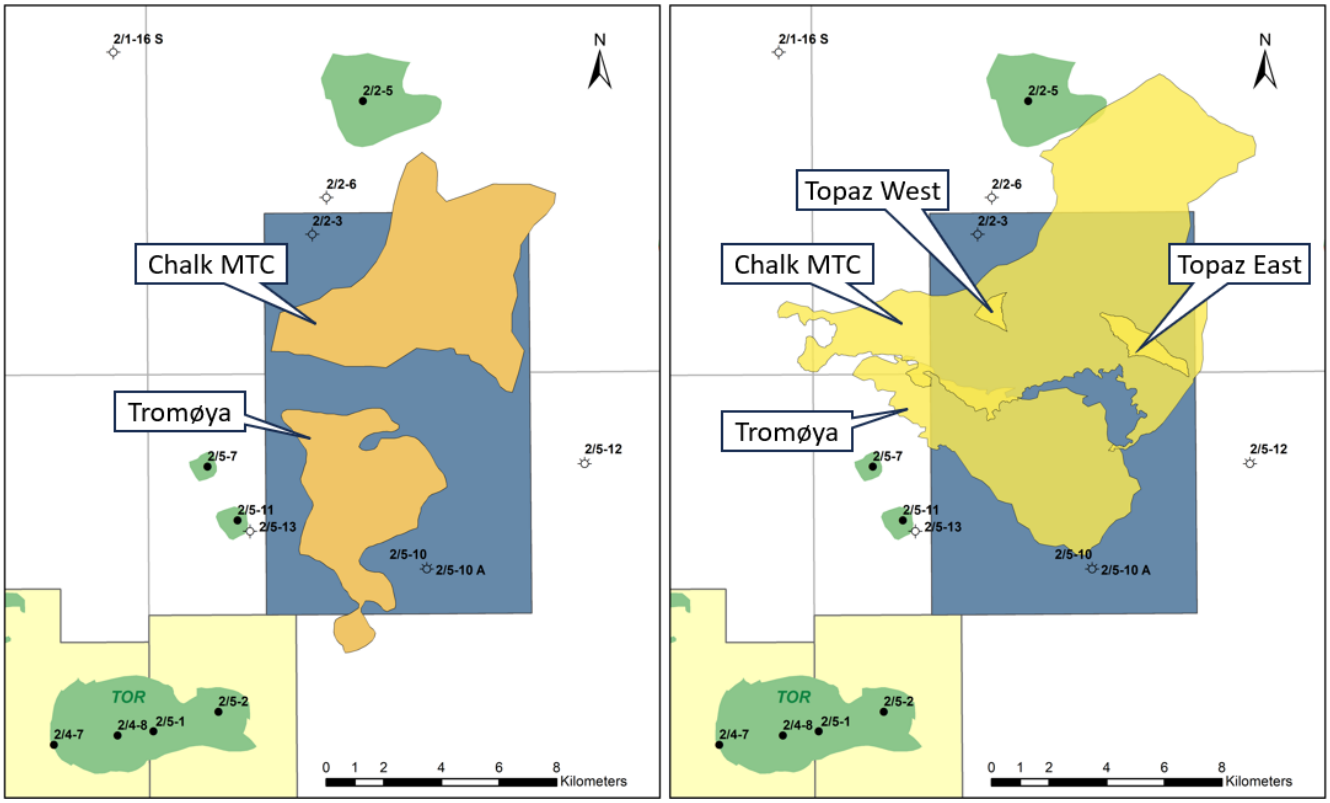

Figure 3: Original APA 2019 prospectivity (left) vs updated current prospectivity (right).

A detailed prospect evaluation of the license has been undertaken during Phase 1 of the work obligation. The Tromøya prospect, which was initially identified in the original license application as the main target, has been re-evaluated with the volumes reduced, and the risks increased. The Chalk MTC prospect which was identified in the license application as a lead has been extensively mapped and analysed which has resulted in high geological risk and moderate volume potential. The Jurassic Topaz prospect was identified on the reprocessed seismic dataset which was subject to detailed geological and geophysical analysis and demonstrated that its geological risk is high, and the volume potential is low (Figure 3).

The Tromøya prospect is a stratigraphic/structural combination trap with potential reservoir in the Hidra Fm and partly in the Rødby Fm. The overall structure is a three-way closure of top Hidra against a pinchout line on BCU and the trap is defined mainly by the 50 m reservoir thickness contour line. Top Sola Fm and Mandal shales act as base seal and Blodøks Fm shales as a top seal. Lateral seal is tight carbonate rich Hidra Fm. The potential reservoir is proven in well 2/5-1 with poor sandstone qualities assumed to be a distal part of a depositional system that originates on the structural high just north of the Tromøya prospect. Seismic mapping and various special studies have not succeeded in demonstrating the likelihood of provenance on the proximal northern high. Hidra/Rodby Fm calcareous sandstones are observed with only limited reservoir quality in nearby wells and all available data suggests the prospect to be within a sand-poor and bioclastic carbonate-rich system. Hydrocarbon migration modelling suggests an underfilled prospect either caused by seal failure or charge limitation. There are neither DHI nor amplitude observations to support a success case.

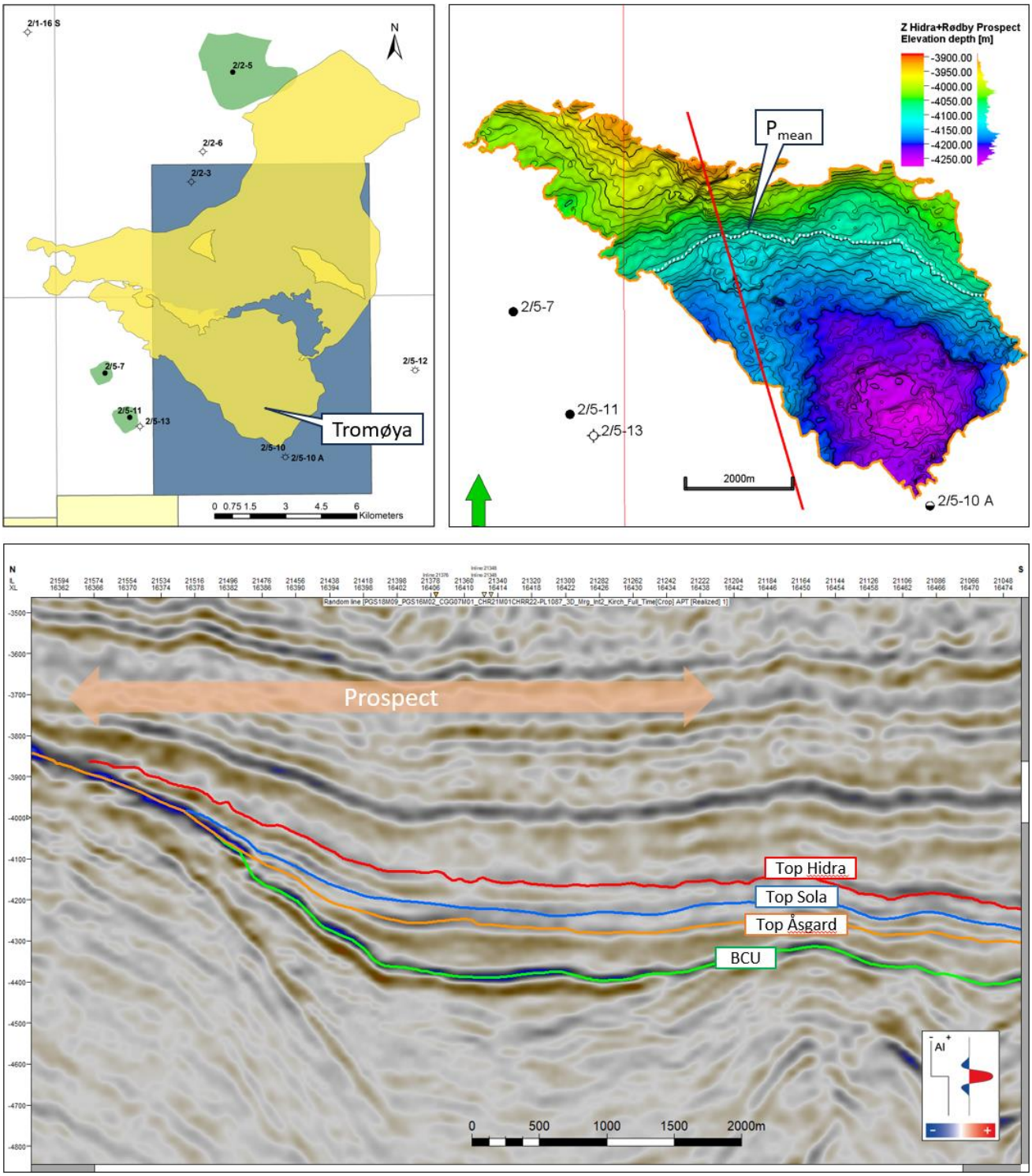

Figure 4: Tromøya prospect. Top Hidra/Rødby Fms depth map and seismic section in depth in S-N direction.

The Chalk MTC prospect is defined as a structural/stratigraphic trap produced by a post-depositional displacement (slumping) of semi-consolidated chalk deposits resulting in a mass transport complex (MTC). Seismic mapping shows the license area is composed of numerous MTCs between the top Hod Fm and top Ekofisk Fm. The near top Tor MTC is mostly separated by underlying MTC by a coherent seismic event which indicates a potential base seal in the form of basal shear surface. The top seal is base Ekofisk Fm which has also been affected by slumping potentially compromising the sealing capacity. Lateral seal is for large part the

Hatton Mbr which is the most porous and permeable part of the chalk sequence. Fault seal is not evident on seismic (displacement not observed) but there are indications of pressure difference between headwall area and footwall area. Hydrocarbon migration modelling suggests an underfilled prospect caused by charge limitation. A seismic low velocity anomaly in the chalk section does not show a good lateral correspondence to the outline of the mapped upper Tor MTC. No anomalous seismic amplitude is observed within the Tor sequence that might be indicative of DHI.

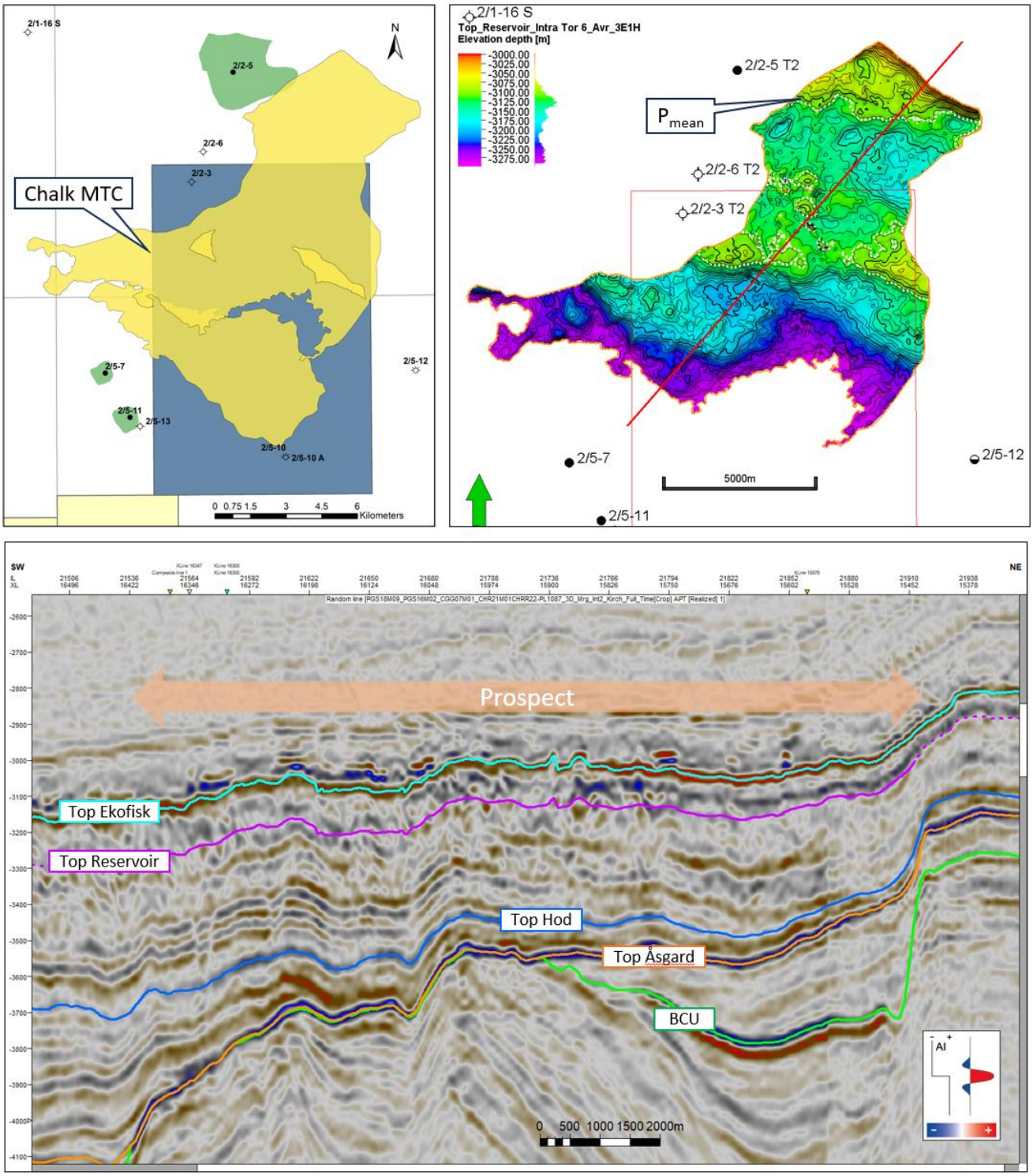

Figure 5: Chalk MTC prospect. Approximate top Tor depth map and seismic section in depth in SW-NE direction.

The Topaz prospect was initially identified as a lead during the license application phase and has been further matured as part of the work program. The Topaz prospect concept is centred around a thick, well developed reservoir section of Oxfordian age, located within the crestal hanging wall Graben trap on the main central Jurassic/Triassic high (see Fig. 6). **Error! No bookmark name given.**This reservoir (J54 Basal Sst and younger) is c omprised of marginal marine sandstones located in a depocenter influenced by early salt wall collapse and is expected to be much better developed than in the 2/2-3 well to the NW.

Detailed basin modelling has been carried out with a focus on Oxfordian source rocks (in addition to the Kimmeridgian and Volgian SRs) and the initial immature potential of these sequences has been calculated and indicates good source potential. The hydrocarbon phase is expected to be mainly light oil, migrating vertically downwards and laterally from the directly overlying mature Oxfordian marine SR.

The Top seal for the prospect is provided by the same Oxfordian marine transgressive shales which function as the source rock. The top of the interpreted reservoir horizon is dipping to the SE with the crest being located at the western end. Laterally to the west, north and south, the trap is bound a complex arrangement of normal faults which dip towards the prospect, i.e. ‘inward’ These faults have been evaluated for their sealing potential using 1 D juxtaposition analysis based on the 2/2-3 well Vshale log. This analysis revealed a very limited column height potential based on the fault throw near the western crestal area of the prospect. This basically resulted in the breakup of the Topaz prospect into a West and East segment and significantly reduced the resource potential from the encouraging initial screening volumes. Other Jurassic structures in the license area either tested or considered too small.

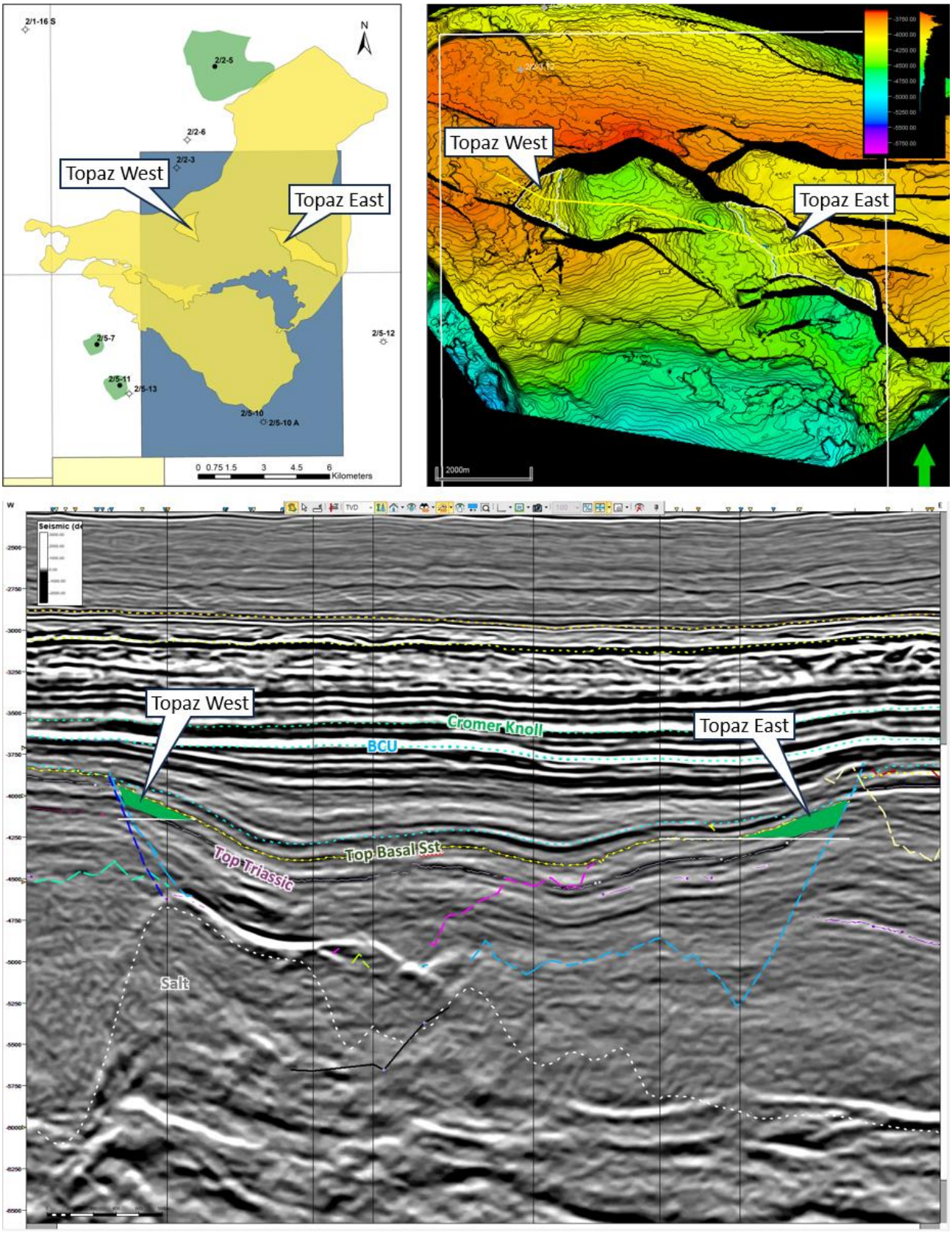

Figure 6: Topaz prospect. Top Tor depth map and seismic section in depth in W-E direction.

In conclusion, the executed work program has delivered on reduction of uncertainty and both main prospects have seen reduction in resource and increase in risk. Both main prospects have each one Petroleum System Element clearly below 50%. The Topaz prospects can act as a 'placeholder' for numerous small other prospects that could be mapped within the PL1087 License area but will not be sufficiently material to warrant further activity. A summary of the license prospectivity and risk development is shown on Figure 7 and an overview of the updated volumes and risk is given in Table 3.

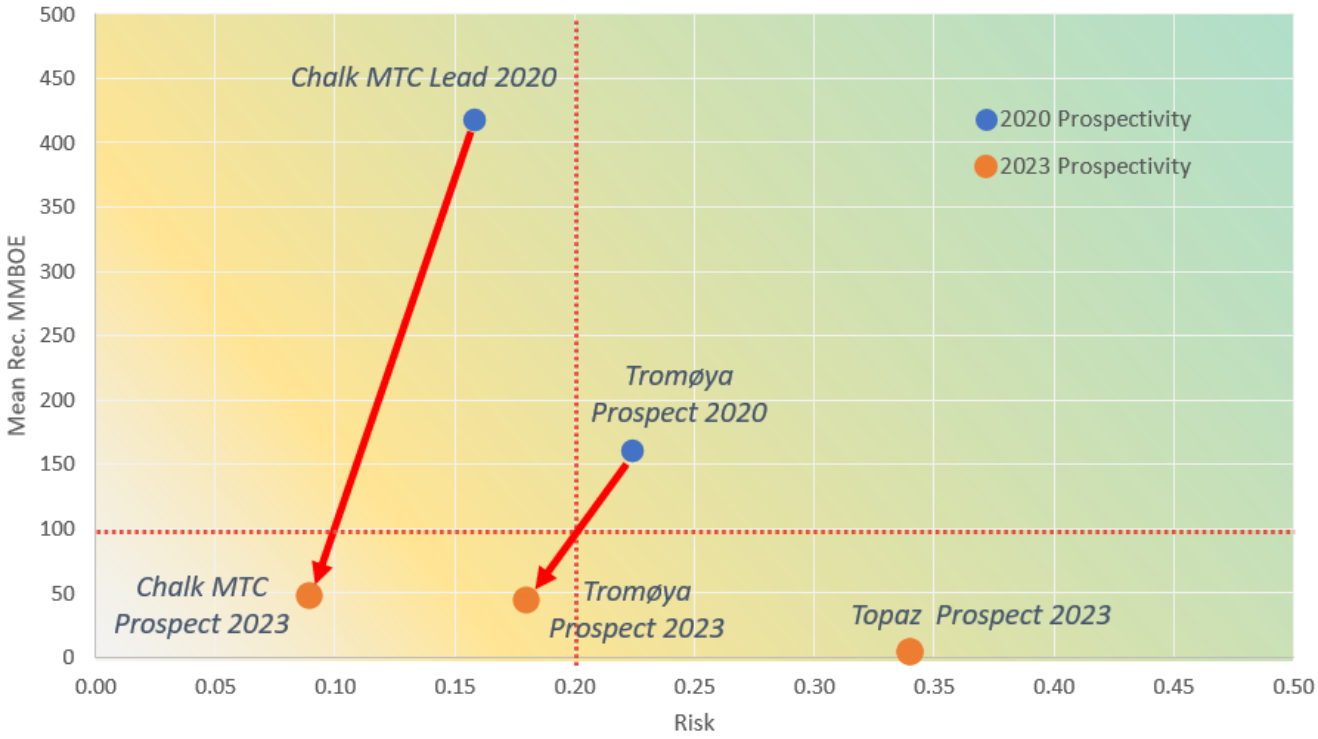

Figure 7: Summary of license prospectivity and risk.

	AGE	TRAP	Recov. Res. (MMBOE)	Oil/ Gas	Pg
PROSPECT/LEAD NAME			Mean		
Tromøya	U.-L. Cret.	Strat.	36.7	Oil	18%
Chalk MTC	U. Cret.	Strat.	47.2	Oil	9%
Topaz West	U. Jur.	Struct.	2.6	Oil	34%
Topaz East	U. Jur.	Struct.	3.6	Oil	34%

Table 3: Recoverable resources and risk

4.1 Tables with Discovery and Prospect data (NPD Table 4)

Table 4: Discovery and Prospect data (Enclose map)

Block	2/2, 2/5	Prospect name	Tromøya	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:	Oil	Reported by company	Harbour Energy	Reference document	PL1087 status report for surrender of production license			Assessment year	2023
This is case no.:	1 of 1	Structural element	Steinbit Terrace	Type of trap	Struct-Strat	Water depth [m MSL] (>0)	65	Seismic database (2D/3D)	3D
Resources IN PLACE and RECOVERABLE		**Main phase**				**Associated phase**			
Volumes, this case		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)	1.41	0.01	17.00	38.10	0.39	0.01	4.94	11.50
	Gas [10^9 Sm^3] (>0.00)								
Recoverable resources	Oil [10^6 Sm^3] (>0.00)	0.30	0.01	4.55	11.10	0.09	0.01	1.32	3.21
	Gas [10^9 Sm^3] (>0.00)								
Reservoir Chrono (from)		Reservoir litho (from)		Source Rock, chrono primary		Source Rock, litho primary		Seal, Chrono	
Reservoir Chrono (to)		Reservoir litho (to)		Source Rock, chrono secondary		Source Rock, litho secondary		Seal, Litho	
Probability [fraction]									
Total (oil + gas + oil & gas case) (0.00-1.00)	0.18	Oil case (0.00-1.00)	1.00	Gas case (0.00-1.00)		Oil & Gas case (0.00-1.00)			
Reservoir (P1) (0.00-1.00)	0.35	Trap (P2) (0.00-1.00)	0.75	Charge (P3) (0.00-1.00)	0.95	Retention (P4) (0.00-1.00)	0.70		
Parametres:	Low (P90)	Base	High (P10)	*Comments*					
Depth to top of prospect [m MSL] (> 0)		3900							
Area of closure [km^2] (> 0.0)									
Reservoir thickness [m] (> 0)									
HC column in prospect [m] (> 0)									
Gross rock vol. [10^9 m^3] (> 0.000)	3.189	3.753	4.439						
Net / Gross [fraction] (0.00-1.00)	0.12	0.19	0.31						
Porosity [fraction] (0.00-1.00)	0.17	0.19	0.21						
Permeability [mD] (> 0.0)									
Water Saturation [fraction] (0.00-1.00)	0.25	0.30	0.35						
Bg [Rm3/Sm3] (< 1.0000)									
1/Bo [Sm3/Rm3] (< 1.00)	0.51	0.56	0.64						
GOR, free gas [Sm^3/Sm^3] (> 0)									
GOR, oil [Sm^3/Sm^3] (> 0)	188	291	407						
Recov. factor, oil main phase [fraction] (0.00-1.00)	0.17	0.25	0.33						
Recov. factor, gas ass. phase [fraction] (0.00-1.00)	0.17	0.25	0.33						
Recov. factor, gas main phase [fraction] (0.00-1.00)									
Recov. factor, liquid ass. phase [fraction] (0.00-1.00)				For NPD use:					
Temperature, top res [°C] (>0)	160			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)	700			Dato:	NPD will insert value	Registrert Dato:	NPD will insert value	Kart dato	NPD will insert value
Cut off criteria for N/G calculation	1.	2.	3.					Kart nr	NPD will insert value

Table 4: Tromøya Prospect

Table 4: Discovery and Prospect data (Enclose map)

Block	2/2, 2/5	Prospect name	Chalk MTC	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:	Oil	Reported by company	Harbour Energy	Reference document	PL1087 status report for surrender of production license			Assessment year	2023
This is case no.:	1 of 1	Structural element	Steinbit Terrace	Type of trap	Struct-Strat	Water depth [m MSL] (>0)	65	Seismic database (2D/3D)	3D
Resources IN PLACE and RECOVERABLE		**Main phase**				**Associated phase**			
Volumes, this case		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)	4.80	5.30	20.70	48.20	1.30	1.44	6.00	14.40
	Gas [10^9 Sm^3] (>0.00)								
Recoverable resources	Oil [10^6 Sm^3] (>0.00)	1.02	1.41	5.86	13.60	0.29	0.44	1.70	4.00
	Gas [10^9 Sm^3] (>0.00)								
Reservoir Chrono (from)		Reservoir litho (from)		Source Rock, chrono primary		Source Rock, litho primary		Seal, Chrono	
Reservoir Chrono (to)		Reservoir litho (to)		Source Rock, chrono secondary		Source Rock, litho secondary		Seal, Litho	
Probability [fraction]									
Total (oil + gas + oil & gas case) (0.00-1.00)	0.09	Oil case (0.00-1.00)	1.00	Gas case (0.00-1.00)		Oil & Gas case (0.00-1.00)			
Reservoir (P1) (0.00-1.00)	0.70	Trap (P2) (0.00-1.00)	0.60	Charge (P3) (0.00-1.00)	0.85	Retention (P4) (0.00-1.00)	0.25		
Parametres:	Low (P90)	Base	High (P10)	*Comments*					
Depth to top of prospect [m MSL] (> 0)		3000							
Area of closure [km^2] (> 0.0)	71.9	79.9	87.9						
Reservoir thickness [m] (> 0)	54	74	100						
HC column in prospect [m] (> 0)									
Gross rock vol. [10^9 m^3] (> 0.000)	3.496	4.720	6.214						
Net / Gross [fraction] (0.00-1.00)	0.57	0.69	0.81						
Porosity [fraction] (0.00-1.00)	0.18	0.22	0.27						
Permeability [mD] (> 0.0)									
Water Saturation [fraction] (0.00-1.00)	0.27	0.35	0.43						
Bg [Rm3/Sm3] (< 1.0000)									
1/Bo [Sm3/Rm3] (< 1.00)	0.51	0.56	0.64						
GOR, free gas [Sm^3/Sm^3] (> 0)									
GOR, oil [Sm^3/Sm^3] (> 0)	188	291	407						
Recov. factor, oil main phase [fraction] (0.00-1.00)	0.15	0.26	0.41						
Recov. factor, gas ass. phase [fraction] (0.00-1.00)	0.15	0.26	0.41						
Recov. factor, gas main phase [fraction] (0.00-1.00)									
Recov. factor, liquid ass. phase [fraction] (0.00-1.00)				For NPD use:					
Temperature, top res [°C] (>0)	130			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)	450			Dato:	NPD will insert value	Registrert Dato:	NPD will insert value	Kart dato	NPD will insert value
Cut off criteria for N/G calculation	1.	2.	3.					Kart nr	NPD will insert value

Table 5: Chalk MTC Prospect

Table 4: Discovery and Prospect data (Enclose map)

Block	2/2, 2/5	Prospect name	Topaz East	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:	Oil	Reported by company	Harbour Energy	Reference document	PL1087 status report for surrender of production license			Assessment year	2023
This is case no.:	1 of 1	Structural element	Steinbit Terrace	Type of trap	Structural	Water depth [m MSL] (>0)	65	Seismic database (2D/3D)	3D
Resources IN PLACE and RECOVERABLE		**Main phase**				**Associated phase**			
Volumes, this case		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)	0.36	0.63	1.12	2.12	0.07	0.09	0.23	0.43
	Gas [10^9 Sm^3] (>0.00)								
Recoverable resources	Oil [10^6 Sm^3] (>0.00)	0.13	0.23	0.46	0.92	0.02	0.04	0.09	0.19
	Gas [10^9 Sm^3] (>0.00)								
Reservoir Chrono (from)		Reservoir litho (from)		Source Rock, chrono primary		Source Rock, litho primary		Seal, Chrono	
Reservoir Chrono (to)		Reservoir litho (to)		Source Rock, chrono secondary		Source Rock, litho secondary		Seal, Litho	
Probability [fraction]									
Total (oil + gas + oil & gas case) (0.00-1.00)	0.34	Oil case (0.00-1.00)	1.00	Gas case (0.00-1.00)		Oil & Gas case (0.00-1.00)			
Reservoir (P1) (0.00-1.00)	0.75	Trap (P2) (0.00-1.00)	0.85	Charge (P3) (0.00-1.00)	0.90	Retention (P4) (0.00-1.00)	0.60		
Parametres:	Low (P90)	Base	High (P10)	*Comments*					
Depth to top of prospect [m MSL] (> 0)		4060							
Area of closure [km^2] (> 0.0)									
Reservoir thickness [m] (> 0)									
HC column in prospect [m] (> 0)	73	105	145						
Gross rock vol. [10^9 m^3] (> 0.000)	0.090	0.099	0.106						
Net / Gross [fraction] (0.00-1.00)	0.37	0.48	0.62						
Porosity [fraction] (0.00-1.00)	0.15	0.17	0.19						
Permeability [mD] (> 0.0)									
Water Saturation [fraction] (0.00-1.00)	0.25	0.30	0.35						
Bg [Rm3/Sm3] (< 1.0000)									
1/Bo [Sm3/Rm3] (< 1.00)	0.58	0.62	0.65						
GOR, free gas [Sm^3/Sm^3] (> 0)									
GOR, oil [Sm^3/Sm^3] (> 0)	138	208	287						
Recov. factor, oil main phase [fraction] (0.00-1.00)	0.29	0.40	0.51						
Recov. factor, gas ass. phase [fraction] (0.00-1.00)	0.29	0.40	0.51						
Recov. factor, gas main phase [fraction] (0.00-1.00)									
Recov. factor, liquid ass. phase [fraction] (0.00-1.00)				For NPD use:					
Temperature, top res [°C] (>0)	155			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)	800			Dato:	NPD will insert value	Registrert Dato:	NPD will insert value	Kart dato	NPD will insert value
Cut off criteria for N/G calculation	1.	2.	3.					Kart nr	NPD will insert value

Table 6: Topaz (East) Prospect

Table 4: Discovery and Prospect data (Enclose map)

Block	2/2, 2/5	Prospect name	Topaz West	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:	Oil	Reported by company	Harbour Energy	Reference document	PL1087 status report for surrender of production license			Assessment year	2023
This is case no.:	1 of 1	Structural element	Steinbit Terrace	Type of trap	Structural	Water depth [m MSL] (>0)	65	Seismic database (2D/3D)	3D
Resources IN PLACE and RECOVERABLE		**Main phase**				**Associated phase**			
Volumes, this case		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)	0.40	0.68	0.79	1.27	0.16	0.26	0.39	0.67
	Gas [10^9 Sm^3] (>0.00)								
Recoverable resources	Oil [10^6 Sm^3] (>0.00)	0.13	0.22	0.33	0.59	0.06	0.77	0.16	0.30
	Gas [10^9 Sm^3] (>0.00)								
Reservoir Chrono (from)		Reservoir litho (from)		Source Rock, chrono primary		Source Rock, litho primary		Seal, Chrono	
Reservoir Chrono (to)		Reservoir litho (to)		Source Rock, chrono secondary		Source Rock, litho secondary		Seal, Litho	
Probability [fraction]									
Total (oil + gas + oil & gas case) (0.00-1.00)	0.34	Oil case (0.00-1.00)	1.00	Gas case (0.00-1.00)		Oil & Gas case (0.00-1.00)			
Reservoir (P1) (0.00-1.00)	0.75	Trap (P2) (0.00-1.00)	0.85	Charge (P3) (0.00-1.00)	0.90	Retention (P4) (0.00-1.00)	0.60		
Parametres:	Low (P90)	Base	High (P10)	*Comments*					
Depth to top of prospect [m MSL] (> 0)		3980							
Area of closure [km^2] (> 0.0)									
Reservoir thickness [m] (> 0)									
HC column in prospect [m] (> 0)	73	112	158						
Gross rock vol. [10^9 m^3] (> 0.000)	0.040	0.043	0.047						
Net / Gross [fraction] (0.00-1.00)	0.37	0.48	0.62						
Porosity [fraction] (0.00-1.00)	0.15	0.17	0.19						
Permeability [mD] (> 0.0)									
Water Saturation [fraction] (0.00-1.00)	0.25	0.30	0.35						
Bg [Rm3/Sm3] (< 1.0000)									
1/Bo [Sm3/Rm3] (< 1.00)	0.58	0.62	0.65						
GOR, free gas [Sm^3/Sm^3] (> 0)									
GOR, oil [Sm^3/Sm^3] (> 0)	278	505	722						
Recov. factor, oil main phase [fraction] (0.00-1.00)	0.29	0.40	0.51						
Recov. factor, gas ass. phase [fraction] (0.00-1.00)	0.29	0.40	0.51						
Recov. factor, gas main phase [fraction] (0.00-1.00)									
Recov. factor, liquid ass. phase [fraction] (0.00-1.00)				For NPD use:					
Temperature, top res [°C] (>0)	155			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)	800			Dato:	NPD will insert value	Registrert Dato:	NPD will insert value	Kart dato	NPD will insert value
Cut off criteria for N/G calculation	1.	2.	3.					Kart nr	NPD will insert value

Table 7: Topaz (West) Prospect

5.0 Technical assessment

A detailed technical-economic evaluation was performed for the Tromøya prospect.

The exploration strategy comprised a vertical exploration well drilled by either a semi-sub or a jack-up rig. The development solution was a subsea tie-back to Ekofisk located 24 km Southwest of the prospect. An alternative development strategy was considered via Tor infrastructure. Producers were planned to be placed high on the structure and pressure maintenance was planned with a combination of high-angle injector wells placed down flank and a connected aquifer. Multi-lateral wells or possibly Fishbones technology could be considered to improved volumetric sweep.

The evaluation demonstrates that the mean recoverable resources at 36,7 mmboe are larger than the estimated B/E reserves for the prospect, but combined with a low chance for success, Pg 18%, the expected monetary value (EMV) is negative which makes the prospect not a viable drilling target.

6.0 Conclusion

The prospectivity within license PL1087 has been thoroughly evaluated over 3 years and all the license commitments have been fulfilled. As a result of the license work the partnership concludes that the geological risk (Pg) is too high, and the recoverable hydrocarbon volume potential is too low to make a viable business case to warrant further work and development. The partnership has unanimously decided to relinquish PL1087 in its entirety.