ORLEN
UPSTREAM
NORWAY

Status report for lapse of license

PL1055, PL1055B and PL1055C

1. History of the Production License

The exploration license PL1055, including area extensions B and C, is situated above the Ona High, approximately 38 km south of the Ormen Lange gas field in the Southern Norwegian Sea (**Fig. 1.1 PL1055 (B, C) Overview**).

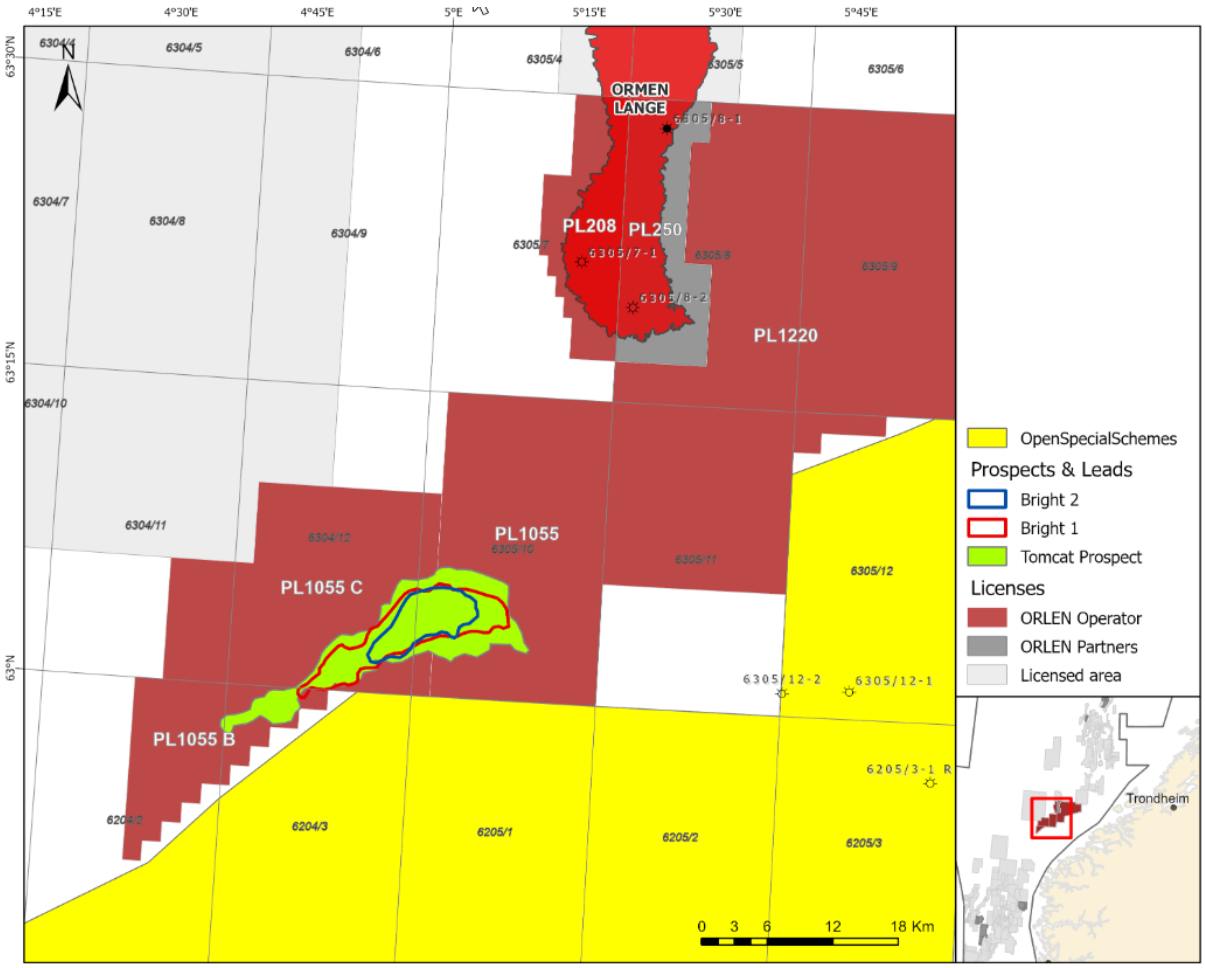

Fig. 1.1 PL1055 (B, C) Overview

The initial PL1055 license was awarded following APA2019 on 14.02.2020, covering part of block 6305/10, with INEOS E&P Norge AS as Operator (60%) and Norske Shell A/S as partner (40%). Extension PL1055 B was granted in the 25th licensing round on 17.09.2021 (blocks 6204/2 and /3), and PL1055 C was awarded on 11.03.2022 after APA2021 (blocks 6304/11, /12, and 6305/10). These extensions were pursued to encompass the full extent of the Tomcat prospect, the primary opportunity in the area. The total acreage, including all extensions, was 973 km².

Upon award, the initial license period was extended by six weeks (approved by MPE, dated 09.03.2022, until 01.04.2022) to allow A/S Norske Shell to complete internal evaluations and

support the operator's drilling recommendation. Following the merger of INEOS E&P Norge AS into PGNiG Upstream Norway AS, operatorship transferred to PGNiG Upstream Norway AS as of 30.09.2021. Subsequently, after the merger of PGNiG and ORLEN in Poland, the final license configuration as of 26.09.2024 became ORLEN Upstream Norway AS (60%) and A/S Norske Shell (40%).

The PL1055 work program comprised 3D seismic reprocessing and G&G studies, leading to a Drill-or-Drop decision after a two-year period (**Table 1.2 Work Program for PL1055**).

Work Program	Original deadline	Extension deadline	Results	Results
Study of geology and geophysics	14.02.2022	-	Fulfilled	Basin modelling, rock physics & sedimentological studies
Reprocessing of 3D seismic data	14.02.2022	-	Fulfilled	CGG reprocessing of MC3D-MOERE
Decision to drill an exploration well (DoD)	14.02.2022	01.04.2022	Drill	Dry
Decision to concretize (BoK)	14.08.2025	-	Not continue	Relinquish license
Decision to continue (BoV)	-	-	-	-
Decision to submit a PDO	-	-	-	-

Table 1.2 Work Program for PL1055

The 3D seismic reprocessing focused on the MC3D-MOERE dataset, the only 3D seismic acquisition over the area, and included the nearest well 6305/12-2 (~30 km east of Tomcat). The resulting dataset was MC3D-MOEREINER21.

Based on updated seismic interpretation and in-house G&G evaluation, including two basin modeling studies indicating favorable gas migration, the operator recommended drilling. This recommendation was supported by A/S Norske Shell on 01.04.2022, initiating planning for the 6305/10-1 Tomcat wildcat well.

During the license period, 11 EC/MC meetings were held with Norske Shell—four leading up to the drill recommendation and seven during well planning and result discussions (**Table 1.3 List of EC/MC meetings held during the lifetime of PL1055**). Additionally, 16 EC Work meetings reflected close collaboration, especially during well planning.

Meeting	Date
EC/MC meeting #1 – License establisment	15.04.2020
EC/MC meeting #2 – Status of reprocessing and G&G work	09.12.2020
EC/MC meeting #3 – Status on G&G and rock physics work	16.06.2021
EC/MC meeting #4 – Drill recommendation from Operator	29.11.2021
EC/MC meeting #5 – Site survey and well planning	27.06.2022
EC/MC meeting #6 – Well planning update and procurement	08.12.2022
EC/MC meeting #7 – Timeline and Anchor ROV survey	21.06.2023
EC/MC meeting #8 – Anchor results and coral risk assessment	29.11.2023
EC/MC meeting #9 – Well planning presentations	18.04.2024
EC/MC meeting #10 – Well planning, acquisition program	30.10.2024
EC/MC meeting #11 – Tomcat well result and way forward	07.01.2025

Table 1.3 List of EC/MC meetings held during the lifetime of PL1055

The primary objective of the exploration well was to assess the presence of economically recoverable hydrocarbons in the Upper Cretaceous Coniacian–Turonian Lysing sandstone reservoirs of the Tomcat prospect. Secondary objectives included evaluating the Bright 1 and 2 prospects immediately above Tomcat.

The Tomcat well 6305/10-1 was dry due to lack of reservoir within the target. With no other drill candidates, the JV in PL1055 (B, C) decided to relinquish the license at the end of the current period.

2. Database Overview

The Common Database (CDB) for the license comprised released wells from the greater Ormen Lange area, public 2D and 3D seismic data, and proprietary 3D seismic data.

Seismic Data:
Multiple datasets and vintages are present around PL1055 (**Fig. 2.1 3D CDB seismic coverage**). The seismic CDB included several 3D datasets, notably the SH18M01/SH19M01 merged datasets, which were instrumental in the original APA application but did not fully cover Tomcat. As part of the work program, the MC3D-MOERE 3D acquisition was reprocessed, resulting in the MC3D-MOEREINER21 dataset. The main objective was to reduce noise, increase resolution, and fully cover Tomcat for amplitude analysis. The reprocessed data improved overburden imaging but provided limited improvement at reservoir level due to seabed relief and other challenges. Final deliverables included full stacks, partial angle stacks, velocities, and gather data.

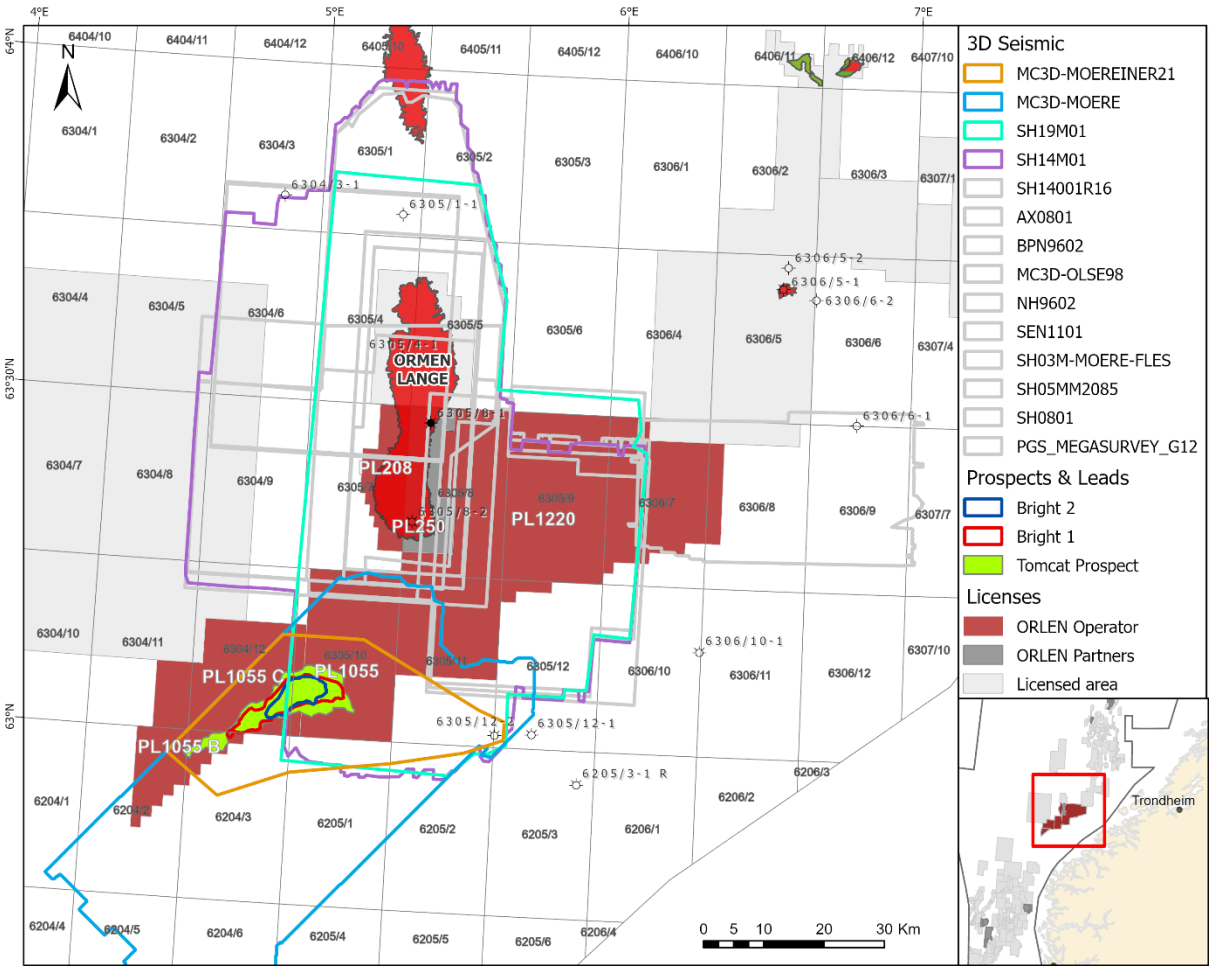

Fig. 2.1 3D Seismic CDB seismic coverage

Despite imaging challenges, MC3D-MOEREINER21 was the preferred dataset for prospect evaluation and well planning. Public 2D data in the area was mainly used for basin modeling and sand fairway mapping (**Fig. 2.1**, **Table 2.1 3D CDB list**, **Fig. 2.2 2D CDB seismic coverage**).

Well Data:
The Well CDB includes all released wells in the area (**Table 2.2 Well CDB, including wells from the Slørebotn Sub-Basin**).

Survey4594	Type	Year	Company	Status	Data Quality	NPD ID
SH14M01	3D	2014	AS Norske Shell	Available via PL698/PL699	Good	n/a
SH14001R16	3D	2016	AS Norske Shell	Available via PL250	Very Good	8042?
SH19M01	3D	2019	AS Norske Shell	Available via PL997	Very Good	n/a
MC3D_MOERE	3D	2001	CGG	Released	Poor - Moderate	4109
MC3D-MOEREINER21	3D	2021	CGG	Proprietary PL1055	Good – Very Good	4109?
SEN1101	3D	2011	Tullow Oil	Released	Moderate	7443
SH03M-MOERE_FLES-PH4	3D	2003	AS Norske Shell	Released	Good	n/a
SH03M-MOERE_FLES-PH5	3D	2003	AS Norske Shell	Released	Good	n/a
SH03M-MOERE_FLES-PH6	3D	2003	AS Norske Shell	Released	Good	n/a
PGS MegaSurvey G12	3D	2010	PGS	MegaSurvey licensed from PGS	Moderate - Good	
AX0801	3D	2008	Aker Exploration AS	Released	Good	4507
NH9602	3D	1996	Statoil	Released	Moderate – Good	3775
MC3D-OLSE98	3D	1998	PGS	Released	Moderate - Good	3915
BPN9602	3D	1996	BP Norge AS	Released	Good	3756
SH0501 (SH05MM2085)	3D	2005	AS Norske Shell	Available via PL250	Moderate	4310 (?)
SH0801	3D	2008	AS Norske Shell	Available via PL250	Moderate	4594

Table 2.1 3D seismic CDB list

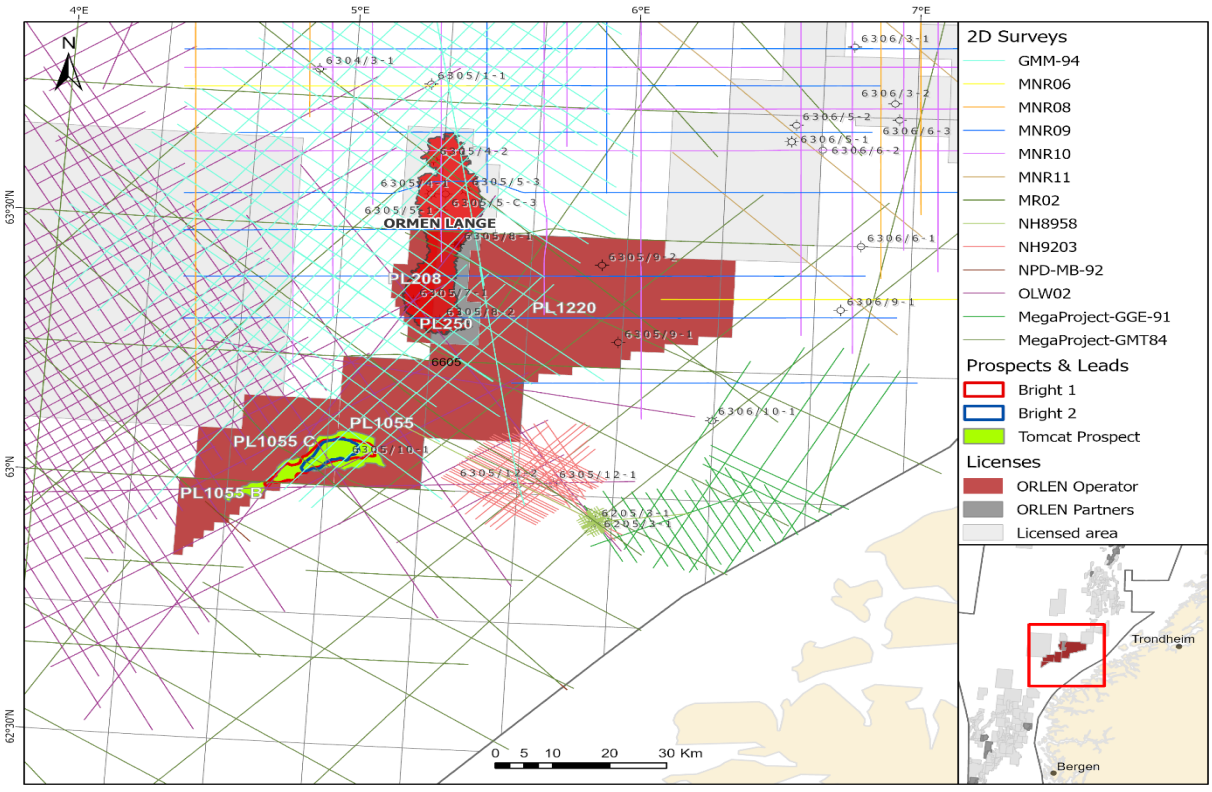

Fig. 2.2 2D Seismic CDB seismic coverage

Well name	Common name	Year	Water depth (mMSL)	TD (mMD)	Age/Fm at TD	Result	Key relevance to this application	NPD ID
6204/10-1	J-prospect	1995	188	2709	Basement	Dry	Principal reservoir analogue	2666
6204/10-2 R	L-Prospect	1997	172	2095	Basement	Gas discovery in the Lower Cretaceous	Reservoir properties	3258
6204/11-1		1994	199	2966	Triassic/ Grey Beds	Shows in Turonian sst, gas in Intra Heather sst	Reservoir properties	2205
6204/11-2	I&O-prospects	1997	197	2920	L. Jurassic/ Sognefjord Fm	Oil Shows	Reservoir properties	3249
6205/3-1 R	B-prospect	1989	159	4300	E. Cretaceous	Shows in Åsgard Fm	Calibration of Cretaceous and Jurassic reservoirs	1510
6305/1-1	North of Ormen Lange	1998	839.5	4560	L. Cretaceous/ Lysing Fm	Weak residual shows throughout Cretaceous section	Northern-most well in the Ormen Lange dome. Key reservoir and seismic calibration down to Lysing Fm. Depth conversion. Rock physics and wedge modelling	3555
6305/4-1	Ormen Lange	2002	1002	2975	L. Cretaceous/ Springar Fm	Gas in Egga Fm	Seismic calibration and depth conversion	4441
6305/5-1	Ormen Lange	1997	888.5	3053	L. Cretaceous/ Nise Fm	Gas in Egga Fm	Seismic calibration and depth conversion	3144
6305/7-1	Ormen Lange	1998	857	3377	L. Cretaceous/ Springar Fm	Gas in Egga Fm	Seismic calibration and depth conversion	3535
6305/8-1	Ormen Lange	2000	837	3175	L. Cretaceous/ Nise Fm	Oil/Gas Egga Fm	Seismic calibration and depth conversion	4109
6305/8-2	Ormen Lange	2014	616	3078	L. Cretaceous/ Springar Fm	Gas in Egga Fm	Seismic calibration and depth conversion	7579
6305/9-1	Blåveis	2001	187	2655	L. Cretaceous/ Springar Fm	Dry	Seismic calibration and depth conversion	4297
6305/9-2	Dovregubben	2011	274	3075	L. Cretaceous/ Springar Fm	Weak shows in Egga Fm	Seismic calibration and depth conversion	6502
6305/12-1	C-prospect	1991	176.5	4302	Late Triassic/ Red Beds	Weak shows in Egga Fm, movable oil in Lange Fm, shows in U. Jurassic	Reservoir properties	1808
6305/12-2 (T3)	Cretaceous wedge and E-prospect	1993	146	3162	Basement	Gas in poor quality M Jurassic, Shows in L & E.Cretaceous	Key reservoir and seismic calibration down to Lysing Fm. Depth conversion. Rock physics and wedge modelling	2207
6306/6-1	A-prospect	1994	284	1317	Basement	Dry	Reservoir analogue for Falcon	2384
6306/6-2	Geitfjellet	2009	224	2080	Basement	Dry	Reservoir properties	6143
6306/10-1	Skalmen	1990	83	3187	Basement	Oil/Gas shows	Key reservoir and seismic calibration. Rock physics and wedge modelling	1551

Table 2.2 Well CDB, including wells from the Sløre botn Sub-Basin

3. Results of Geological and Geophysical Studies

Several semi-regional external and internal studies were conducted, focusing on basin modeling, reservoir presence, trap geometry, and seal. A summary is provided in **Table 3.1 Studies completed during the license evaluation up to the drill recommendation**.

Two 3D basin modeling studies (INEOS, 2019; Petroleum Systems Consulting A/S, 2021) indicated favorable hydrocarbon charge for Tomcat. Reservoir studies by both the operator and Norske Shell suggested active source-to-sink systems, with turbiditic channels and lobes likely depositing sands at Tomcat, though reservoir presence remained a key risk.

The results of the Rick Physics modeling is covered in the next chapter.

Norske Shell reprocessed and merged 3D surveys AX0801, MC3D-OLSE98, MC3D-MOERE and SH14M01 into SH18M01 in 2018 to enhance seismic quality for the Cretaceous succession. Tomcat was identified using SH18M01. The MC3D-MOEREINER21 reprocessing aimed to improve amplitude analysis for Tomcat.

Study Name	Company	Year
South Halten Terrace & Møre Stratigraphic Database	Ichron	2015
Reservoir Quality Study	A/S Norske Shell	2017
Broadband Reprocessed Seismic, SH18M01	A/S Norske Shell	2018
Regional Sand Fairway Study	INEOS E&P Norge	2019
Petrophysical Study	INEOS E&P Norge	2019
Basin Modelling Analysis	INEOS E&P Norge	2019
MC3D-MOERE Reprocessing (MC3D-MOEREINER21)	CGG	2020-2021
Rock Physics evaluation	INEOS E&P Norge	2020-2021
Basin Modelling Analysis	Petroleum Systems Consulting A/S	2021

Table 3.1 Studies completed during the license evaluation up to the drill recommendation

4. Prospect Update Report

Pre-drill Evaluation:
Tomcat was originally defined by a bright seismic event on SH18M01 within the Cretaceous post-rift succession over the Ona High, confirmed on SH19M01 and MC3D-MOEREINER21. The prospect was characterized by strong amplitude anomalies at both top and base reservoir (**Fig. 4.1–4.5**), interpreted as sand deposition in a channel/lobe complex with lens geometry.

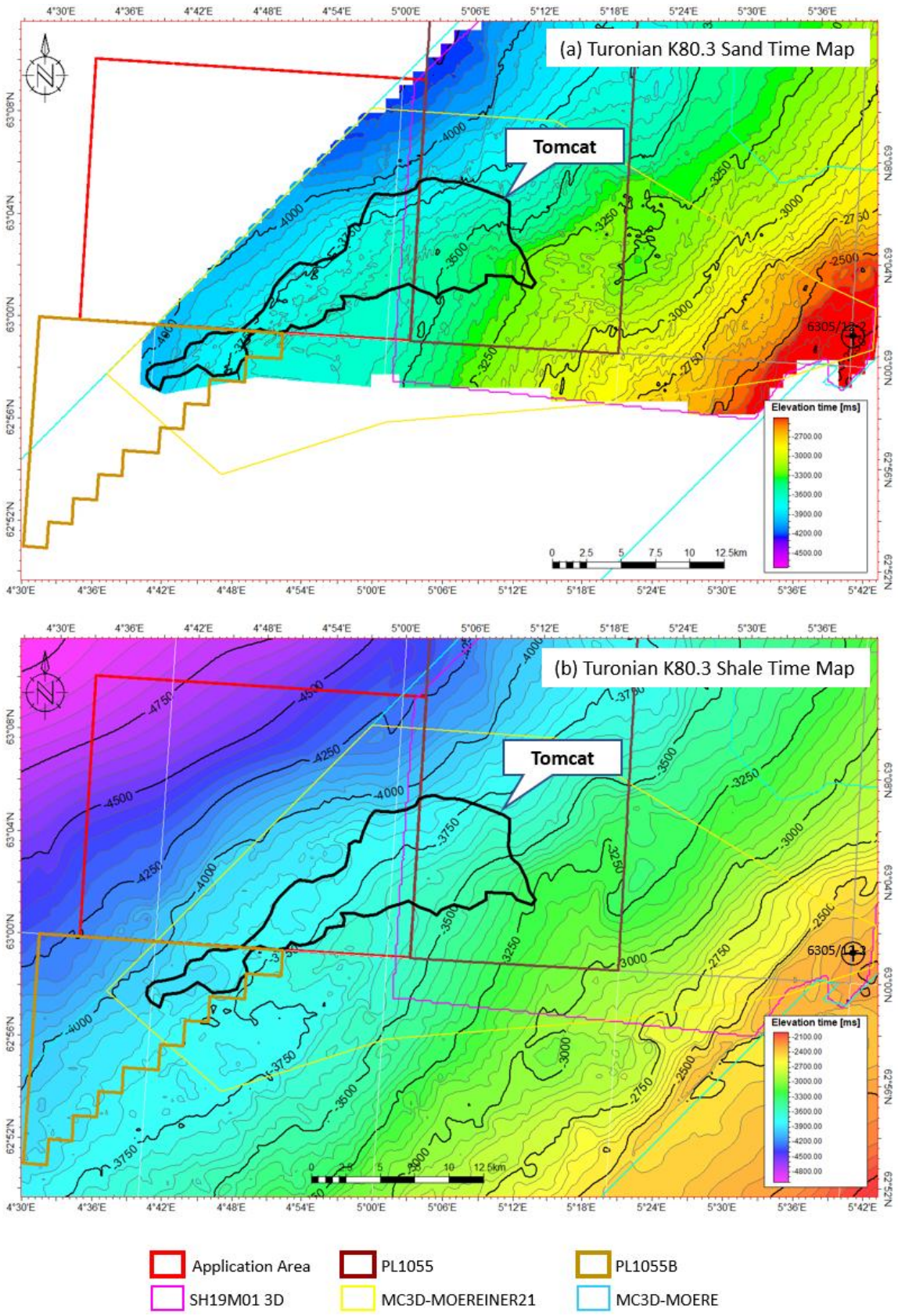

Fig. 4.1 Time maps. A) Top Tomcat horizon. B) Base Tomcat horizon

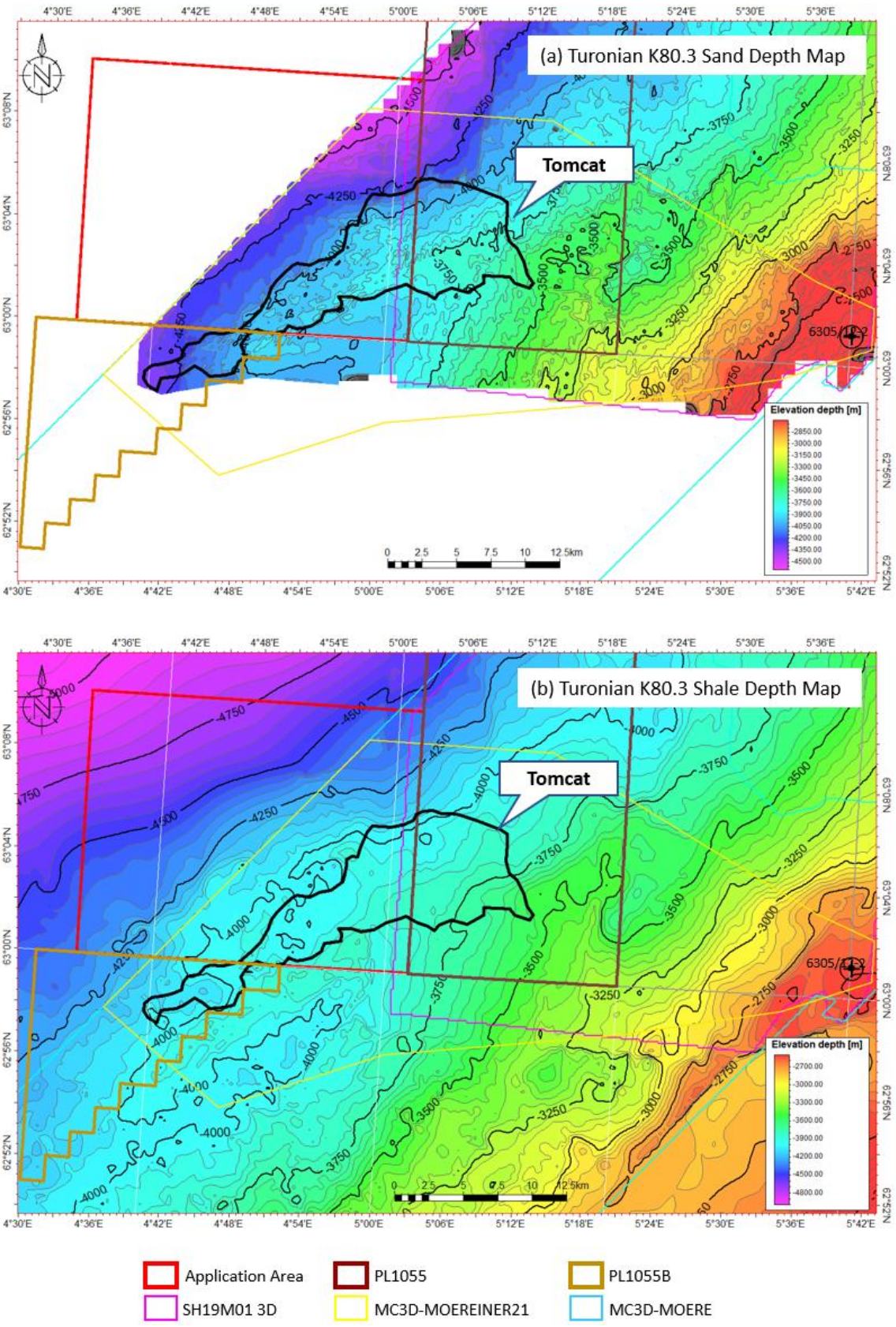

Fig. 4.2 Depth maps of Tomcat. A) Top Tomcat horizon. B) Base Tomcat reflector horizon

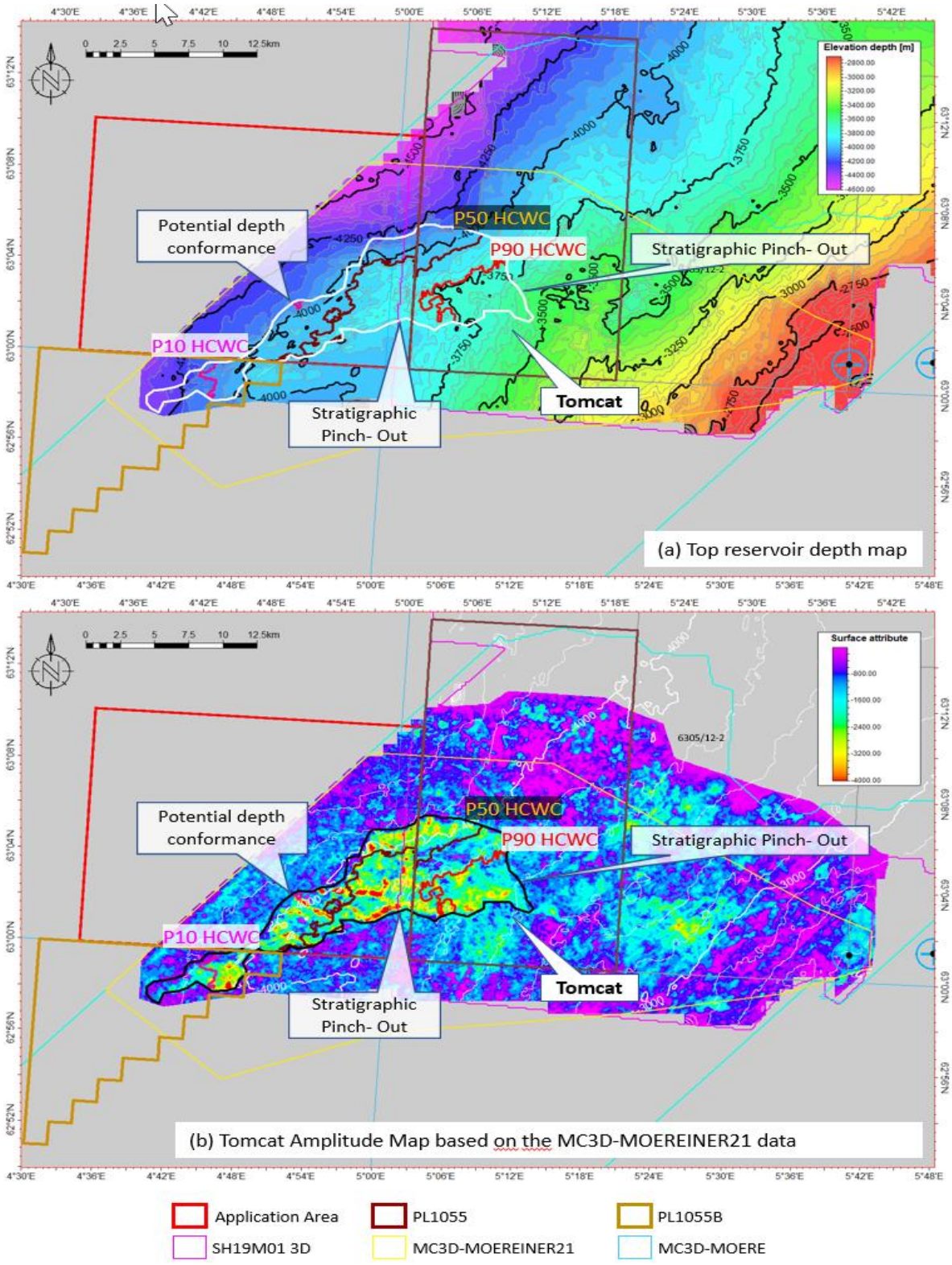

Fig. 4.3 A) Depth map with superimposed hydrocarbon contacts. B) Far stack amplitude map with superimposed hydrocarbon contacts

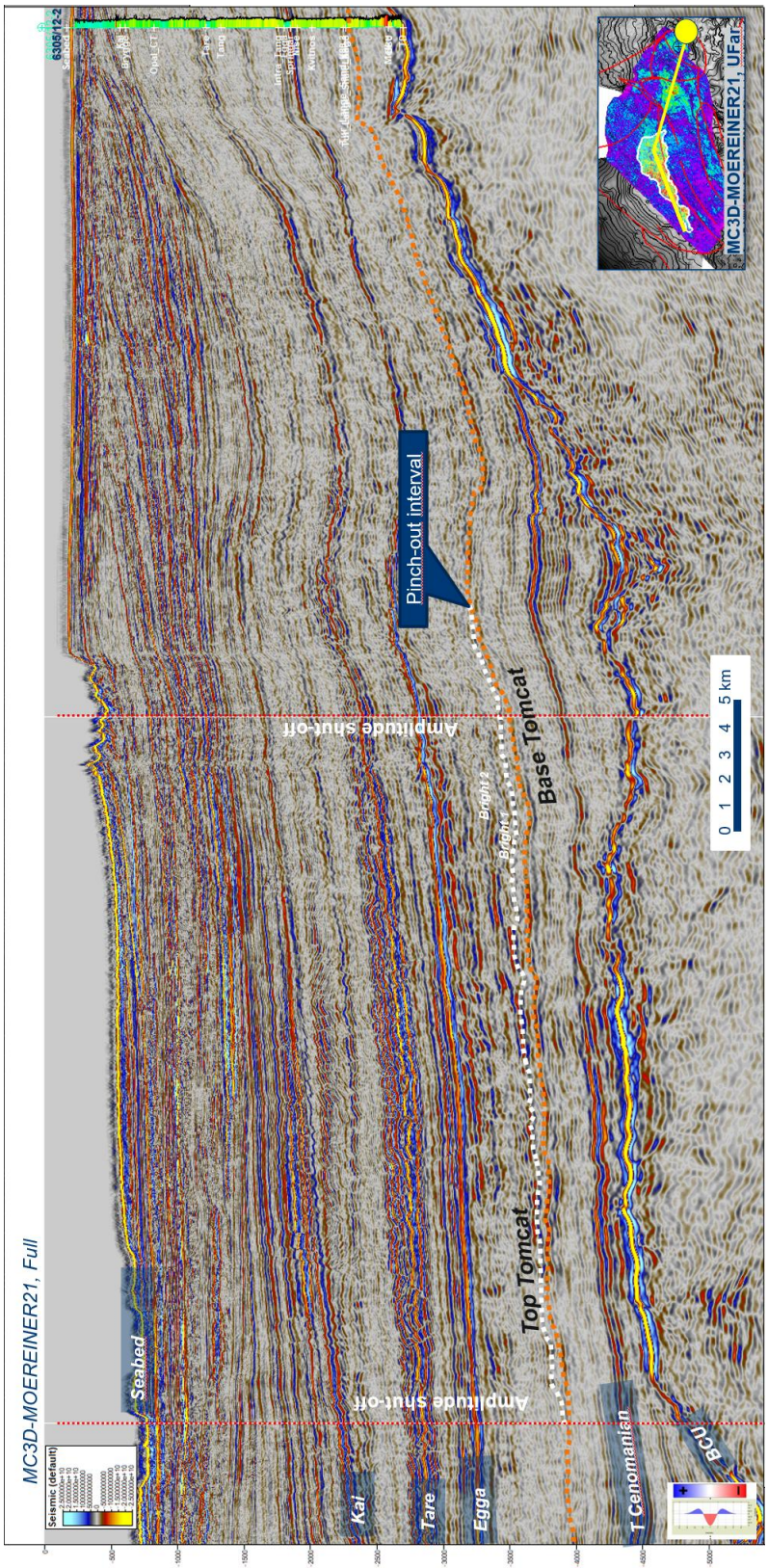

Fig. 4.4 Arbitrary regional seismic line tied to 6305/12-2 on the Gossa High. MC3D-MOEREINER21 full stack cross-section

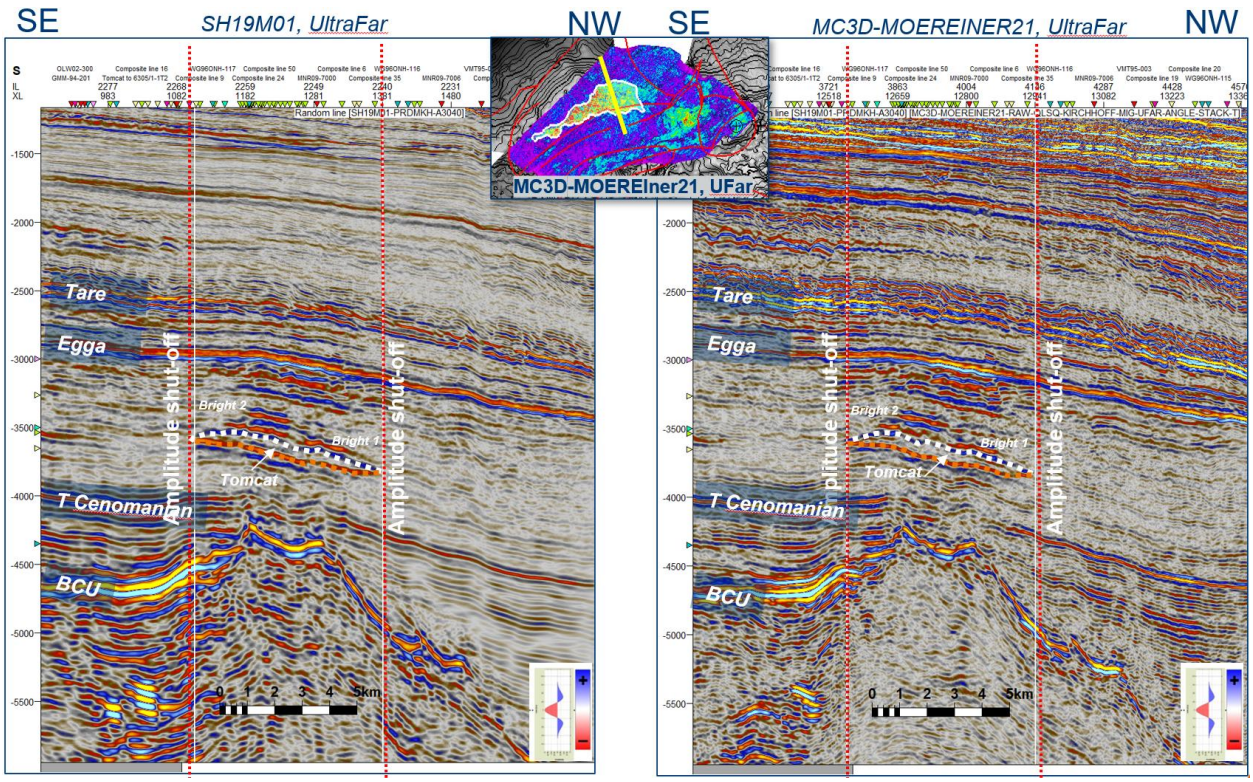

Fig. 4.5 Seismic cross-section of the Tomcat prospect on both SH19M01 and MC3D-MOEREINER21 (ultrafar) for comparison. The intriguing soft anomaly and lens geometry of Tomcat is clear (dotted outline). In addition, the stacked soft anomalies above Tomcat reflecting additional prospectivity of Bright 1 and 2 in uppermost Lysing and Kvitnos Formations and potentially also in the uppermost Cretaceous can be observed

Trap closure was defined by lateral pinch-out against the erosional base. Down-dip, westward dimming indicated transition to finer sands and eventually shale-out. Upslope feeder systems may be disconnected, providing a trapping mechanism up-dip. Faults on the eastern side could provide additional containment.

Basin modeling suggested wet gas migration into Tomcat (**Fig. 4.6**). The location atop Ona High, adjacent to proven gas in the Møre Basin and mature source rocks, minimized charge risk. Offset wells encountered hydrocarbon shows in the Coniacian–Turonian sequence.

Rock physics modeling (using distant analogues) suggested Tomcat would display AVO class 3 response for gas-charged Lysing sand, but seismic data showed AVO class 4 response, with low confidence due to data quality and lack of calibration. Despite uncertainties, Tomcat remained a seismic anomaly. The main antimodel was hydrocarbon saturation in non-reservoir lithologies.

Main geological risks were reservoir presence and up-dip trap. Pre-drill studies focused on derisking reservoir presence; trap risk was generic for the Lysing play. **Table 4.1 Pre-drill chance of success for the Tomcat prospect** and **Table 4.2 Tomcat prospect data sheet (APA2019)** summarize the evaluation.

NPD Risk parameter	Risk	Orlen Risk parameter (play x prospect)	Risk
Reservoir	0.65	Reservoir (play x presence x quality)	0.9 x 0.8 x 0.8
Trap	0.50	Trap (play x trap)	1 x 0.5
Charge	0.80	Charge (play x access to charge)	1 x 0.9
Retention	1		
Total POS	**0.26**	**Total POS**	**0.26**

Table 4.1 Pre-drill chance of success for the Tomcat prospect

Table 4: Discovery and Prospect data (Enclose map)

Block	6305/10 (part)	Prospect name	Tomcat	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)	No	Outside play (Y/N)	No				
Oil, Gas or O&G case:	Gas	Reported by company	INEOS E&P NORG	Reference document				Assessment year	2019
This is case no.:	1 of 1	Structural element	Ona High	Type of trap	Stratigraphic	Water depth [m MSL] (>0)	350	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)								
	Gas [10^9 Sm^3] (>0.00)	16,80	84,30	90,40	199,00				
Recoverable resources	Oil [10^6 Sm^3] (>0.00)								
	Gas [10^9 Sm^3] (>0.00)	10,00	57,60	63,60	150,00				
Reservoir Chrono (from)	Turonian	Reservoir litho (from)	Lysing Formation	Source Rock, chrono primary	Late Jurassic	Source Rock, litho primary	Spekk Formation	Seal, Chrono	Late Cretaceous
Reservoir Chrono (to)	Coniacian	Reservoir litho (to)	Lysing Formation	Source Rock, chrono secondary	Early Jurassic	Source Rock, litho secondary	Åre Formation	Seal, Litho	Kvitnos and Nise Fms.
Probability [fraction]									
Total (oil + gas + oil & gas case) (0.00-1.00)	0,18	Oil case (0.00-1.00)		Gas case (0.00-1.00)	0,18	Oil & Gas case (0.00-1.00)			
Reservoir (P1) (0.00-1.00)	0,57	Trap (P2) (0.00-1.00)	0,40	Charge (P3) (0.00-1.00)	0,80	Retention (P4) (0.00-1.00)	1,00		
Parametres:	Low (P90)	Base	High (P10)	*Comments: Base (Mode) = P50. Top and base reservoir used for GRV calculations.*					
Depth to top of prospect [m MSL] (> 0)	3527	3527	3527						
Area of closure [km^2] (> 0.0)	19,7	47,7	73,0						
Reservoir thickness [m] (> 0)	49	73	83						
HC column in prospect [m] (> 0)	233	329	416						
Gross rock vol. [10^9 m^3] (> 0.000)	12,894	13,593	14,297						
Net / Gross [fraction] (0.00-1.00)	0,60	0,70	0,78						
Porosity [fraction] (0.00-1.00)	0,16	0,18	0,20						
Permeability [mD] (> 0.0)	10,0	50,0	90,0						
Water Saturation [fraction] (0.00-1.00)	0,38	0,32	0,26						
Bg [Rm3/Sm3] (< 1.0000)	0,0034	0,0033	0,0032						
1/Bo [Sm3/Rm3] (< 1.00)									
GOR, free gas [Sm^3/Sm^3] (> 0)	5186	5186	5186						
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)	0,60	0,68	0,75						
Recov. factor, liquid ass. phase [fraction] (0.00-1.00)				For NPD use:					
Temperature, top res [°C] (>0)	124			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)	400			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 4.2 Tomcat prospect data sheet (APA2019)

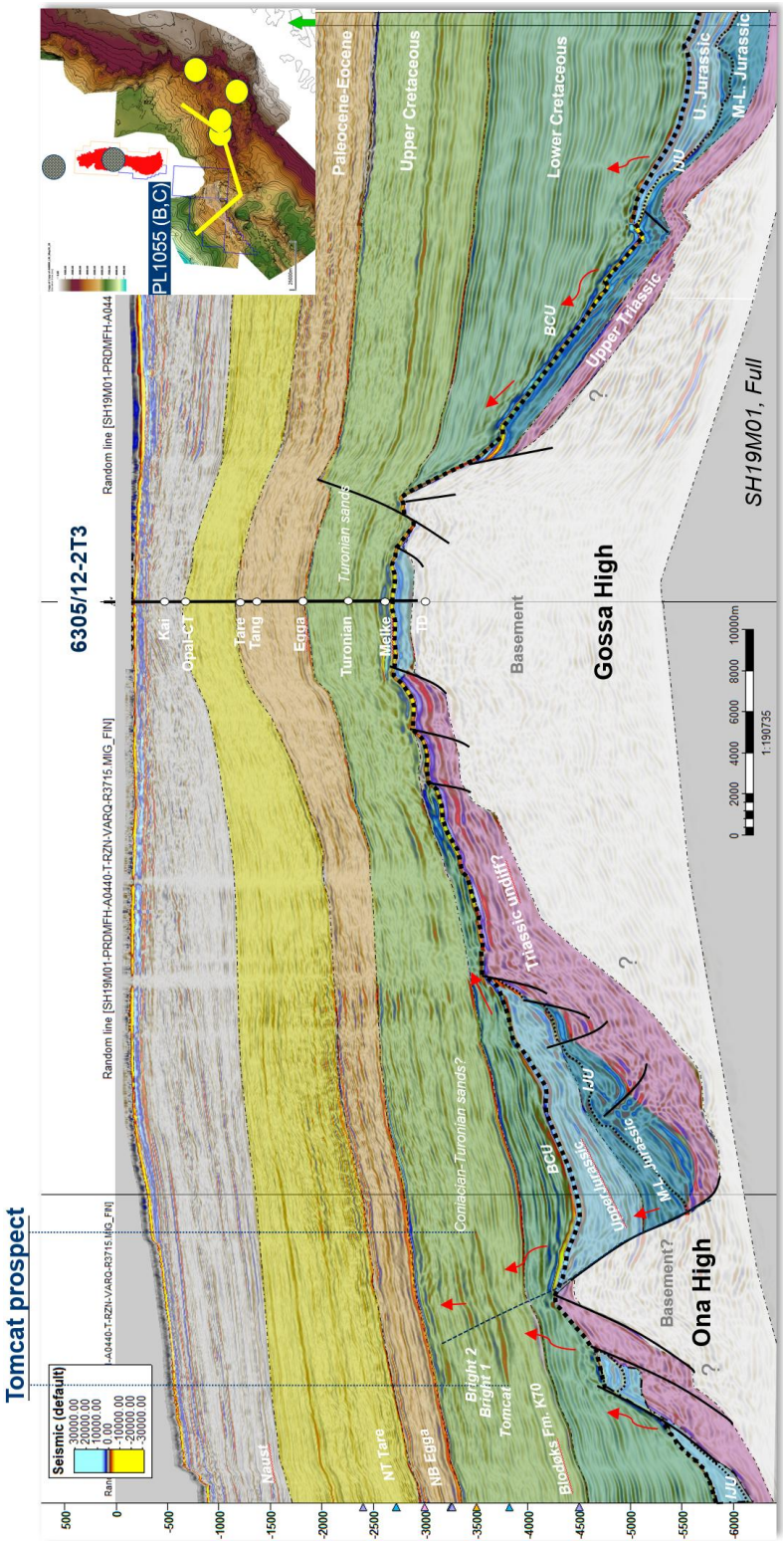

Fig. 4.6 Geological petroleum system and geosection of the Ona and Gossa Highs. The Ona High is surrounded by mature source rocks. Charge and migration were positive for the license.

Additional Prospectivity – Bright 1 and Bright 2:
Bright 1 and 2, secondary objectives above Tomcat, showed similar seismic characteristics but had a lower areal extent and were thinner. They were interpreted as younger sand deposits in the same fairway system.

The license approved drilling Tomcat and testing Bright 1 and 2 with well 6305/10-1, representing a stacked pay target near Ormen Lange.

Outcome of the 6305/10-1 Tomcat Exploration Well:
The exploration well, drilled atop Ona High (38 km south of Ormen Lange), reached TD of 4020 m MD RKB in the Lange Fm shales (Nov 2024–Jan 2025, Deepsea Yantai rig, Odfjell Drilling, 61 days). No reservoir sandstones were found; instead, a shaly-silt interval with minor poor-quality sandstone stringers and higher gas content was encountered, confirming the antimodel. Bright 1 was also a thin shaly/silt interval; Bright 2 was not encountered. The well is classified as dry.

A dry hole data acquisition program was completed; no coring was performed.

5. Technical assessment

A technical evaluation was conducted to outline the potential development approach should the Tomcat exploration well be a discovery. During the exploration phase, two appraisal wells were planned in addition to the drilled exploration well. In the event of a gas-condensate find, the base case development concept involved a 38-kilometre subsea tie-back to the Ormen Lange gas field, utilizing a 120-kilometre, 18-inch flowline to Nyhamna (see Fig. 5.1). The plan assumed the drilling of seven nearly horizontal gas production wells, arranged in two four-slot templates. This development scenario demonstrated robust economic viability, supporting the

decision to proceed with drilling of the Tomcat prospect.

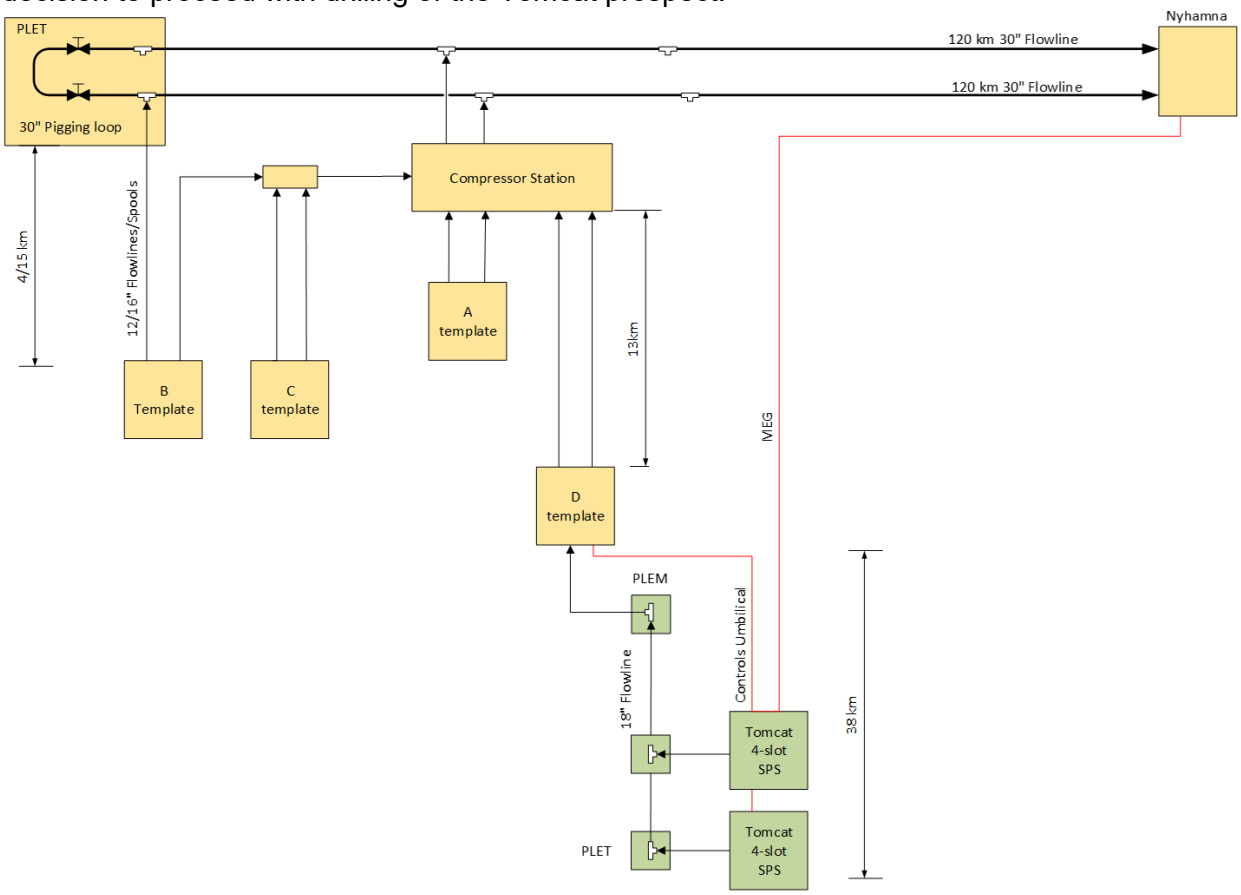

Fig. 5.1 Tie-back concept of the Tomcat prospect

6. Conclusion

A positive drill decision was made on 01.04.2022. Well planning was based on 3D seismic and offset well data. Site and environmental surveys were conducted in 2022–2023 for optimal rig placement and hazard assessment.

Well 6305/10-1 was spudded 22.11.2024 and reached TD on 07.01.2025. The well was drilled safely and efficiently, with no serious incidents. The well was dry, with no reservoir presence in Tomcat or the overlying Bright 1 and 2 anomalies. With no further drillable opportunities, the JV decided to relinquish the license at the end of the current period.