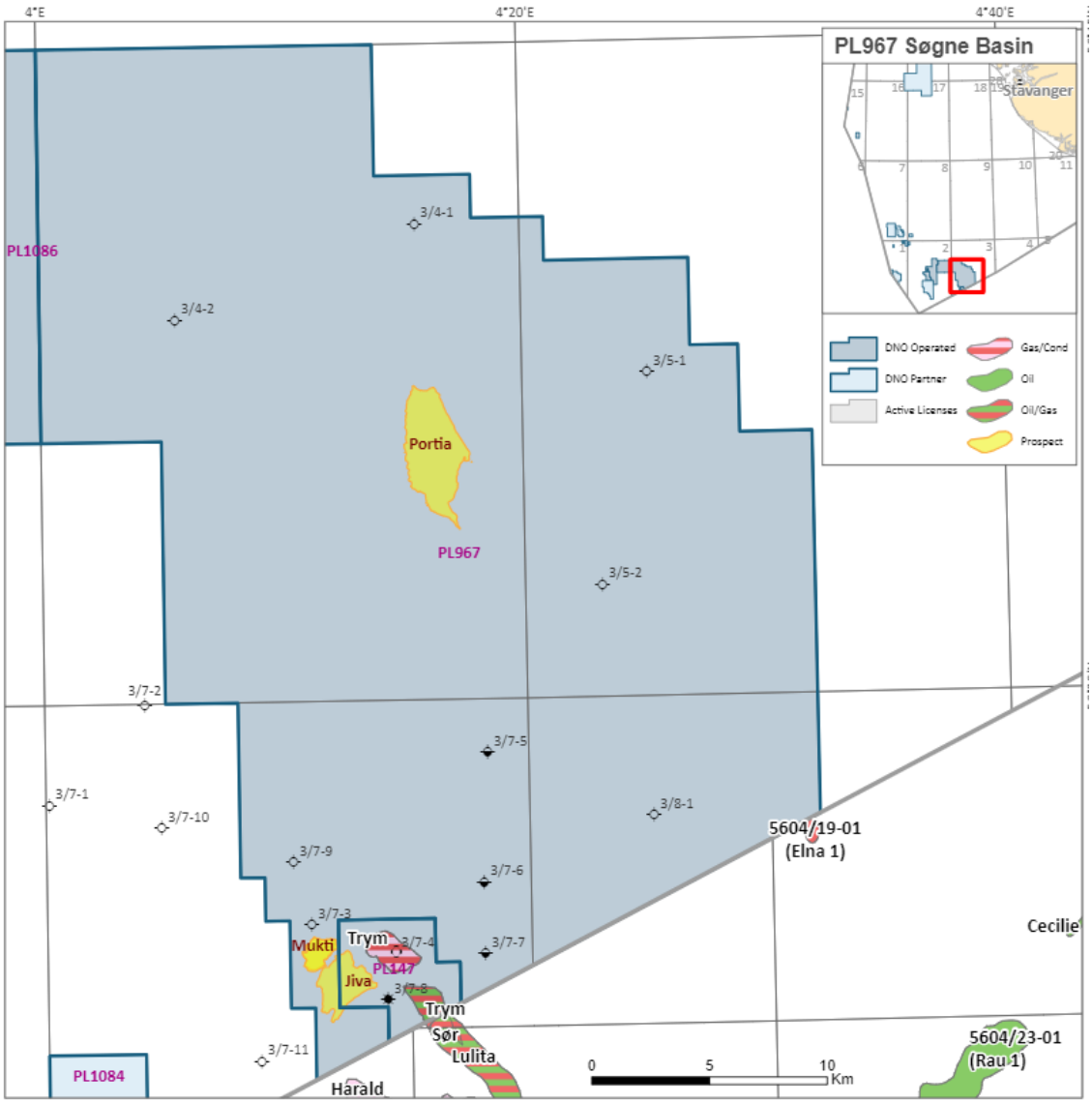
# PL967 Relinquishment report

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# 1 Licence History

PL967 is located in the Southern North Sea adjacent to the Danish Border. The licence covers parts of blocks 3/4, 5, 7, 8 and surrounds the Trym Licence on the Norwegian side (Fig. 1.1).

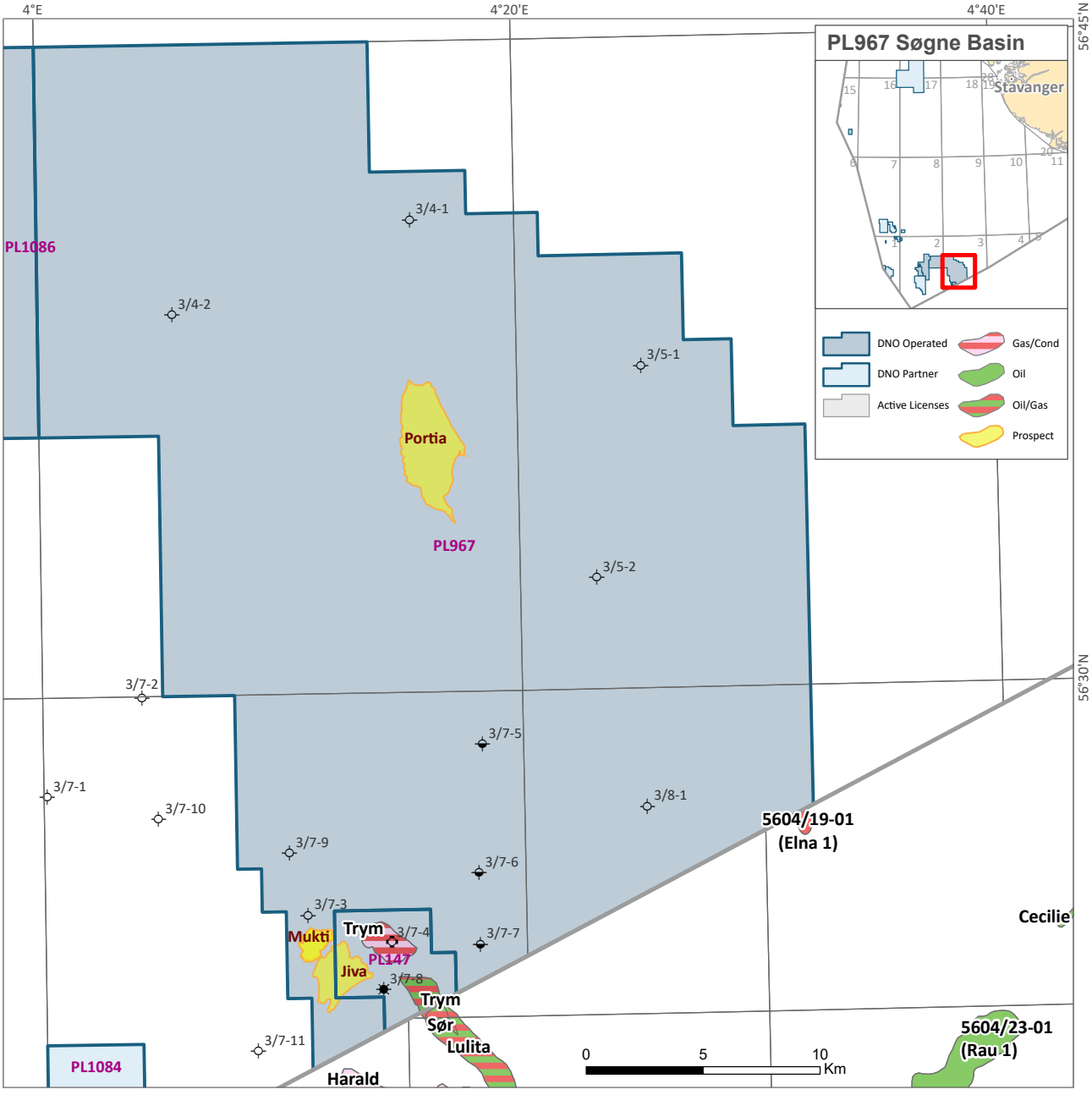


**Fig. 1.1 PL967 Location Map**

The licence was awarded to DNO Norge AS as Operator on 1 March 2019 through the 2018 APA licensing round, with Equinor ASA as partner. The licence partnership at the time of relinquishment is shown in Table 1.1

**Table 1.1 PL 967 partnership**

| Company | Equity |
|---|---|
| DNO Norge AS | 60% and operator |
| Equinor ASA | 40% |

The work commitment at the time of the licence award consisted of purchasing 3D seismic data prior to the initial drill or drop decision (1 March 2021). A one year licence extension was applied for and was granted by authorities 11 November 2020, with the final drill or drop decision being 1 March 2022.

The following meetings were held in the licence:

2019

- Exploration/ Management Committee Licence Kick-Off Meeting: 28 March 2019
- Exploration/ Management Committee Licence Meeting: 3 December 2019

2020

- Exploration Committee Work Meeting: 27 August 2020
- Exploration/Management Commitee Licence Meeting: 26 November 2020

2021

- Exploration Committee Work Meeting: 6 October 2021
- Exploration/Management Committee Licence Meeting: 26 November 2021 w/ recommendation DoD

Since the award, the Joint Venture has fulfilled the work programme and matured the Jiva and Mukti prospects to drillable candidates. Several regional studies have been conducted in the licence including stratigraphic, structural and basin modelling studies. The key risk for most of the prospects within the licence is charge. A PSA study conducted by Torena is key to understanding the source distribution, source quality and to assess potential migration routes. The study indicated a source rock with lower maturity and expulsion in the basinal areas than originally expected, and was not favourable when identifying sufficient mature source presence in close proximity to Portia. The key prospects after the study became Jiva and Mukti prospects close to the Trym Field. Both prospects can be sourced from already existing hydrocarbon accumulations in the area and are therefore not relying on an independent kitchen area . The recoverable mean volumes for Jiva and Mukti are 2.25 $Mm^3OE$ (total resources) and 0.7 $Mm^3OE$ (gas case)/ 0.66 $Mm^3OE$ (oil case). Probability of success is 30% for Jiva with the main risk being migration, followed by trap seal.

Proposed development scenario is drilling from a spare slot on the Trym Template and later production through the Harald facilities following the Trym South development.

An economical analysis performed on the gas case indicated negative project economics for Mukti and marginal to negative project economic results for Jiva.

Based on the limited resources and negative to marginal expected economics on the main prospects, Jiva and Mukti do not meet the requirements to make a positive drill decision in PL967.

# 2 Database Overview

## 2.1 Seismic data

The common database for PL967 consists of 1578 km$^2$ seismic data comprising the PGS broadband survey MC3D-CGR2015M (1369 km$^2$) and DNO0601 (320 km$^2$). The common database outline is portrayed in Fig. 2.1.

The evaluation conducted prior to the APA2018 licence application was mainly focused on the PGS Mega Survey comprised of vintage 3D datasets. Following the award, purchase of high quality PGS broadband seismic data (MCC3D-CGR2015M) has been licensed, fulfilling the licence commitments. A merge and reprocessing of the MC3D-CGR2015M and DNO-0601R08 survey was completed by Sharp Relections in Q2 2020 and resulted in the DNO20M02 merged survey which has been the basis for most of the recent interpretation and evaluation for the licence area. An overview of the 3D surveys used in the licence evaluations are displayed in Fig. 2.1. In addition, the licence is also covered by NSR 2D-lines and the more recent PGS18M09.

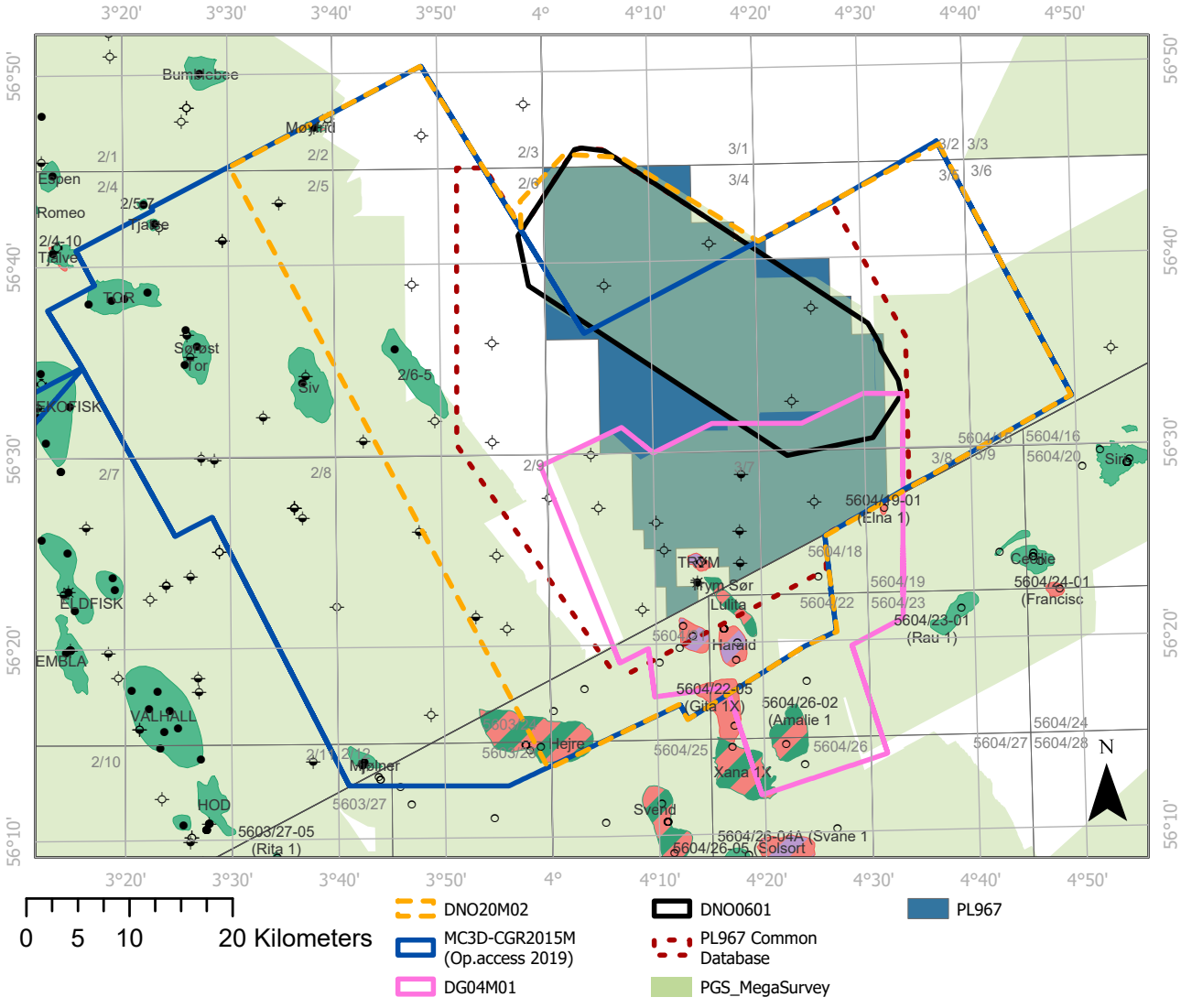


**Fig. 2.1 PL967 Seismic Database**

Table 2.1 summarises all the 3D and 2D surveys used in the evaluation. The final interpretation for the prospect evaluation has been completed on the DNO20M02 survey.

**Table 2.1 PL967 Datasets used for evaluation**

| Survey Name | Dataset Name | NPDID | Processing Year | Data Type | Processing Type | Entitlements | Processing |
|---|---|---|---|---|---|---|---|
| DNO20M02 | DNO20M02-PL967-SURVEYMERGE | - | 2020 | POST STACK | STK FIN | NOT PUBLIC | POSTSTACK-MERGE |
| DNO20M02 | DNO20M02-PL967-SURVEYMERGE-ADAPTIVESUBTRACTION | - | 2020 | POST STACK | STK FIN | NOT PUBLIC | POSTSTACK-MERGE |
| DNO20M02 | DNO20M02-PL967-SURVEYMERGE-POSTSTACKDECONVOLUTION | - | 2020 | POST STACK | STK FIN | NOT PUBLIC | POSTSTACK-MERGE |
| | | | | | | | |
| | | | | | | | |
| MC3D-CGR2015M | MC3D-CGR2015M-KPSDM-FINAL-FAR-STK-TIME | - | 2015 | POST STACK | MIG FIN | NOT PUBLIC | KIRCHOFF PSTM |
| MC3D-CGR2015M | MC3D-CGR2015M-KPSDM-FINAL-FULL-STK-TIME | - | 2015 | POST STACK | MIG FIN | NOT PUBLIC | KIRCHOFF PSTM |
| MC3D-CGR2015M | MC3D-CGR2015M-KPSDM-FINAL-NEAR-STK-TIME | - | 2015 | POST STACK | MIG FIN | NOT PUBLIC | KIRCHOFF PSTM |
| MC3D-CGR2015M | MC3D-CGR2015M-KPSDM-FINAL-MID-STK-TIME | - | 2015 | POST STACK | MIG FIN | NOT PUBLIC | KIRCHOFF PSTM |
| MC3D-CGR2015M | MC3D-CGR2015M-KPSDM-FINAL-ULTRA-FAR-STK-TIME | - | 2015 | POST STACK | MIG FIN | NOT PUBLIC | KIRCHOFF PSTM |
| | | | | | | | |
| DNO-0601 | DNO-0601R08-FULL-ANGLE | 4342 | 2008 | POST STACK | MIG FIN | PUBLIC | |
| DNO-0601 | DNO-0601-FULL-ANGLE | 4342 | 2007 | POST STACK | MIG FIN | PUBLIC | |
| | | | | | | | |
| DG04M01 | DG04M01-FAR-OFFSET | - | 2006 | POST STACK | MIG FIN | NOT PUBLIC | |
| DG04M01 | DG04M01-FULL-OFFSET | - | 2006 | POST STACK | MIG FIN | PUBLIC NORWAY | |
| DG04M01 | DG04M01-MID-OFFSET | - | 2006 | POST STACK | MIG FIN | NOT PUBLIC | |
| DG04M01 | DG04M01-NEAR-OFFSET | - | 2006 | POST STACK | MIG FIN | NOT PUBLIC | |
| | | | | | | | |
| | | | | | | | |
| PGS_MS_NorthSea_DK_GE_NL_2014 | MC3D-N_SEA_MEGA_FIN_MIG_2014_DK_NL_GE | - | 2014 | POST STACK | MIG FIN | NOT PUBLIC | |
| MC3D-NSea_Mega_2015_South | MC3D-N_SEA_MEGA_FIN_MIG_2015_SOUTH | - | 2015 | POST STACK | MIG FIN | NOT PUBLIC | |
| | | | | | | | |
| PGS18M09_PGS18M09CGR | PGS18M09CGR-KPSDM-FINAL-STACK-TIME-FULL-4-36DEG | - | 2020 | POST STACK | MIG FIN | NOT PUBLIC | KIRCHOFF PSDM |
| | | | | | | | |
| NSR04 (32298) | NSR04-FULL-OFFSET | 4260 | 2004 | POST STACK | MIG FIN | PUBLIC | |
| NSR05 (22308) | NSR05-FULL-OFFSET | 4308 | 2005 | POST STACK | MIG FIN | PUBLIC | |

### DNO20M02

This is a reprocessing and merge of:

- MC3D-CGR2015M, reprocessed and merged by PGS Imaging Oslo in 2015. See below for details on NPDID for individual datasets.
- DNO-0601, acquired by DNO Olje A/S in 2006. *NPDID: 4342*

### MC3D-CGR2015M

This is a reprocessing and merge of:

- MC3D-NDB2013. *NPDID:7922*
- MC3D-CGRN13. *NPDID: 7904*
- CGR2013RM, consisiting of surveys; 1) MC3D-CGR-2010 (*NPDID: 7190)* and 2) MC3D-CGR-2011 in Denmark

### DG04M01

This is a reprocessing and merge of:

- SH9302 (=SH9003+SH9204) *NPDID: 3621*
- G-9603 (merged with SH9204) *NPDID: 3763*
- WLulu/Lulu 85/86 (Denmark)
- ST9205 (Denmark)

### PGS_MS_NorthSea_DK_GE_NL_2014 and MC3D-NSea_Mega_2015_South

In the area of interest, these are a reprocessing and merge of:

- DNO0601R08. *NPDID: 4342*
- ST9602. *NPDID:3829*
- LN0705. *NPDID: 4443*
- G-9603. *NPDID: 3763*
- SH9204: *NPDID: 3556*
- SH9003: *NPDID: 3345*
- GA3D-93. NPDID: 3584

- NH8702. *NPDID: 2983*
- ANO9201. *NPDID: 3483*
- PG01. *NPDID: 4126*
- PN9401M
- PAG95. *NPDID: 3724*
- SIRITRYM in Denmark
- DEN03 in Denmark

**PGS18M09**

This is a reprocessing of the MC3D-CGR2015M survey merge

## 2.2 Well data

An overview of the common well database is provided in Table 2.2 and includes the relevant wells used in the licence evaluation. The common well database consists of 29 wells and includes traded wells 2/6-6 S (Oppdal/ Driva) and 3/7-11 S (Otta/Vinstra).

**Table 2.2 PL 967 Common Well Database**

| Well | NPDID | Result (NPD) | Completion Year | Release Status | TD Stratigraphy | TD (MD/TVD m RKB) | Seismic to well tie | Petrophysics | Biostratigraphy/ Sequence stratigraphy | PSA Study |
|---|---|---|---|---|---|---|---|---|---|---|
| 2/3-4 | 129 | Dry | 1984 | Released | Zechstein Gp. | 3386/3386 | x | | | |
| 2/6-1 | 160 | Dry | 1969 | Released | Zechstein Gp | 3336/-- | x | | | |
| 2/6-6 S | 8560 | Dry | 2019 | Partially released | Rotliegend Gp. | 3843/3625 | x | | | |
| 3/4-1 | 2222 | Dry | 1994 | Released | Zechstein Gp. | 3107/3107 | x | x | x | x |
| 3/4-2-S | 6622 | Dry | 2012 | Partially released | Farsund Fm. | 2961/2864.6 | x | | | x |
| 3/5-1 | 290 | Dry | 1978 | Released | Rotliegend Gp. | 3426/3423 | x | x | x | x |
| 3/5-2 | 291 | Dry | 1978 | Released | Smith Bank Fm. | 3825/3824 | x | x | x | x |
| 3/6-1 | 4117 | Dry | 2000 | Released | Tor Fm. | 2167/2167 | | | x | |
| 3/7-2 | 220 | Dry | 1981 | Released | Rotliegend Gp. | 4330/4330 | x | | | x |
| 3/7-3 | 293 | Dry | 1981 | Released | Zechstein Gp. | 3540/-- | x | x | x | x |
| 3/7-4 | 1467 | Gas/Condensate | 1990 | Released | Zechstein Gp. | 3723/3721 | x | x | x | x |
| 3/7-5 | 1759 | Shows | 1992 | Released | Zechstein Gp. | 3666/-- | x | x | x | x |
| 3/7-6 | 2891 | Shows | 1996 | Released | Haugesund Fm. | 4120/4109 | x | x | x | x |
| 3/7-7 | 5932 | Shows | 2008 | Partially released | Haugesund Fm. | 3930/3930 | x | x | x | x |
| 3/7-8 S | 7058 | Oil/Gas | 2013 | Partially released | Zechstein Gp. | 4188/3733 | x | x | x | x |
| 3/7-9 S | 7137 | Dry | 2013 | Partially released | Smith Bank Fm. | 3717/3678 | x | x | | x |
| 3/7-10 S | 7749 | Dry | 2015 | Partially released | Smith Bank Fm. | 3511/3465 | x | x | | x |
| 3/7-11 S | 8705 | Dry | 2019 | Partially released | Rotliegend Gp. | 3893/3723 | x | x | | x |
| 3/8-1 | 6476 | Dry | 2010 | Partially released | Rotliegend Gp. | 4070/4070 | x | x | | x |
| 4/4-1 | 7270 | Dry | 2013 | Partially released | Tor Fm. | 2012/2012 | | | | |
| Cleo-1 | - | - | 1984 | DK Well | Skagerrak Fm. | 4861.3 MD | x | x | | x |
| Elna-1 | - | - | 1985 | DK Well | Rotliegend Gp. | 3134.9 MD | x | x | | x |
| Lulita-1 | - | - | 1992 | DK Well | Smith Bank Fm. | 4679 MD | x | x | x | x |
| Siri-1 | - | - | 1995 | DK Well | Ekofisk Fm. | 2220 MD | | | | |
| Siri-3 | - | - | 1996 | DK Well | Ekofisk Fm. | 2170 MD | | | | |
| West Lulu-1 | - | - | 1984 | DK Well | Smith Bank Fm. | 4227.6 MD | x | x | x | x |
| West Lulu-2 | - | - | 1985 | DK Well | Smith Bank Fm. | 4053.8 MD | x | x | x | x |
| West Lulu-3 | - | - | 1985 | DK Well | Smith Bank Fm. | 3856.6 MD | x | x | x | x |
| West Lulu-4 | - | - | 1986 | DK Well | Smith Bank Fm. | 3849.6 MD | | x | | x |

# 3 Geological and Geophysical Studies

Listed below is a summary of the work done in PL967 and descriptions of the geological and geophysical studies carried out in the licence:

### Purchase of PGS broadband seismic data

- The purchase of high quality PGS broadband data (MC3D-CGR2015M) fulfilled the licence commitments. This survey was the basis for further reprocessing in the licence.

### Seismic merge and reprocessing (DNO20MO2)

- A seismic merge of the two main surveys DNO01_0601R08 and MC3D-CGR2015M was performed by SharpReflections in Spring 2020. In addition to the original post stack volume, two additional reprocessed volumes (adaptive subtraction and post stack deconvolution) were delivered. The main focus for the two latter cubes, was removal of remnant multiples below BCU which had proved challenging for interpretation of several leads in the Jurassic section.

### Seismic Interpretation and Well Ties

- Regional and prospect based seismic interpretation in addition to multiple well to seismic ties for key wells in and around the licence area.

### Depth Conversion

- A velocity model was created for an extensive regional area covering PL967 and parts of the Danish sector. The model was completed in 2021 and was largely focused on interval velocities from key wells in and around the licence area. It was further implemented in prospect specific depth conversion, as input to the basin modelling study and to assess spill-point sensitivities of the key prospectivity.

### Rock physics model of relevant wells

- Fluid substitution and seismic forward modelling have been done on the key well 3/8-1 to understand the seismic response of the reservoir in different fluid scenarios.

### Sedimentological and petrophysical evaluations

- An integrated sedimenotological study was carried out by Geolink in 2019, where detailed sequence stratigraphic interpretation of several wells in and around the licence was performed. The wells included in the study have been listed in Table 2.2.
- Well log conditioning and evaluation was carried out on key wells in the licence to determine reservoir quality and assess the overall lithostratigraphic response. The main deliverables from the study were reservoir formation parameters, depth trend plots (PHIE) and CPI plots, which were further implemented in the prospect evaluation.
- A Play Analysis Study was carried out in-house to evaluate and determine reservoir presence, distribution and quality. The study indicated high probability of good reservoir quality sands in the main prospects Jiva and Mukti.

### Basin Modelling, migration modelling, source rock evaluation and geochemical semi-regional evaluation of oil families

- A regional PSA study with Torena was carried out in Q1&Q2 2021 to evaluate presence, maturity and likely migration from potential sources in the area. The study indicated lower maturity and expulsion from the source rock in the basinal areas, compared to previous observations. This was largely due to implications related to thermal conductivity distributions associated with salt presence, and its further impact on the heat flow distribution. As the source in the basinal areas have not been affected by salt presence, the sediments would have an overall lower heat flow distribution. This would further reduce the maturity of the source and its hydrocarbon expulsion capacity.

### Fault Seal Analysis Study

- A Fault Seal Analysis Study was completed by Terractiva in Q1 2021, assessing trap seal risk for Paleocene prospectivity in the licence. The study indicated likely failure of the trapping mechanism for Paleocene sands due to sand-sand juxtaposition and potential leakage of fluids.

### Structural Reconstruction study

- A regional interpretation and structural reconstruction study by Terractiva was performed in 2019 to better understand the regional depositional and structural history of the area. The study indicated potential for syn-diapiric strata of Mid Jurassic sediments in key basins.

### Prospect Evaluation

- Detailed prospect mapping and evaluation of main prospects in the licence, in addition to technical economical evaluation on main prospects Jiva and Mukti.

# 4 Prospect Update

The prospects and leads applied for in APA 2018 are shown in Fig. 4.1. The prospectivity at time of relinquishment of PL967 in March 2022, are shown in Fig. 4.2.

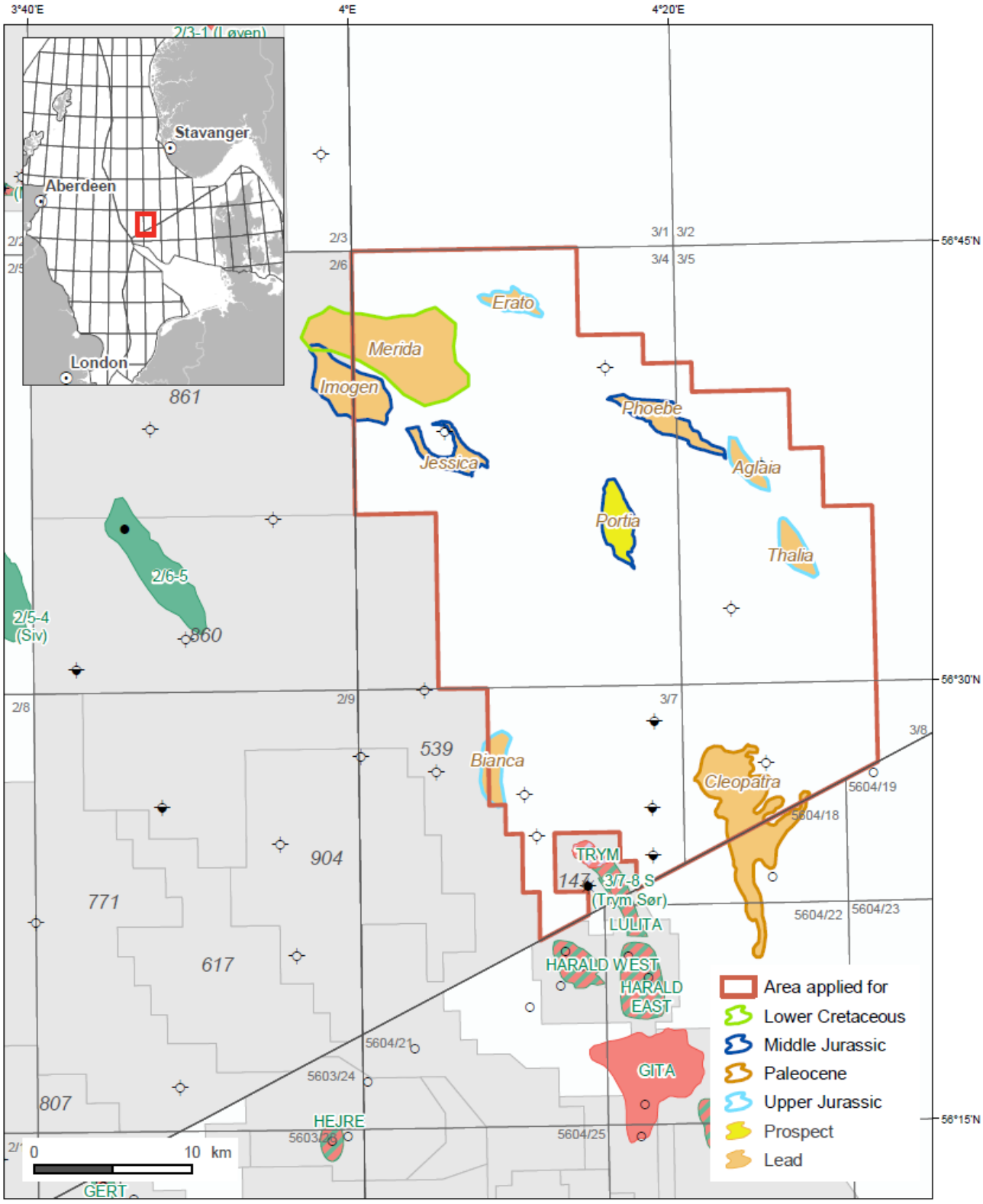


**Fig. 4.1 PL967 prospectivity on award in March 2019**

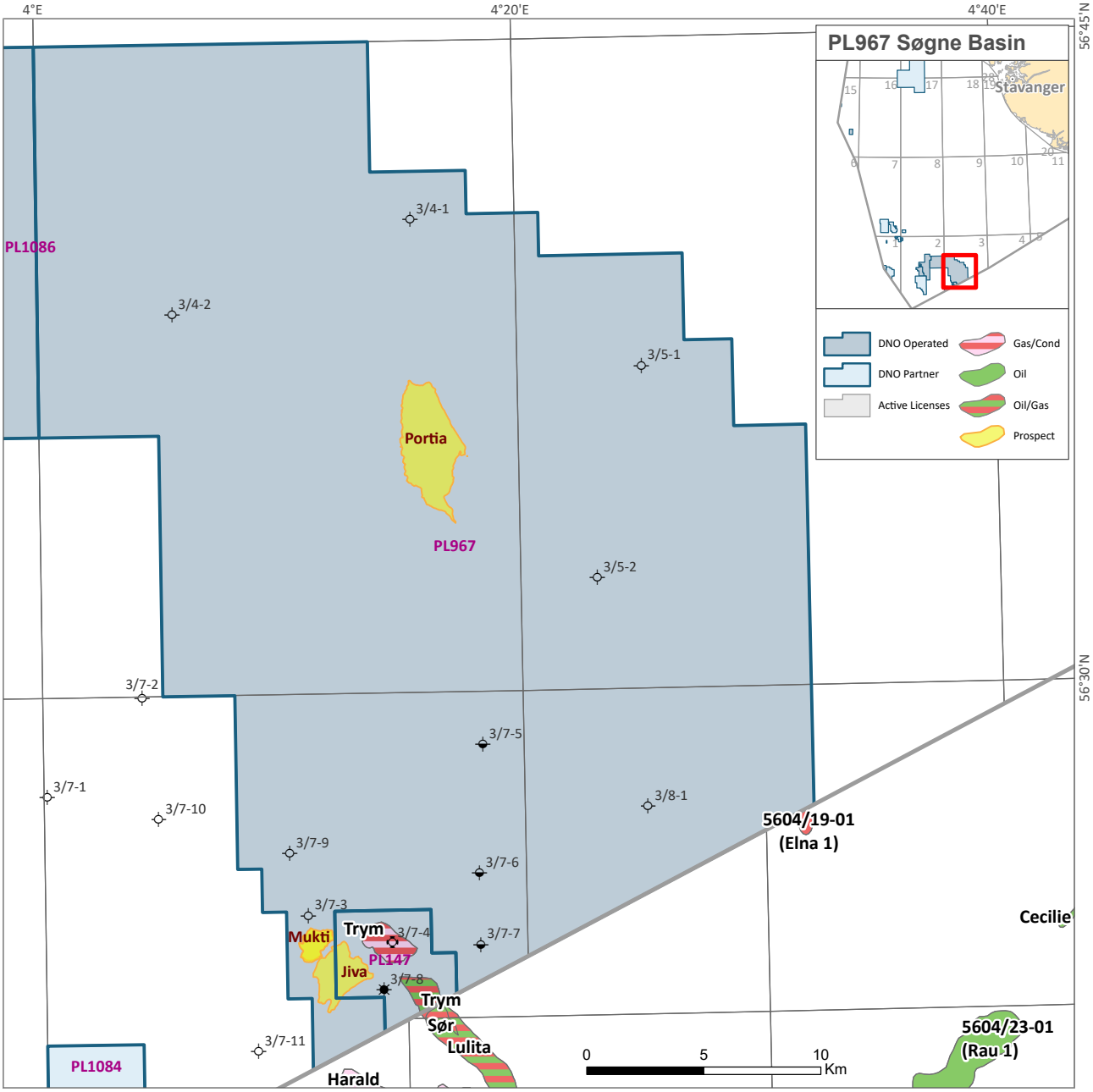


**Fig. 4.2 PL967 prospectivity at relinquishment in February 2021**

## APA 2018

Resource potential for prospectivity applied for during APA 2018 is summarised in Table 4.1.

**Table 4.1 PL967 Resource summary APA 2018**

| Prospect name | D/ P/ L | Case | Unrisked recoverable resources | | | | | | Probability of discovery | Resources in acreage applied for (%) | Reservoir | | Nearest relevant infrastructure | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Oil ($10^6 Sm^3$) | | | Gas ($10^9 Sm^3$) | | | | | Litho-/ Chronostratigraphical level | Reservoir depth (m MSL) | Name | km (>0) |
| | | | P90 | Mean | P10 | P90 | Mean | P10 | | | | | | |
| Portia | P | Oil/ gas | 0.86 | 3.09 | 5.89 | 0.45 | 1.56 | 2.92 | 0.23 | 100 | Sandnes/ M.Jur. | 3075 | Trym | 20 |
| Cleopatra | L | | | | | | | | | 100 | Bor Fm/ Paleoc. | | | |
| Merida | L | | | | | | | | | 100 | Ran Fm/ Cret. | | | |
| Erato | L | | | | | | | | | 100 | Ula Fm/ U.Jur | | | |
| Aglaia | L | | | | | | | | | 100 | Ula Fm/ U.Jur | | | |
| Thalia | L | | | | | | | | | 100 | Ula Fm/ U.Jur | | | |
| Bianca | L | | | | | | | | | 100 | Ula Fm/ U.Jur | | | |
| Imogen | L | | | | | | | | | 100 | Sandnes/ M.Jur. | | | |
| Jessica | L | | | | | | | | | 100 | Sandnes/ M.Jur. | | | |
| Phoebe | L | | | | | | | | | 100 | Sandnes/ M.Jur. | | | |

*Portia*

Portia was the main prospect in PL967 at the time of the APA2018 licence application. The prospect is a salt induced, elongate faulted anticlinal structure and top reservoir is mapped as the Mid Upper Jurassic Unconformity. Reservoir is considered to be Mid jurassic Bryne and Sandnes with top seal provided by Upper Jurassic shales. The compressional events during the Eocene Alpine Orogeny are responsible for forming the trap into its present day configuration. Source is provided from the humic coals, carbonaceous mudstones and lacustrine mudstones of the Bryne Formation and the lower part of the Haugesund and Farsund formations. A two phase accumulation is expected and the Portia prospect has been modelled as a mixed oil and gas case. The mean recoverable volumes calculated at the time of application was 3.09 $Msm^3$ oil and 1.56 $Gsm^3$ gas with a 23 % chance of success.

*Middle Jurassic: Jessica, Imogen and Phoebe Leads*

Jessica and Imogen are defined as the flank areas of the two poorly imaged, high relief salt domes within the basin, where hydrocarbon charge comes from the Upper Jurassic source kitchen. The Phoebe Lead is a hanging wall closure with side seal provided by salt in the Coffee Soil Fault zone and relies on charge from the Middle Jurassic source kitchen. Reservoir is considered to be the Sandnes and Bryne formations.

*Upper Jurassic: Erato, Aglaia, Thalia and Bianca Leads*

Ula Formation shoreface sandstones form the reservoir for this series of leads which are defined by mapping at the Base Cretaceous Unconformity level. The traps are salt and inversion related closures associated with major basin boundary faults.

*Lower Cretaceous: Merida Lead*

The Merida Lead is loosely defined by an isopach thick in the Lower Cretaceous at a similar stratigraphic level to the sandstones in well 3/7-3.

*Paleocene: Cleopatra Lead*

The Cleopatra Lead is defined by a Paleocene fan shaped thickened isochore at the mouth of a feeder incision.

**2019-2021 Update**

Charge is the main risk for the majority of the prospects in the licence. The basin modelling study by Torena in Q1/ Q2 2021 indicated lower maturity and expulsion of the source in the basinal areas than what had previously been expected. This was due to implications related to thermal conductivity distributions associated with salt presence, and its impact on the heat flow distribution. The effect was most prominent in the South and greatly affected maturity of the Middle Jurassic source rock.

Following the study, Portia had significant risk on source presence as maturity of nearby Bryne source is questionable. The final mapping and evaluation concluded with approximately similar resource estimates as in the APA, but with a slightly lower chance of geological success Table 4.2.

In summary, due to implications regarding presence and maturity of source, the Jurassic prospects and leads applied for in APA 2018 were downgraded and assumed low potential to generate economic viable resources. In addition, the Paleocene prospectivity was evaluated to have a high risk on the trapping mechanism of a crucial boundary fault due to sand-sand juxtaposition and potential leakage of fluids.

The subsequent focus was on maturing prospects which could receive charge (fill-spill) from proven hydrocarbon accumulations, and would therefore not be dependent on migration from a nearby kitchen area. Following intital studies and evaluations, the Mid Jurassic Jiva and Lower Cretaceous Mukti prospects became the key focus as they may be sourced directly from surrounding fields (Trym and Harald West). Fig. 4.3

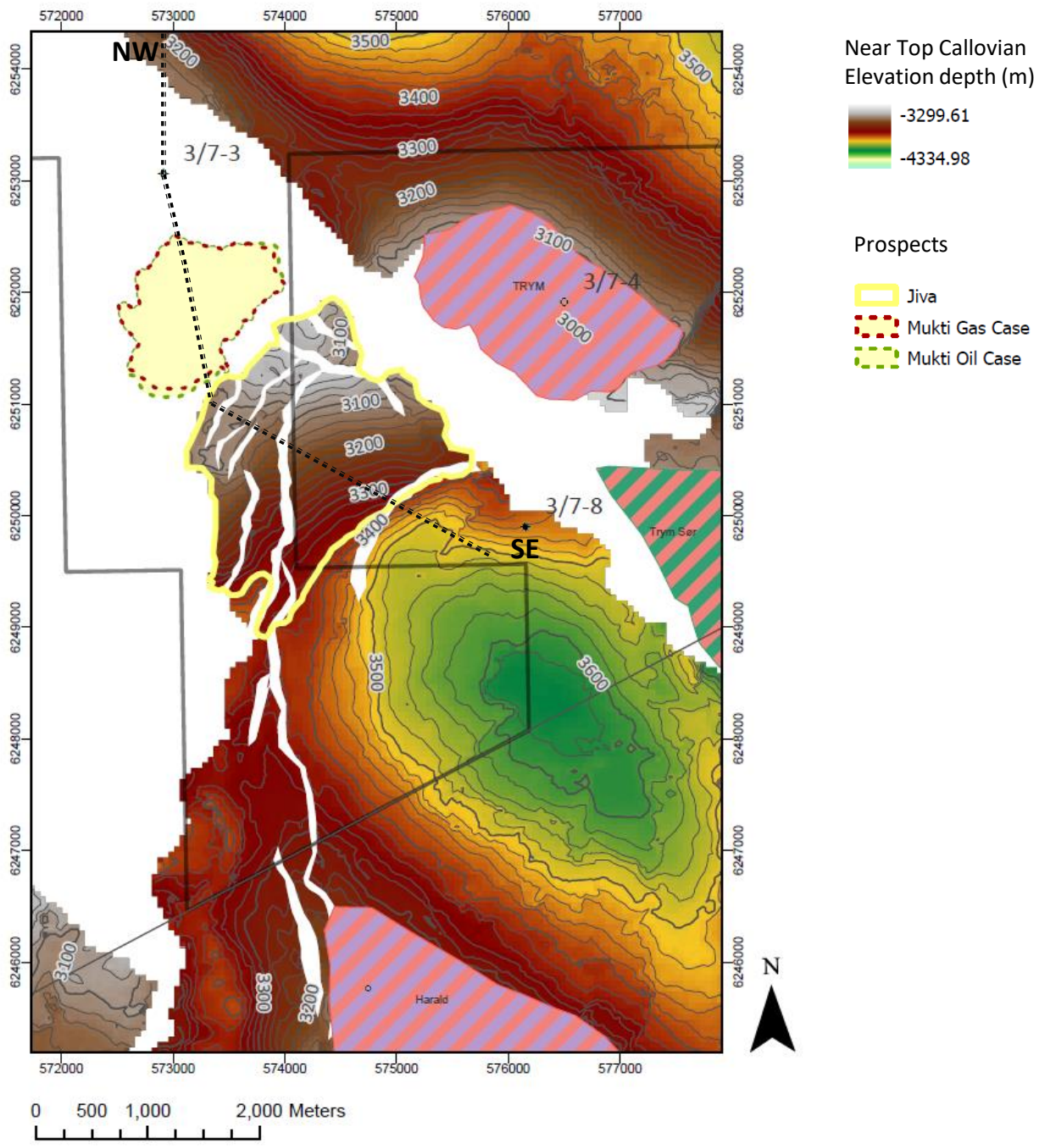


**Fig. 4.3 Near Top Callovian reservoir depth map**

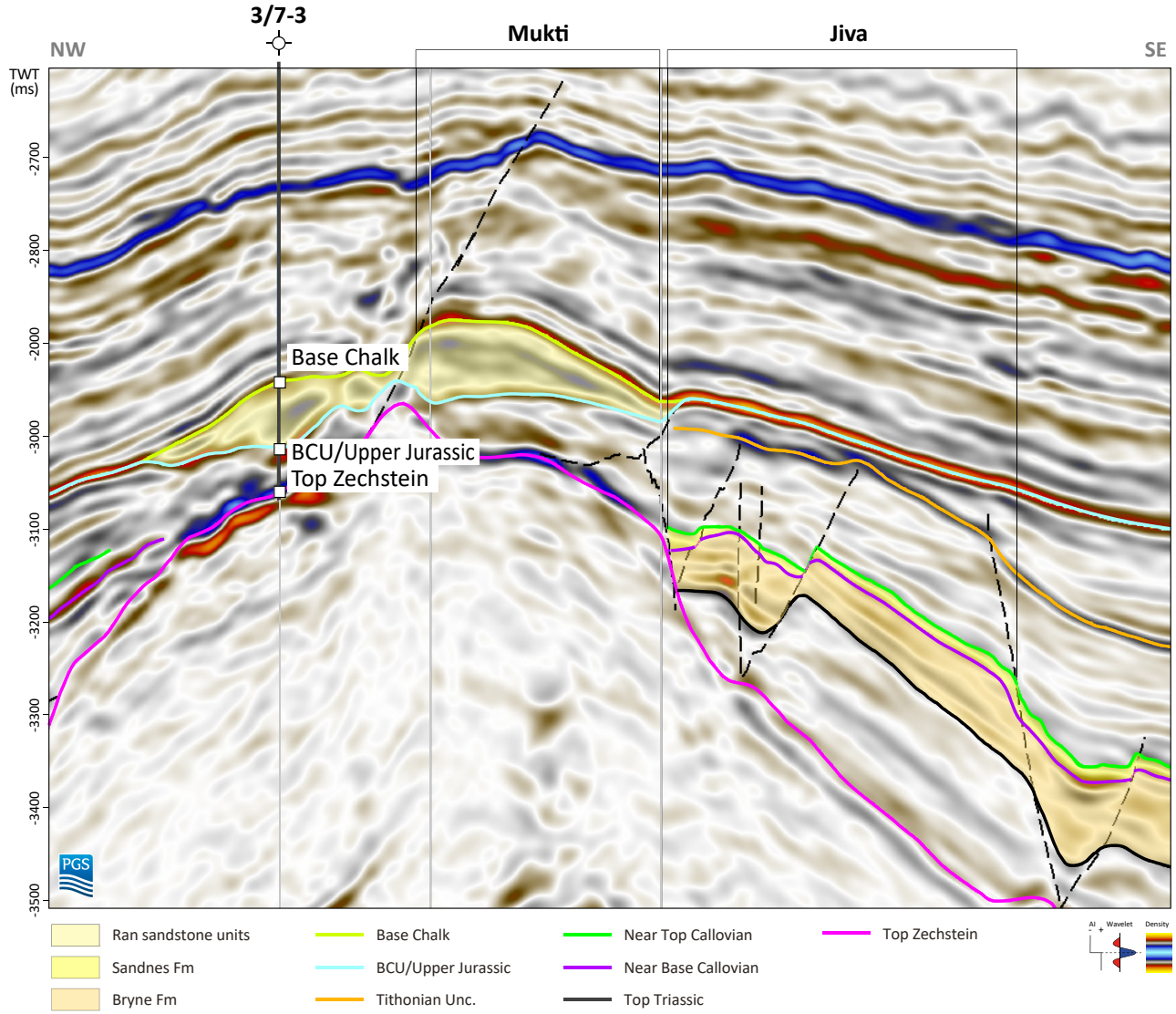


**Fig. 4.4 Seismic TWT section** Composite line taken from survey DNO20M02, reprocessed from PGS survey MC3D-CGR2015M

*Jiva*

The Jiva prospect is located West of the Trym/ Lulita structure and comprises an area of approximately 4 km$^2$. The trap is a combination of closure, stratigraphic and fault bounded (Fig. 4.3), with top seal provided by Upper Jurassic shales. The crest of the structure is at 3406 m TVDss with potential spill down to a maximum of 3767 m TVDss. The structure is heavily faulted and fault bounded to the East, North and West. Main risk is on charge and trap seal where the preferred charge model is spill from the nearby Harald Field and subsequent filling of the structure. A mixed fluid case has been considered with a higher HC probability of gas.

Upper Jurassic sands have been identified in nearby wells and can act as potential carrier beds for migration from Harald West to the Jiva structure. Jiva has a P90-P50-P10 recoverable volume range of 4.7-13.4-24.3 mmboe with a mean of 14.1 mmboe, and a chance of success of 30%. Reservoir is considered to consist of sands from the Sandnes and Bryne formations which have proven to be of good quality in nearby wells (Trym, Trym S, West Lulu). Reservoir parameters used in the evaluation displays a N/G mean of 0.77 for the Sandnes segment and 0.54 for the Bryne segment. Porosities are in the range of 12-21% for Sandnes and 10-17% for the Bryne sands.

Several nearby wells (Trym, Trym S, West Lulu, Lulita) have discoveries in the Middle Jurassic Sandnes and Bryne formations. It is a prosperous area with a working hydrocarbon system. Most of the discoveries are gas or gas-condensate, but Lulita and Trym S contain oil. Jiva was ranked high because it is not dependent on an unproven source area, and could be a potential fast-track tie-back development, given availability on the Harald Field.

*Mukti*

The Mukti prospect covers an area of approximately 1.3 km$^2$, and is located just North of the Jiva prospect. The trap is a combination of structural and stratigraphic trapping updip of the 3/7-3 well, and it is fault bounded to the North. Top seal is provided by either Åsgard shales or Hod carbonates, which were found to be present in the nearby 3/7-3 well. Reservoir is interpreted to be lower Cretaceous Ran sandstones which have proven to have good porosity in the 3/7-3 well (average 20%).

Two different charge scenarios have been considered for Mukti:

1) Direct sourcing from underlying Upper Jurassic shales. Results from the basin modelling supports oil mature Upper Jurassic shales favourably located to source the Mukti prospect.

2) Direct migration from the Trym Field, with HC accumulation above the dry 3/7-3 well. In such a case the expected fluid would be gas-condensate.

Mukti was initially considered to be a potential secondary target for Jiva due to their close proximity to one another, and was therefore ranked high during the final evaluation.

An overview of the in place and recoverable resources in addition to success summaries for the remaning prospectivity in PL967 are listed in Table 4.2 . Resource calculations for Jiva are given as both an aggregated case and separately for the individual Sandnes and Bryne reservoir segments. Mukti is calculated as one segment, but with two potential fluid outcomes. The geoseismic line displays the Mukti and Jiva prospects in cross section Fig. 4.4

**Table 4.2 PL967 Resource summary 2022**

| | Total Resources | | | | | | |
|---|---|---|---|---|---|---|---|
| | In Place (Msm³ OE) | | | Recoverable (MSm³ OE) | | | |
| Prospect | P90 | Mean | P10 | P90 | Mean | P10 | CoS |
| *Jiva Bryne* | 0.383 | 2.79 | 5.97 | 0.165 | 1.18 | 2.47 | |
| *Jiva Sandnes* | 1.35 | 3.14 | 5.06 | 0.631 | 1.42 | 2.26 | |
| *Jiva Prospect (aggregated)* | 1.61 | 5.13 | 9.13 | 0.74 | 2.25 | 3.87 | 0.3 |
| *Mukti Ran- Oil* | 1.39 | 2.2 | 3.07 | 0.406 | 0.661 | 0.934 | 0.32 |
| *Mukti Ran- Gas/Condensate* | 0.875 | 1.3 | 1.76 | 0.464 | 0.696 | 0.941 | 0.3 |
| *Portia* | 4.61 | 12.6 | 21 | 1.87 | 4.16 | 6.57 | 0.22 |

# 5 Technical Assessment

Key prospects in the licence is Jiva (45% of area within PL967) and Mukti (100% of area within PL967).

Both Jiva and Mukti are within drilling reach from the Trym template. Jiva is considered to contain the same reservoirs as Trym/Trym South (Sandnes and Bryne) and therefore assumed similar reservoir properties. Reservoir parameters in the evaluation considers a N/G mean of 0.77 for Sandnes and 0.54 for Bryne. Porosities are in the range of 12-21% for Sandnes and 10-17% for the Bryne sands. Mukti is considered to consist of good quality Cretaceous Ran sands based on evaluations from the nearby 3/7-3 well with PHIE values of around 20%.

Jiva is evaluated as a mixed case with differerent scenarios for the fluid type, where the component can be gas, oil or oil with a gas cap. Mukti is considered to contain either oil or gas. Proposed development scenario is drilling from a spare slot on the Trym Template and production through Harald following the Trym South development. In the evaluation, only gas was taken into account as the oil is considered too waxy and beyond producible limits. As a result, the recoverable volumes used in the economical evaluation were reduced from the initial assessment.

Production start-up is planned for mid 2028 with a 2.5 year production period to 2031. Initial expected field rates are around 1.7 $Msm^3$ gas per day for Jiva and just below 0.8 $MSm^3$ gas per day for Mukti (P50 case). A processing agreement with Harald (DUC) would be needed and the lifetime of Harald is a critical aspect for this development scenario. The recovery factor for the gas is expected to be 70%, and are based on evaluations from the nearby surrounding fields.

An economical analysis performed on the gas case indicated negative project economics for Mukti and marginal or negative project economics for Jiva.

# 6 Conclusion

Following the 2018 APA licensing round, PL967 was awarded in 2019 to DNO Norge AS (Operator) and Equinor ASA (partner). The work commitment at the time of award was to purchase 3D seismic data prior to the initial drill or drop decision (01 March 2021). A one year licence extension was applied for and was granted by authorities in 2020, with the final drill or drop decision being 1 March 2022.

Leading up to the drill or drop decision, several G&G studies (both internal and external) have been implemented to attempt to de-risk and mature key prospects to drillable candidates.The PSA study performed by Torena in 2021 has been crucial to gain a broader understanding of charge in the basin, which has been the main risk for most of the prospects in the licence.  The Joint Venture has fulfilled the work programme with the key prospects Jiva and Mukti being matured to drillable candidates using the high quality PGS data (MCC3D-CGR2015M). Due to poor or marginal project economics, these result in a low chance of being economical successful. In addition, the main prospect Jiva is only positioned 45% within PL967.

Based on the limited resources and negative/marginal economics on the main prospects, Jiva and Mukti do not meet the requirements to make a positive drill decision in PL967.

The licencees came to a unanimous decision to relinquish PL967 and the drop notification was submitted to authorities on 26 January 2022.