Norwegian Continental Shelf

Relinquishment Report

PL1035

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1 History of the production licence

1.1 Summary

PL1035 (part blocks 15/12, 16/7, 16/10 and 16/11) is mainly located in the Ling Depression, South of Sleipner Terrace and North of the Jæren High, in a water depth of c. 75 m. One prospect was mapped in the Upper Jurassic and Triassic shallow marine and fluvial sandstones (Figure 1.1). Ten leads were also identified, nine of Late Jurassic to Triassic age and one of Permian age. Nearby producing fields include Sigyn to the north (Equinor op. 60%, Vår Energi 40%) and Rev to the southwest (Repsol op. 70%, Petoro 30%).

PL1035 was awarded as part of APA 2019 licence round on the 14th of February 2020. The initial period was set to 7 years (2+2+2+1), of which the first decision, drill or drop, was due 14th of February 2022. Three months extension was applied for, and the final drill or drop was 14th of May 2022.

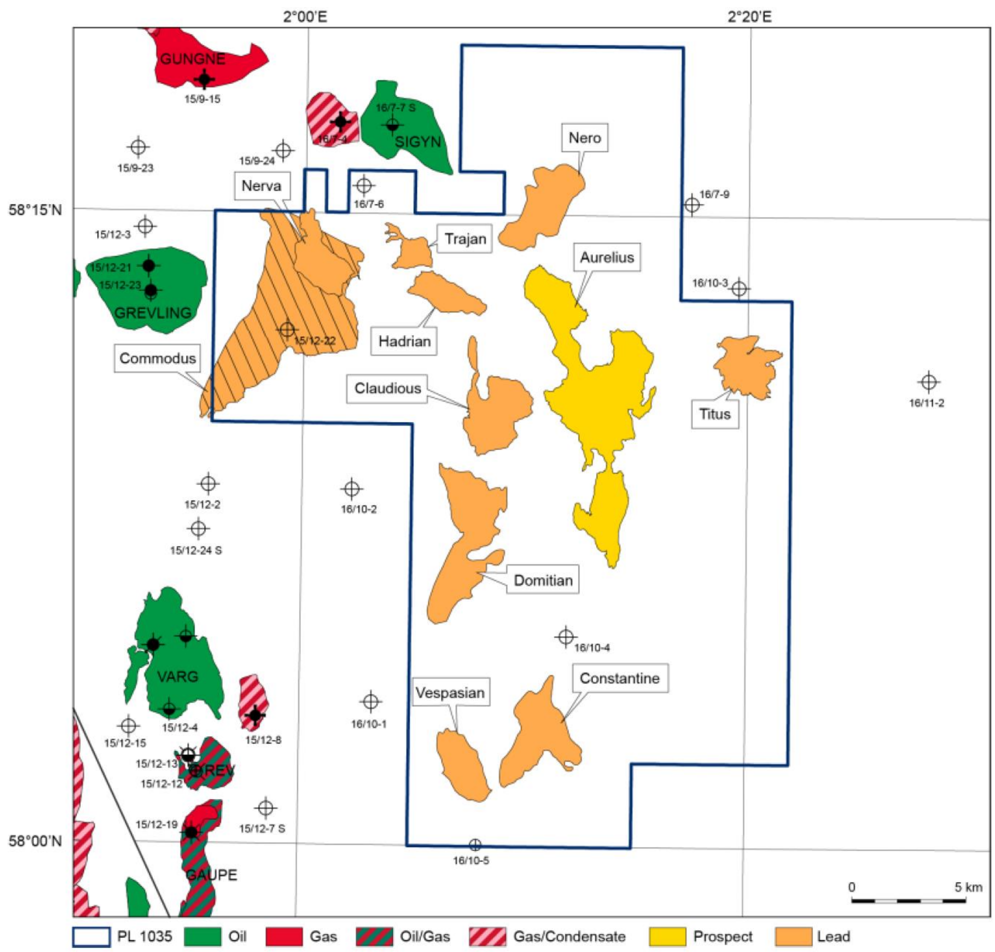

Figure 1.1 Licence area*: blue outline of the awarded licence PL1035. The main prospect (Aurelius) is marked in yellow and leads are marked in orange. Nearby fields and discoveries (e.g. Sigyn, Grevling, Varg) are displayed in green and red.*

Based on licence work the prospectivity in the licence is interpreted to be of high risk and moderate volumes.

1.2 Participants

The partnership consists of:

- *Suncor Energy Norge AS, 40% equity, **operator***
- *Vår Energi AS, 30% equity*
- *Neptune Energy Norge AS, 30 % equity*

1.3 Work Commitment

The work commitment was initial purchase and re-processing of 3D seismic.

1.4 Meetings

MC meetings were held at least once and EC meetings twice a year, in accordance with JOA article 2.1. These meetings were combined ECMC meetings and in addition several EC work sessions have been organized.

Below is a list of the meetings held during the licence term:

1. ECMC start up meeting on 17th of March 2020, Virtual meeting
2. Work meeting addressing seismic re-processing on the 27th of March 2020, Virtual meeting
3. Work meeting addressing seismic re-processing on the 10th of September 2020, Virtual meeting
4. ECMC End of Year meeting on the 23rd of November 2020, Virtual meeting
5. EC meeting the 17th of June 2021, Virtual meeting
6. EC workshop the 7th of October 2021, Virtual meeting
7. ECMC End of Year meeting the 18th of November 2021, Virtual meeting

1.5 Reason for licence lapse

The main prospectivity within the Jurassic and Triassic was re-evaluated based on the re-processed SUN21M01 3D seismic survey, as well as geological and geophysical studies. Charge and migration were initially seen as the main uncertainty for prospectivity within the area. The oil family correlation study done in the licence period, paired with the re-evaluation of the re-processed 3D seismic strengthened this hypothesis.

During the licence work, no additional prospectivity in the Cretaceous and Paleocene was identified. Based on the integration of the work outlined above, it was decided to lapse PL1035.

2 Database overviews

A common licence database was established at the beginning of the PL1035 licence award.

2.1 Seismic data

As part of the work commitment, the licence agreed upon a common 3D seismic dataset, as well as the subsequent merge and re-processing of these.

The following seismic surveys were used for re-processing (Figure 2.1):

- *PGS16902VIK, known in Diskos as PGS16M03-PGS16902VIK (PGS GeostreamerPURE)*

This 3D seismic dataset includes 2015 and 2016 acquisitions with a complete re-processing of 2012 vintage data, completed in 2017. Processing bin dimensions for the dataset were 12.5 x 12.5 m.

- *MC3D_GRVLIN2012 (PGS Geostreamer)*

GRV and LIN2012 (often referred to as GRVLIN2012) is first generation of broadband dataset, with acquisition during 2010 – 2012 and processing completed in 2013. Processing bin dimensions for the 3D seismic dataset were 12.5 x 12.5 m.

- *PGS14012 (PGS Geostreamer)*

Acquisition of this 3D seismic dataset was in 2014, while processing was completed in 2015. Processing bin dimensions for the 3D seismic dataset were also 12.5 x 12.5 m.

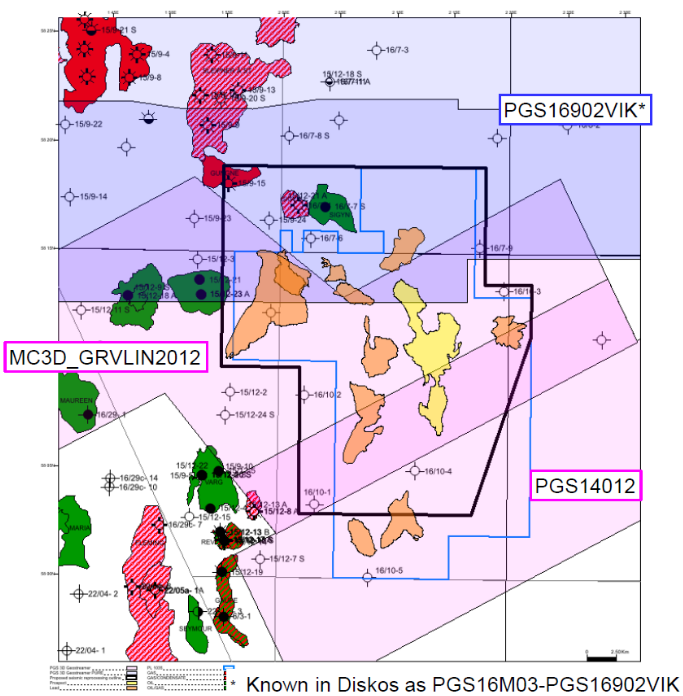

Figure 2.1 Seismic database*: Outline of the seismic surveys used for re-processing, with PL1035 outlined in blue. The re-processed seismic area for SUN21M01 is outlined in black.*

Re-processing for PL1035 was completed by DUG, including a total area of 624 km^2 (Figure 2.1). The resultant new survey, SUN21M01, contains a 12.5 x 12.5 m grid, AI increase as peaks (blue/black on figures) and line directions as PGS16M03 (north-south inlines and east-west crosslines).

The common seismic database is listed in (Table 2-1)

Table 2-1 PL1035 seismic database

Seismic survey	NPDID	Survey Type	Processing Company	Processing	Status	Comments
PGS15002	8245	3D	PGS	PSDM	Multi-client	Part of PGS16M03-PGS16902VIK
MC3D_GRVLIN12	7653	3D	PGS	PSTM	Multi-client	
PGS14012	8045	3D	PGS	PSTM	Multi-client	
SUN21M01		3D	DUG	PSDM	Licence owned	Seismic merge and reprocessing including the surveys listet above

2.2 Well data

All well data in the vicinity of the licence has been released and therefore no purchasing or trading of the wells was needed for the common database. Wellbores used in the evaluation of the licence prospectivity are listed in Table 2-2, and labeled in Figure 2.1.

Table 2-2 PL1035 well database

Well	NPDID
6/3-1	450
6/3-2	862
7/1-1	192
7/1-2 S	5793
7/3-1	164
15/9-1	322
15/9-2	323
15/9-4	325
15/9-10	69
15/9-13	45
15/9-14	71
15/9-15	74
15/9-23	6186
15/12-2	331
15/12-3	199
15/12-4	438
15/12-6 S	1524
15/12-7 S	1680
15/12-8 A	1835
15/12-13 B	4759
15/12-18 S	5607
15/12-19	5705
15/12-21	6047
15/12-22	6326
15/12-23	6327
15/12-23 A	6404

Well	NPDID
16/7-1	146
16/7-2	40
16/7-3	75
16/7-4	91
16/7-5	134
16/7-6	3067
16/7-7 ST2	3244
16/7-8 S	4612
16/7-9	6382
16/7-11	7750
16/8-1	335
16/8-2	234
16/8-3 S	7115
16/9-1	151
16/10-1	901
16/10-2	1767
16/10-3	2703
16/10-4	3531
16/10-5	7021
16/11-1 S	112
16/11-2	336

3 Results of geological and geophysical studies

3.1 Review of geological framework

The area of interest is located in the Ling Depression, south of Sleipner Terrace and north of the Jæren High (Southern Viking Graben, Southern North Sea; Figure 3.1). The stratigraphic architecture of the Southern Viking Graben resulted from the interplay among multiple extensional events, salt movements and eustatic sea-level changes, which overall governed accommodation and sediment supply. Rift extensional tectonics and salt tectonics produced a typical pod-interpod structure, with timing of salt welds at the base of pods controlling accommodation. Specifically, pods correspond to turtle structures mainly comprised of Triassic continental deposits, while interpods represent areas of salt collapse/dissolution following the Late Jurassic rifting, with deposition of paralic sandstones (deltaic to shoreface/offshore sandstones).

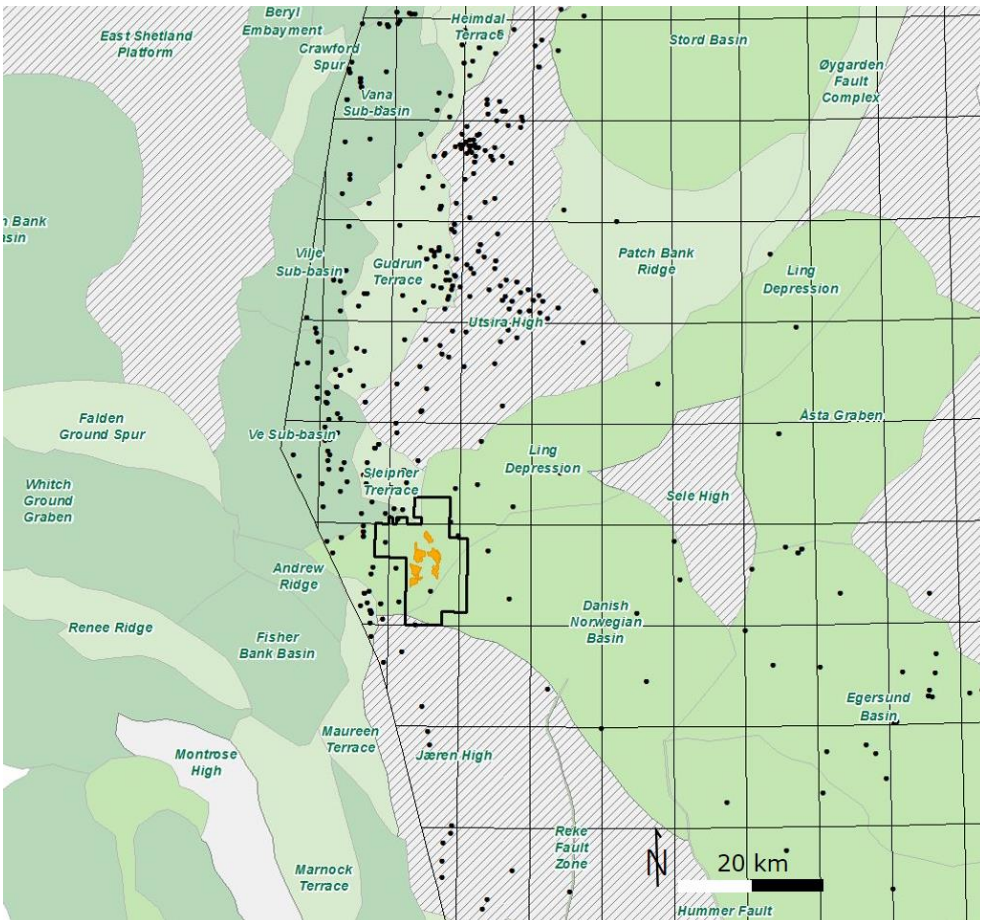

Figure 3.1 Structural element map: *The position of PL1035, outlined in black, within the South Viking Graben.*

The Upper Jurassic Marine Clastic Play in the Southern Viking Graben is a play proven by several discoveries and nearby fields, such as Rev and Varg. It consists mainly of Oxfordian-Kimmeridgian shallow-marine sandstones related to the tectono-sedimentary evolution of the Jurassic rifting, which stratigraphically belongs to the Heather, Draupne and Ula Formations (Vestland Group; Figure 3.2). All the wells drilled in the licence area and surroundings have proven fair to very good reservoir properties both for Upper Jurassic (e.g., 15/12-22 and 16/10-2) and Triassic (e.g., 16/7-7S) sandstones.

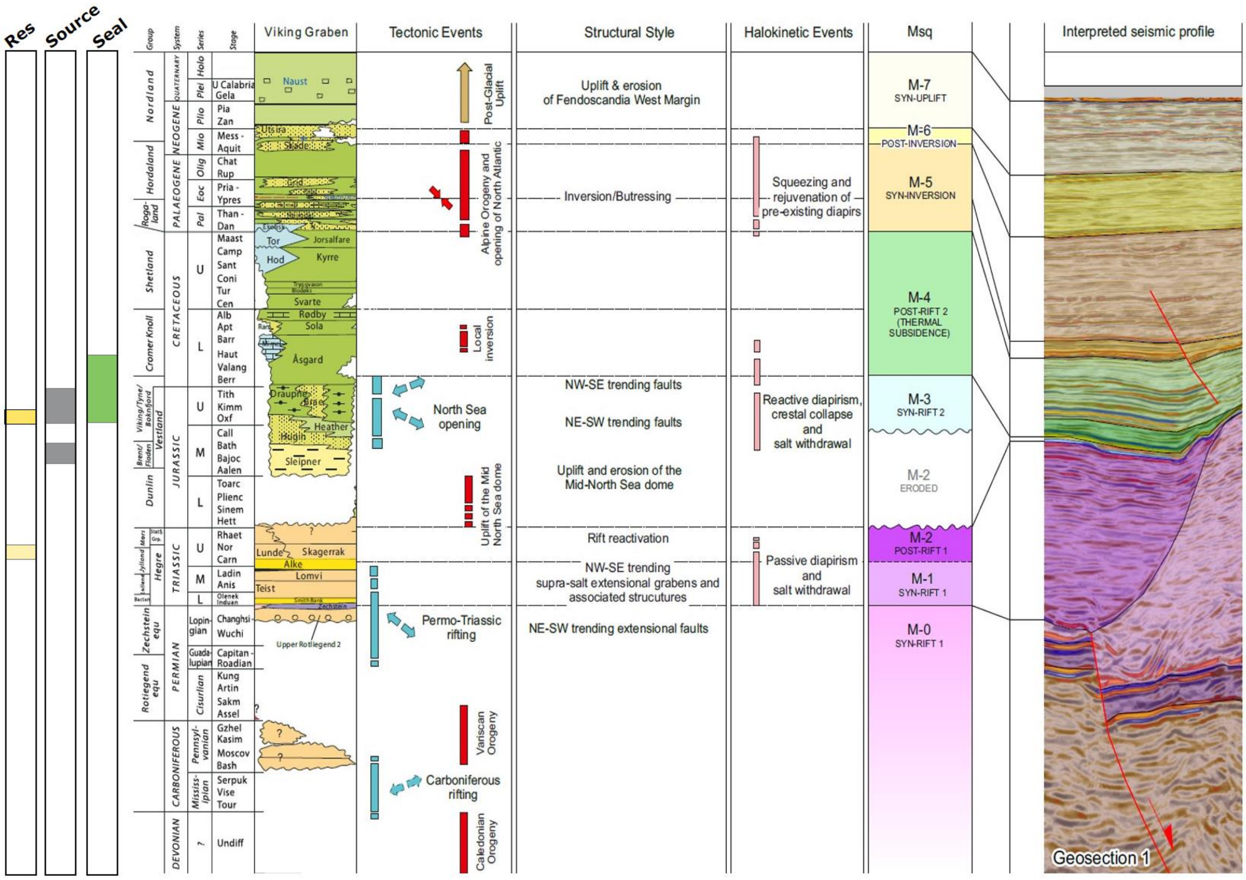

Figure 3.2 Tectono-stratigraphic framework: *Tectonic history and petroleum system elements within the Viking Graben.*

The Upper Jurassic Marine Clastic Play has multiple source rocks, with the main one represented by the Upper Jurassic anoxic shales of the Draupne Formation generating both oil and gas (Figure 3.2). In addition, minor source rocks are the late Middle-Upper Jurassic marine shales of the Heather Formation (oil and gas prone), and the Middle Jurassic, organic-rich shales of the Sleipner Formation (gas and condensate prone). The latter represents the main source of gas and condensate in the Sigyn, Sleipner and Gungne fields.

Traps are primarily related to salt tectonics, possibly re-shaped by later tectonic events (e.g. inverted anticlines, rollover anticlines and faulted salt diapirs), with top seal provided by Upper Jurassic shales of the Viking Group with additional contribution from the overlying Lower Jurassic fines of the Cromer Knoll Group (Figure 3.2).

No hydrocarbon kitchen is envisaged within the licence, thereby requiring a relatively long-distance migration either from the north or from the west to explain the residual oil and gas cloud in well 16/10-4. The onset of hydrocarbon maturation is modelled to have started in the Paleocene with no issues related to timing and with the expected hydrocarbon phase as oil and gas within the licence.

3.2 List of completed studies

For a thorough evaluation of all the prospects and leads within PL1035, the following is a list of studies completed within the licence:

- *Top seal integrity study (in-house 2021)*
- *Integrated stratigraphic and depositional study of the Middle to Upper Jurassic succession (Skolithos 2020-2021)*
- *Oil typing study focusing on 16/10-4 geochemical data review (APT 2020)*

3.3 Noteworthy results

Two proprietary studies have been performed as part of the licence work to evaluate the prospectivity in PL 1035. The studies are expanded upon below:

- *Integrated stratigraphic and depositional study of the Middle to Upper Jurassic succession (Skolithos 2020-2021)*

Although focusing on the Jurassic intervals, the thorough review extended from the Triassic to the Upper Jurassic in 49 selected wells adjacent to the licence where both core and log data were studied to interpret facies associations. A total of 20 facies associations were documented for the Smith Bank, Skagerrak, Sleipner, Hugin, Heather, Draupne, Mime, Sola and Rødby Formations.

This study concluded that the main prospectivity is in the Upper Jurassic Heather Formation and the Triassic Skagerrak Formation. The Middle Jurassic sands in the Sleipner and Hugin Formations are not preserved this far east, while the Intra Draupne sands were confined to the Ula fairway to the south. The Intra Heather Sands were deposited in the Late Oxfordian within a shelfal sand fairway and were widespread with variable thickness. The older shoreface sands, which are the principal reservoirs in the nearby Varg Field, do not extend into the licence. Although carbonate cements have the potential to diminish reservoir quality, it is unlikely to be significant. The sand-prone Skagerrak Formation is of varying reservoir quality due to differences in sorting, mica content and carbonate cementation. Although the best quality sands are the aeolian dune and interdune deposits, fluvial channels appear to be the main deposit within the licence area.

- *Oil typing study focusing on 16/10-4 geochemical data review (APT 2020)*

Review of geochemical data of well 16/10-4 and correlation to the Sigyn oil showed that the migration into the 16/10-4 most likely came from west and not from north as assumed at time of the application. Sigyn oils contain a unique signature with a strong terrestrial influence, comprising of gas and light oil/condensate generated from the Middle Jurassic coals and carbonaceous shales (e.g. Hugin and Sleipner Formations). Conversely, the trace amounts of migrant oil found in 16/10-4 core samples suggested an early to middle mature clastic source rock, more consistent with an Upper Jurassic Draupne Formation source rock (standard North Sea oil). The fluid similarity at 16/10-4 was found to be closer to those fields in the South Viking Graben (e.g. Varg and Gaupe).

4 Prospect update reports

When the licence was established, it became clear that the partnership had very similar views on prospectivity within the licence. Aurelius was deemed as the main prospect, while Nero was defined as a lead. Work during the licence period has changed the view on Aurelius from one large structure to four smaller segments. Nero has been upgraded from a lead to a prospect (Figure 4.1).

4.1 Reservoir units and trap geometries

Top reservoir was originally mapped at BCU level on the multi-client MC3D-PGS-Megasurvey as the reflectivity was poor and it was assumed this was a representative reflector for both trap integrity and top reservoir. A significant uplift of data quality and resolution was observed on the acquired and re-processed seismic dataset SUN21M01 compared to the multi-client MC3D-PGS-Megasurvey. This improvement allowed the high confidence mapping of the Intra Draupne Unconformity as the top reservoir within the licence (Figure 4.2). Due to the deeper, but more accurate top reservoir, the Aurelius structure was then divided into four smaller 4-way closures instead of one larger closure.(Figure 4.1).

At the time of application, the reservoir units were Upper Jurassic Hugin Fm and Triassic Skagerrak Fm. As a result of the stratigraphic study and re-dating of the Jurassic intervals in the nearby wells (3.3 Noteworthy results), the main reservoir interval was deemed more likely to be the high quality Intra Heather Formation shelf sands instead of the Upper Jurassic shallow marine Hugin Fm. No significant updates were done in the fluvial Skagerrak Fm in the area of interest.

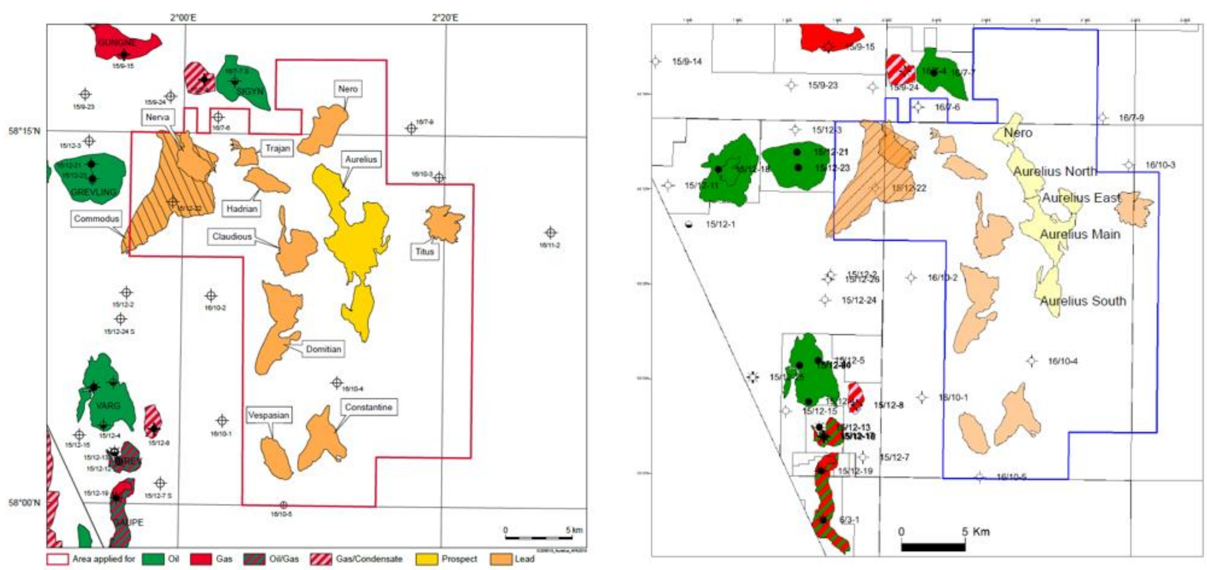

Figure 4.1 APA prospectivity (left) and updated prospectivity (right): *Aurelius was one large trap at the time of the APA application but is now divided into four segments after re-mapping. Nero has been upgraded from lead to prospect.*

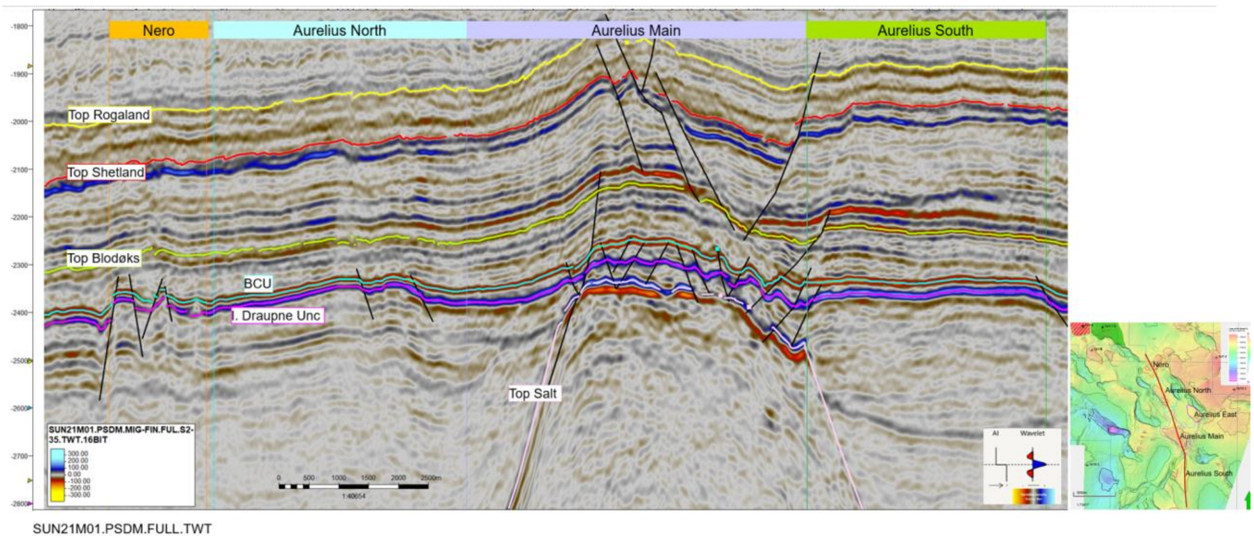

Figure 4.2 Seismic section along Aurelius and Nero: *Top reservoir (Intra Draupne Unconformity) along the Aurelius prospect segments and the Nero prospect.*

4.2 Seal

Top seal was assumed to be the Upper Jurassic Draupne and Heather shales, as well as the Lower Cretaceous shales. These shales are regionally proven by wells in the area, including at the Sleipner East, Sigyn and Varg fields. Above the Aurelius structure, the top seal is cut by normal faults, making the seal risk moderate. Top seal risk is still seen as moderate for all the four Aurelius segments due to the larger faults cutting the main seal units. Nero has low risk on top seal, but high risk on lateral seal due to likely sand-sand juxtaposition on the northeastern fault.

The top seal integrity study aimed to test the APA 2019 hypothesis of a continuous pressure cell and migration from 15/9-15 to 16/10-4, due to the presence of a gas chimney around 16/10-4 (**Figure 4.3 Potential pressure cell communication:** Is it possible for migration from 15/9-15 to 16/10-4?Figure 4.3).

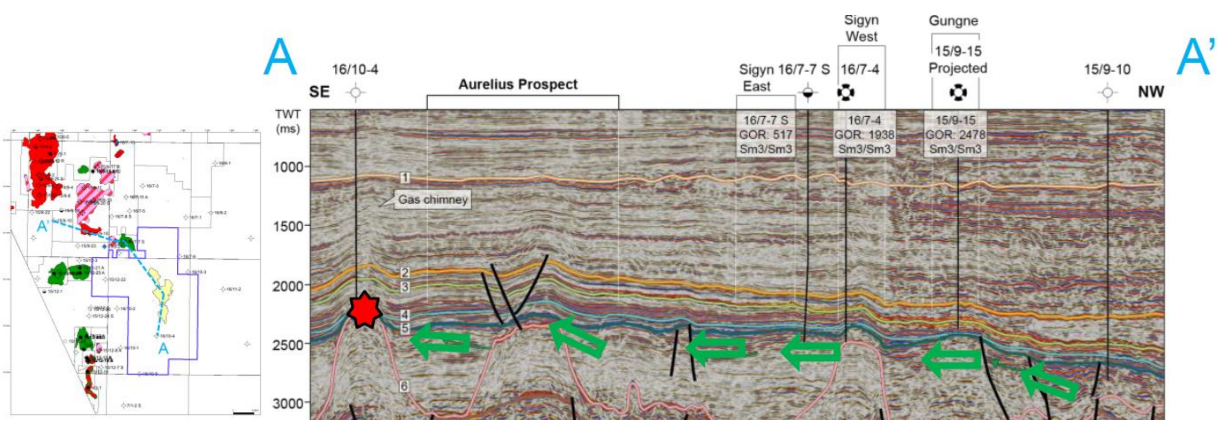

Figure 4.3 Potential pressure cell communication: *Is it possible for migration from 15/9-15 to 16/10-4?*

Regional pressure tests indicates that a lot of > 2.00 sg was achieved in the Draupne at 16/10-5 and 15/12-8. If we assume it is close to fit, this equates to a cap pressure of c. 490 bar at the crest of 16/10-4 to blow a Draupne top seal. RFT pressures do not confirm this present day, nor is this a common occurrence in the

North Sea as the Draupne has been observed to be an excellent top seal. The formation pressure required to blow the top seal at 16/10-4 is c. 200 bar higher than present day (Figure 4.4). Subject to fluid densities, this is a column of several thousand meters. Therefore, it is very unlikely Aurelius is a pressure protected trap and it is more likely that the gas chimney at 16/10-4 is due to faulting or erosion of the Draupne Formation.

Relative to the Sigyn field, wells to the south are at higher pressure / within different pressure regimes and contain remarkedly distinct fluids. The well 16/10-3 in the east appears to be under pressure.

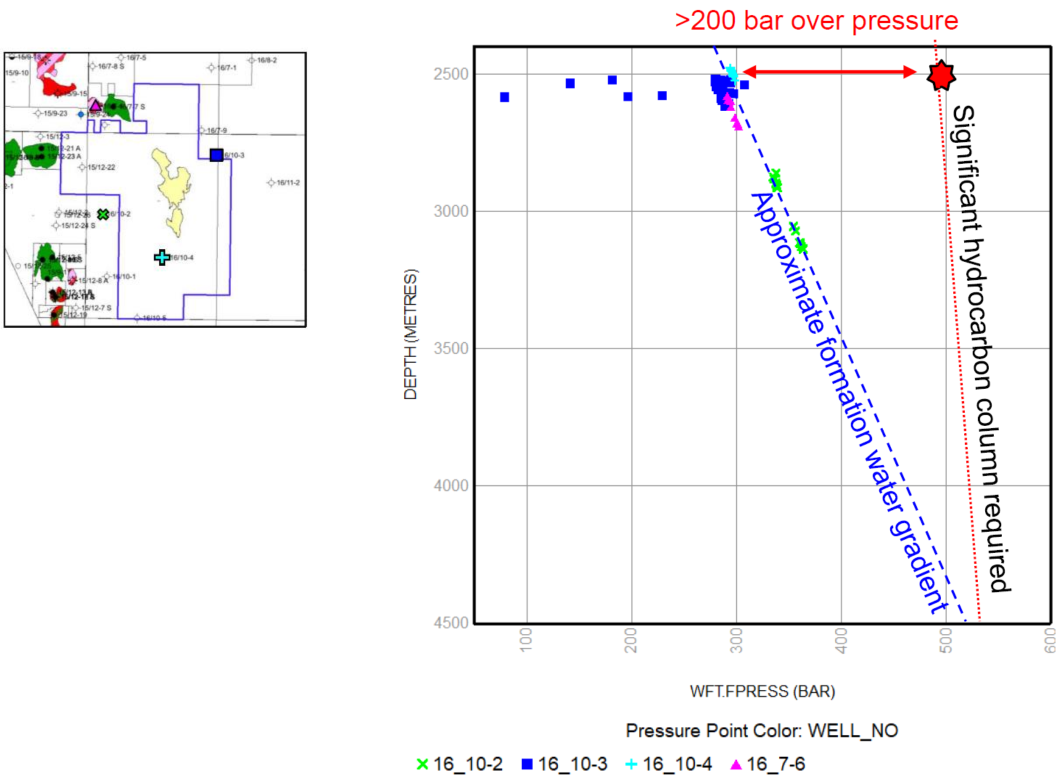

Figure 4.4 Top seal integrity study: *Offset pressures.*

4.3 Hydrocarbon migration

The main reason for failure within PL1035 and the surrounding vicinity is charge. It is believed that there is a lack of mature source rocks within PL1035 and therefore the prospects rely on hydrocarbon migration from areas outside the licence. Oil charging started in the Late Cretaceous after the traps were formed. Migration is identified as the main risk, with the initial migration pathway identified as a fill-and-spill scenario from the northern Sigyn area into the main prospect Aurelius. This model was supported by a gas cloud on the seismic near well 16/10-4, in addition to oil shows in the Hugin Formation.

However, the oil family correlation study done by APT in 2020 showed that the oil in 16/10-4 most likely had come from the deep, mature western basin and not from the north as assumed previously. The Sigyn field was largely sourced from Sleipner coals, but the oil in 16/10-4 contained a different signature and likely different sourcing.

Furthermore, mapping of the re-processed seismic also revealed that the migration route from Sigyn to Aurelius is more complicated than first assumed. The prospect Nero is located on the migration route from Sigyn to Aurelius and is of importance to the further spill southwards (Figure 4.5). The spill point from Sigyn towards Aurelius is c. 62 m deeper than the known contact at the Sigyn field, to which regional tilting (i.e. related to glacial-interglacial phases) would have to be active to support the southward migration of hydrocarbons as the uncertainty in depth conversion would not account for this difference.

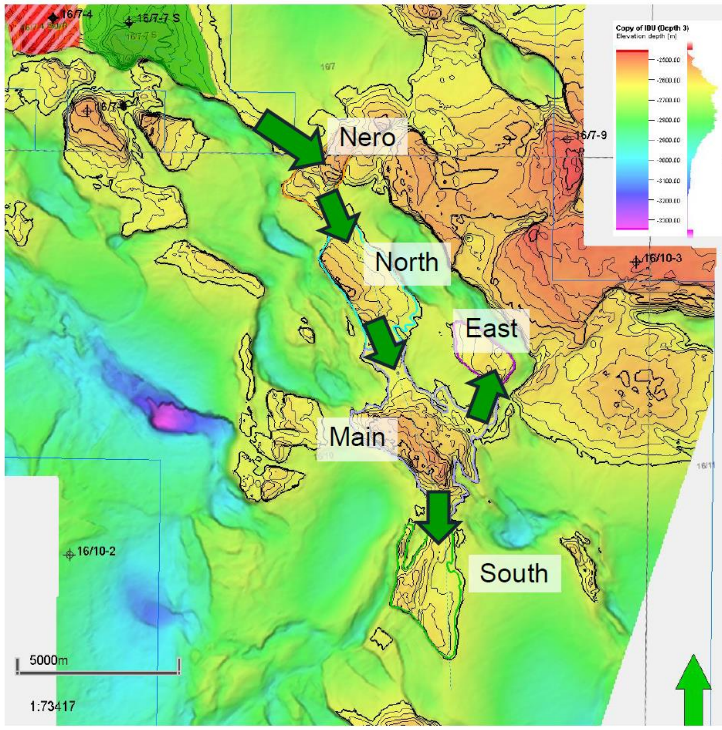

Figure 4.5 Migration pathway: *Fill-and-spill from the Sigyn East field to the Nero prospect and further to the Aurelius prospect segments.*

The structure at Nero is a complicated array of faults in all directions (Figure 4.6). As Nero must be filled to ensure spill into Aurelius, some faults bounding Nero needed to be open and some needed to be closed to guarantee successful migration southwards. Thus, the western fault needed to be open while the fault to the northeast needed to seal as there are dry wells (e.g. 16/7-9, 16/10-3) up flank. Conclusively, charge into Aurelius has high risk, due to both the complicated migration route from Sigyn towards Aurelius and the result from the oil family correlation study.

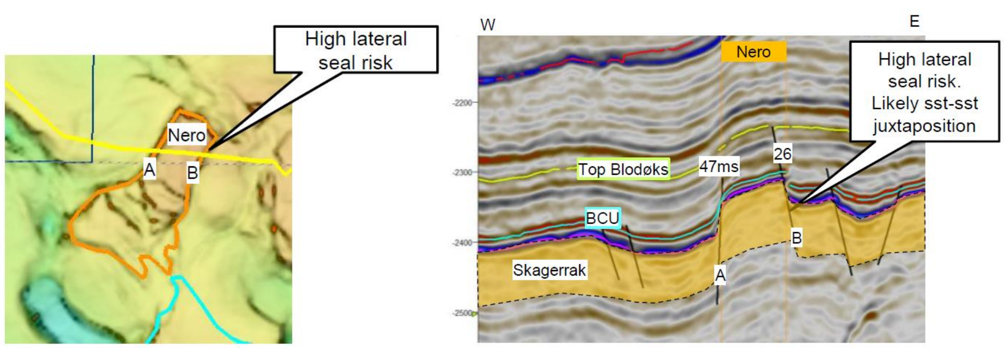

Figure 4.6 Nero bounding faults: *Critical fault array around the Nero prospect.*

Alternative migration pathways from west were investigated, but found very risky since dry wells are located on the possible migration routes.

4.4 Volume updates

Original Aurelius volumes from APA 2019 are listed in (Table 4-1). At that time Aurelius was one large closure and Nero defined as a lead, hence no volumes calculated for Nero.

Table 4-1 In-place volumes and risks APA 2019

Discovery/ Prospect/ Lead name [1]	D/ P/ L [2]	Case (Oil/ Gas/ Oil&Gas) [3]	Unrisked recoverable resources [4]						Probability of discovery [5] (0.00 - 1.00)	Resources in acreage applied for [%] [6] (0.0 - 100.0)	Reservoir		Nearest relevant infrastructure [8]	
			Oil [$10^6 Sm^3$] (>0.00)			Gas [$10^9 Sm^3$] (>0.00)					Litho-/ Chrono-stratigraphic level [7]	Reservoir depth [m MSL] (>0)	Name	Km (>0)
			Low (P90)	Base (Mean)	High (P10)	Low (P90)	Base (Mean)	High (P10)						
Aurelius	P	Oil	9.39	19.90	32.80				0.25	100.0	Hugin Fm, Skagerrak Fm/ Upper Jurassic, Upper Triassic	2470	Sleipner East	26
Nero	L	Oil								100.0	Hugin Fm, Skagerrak Fm/ Upper Jurassic, Upper Triassic	2503		

The main result of interpretation of the re-processed seismic dataset was a more accurate, deeper top reservoir map and the accompanying segmentation of Aurelius into four smaller structures. The resultant gross rock volume for Aurelius decreased significantly and the volumes are no longer proved economic (Table 4-2, Table 4-3, Table 4-4 and Table 4-5).

The secondary prospect Nero also contains small volumes due to the limited lateral extent. The risk is high due to the complicated array of faults bounding the structure (lateral seal risk) in addition to the charge risk (Table 4-6).

For evaluation of the risks, dependencies are used. If Nero is filled to spill then Aurelius North will be charged. If Aurelius North is filled to spill then will Aurelius Main will be charged. If Aurelius Main is filled to spill then the two last segments Aurelius East and South will be charged.

The charge risk for the Aurelius segments are therefore dependent on Nero and the risking is done accordingly.

Table 4-2. Aurelius North Prospect data

Block	16/10	Prospect name	Aurelius North	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	Suncor Energy	Reference document				Assessment year	2022
This is case no.:	1 of 1	Structural element	Ling Depression	Type of trap	4 way	Water depth [m MSL] (>0)	84	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)	3.80	6.15	6.36	9.22				
	Gas [10^9 Sm^3] (>0.00)								
Recoverable resources	Oil [10^6 Sm^3] (>0.00)	1.16	2.25	2.41	3.87				
	Gas [10^9 Sm^3] (>0.00)					0.58	1.15	1.25	2.04
Reservoir Chrono (from)	Triassic	Reservoir litho (from)	Skagerrak	Source Rock, chrono primary	Middle Jurassic	Source Rock, litho primary	Sleipner	Seal, Chrono	Late Jurassic
Reservoir Chrono (to)	Late Oxfordian	Reservoir litho (to)	Intra Heather	Source Rock, chrono secondary		Source Rock, litho secondary		Seal, Litho	Draupne shale
Probability [fraction]									
Total (oil + gas + oil & gas case) (0.00-1.00)	0.60	Oil case (0.00-1.00)	1.00	Gas case (0.00-1.00)	0.00	Oil & Gas case (0.00-1.00)			
Reservoir (P1) (0.00-1.00)	0.90	Trap (P2) (0.00-1.00)	0.95	Charge (P3) (0.00-1.00)	1.00	Retention (P4) (0.00-1.00)	0.40		
Parametres:	Low (P90)	Base	High (P10)	*Comments: P50 quoted in the Base case. PoS of 0.60 is assuming a succes case in the northern structure - Nero using Bayes Law. Without prior knowledge the PoS for Aurelius North will be 0.14(Nero)*0.6(Aurelis North) = 0.08. Cut off criteria Skagerrak: Por >= 0.17, Vsh <= 0.4. Intra Heather: Por >= 0.13, Vsh<= 0.5*					
Depth to top of prospect [m MSL] (> 0)		2540							
Area of closure [km^2] (> 0.0)	5.3	5.9	6.5						
Reservoir thickness [m] (> 0)	101	175	250						
HC column in prospect [m] (> 0)		112							
Gross rock vol. [10^9 m^3] (> 0.000)	0.186	0.208	0.229						
Net / Gross [fraction] (0.00-1.00)	0.40	0.60	0.80						
Porosity [fraction] (0.00-1.00)	0.19	0.22	0.25						
Permeability [mD] (> 0.0)									
Water Saturation [fraction] (0.00-1.00)	0.20	0.30	0.40						
Bg [Rm3/Sm3] (< 1.0000)									
1/Bo [Sm3/Rm3] (< 1.00)	0.29	0.33	0.38						
GOR, free gas [Sm^3/Sm^3] (> 0)									
GOR, oil [Sm^3/Sm^3] (> 0)	431	517	603						
Recov. factor, oil main phase [fraction] (0.00-1.00)	0.23	0.38	0.52						
Recov. factor, gas ass. phase [fraction] (0.00-1.00)									
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)	100			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)	295			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. See comments	2.	3.					Kart nr	NPD will insert value

Table 4-3. Aurelius Main prospect data

Block	16/10	Prospect name	Aurelius Main	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	Suncor Energy	Reference document				Assessment year	2022
This is case no.:	1 of 1	Structural element	Ling Depression	Type of trap	4 way	Water depth [m MSL] (>0)	84	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)	6.40	10.20	10.50	15.00				
	Gas [10^9 Sm^3] (>0.00)								
Recoverable resources	Oil [10^6 Sm^3] (>0.00)	1.56	3.60	3.79	6.25				
	Gas [10^9 Sm^3] (>0.00)					0.78	1.84	1.96	3.29
Reservoir Chrono (from)	Middle Oxfordian	Reservoir litho (from)		Source Rock, chrono primary	Middle Jurassic	Source Rock, litho primary	Sleipner	Seal, Chrono	Late Jurassic
Reservoir Chrono (to)	Late Oxfordian	Reservoir litho (to)	Intra Heather	Source Rock, chrono secondary		Source Rock, litho secondary		Seal, Litho	Draupne shale
Probability [fraction]									
Total (oil + gas + oil & gas case) (0.00-1.00)	0.60	Oil case (0.00-1.00)	1.00	Gas case (0.00-1.00)	0.00	Oil & Gas case (0.00-1.00)			
Reservoir (P1) (0.00-1.00)	0.90	Trap (P2) (0.00-1.00)	0.95	Charge (P3) (0.00-1.00)	1.00	Retention (P4) (0.00-1.00)	0.40		
Parametres:	Low (P90)	Base	High (P10)	*Comments: P50 quoted in the Base case. PoS of 0.60 is assuming a succes case in the northern structure(s) - Nero and Aurelius North using Bayes Law. Without prior knowledge the PoS for Aurelius Main will be 0.14(Nero)*0.6(Aurelis North)*0.6 (Aurlius Main) = 0.05. Cut off criteria Skagerrak: Por >= 0.17, Vsh <= 0.4. Intra Heather: Por >= 0.13, Vsh<= 0.5*					
Depth to top of prospect [m MSL] (> 0)		2500							
Area of closure [km^2] (> 0.0)	9.0	10.0	11.0						
Reservoir thickness [m] (> 0)									
HC column in prospect [m] (> 0)		152							
Gross rock vol. [10^9 m^3] (> 0.000)	0.301	0.334	0.368						
Net / Gross [fraction] (0.00-1.00)	0.40	0.60	0.80						
Porosity [fraction] (0.00-1.00)	0.20	0.23	0.25						
Permeability [mD] (> 0.0)									
Water Saturation [fraction] (0.00-1.00)	0.20	0.30	0.40						
Bg [Rm3/Sm3] (< 1.0000)									
1/Bo [Sm3/Rm3] (< 1.00)	0.29	0.33	0.38						
GOR, free gas [Sm^3/Sm^3] (> 0)									
GOR, oil [Sm^3/Sm^3] (> 0)	431	517	603						
Recov. factor, oil main phase [fraction] (0.00-1.00)	0.19	0.37	0.52						
Recov. factor, gas ass. phase [fraction] (0.00-1.00)									
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)	100			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)	295			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. See comments	2.	3.					Kart nr	NPD will insert value

Table 4-4. Aurelius South prospect data

Block	16/10	Prospect name	Aurelius South	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	Suncor Energy	Reference document				Assessment year	2022
This is case no.:	1 of 1	Structural element	Ling Depression	Type of trap	4 way	Water depth [m MSL] (>0)	84	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)	2.43	3.90	4.04	5.82				
	Gas [10^9 Sm^3] (>0.00)								
Recoverable resources	Oil [10^6 Sm^3] (>0.00)	0.64	1.20	1.30	2.10				
	Gas [10^9 Sm^3] (>0.00)					0.32	0.61	0.67	1.10
Reservoir Chrono (from)	Triassic	Reservoir litho (from)	Skagerrak	Source Rock, chrono primary	Middle Jurassic	Source Rock, litho primary	Sleipner	Seal, Chrono	Late Jurassic
Reservoir Chrono (to)	Late Oxfordian	Reservoir litho (to)	Intra Heather	Source Rock, chrono secondary		Source Rock, litho secondary		Seal, Litho	Draupne shale
Probability [fraction]									
Total (oil + gas + oil & gas case) (0.00-1.00)	0.60	Oil case (0.00-1.00)	1.00	Gas case (0.00-1.00)	0.00	Oil & Gas case (0.00-1.00)			
Reservoir (P1) (0.00-1.00)	0.90	Trap (P2) (0.00-1.00)	0.95	Charge (P3) (0.00-1.00)	1.00	Retention (P4) (0.00-1.00)	0.40		
Parametres:	Low (P90)	Base	High (P10)	*Comments: P50 quoted in the Base case. PoS of 0.60 is assuming a succes case in the northern structure(s) - Nero, Aurelius North and Aurelius Main using Bayes Law. Without prior knowledge the PoS for Aurelius South will be 0.14(Nero)*0.6(Aurelis North)*0.6 (Aurlius Main)*0.6 (Aurelius South) = 0.03. Cut off criteria Skagerrak: Por >= 0.17, Vsh <= 0.4. Intra Heather: Por >= 0.13, Vsh<= 0.5*					
Depth to top of prospect [m MSL] (> 0)		2580							
Area of closure [km^2] (> 0.0)	4.7	5.2	5.7						
Reservoir thickness [m] (> 0)	101	175	250						
HC column in prospect [m] (> 0)		72							
Gross rock vol. [10^9 m^3] (> 0.000)	0.118	0.131	0.145						
Net / Gross [fraction] (0.00-1.00)	0.40	0.60	0.80						
Porosity [fraction] (0.00-1.00)	0.19	0.22	0.25						
Permeability [mD] (> 0.0)									
Water Saturation [fraction] (0.00-1.00)	0.20	0.30	0.40						
Bg [Rm3/Sm3] (< 1.0000)									
1/Bo [Sm3/Rm3] (< 1.00)	0.29	0.33	0.38						
GOR, free gas [Sm^3/Sm^3] (> 0)									
GOR, oil [Sm^3/Sm^3] (> 0)	431	517	603						
Recov. factor, oil main phase [fraction] (0.00-1.00)	0.20	0.32	0.45						
Recov. factor, gas ass. phase [fraction] (0.00-1.00)									
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)	100			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)	295			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. See comments	2.	3.					Kart nr	NPD will insert value

Table 4-5. Aurelius East prospect data

Block	16/10	Prospect name	Aurelius 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	Suncor Energy	Reference document				Assessment year	2022
This is case no.:	1 of 1	Structural element	Ling Depression	Type of trap	4 way	Water depth [m MSL] (>0)	84	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)	1.15	1.85	1.91	2.75				
	Gas [10^9 Sm^3] (>0.00)								
Recoverable resources	Oil [10^6 Sm^3] (>0.00)	0.30	0.57	0.61	0.99				
	Gas [10^9 Sm^3] (>0.00)					0.15	0.29	0.32	0.52
Reservoir Chrono (from)	Triassic	Reservoir litho (from)	Skagerrak	Source Rock, chrono primary	Middle Jurassic	Source Rock, litho primary	Sleipner	Seal, Chrono	Late Jurassic
Reservoir Chrono (to)	Late Oxfordian	Reservoir litho (to)	Intra Heather	Source Rock, chrono secondary		Source Rock, litho secondary		Seal, Litho	Draupne shale
Probability [fraction]									
Total (oil + gas + oil & gas case) (0.00-1.00)	0.60	Oil case (0.00-1.00)	1.00	Gas case (0.00-1.00)	0.00	Oil & Gas case (0.00-1.00)			
Reservoir (P1) (0.00-1.00)	0.90	Trap (P2) (0.00-1.00)	0.95	Charge (P3) (0.00-1.00)	1.00	Retention (P4) (0.00-1.00)	0.40		
Parametres:	Low (P90)	Base	High (P10)	*Comments: P50 quoted in the Base case. PoS of 0.60 is assuming a succes case in the northern structure(s) - Nero, Aurelius North and Aurelius Main using Bayes Law. Without prior knowledge the PoS for Aurelius East will be 0.14(Nero)*0.6(Aurelis North)*0.6 (Aurlius Main)*0.6 (Aurelius East) = 0.03. Cut off criteria Skagerrak: Por >= 0.17, Vsh <= 0.4. Intra Heather: Por >= 0.13, Vsh<= 0.5*					
Depth to top of prospect [m MSL] (> 0)		2590							
Area of closure [km^2] (> 0.0)	1.9	2.1	2.3						
Reservoir thickness [m] (> 0)	101	175	250						
HC column in prospect [m] (> 0)		62							
Gross rock vol. [10^9 m^3] (> 0.000)	0.056	0.062	0.068						
Net / Gross [fraction] (0.00-1.00)	0.40	0.60	0.80						
Porosity [fraction] (0.00-1.00)	0.19	0.22	0.25						
Permeability [mD] (> 0.0)									
Water Saturation [fraction] (0.00-1.00)	0.20	0.30	0.40						
Bg [Rm3/Sm3] (< 1.0000)									
1/Bo [Sm3/Rm3] (< 1.00)	0.29	0.33	0.38						
GOR, free gas [Sm^3/Sm^3] (> 0)									
GOR, oil [Sm^3/Sm^3] (> 0)	431	517	603						
Recov. factor, oil main phase [fraction] (0.00-1.00)	0.20	0.32	0.45						
Recov. factor, gas ass. phase [fraction] (0.00-1.00)									
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)	100			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)	295			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. See comments	2.	3.					Kart nr	NPD will insert value

Table 4-6. Nero prospect data

Block	16/10	Prospect name	Nero	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	Suncor Energy	Reference document				Assessment year	2022
This is case no.:	1 of 1	Structural element	Ling Depression	Type of trap	4 way	Water depth [m MSL] (>0)	84	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)	2.95	4.84	5.01	7.30				
	Gas [10^9 Sm^3] (>0.00)								
Recoverable resources	Oil [10^6 Sm^3] (>0.00)	0.78	1.48	1.61	2.62				
	Gas [10^9 Sm^3] (>0.00)					0.39	0.76	0.84	1.38
Reservoir Chrono (from)	Triassic	Reservoir litho (from)	Skagerrak	Source Rock, chrono primary	Middle Jurassic	Source Rock, litho primary	Sleipner	Seal, Chrono	Late Jurassic
Reservoir Chrono (to)	Late Oxfordian	Reservoir litho (to)	Intra Heather	Source Rock, chrono secondary		Source Rock, litho secondary		Seal, Litho	Draupne shale
Probability [fraction]									
Total (oil + gas + oil & gas case) (0.00-1.00)	0.14	Oil case (0.00-1.00)	1.00	Gas case (0.00-1.00)	0.00	Oil & Gas case (0.00-1.00)			
Reservoir (P1) (0.00-1.00)	0.90	Trap (P2) (0.00-1.00)	0.95	Charge (P3) (0.00-1.00)	0.40	Retention (P4) (0.00-1.00)	0.40		
Parametres:	Low (P90)	Base	High (P10)	*Comments: P50 quoted in the Base case. Cut off criteria Skagerrak: Por >= 0.17, Vsh <= 0.4. Intra Heather: Por >= 0.13, Vsh<= 0.5*					
Depth to top of prospect [m MSL] (> 0)		2510							
Area of closure [km^2] (> 0.0)	2.5	2.8	3.1						
Reservoir thickness [m] (> 0)	101	175	250						
HC column in prospect [m] (> 0)		142							
Gross rock vol. [10^9 m^3] (> 0.000)	0.143	0.165	0.182						
Net / Gross [fraction] (0.00-1.00)	0.40	0.60	0.80						
Porosity [fraction] (0.00-1.00)	0.19	0.22	0.25						
Permeability [mD] (> 0.0)									
Water Saturation [fraction] (0.00-1.00)	0.20	0.30	0.40						
Bg [Rm3/Sm3] (< 1.0000)									
1/Bo [Sm3/Rm3] (< 1.00)	0.29	0.33	0.38						
GOR, free gas [Sm^3/Sm^3] (> 0)									
GOR, oil [Sm^3/Sm^3] (> 0)	431	517	603						
Recov. factor, oil main phase [fraction] (0.00-1.00)	0.20	0.32	0.45						
Recov. factor, gas ass. phase [fraction] (0.00-1.00)									
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)	100			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)	295			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. See comments	2.	3.					Kart nr	NPD will insert value

5 Technical assessments

A dry hole exploration case is estimated to be c. 240 MNOK based on a duration of 40 days, while the discovery case cost is estimated 276 MNOK based on a duration of 46 days. Estimated spread rate is 6MNOK/day based on actual performance in the area, while Rushmore reviews has been used to benchmark the duration time vs depth estimation discovery case.

At the time of the award, the development concept was a tie-back to the existing Sleipner facilities. During the licence evaluation, two different development cases were considered: a leased jack-up and a subsea tie-back.

All the investigated development solution did not provide positive economic outcome and therefore the Operator recommended to drop the PL 1035.

6 Conclusions

The obligatory work program for PL1035 was fulfilled with the re-processing and re-interpretation of the seismic dataset.

The prospects Aurelius (4 segments) and Nero have been analyzed in detail, including the integration of G&G new studies. Results of the oil typing study essentially dismissed the fill-and-spill migration pathway scenario originally suggested, thereby increasing the charge risk in an area already containing many dry wells. Reservoir parameters were increase from the integrated stratigraphic and depositional study of the Middle to Upper Jurassic succession, but segmentation of Aurelius and overall gross rock volumes for all the prospects decreased as the top reservoir interpretation was shifted down from the BCU to the more accurate Intra Draupne Unconformity. The resultant P10 and P50 values for both prospects are well below the tie-back minimum economic field size for an appropriate development concept.

The first decision (drill or drop) was due 14th of February 2022 and the operator applied for a three-month extension. Based on the overall licence evaluation, the operator recommended dropping PL1035 at the decision gate 14th of May 2022, based on the reasoning that the licence did not contain prospects with an acceptable combination of risk, volume and commercial potential to justify an exploration well. The partnership had a non-unanimous view and outlook for the main prospect. Vår Energi maintained the interpretation that migration may have been from the west (e.g. Varg, Rev area) and not from the north (e.g. Sigyn area), thereby lowering the risk for Aurelius. Vår Energi recommended an additional G & G study to further investigate this migration path, while Neptune Energy Norge sided with the operator in relinquishing the area. The majority of the partnership agreed to drop the licence at the drill or drop decision gate on 14th of May 2022, after a short extension to investigate the opportunity of forming a new JV.