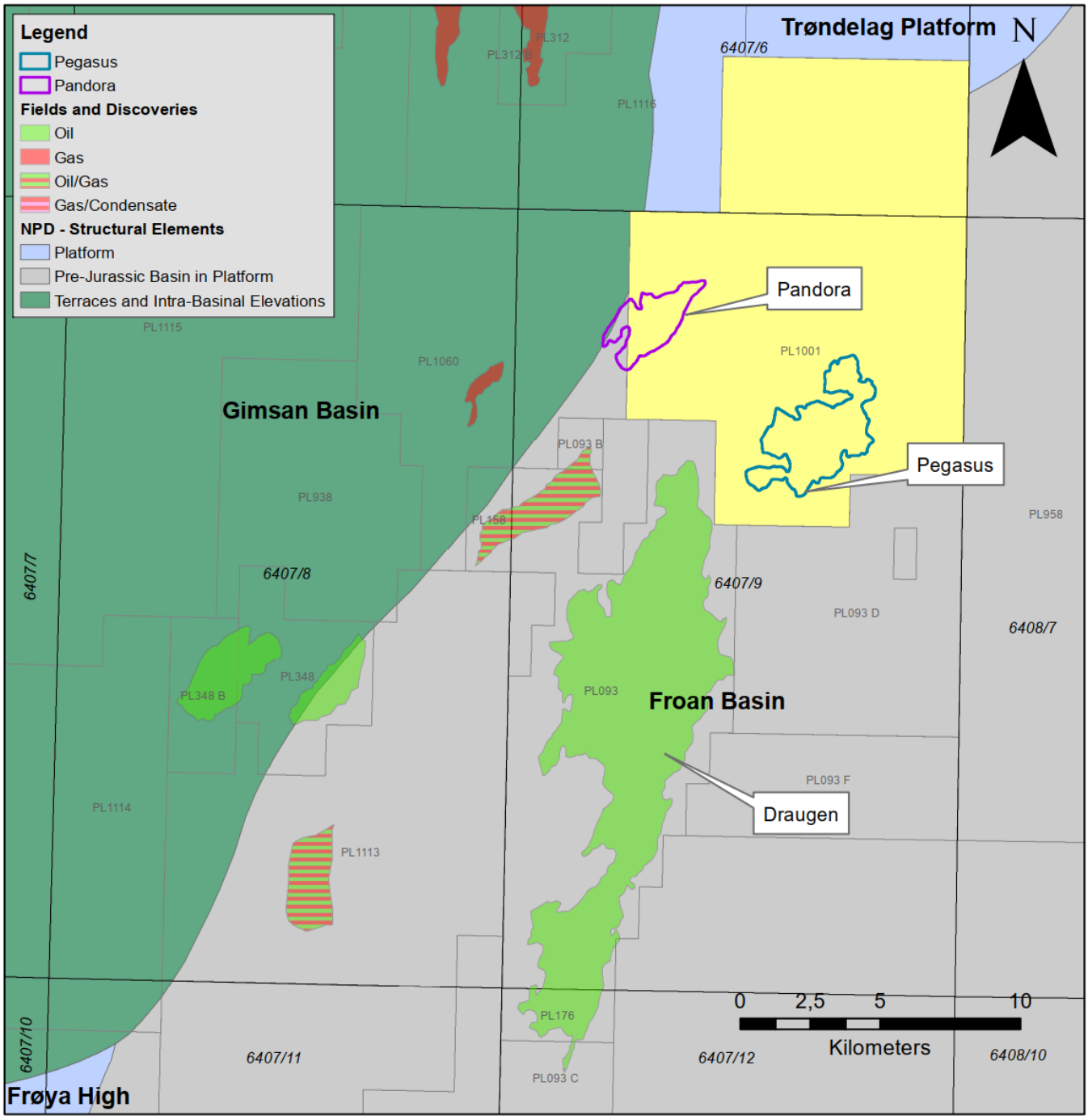
PL1001 Prospect Evaluation Status Report



Prepared by ConocoPhillips Skandinavia AS 2021

ConocoPhillips

OKEA

vår energi

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1 History of the Production License

Production licence PL1001 is located at the intersection between Froan Basin, Gimsan Basin and Trøndelag Platform in the southern part of the Norwegian Sea. The Licence consists of Block 6407/6 and 6407/9 and was awarded 01.03.2019.

The partnership in PL1001 at the time of lapse consists of:

- ConocoPhillips Skandinavia AS 60% (operator)
- Vår Energi AS 20%
- OKEA AS 20%

An initial two year work program was proposed, consisting of purchase and reprocessing of 3D seismic in addition to G&G studies, leading to a drill-or-drop decision in Q1 2021. Proposed G&G studies includes rock physics expectation and pre-stack analysis, basin model update, comprehensive revision of formation tops at Draugen and Velocity model update.

Due to the global Covid-19 pandemic, one year extension to the initial two year work program was applied for and approved. The meetings held are summarized in Table 1.1.

Table 1.1 License Meetings

Year	DD.MM	Meeting
2019	08.04	Exploration / Management Committee Licence Kick-off Meeting
2019	25.06	Exploration Committee Seismic Work Meeting
2019	04.12	Exploration / Management Committee
2020	03.03	Exploration / Management Committee
2020	06.05	Exploration Committee Seismic Interpretation Work Meeting
2020	15.06	Exploration / Management Committee
2020	28.09	Exploration Committee Basin Modelling Workshop
2020	19.10	Exploration Committee Rock Physics Workshop
2020	26.11	Exploration / Management Committee
2021	05.06	Exploration Committee Seismic Interpretation Work Meeting
2021	05.05	Exploration / Management Committee

License prospect evaluation did not meet criteria to warrant drilling an exploration well, mainly due to small volumes and condemning HGMT risk, and decision to Lapse PL1001 was agreed upon by the licencees.

2 Database Overviews

2.1 Seismic Database

The seismic database used in the licence is shown in Fig. 2.1. Initial semi-regional and prospect specific evaluations were carried out using a combination of publically released 2D and 3D seismic, of various vintages and qualities, together with modern proprietary (e.g PGS14005) and released Geostreamer surveys (e.g SH13001). In order to better define the prospectivity, the first phase of work commitments included purchase and conditioning of the SH13001R16 raw PSDM gathers.

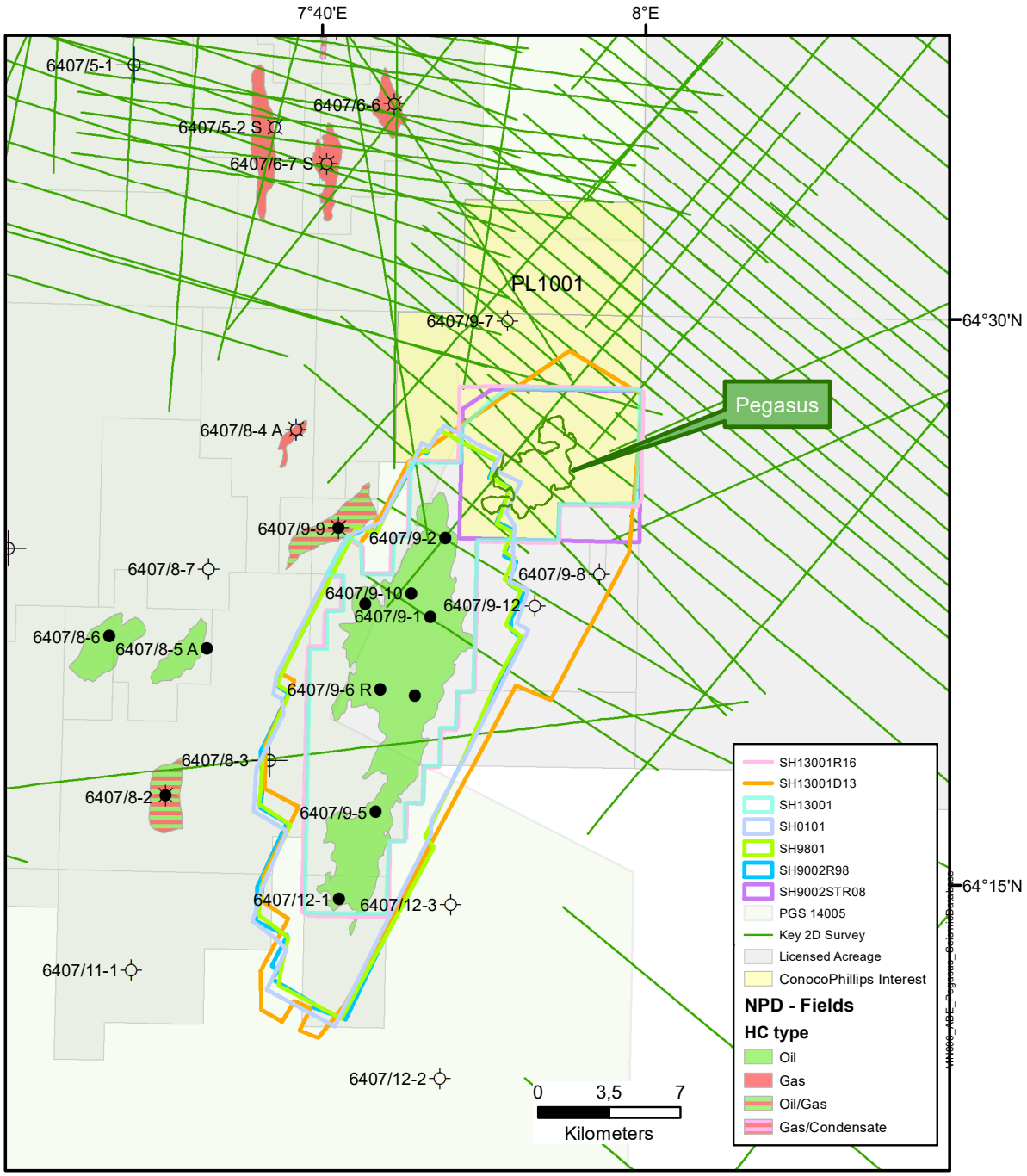

Fig. 2.1 PL1001 Seismic Database. Key dataset used in the evaluation was the gather conditioning of the SH13001R16 dataset.

Table 2.1 Seismic Datasets

Dataset Name	Original Survey(s)	NPDID	Status	Data Type	Processing Type
PGS14005		8054	Not released	Full stacks,angle stacks and gathers	PSTM
SH13001R16	SH13001	7844	Released	Full stacks and angle stacks	Kirchoff PSDM
SH13001R16	SH13001	7844	Not released	Raw SEGY gathers	PSDM
SH13001D13	SH13001	7844	Released	Full stacks and angle stacks	PSDM
SH13001		7844	Released	Full stack	MIG-FIN
SH0101		4127	Released	Full stack	MIG-FIN
SH9801		3946	Released	Full stack	MIG-FIN
SH9002		3344	Released	Full stack	MIG-FIN
SH9002R98	SH9002	3344	Released	Full stack	MIG-FIN

2.2 Well Database

The released wells in and surrounding the licence constituted the common well database and are shown in the table below (Table 2.2).

Table 2.2 PL1001 Well Database. Key wells and their use in the licence evaluation.

Well	NPDID	NPD Status	Year	Well status (COP)	TD Age	TD (m)	Well tie	Rock physics	Petrophysics	HGMT	Field/Discovery
6407/12-1	3781	Oil	1999	Released	Late Jurassic	1805	x		x		Draugen Field
6407/12-3	6370	Dry	2010	Traded	Middle Jurassic	1968	x				
6407/9-1	133	Oil	1985	Traded	Late Jurassic	1865	x		x	x	Draugen Field
6407/9-2	449	Oil	1985	Traded	Early Jurassic	1865	x	x	x	x	Draugen Field
6407/9-3	469	Oil	1985	Traded	Early Jurassic	1868	x		x	x	Draugen Field
6407/9-4	480	Oil	1985	Traded	Early Jurassic	1820	x		x	x	Draugen Field
6407/9-5	492	Oil	1985	Traded	Middle Jurassic	1820	x	x	x	x	Draugen Field
6407/9-6	871	Oil	1986	Traded	Late Jurassic	1800	x		x	x	Draugen Field
6407/9-7	1057	Dry	1988	Traded	Late Triassic	2561	x			x	
6407/9-8	1974	Dry	1992	Traded	Early Jurassic	2126	x				
6407/9-10	4710	Oil	2003	Traded	Late Jurassic	1800	x	x	x	x	Draugen Field
6407/9-12	8893	Dry	2019	Released	Middle Jurassic	1775	x	x			
6407/9-B-5 H	2144	NA	1994	Released	Late Jurassic	2811					Draugen Field
6407/9-D-1 H	4286	NA	2001	Released	Late Jurassic	2093				x	Draugen Field

3 Results of Geological and Geophysical studies

Conditioning of the SH13001R16 raw PSDM gathers

Seismic conditioning was carried out during 2019 with the aim to enhance the vertical and horizontal resolution to increase the confidence of top reservoir picking, and preserve amplitude to maintain relative trace amplitudes for amplitude and AVO analysis. The input to the conditioning was the SH13001R16 Raw PSDM gathers (time) and the final outputs were full stacks and angle stacks. The conditioning was carried out in PsPro by Sharp Reflections. The result of the gather conditioning showed a final dataset with increased resolution, improved S/N ratio and improved preservation of the amplitudes with offset.

Reservoir Quality evaluation

Detailed sedimentological study was conducted to assess the lateral facies variation and reservoir quailty of the Rogn Fm.The late Jurassic Rogn Fm. was deposited in a shallow marine environment. From west to east the sands shale out over relatively short distance from thick upper and lower shoreface deposits to only lower shoreface and shelf deposits as seen in wells 6407/9-12 and 6407/9-8. The shelf deposits are referred to as distal Rogn Fm. Equivalent, see Fig. 3.1 . From south to north, along the strike of the paleo shoreline towards Pegasus, there are evidence for thicker lower shoreline facies and thinner upper shoreface facies. There is not a big difference in porosity between lower and upper shoreface facies, but there is a significant reduction in permeability in lower shoreface deposits and this results in risk on reservoir quality in the Pegasus prospect..

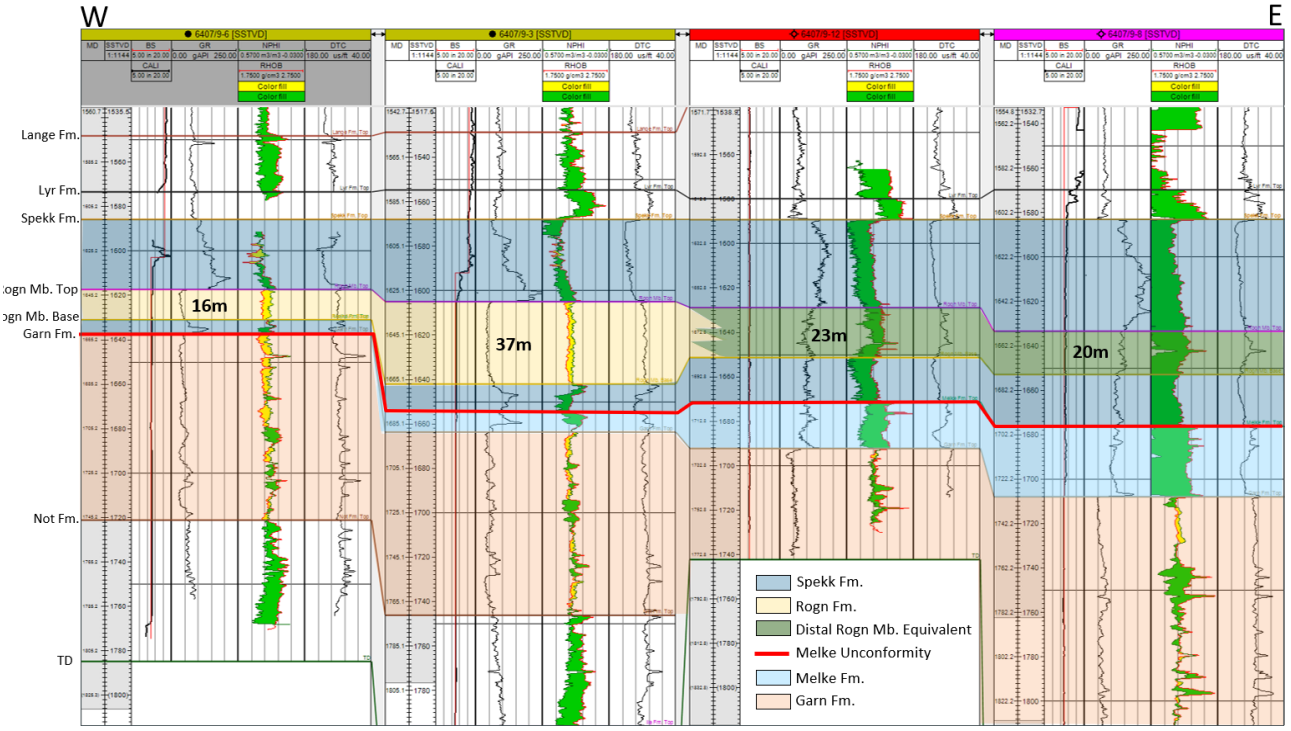

Fig. 3.1 West to East Well-log Correlation Correlation from well 6407/9-6 and 6407/9-3 on Draugen, east to well 6407/9-12 and 6407/9-8. Top of Rogn Fm. sand in Draugen and top of Rogn Fm. equivalent silt and shale in the wells to the east of Draugen is interpreted on a continuous peak (hard event) in the seismic.

Seismic interpretation

New seismic interpretation carried over the prospect area was essential in re-defining the trap model. The APA2018 trap definition was amplitude driven where the Rogn sand in Pegasus was separated from

the Rogn sand in Draugen by sand pinch-out. Updated interpretation on the conditioned SH13001R16 dataset shows continuous Rogn Fm. between Draugen and Pegasus, and the trap configuration of Pegasus is re-defined as a four-way closure.

IKON Rock physics study

Petrophysical evaluation was carried out on the wells 6407/9-2, 6407/9-5, 6407/9-10 and 6407/9-12 using standard IKON workflow. Elastic log data was reviewed and elastic log conditioning was performed from Springar Fm. to the base of the well. The conditioned logs were used as the basis of a rock physics and synthetic seismic AVO study. The result of the study showed that at an interface with Rogn Fm. sandstone beneath the Spekk Fm. shale is a positive reflection that decreases in amplitude with offset (AVO Class I). Hydrocarbon saturation results in a decrease in amplitudes at all offsets. Similarly, a Rogn Fm. Equivalent (very fine sand and silt) beneath a Spekk Fm. shale is also a positive reflection that decreases in amplitude with offset (AVO Class I). The reflectivity of Spekk Fm. shale on Rogn Fm. Equivalent is very similar to that of a Spekk Fm. shale on top of an oil saturated Rogn Fm. sandstone, this is a significant ambiguity for de-risking the prospect.

Amplitude Analysis

Seismic analysis was carried out on the different datasets, with the objective to determine lithology and/or fluid content.The Rogn Fm. is interpreted on a peak (hard event) both for proximal and distal facies. The seismic dimming seen in the Draugen area is matching the expectation modelling; Hydrocarbon saturation gives decrease in amplitude and reveals water encroachment on the Draugen 4D seismic data. However, a dim response can also represent silt or shales, making amplitude interpretation outside Draugen challenging.

Modelling Fault Seal within the Bremstein Terrace

A fault seal analysis study was done as part of the evaluation of charge into the Pegasus prospect. Hydrocarbons from the kitchen in the west must migrate through a complex fault pattern in the Bremstein Terrace to reach the Pegasus prospect. This is recognized to be a function of the sealing properties of the faults combined with their cross-fault juxtapositions. The outcome of the study was used to guide the migration modelling in Trinity.

Semi-Regional Basin Model

The objective was to address charge as the source rocks are immature in the Pegasus area. The prospect relies on long distance migration from the west across the Bremstein fault complex. Multiple iterations of structure grids, facies, and fault interpretations were integrated into a semi-regional 3D basin model over the Draugen-Pegasus area. In all variations Pegasus did not receive direct hydrocarbon charge. The model closely matched offset well results including the dry 6407/9-7 well. Pegasus is interpreted to be in a migration shadow and the only modelled scenario that fills Pegasus is the over-filling of Draugen and spilling to Pegasus.

Fill-Spill from Draugen Field study

Detailed analysis of residual oil below OWC was carried out for wells on the Draugen Field since oil shows has been reported below the OWC in some of the western wells. Due to deep saddle point between Draugen and Pegasus and no shows below the OWC in 6407/9-2, the well closest to the saddle point, oil charge by spill from the Draugen Field is regarded very high risk.

Depth Conversion

The Pegasus prospect is interpreted as a low relief structure and therefore very sensitive to depth conversion, and assesment of best-fit velocity model was key in final prospect evaluation. The Estimage v7 model was chosen for depth conversion. This model is built on the most recent PGS19M03NWS PSDM velocities and exploration wells, and is well callibrated to the Draugen wells.

4 Prospect Update Report

The target prospect in the PL1001 license is the Upper Jurassic Pegasus prospect located ~3 km to the northeast of the Draugen Field (Fig. 4.1). At the time of the application the Pegasus prospect was characterized as a 13% POS opportunity with key risk being trap and seal. The relatively high trap and seal risk resulted from poor definition of the prospect on 2D and limited 3D seismic. The interpretation was that the Rogn Fm. sand in Pegasus was separated from the Rogn Fm. sand in Draugen thus defining Pegasus as a stratigraphic trap with a significant volume potential below the known OWC in the Draugen field. At time of application the estimated recoverable resources for the Pegasus lead range from 4.18x10^6 Sm^3 to 32.5x10^6 Sm^3 of oil and from 0.22x10^9 Sm^3 to 1.77x109 Sm^3 gas, with a respective mean of 17.2x10^6 Sm^3 of oil and 0.92x10^9 Sm^3 gas (Table 4.1).

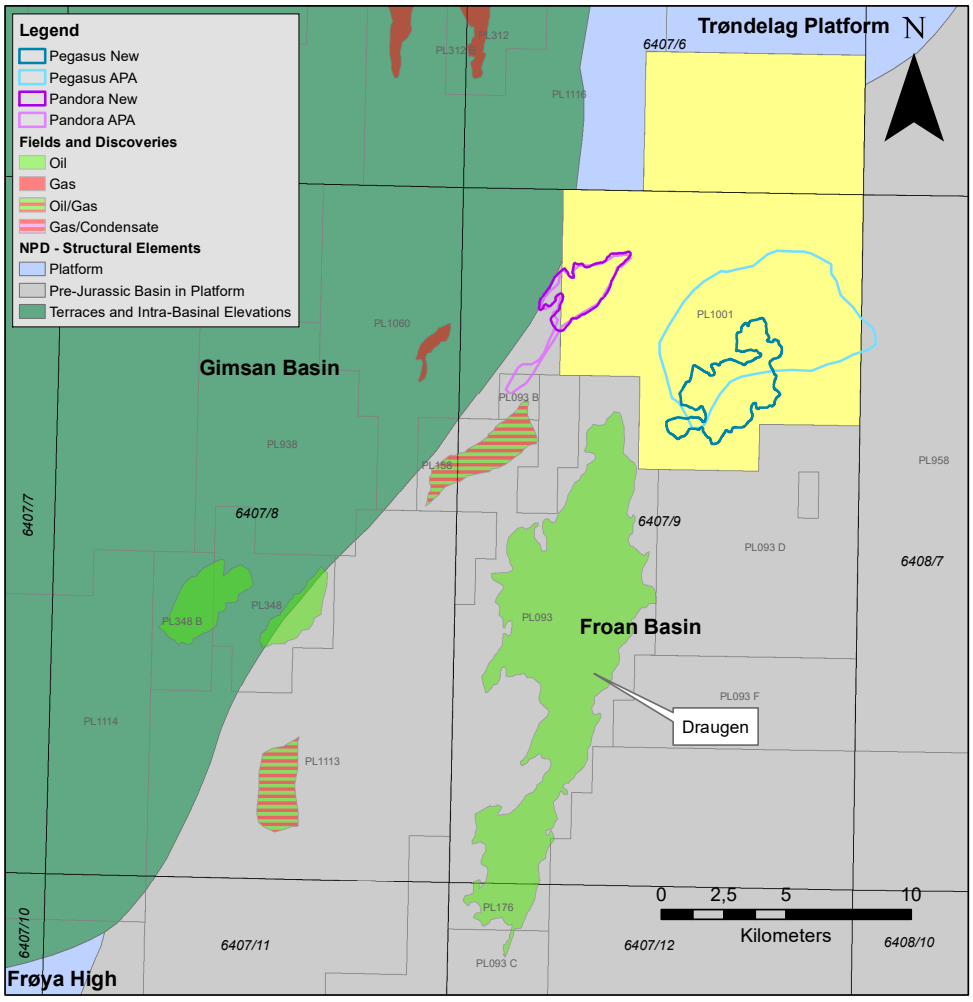

Fig. 4.1 PL1001 Area Map. Outlines of the Pegasus prospect and Pandora Lead at APA times and with renewed interpretation.

Table 4.1 APA Resource Potential

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)						
Pegasus	L	Oil	4.18	17.20	32.50	0.22	0.92	1.77	0.13	98.0	Rogn Fm/Upper Jurassic	1640	Draugen	17
Pandora	L	Oil								70.0	Ile Fm/ Middle Jurassic	1710	Draugen	19

Trap/Seal

The 2021 interpretation on conditioned 3D seismic do not have a stratigraphic separation between the Rogn Fm. sand in Pegasus and the Rogn Fm. sand in Draugen. As a result, the trap was re-defined as a 4-way low relief structure (Fig. 4.2). The trap is defined by crest at -1648 m and western spill point at -1665 m with total productive area of 9.72 km^2. Saddle point towards Draugen is at -1667 m. The calculated volumetrics is the max case in which sand distribution according to relative amplitude and geomorphology is not included. The Rogn Fm. sand is sealed by the organic rich Spekk Fm. shales which is proven top seal at Draugen field. This reduces the risk on trap from 0.5 to 0.9 and seal risk from 0.6 to 1.

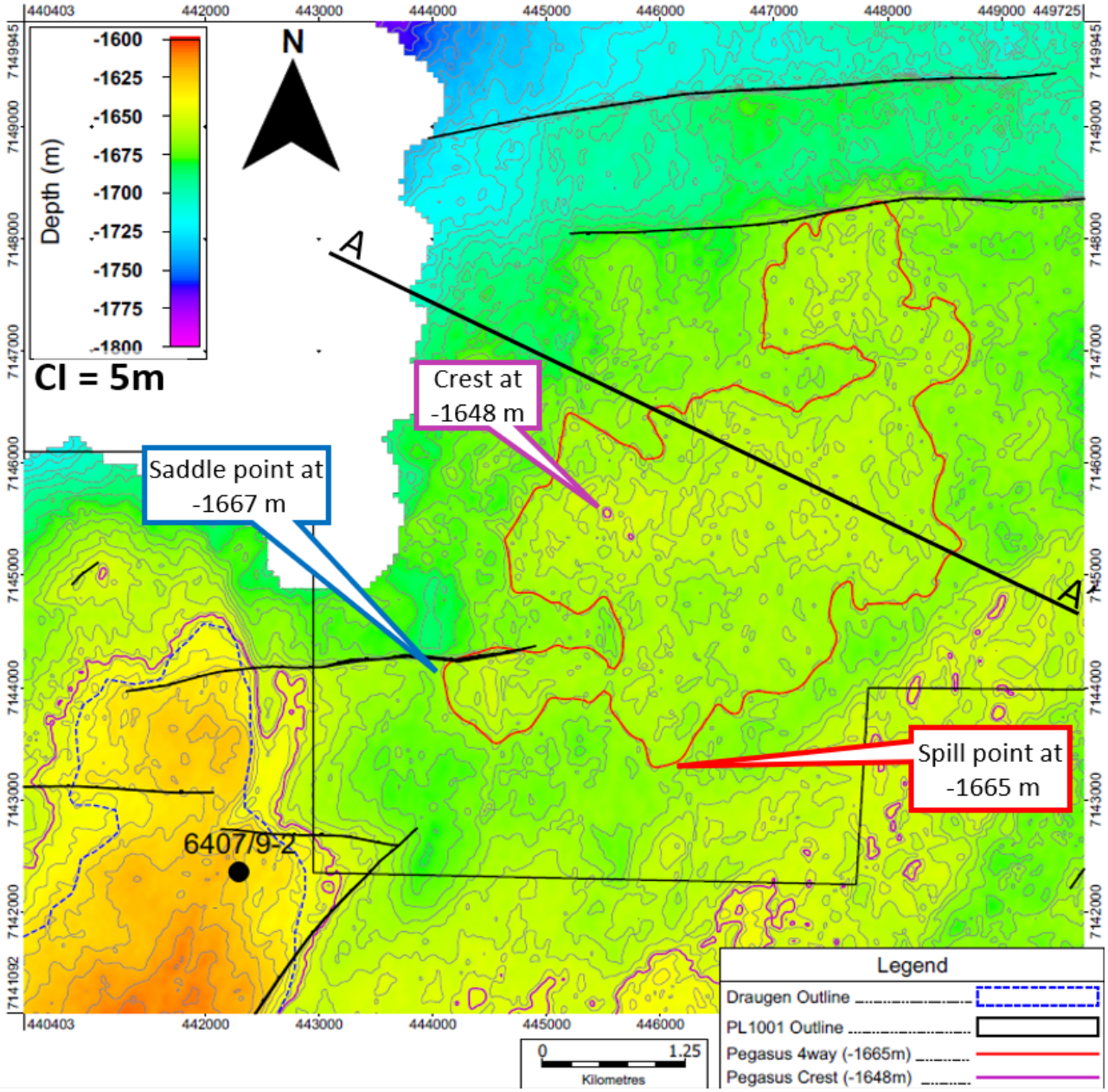

Fig. 4.2 Top Rogn Depth Map. The red polygon defines the Pegasus prospect outline. The black line indicates location of seismic line in Fig. 4.3.

Reservoir

Rogn Fm. reservoir is proven in the Draugen field. Mappable top and base Rogn Fm. equivalent with good ties to offset wells limits reservoir thickness to one peak-trough pair (18 m) (Fig. 4.3). Rogn Fm. equivalent facies transition from high quality upper shoreface sands in Draugen to low perm lower

shoreface sands/shelf facies in 6407/9-12 and shale in 6407/9-8. Interpreted paleo shoreline suggests that Pegasus is located more proximal compared to 6407/9-12, but Rogn sand in Pegasus may be dominated by low permeability lower shoreface facies as observed in well 6407/9-2 and 6407/9-B-5 H in the northern part of Draugen. Reservoir presence and quality remains an uncertainty as amplitudes alone cannot be used to differentiate lithology below Upper Spekk Fm and reservoir risk on Pegasus is kept at 0.6.

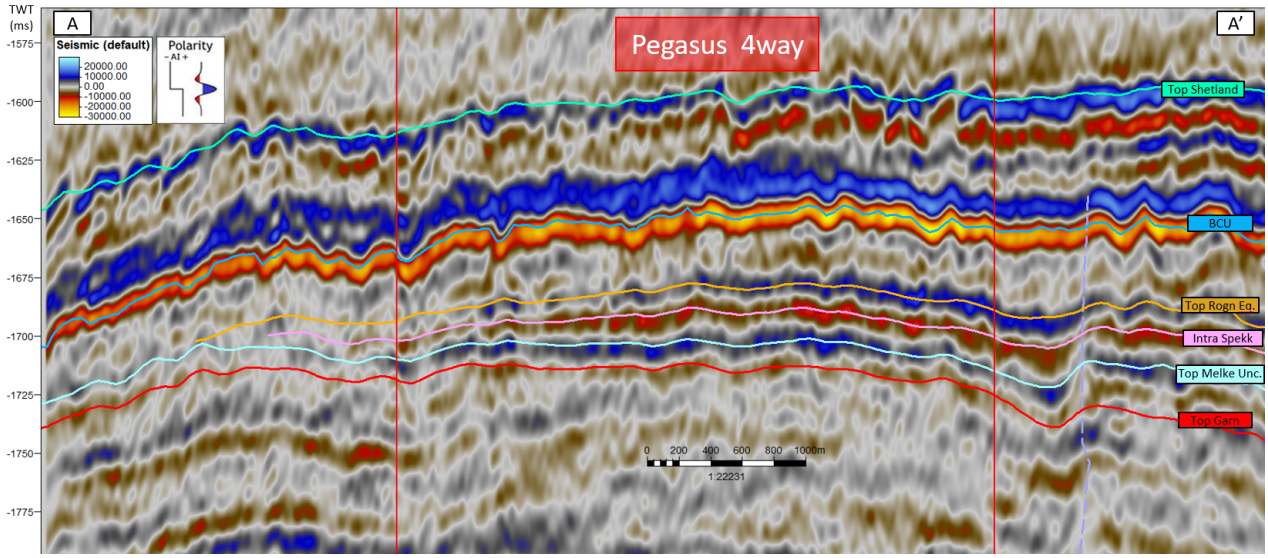

Fig. 4.3 NW-SE seismic line through Pegasus prospect. Seismic line location indicated in Fig. 4.2. Interpreted Intra Spekk horizon defines base of Rogn Fm.

HGMT/Source

Despite working with multiple possible structural interpretations, migration timings, and flow models, Pegasus is interpreted to lie in a migration shadow and we do not predict access to direct charge. Oil charge of Pegasus from the Draugen Field seems very difficult via the Rogn Fm. and nearly impossible via the Garn Fm. Based on result of the basin model update and Draugen paleocolumn interpretation, HGMT risk was increased from 0.7 to 0.2 and is deemed the main risk for this prospect.

Resource Evaluation

The GeoX model was built as a 4-way trap with constant spill point at -1665 m and constant crest at -1648 m. Reservoir thickness of 10-25 m with mode at 18 m was guided by modelled tuning thickness. NTG and porosity are based on the Draugen wells, with modes defined by the 6407/9-2 well (including the lower shoreface interval). Recovery mechanism was changed from waterflood to primary depletion due to the very low in-place volumes predicted. Oil recovery factors of 5-40% is being used reflecting typical recovery from gas solution drive reservoirs and including a small upside from aquifer pressure support. Total recoverable resources are estimated to 3.5-6.7(7.0)-10.9 MMB (P90-P50(Mean)-P10), a significant reduction compared to the initial assessment. Productive area and HC column suffered during change in trap configuration which is the key reason for the low volumes.

Overall, the probability of geological success has decreased from 13% at the time of APA to 11% post the license work. Updated trap geometry, column height and limitations on reservoir thickness is the main reason for the significant reduction in volumes compared to APA times. Updated estimated recoverable resources for the Pegasus lead range from $0.53x10^6$ Sm^3 to $1.65x10^6$ Sm^3 of oil and from $0.03x10^9$ Sm^3 to $0.09x10^9$ Sm^3 gas, with a respective mean of $1.06x10^6$ Sm^3 of oil and $0.06x10^9$ Sm^3 gas (Table 4.2).

Table 4.2 Updated Resource Potential

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 [10^6Sm^3] (>0.00)			Gas [10^9Sm^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)						
Pegasus	L	Oil	**0.53**	**1.06**	**1.65**	**0.03**	**0.06**	**0.09**	**0.11**	**100**	Rogn Fm/Upper Jurassic	**1648**	Draugen	**17**
Pandora	L	Oil								**80**	Ile Fm/ Middle Jurassic	**1710**	Draugen	**19**

Pandora Lead

The Pandora lead is defined as a 3-way dip closure against fault towards the south east, with expected reservoir of moderate-to-good quality marine shoreface sands of the Ile Fm. The Top Not depth structural map (regional proxi for top Ile) was used in re-mapping of the Pandora lead which lies within the same fault block as 6507/9-7, although, separated from the 6507/9-7 structure by a saddle point towards northeast. The main risk is fault seal and hydrocarbon migration. Similar to Pegasus, Pandora is interpreted to lie within a migration shadow, supported by the dry 6407/9-7 well only 4 kms to the northeast of the lead.

5 Technical Assessment

Potential development solution has not been investigated since the detailed interpretation of the Pegasus prospect has resulted in a small resource potential with very high risk.

6 Conclusions

At the time of application, the Jurassic Pegasus prospect in PL1001 was identified to be of a sufficient risk and resource range to warrant a higher risk exploration well. However, the licence evaluation did not meet criteria for a positive drill decision, mainly due to small volumes and condemning HGMT risk.