



PL 833 - Licence status report

Summary

The PL833 licence is located to the west of the Draugen field and southeast of the Hyme and Bauge fields and was previously a part of the former PL348 licence. The Måse-Geir prospect is the driving prospect within the licence. The Måse-Geir prospect is of Lower Jurassic age, and is located around the northernmost tip of the Frøya High bordering the Froan Basin. A well would therefore be planned to test migration into the Froan Basin across the Bremstein Fault Complex area. Middle Jurassic reservoirs with hydrocarbons are proven in offset wells. The prospect is most likely an oil prospect based on AVO analysis.

An updated evaluation of the PL833 prospectivity, based on interpretation of the results in PL751 6407/11-1 Gunnvald, was carried out. The driving PL833 Måse-Geir prospect was evaluated to get a downgrade for the seal risk, and a minor upgrade for the migration risk based on the Gunnvald well results. The ultimate impact is a downgrade of the Måse-Geir prospect. An evaluation of a new prospect (Radiator) was triggered by the results in the Gunnvald well, but the final risk and volume appear insufficient to recommend this as a drilling candidate. Based on this, the PL833 partnership did not see any attractive drilling candidates in PL833 and have unanimously decided to drop the licence.

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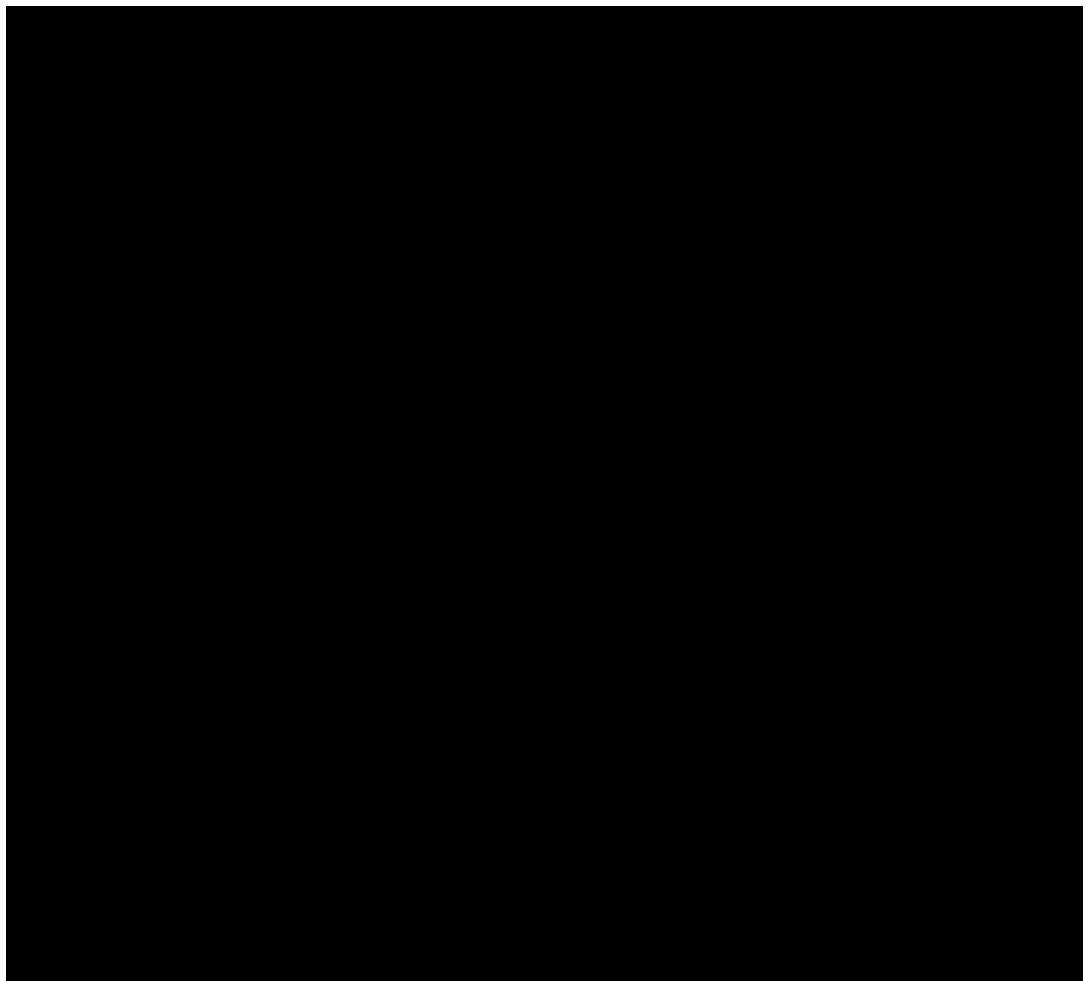


Figure 1: Area map with PL833 licence outlined in red, Bauge, Hyme, Draugen fields, Måse-Geir prospect and surrounding prospects and discoveries.

1 Licence history

Licence: PL833

Awarded: 05.02.2016 (APA2015)

Licence period: Expired 05.10.2019

Licence group:

Equinor Energy AS	40% (Operator)
Vår Energi AS	30%
Neptune Energy Norge AS	30%

Licence area: 121.373 km²

Work programme:

Technical G&G work	- Fulfilled
Purchase 3D seismic	- Fulfilled
Several vintages of AVO analysis	- Fulfilled
Seismic gather conditioning and attribute analysis	- Fulfilled
Post stack merge PGS14005 & SH9002R06M	- Fulfilled
Måse-Geir prospect and economical evaluations	- Fulfilled
Implement impact of 6407/11-1 Gunnvald well	- Fulfilled
Radiator prospect evaluation	- Fulfilled
Initial Drill or Drop by 05.02.2018	- Applied for one year extension
Extended Drill or Drop by 05.02.2019	- Applied for one year extension
Extended Drill or Drop by 05.06.2019	- Applied for four month extension
Extended Drill or Drop by 05.10.2019	- Decision made to drop the licence

Meetings held:

04.05.2016	EC/MC meeting #1
23.11.2016	EC/MC meeting #2
09.05.2017	EC work meeting #1
23.08.2017	EC work meeting #2
30.10.2017	EC work meeting #3
22.11.2017	EC/MC meeting #3
08.05.2018	EC work meeting #4
20.09.2018	EC work meeting #5
28.11.2018	EC/MC meeting #4
03.05.2019	MC work meeting #6
20.09.2019	EC work meeting #7
31.10.2019	EC/MC meeting #5

Work performed:

2016: Licence start-up. The licence purchased 346 km² of the PGS14005 3D broadband seismic survey covering the PL833 licence area. General prospectivity was interpreted in the licence on the new seismic dataset. The Måse-Geir prospect was brought forward as the main driving prospect for the licence.

2017: AVO analysis was performed on the new dataset as part of the Måse-Geir prospect evaluation. In addition, seismic gather conditioning was performed on the PGS14005 dataset, followed by

an updated AVO and attribute analysis on this new dataset. A final Måse-Geir prospect evaluation, including technical economical evaluation was brought forward as a potential drilling candidate for the licence.

Site survey acquired at the Måse-Geir prospect (28.07-06.08.2017).

2018: Decision made to apply for a one year extension of the Drill or Drop decision, mainly due to the drill decision made in the neighboring PL751 licence. The Måse-Geir prospect constitutes one of the segments in a larger prospect cluster to be tested in the Gunnvald well (6407/11-1) in PL751.

A post-stack merge of the PGS14005 and SH9002R06M dataset was done. A subsequent AVO analysis was run on this new dataset. An update of additional prospectivity within the licence was done based on this dataset. The Måse-Geir prospect was still defined as the main driving prospect for the PL833 licence.

2019: A four month extension of the Drill or Drop decision was given. Decision was made to apply for another four month extension of the Drill or Drop decision, mainly due to final implementation of the PL751 Gunnvald well results (6407/11-1). Based on the Gunnvald well results, the Radiator prospect was identified and brought forward as a potential drilling candidate. The technical economical valuation of the Radiator prospect was concluded to not be of good enough quality such that the licence finally made a decision to drop the licence.

Reason for surrender:

The Måse-Geir prospect has been evaluated on good quality seismic. An updated evaluation of the PL833 prospectivity, based on interpretation of the results in PL751 6407/11-1 Gunnvald, was carried out. The driving PL833 Måse-Geir prospect was evaluated to get a downgrade for the seal risk, and a minor upgrade for the migration risk based on the Gunnvald well results. The ultimate impact is a downgrade of the Måse-Geir prospect. The Måse-Geir prospect is interesting from a volume perspective, but with very high risk attached to it. An evaluation of a new prospect (Radiator) was triggered by the results in the Gunnvald well, but the final risk and volume appear insufficient to recommend this as a drilling candidate. Based on this, the PL833 partnership did not see any attractive drilling candidates in PL833 and have unanimously decided to drop the licence

2 Database overviews

The PL833 licence common database was approved after ECMC meeting #1..

2.1 Seismic data

The seismic data that was utilized in the PL833 technical evaluations are shown in Table 1.

Table 1: Seismic and CSEM data included in the PL834 common database

Survey	NPDID	TYPE	Quality
PGS14005 (parts, 346 km2)	8054	3D	Good
SH9002R06	3344	3D	Fair

2.2 Well data

The well database utilized in the PL833 technical evaluations area is shown in Table 2. Wells 6407/8-4A & 6407/8-4S (Galtvort) were used for well ties and fluid substitution modelling. Wells 6407/9-9T2 (Hasselmus), 6407/8-3, 6407/8-2, 6407/9-1, 6407/9-4, 6407/9-5, 6407/8-7 (Bister) and 6407/12-1 were also used for well ties.

The well data that utilized in the PL833 technical evaluations are shown in Table 2.

Table 2: wells included in the PL833 common database

Well	NPDID	Well	NPDID
6407/2-6S	6351	6407/8-7	7684
6407/6-4	1604	6407/8-7A	7707
6407/7-1S	474	6407/9-1	133
6407/7-2	1017	6407/9-4	480
6407/7-8	5844	6407/9-5	492
6407/8-2	2434	6407/9-7	1057
6407/8-3	3092	6407/9-9T2	1990
6407/8-4S	5813	6407/10-3	1927
6407/8-5S	6110	6407/10-4	7699
6407/8-6A	7266	6407/12-1	3781
6407/8-6	7265	6407/12-2	6191

3 Results of geological and geophysical studies

Seismic gather conditioning

The MC3D-PGS14005 seismic survey is to some degree contaminated by dipping and low frequent noise. In addition to that the gathers are not flat, which causes some problems in the AVO analysis. In order to provide a more appropriate data input to the AVO analysis gather conditioning were performed in the area around the main prospect in the PL834 licence. The processing flow included linear and parabolic radon, RMO, additional gather flattening and bandwidth matching. The conditioned data were used as input to the AVO analysis.

The main uplift of the process was seen on the near offset data, which were cleaned up quite well. De-noise in general improved the stability of the AVO attributes, however the low frequent noise seen as spikes in the low end of the spectrum were harder to attack and are probably remnant noise boosted by pre-migration processes. The conclusion from the conditioning work was that the PGS14005 data have limitations with respect to the amplitude responses. A strong HC AVO effect i.e. gas in good reservoir conditions will likely be observable and identified, less strong AVO effects i.e. oil vs. Brine response will be less likely to be identified.

In addition to AVO conditioning an attempt to merge MC3D-PGS14005 and post stack de-ghosted SH9002R06. The MC3D-PGS14005 data was conditioned to match SH9002R06 angle and frequency ranges. SH9002R06 was de-ghosted and matched in terms of amplitude and bandwidth. The objective of the work was to evaluate if pre-production seismic data over the Draugen field could aid in the isolation of positive AVO responses in the PL833 this without undertaking a

re-processing of the PGS14005 and SH9002 data. The result of the evaluation was that a simple approach by gather conditioning did not bring substantial uplift in quality. In order to obtain a functional merged dataset for AVO analysis a proper re-processing needs to be conducted.

AVO and attribute analysis

A substantial work program was conducted with respect to AVO and attribute analysis. Gather conditioning were applied to the input data in order to make some use of the near angle information in PGS14005 and gather flattening in order to stabilize the Intercept/ Gradient attributes. Attributes generated in the AVO work included, bandwidth matched angle volumes, relative impedance cubes, trace integrated and colored inversion volumes, intercept & gradient, AVO volume, shear impedance volume, various Chi/ EEI rotated volumes.

The conclusions of the AVO work conducted was that the main driving prospect Måse-Geir has a good probability of Jurassic reservoir presence. A positive AVO anomaly can be observed over the prospect at Tilje Fm. level, however the amplitude dims at apex of the structure. The lack of amplitude at the apex is likely to be a result of changes to the overburden as the Tilje Fm. is truncated by a thin Spekk. Down-flank the Jurassic package is growing and at the edge of the prospect outline a full sequence is present except for the Garn Fm. and parts of the Not Fm. The reservoir model is based on a heterogeneous Tilje Fm. Which will impact the expected HC response and given the observations in 6407/8-2 (Tau), 6407/9-9 T2 (Hasselmus) and 6407/8-4 A/S (Galtvort) the conclusion is that a gas fill is less likely than an oil filled prospect. AVO fluid prediction indicate fluid fill in the Måse-Geir prospect, however it is only confined consistently to a depth contour if the full Tilje interval is considered and the amplitude is dimming at the apex as described previously. This impacts the DFI of the prospect, as it cannot be determined with confidence if the observation is a fluid effect or lithology only.

Site survey

The Måse-Geir prospect was included in a Statoil Site Survey campaign in the area acquired during 2017. ST17329 was focused to cover a potential well location for the Måse-Geir prospect, Figure 2. The well location was located close to apex of the prospect. In total, 317 line km of integrated data were acquired. 9 CPT's were also acquired.

Well location characteristics:

- The well location is placed 1km distance to major faults.
- The prospect apex area is characterized by dense faulting, and the well location is placed 60m dowflank from this.
- The Måse-Geir well location has potential pock marks at the well location. Glacially derived scour marks in the seabed may hold shallow gas. There are no apparent reef build-ups. No seismic bright spots are observed in the overburden along the well path.

ST17329

- 317 km + 9 CPTs
- Acquisition time: 28.07.17 – 06.08.17 (10 days)
 - Operational Digital 96:31 (45.7 %)
 - Operation Geotechnical 10:16 (4.9 %)
 - Standby (WOW) 99:00 (47 %)
 - Transit 1:00 (0.5 %)
 - Non-invoicable time 3:48 (1.6%)
- No HSE to report, 3319 Synergi Hours.

Acquisition Cost:

- Vessel Contractor GBP 246.693,33 (Invoiced)
- FLO Services NOK 75.000 (Estimated)
- On-Board QC GBP 8.200 (Estimated)
- Reporting GBP 48.000 (Estimated)

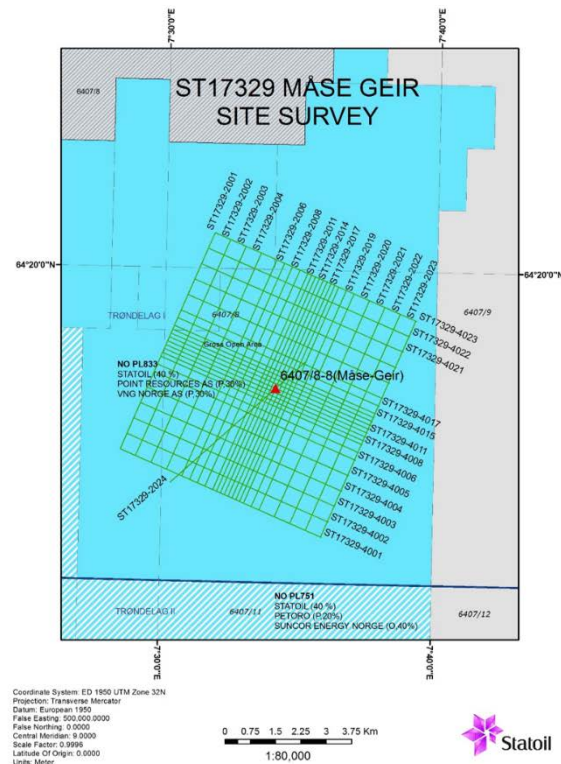


Figure 2: ST17329 Site Survey focused on Måse-Geir well location.

4 Prospect update report

Måse-Geir Prospect

The Måse-Geir prospect is a downfaulted structural trap with reservoir in the Tilje Formation. The prospect consists of 3 fault segments were only Svartbak and Hettemåke were evaluated as part of the prospect. Apex and the main volumes are located within the Svartbak segment. The top seal is the Lower Ror Formation regional marine shale combined with upper Jurassic Spekk and/or Cretaceous shales above the upper Jurassic unconformity (Intra Melke Unconformity, IMU). Base seal consists of floodplain shale deposits within the Åre Formation.

The main risk for the prospect is migration. Long distance migration from the mature Spekk Formation source rock in the Gimsan basin, through the Bremstein fault complex into the Froan basin is evaluated to be the most likely charge model for the prospect. The migration route through the Bremstein fault complex can either be via Hyme or further north in the Hasselmus discovery area. Based on previous discoveries in the area, both oil and gas are possible phases. Oil was used as the most likely case (P_{oil} 75%) in the prospect economical evaluations.

Geophysical anomalies have been analysed for the Måse-Geir prospect. In the Tilje interval, observations of positive amplitude responses with angle are observed, however these are patchy and not continuous. The AVO responses map out as class IIp and class III and are relative consistent and confined by depth contour when whole of Tilje interval is considered. There is a risk related to amplitude shutoff where Spekk formation is deposited directly on top of Tilje.

Additional risk is related to lack of a clear hydrocarbon to brine transition and response downflank to the north east. A small downgrade based on the DFIs were therefore applied.

The apex of Måse-Geir (Svartbak segment) is a small 4 way closure (20m HC column). The hydrocarbon column distribution (HCD) is mainly weighed on the fault against the Tau discovery (Åre-Tilje juxtaposition). The HCD has is also dependent on fault seal against the dry 6407/8-3 well. The Måse-Geir hydrocarbon column distribution is not weighted to the geophysical anomalies.

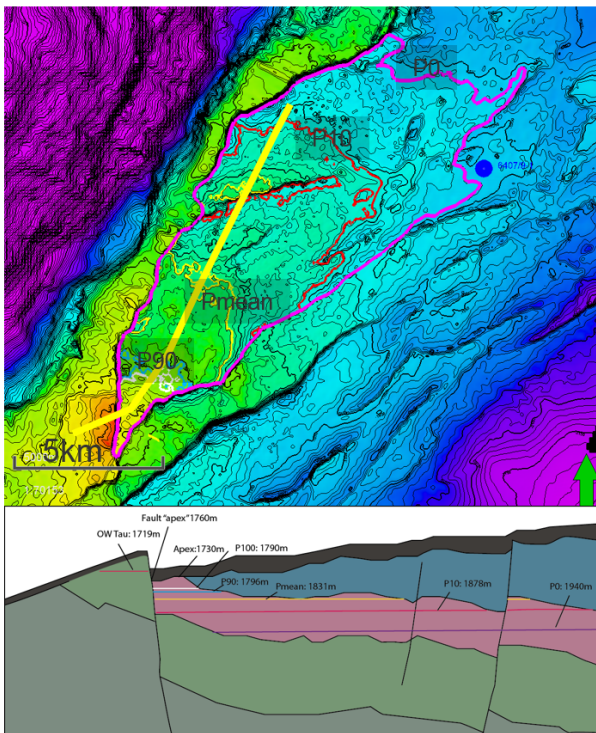


Figure 1 Top Reservoir map (Tilje formation) and geological cross section along the Måse-Geir prospect.

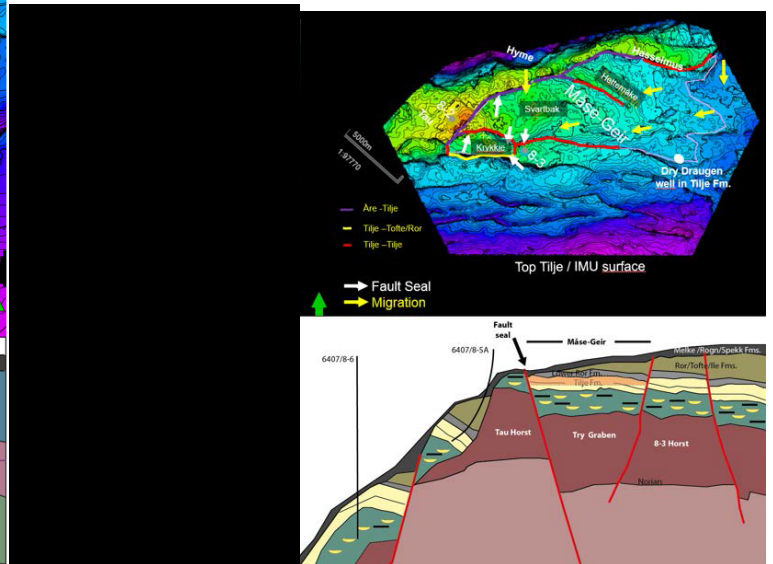


Figure 3. Key elements of the Måse-Geir prospect. Måse-Geir is a downfaulted structural trap with reservoir in the Tilje Fm. Main risk is migration (migration route through the Bremstein fault complex can either be through Hyme or north of the Hasselmus discovery).

Table 1 Volume summary for the Måse-Geir prospect. Risk adjusted after 6407/11-1 Gunnvald. The Svartbak segment carry most of the volumes.

		Prospect/discovery name:				JDS Extended				Licence no.:				833	
UNDISCOVERED	Prospect segments	In-place res. (MSm ³ oe) 100%, Total Structure				Recoverable res. (MSm ³ oe) 100%, Total Structure				Pg %	Statoil equity %	Within license %	Proven by well %	Mean volumes (mboe SOA)	
		P90	Mean	P10	Fixed	P90	Mean	P10	Fixed					Risked	Unrisked
Pre drill segment	Måse-Geir	3,4	31,2	79,1	307,8	1,6	11,4	29,3	105,0	18	40	100	100	5,16	28,68

Additional prospectivity

As part of sweet spotting the PL833 area, a number of leads have been identified. All of these are within the same lower to middle Jurassic play models and are in general driven by observations of seismic amplitudes. The most robust opportunities were brought forward as prospects together with the Måse-Geir prospect. The Gladiator prospect is a

truncation trap in the Tofte formation. The Radiator prospect is overlying the Gladiator and is located within the Ile formation. Both prospects are analogues to the Gunnvald prospect that was drilled in the PL751 licence in 2019.

5 Technical evaluation

Both oil and gas cases are evaluated for Måse-Geir. The field development solution for the P50 oil case consists of two producers with gas lift and one water injector. Gas lift and water for injection is taken from the Hyme template and the production is tied directly to Njord A. The field development solution for the gas case is a single slot Cap'X satellite with one gas producer tied back directly to Njord A (Figure 4). The assumed project plan was to start production in Q1/2024 given an exploration well in 2019.

6 Conclusion

The lower and middle Jurassic play has been the main focus in the PL833 licence. The Lower Jurassic Måse-Geir prospect was put forward as the main driving prospect within the licence towards the Drill or Drop milestone. A thorough evaluation of the prospect has been carried out, including acquiring modern 3D broadband seismic data, conditioning seismic datasets, post-stack merge of seismic datasets with subsequent AVO and attribute analysis. The Gunnvald well (6407/11-1) in the neighbouring licence PL751 resulted in a slight downgrade of the Måse-Geir prospect risk. Integration of all data brings the Måse-Geir prospect forwards as an opportunity with decent volumes but high risk. The licence decided unanimously to drop the licence.

