



PL 751 - Licence status report

Summary

The PL751 licence is located to the southwest of the Draugen field and east of the Njord field and was previously a part of various former licences: PL176, PL349, PL469 and PL556. Suncor was the Operator from award until drill or drop decision in February 2017. Equinor took over the operatorship after Suncor recommended to drop the licence. A drill decision was made in order to drill the Gunnvald prospect. Since a drill decision was taken, shallow seismic was acquired and the exploration well 6407/11-1 planned and drilled. Data acquisition was focused on proving hydrocarbon accumulations, but also to explore signs of migrated hydrocarbons and a working petroleum system in the lower Jurassic in the Froan basin. This includes acquiring core in the transition from the Spekk Formation to the top reservoir in the Tofte Formation and additional sidewall cores in non-cored intervals. Good oil shows were found in the well and interpreted to be migrated oil coming from the Spekk Fm. in the Gimsan Basin. An upper Jurassic Rogn sandstone was found lying unconformably upon the prognosed Tofte Fm reservoir. The interpreted failure reason for 6407/11-1 is that the Rogn sandstone acts as a pathway breaching the top seal. Generally, the well results strengthen the concept of migration from mature source rock on the Halten Terrace into the Froan basin. On the other hand the seal risk is worsened where the top seal is dependent upon a Spekk Fm. shale. Some segments will also require fault seal to work towards the water filled well.

An updated evaluation of the PL751 prospectivity, with revised risking based on interpretation of the results in PL751 6407/11-1 Gunnvald, was carried out. The lower Jurassic prospectivity get an overall downgrade, while other prospects are little impacted by the well results. Based on the evaluation of the prospectivity, the PL751 partnership do not see any attractive drilling candidates in PL751 and have unanimously decided to drop the licence.

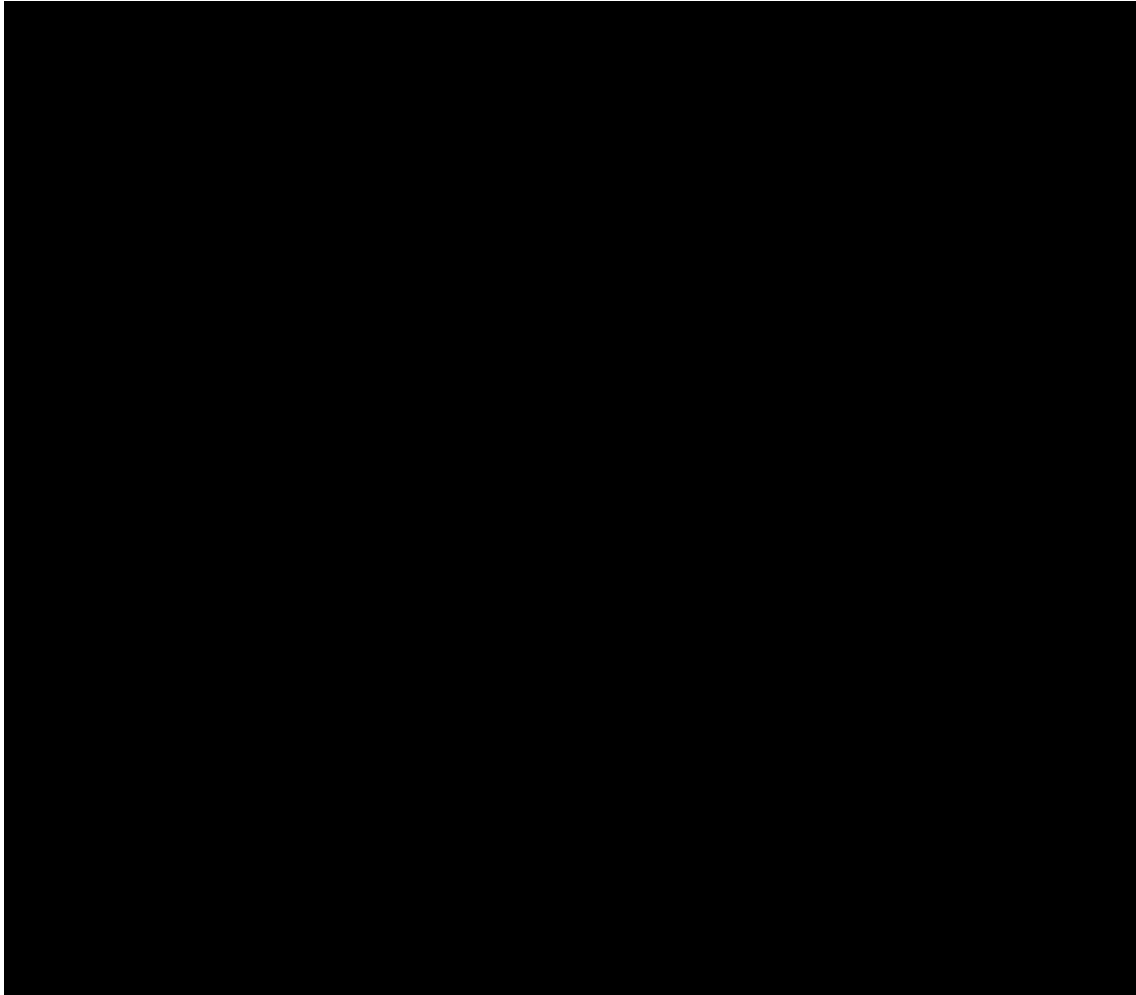


Figure 1: Area map with PL751 licence outlined in red, Bauge, Hyme, Draugen fields, prospects and surrounding discoveries.

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1 Licence history

<u>Licence:</u>	PL751	
<u>Awarded:</u>	07.02.2014 (APA2013)	
<u>Licence period:</u>	Expires 07.02.2022 Initial period: 8 years	
<u>Licence group:</u>	Equinor Energy AS	80% (Operator from 09.08.2017)
	Petoro AS	20%
<u>Licence area:</u>	389.313 km ²	
<u>Work programme:</u>	Technical G&G work	- Fulfilled
	Purchase 3D seismic	- Fulfilled
	Gunnvald prospect and economical evaluations	- Fulfilled
	Initial Drill or Drop by 07.02.2017	- Decision to drill the Gunnvald well
	Initial BoK or Drop by 07.02.2019	- Applied for one year extension
	Extended BoK or Drop by 07.08.2019	- Applied for three month extension
	Extended BoK or Drop by 07.11.2019	- Decision made to drop the licence
<u>Meetings held:</u>		
21.02.2014	EC/MC meeting #1	
27.11.2014	EC/MC meeting #2	
04.12.2014	EC work meeting #1	
12.05.2015	EC work meeting #2	
25.11.2015	EC/MC meeting #3	
03.02.2016	EC work meeting #3	
10.03.2016	EC work meeting #4	
22.09.2016	EC/MC meeting #4	
10.01.2017	EC/MC meeting #5	
07.09.2017	EC work meeting #5	
08.11.2017	EC/MC meeting #6	
27.04.2018	EC work meeting #6	
29.11.2018	EC/MC meeting #7	
31.10.2019	EC/MC meeting #8	
<u>Work performed:</u>		
2014:	Licence start-up. CSEM feasibility study performed.	
2015:	536 km2 of PGS14005 PSTM & PSDM was purchased and included in the licence database. Biostratigraphy, sequence stratigraphy, rock physics, structural reconstruction and basin modelling studies performed.	
2016:	Gather conditioning of PGG14005 PSDM - PGG14005R16. Mapping of prospectivity.	

- 2017: Drill or drop decision where operator Suncor recommended to drop the licence. Equinor and Petoro in favour of drill decision and Equinor took over the operatorship. Site survey acquired for the Gunnvald prospect and well planning started.
- 2018: Drill well 6407/11-1 Gunnvald. The well was dry with good oil shows at the uppermost reservoir section.
- 2019: Post well studies performed on data from 6407/11-1. Reevaluation of prospectivity within the licence. Decision made to drop the licence.

Reason for surrender:

The Gunnvald was the driving prospect in the licence and evaluated as a high risk prospect with high upside potential close to existing infrastructure. The remaining mapped lower Jurassic prospectivity has a limited remaining potential. The remaining prospectivity within other stratigraphic intervals are not evaluated to be significantly influenced by the 6407/11-1 well results. The evaluation of this portfolio from the 2017 drill or drop evaluation prevails, where no attractive drilling candidates are found. The PL751 partnership have thus unanimously decided to drop the licence.

2 Database overviews

The PL751 licence common database was approved after EC/MC meeting #2 In December 2014, with revisions in 2015 and 2016.

2.1 Seismic data

The seismic data that was utilized in the PL751 technical evaluations are shown in Table 1.

Table 1: Seismic data included in the PL834 common database

Survey	NPDID	TYPE	Quality
PGS14005 (parts, 536 km2)	8054	3D	Good
SH9104	3443	3D	Poor
CFI_MNR06_7110	4364	2D	Good
CFI_MNR06_7124	4364	2D	Good
CFI_MNR07_440	4450	2D	Good
CFI_MNR08_417A	4571	2D	Good
CFI_MNR11_90497	7389	2D	Good
CFI_MNR11_90471	7389	2D	Good
CFI_MNR11_90446	7389	2D	Good
CFI_MNR11_90415	7389	2D	Good
CFI_MNR11_90387	7389	2D	Good
CFI_MNR11_434	7389	2D	Good

2.2 Well data

The well database utilized in the PL751 technical evaluations area shown in Table 2.

Table 2: Wells included in the PL751 common database

Well	NPDID	Well	NPDID
6306/5-1	3060	6407/7-2	1017
6306/6-1	2384	6407/7-3	1229
6306/6-2	6143	6407/7-4	1360
6406/1-2	4762	6407/7-5	1699
6406/11-1 S	1539	6407/7-6	4172
6406/12-1 S	1711	6407/7-8	5844
6406/12-2	2640	6407/8-1	1859
6406/3-6	4589	6407/8-2	2434
6406/5-1	4451	6407/8-3	3092
6406/6-1	486	6407/8-4 S	5813
6406/6-2	5359	6407/8-5 S	6110
6406/8-1	1136	6407/9-1	133
6406/8-2	5435	6407/9-2	449
6406/9-1	4927	6407/9-3	469
6407/1-3	29	6407/9-4	480
6407/2-6 S	6351	6407/9-5	492
6407/4-1	490	6407/9-6	871
6407/4-2	6557	6407/9-7	1057
6407/5-1	1174	6407/9-8	1974
6407/5-2 S	6648	6407/9-9	1990
6407/6-4	1604	6407/10-1	1054
6407/6-5	3921	6407/10-2	1497
6407/6-6	5636	6407/10-3	1927
6407/6-7 S	6100	6407/12-1	3781
6407/7-1 S	474	6407/12-3	6370

3 Results of geological and geophysical studies

Upper Jurassic maturation

The licence focused initially on the upper Jurassic play in the Froan Basin analogues to the Draugen field. Several geological and geophysical studies were performed to mature this play, coordinated by Suncor as operator at the time. The conclusion was that no prospects were sufficiently attractive to recommend a drill decision.

6407/11-1 Gunnvald

The Gunnvald prospect was considered the best prospect in PL751 and the remaining licence partners Equinor and Petoro committed to a drill decision. It was considered a high risk well with high upside volume potential and a key to unlock further prospectivity in the area. A site survey was acquired during the summer 2017 and a detailed planning of the well was started in late 2017. 6407/11-1 was drilled in Q4 2018. Extensive data acquisition, including a core from the source rock into the reservoir, was collected; all in order to conclude on a potential hydrocarbon presence.

6407/11-1 Gunnvald post well studies

The Gunnvald well proved 2 m of good oil shows in the very upper part of the Jurassic reservoir. The shows are found in a 4m Rogn Fm. sandstone lying unconformably above the prognosed Tofte Fm. Geochemical analysis of the oil shows indicate an upper Jurassic source rock, the Spekk Formation. The oil is interpreted to come from an early mature source rock.

The Spekk Fm is clearly immature in the well, and also in the rest of Froan basin according to existing models.

The presence of the shows in Rogn Fm. prove that migration from the Gimsan Basin and into the Froan Basin has happened. The failing mechanism of the prospect is assumed to be trap failure/leakage. The implications for the further prospectivity in the Froan basin are: 1) the general concept of long distance migration from the Halten Terrace into the Froan basin is strengthened 2) the trap risk is increased due where prospects are juxtaposed to water filled Tofte in the Gunnvald well and/or where there is risk of having Rogn sandstone acting as a thief sandstone breaching the top seal. This information has been used to reevaluate the prospect portfolio.

4 Prospect update report

Idun/Eir Prospect

The prospect consists of two segments Idun in the Tilje Fm and Eir in the Åre Fm. It had the potential to be part of a prospect complex being tested by 6407/11-1 Gunnvald. Approximately 60% of the area is within PL751 while it also extends into the recently relinquished licences PL793 and PL833. The prospect has been re-evaluated after 6407/11-1. The migration risk has improved slightly, while seal risk has significantly deteriorated. The risk of top seal failure due to Rogn sandstones are highlighted by 6407/11-1 and the prospect also requires fault seal vs proven water filled Tofte Fm. The overall conclusion is a downgrade of the prospect with reduced Pg and mean volume.

Idun / Eir	0.2 – 6.3 – 15.9 (0.4–9.0–20.6)	18 (23)	$P_{\text{migration}}$ minor upgrade, P_{trap} major downgrade, volume upside reduced
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Table 1 Pre- and Post-Gunnvald risk and volume, Post at top, Pre in parenthesis

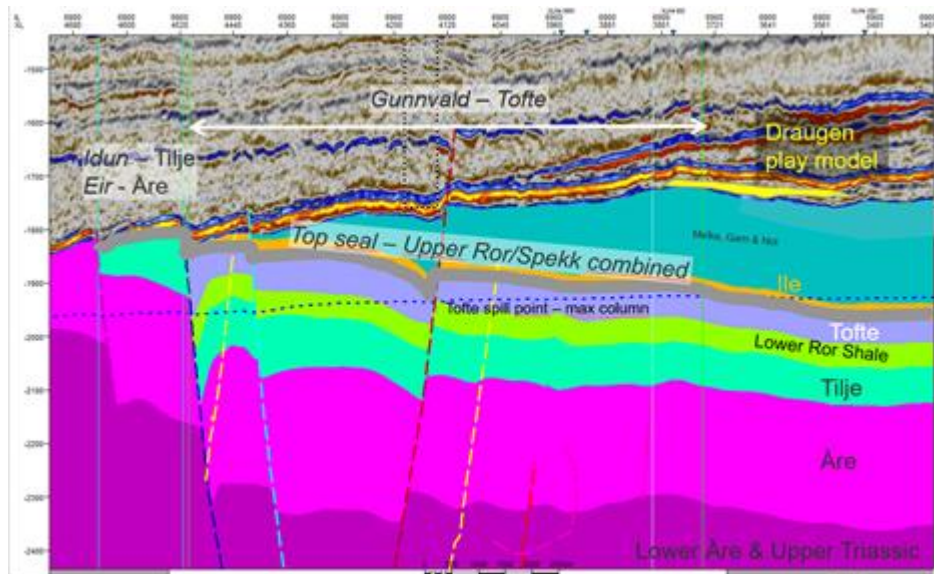


Figure 1 Geo section showing the juxtaposition of the Gunnvald prospect vs the Idun/Eir prospect. The Tilje Fm reservoir in Idun is juxtaposed vs water filled Tofte Fm. observed in 6407/11-1. The prospect is also dependent on a top seal at the regional upper Jurassic unconformity.

Heidi prospect

The Heidi prospect in the Tilje Fm. was considered a secondary target for the well 6407/11-1. The Tilje Fm. was dry in the well, but a minor upflank potential still exist in the prospect. The remaining volume potential is considered too small to be attractive.

Additional prospectivity

Prospectivity in Upper Jurassic, Cretaceous and Cenozoic was evaluated by Suncor prior to the drill or drop decision in 2017. The licence agreed that no sufficiently attractive prospects within these plays were found to recommend a drill decision. This conclusion is not altered by the data provided by 6407/11-1 and subsequent work.

5 Technical evaluation

A field development solution for the P50 oil volumes of the Gunnvald prospect was evaluated prior to drilling the well. The P50 volumes was evaluated as a stand-alone development with 12 oil producers and 6 water injectors. Smaller volumes were considered as potential subsea tie-ins to the Draugen or Njord installations. Tie-in solutions were considered as most likely for the remaining prospectivity in the licence.

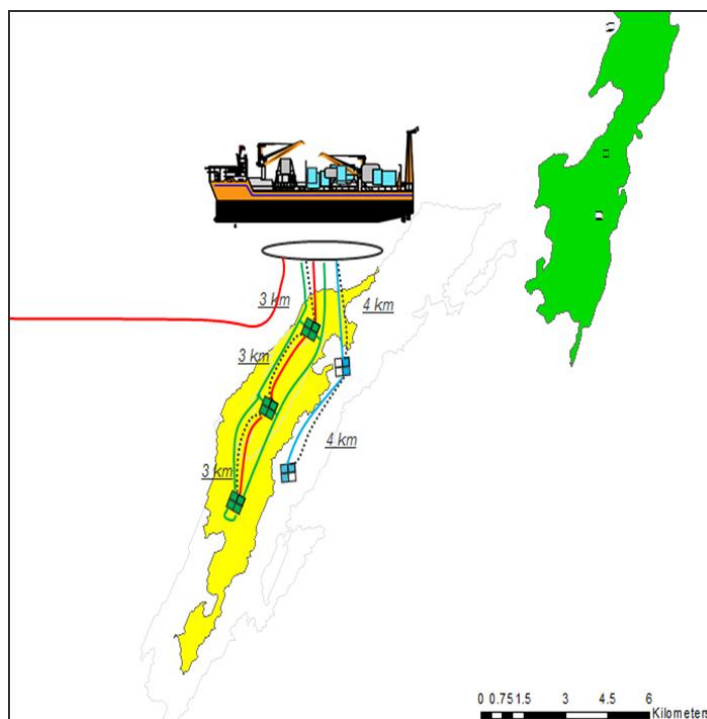


Figure 2 Evaluated field development solution for the Gunnvald prospect P50 volume prior to drilling.

6 Conclusion

The well 6407/11-1 was drilled on the Gunnvald prospect. This was a high-risk prospect with a large upside volume potential. The main risk was considered migration in addition to a significant seal risk. Post well studies interpret migration to be working, but failure of the top seal. The main remaining prospect in the licence is the Idun/Eir prospect which has been downgraded due to increased top seal risk and increased fault seal risk due to juxtaposition versus the water filled Tofte Fm in 6407/11-1. No other attractive drilling candidates have been found and the licence decided unanimously to drop the licence.