RELINQUISHMENT REPORT
PL 847/847B

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1 Key License History

Production License 847 was awarded on 5th February 2016 as a result of a 2015 APA application and consists of blocks 6706/5 and 6706/6 covering a total area of 790km^2. Production License 847B is a license extension awarded the 10th February 2017 and covers 289km^2 of block 6707/4, Fig. 1.1

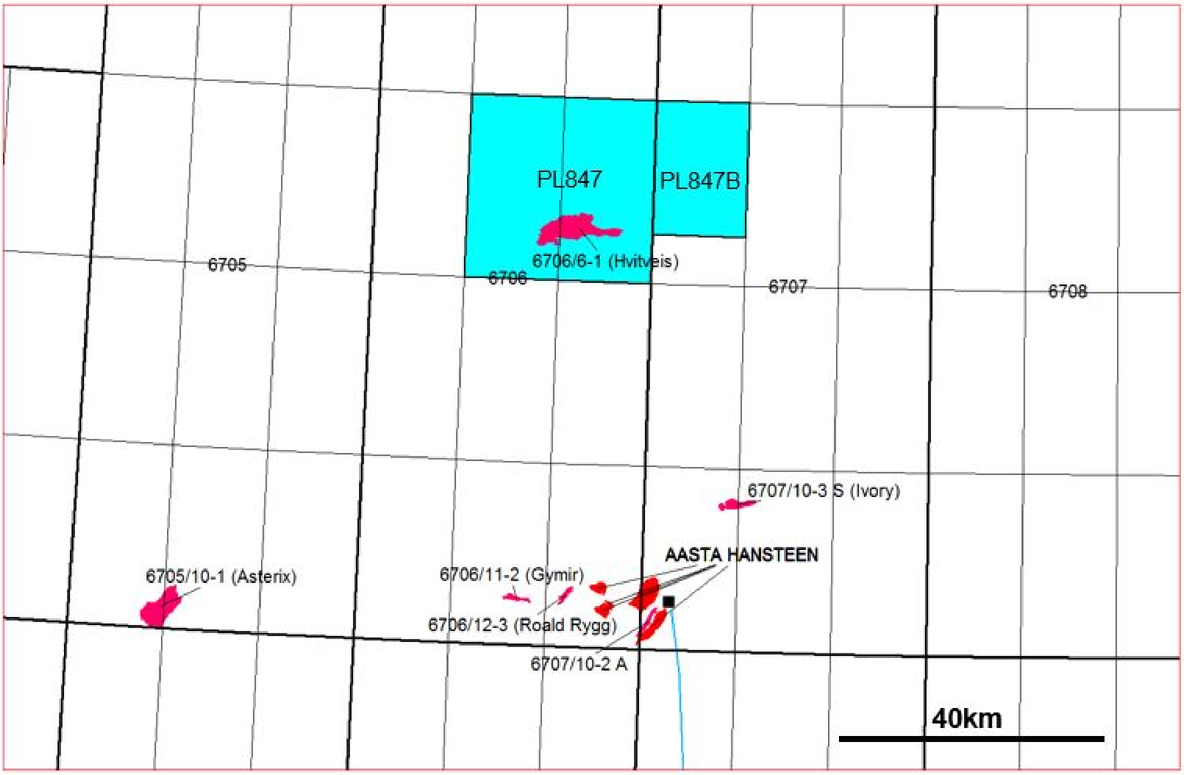


Fig. 1.1 PL847/847B Location map

The initial license group consisted of Wintershall Norge AS (operator, 40%), Statoil Petroleum AS (20%), Repsol Norge AS (20%) and OMV (Norge) AS (20%). As of 12th December 2018, Dyas Norge AS (now ONE-Dyas Norge AS) took a 10% part of Statoil's (now Equinor) initial share in the license.

The work obligation for both license parts was reprocessing of 3D seismic within a 5th February 2018 deadline. This work obligation was fulfilled. By the same date a Drill or Drop decision had to be taken, and the license group decided to drill.

EC/MC meetings were held at least once a year, in addition to numerous EC work meetings, particularly in 2018, in which most of the preparation for, and spudding of the Marisko exploration well 6706/6-2S took place.

Drilling of the Marisko well commenced 4th December 2018 and was completed 16th February 2019. The well targeted two sandstone units of possible Upper Cretaceous age (Nise Fm) and reached TD at 3916m MD.

The Marisko well was dry with gas shows, and data suggests insufficient gas retention, over time, is the main cause for failure.

In PL847/847B, most prospects of significant size are, like the Marisko Prospect, related to three-way closures against main E-W oriented faults. Analysis of fault activity timing, local stress field and indications of shallow gas, points to late gas leakage along these E-W oriented main faults as the primary leakage mechanism. The negative result of the Marisko exploration well has consequently led to a significant downgrading of the license prospectivity, and hence a wish to relinquish.

2 Database

The common data base established for the license consists of seismic data and well data (Fig. 2.1).

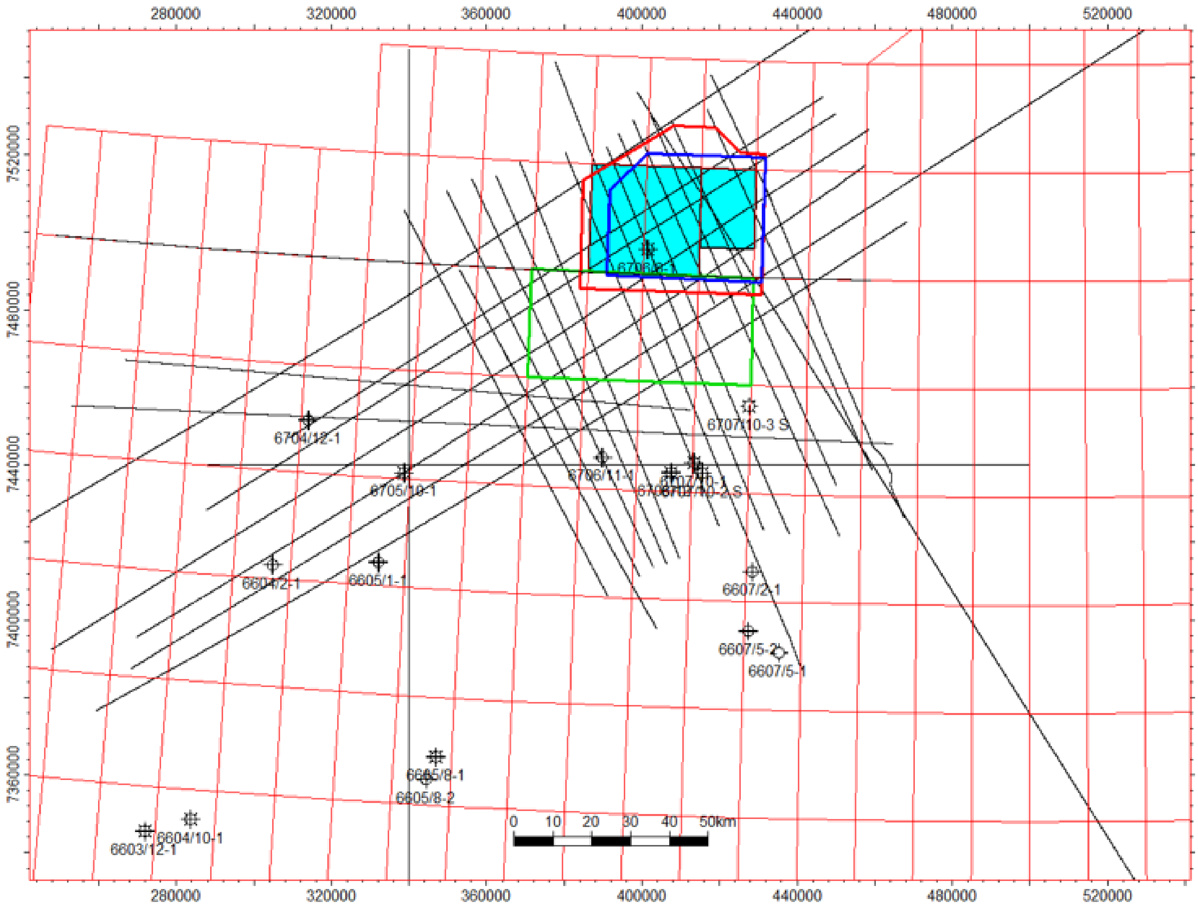


Fig. 2.1 Seismic- and well database

This basemap shows the PL847/847B License and related common seismic- and well database. Green polygon represents the SUN12NO01 3D seismic survey and red polygon represents the EM00-01 3D seismic survey. The reprocessed EM00-01WIN17R01 (dark blue polygon) is shown for reference.

A listing of the seismic data is found in Table 2.1.

Table 2.1 Seismic database

3D seismic survey	NPDID	3D seismic survey	NPDID
EM00-01 Full Stack and 1230 km^2 Raw Field Data	4040	SUN12NO01-PC10NO01 Full Stack	7576

2D seismic lines	NPDID	2D seismic lines	NPDID
MNR04-7440 Sp. 13200-18000	4252	NPD-VRB-89-BPR01-VB0989	3263
MNR08-340 Sp. 22600-26200	4571	NPD-VRB-89-BPR01-VB1089	3263
NPD-VRB-86-BPR01-VB1086	2866	NPD-VRB-89-BPR01-VB1489	3263
NPD-VRB-86-BPR01-VB1286	2866	NPD-VRB-89-BPR01-VB15A89	3263
NPD-VRB-86-BPR01-VB186	2866	NPD-VRB-89-BPR01-VB01789	3263
NPD-VRB-86-BPR01-VB886	2866	NPD-VRB-89-BPR01-VB1889	3263
NPD-VRB-87-BPR01-VB1087	3007	NPD-VRB-89-BPR01-VB2989	3263
NPD-VRB-87-BPR01-VB11ABC87	3007	NPD-VRB-90-BPR01-VB0790	3338
NPD-VRB-87-BPR01-VB1287	3007	NPD-VRB-90-BPR01-VB0890	3338
NPD-VRB-89-BPR01-VB0389	3263	NPD-VRB-90-BPR01-VB673090	3338
NPD-VRB-89-BPR01-VB0489	3263	VB-14-87	3007
NPD-VRB-89-BPR01-VB0589	3263	VB-11-89	3263
NPD-VRB-89-BPR01-VB0689	3263	VB-12-89	3263
NPD-VRB-89-BPR01-VB0789	3263	VBT-94-3	3701
NPD-VRB-89-BPR01-VB0889	3263		

The work obligation of reprocessing 3D seismic was carried out on the EM00-01 3D seismic survey (NPDID 4040), acquired by WesternGeco for ExxonMobil in 2000. The reprocessing was done by ION GXT and the resulting reprocessed data set, EM00-01WIN17R01, became available for the license in August 2017 and covers 1230 km^2 (Fig. 2.1).

The EM00-01WIN17R01 data set was processed with broadband PreSDM, with key objectives of improving fault definition and amplitude preservation as well as accentuating possible DHIs.

The wells included in the common data base are listed in Table 2.2 .

Table 2.2 Well database

Database consists of released well data only

Well	NPDID	Well	NPDID
6603/12-1 (Gro I)	5985	6704/12-1 (Gjallar)	3759
6604/2-1 (Gullris)	6568	6705/10-1 (Asterix)	6044
6604/10-1 (Gro II)	6356	6706/6-1 (Hvitveis)	4705
6605/1-1 (Obelix)	5979	6706/11-1 (Vema)	3202
6605/8-1 (Stetind I)	4984	6706/12-1 (Snefrid S)	5867
6605/8-2 (Stetind II)	5812	6707/10-1 (Luva)	3075
6607/2-1 (Cygnus)	5471	6707/10-2 A & S (Haklang)	5931/5918
6607/5-1 (Amundsen I)	1064	6707/10-3 S (Ivory)	7550
6607/5-2 (Amundsen II)	1789		

3 Geological and Geophysical Studies

A series of geological and geophysical studies and analyses were carried out prior to, and following drilling of the Marisko exploration well 6706/6-2S.

Seismic reprocessing
Reprocessing of the EM00-01 3D seismic data was instrumental in defining new prospectivity in the license and for the maturation of the Marisko prospect. The reprocessed seismic data shows an image quality which is far superior to the vintage data and therefore facilitates general seismic mapping and prospect definition including seismic amplitude analyses.

Seismic mapping - Basin configuration
Three main reservoir sandstone units (Nise 1, 2 & 3) have been mapped across the license (Fig. 3.1, Fig. 3.2 & Fig. 3.3) along with numerous shallower key surfaces (Fig. 3.4). The interpretation of over 250 fault planes supports a consistent structural interpretation which, in turn, was validated by a structural reconstruction exercise. The detailed seismic mapping also highlighted new stratigraphic aspects of the main reservoir units, thereby unraveling their sediment transport directions and changing basin configurations over time (Fig. 3.5, Fig. 3.6 & Fig. 3.7).

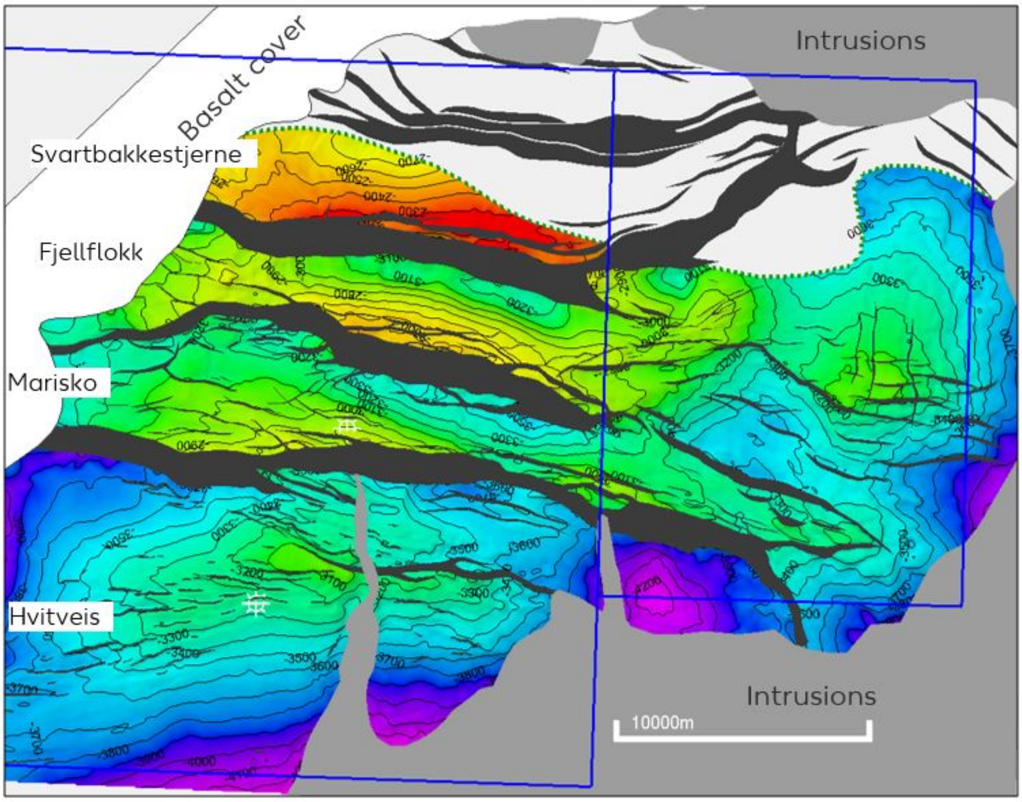


Fig. 3.1 Nise 1 depth structure map
Depth structure map of top Nise 1. Contour interval is 100m. Green dotted line is the pinch-out line for the Nise 1 reservoir. Main structures labelled for reference

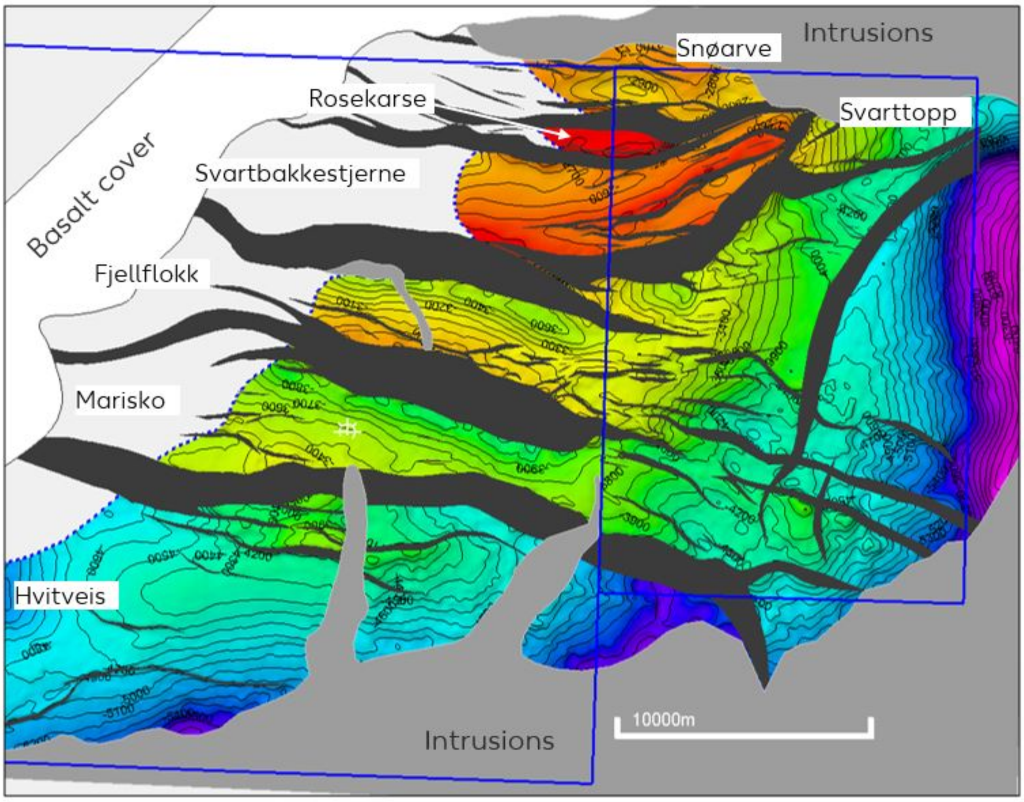


Fig. 3.2 Nise 2 depth structure map

Depth structure map of top Nise 2. Contour interval is 100m. Blue dotted line is pinch-out line for the Nise 2 reservoir. Main structures labelled for Reference.

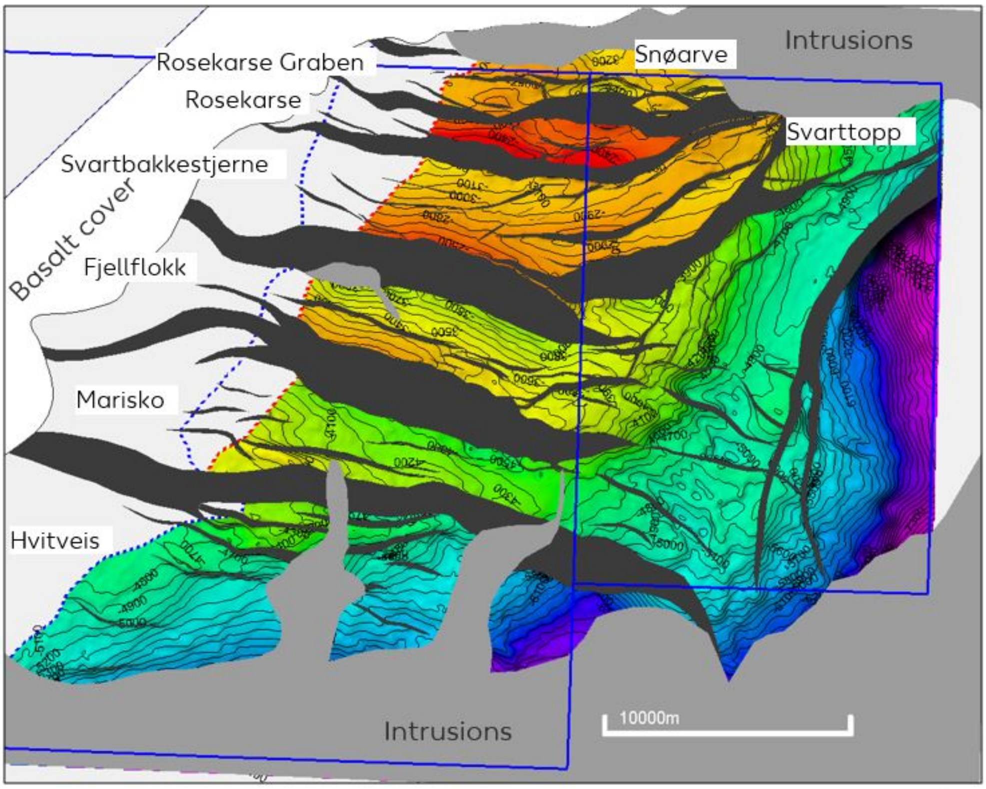


Fig. 3.3 Nise 3 depth structure map

Depth structure map of top Nise 3. Red dotted line is pinch-out line for the Nise 3 reservoir. Blue dotted line is truncation line (partial erosion of Nise 3). Main structures labelled for reference.

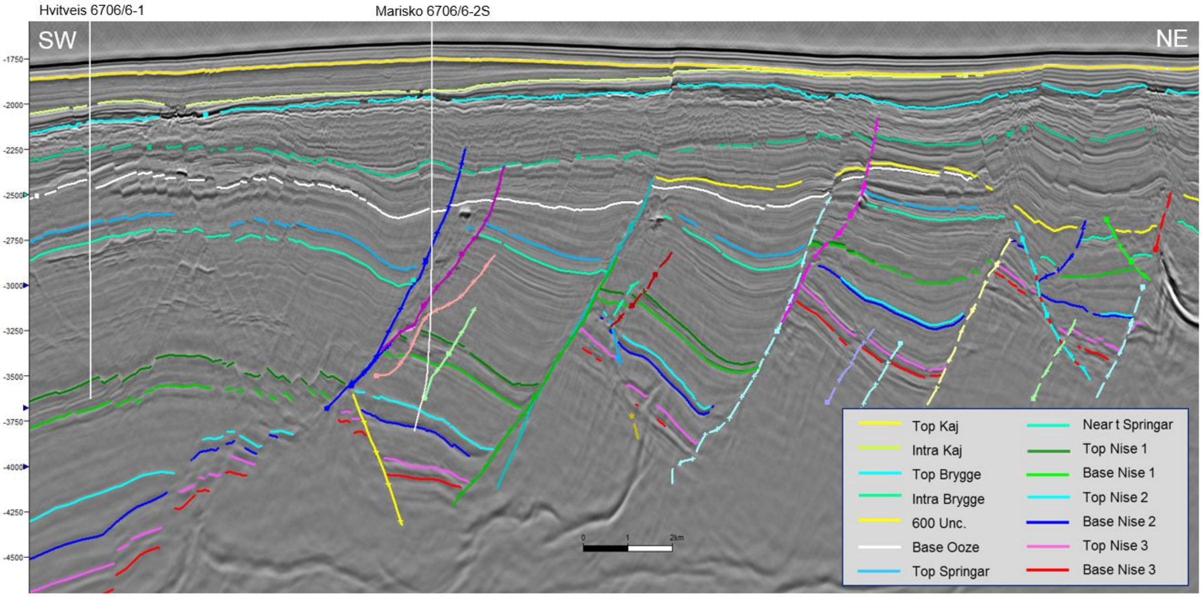


Fig. 3.4 Seismic interpretation

Random seismic line through the Hvitveis and Marisko wells. Key surfaces mapped.

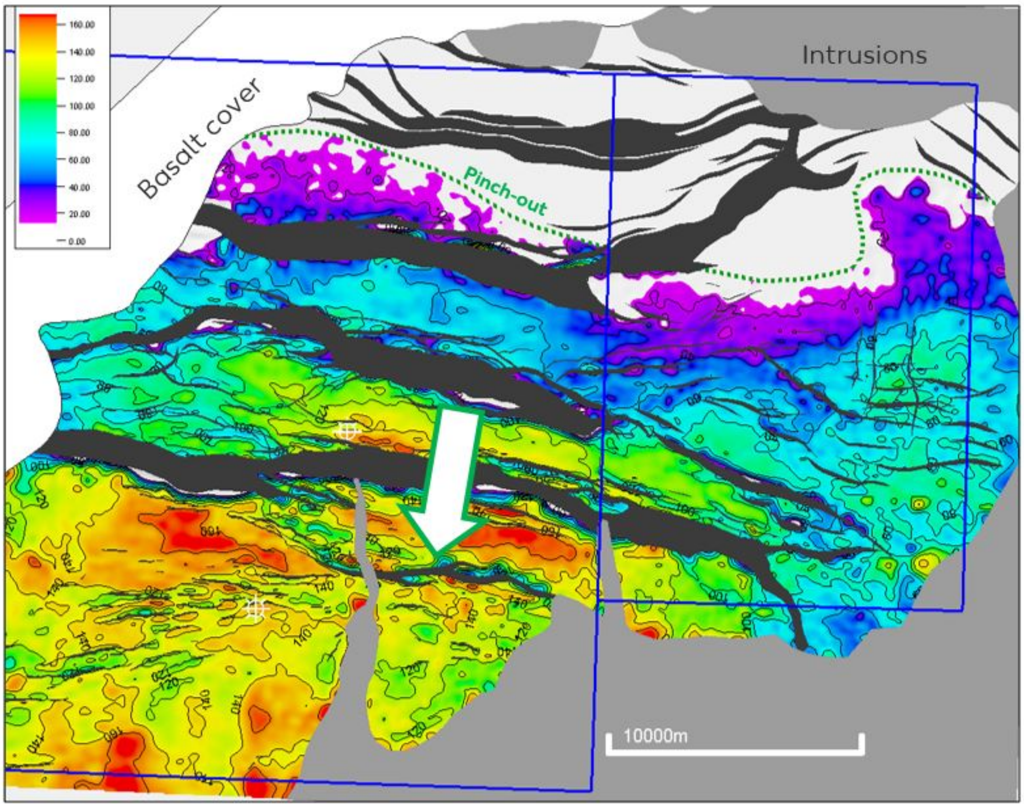


Fig. 3.5 Isochron map of Nise 1 reservoir

Red colours representing relative thick. Contour interval is 20ms. Arrow is marking interpreted main depositional transport direction.

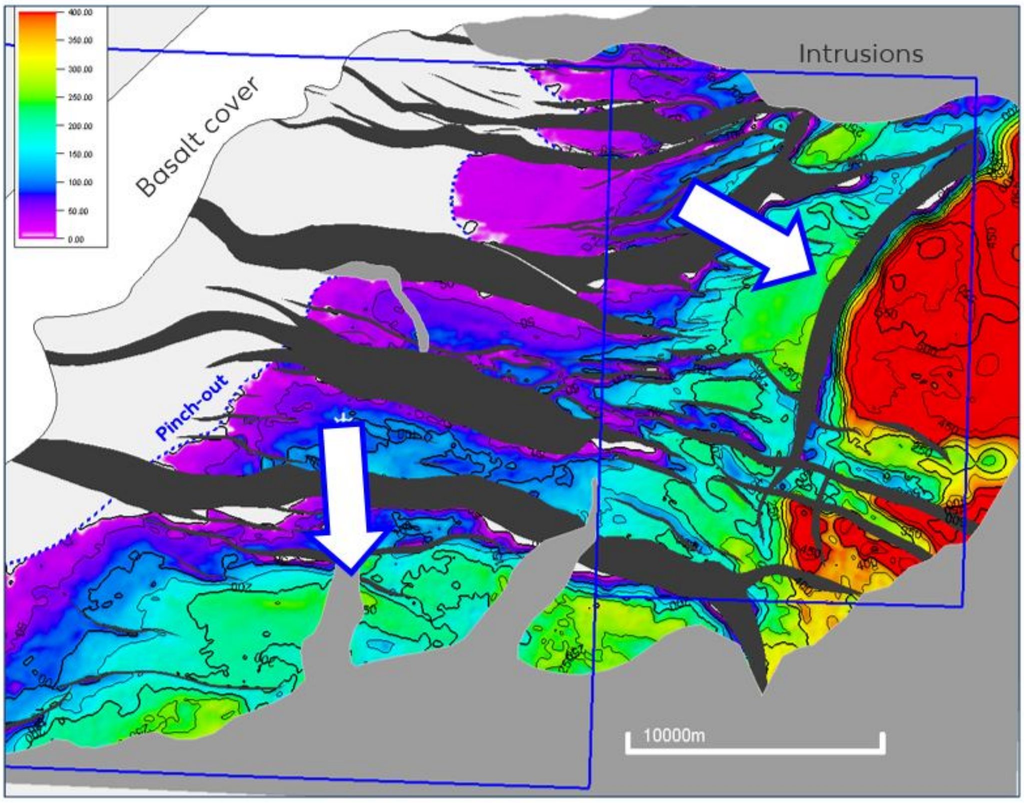


Fig. 3.6 Isochron map of Nise 2 reservoir

Red colours representing relative thick. Contour interval is 50ms. Arrows are marking interpreted main depositional transport directions.

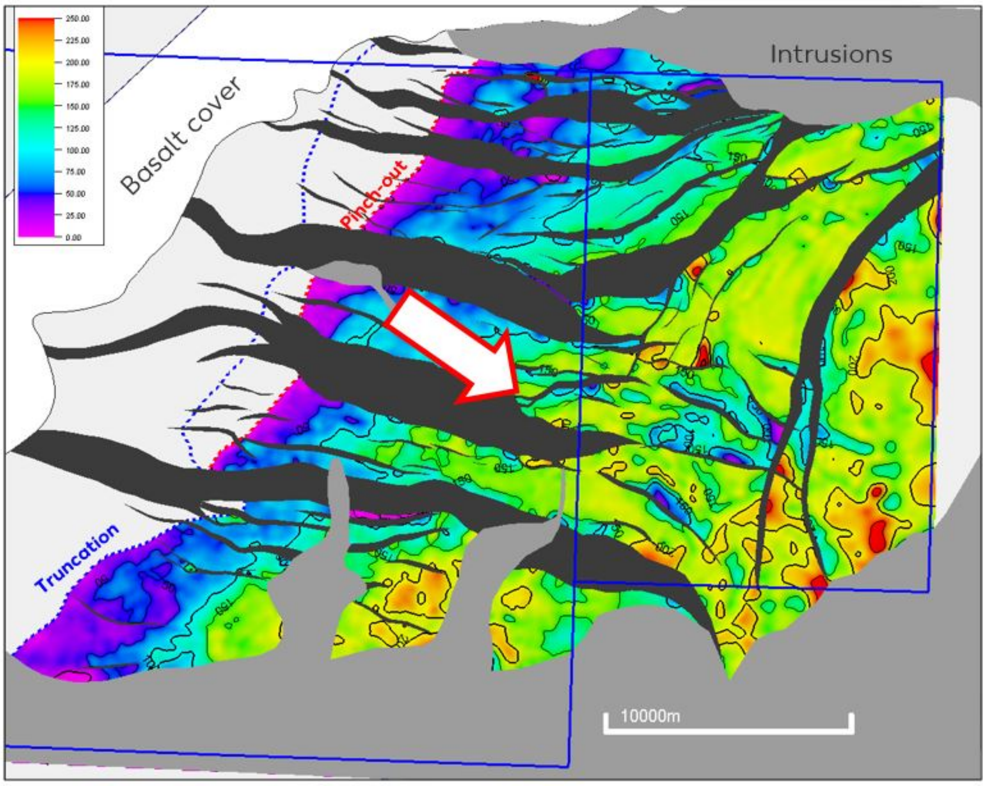


Fig. 3.7 Isochron map of Nise 3 reservoir

Red colours representing relative thick. Contour interval is 50ms. Arrow is marking interpreted main depositional transport direction.

Rock physics and AVO analysis

Maturation of the Marisko prospect included rock physics modeling (of the Hvitveis well) and AVO analysis. The Marisko well was, for both targeted sandstone units, Nise 1 and 2, drilled on amplitude anomalies with partial conformance to structure and well defined, but local flat events at the well location (Fig. 3.8). For both sandstone units the flat event levels correspond to phase changes at top reservoir and amplitude brightening on far stacks (AVO class III) is observed above these levels. These geophysical observations led to a positive modification of the prospect COS based on SAAM amplitude anomaly analysis.

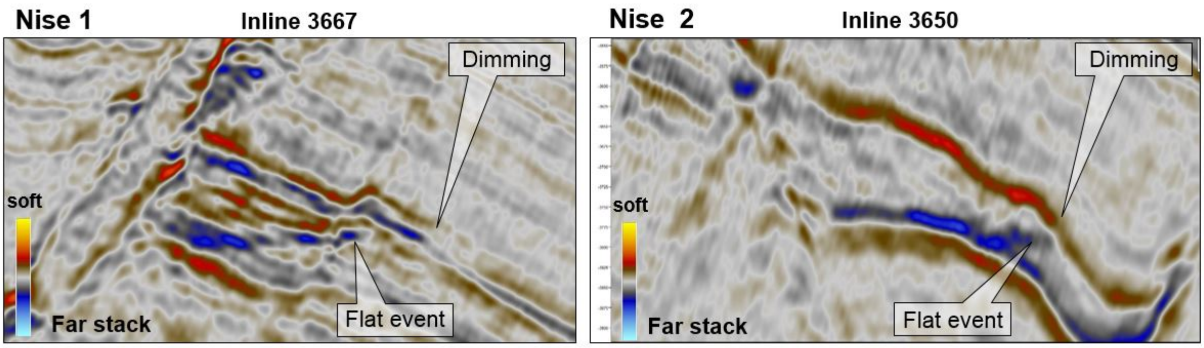


Fig. 3.8 Marisko prospect HC indicators

Amplitude characteristics and flat events on two seismic sections representing the Nise 1 reservoir (left) and Nise 2 reservoir (right).

Basin Modeling

A pre-drill semi-regional 3D basin modeling was carried out in order to evaluate kitchen size, drainage area and migration pathways. Expulsion curves were constructed for a series of assumed Lange Fm source rock depth and thickness scenarios. Results show expulsion would take place also late in geological history and oil expulsion being a secondary possibility. The basin modeling work also concluded that HC charge would not be limiting trap fill of the Marisko prospect.

Marisko 6706/6-2S exploration well results

The Marisko well was dry with gas shows. Both targeted reservoir sandstone units were water-bearing with low residual gas saturations. The well result proves charge into the Marisko prospect.

Residual gas presence in the reservoir units is indicating leaked reservoirs and suggests insufficient gas retention over time is the main cause for the Marisko prospect failure.

The upper reservoir unit, called Nise 1 (Fig. 3.9), has a gross thickness of 231m with a N/G of 77% and an average porosity of 19.1%. The deeper reservoir unit, Nise 2 (Fig. 3.10), has a thickness of 182m with a high N/G of 93% and an average porosity of 13.9%.

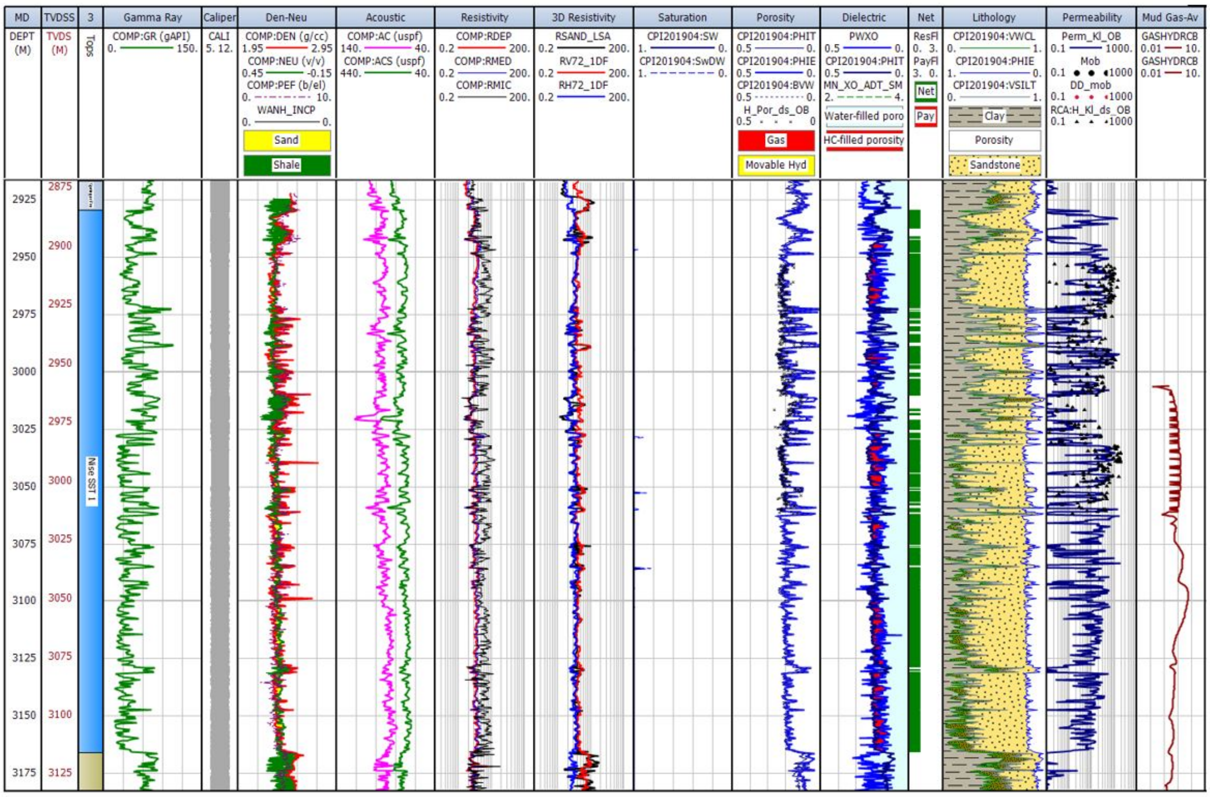


Fig. 3.9 CPI logs of Nise 1 reservoir

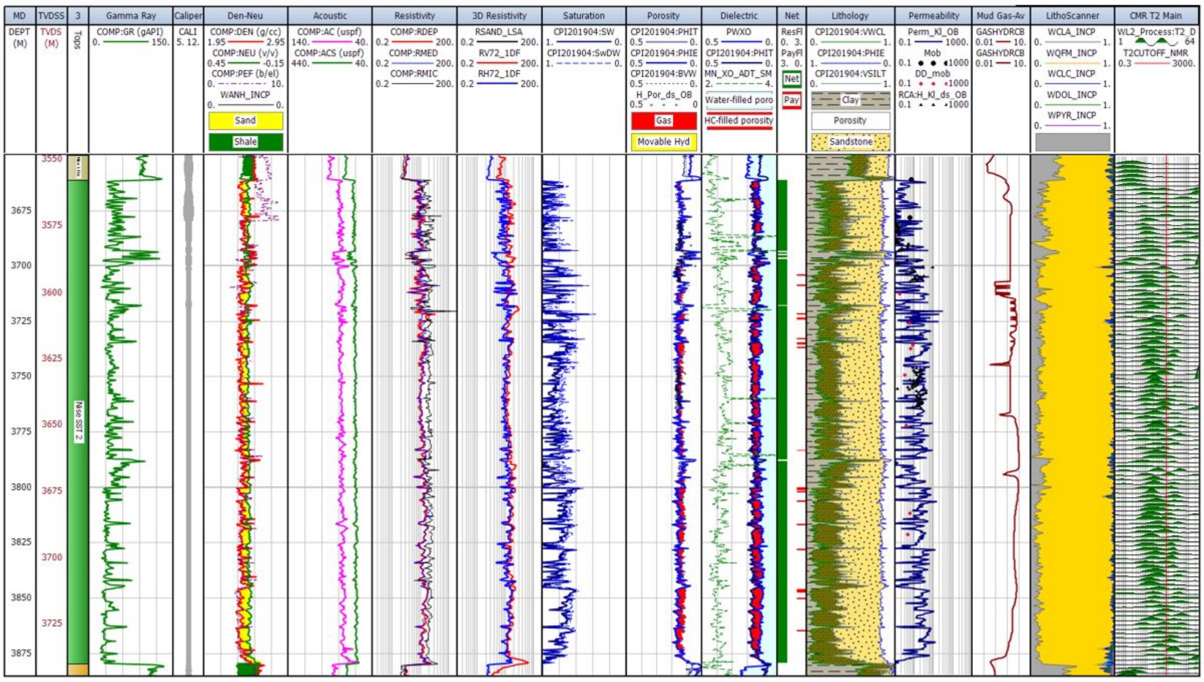


Fig. 3.10 CPI logs of Nise 2 reservoir

Both reservoir units were cored with a total of 155m core retrieved. The deeper reservoir unit, Nise 2, is more compacted and cemented by both siderite and quartz. This has led to a significantly reduced permeability compared to the Nise 1 reservoir unit.

From a sedimentological point of view the Nise 1 unit is very similar to the reservoir sandstone encountered in the nearby Hvitveis well. It is a very fine to fine sand, generally showing a very low level of bioturbation (anoxic) and is interpreted to represent lobe and channel fill deposits related to amalgamated turbidites and mass transport complexes. The Nise 2 reservoir sandstone shows common bioturbation (oxic) and is interpreted to represent lobe and sheet facies deposits of high density turbidites.

As age determination of the reservoir unit in the Hvitveis well 6706/6-1 was found to be problematic, two independent biostratigraphic studies were performed on the Marisko well data. Based on cuttings from 2110m MD to TD at 3619m MD, the two studies do however not conclude on a common age determination of the two reservoir units drilled. One contractor considers all samples as Late Cretaceous assemblages, with sporadic Tertiary taxa, while the other contractor refers to a Paleocene assemblage, with some Late Cretaceous taxa. Reservoir age determination in the Marisko well is therefore, so far, enigmatic and inconclusive.

Post-drill geophysics

Only preliminary post-drill geophysical studies have been carried out. Although key geophysical evidence supporting gas in the Marisko prospect is still valid, post-drill fluid substitution indicates the Nise 1 in situ model looks more like the brine saturated case. The Nise 2 in situ model falls more in between the brine and gas cases, Fig. 3.11. The seismic data itself looks more like the gas case, which highlights the difficulty of modeling and measuring low gas saturations.

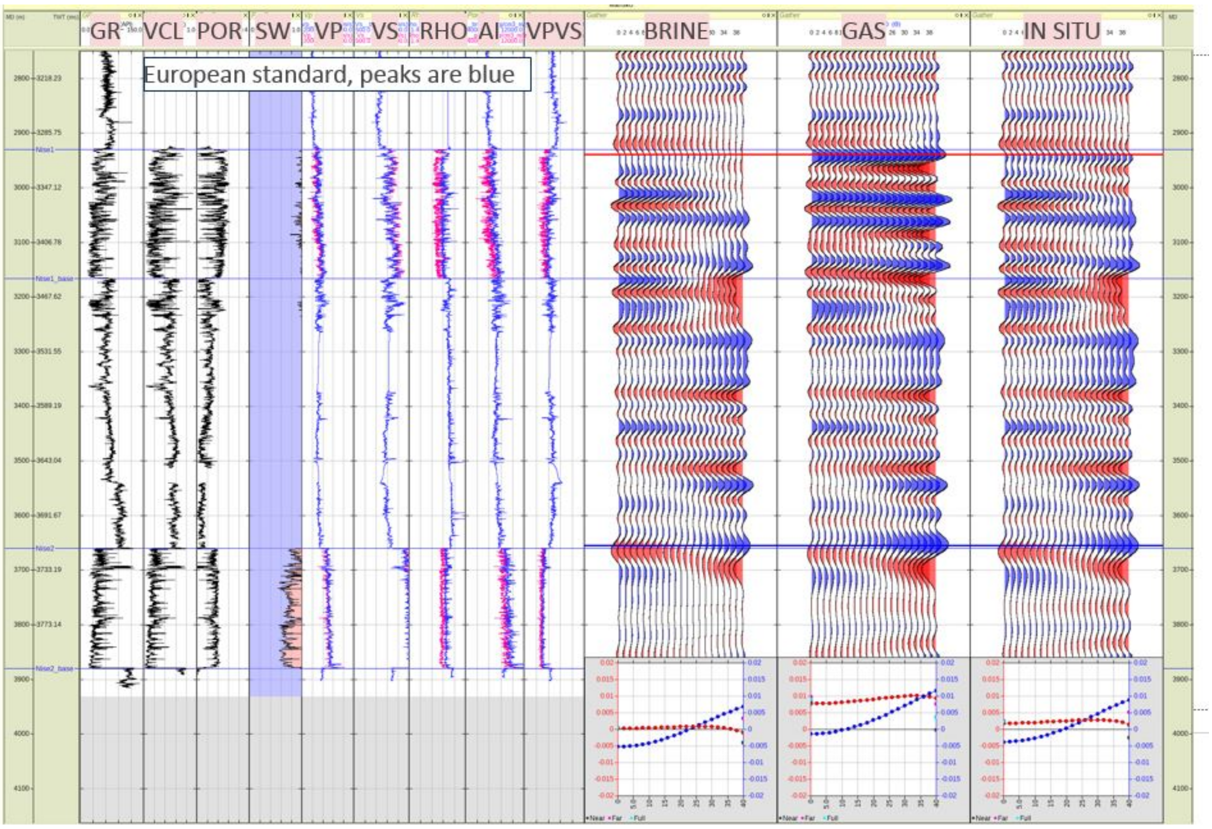


Fig. 3.11 Fluid substitution with AVO on the Marisko reservoirs

Structural study

A structural study with the aim of understanding gas leakage in the Marisko structure was carried out as part of the post well analyses. This study included juxtaposition mapping on the Marisko faults and an assessment of fault re-activation history and critical stress across the license area. Analysis of shallow gas occurrence and sequential 2D restoration of selected traverses were critical elements in the conclusions that all major E-W faults have seen late vertical gas leakage and that gas leakage at Marisko is controlled by stress, not juxtaposition.

Based on the learnings of the Marisko exploration well, a thorough assessment of remaining prospectivity in the license have been completed.

4 Prospect Update report

The 2015 APA license application was based on the 2003 Hvitveis 6706/6-1 discovery as well as three prospects related to major rotated fault blocks in the Upper Cretaceous section north of the Hvitveis discovery Table 4.1 and Fig. 4.1. The Marisko exploration well tested the southernmost of these prospects, which was the prospect carrying the lowest perceived risk.

Table 4.1 Resource potential APA 2015 application

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)						
Hvitveis	D	Gas	0.23	0.96	1.98	18.90	37.70	59.30	1.00	100.0	Nise Fm / Upper Cretaceous	2904	Aasta Hansteen	59
Berber	P	Gas	0.09	0.70	1.60	5.86	27.60	54.60	0.45	71.0	Nise Fm / Upper Cretaceous	2684	Aasta Hansteen	64
Fjordpferd	P	Gas	0.18	1.40	3.19	12.10	55.30	108.00	0.43	79.0	Nise Fm / Upper Cretaceous	2305	Aasta Hansteen	67
Schwarzwaelder	P	Gas	0.09	0.78	1.84	5.54	30.90	64.40	0.41	63.0	Nise Fm / Upper Cretaceous	2302	Aasta Hansteen	71

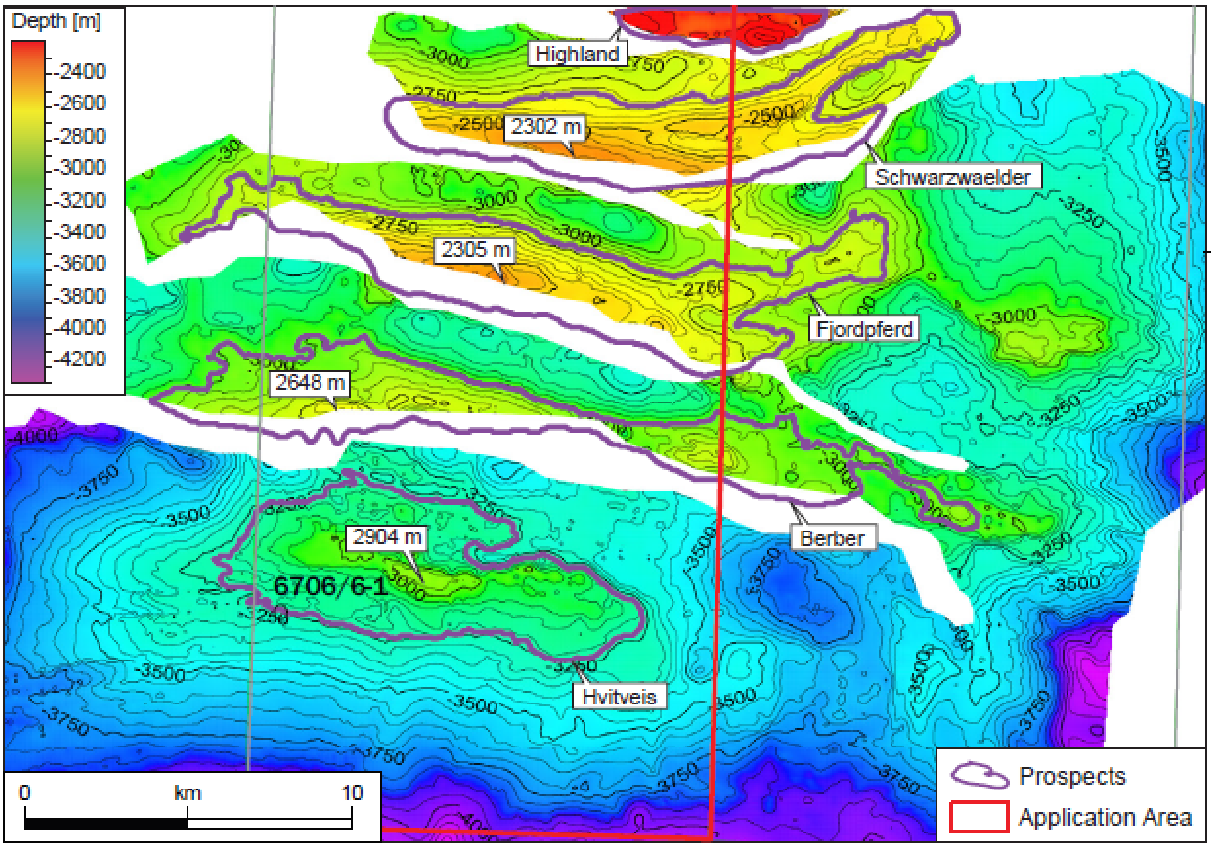


Fig. 4.1 2015 APA license application

Depth structure map showing the Hvitveis discovery and three prospects (here labelled with previous names) related to major rotated fault blocks.

Detailed fault and amplitude work on the 3D seismic data reprocessed by the license group, suggests the Hvitveis discovery consists of a very small gas accumulation trapped by small scale faults (Fig. 4.2) and that the overall Hvitveis 4-way dip structure is unlikely to be HC-filled. Although the Hvitveis structure is not related to any of the major E-W faults which have been demonstrated having undergone late reactivation, the structure has been subject to the same critical stress and shows numerous crestal collapse faults and evidence of shallow gas occurrences (Fig. 4.3). The Hvitveis discovery have therefore been re-assessed to hold an uneconomic volume, nominally less than 20 bcf gas recoverable.

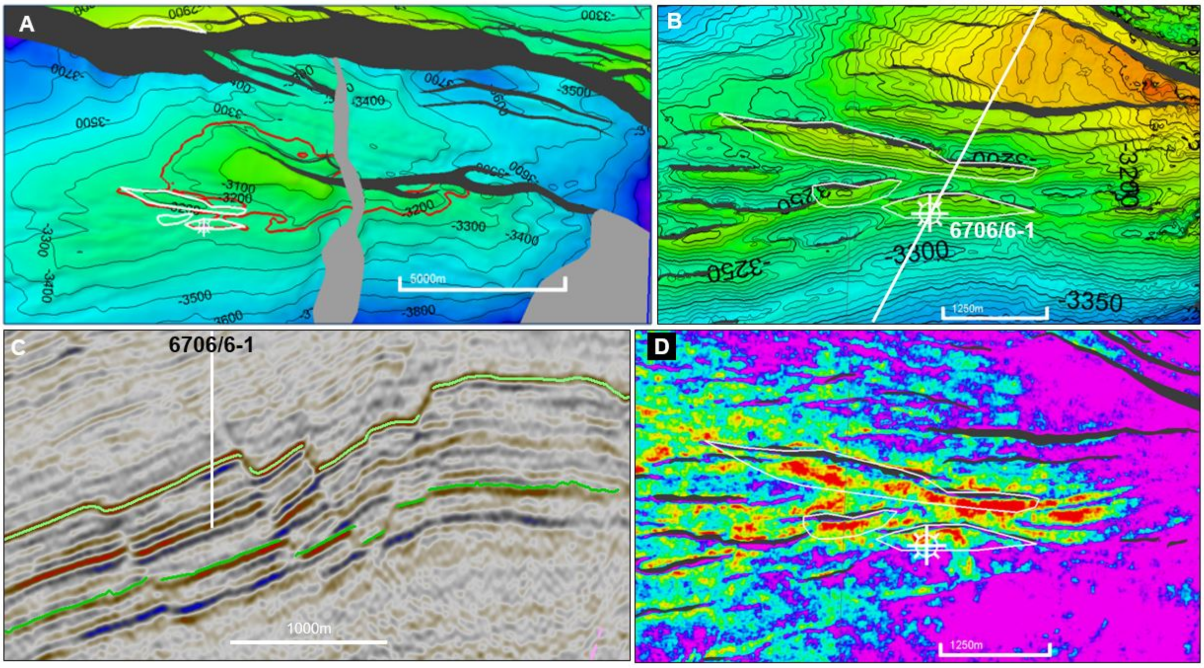


Fig. 4.2 Hvitveis Discovery

A: Depth structure map (CI=100m) of entire Hvitveis structure. Red countour represents depth to encountered GWC. Note N-S oriented dyke (grey polygon) intersecting the structure.

B: Detailed depth structure map (CI=10m) showing small scale faults in vicinity of the Hvitveis well. C: Seismic section through the Hvitveis discovery (trace of section in B) showing small scale faulting and amplitude variations. Light green horizon is top reservoir (Nise 1), dark green horizon is interpreted base reservoir. D: Minimum amplitude (Full stack) map extracted 0-30ms below top reservoir surface.

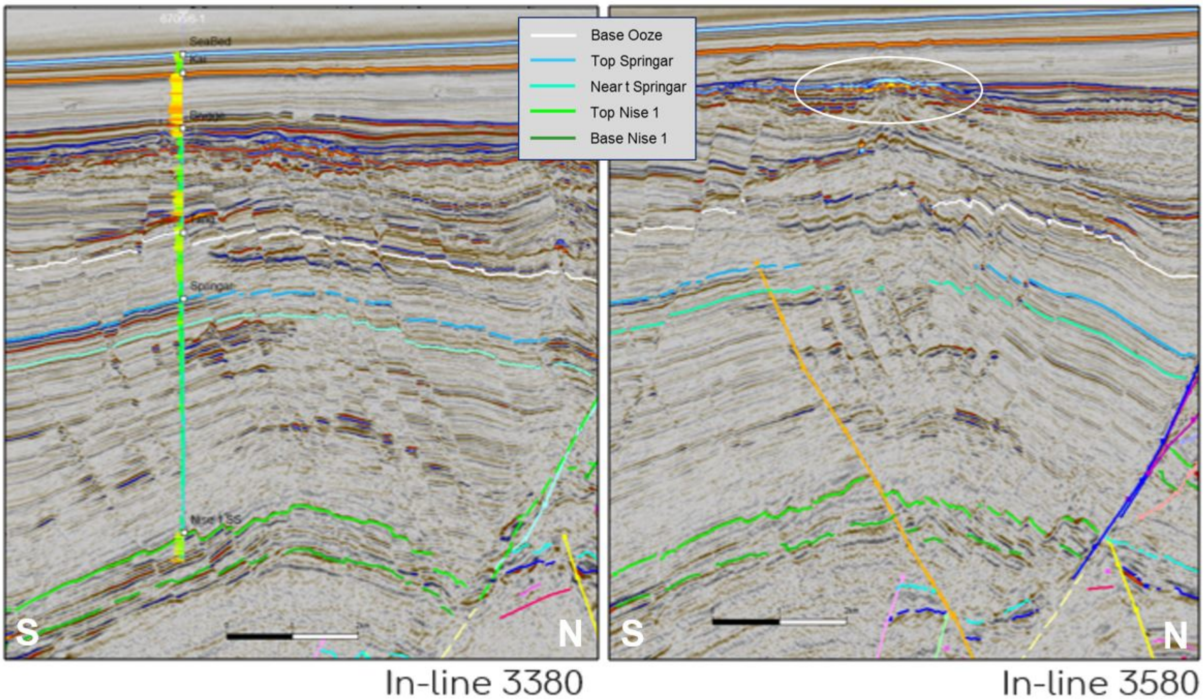


Fig. 4.3 Hvitveis structure and overburden

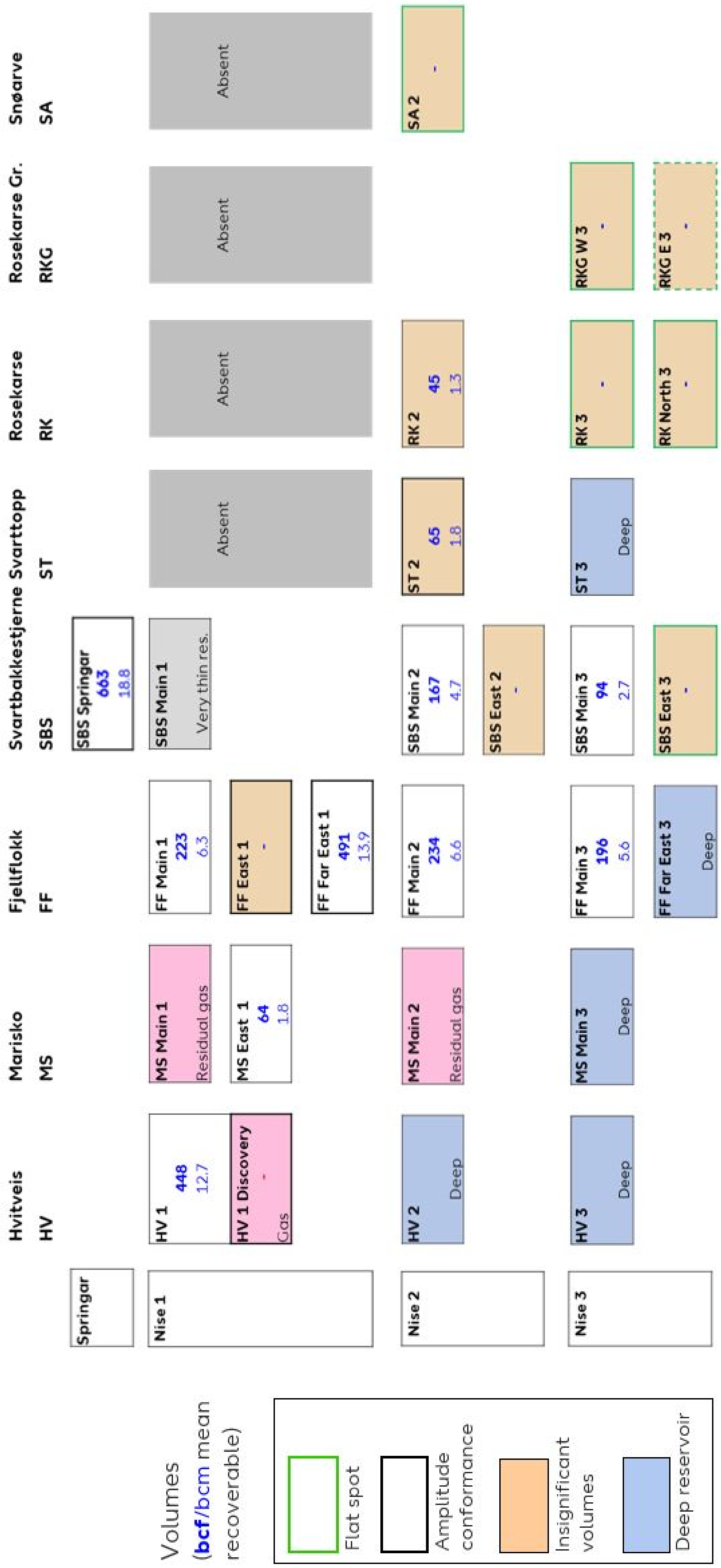
Two seismic lines across the Hvitveis structure. Line through Hvitveis well (left) showing numerous small offset faults and related amplitude anomalies in overburden. Line 2.5km further to the east (right) showing faults related to crestal collapse and indication of gas in shallow overburden (white ellipse).

The negative Marisko well result and subsequent analysis of the cause for failure, has had a severe impact on the remaining prospectivity in the license. As the two remaining prospects, which the license application was based on, are related to structures very similar to the Marisko structure, they have undergone the same critical stress history. Late fault reactivation apparently led to gas leakage along the main bounding faults and the prospects are therefore associated with significant trap effectiveness risk.

After drilling of the Marisko prospect, seismic mapping was carried out with the aim of obtaining a complete overview of remaining prospectivity in the license. Emphasis was put on distinguishing prospects with amplitude conformance to structure from prospects without amplitude support (Table 4.2). This division revealed that all prospects of significant size, related to main E-W oriented faults, do not show amplitude conformance.

Table 4.2 License prospectivity

Overview of mapped prospects with related volumes. Prospects refer to main structures and reservoir unit.



Remaining prospectivity of significance is related to two prospects with amplitude conformance to structure, the **"Fjellflokk Far East 1"** prospect and the **"Svartbakkestjerne Springar"** prospect (Fig. 4.4).

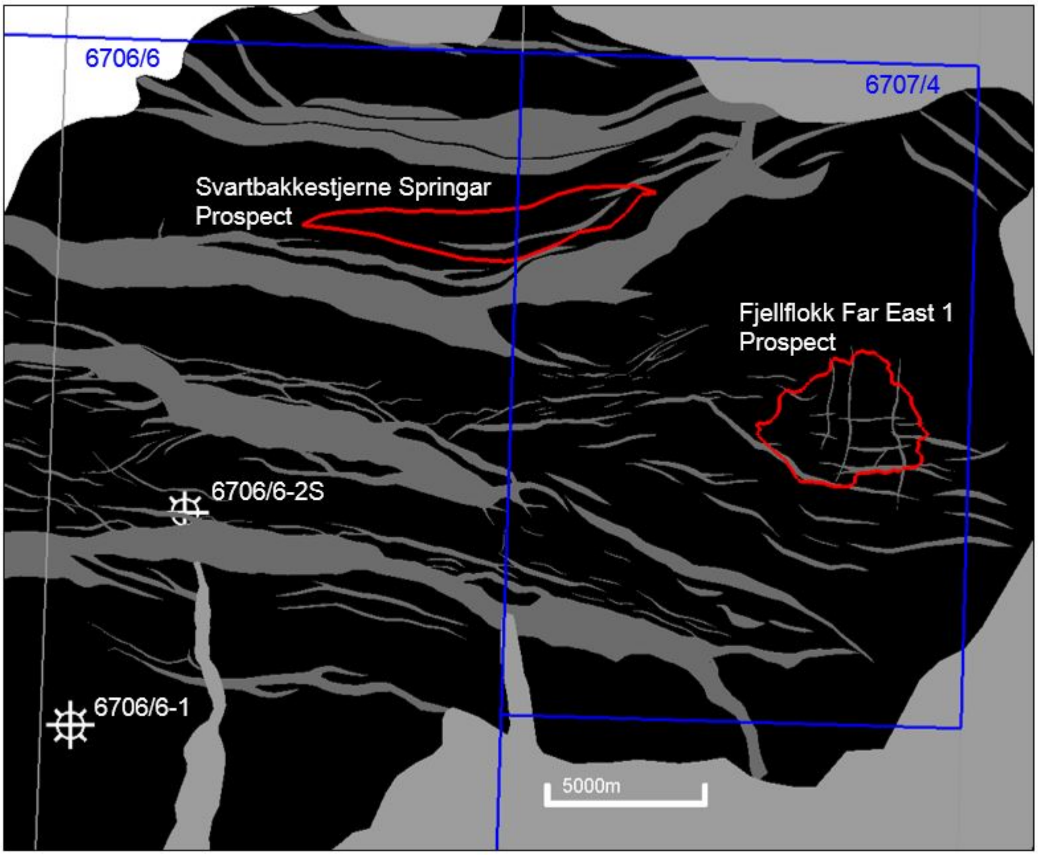


Fig. 4.4 Remaining prospectivity

Remaining prospectivity of significance is related to the Fjellflokk Far East 1 prospect and the Svartbakkestjerne Springar prospect.

4.1 Fjellflokk Far East 1

The Fjellflokk Far East 1 prospect is related to the "Nise 1" sandstone reservoir (Fig. 3.1 & Fig. 3.4) encountered in both the Hvitveis and Marisko wells. Mapping shows this sandstone unit has a northern provenance with an E-W oriented pinch-out line in the license (Fig. 3.5). The trap is a faulted, 4-way dip closure (Fig. 4.5), which was created in response to E-W oriented inversion of a major N-S striking normal fault (Fig. 4.6). The crest of the prospect is at 3020m TVDSS and it spills towards west at 3235m TVDSS. Seismic amplitudes conform relatively well to structure with a switch-off level at approximately 3200m TVDSS, defining an area of 14km^2. The central part of the prospect is characterized by less strong amplitudes (Fig. 4.7). This could be caused by gas escape as well as the presence of converging small-scale fault sets (Fig. 4.8) which seems to reduce seismic image quality locally. Amplitude extractions on far offset data show less dimming of the central prospect area. Although mapping suggests reservoir thickness is 100-120m in the prospect area, about half the thickness (231m) penetrated at the Marisko well, seismic attributes seems to demonstrate the prospect is in a favorably location for reservoir development as visible distributary channels are entering the basin just north of the prospect (Fig. 4.9). Along it’s south-western margin, the prospect is limited by a NW-SE oriented fault segment. This specific fault segment does not show the late reactivation which characterizes most east-west oriented faults. Volumetric assessment of the Fjellflokk Far East

1 prospect shows a mean recoverable volume of 491 bcf gas (Table 4.3). It is believed the only risk element for the prospect is trap effectiveness, related to the risk of gas leakage along faults. This results in a COS for the Fjellflokk Far East 1 prospect of 60%.

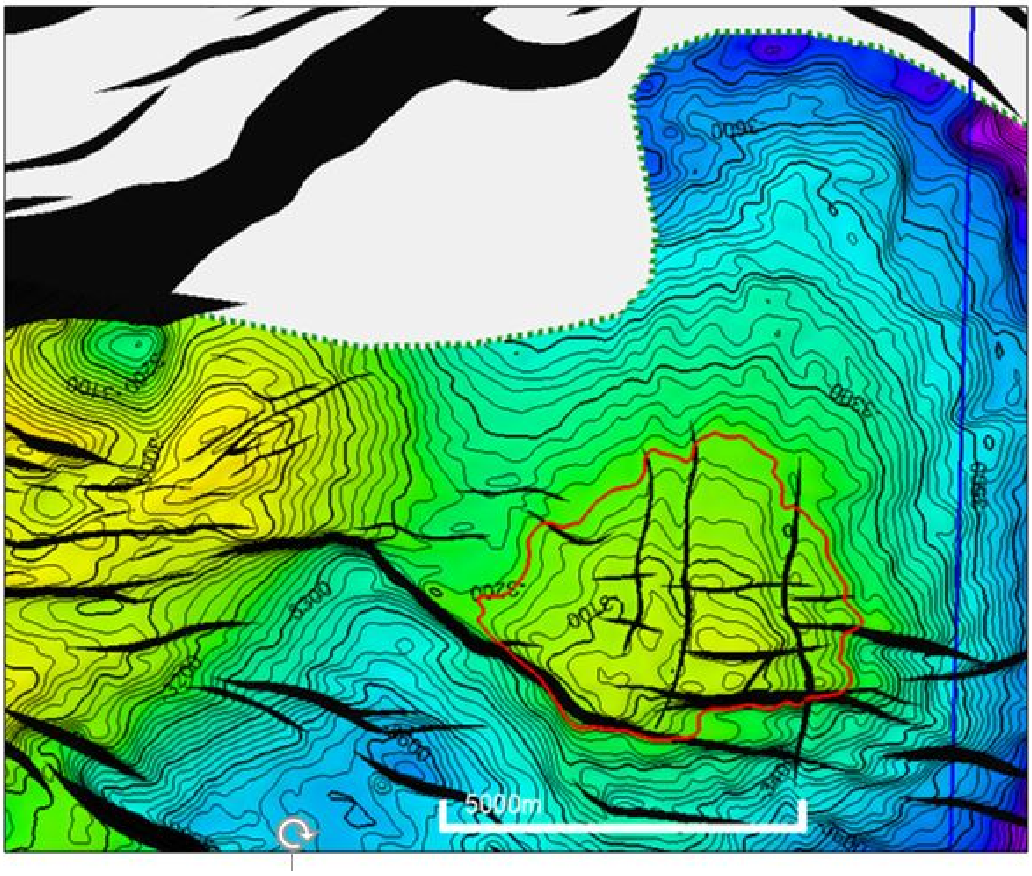


Fig. 4.5 Fjellflokk Far East 1 prospect: trap

Depth structure map of top Nise 1. Contour interval is 20m. Red contour (3200m) marks approximate Level of amplitude switch off.

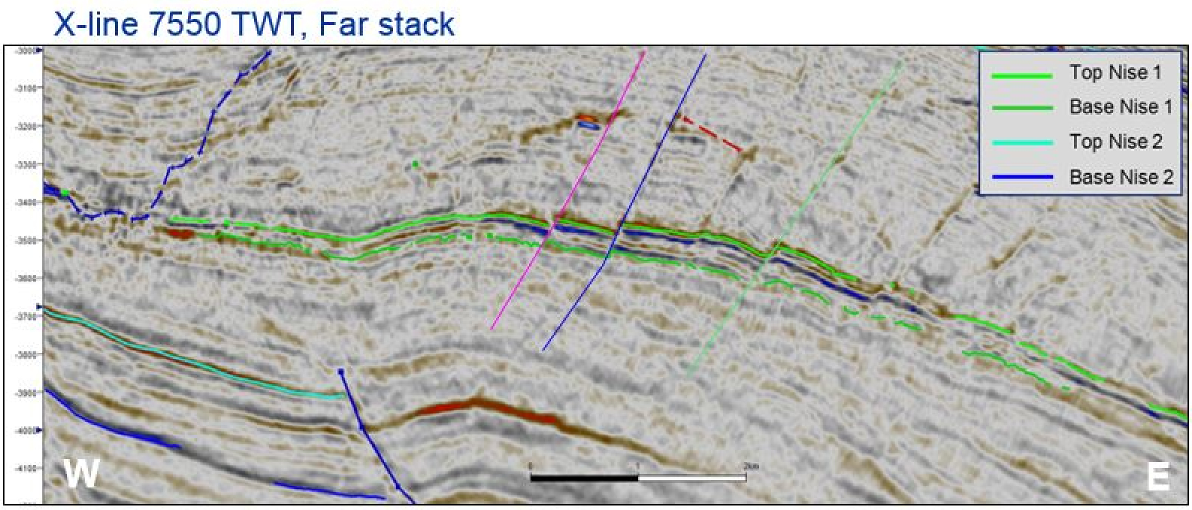


Fig. 4.6 Fjellflokk Far East inversion structure

Fjellflokk Far East structure created by E-W oriented inversion of deep east-dipping fault.

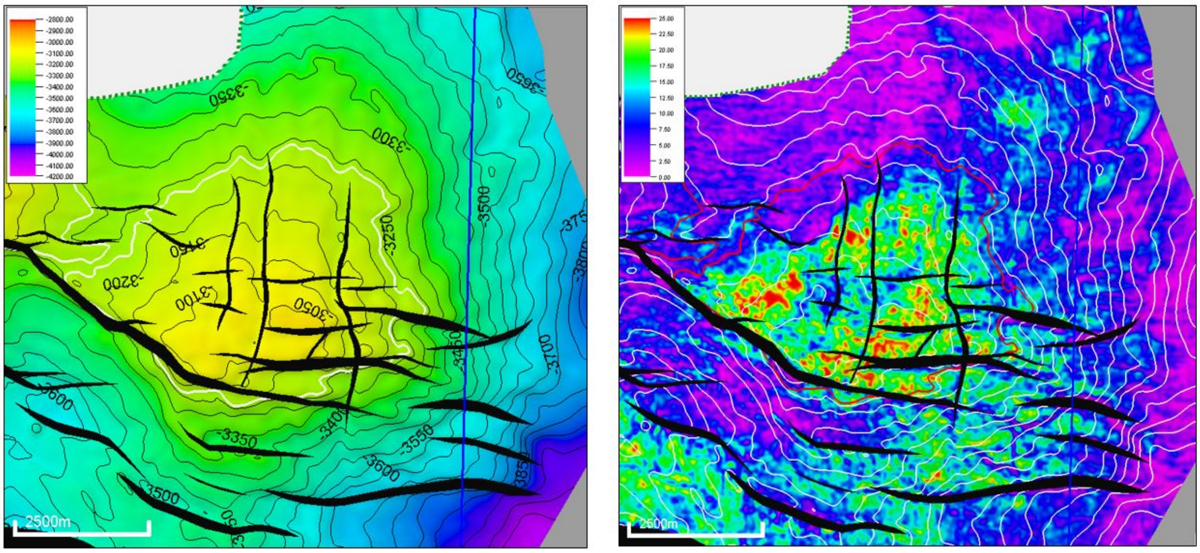


Fig. 4.7 Fjellflokk Far East 1 prospect: amplitude anomaly

Comparison of structure and amplitudes (Far stack max amplitude on top reservoir surface). Overall good amplitude conformance to structure. Some dimming in central part of structure. Contour interval is 50m. Spill point contour (white, left & red, right) is 3235m.

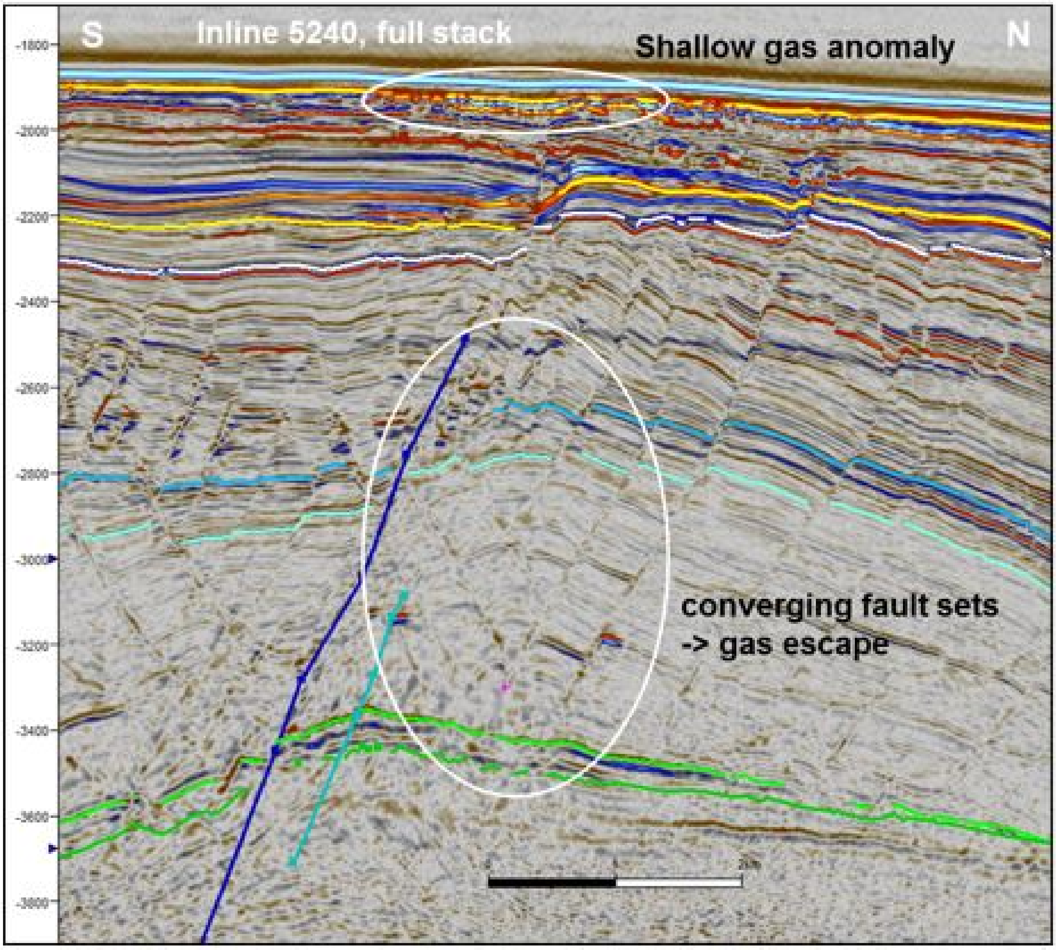


Fig. 4.8 Fjellflokk Far East 1 prospect: overburden complexity

Seismic section through central part of the prospect. Poor imaging locally at top reservoir level potentially caused by gas escape related to converging fault sets. Note late fault activity related to blue fault. This fault cuts the reservoir off the crest.

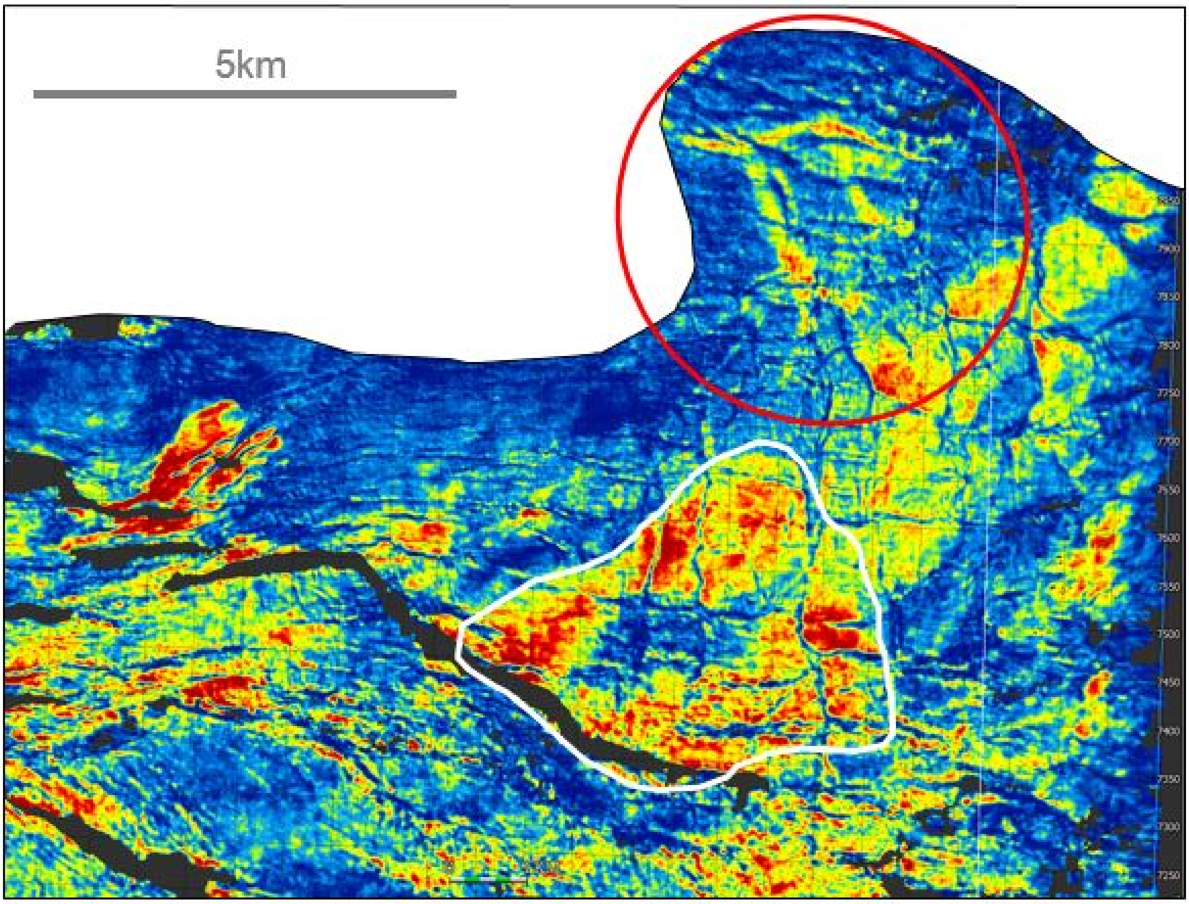


Fig. 4.9 Fjellflokk Far East 1 prospect: reservoir development

Amplitude map (Full stack, sum negative amps) of top reservoir showing distributary channel complex (red circle) just north of prospect (white polygon).

Table 4.3 Fjellflokk Far East 1 prospect data

Block	6707/4	Prospect name	Fjellflok Far East 1	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:	Gas	Reported by company	Wintershall Dea	Reference document				Assessment year	2019
This is case no.:	1 of 1	Structural element	Naglefar Dome	Type of trap	Faulted 4-way clo	Water depth [m MSL] (>0)	1415	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)					0,19	0,25	0,77	1,49
	Gas [10^9 Sm^3] (>0.00)	16,70	24,90	25,70	35,60				
Recoverable resources	Oil [10^6 Sm^3] (>0.00)					0,05	0,10	0,21	0,41
	Gas [10^9 Sm^3] (>0.00)	8,60	12,80	13,90	19,70				
Reservoir Chrono (from)	Campanian	Reservoir litho (from)	Nise Fm	Source Rock, chrono primary	?	Source Rock, litho primary	?	Seal, Chrono	Campanian
Reservoir Chrono (to)	Campanian	Reservoir litho (to)	Nise Fm	Source Rock, chrono secondary	?	Source Rock, litho secondary	?	Seal, Litho	Springar Fm
Probability [fraction]									
Total (oil + gas + oil & gas case) (0.00-1.00)	0,60	Oil case (0.00-1.00)		Gas case (0.00-1.00)	0,60	Oil & Gas case (0.00-1.00)			
Reservoir (P1) (0.00-1.00)	1,00	Trap (P2) (0.00-1.00)	1,00	Charge (P3) (0.00-1.00)	1,00	Retention (P4) (0.00-1.00)	0,60		
Parametres:	Low (P90)	Base	High (P10)	*Comments*					
Depth to top of prospect [m MSL] (> 0)		3020							
Area of closure [km^2] (> 0.0)	11,2	13,9	16,8						
Reservoir thickness [m] (> 0)		120							
HC column in prospect [m] (> 0)	170	180	190						
Gross rock vol. [10^9 m^3] (> 0.000)	1103,000	1366,000	1663,000						
Net / Gross [fraction] (0.00-1.00)	0,60	0,77	1,00						
Porosity [fraction] (0.00-1.00)	0,11	0,18	0,25						
Permeability [mD] (> 0.0)									
Water Saturation [fraction] (0.00-1.00)	0,15	0,28	0,50						
Bg [Rm3/Sm3] (< 1.0000)	0,0033	0,0037	0,0038						
1/Bo [Sm3/Rm3] (< 1.00)									
GOR, free gas [Sm^3/Sm^3] (> 0)	185000	55000	18000						
GOR, oil [Sm^3/Sm^3] (> 0)									
Recov. factor, oil main phase [fraction] (0.00-1.00)									
Recov. factor, gas ass. phase [fraction] (0.00-1.00)									
Recov. factor, gas main phase [fraction] (0.00-1.00)	0,35	0,55	0,70						
Recov. factor, liquid ass. phase [fraction] (0.00-1.00)	0,18	0,28	0,35	For NPD use:					
Temperature, top res [°C] (>0)				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)				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.	2.	3.					Kart nr	NPD will insert value

4.2 Svartbakkestjerne Springar

The Svartbakkestjerne Springar prospect is located on the Svartbakkestjerne structure (Fig. 4.10). It consists of a series of stacked amplitude anomalies in the uppermost part of the Springar Fm (Fig. 4.11). These anomalies show very high reflection strengths, overall conformance to structure and cover areas of 10-15km^2. The reflection pattern suggests presence of a series of thin sands separated by shales. Based on seismic velocities and frequencies, individual sands could be only 20m thick, and seismic tuning is likely to play a role in the amplitude pattern seen.

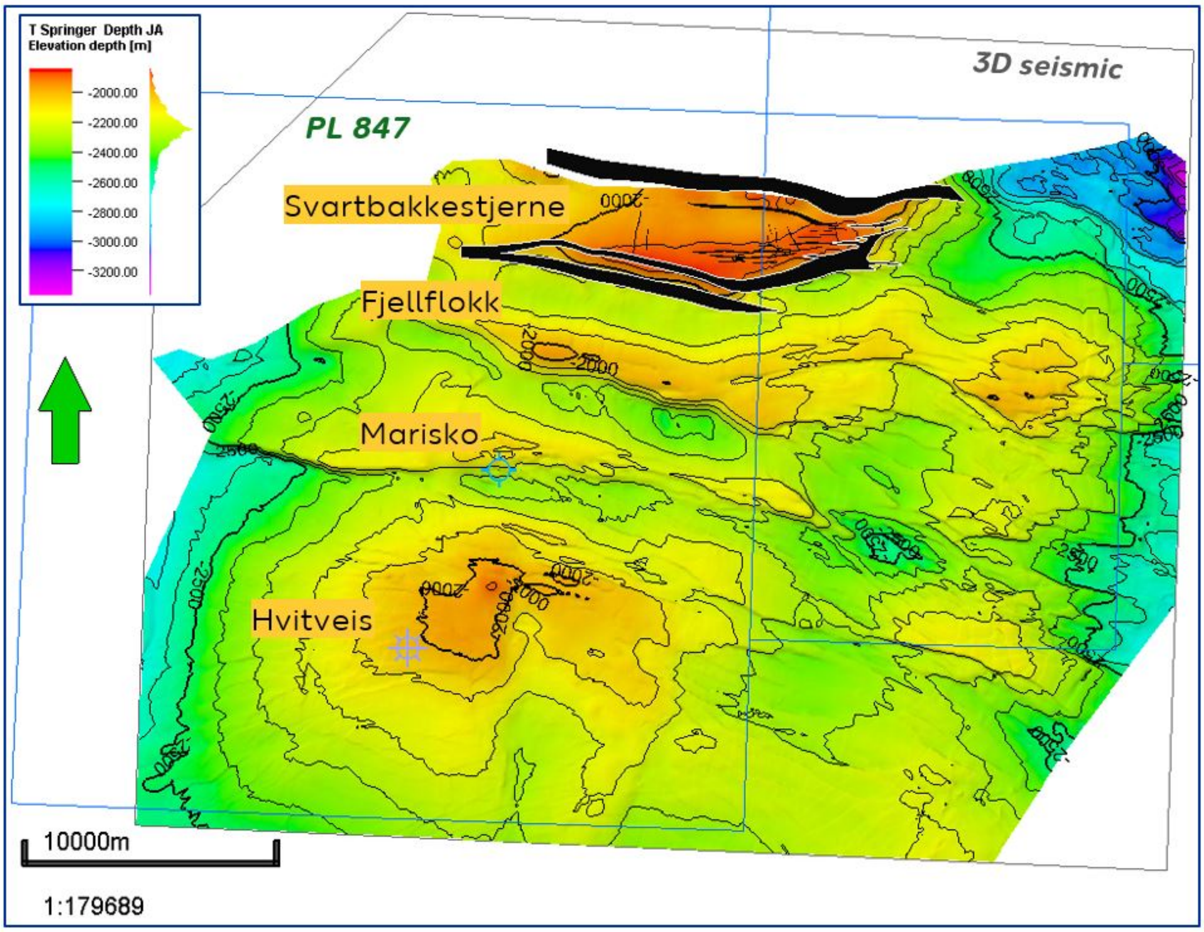


Fig. 4.10 Svartbakkestjerne location map

Top Springar Fm depth structure map with the Svartbakkestjerne structure in the north. Contour interval is 100m.

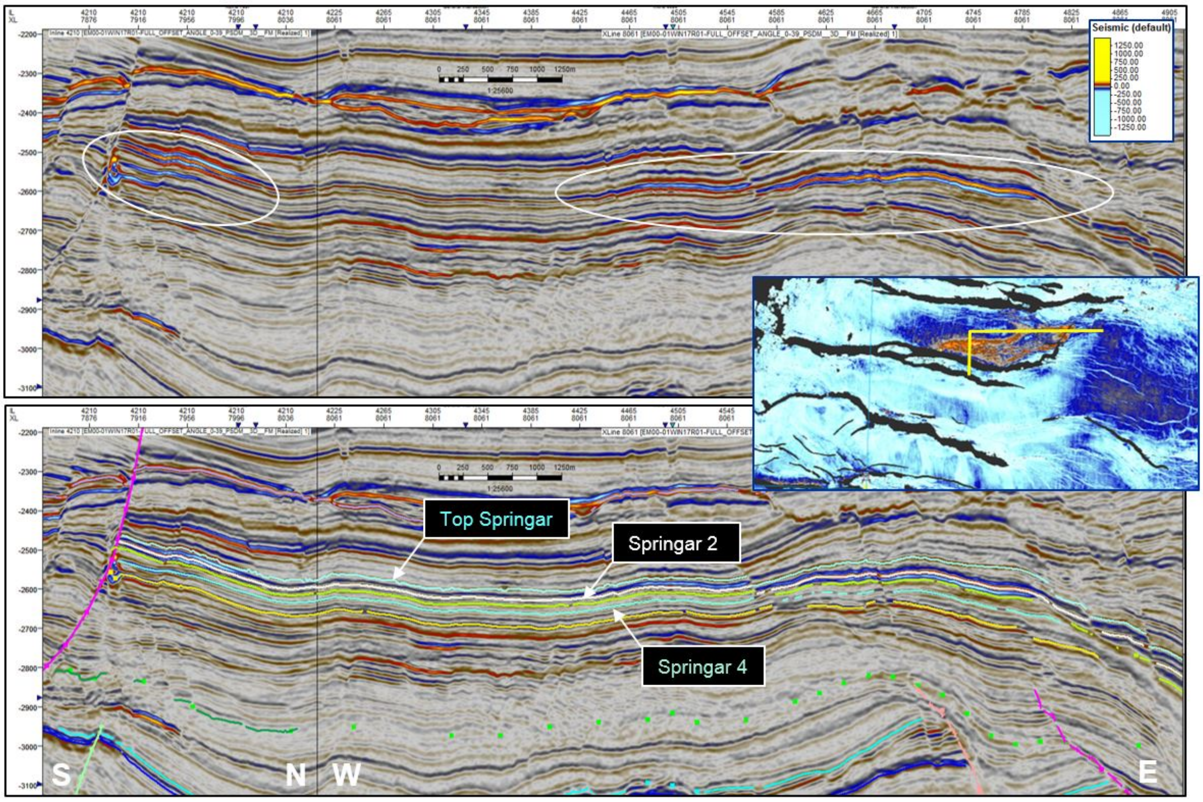


Fig. 4.11 Svartbakkestjerne Springar prospect: seismic definition

Composite seismic line (In-line 4210 & X-line 8061), uninterpreted (top) and interpreted (bottom), showing uppermost Springar Fm section amplitude anomalies (white ellipses) and surfaces included in the prospect. Index map is top Springar RMS attribute.

On seismic, top reservoirs are represented by a decrease in acoustic impedance (positive red peak), however, amplitude conformance to structure can be seen on both positive and negative reflections. Three individual reservoirs units, Springar 1 (top Springar), 2 and 4, have been mapped (Fig. 4.12, Fig. 4.13 & Fig. 4.14) and constitute the Svartbakkestjerne Springar prospect. The lower reservoir unit is mapped on an assumed base reservoir reflector (negative blue trough) for interpretation reasons.

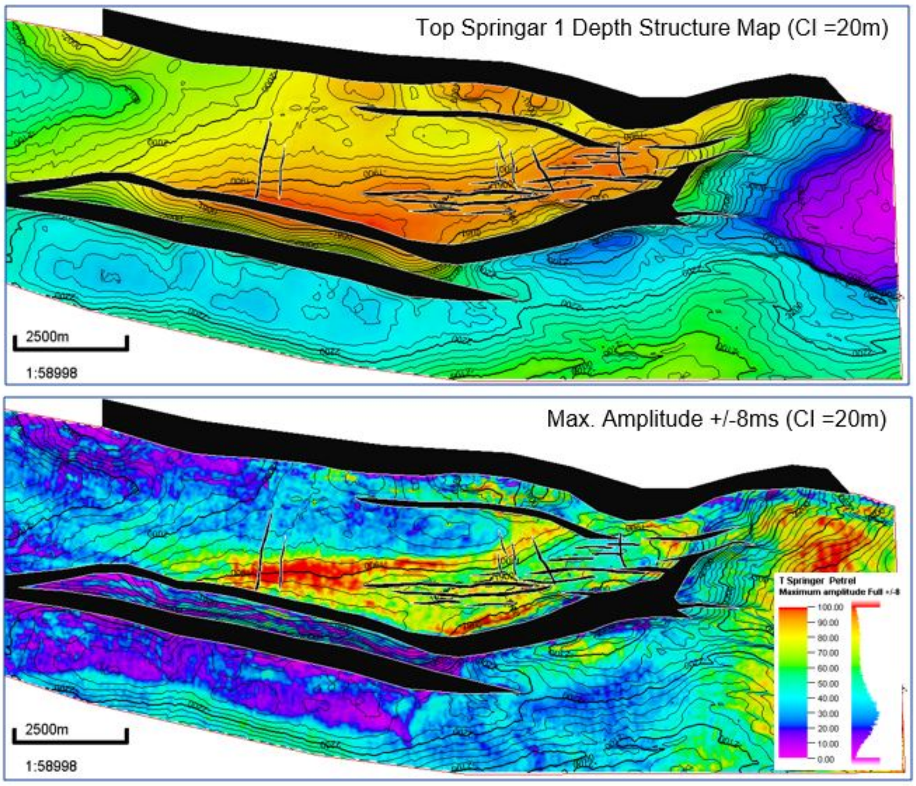


Fig. 4.12 Svartbakkestjerne Springar 1

Depth structure map of Springar 1 (Top Springar) reservoir unit (top) and max amplitude map of surface (bottom). Contour interval is 20m.

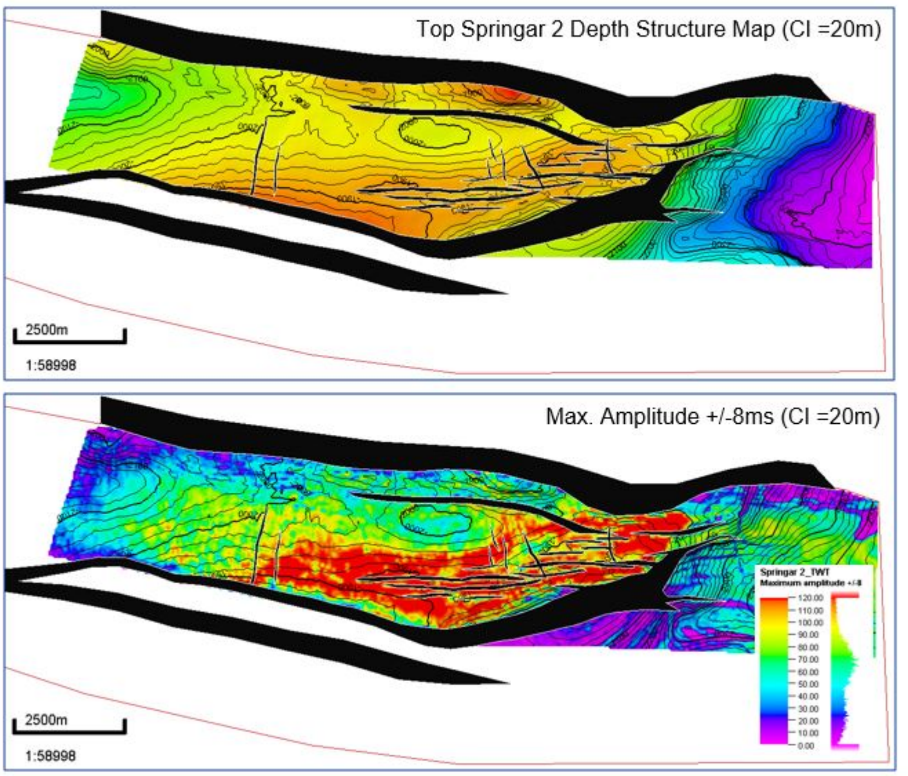


Fig. 4.13 Svartbakkestjerne Springar 2

Depth structure map of Springar 2 reservoir unit (top) and max amplitude map of surface (bottom). Contour interval is 20m.

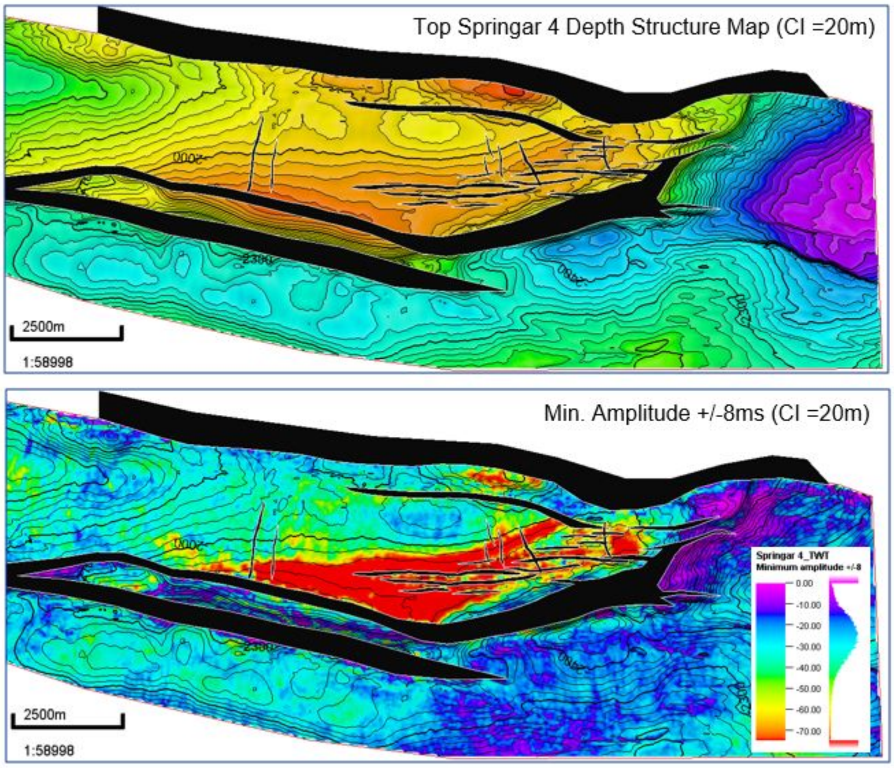


Fig. 4.14 Svartbakkestjerne Springar 4

Depth structure map of Springar 4 reservoir unit (top) and minimum amplitude map of surface (bottom). Contour interval is 20m.

All three reservoir units show an area of relative dimming in the eastern part of the structure, possibly related to small-scale faulting, however, for the upper unit, Springar 1, this dimming is quite pronounced.

The depth to the crest of the uppermost reservoir is 1840m and the mean potential column heights for each reservoir unit are 100-140m.

The Svartbakkestjerne Springar prospect is structurally a 3-way closure against a major E-W oriented fault in the south. This fault is secondary to, and joining, a parallel fault at depth (Fig. 4.15), which seems to have taken up most of the late reactivation previously discussed as a cause for gas leakage. This structural situation could therefore have protected the Svartbakkestjerne Springar prospect from late gas leakage.

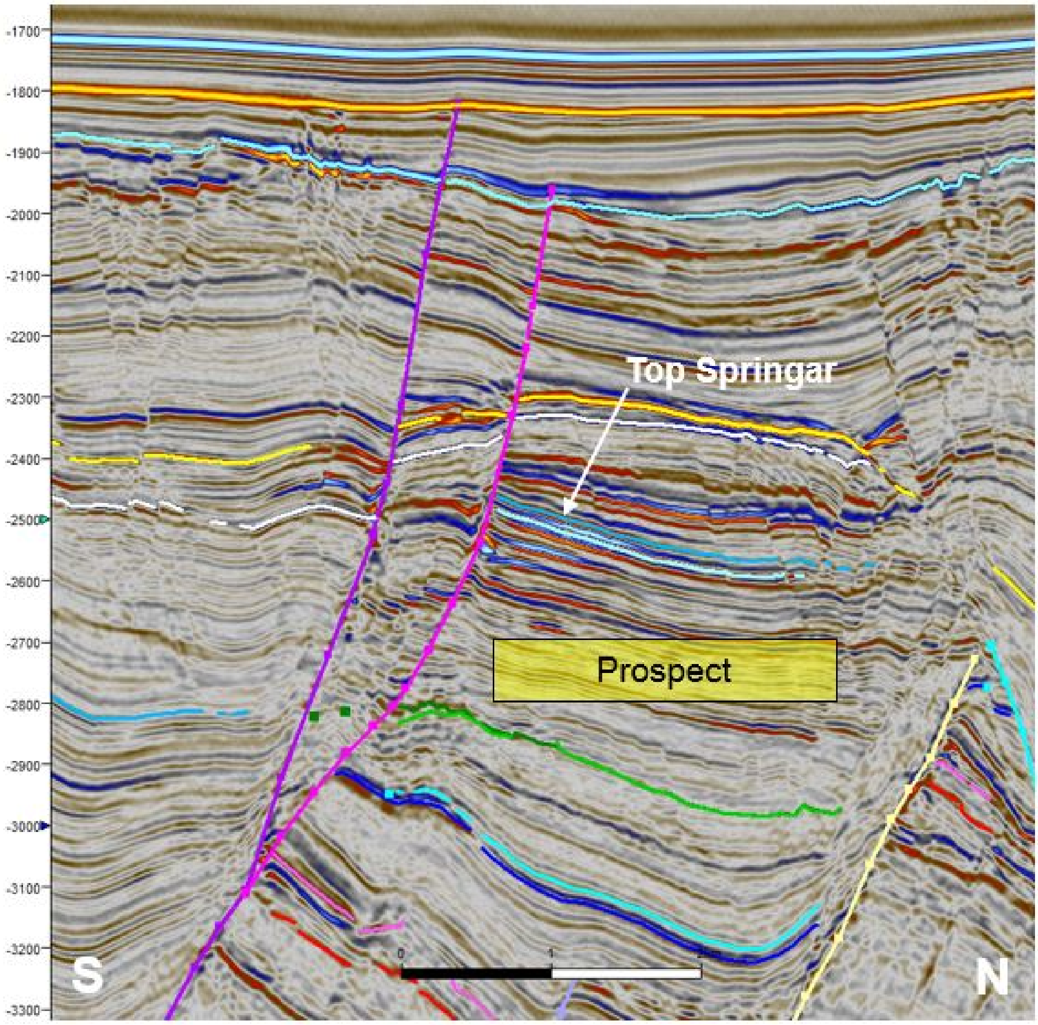


Fig. 4.15 Svartbakkestjerne Springar prospect: relation to main faults

Seismic In-line 4120 showing the main bounding fault (pink) delimiting the prospect towards south. This fault is secondary to the purple fault which seems to have taken up late reactivation.

Volumetric assessment of the prospect shows a total of 663bcf recoverable gas. This value is the sum of mean values for all three conformable reservoir units. Prospect data for one of the reservoir units (Springar 1) is shown in Table 4.4. Each reservoir unit has an estimated COS of 42%. Risk elements are thought to be trap effectiveness (0.6) and reservoir presence (0.7).

Table 4.4 Svartbakkestjerne Springar 1 prospect data

Table 5: Prospect data (Enclose map)

Block	6706/6 & 6707/4	Prospect name	Svartbakkestjerne	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:	Gas	Reported by company	Wintershall Dea	Reference document				Assessment year	2019
This is case no.:	1 of 1	Structural element	Naglefar Dome	Type of trap	3-way closure ag	Water depth [m MSL] (>0)	1300	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)					0,57	1,32	2,45	4,87
	Gas [10^9 Sm^3] (>0.00)	8,86	11,50	13,00	17,80				
Recoverable resources	Oil [10^6 Sm^3] (>0.00)					0,15	0,47	0,66	1,33
	Gas [10^9 Sm^3] (>0.00)	4,59	6,64	7,06	10,10				
Reservoir Chrono (from)	Maastrichtian	Reservoir litho (from)	Springar Fm	Source Rock, chrono primary	?	Source Rock, litho primary	?	Seal, Chrono	Paleocene
Reservoir Chrono (to)	Maastrichtian	Reservoir litho (to)	Springar Fm	Source Rock, chrono secondary	?	Source Rock, litho secondary	?	Seal, Litho	Tang Fm
Probability [fraction]									
Total (oil + gas + oil & gas case) (0.00-1.00)	0,42	Oil case (0.00-1.00)		Gas case (0.00-1.00)	0,42	Oil & Gas case (0.00-1.00)			
Reservoir (P1) (0.00-1.00)	0,70	Trap (P2) (0.00-1.00)	1,00	Charge (P3) (0.00-1.00)	1,00	Retention (P4) (0.00-1.00)	0,60		
Parametres:	Low (P90)	Base	High (P10)	*This prospect segment is one reservoir unit (Springar 1) of three similar reservoir units constituting the overall Svartbakkestjerne Springar prospect*					
Depth to top of prospect [m MSL] (> 0)		1840							
Area of closure [km^2] (> 0.0)	12,4	15,6	19,0						
Reservoir thickness [m] (> 0)	18	21	25						
HC column in prospect [m] (> 0)	100	105	110						
Gross rock vol. [10^9 m^3] (> 0.000)	474,000	638,000	826,000						
Net / Gross [fraction] (0.00-1.00)	0,85	0,90	0,95						
Porosity [fraction] (0.00-1.00)	0,23	0,27	0,32						
Permeability [mD] (> 0.0)									
Water Saturation [fraction] (0.00-1.00)	0,25	0,30	0,35						
Bg [Rm3/Sm3] (< 1.0000)	0,0038	0,0044	0,0051						
1/Bo [Sm3/Rm3] (< 1.00)									
GOR, free gas [Sm^3/Sm^3] (> 0)	17860	38460	185000						
GOR, oil [Sm^3/Sm^3] (> 0)									
Recov. factor, oil main phase [fraction] (0.00-1.00)									
Recov. factor, gas ass. phase [fraction] (0.00-1.00)									
Recov. factor, gas main phase [fraction] (0.00-1.00)	0,35	0,55	0,70						
Recov. factor, liquid ass. phase [fraction] (0.00-1.00)	0,18	0,28	0,35	For NPD use:					
Temperature, top res [°C] (>0)				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)				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.	2.	3.					Kart nr	NPD will insert value

5 Technical evaluations

Based on reprocessed seismic data, representing a significant quality uplift, the 2003 Hvitveis discovery has been re-evaluated and the Marisko well 6706/6-2S has been drilled. The disappointing result of the Marisko well suggests insufficient gas retention over time is the main cause for failure. As several prospects in the license share the same critical stress history as the drilled Marisko prospect, these are now associated with significant risk and the overall exploration potential in the license is downgraded.

Remaining prospectivity is thought to be related to mainly two prospects, the **Fjellflokk Far East 1** and the **Svartbakkestjerne Springar**. These prospects show amplitude conformance to structure and has a current volume estimate of 491 and 663 bcf recoverable gas respectively.

6 Conclusions

As a result of work conducted in the license, including drilling of the Marisko well, the remaining prospectivity is currently not seen as economically viable. All work commitments are completed in the license. The operator proposed to apply for a one year extension of the BOK milestone to further study the Marisko well and core data. This was not supported by a majority of partners in the license.

The license decision is to drop the license at the BOK milestone.