TOTAL E&P NORGE AS

Konfidensielt – Unntatt offentlighet

Oljedirektoratet
v/ Ronni Moi
Postboks 600
4003 Stavanger

Deres dato:	Deres ref.:	Vår ref.:	Vår dato:
		1077817	Stavanger, 26. august 2016

Vedrørende utvinningstillatelse nr. 710

Det refereres til utvinningstillatelse nr. 710 tildelt den 21. juni 2013 i forbindelse med 22. konsesjonsrunde. Som vist til i brev fra Olje- og energidepartementet datert 30. juni bortfalt utvinningstillatelsen i sin helhet den 21. juni 2016, jf. utvinningstillatelsens punkt 4 b), fjerde avsnitt.

Interessentskapet har bestått av:

TOTAL E&P NORGE AS	40%
ENGIE E&P Norge AS	20%
Maersk Oil Norway AS	20%
Tullow Oil Norge AS	20%

I medhold av utvinningstillatelsen punkt 4 h) oversendes statusrapport til Oljedirektoratet, vedlagt. Med dette anses myndighetsforpliktelser for rettighetshaverne i utvinningstillatelse nr. 710 å være oppfylt i sin helhet.

Dersom det skulle være behov for ytterligere opplysninger, ber jeg om at det tas kontakt med [redacted] varaformann i styringskomiteen.

Vennlig hilsen
TOTAL E&P NORGE AS
[redacted]

Vedlegg: PL710 relinquisment report

Postadresse:			Besøksadresse:	Telefon:	Telefaks:	E-post:	Foretaksnr.:
Hovedkontor	Postboks 168	4001 Stavanger	Finnestadv. 44, Dusavik	51 50 30 00	51 72 66 66	firmapost@ep.total.no	NO 927 066 440 MVA
Oslo-kontor	Postboks 1361	Vika 0113 Oslo	Haakon VIIs gt. 1	22 01 95 00	22 01 95 99	Web:	
Harstad-kontor	Postboks 63	9481 Harstad	Torvet 2	77 28 21 50	51 72 66 66	total.no	

TOTAL E&P NORGE AS

PL710 Relinquishment Report

26.08.2016

1. KEY LICENSE HISTORY

PL710 was awarded June 21, 2013 as part of the 22nd licensing round to: Total E&P Norge (40%, operator), ENGIE E&P Norge (20%), Tullow Oil Norge (20%), and Maersk Oil Norway (20%).

The first license commitment was to purchase 3D seismic in PL710 area which is already covered by 3D seismic, to evaluate to acquire/collect geophysical data and a Drill or Drop decision by June 21, 2016.

The work commitment has been fulfilled by licensing parts of the WesternGeco seismic; WG0901, WG1001 and WG1002. The total area of the common 3D seismic data area is about 1300 Km^2, which covers the license area. An OBN pilot was evaluated by the partnership spring 2014, but not decided the license to be pursued.

It was agreed to drop the license in the MC meeting May 25, 2016 and confirmed unanimous in the license through the partner resolution dated June 6, 2016.

A relinquishment notification letter to authorities sent to the Ministry June20, 2016.

Overview of license meetings:

Date	Meeting		
	MC#	EC#	WM#
05.09.2013	1		
04.11.2013			1
17.12.2013	2	1	
26.03.2014			2
10.06.2014	3	2	
03.12.2014	4	3	
10.06.2015	5	4	
27.10.2015	6	5	
26.11.2015			3
03.03.2016			4
25.05.2016	7		

2. DATABASE

The common license database, agreed by the license partners, consists of 2D and 3D seismic data, and well data. The common license database is itemized in Figure 1. Wells drilled nearby were added to the database as soon as possible, notably 7218/8-1 and 7219/8-2.

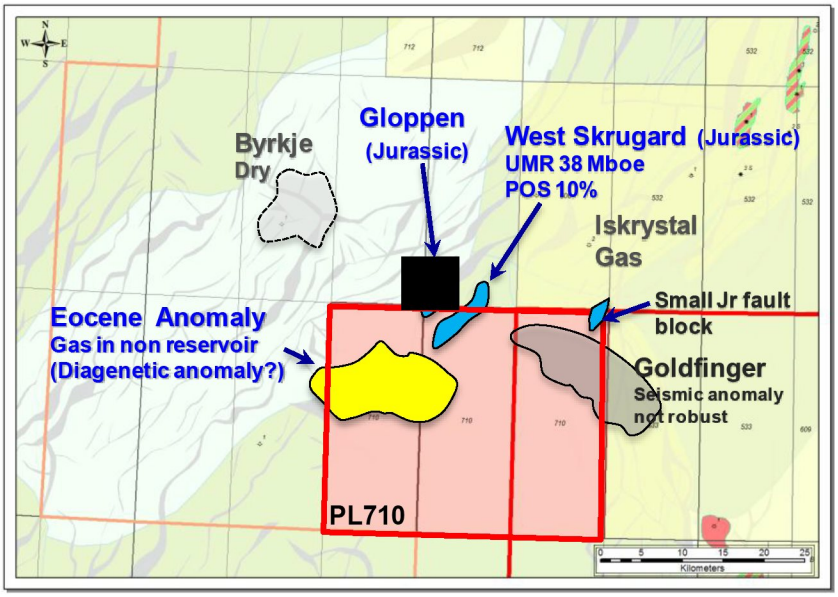
Due to very poor imaging of the Jurassic and Triassic levels around the West Skrugard prospect, various options were considered. Reprocessing of existing data was considered to deliver suboptimal results due to short offsets and inferior illumination in the existing legacy data. Regarding seismic acquisition, benchmarking and illumination studies for NAZ, WAZ, Coil, OBN and OBS/OBC data proved that the West Skrugard structure suffered from illumination problems for most acquisition schemes. The uplift from the PS-wave solutions was not as significant as initially expected and a long offset P-wave acquisition with coil geometry seemed preferable. By early 2015 the operator had downgraded West Skrugard based on the revised structural interpretation.

3. REVIEW OF GEOLOGICAL FRAMEWORK

The identified prospectivity at the outset of the license from the partner companies was presented at the first MC meeting. Key prospectivity was identified at Middle Jurassic (West Skrugard prospect), base Tertiary (Goldfinger prospect), and Eocene (shallow Eocene leads).

The license area is affected by strong extension, focused on the western fault panels of the Loppa High, which extends slightly into the NE corner of PL710, and the Veslemøy High, the location of the West Skrugard prospect. The Veslemøy High itself, on new seismic interpretation, resembles a core complex with very significant throw and significant footwall uplift.

A basin model study performed for the license concluded that the maturation of and expulsion from Upper Jurassic and (less important) Lower Cretaceous source intervals commenced in Cretaceous times in the surrounding kitchen areas, while late-mature U Jurassic source is still possible on the High.



4. PROSPECT UPDATE

West Skrugard prospect

The West Skrugard prospect is part of the large West Skrugard / Gloppen tilted fault block (the overall structure of the Veslemøy High), which straddles PL710 and the now-relinquished PL607.

The imaging of the structure, particularly in PL710 area, is strongly obscured by shallow gas anomalies in Eocene strata. Options to image the structure better were studied, focusing on a potential OBN seismic acquisition. This option was never in the end pursued by the license.

The operator conducted structural studies to better understand the poorly-imaged, complex structure, and using the PSDM reprocessing from PL607 (where ENGIE was the operator and Total partner). The Cretaceous section of the Veslemøy High is very sheared, comprising many faults that root into the master shear zone on the NW part of the structure, and were rotated on subsequent uplift. Continuity of the footwall Triassic reflectors seen on the PSDM indicate that the section is relatively unfaulted, and that unfortunately the Jurassic reservoir section is structurally removed by the shear zones in all but the rear fault block in West Skrugard.

Additional control on reservoir parameters was provided by the result of the 7219/8-2 Iskrystal well. The offset well reservoir parameters, when plotted and corrected for uplift, indicate poorer reservoir characteristics at West Skrugard Jurassic than initially predicted, with consequent downgrade of recovery factors.

Seismic mapping show that West Skrugard has similar Cretaceous isopach as the deep, high-pressure offset well 7219/8-1 (interpreted as a top seal hydrofracture failure, as fluid inclusions indicate the structure was charged). The West Skrugard-Gloppen structure, being at the high point of a likely HPHT pressure cell (from analogy with the Kristin area of mid-Norway) indicate a very high top seal risk, and limited columns in a success case.

In summary, West Skrugard was downgraded to a lead due to:

- High reservoir presence risk from structural interpretation
- Downgraded reservoir parameters based on offset well data
- High seal risk since pressure expected to be near the fracture gradient
- Reduction of prospect volumes by an order of magnitude (38 Mboe mean; Figure 2).

Table 5: Prospect data (Enclose map)

Block	7219/10	Prospect name	West Skrugard	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	Total E&P Norge	Reference document	PL710 relinquishment report to NPD			Assessment year	2015
This is case no.:		Structural element	Veslemøy High	Type of trap	Structural	Water depth [m MSL] (>0)	350	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)					2,90	5,20	8,30	15,00
	Gas [10^9 Sm^3] (>0.00)	3,00	5,50	8,70	15,60				
Recoverable resources	Oil [10^6 Sm^3] (>0.00)					0,80	1,40	2,50	4,60
	Gas [10^9 Sm^3] (>0.00)	1,20	2,20	3,60	6,60				
Reservoir Chrono (from)	Middle Jurassic	Reservoir litho (from)	Stø Fm	Source Rock, chrono primary	Upper Jurassic	Source Rock, litho primary	Hekkingen Fm	Seal, Chrono	L. Cret
Reservoir Chrono (to)	Middle Jurassic	Reservoir litho (to)	Tubåen Fm	Source Rock, chrono secondary	Upper Jurassic	Source Rock, litho secondary		Seal, Litho	Knurr/Kolmule
Probability [fraction]									
Total (oil + gas + oil & gas case) (0.00-1.00)	0,10	Oil case (0.00-1.00)		Gas case (0.00-1.00)		Oil & Gas case (0.00-1.00)			
Reservoir (P1) (0.00-1.00)	0,63	Trap (P2) (0.00-1.00)	0,50	Charge (P3) (0.00-1.00)	0,80	Retention (P4) (0.00-1.00)	0,40		
Parametres:	Low (P90)	Base	High (P10)	*Fluid is modeled as a wet-gas.*					
Depth to top of prospect [m MSL] (> 0)		3500							
Area of closure [km^2] (> 0.0)	3,5	6,5	9,9						
Reservoir thickness [m] (> 0)		350							
HC column in prospect [m] (> 0)	150	300	650						
Gross rock vol. [10^6 m^3] (> 0.000)	5,500	6,400	6,900						
Net / Gross [fraction] (0.00-1.00)	0,35	0,48	0,63						
Porosity [fraction] (0.00-1.00)	0,07	0,09	0,14						
Permeability [mD] (> 0.0)	0,1	1,0	10,0						
Water Saturation [fraction] (0.00-1.00)	0,25	0,30	0,35						
Bg [Rm3/Sm3] (< 1.0000)		0,0032							
1/Bo [Sm3/Rm3] (< 1.00)									
GOR, free gas [Sm^3/Sm^3] (> 0)		1200							
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)	0,30	0,40	0,55						
Recov. factor, liquid ass. phase [fraction] (0.00-1.00)	0,20	0,30	0,40	For NPD use:					
Temperature, top res [°C] (>0)	125			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)	550			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. Porosity >0.7	2. Vshale <0.4	3. Shc >0.5					Kart nr	NPD will insert value

Goldfinger

An interesting, potentially sandy wedge was observed on 2D seismic data at the base Tertiary level, with a downdip flat event indicating a potential gas-water contact (Maersk-Tullow presentation at MC meeting #1).

This prospect was studied in the course of the license work with the following conclusions:

- The potential flat-spot is not flat on 3D seismic data. It has an erosional morphology
- The seismic reflector polarity (hard event), and the very weak AVO signature are not compatible with a gas-charged sand
- From progradation direction, the sediment provenance seems to be from the north, which is not expected to be sandy hinterland.

Therefore the prospect was downgraded to a lead.

Shallow gas (Eocene)

Anomalous amplitudes in the Eocene section, capped by a very strong reflector, probably indicating gas presence, were studied to determine if they potentially represented a sandy turbidite system and a drillable prospect.

This subject was also studied in the course of the license work with the following conclusions:

- The very bright reflector is cross-cutting, and is interpreted as a diagenetic horizon. It is most likely a gas-affected paleo Opal A-CT transition.
- This horizon does not represent a robust seal, since gas is seen locally escaping through it.
- It does not have a trapping geometry, since gas is observed bypassing it where it is tipped up towards the base Quaternary unconformity.
- The underlying anomalies do not have sedimentary geometries, rather they are blob-shaped focused around faults.
- The Eocene stratigraphy is interpreted to be non-reservoir lithologies of shale, silt, and siliceous ooze, based on the offset well data.

The prospect was downgraded to a lead based on unacceptable risk on reservoir and seal.

5. TECHNICAL EVALUATIONS

Work on West Skrugard focused on confirming the initial very large prospect size, and de-risking it. Since the license did not conclude towards a drill decision, no technical development evaluation was performed by the license.

Given the remote location it is evident that the minimum economic field size for a gas discovery would be very large (at least an order of magnitude bigger than the evaluated prospect sizes), in order to develop the necessary gas export infrastructure.

6. CONCLUSIONS

As a result of the license work, the PL710 partners have concluded that there are not economically viable prospects in the license area, and the unanimous decision was to drop the license at the Drill or Drop deadline.

Geological and geophysical work focused on assessing prospectivity at the Eocene, base Tertiary, Jurassic (Realgrunnen), and Triassic (Snadd) levels.

The base Tertiary prospect (Goldfinger) was downgraded to lead based on unacceptable risk on reservoir, and seismic/AVO response incompatible with HC-filled reservoir. However seismic quality is good, allowing confidence in the assessment.

The Eocene was downgraded to lead based on unacceptable risk on reservoir presence and seal. Again, the seismic data quality is good.

The Jurassic/Triassic prospect levels in the West Skrugard prospect were downgraded to lead based on structural interpretation, and assessment of reservoir quality and top seal integrity. These resulted in a severe decrease in prospective volumes. Reservoir quality and top seal are controlled by (relatively sparse) offset well data, including the Iskrystal well, drilled NW of PL710 during the license period. West Skrugard is interpreted to be in the HPHT zone of the western Barents Sea, where all offset wells are interpreted to be top seal failures or limited columns, and this is an important risk for West Skrugard. Finally, the structural interpretation is based mainly on PSDM data over the greater structure, including former PL607. However seismic data quality at Jurassic level in PL710 is extremely compromised by the strong, gas-affected, diagenetic marker in the Eocene. It was concluded that the stakes of the West Skrugard structure were not sufficient to justify further geophysical acquisition to better image the structure.

Attachments:

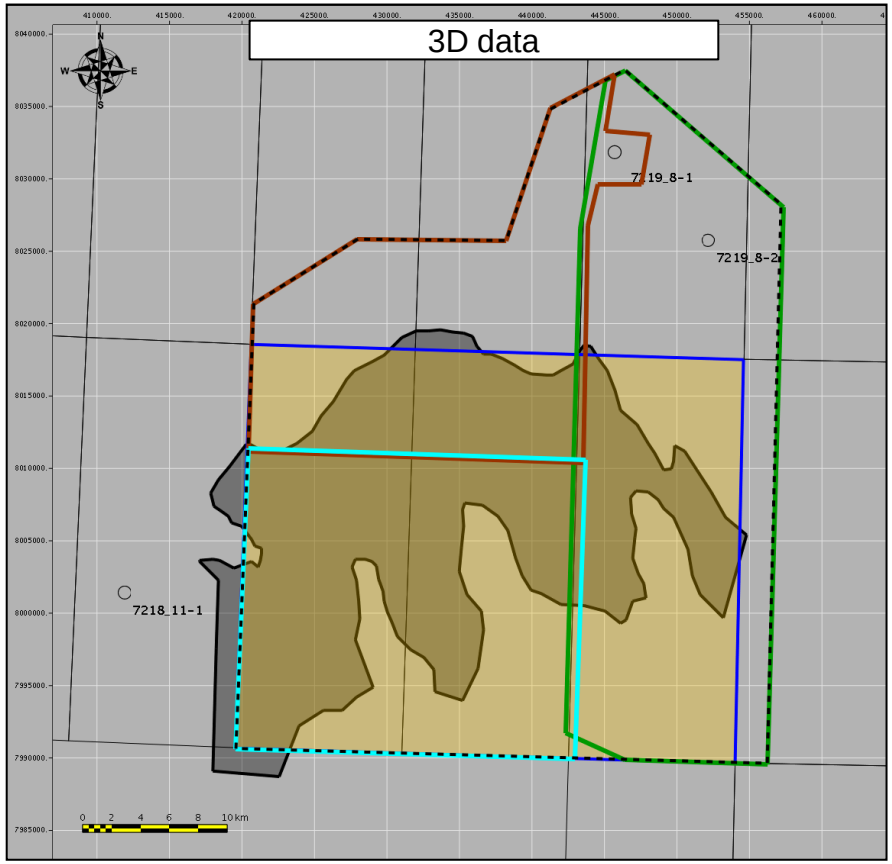
Figure 1 – PL710 Common license database

Figure 2 – West Skrugard Jurassic prospect summary

Figure 3 – Goldfinger Upper Cretaceous prospect summary

Figure 4 – Eocene evaluation

FIGURE 1: PL710 COMMON LICENSE DATABASE



Legend:

- Global area for common 3D seismic database
- WG0901 for common DB
- WG1001 for common DB
- WG1002 for common DB
- PL710 outline
- Shallow gas outline

wells

- 7216/11-1S (2000 – Norsk Hydro)
- 7218/11-1 (Darwin)
- 7219/8-1S (1992 – Saga)
- 7219/8-2 (Iskrystall)
- 7219/9-1 (1987 – Norsk Hydro)
- 7220/8-1 (Skrugard)
- **7218/8-1 (Byrkje) (Rev 02)**

2D data

Project	Line	From Shot Point	To Shot Point	Length (km)
NBR-08	NBR08-141147	10382	12381	50.000
	NBR08-141500	9830	12422	64.825
	NBR08-141983	9830	12423	64.850
	NBR08-142383	8435	12810	109.400
	NBR08-143376	10640	10795	3.9
	NBR08-143376	12798	13780	24.575
	NBR08-228596	14627	18213	89.675
NBR-10	NBR10-230110	14978	15724	18.675
NBR-11	NBR11-327847A	9660	11180	38.025
	NBR11-432981A	11735	12487	18.825
NBR-12	NBR12-3278A	9422	9900	11.975
	NBR12-4329	12247	14215	49.225

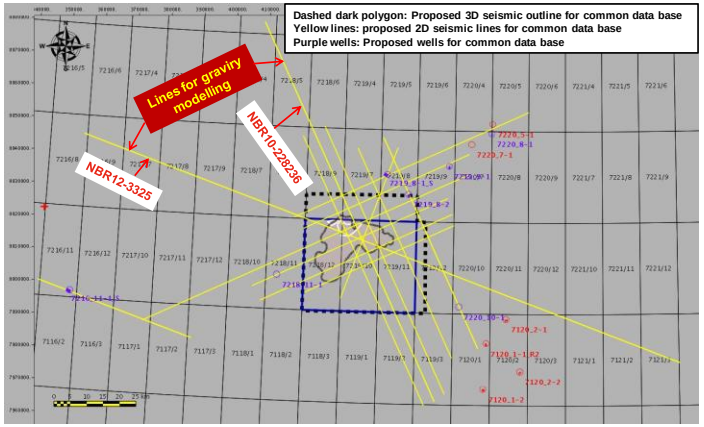
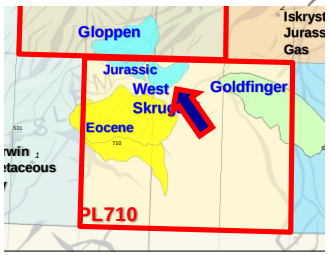
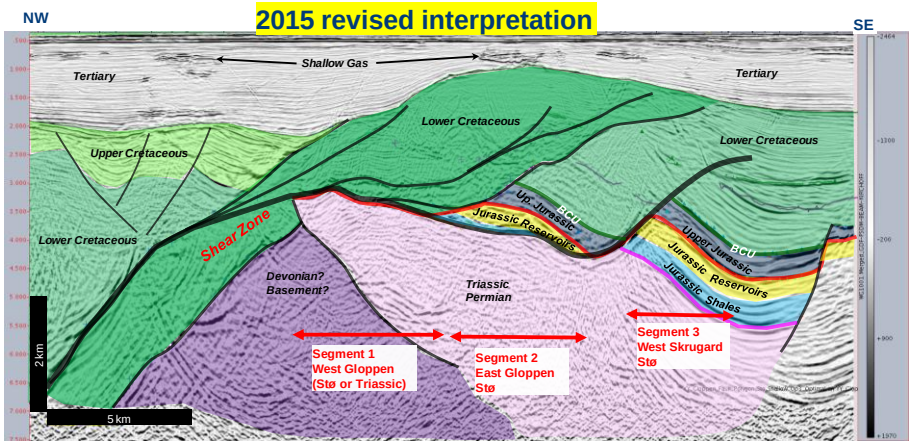
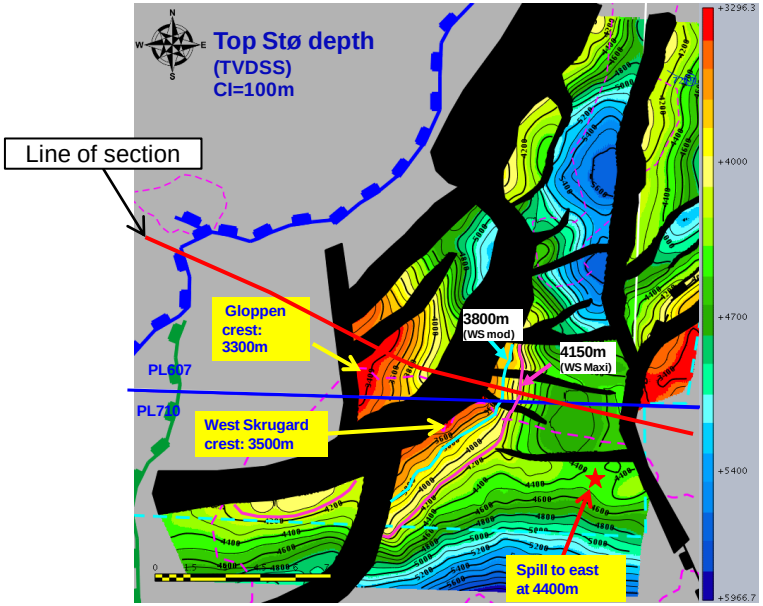


FIGURE 2: WEST SKRUGARD JURASSIC PROSPECT: SUMMARY







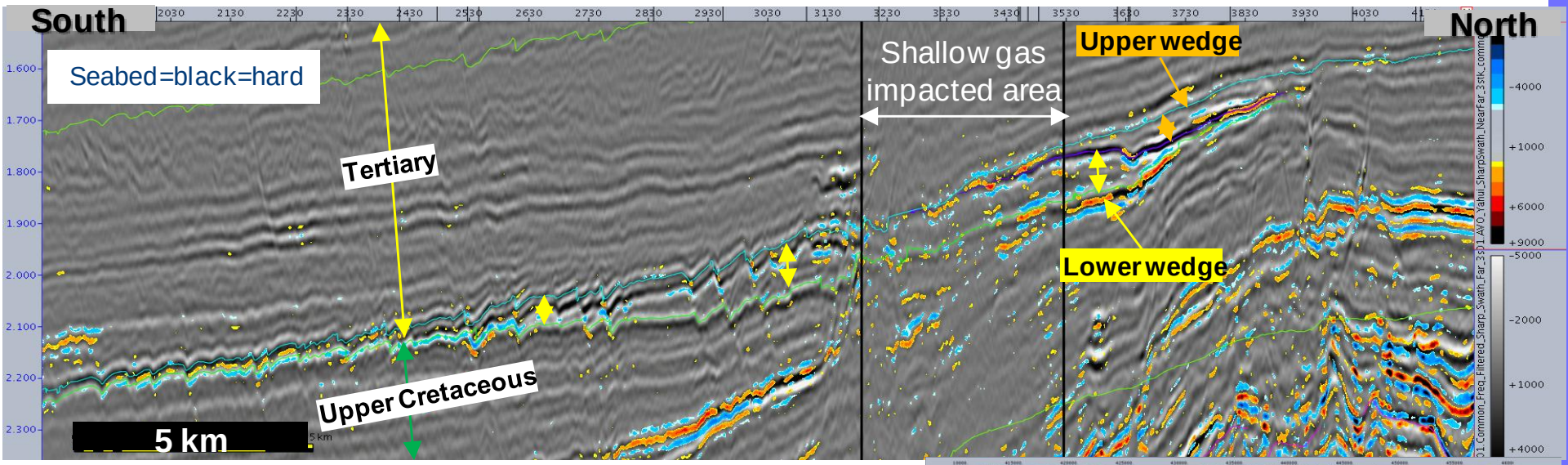
2015 revised prospect volumes

West Skrugard 2015 eval.	mini (P95)	mode	maxi (P5)
area (km2)	3	6	11,2
gross thickness (m)	350	350	350
GWC (m/msl)	3650	3800	4150
column height (m)	150	300	650
porosity (%)	7	9	14
N/G (%)	35	48	63
gas saturation (%)	65	70	75
1/Bg	300	310	320
Fg (%)	88	93	99
GCR (m3/m3)	1200	1200	1200
recovery factor gas	30	40	55
recovery factor condensate	20	30	40

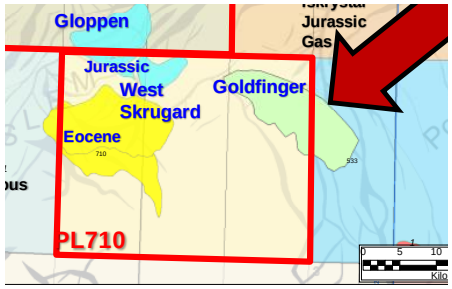
West Skrugard volumes	mini (P95)	mode	maxi (P5)	mean
recoverable resources (Mboe)	9,8	23	85	38

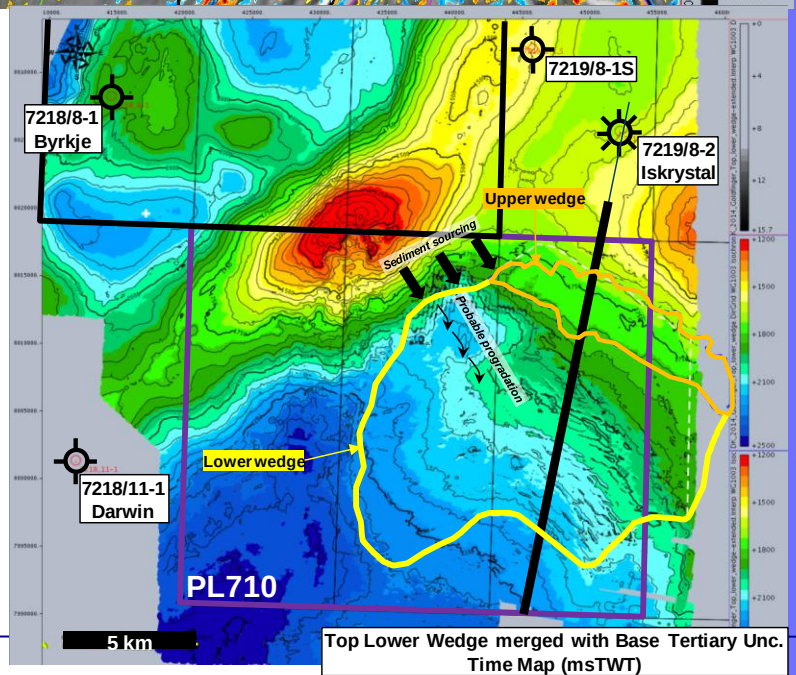
POS	10 %

FIGURE 3: GOLDFINGER UPPER CRETACEOUS PROSPECT SUMMARY



- Possible sediment provenance from NW Veslemøy High as suggested by progradation: Very bad to no reservoir
- AVO analysis : very weak anomaly, not supporting existence of gas bearing sands
- No amplitude changes due to either fluid or lithology along the slope.
- High amplitude corresponds to the hard base of slope-channels: Not flat, not a fluid effect

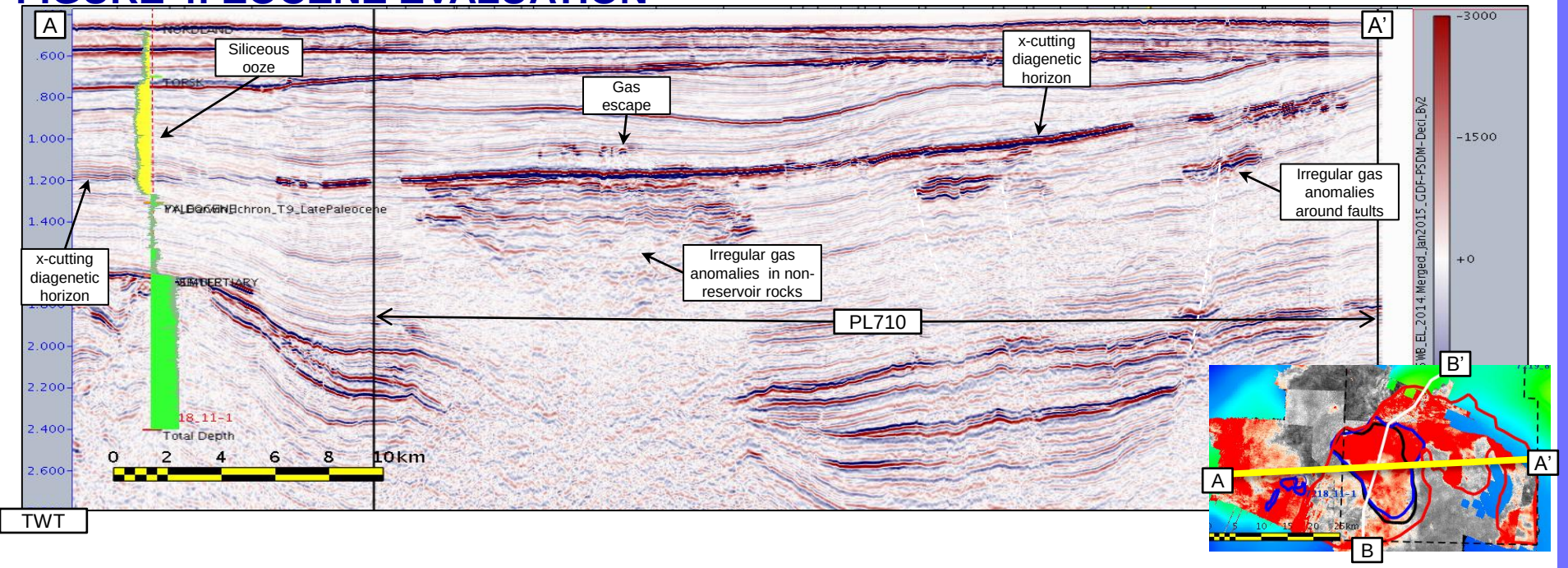




Top Lower Wedge merged with Base Tertiary Unc. Time Map (msTWT)

TOTAL

FIGURE 4: EOCENE EVALUATION



2016 evaluation:

1) High risk on reservoir: The geometry of the amplitude anomalies does not indicate turbiditic channel neither submarine fan sediments-----They are interpreted to be gas in non-reservoir lithology with low porosity and low permeability

2) High risk on seal:

- ➢vertical gas escape indication and pockmark concentration at base quaternary
- ➢No closure towards the North → Leakage at Quaternary Unconformity