



REPORT

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SUBJECT:	PL657 License Full Relinquishment Report
ABSTRACT:	The PL657 evaluation results as low materiality asset with a high risk associated to hydrocarbon occurrence.
DESCRIPTION:	

Rev.	26/11/2015	Version 2			
Rev.	June 2015	Version 1			



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1. KEY LICENSE HISTORY

PL657 is located in the Barents Sea, approximately 10 km east of the Goliat Field. The licence was awarded on February 3rd, 2012 as result of APA 2011 application (Figure 1). Part of the area was previously included in the original PL229 and PL229 C area and due to licence conditions, lack of drilling rigs and high area fee the acreage had to be relinquished on 2010.

The original Drill or Drop deadline was 3rd February 2014. The deadline has been postponed of 1 year by 3rd February 2015 and lately extended 2 months at 3rd April 2015.

The license consists of 2 blocks, 7122/8 & 9 (parts), for an area of 431 Km² and lies in about 200-300m water depth.

The Joint Venture present configuration consists of:

- Eni Norge AS 50% (operator)
- Statoil AS 30%
- Petoro AS 20%

The license commitment was seismic reprocessing and G&G studies and the work commitment has been full filled.

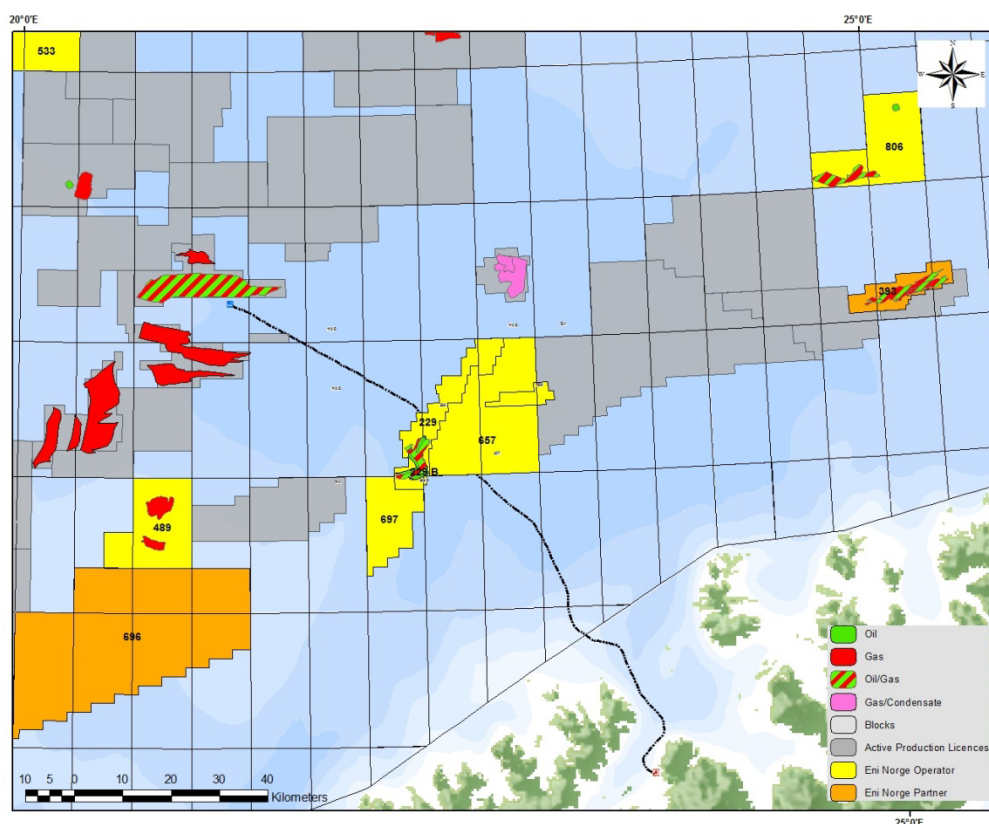


Figure 1: PL657 Location Map

2. LICENCE DATABASE

The main prospectivity of the licence is associated with the Permian play where the “David Pinch-out” stratigraphic prospect has been outlined. A secondary play was identified in the upper Cretaceous sands and small leads, as wedge closures, were indicated as minor upside potential.

The well licence database includes the wells that have reached the Permian target in the area (7122/7-3, 7120/12-2, 7120/12-4) and the wells used for the Lower Cretaceous play analysis and interpretation in the surrounding area (7120/1-2, 7122/2-1, 7120/10-2) (figure 2).

3D and 2D seismic survey have been used in the licence for geological and geophysical interpretation. The recent FP13 PSTM 3D seismic survey has been used for geological interpretation together with 3D survey EN0702 PSTM reprocessed-phase shift and 3D survey EN0702 PSDM (figure 3 and table 1).

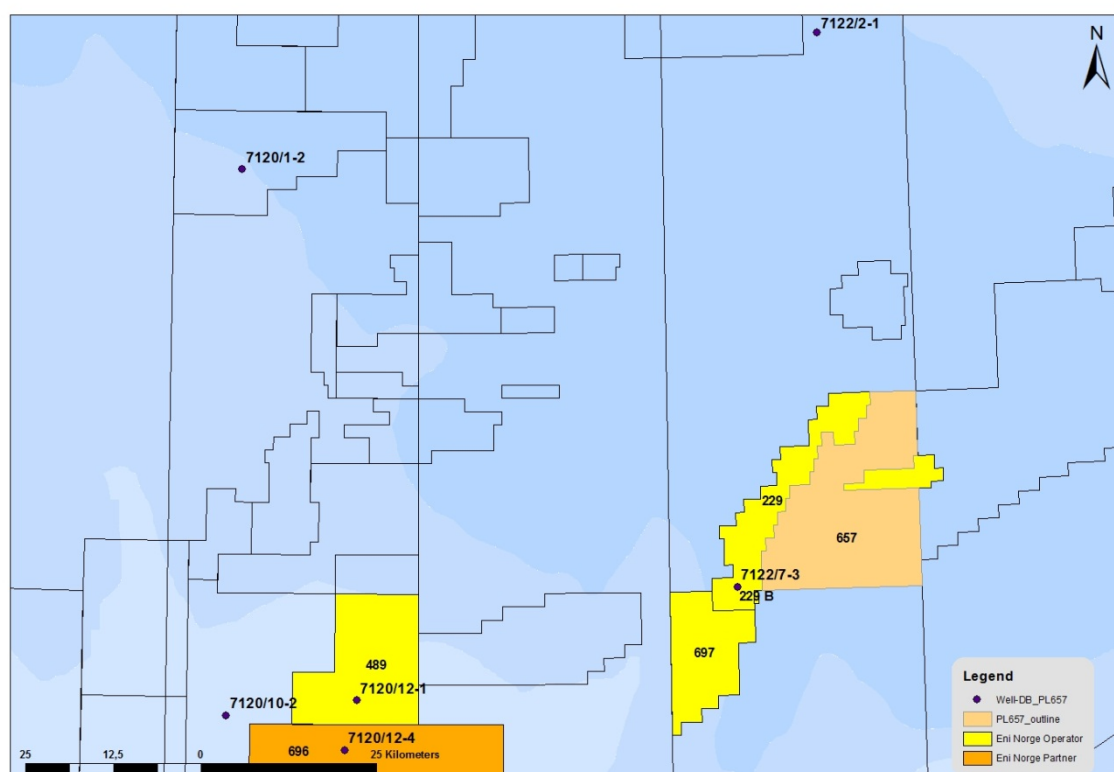


Figure 2: PL657 wells database

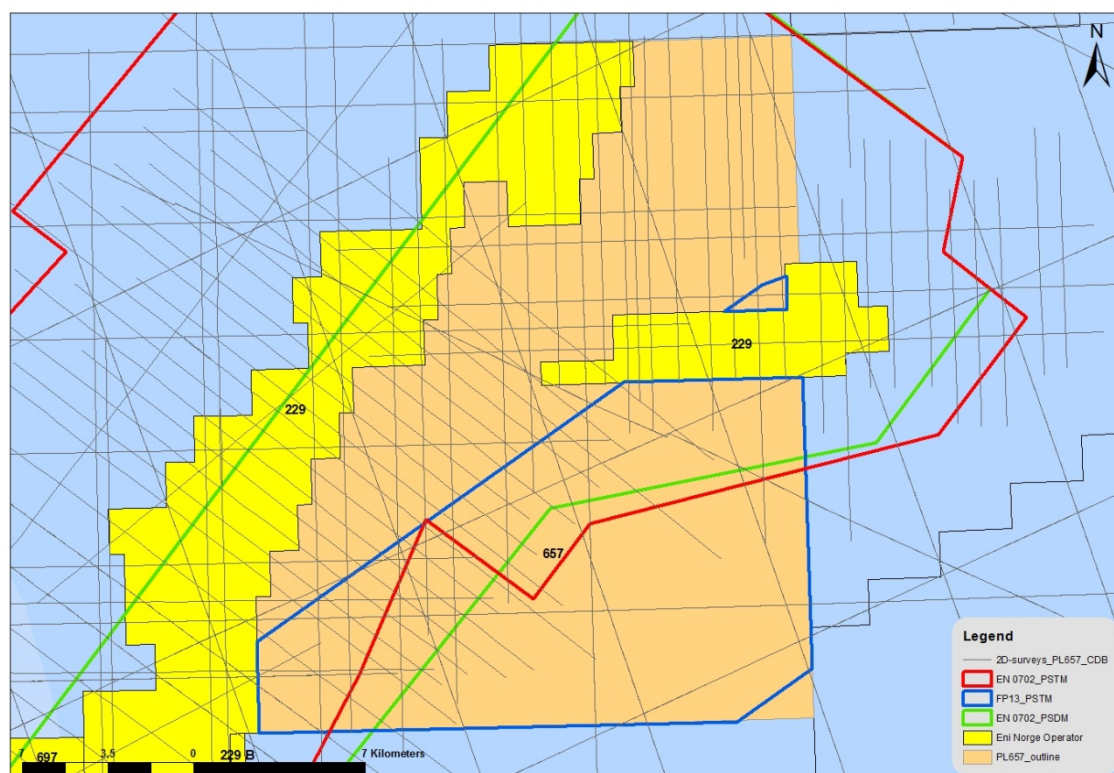


Figure 3: PL657 2D/3D Seismic coverage

3D Survey	extension in Km ²	Operator
EN 0702 PSTM	647	Eni Norge
EN 0702 PSDM	295	Eni Norge
FP13	235	TGS Nopec
2D	length (km)	
BARE05		Fugro
BSS01		Nopec
FWGS 84		Statoil
GFW-85		WesternGeco
GFW1-187		WesternGeco
NA9701		Eni Norge
Total	29 538	

Table 1: PL657 2D/3D Seismic Database

3. REVIEW OF GEOLOGICAL FRAMEWORK

The PL657 licence is located in south-western Barents Sea. It is located between the Finnmark Platform and partly on the southern part of Hammerfest Basin immediately east of the Goliat field, in the footwall of the main fault of the Tromsø/Finnmark fault Complex (TFFC).

The play of "David Pinch-Out" prospect consists of Permian marginal marine sandstones of the Ørret Fm pinching-out against the underlying tight Permian carbonates of the Røye Fm, sealed at the top by the Ørret 2 and by the shale of the Lower Triassic Havert Fm and relying on the Triassic and Jurassic petroleum systems (Kobbe and Hekkingen Fms) for charge.

Analogous stratigraphic pinch-outs are present all along the whole Finnmark Platform and only one well (well 7120/12-4) has tested such play with negative results.

The seismic interpretation was originally carried out on the 3D survey EN0702, a conventional single azimuth survey acquired in 2007 by PL229 (Eni Norge operator). In the south-western most part of the prospect, the poor imaging of the 3D data, together with a lack of 3D seismic survey, made it necessary to use 2D seismic lines. The newly acquired FP13 PSTM 3D survey, the 3D survey EN0702 PSTM reprocessed-phase shift and 3D survey EN0702 PSDM led to a new interpretation and full coverage of the prospect with 3D seismic data, consequently reducing the risks associated with seismic interpretation and depth conversion.

All available wells within the 3D area and nearby surrounding areas covered by 2D seismic have been investigated and tied to the seismic. The reference wells for the Permian sequence are: 7120/12-2, 7120/12-4, 7122/7-3 and 7128/4-1. The Well 7120/12-4 is a key well for mapping the Permian section.

A deep revision of the geological and structural framework has been done through several special studies consisting in: sedimentological revision of Permian sequence, petroleum system modelling assessment and fault seal analysis on the TFFC behaviour.

A comprehensive sedimentological study was performed on the Late Permian successions at semi-regional scale in the entire western Finnmark Platform with the main aim to investigate the "David Pinch-out" reservoir under a sedimentological perspective. A sequence stratigraphic model has been defined for the Tempelfjorden Group of the western Finnmark Platform where seven sedimentary sequences have been recognized and interpreted on the seismic data, based on sedimentary facies and well log response. Subsequent to this sedimentological study the sandstone prone reservoir of the David prospect has been correlated to Ørret 1 and the shaly clinoforms of Ørret 2 are interpreted as top sealing unit. The study contributed to the risk analysis at plays and prospect level for the reservoir distribution and efficacy. The Permian Ørret Fm. reservoir is proven at play level however the reservoir quality and seal could involve some uncertainties due to the distance to the siliciclastic sediment input at local scale.

A dedicated petroleum system modelling together with a 2D fault seal analysis study was performed to investigate the source provenance and migration mechanism. According to the model results, the kitchen areas of proven sources are distant from the prospect location consequently a long way migration it is needed and the TFFC should have had leaking behaviour at the time of the migration. The performed model could not support the effectiveness of charging mechanism of the "David Pinch-out" prospect.

4. PROSPECT UPDATE

The prospectivity in the licence has been updated after the licence APA application on 2011 and it is now represented by the "David Pinch-out" prospect only.

The lower Cretaceous wedges, formed by small structural closures of Knurr Fm. on the down thrown side of the platform (Lead N, Lead M and Lead S), were considered an upside potential. After a thorough revision of the seismic interpretation and geological model and taking into account the negative result of DONG well (7121/9-1) drilled in 2012 (former PL518) in nearby area, the Cretaceous wedges have been downgraded to minor leads and are considered as negligible economic interest.

The "David Pinch-out" prospect is a stratigraphic trap located in the footwall of the main fault of the Tromsø/Finnmark fault Complex (TFFC). The reservoir is believed to be marginal marine sandstones belonging to the Ørret Formation pinching-out against underlying tight Permian carbonates belonging to the Røye Formation.

After the new seismic interpretation of the PSDM and of the recently acquired PSTM - FP13 seismic volume, the David Pinch-out top Reservoir unit (Ørret 1 unit) depth map has been revised. The updated top reservoir map is shown below and compared with interpretation performed during the APA 2011 application. The hydrocarbon columns of the interpreted prospect for APA application and after the revised interpretation on recent 3D seismic data sets are shown in the figures 4 and 5.

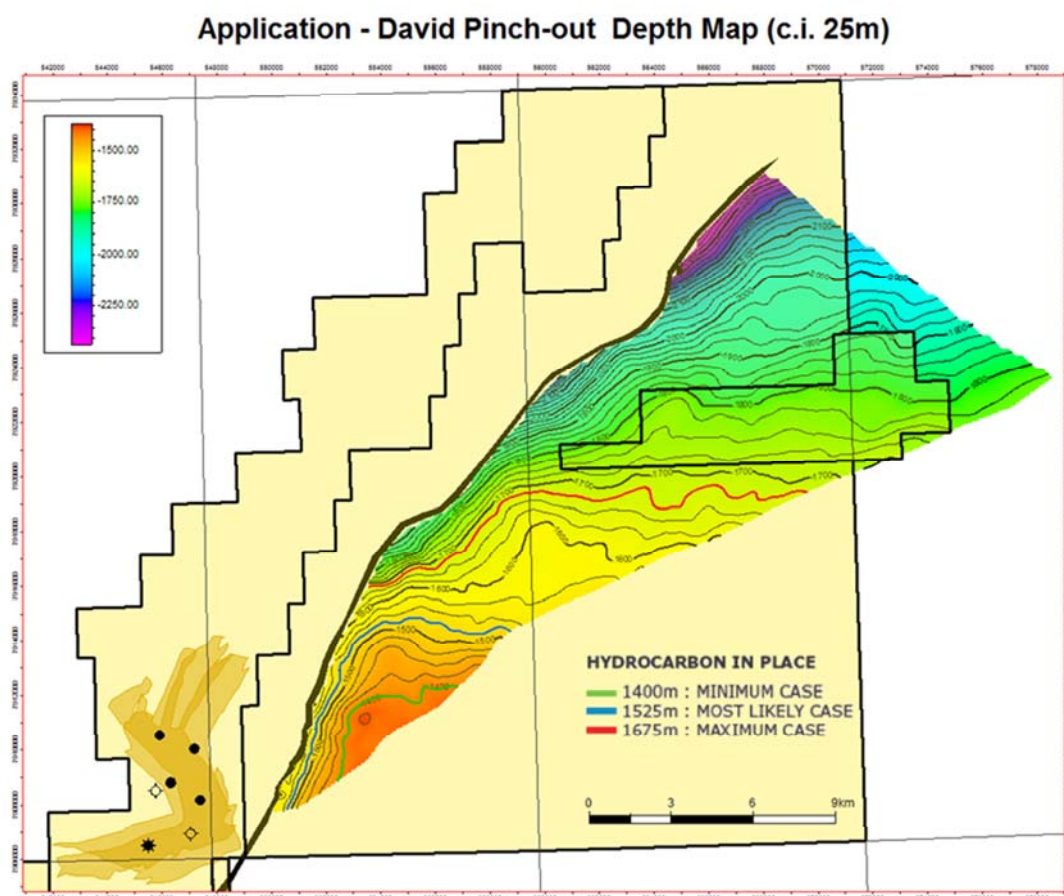


Figure 4: David Pinch-Out 3 cases – 2011 main geological mapping

2014 Interpretation - David Pinch-out Depth Map (c.i. 25m)

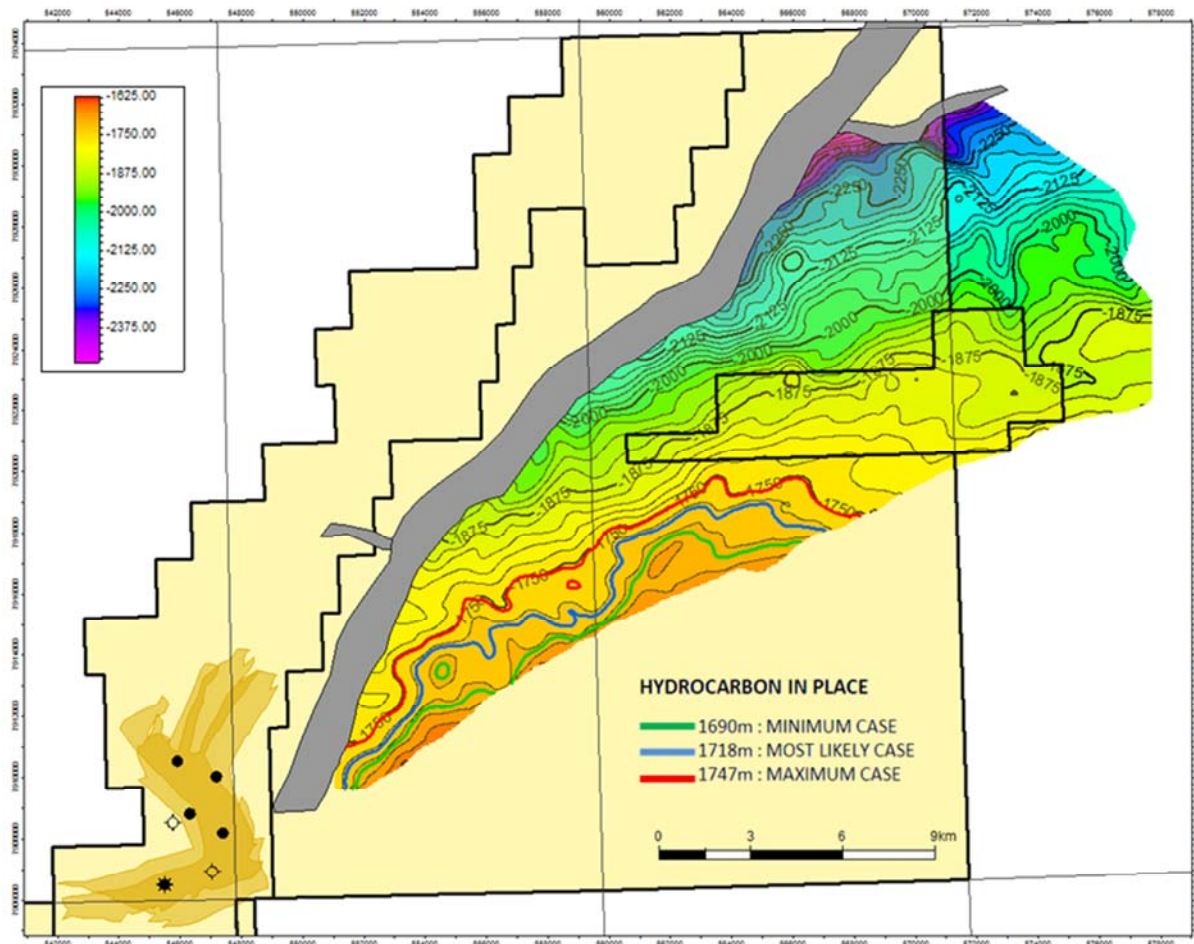


Figure 5: David Pinch-Out 3 cases – 2014 main geological mapping

The hydrocarbon initially in place have been carried out by utilising PRES (Prospect Resources Evaluation by scenarios) and the estimation of the David Pinch-out prospect presented during the APA application is summarized in table 2.

Resources IN PLACE	Main phase			
	Low (P90)	Base (P50)	High (P10)	Base, Mean
Oil [10 ⁶ Sm ³]	23,24	85,34	167,35	85,35

Table 2: Hydrocarbon initially in place – 2011 APA Application

According to updated seismic interpretation and prospect geometry together with revised reservoir petrophysical parameters of the Ørret unit, a review of the hydrocarbon initially in place has been carried out and the outcomes are shown in the table 3.

Block/1122839	Prospect name	David Pinch-out	Discovery/Prospect lead	Prospect	Prost ID (or Newt)	NPD will insert value	NPD approved (Y/N)	Yes
Play name	New Play (Y/N)	Yes	Outside play (Y/N)	No				
Oil, Gas or O&G case	Reported by company	Eni Norge	Reference document				Assessment year	2014
This is case no.	Structural element	Finmark Platform	Type of trap	Stratigraphic	Water depth (m US) (>0)	415	Seismic database (2D/3D)	3D
Resources IN PLACE and RECOVERABLE								
Volumes, this case								
In place resources	Low (P50)	Base, Mode	Base, Mean	High (P10)	Low (P50)	Base, Mode	Base, Mean	High (P10)
Oil (10 ⁶ Sm ³) (>0.00)	3.48	11.82	15.77	34.61				
Gas (10 ⁶ Sm ³) (>0.00)	0.01	0.05	0.11	0.29				
Oil (10 ⁶ Sm ³) (>0.00)	1.01	3.46	4.57	10.04				
Gas (10 ⁶ Sm ³) (>0.00)								
Recoverable resources	Reservoir litho (from)	Onet Fm	Source Rock, chrono primary	L. Trias	Source Rock litho primary	Hekkingen Fm	Seal, Chrono	Early Trias
Reservoir Chrono (from)	Reservoir litho (to)	Onet Fm	Source Rock, chrono secondary	M. Trias	Source Rock litho secondary	Kobbø Fm	Seal, Litho	Havert Fm
Reservoir Chrono (to)								
Probability (fraction)								
Total (oil + gas + oil & gas case) (0.00-1.00)	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)	Trap (P2) (0.00-1.00)	0.55	Charge (P3) (0.00-1.00)	0.50	Retention (P4) (0.00-1.00)	0.50		
Parameters:								
Depth to top of prospect [m MSGL] (> 0)	Base	High (P10)	Comments: Gross Reservoir Thickness computed with Top & Bottom Surfaces, ranging from 0 to about 130m.					
Area of closure [km ²] (> 0.0)	12.7	1621						
Reservoir thickness (m) (> 0)	26.7	26.7						
HC column in prospect (m) (> 0)	68	98						
Gross rock vol. [10 ⁹ m ³] (> 0.000)	142.190	484.890						
Net / Gross fraction (0.00-1.00)	0.10	0.50						
Porosity (fraction) (0.00-1.00)	0.13	0.17						
Permeability (mD) (> 0.0)								
Water Saturation (fraction) (0.00-1.00)	0.20							
Bg [Rm ³ /Sm ³] (< 1.00000)								
180 [Sm ³ /Rm ³] (< 1.00)								
GOR, free gas [Sm ³ /Sm ³] (> 0)								
GOR, oil [Sm ³ /Sm ³] (> 0)	0.28	0.28						
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)								
Recov factor, liquid ass. phase (fraction) (0.00-1.00)								
Temperature, top res [°C] (>0)	45							
Pressure, top res [bar] (>0)	190							
Cut off criteria for NG calculation	1.	2	3.					
For NPD use:								
Interapp. as geolog.-int.	NPD will insert value	Registrant - int.	NPD will insert value	Kart. oppdakt	NPD will insert value	Kart. oppdelt	NPD will insert value	
Date:	NPD will insert value	Registrant Date:	NPD will insert value	Kart. dato	NPD will insert value	Kart. tr	NPD will insert value	

Table 3: NPD Table, David Pinch-Out Prospect Data – 2014 Evaluation



The estimated volumes have been strongly reduced due to a revision of reservoir properties and petrophysical characteristic.

The overall probability of discovery is about 11%, resulting from probability of reservoir 65%, probability of seal 60%, probability of trap 55%, probability of source 100% and migration 50%.

Charging mechanism together with the trap integrity is perceived to be the main risks for the "David Pinch-Out" prospect.

The trap is considered risky due to the lateral seal (risk of sands) and bottom seal (poro/perm characteristics of the carbonatic sequence - Røye Fm).

The charge is also risky due to the complex migration mechanism and pathways that need be invoked for the prospect (dependence of the leaking from the Troms-Finnmark Fault)

5. TECHNICAL EVALUATIONS

The outcome of the project economic of the David Pinch-out prospect led to negative results, and as consequence Eni Norge has taken the decision to withdraw from the licence.

The proposed PL657 relinquishment area vertex coordinates are shown in table 4 and displayed in the figure 6.

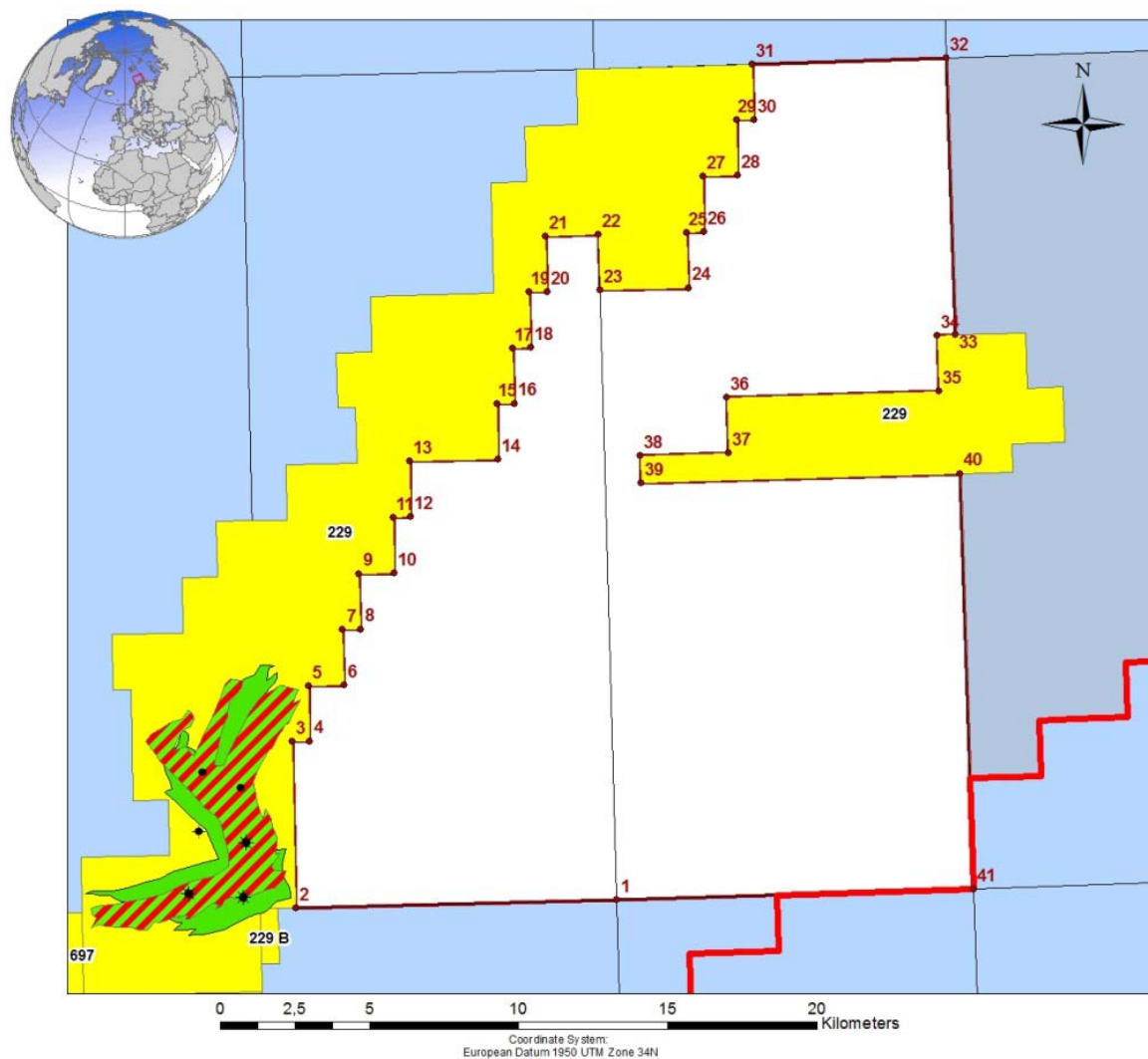


Figure 6: PL657 relinquishment area

VERTEX	X UTM 34	Y UTM 34	LONGITUDE	LATITUDE
1	559789,766	7906316,541	22°40'0,000"E	71°15'0,000"N
2	549029,405	7906046,759	22°22'0,000"E	71°15'0,000"N
3	548903,425	7911622,428	22°22'0,000"E	71°18'0,000"N
4	549499,715	7911635,985	22°23'0,000"E	71°18'0,000"N
5	549457,201	7913494,541	22°23'0,000"E	71°19'0,000"N
6	550648,752	7913522,127	22°25'0,000"E	71°19'0,000"N
7	550605,210	7915380,654	22°25'0,000"E	71°20'0,000"N
8	551200,464	7915394,683	22°26'0,000"E	71°20'0,000"N
9	551156,405	7917253,213	22°26'0,000"E	71°21'0,000"N
10	552345,887	7917281,741	22°28'0,000"E	71°21'0,000"N
11	552300,799	7919140,253	22°28'0,000"E	71°22'0,000"N
12	552895,018	7919154,752	22°29'0,000"E	71°22'0,000"N
13	552849,413	7921013,245	22°29'0,000"E	71°23'0,000"N
14	555817,910	7921088,138	22°34'0,000"E	71°23'0,000"N
15	555769,738	7922946,588	22°34'0,000"E	71°24'0,000"N
16	556362,912	7922962,046	22°35'0,000"E	71°24'0,000"N
17	556314,222	7924820,487	22°35'0,000"E	71°25'0,000"N
18	556906,883	7924836,096	22°36'0,000"E	71°25'0,000"N
19	556857,676	7926694,517	22°36'0,000"E	71°26'0,000"N
20	557449,820	7926710,278	22°37'0,000"E	71°26'0,000"N
21	557400,096	7928568,701	22°37'0,000"E	71°27'0,000"N
22	559174,964	7928616,927	22°40'0,000"E	71°27'0,000"N
23	559226,225	7926758,541	22°40'0,000"E	71°26'0,000"N
24	562186,819	7926842,245	22°45'0,000"E	71°26'0,000"N
25	562132,994	7928700,566	22°45'0,000"E	71°27'0,000"N
26	562724,589	7928717,784	22°46'0,000"E	71°27'0,000"N
27	562670,247	7930576,095	22°46'0,000"E	71°28'0,000"N
28	563852,396	7930610,992	22°48'0,000"E	71°28'0,000"N
29	563797,023	7932469,269	22°48'0,000"E	71°29'0,000"N
30	564387,580	7932486,949	22°49'0,000"E	71°29'0,000"N
31	564331,689	7934345,225	22°49'0,000"E	71°30'0,000"N
32	570821,866	7934550,297	23°0'0,000"E	71°30'0,000"N
33	571129,459	7925259,755	23°0'0,000"E	71°25'0,000"N
34	570536,902	7925240,223	22°59'0,000"E	71°25'0,000"N
35	570597,889	7923382,104	22°59'0,000"E	71°24'0,000"N
36	563480,709	7923160,299	22°47'0,000"E	71°24'0,000"N
37	563535,542	7921302,013	22°47'0,000"E	71°23'0,000"N
38	560567,303	7921216,480	22°42'0,000"E	71°23'0,000"N
39	560593,437	7920287,311	22°42'0,000"E	71°22'30,000"N
40	571283,198	7920614,506	23°0'0,000"E	71°22'30,000"N
41	571744,185	7906678,879	23°0'0,000"E	71°15'0,000"N

Table 4: PL 657 relinquish area corner coordinates



6. CONCLUSIONS

After a deep revision of the technical and economical evaluation of PL657, Eni Norge on behalf of PL657 JV recommends relinquishing the license due to low materiality of the asset and high risk associated to hydrocarbon occurrence.