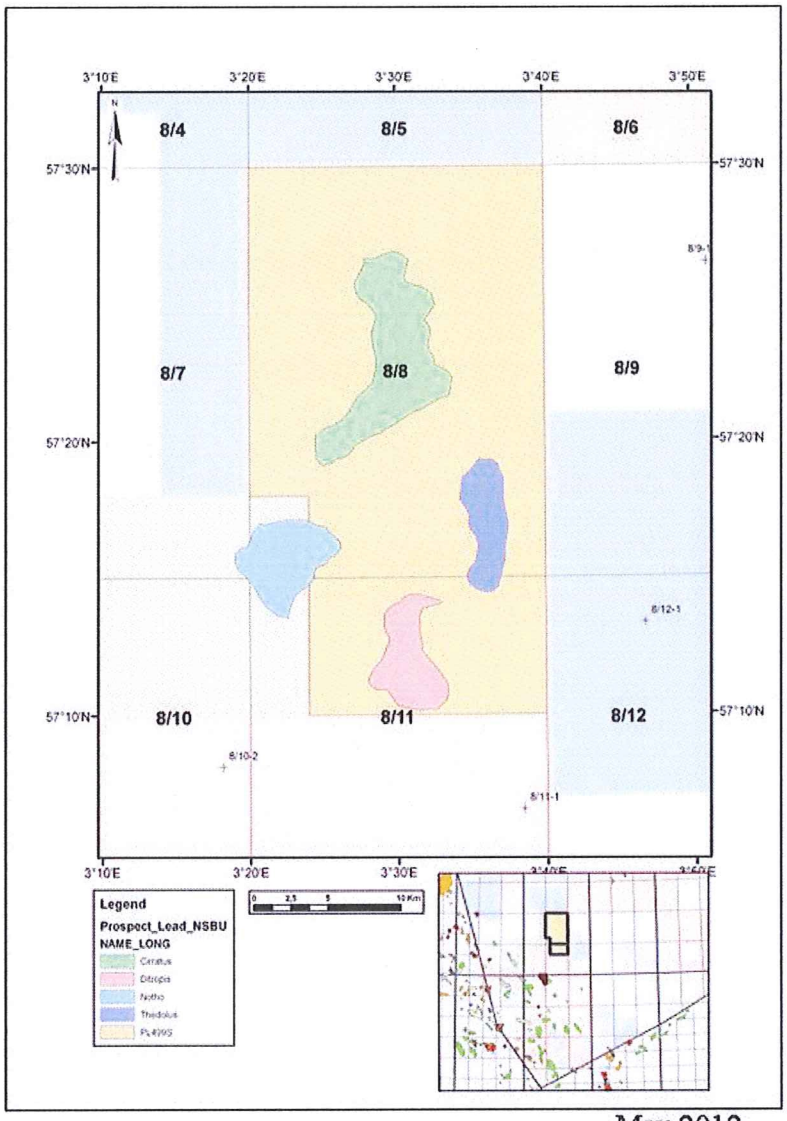
PL499S Licence Relinquishment Report



May 2012

ConocoPhillips

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List of figures

1 Summary and Conclusion

PL499S was situated in the Norwegian-Danish basin in Norwegian waters. The license covers block 8/8 and part of block 8/11, and was stratigraphically split. The PL499S license applied to all levels 200m below base Jurassic. The license was awarded 23rd January 2009, and had an initial drill or drop decision point one year later. An extension to this initial period was granted, and final license extension date was set to 23rd July 2011. The main play in the PL499S is the Pre-Zechstein play, with a Carboniferous source, Permian Rotliegendes aeolian sandstone reservoir and Zechstein salt as the primary seal.

This report summarises the work done in 2009-2011, after the license was awarded, and after drilling the 8/10-3 Megalodon well in the license PL331 in block 8/10 to the south. The main elements of updates on the license have been interpretation of NSR 2D long offset seismic, re-interpretation of older vintage seismic, depth conversion analysis, basin modelling and volume calculations. The final update to the evaluation was done during the winter of 2010, after drilling of the Megalodon well. The Megalodon well did find a Rotliengendes reservoir section, although deeper than expected below an expanded shale section; however it did not find any traces of hydrocarbons.

Compared to Megalodon the remaining PL499S leads may be more favourably positioned relative to the prognosed source basin for hydrocarbon migration. Due to the nature of the salt, the trap geometry and volumetric calulations are very uncertain. The major risk element is the presence of a working Carboniferous source basin.

Based on the results from the 8/10-3 Megalodon well with no indications of a working source rock interval, together with post well mapping and geological evaluations, the risk of prospectivity in the PL499S license is considered to be too high to pursue. The partnership therefore decided to fully relinquish the license.

2 Key License History

The initial application for this license was submitted in 2007 jointly by ConocoPhillips (operator) and StatoilHydro. The block was offered but the work programme was not accepted. The license was subsequently split stratigraphically and a second application for block 8/8 and block 8/11(part) was made in the APA 2008. The PL499S licence was awarded on 23rd January 2009 to ConocoPhillips (operator) and StatoilHydro with 50% equity each.

The initial work obligations were to a) reprocess 2D seismic and buy available long offset 2D seismic over the area and b) to perform geological and geophysical studies of the area.
Within 1 year decide whether to purchase or acquire 500km^2 of 3D seismic and to drill an exploration well to test the Permian or to relinquish the license.
Within 4 years from award purchase/acquire the seismic, drill the well and conclude on the path forward for development, else relinquish the license.
Within 6 years from award deliver a PDO else relinquish the license.

The initial work obligations regarding 2D seismic and geological studies were completed.

Due to the 2/4-W incident, 8/10-3 was delayed and an application for license extension was submitted in August 2009. Approval of this request was granted by the Ministry in a letter on 22nd September 2009 and the new deadline for a drill/drop decision was set to 23rd July 2011.

Following the completion of the Megalodon well in 2010, which found Permian reservoir rocks but no signs of hydrocarbons, the decision was taken by the PL499S partnership to fully relinquish the license with no further seismic or well activity.

3 Database

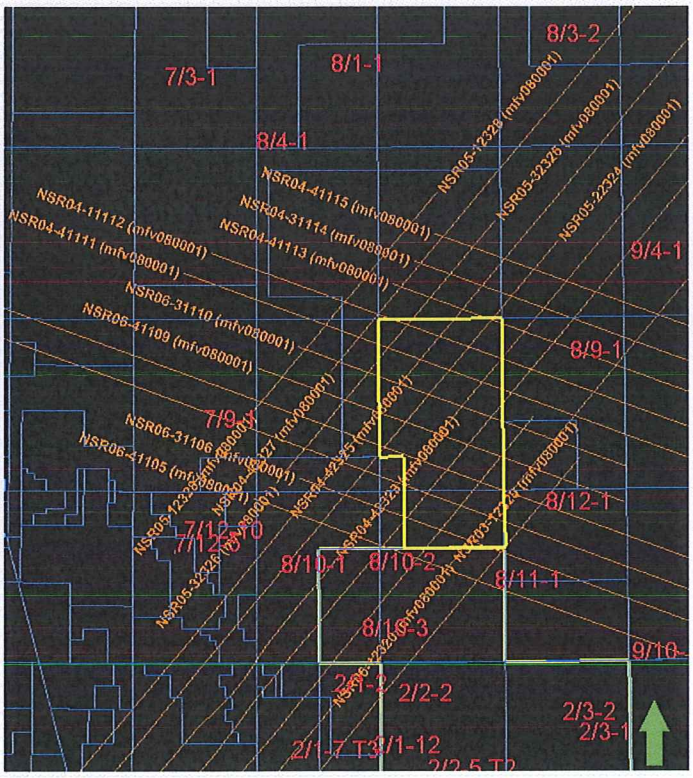
3.1 Well database

Pre-Zechstein well control is limited and all the nearest wells available at the time of evaluation have been used in the project. The key wells penetrating the pre-Zechstein relevant to PL499S are 8/10-3, 9/4-5, 2/1-7, 7/3-1, 3/1-5.

3.2 Seismic data

The original seismic database over the area is detailed in the 2007 APA application document. The license was only covered by 2D seismic data.

As part of the work commitment the PL499S partnership purchased all available NSR long offset 2D seismic from TGSNopec over the license. The final NSR coverage gives a 5*5 km grid coverage as shown in Figure 3.1.



NSR03-12320 (mfv080001)	NSR03
NSR04-42327 (mfv080001)	NSR04
NSR04-42325 (mfv080001)	NSR04
NSR04-42323 (mfv080001)	NSR04
NSR04-32322 (mfv080001)	NSR04
NSR04-41115 (mfv080001)	NSR04
NSR04-31114 (mfv080001)	NSR04
NSR04-41113 (mfv080001)	NSR04
NSR04-11112 (mfv080001)	NSR04
NSR04-41111 (mfv080001)	NSR04
NSR04-31110 (mfv080001)	NSR04
NSR04-31110-1 (mfv080001)	NSR04
NSR04-31106 (mfv080001)	NSR04
NSR05-32326 (mfv080001)	NSR05
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NSR05-41107 (mfv080001)	NSR05
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NSR06-41105 (mfv080001)	NSR06
NSR06-41109 (mfv080001)	NSR06
NSR06-42319 (mfv080001)	NSR06
NSR06-42321 (mfv080001)	NSR06
NSR06-42323 (mfv080001)	NSR06
NSR06-42325 (mfv080001)	NSR06

Figure 3.1 NSR 2D seismic over PL499S

A 3D seismic spec survey (MC3D-Q8) had been acquired over the license by PGS, but this was not purchased by the license partnership prior to drilling the Megalodon well.

4 Review of Geological Framework

4.1 Permian Stratigraphy

The main change in our understanding of the stratigraphy in the Permian in the North Permian Basin, is that the Frazerburgh Formation is much more extensively developed in the than what was prognosed prior to drilling. It had been identified in some Norwegian wells but previously as only a thin section less than 30m thick. The Megalodon well penetrated 192m of lacustrine shales assigned to the Fraserburgh Formation before entering the Auk Fm sandstones. The lacustrine interval in this well has been correlated with similar rocks in the 2/4-20, 2/1-7 and 9/4-5. Although thinner in these wells, common for all was that the lacustrine rocks were deposited above the aeolian sandstones and directly below the Kupferschiefer.

4.2 Reservoir Presence and Quality

The first real basin centre test was the Megalodon well which confirmed the pre-drill depositional model in many aspects although also indicated some variability in the facies. A 150m section of sabkha sandstones of the Auk Formation was penetrated. The sandstones are interpreted to have been deposited under both wet and dry sabkha conditions although primarily influenced by aeolian input.

The aeolian sandstone reservoir in the 8/10-3 Megalodon well had somewhat lower porosities than most offset wells, averaging at 14% with a net-to-gross of 0.85. RFTs in the 8/10-3 well indicated permeabilities of around 2-4 mD.

In the PL499S license, the reservoir in the identified leads lies at depths greater than 6km. Porosity and permeability ranges expected within the study area are 10 - 15 - 20% and 0.1 - 2 - 10 mD Ka (air permeability) which translates to 0.1 - 0.3 - 0.8 mD Krg (relative permeability to gas) at reservoir conditions.

4.3 Mapping Updates

Post Megalodon interpretation and a further iteration on the depth conversion has been investigated. In this work, several methods have been tested, including methods utilizing constant interval velocities, depth-dependent interval velocities (V0+k) and average velocity to surface. No update of the volumetrics have been made, as the range of volumes are still believed to be in the right order og magniture, although a bit too optimistic.

The re-mapping carried out after the results of the 8/10-3 well primarily focussed upon the new observations of thicker Frazerburgh formation, resulting in new Top Rotliegendes and Top Rotliegendes sand maps, and also updates were made to the Base Rotliegendes.

From seismic correlation to the Megalodon well the lake deposits have been mapped and found to cover an area of over 11000 km2, where the thickest part is to the north east of Megalodon within the PL499S license area (Figure 4.1). Base Frazerburgh becomes new Top (Auk) reservoir which is 400-700 metres deeper than previously mapped. However the general shape of the leads remains the same but deeper. Top Rotliegendes Group (Top Frazerburgh Fm) and Top Rotliegendes sand depth maps are shown in Figure 4.2.

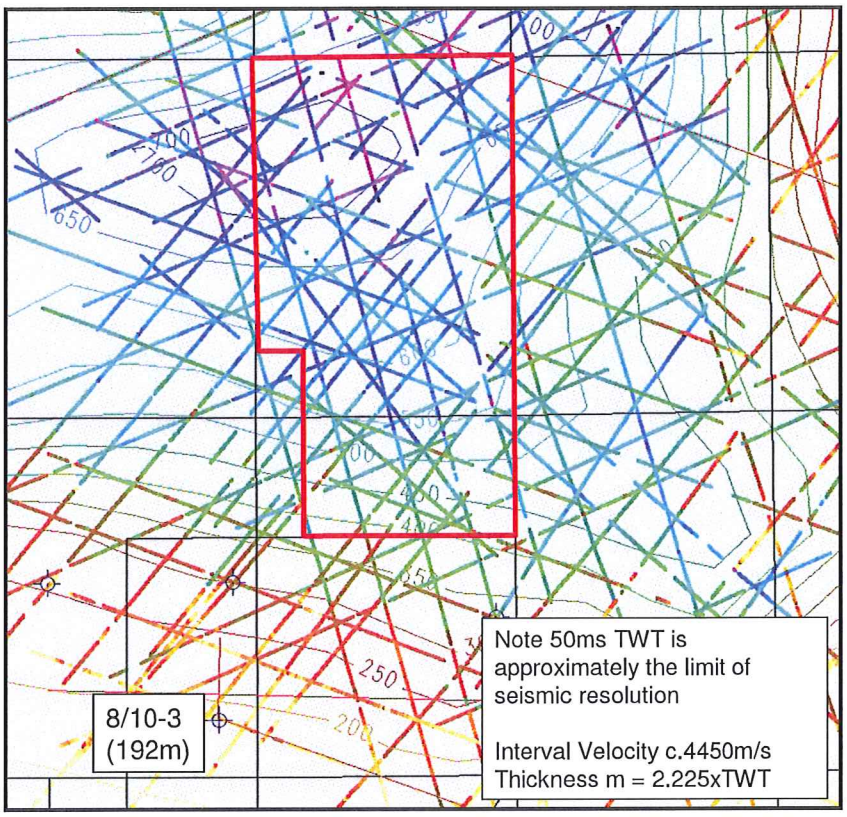

Figure 4.1 Thickness map of the Frazerbugh Formation. *As mapped from seismic tied to the Megalodon well. Thickness in metres. Varies between 400 and 700 metres across the license.*

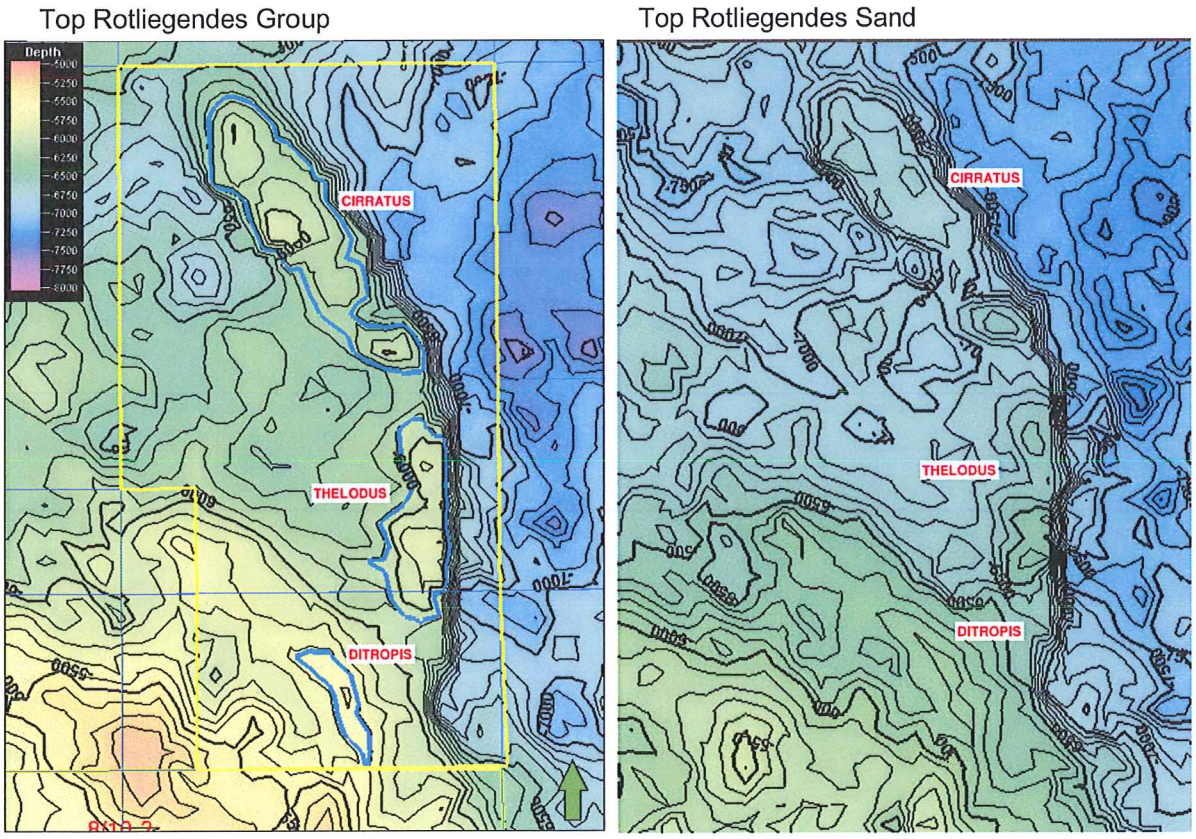

Figure 4.2 Depth Structure maps for Top Rotliegendes and Top Rotliegendes sand. *Depths in metres TVDSS.*

4.4 Source Rocks and Hydrocarbon Migration

The presence and quality of source rocks have always constituted the greatest uncertainties for the prospectivity of the Rotliegendes Pre-Zechstein Play. See the 2007 and 2008 APA Application documents for more detailed description of the source rocks.

After the APA award in 2009 the 3D basin model was updated, to show the new interpretation and to locate fetch areas for the different leads in the license.

The Megalodon well was dry and the failure is believed to be related to either the absence of functioning source rocks or poor migration efficiency. The two leads in the PL499S licence are overlying the prognosed Carboniferous source basin, and may be less vulnerable to migration issues and carrier bed quality. The exploration risk however, is thought to be high (see section 5.3 Risking.

5 Prospect Updates

Three leads were originally identified in the license area and defined on the top Rotliegendes time map and depth maps. All leads were briefly described in the 2007 APA Application document. These maps have been subsequently updated using the new 2D seismic data and depth converted using various methods (4.3 Mapping Updates). This work resulted in the disappearance of the lead called Ditropis Figure 5.1.

Evaluation of the size and risk of the leads was carried out prior to drilling the 8/10-3 Megalodon well. In the final evaluation of the licence, post Megalodon, no new volume estimations have been made although re-risking has been performed, see 5.3 Risking. The major risk elements are considered to be source presence and trap geometries. 3D seismic interpretation would be necessary for maturing the leads to prospects providing more confidence in the trap mapping, but would not address the source presence risk.

5.1 Trap

According to the most recent interpretation and depth conversion, the structures appear as large robust closures in time, but the corresponding depth models vary considerably depending upon which depth conversion method is used. A comparison of TWT and depth maps are shown in Figure 5.1.

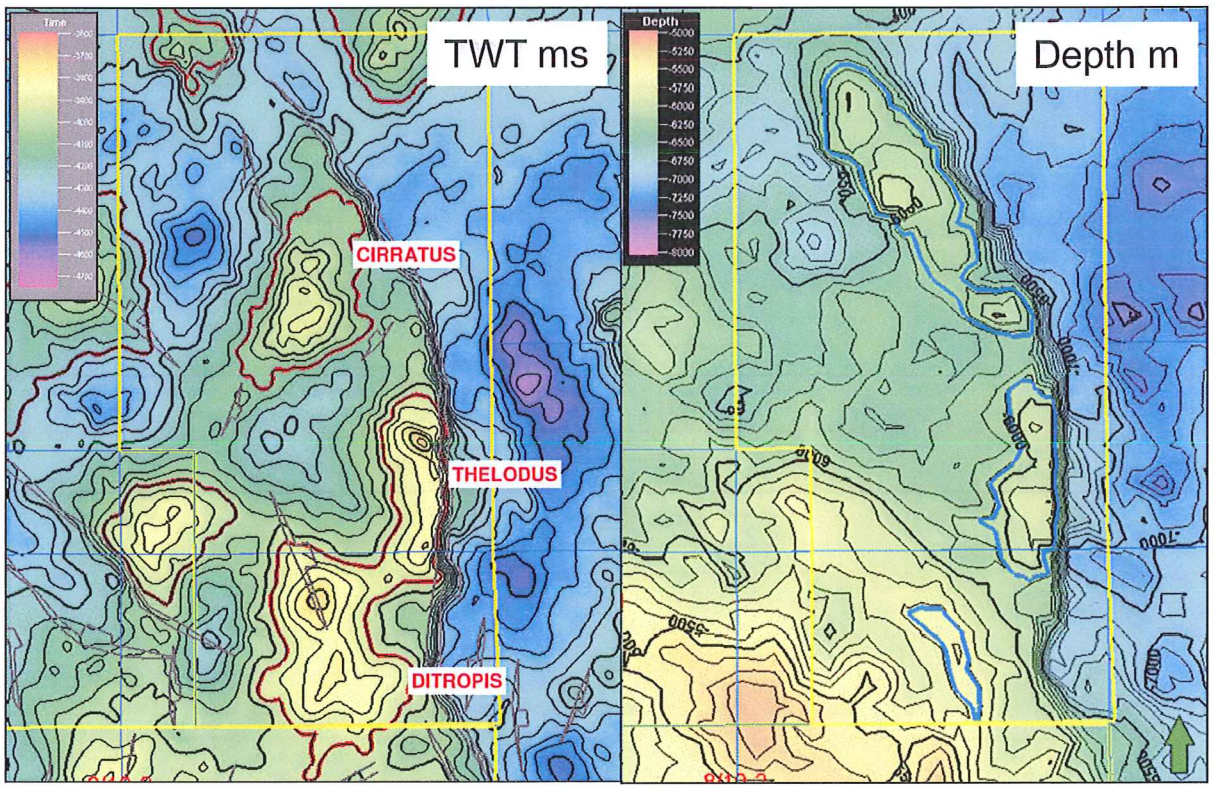

Figure 5.1 Top Rotliegendes TWT and Depth Maps over PL499S. *TWT in ms; depth in metres TVDSS. Note the depth map is derived from the VoK depth conversion method.*

The post Megalodon maps indicate that the previously defined Ditropis lead has significantly reduced in size and probably should no longer be carried as a lead. The crests of Cirratus and Thelodus move down from 5900m to 6670m and from 5780m to 6340, respectively, a change of 750m and 550m respectively.

5.2 Volumes

Volume calculations made prior to drilling of the Megalodon well and post well re-mapping and depth conversion are summarised in Figure 5.2 and Figure 5.3.

Table: Prospect data

Block	Prospect name		Discovery/Prosp/Lead		Prosp ID (or New!)	NPD approved?
1/3, 7/12, 2/1	Cirratus		Prospect		*NPD will insert data*	*NPD will insert data*
Play (name / new)	Structural element		Company/ reported by / Ref. doc.			Year
NPD will insert data	Norwegian Danish Basin		ConocoPhillips			2012
Oil/Gas case	**Resources IN PLACE**					
	Main phase			Ass. phase		
	Low	Base	High	Low	Base	High
Oil 10^6 Sm^3						
Gas 10^9 Sm^3	263	585	1059			
	Resources RECOVERABLE					
	Main phase			Ass. phase		
	Low	Base	High	Low	Base	High
Oil 10^6 Sm^3						
Gas 10^9 Sm^3	0,09	0,39	0,86			
	Which fractiles are used as:		Low:	P90	High:	P10
Type of trap	Water depth (m)		Reservoir Chrono (from - to)		Reservoir Litho (from - to)	
4-way dip	60		Permian (Capitanian)		Rotliegendes Group, Auk Formation	
Source Rock, Chrono	Source Rock, Litho		Seal, Chrono		Seal, Litho	
Carboniferous			Permian (Changhsigian-Wuchiapingian)		Zechstein, Salt	
Seismic database (2D/3D):	2D					
Probability of discovery:						
Technical (oil+gas case)	0,03			Prob for oil/gas case		
Probability (fraction):	Reservoir (P1)	Trap (P2)	Charge (P3)	Retention (P4)		
	0,6	0,5	0,14	0,8		
Parametres:	Low	Base	High	Comments		
Depth to top of prospect (m)	5725	5800	6250	The gas is expected to be very dry - hardly any condensate - very low CGR. Further it must be noted that the depth to top of prospect has been changed to deeper levels after new depth conversion. New volumetrics has not been done however.		
Area of closure (km^2)	6	28	52			
Reservoir thickness (m)	170	320	495			
HC column in prospect (m)	270	270	270			
Gross rock vol. (10^9 m^3)		3,4				
Net / Gross (fraction)	0,6	0,7	0,8			
Porosity (fraction)	0,1	0,15	0,2			
Water Saturation (fraction)	0,2	0,38	0,55			
Bg. (<1)	0,00295	0,00297	0,00301			
Bo. (>1)						
GOR, free gas (Sm^3 /Sm^3)						
GOR, oil (Sm^3 /Sm^3)						
Recovery factor, main phase	0,65	0,73	0,77			
Recovery factor, ass. phase						
Temperature, top res (deg C) :	189	Pressure, top res (bar) :			912	

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Dato:		Dato:		Dato:		

Figure 5.2 Cirratus Prospect data

Table: Prospect data

Block	Prospect name		Discovery/Prosp/Lead		Prosp ID (or New!)	NPD approved?
1/3, 7/12, 2/1	Thelodus		Prospect		*NPD will insert data*	*NPD will insert data*
Play (name / new)	Structural element		Company/ reported by / Ref. doc.			Year
NPD will insert data	Norwegian Danish Basin		ConocoPhillips			2012
Oil/Gas case	**Resources IN PLACE**					
	Main phase			Ass. phase		
	Low	Base	High	Low	Base	High
Oil 10^6 Sm^3						
Gas 10^9 Sm^3	100	282	565			
	Resources RECOVERABLE					
	Main phase			Ass. phase		
	Low	Base	High	Low	Base	High
Oil 10^6 Sm^3						
Gas 10^9 Sm^3	0,06	0,24	0,5			
	Which fractiles are used as:		Low:	P90	High:	P10
Type of trap	Water depth (m)		Reservoir Chrono (from - to)		Reservoir Litho (from - to)	
4-way dip	60		Permian (Capitanian)		Rotliegendes Group, Auk Formation	
Source Rock, Chrono	Source Rock, Litho		Seal, Chrono		Seal, Litho	
Carboniferous			Permian (Changhsingian-Wuchiapingian)		Zechstein, Salt	
Seismic database (2D/3D):	2D					
Probability of discovery:						
Technical (oil+gas case)	0,04		Prob for oil/gas case			
Probability (fraction):	Reservoir (P1)	Trap (P2)	Charge (P3)	Retention (P4)		
	0,6	0,7	0,14	0,7		
Parametres:	Low	Base	High	Comments		
Depth to top of prospect (m)	5575	5700	6000	The gas is expected to be very dry - hardly any condensate - very low CGR. Further it must be noted that the depth to top of prospect has been changed to deeper levels after new depth conversion. New volumetrics has not been done however.		
Area of closure (km^2)	20		26			
Reservoir thickness (m)	170	320	495			
HC column in prospect (m)	280	280	280			
Gross rock vol. (10^9 m^3)		2,06				
Net / Gross (fraction)	0,6	0,7	0,8			
Porosity (fraction)	0,1	0,15	0,2			
Water Saturation (fraction)	0,2	0,38	0,55			
Bg. (<1)	0,00295	0,00297	0,00301			
Bo. (>1)						
GOR, free gas (Sm^3 /Sm^3)						
GOR, oil (Sm^3 /Sm^3)						
Recovery factor, main phase	0,65	0,73	0,77			
Recovery factor, ass. phase						
Temperature, top res (deg C) :	198	Pressure, top res (bar) :		912		

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Figure 5.3 Thelodus Prospect Data

After the 8/10-3 well the identification of a thick Frazerbugh Formation mudstone interval places the expected top reservoir 400-700m deeper than initial maps indicate (Figure 4.2). However no new volumetrics were calculated as the general trap shapes are similar but deeper and within the uncertainties of the 2D mapping and depth conversion. They were regarded as giving a reasonable volumetric range for the leads, although anticipated to be on the optimistic side. It is expected that

the anticipated volumes of the latest mapped leads may be approximately 60-80% of those calculated in 2009.

5.3 Risking

The critical risk for the leads in PL499 is source rock presence. Source presence being a ***shared*** risk means that when a well in the same play proves the presence of source rocks, this risk element would be eliminated for any remaining prospects. Since the PL331 Megalodon 8/10-3 well was dry, a working Carboniferous source rock and charge system has not yet been proven. There is a large uncertainty, but still a possibility of source as the Megalodon well may have failed due to potential migration issues precluding charging the Megalodon structure.

A post Megalodon re-evaluation of the risk of the PL499S license leads has been performed and the pre- and post- Megalodon risks are shown in Figure 5.4. Overall the probablility of success for the PL499S leads have decreased significantly due to the negative outcome of the Megalodon well. There is a significant perceived increase in source risk and an increased risk in reservoir due to the greater depths now anticipated for top reservoir. The trap risk has not changed and could only be improved with the use of 3D seismic. The migration risk has not been changed as the leads are located adjacent to the prognosed source basin and also the containment risk has not changed.

Ditropis

	Pre Megalodon	Post Megalodon
Source	0,5	0,2
Reservoir	0,7	0,6
Trap	0,8	0,8
Migration	0,7	0,7
Containment	0,7	0,7
Ps	**13 %**	**5 %**

Cirratus

	Pre Megalodon	Post Megalodon
Source	0,5	0,2
Reservoir	0,7	0,6
Trap	0,5	0,5
Migration	0,7	0,7
Containment	0,8	0,8
Ps	**9 %**	**3 %**

Thelodus

	Pre Megalodon	Post Megalodon
Source	0,5	0,2
Reservoir	0,7	0,6
Trap	0,8	0,7
Migration	0,7	0,7
Containment	0,7	0,7
Ps	**13 %**	**4 %**

Figure 5.4 PL499S Lead risk evaluation post Megalodon Well

6 References

ConocoPhillips (2004) *Awards in Predefined areas 2004, Open blocks 8/10 & 8/11 and part and Blocks 2/2 and 2/3*

ConocoPhillips (2007) *Awards in Predefined areas 2007, Blocks 8/8 and 8/11*

ConocoPhillips (2008) *Awards in Predefined areas 2007, Application for part blocks 8/8 & 8/11*