






# Hansa Hydrocarbons Limited

**Licence P2088 Block 048-17d Relinquishment Report**

## Document Control

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## Revisions

Version	Date	Remark/Update
V1	24/10/16	
V2	xx/10/16	Incorporating comments from internal Hansa Review

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# 1 Licence Information

Licence Number: **P2088**

Licence Round: **27<sup>th</sup> Round – Expiry 31<sup>st</sup> December 2016**

Licence Type: **Traditional**

Block Number: **048/17d**

All permissions to publish this report have been obtained.

# 2 Licence Synopsis

## P2088

Licence P2088 is shown in Figure 1. The Licence was awarded 100% to Hansa Hydrocarbons Ltd (Hansa) in July 2013 and at the end of the initial term it was relinquished in its entirety.

# 3 Work Programme Summary

## Original work programme:

- Obtain 300 km of 2D seismic data
- Undertake depth conversion studies

## Work Undertaken

Obtain 300 km of 2D seismic data	<ul style="list-style-type: none"> <li>• 3 different sets of vintage 2D seismic were obtained amounting to a total of 3885 line kilometres.</li> <li>• MB882D1012 was acquired in 1988 by Western Geco for Mobil Oil and amounts to a total of 329 Km</li> <li>• AT912D0007 was acquired in 1991 by western Geco for Arco and amounts to a total of 502 Km</li> <li>• GC812D1010 was acquired in 1981 by SSL for the Gas council and amounts to a total of 2978 Km</li> </ul> <p>A regional intra Carboniferous flooding surface was mapped on the obtained 2D seismic. Reservoir effectiveness and top seal are the key risks for the play. Figure 5 shows the regional sequence boundary mapped.</p>
Depth conversion	<ul style="list-style-type: none"> <li>• A nine layer depth conversion was performed using a combination of velocities determined by a refraction tomography, VOK method and constant interval velocities as shown in figure 2.</li> <li>• The depth structure at top Rotliegend is most sensitive to velocity models for the Chalk and Zechstein Groups.</li> <li>• For the uppermost layer, mean sea level to base chalk, an innovative methodology using the refracted arrivals from the raw 3D dataset was</li> </ul>

	<p>employed. The benefits of this methodology were manifold:</p> <ul style="list-style-type: none"> <li>• 1.) Generates robust velocity model for Chalk</li> <li>• 2.) Corroborates previous east-west velocity trend that was derived from stacking velocities</li> <li>• 3.) Captures velocity anomalies of incised channel at sea bed</li> <li>• For the Zechstein, the velocity varies from the relatively slow halites to the fast anhydrites and dolomites. For the purpose of depth conversion the interval was divided into three layers and converted using constant interval velocities as shown below:             <ul style="list-style-type: none"> <li>• 1.) Brockelschiefer to PlattenDolomit – 4103m/s</li> <li>• 2.) PlattenDolomit to Basalanhydrit – 5370 m/s</li> <li>• 3.) Basalanhydrit to Rotliegend – 6069 m/s</li> </ul> </li> </ul>
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## 4 Database

The well database within Licence P2088 is shown in Figure 1. Key offset wells are summarized in the table below, well 048/17-01 is the only well in the Licence. The seismic dataset utilised by Hansa was the PreSDM GXT 2010 based on the GECO-Prakla TQ4895 Phase I, TQ4896 Phase III and TQ4897 Phase V surveys acquired between 1995 and 1997, reprocessed in 2010 on a proprietary basis for Hansa by GXT Ltd.

048/16b-02	<ul style="list-style-type: none"> <li>• Discovery well of Thoresby Field (formerly called Islay and Chablis) although the discovery was considered non-commercial at the time.</li> <li>• Drilled by ConocoPhillips in 2002</li> <li>• TD in the Carboniferous at 2584m TVDSS</li> <li>• GWC interpreted at 2443m TVDSS giving a 17m gas column</li> <li>• 35m of core was taken</li> <li>• High water saturations were interpreted from logs at the time of drilling, although later work showed significant formation damage.</li> </ul>
048/16b-03z	<ul style="list-style-type: none"> <li>• Appraisal well to the Thoresby Discovery</li> <li>• Drilled by Serica Energy and Hansa in 2009</li> <li>• TD in the Lemman sandstone at 2480m TVDSS</li> <li>• Top Lemman was low to prognosis and the well was neither cored nor tested.</li> <li>• Post well analysis showed the well may have a missing section due to faulting.</li> <li>• Significantly better reservoir quality than in 048/16b-02 was encountered</li> <li>• GWC encountered at 2443m TVDSS</li> </ul>

048/17-01	<ul style="list-style-type: none"> <li>• Exploration well drilled by Mobil Oil North Sea Ltd in 1969</li> <li>• TD in the Carboniferous at 2538 TVDSS</li> <li>• Found 52 m of good porosity reservoir ( 20%) but dry</li> <li>• Cored 17 m in the Leman Sandstone</li> </ul>
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Table 1: Well Database

## 5 Prospectivity Update

At the time of application for the Licence the identified prospectivity consisted primarily of an eastward extension of the Thoresby discovery (Rotliegend Leman Sandstone), named Thoresby East. Thoresby East has limited relief in the time domain but in depth has significant closure. The difference between time and depth is due primarily to a velocity gradient in the Chalk, identified from the refraction tomography study and well data. The primary reservoir is the Rotliegend Leman Sandstone which was developed in 48/16-02 and 48/16b-03z, of better quality in the latter. The primary facies type in this area is aeolian and poroperms are generally good.

The reservoir is charged by the Carboniferous Coal Measures which are a prolific source rock and have charged all adjacent fields. Excellent migration pathways exist from the source into the Rotliegend Formation.

The traps at Rotliegend level identified in the block are low relief four-way dip or fault bounded closures. These are very sensitive to velocity variations in the overburden and this is one of the key risks.

Additionally a regional intra Carboniferous flooding surface was mapped on the obtained 2D seismic dataset. Two untested traps exist within Licence P2088 as shown in figure 5. Reservoir effectiveness and intra Carboniferous seal are the key risks.

## 6 Further Technical Work Undertaken

- A coloured inversion was performed on the PreSDM GXT 2010 seismic volume to aid reservoir discrimination.
- A static and dynamic 3D geocellular model was produced. A base case static model was built using Petrel for the entire Thoresby closure comprising Thoresby and Thoresby East and extended to include the Waveney field and wells 048/17-01 and 048/17c-12.
- A dynamic model has been built for Thoresby using Eclipse100. The model has been restricted to the Thoresby and Thoresby East Areas.

## 7 Resource and Risk Summary

Resource and Risk Summary										
Prospect Lead Discovery Name	P L D	Stratigraphic level	Unrisked recoverable resources						Geological Chance of Success %	Risked P50 MMboe
			Oil MMbbls			Gas BCF				
			Low	Central	High	Low	Central	High		
Thoresby East	P	Rotliegend	-	-	-	43	55	69	50	-

Note: Thoresby East structure extends across 048/16C, 048/17d and 048/22

## 8 Conclusions

Licence P2088 was relinquished at the end of the first term because of lack of partners to participate in a well.

## 9 Clearance

All permissions to publish have been obtained.

## 10 Maps and Figures

Figure 1: Location map of Licence, regional well database, reprocessed seismic and Thoresby discovery

Figure 2: Depth conversion scheme

Figure 3: Rotliegend Depth Grid (10m contours. GWC of 2443m marked in dark blue)

Figure 4: Seismic section in West – East orientation through prospect

Figure 5: Intra Carboniferous flooding surface and two mapped closures occurring partly within Licence P2088.





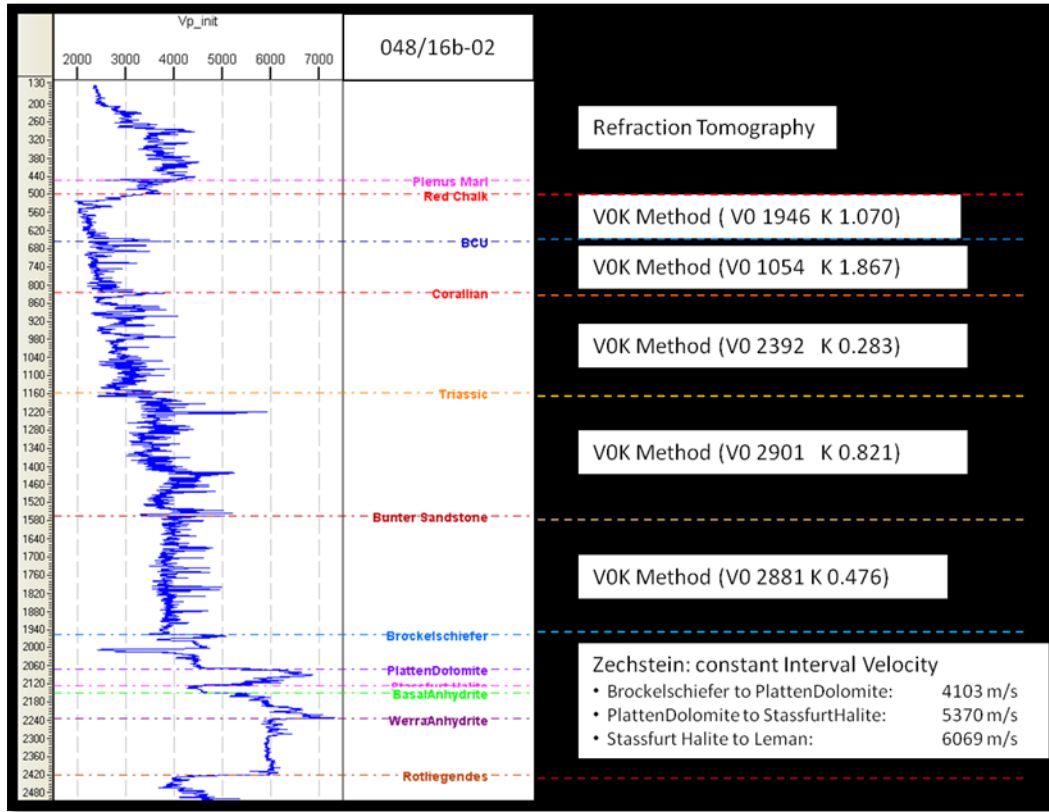


Figure 2: Depth conversion scheme

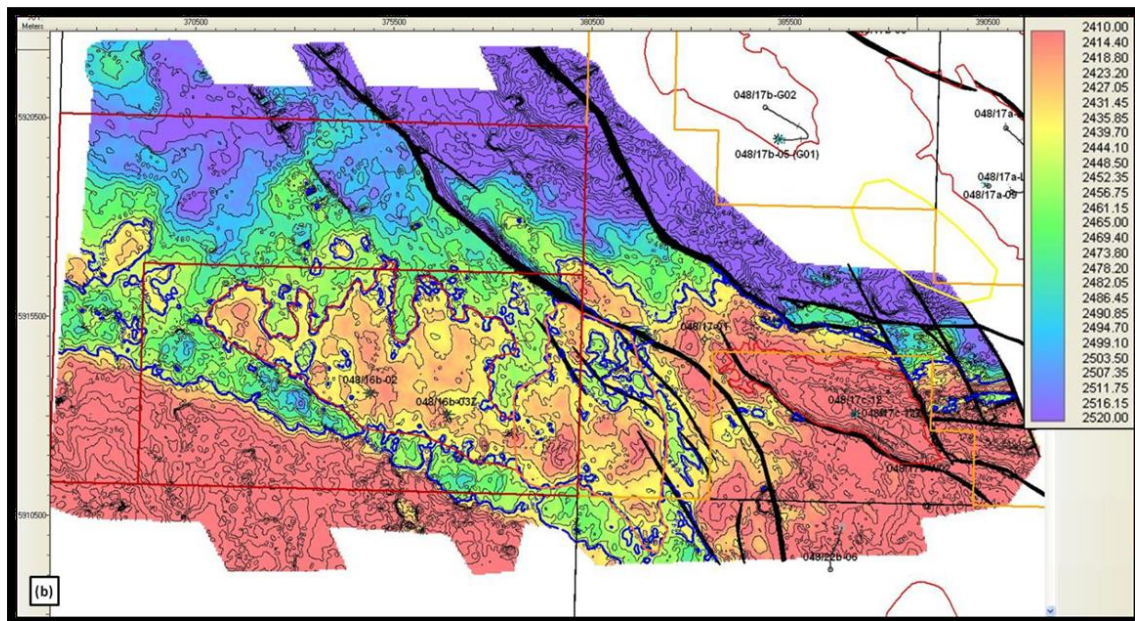


Figure 3: Rotliegend Depth Grid (10m contours. GWC of 2443m marked in dark blue)

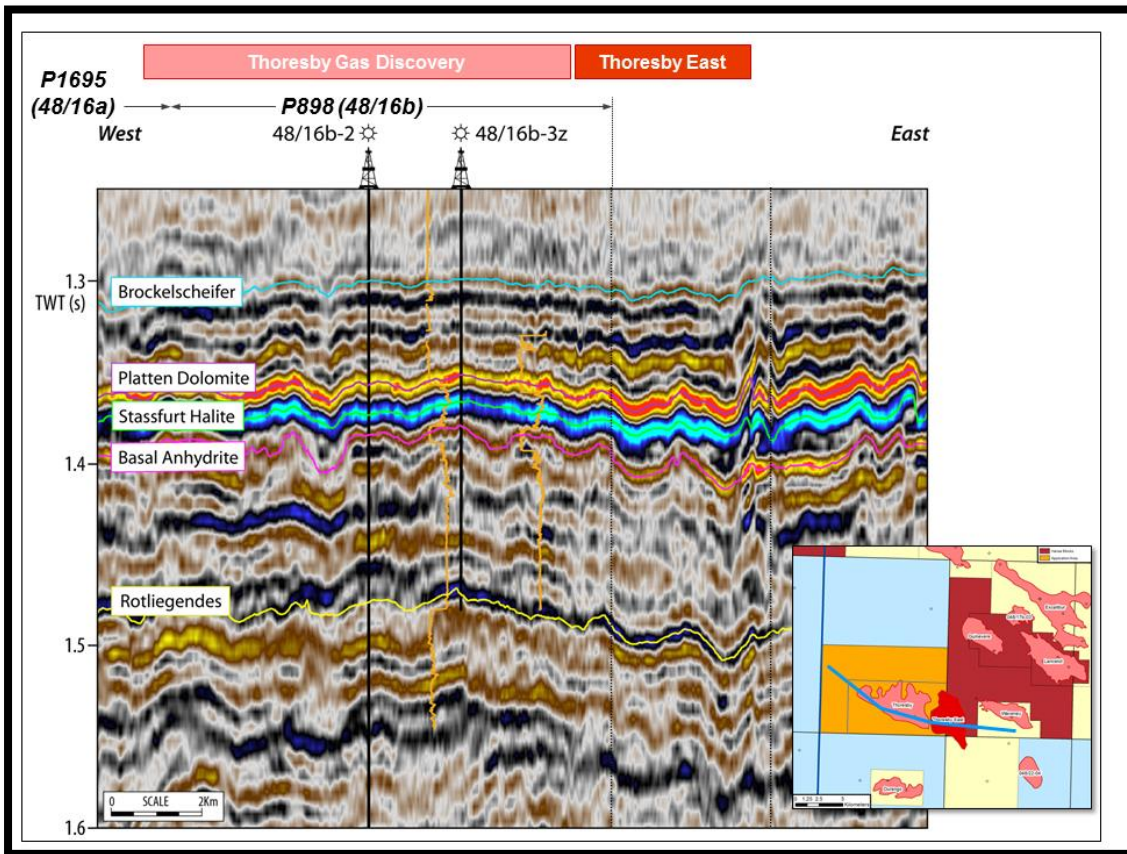


Figure 4: Seismic section in West – East orientation through prospect. Data courtesy of WesternGeco.

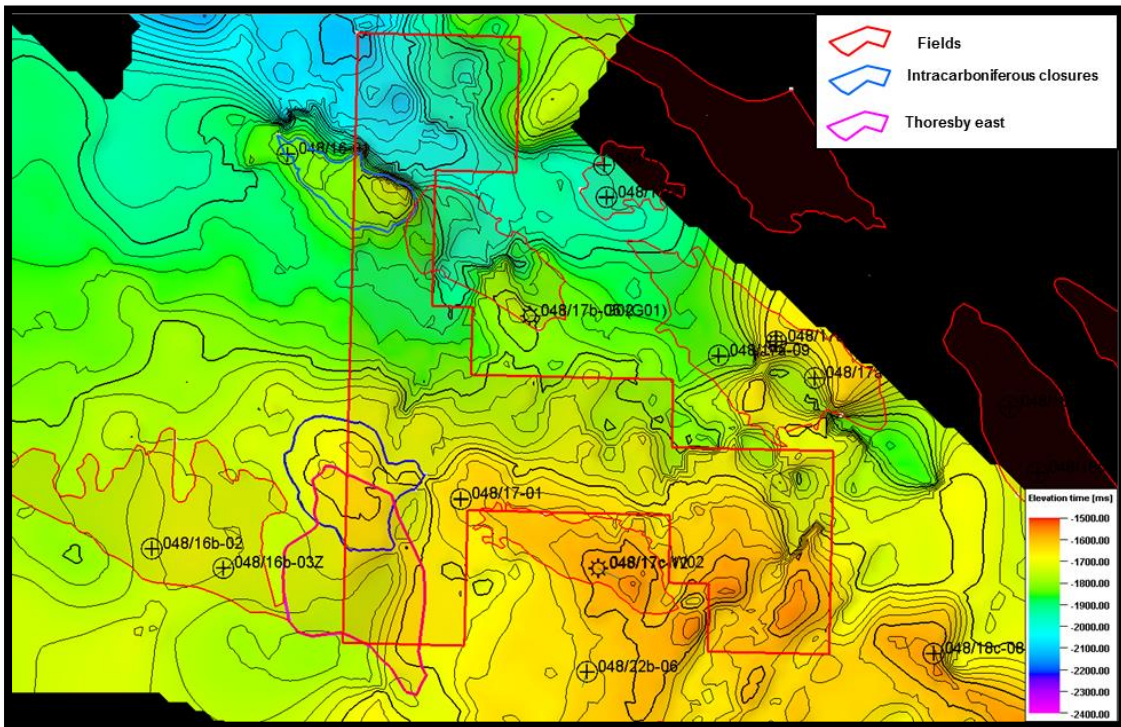


Figure 5: Intra Carboniferous flooding surface and two mapped closures occurring partly within Licence P2088.