Final Licence Relinquishment Report

Licence P1614

UKCS Blocks 15/30b

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Compiled By: Mark Goodchild & Tue Larsson
JX Nippon Exploration and Production (U.K.) Limited
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1. SYNOPSIS

P1614 was awarded under the 25th UK offshore licensing round. The licence comprises a single part-block (15/30b) covering a total area of 43.5 sq km (Figure 1). The licence was originally awarded to a group comprising Nippon Oil Exploration & Production Ltd (NOEPUK, 33.33% op), Stratic Energy UK Ltd (33.33%) and XTO UK Ltd (33.33%). Subsequent changes in the licence group during the initial term saw EnQuest assume Stratics’ equity and XTO merge with ExxonMobil. Thus, the licence group at the time of compiling this report is;

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<td>JX Nippon</td>
<td>33.33% and operator</td>
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<td>EnQuest plc</td>
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<td>XTO/XOM</td>
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At the time of application, prospectivity had been identified at a primary Upper Jurassic level, with a possible extension of the Bowmore (Alpha) prospect in licence P1465 mapped in-block. A small lead at Palaeocene Forties sandstone level was also recognised and a seismic work commitment and drill or drop well was bid commensurate with this pre-award evaluation. The subsequent work programme under licence P1614 has focused on maturing prospects at both levels. However, the remaining prospectivity at Jurassic level following the drilling of Bowmore appraisal well 15/24a-9 in P1465 is considered to be high risk and with limited resource potential. At Palaeocene (Forties Sst) and Eocene levels, a number of small anomalies have been identified outside of the licence on the basis of calibrated amplitude modeling but no significant prospectivity was recognised on-block at this level. A decision to relinquish the licence prior to the expiry of the initial 4 year term was therefore made.

2. INTRODUCTION

2a. Licence Terms

P1614 was awarded to the NOEPUK-operated group, effective 20th June 2009, under the 25th UK offshore licensing round. The firm commitment associated with the licence was;

- Obtain 43.5 sq km of 3D seismic data.

In addition, a drill or drop commitment required that;

- The licensee drill one well to 2700m or into water-bearing Forties Formation, whichever is the shallower or
- Elect to allow the licence to automatically cease and determine pursuant to Clause 3.

As described in more detail below, the firm element of the work programme has been fulfilled.
2b. Database

Figure 2 shows the seismic database utilised by the group in the evaluation of P1614. The pre-application evaluation was undertaken using a semi-regional seismic database comprising elements of 4 surveys; Western Geophysical 1993 3D survey, released Conoco (MacCulloch) and Chevron (Britannia) 3D surveys and, to the west, CGGVeritas long offset data. Post-award, an additional 58 sq km of CGGVeritas long-offset data, including angle stacks and gathers was acquired and this formed the primary dataset for the evaluation. This data was also reprocessed to provide an AVO inversion volume.

All released wells within and surrounding the licence area were utilised in the evaluation. A stratigraphic and petrophysical study of potential Tertiary and Upper Jurassic reservoirs in these wells (44 Palaeocene and 33 Jurassic well penetrations) was commissioned and undertaken by Merlin Energy Resources (Merlin) to support the assessment of prospectivity.

3. EXPLORATION/APPRaisal ACTIVITY

3a. Seismic

The Group acquired 58 sq km of the long offset CGGVeritas survey over the prospective area of the Licence. The data was processed to PSTM output.

3D Seismic Inversion

A well-calibrated AVO-Inversion was run over an area of 85km², by IKON Science Ltd. The inverted data covered the block 15/30b and an area beyond to the south and the west, and especially the Ptarmigan field (Well 15/29a-9) was included in the area. The AVO-Inversion targeted the Forties interval but it included the Eocene. Both P- and S-Impedance cubes were produces along with a Vp/Vs cube.

AVO Studies

AVO forward modeling was performed for two wells (15/29a-9 and 15/30-4). Synthetic angle gathers were run for four cases: In-situ (bore-hole corrected), Water, Oil and Gas. The AVO response was modeled over the range 0-40° and amplitude variations were analysed at Forties and Eocene level. The models provided rock physics thresholds applicable to the data sets derived from the AVO-Inversion.

3b. Wells Drilled

No wells were drilled under the terms of P1614.

4. REVIEW OF REMAINING PROSPECTIVITY

4a. Jurassic Prospects and Leads

The groups’ evaluation of block 15/30b for the 25th Round identified a possible extension of the Bowmore prospect, mapped at Upper Jurassic Galley Sandstone level, in blocks 15/24a and 15/24c at P50 and P10 levels. The subsequent drilling of an appraisal well on Bowmore (15/24a-9) confirmed a contact close to the P90 level however and remapping post well indicates that the prospect does not extend into 15/30b.
A small combination structural-stratigraphic prospect has been recognised at Upper Jurassic level in 15/30b, the trap requiring up-dip pinchout of the Galley Sandstone across a northwest-southeast trending tilted fault block (Figures 3 and 4). The prospect is judged to be high risk (GCOS 17%), with the mapped Galley Sandstone fairway being located west of the block, and a P50 GIIP of 23 Bcf has been calculated. This is not considered to be a commercial volume.

4b. Palaeocene Prospects and Leads

The original licence application identified a small closure at Forties sandstone level, northeast of the Ptarmigan field. This structure was calculated to have a STOIIP of 3 MMbo. Re-mapping on the new CGGVeritas data confirmed the presence of a small 4 way dip closed high (Figure 5 Forties A prospect), but with a weak, diffuse amplitude trend which appears to be marginal to the main Forties Sandstone fairway and shows no clear conformance with structure (Figure 6).

In order to further assess the prospectivity at Forties Sandstone level, a series of rock physics models were constructed to calibrate to known hydrocarbons in the Ptarmigan field (Figures 7 and 8) and offset well 15/30-4 (Figures 10 and 11). These suggest that a type II (Phase reversal) response would be expected for oil-bearing Forties sandstone. The P-Impedance and Vp/Vs data sets were then used to screen the block at both Forties sandstone and Eocene target levels and P-Impedance and Vp/Vs maps were used to assess the likely distribution of hydrocarbons at Tertiary level. These confirm the absence of viable hydrocarbon anomalies on block (Figures 9 and 12).

5. RESOURCE AND RISK SUMMARY

As described above, the remaining resource potential of Licence P1614 at both Jurassic and Tertiary levels are considered to be too low, and to carry too high a risk, to support further exploration activity. For this reason, a decision was made to relinquish the licence, having fulfilled the initial term work commitment.

6. CLEARANCE

The operator and partners confirm that the DECC is free to publish information contained in this report. It is also confirmed that all 3rd party ownership rights on data or interpretations contained herein have been reviewed and appropriately cleared for publication purposes.
Figure 1: P1614 Licence location map

Figure 2: P1614 3D seismic database
Figure 3: P1614 Top Galley Sst Depth (CI 10’)

Figure 4: SW-NE random tracks showing Galley Sst pinch-out
Figure 5: P1614 Top Forties Sst Depth (20')

Figure 6: P1614 Top Forties Sst Amplitude
Figure 7: Ptarmigan (15/29a-9) AVO modelling at Forties Sst level

Figure 8: Quantitative Rock Physics interpretation model for Forties Sst

The simple model suggests that hydrocarbon can be found where AI is low (i.e. no response) and Vp/Vs is very low.
Figure 9: Map showing areas where Al < 6800 and Vp/Vs < 2.1 at Forties Sst level

Figure 10: AVO model for Eocene in well 15/30-4
Figure 11: Fluid response on gathers at Eocene level

Figure 12: AVO model for Eocene in well 15/30-4