### Relinquishment Report

**Licence P225**  
**Block 16/27a N**

<table>
<thead>
<tr>
<th>Job Title</th>
<th>Approver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licence Manager</td>
<td>Senior Geologist</td>
</tr>
<tr>
<td>Name</td>
<td>Angela Dobb</td>
</tr>
<tr>
<td>Signature</td>
<td>Jo Baggaley</td>
</tr>
<tr>
<td>Date</td>
<td>17/2/16</td>
</tr>
</tbody>
</table>

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1 Licence Information

<table>
<thead>
<tr>
<th>Licence Number:</th>
<th>P225</th>
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<tbody>
<tr>
<td>Licence Round:</td>
<td>4th</td>
</tr>
<tr>
<td>Award Date:</td>
<td>16th March 1972</td>
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<td>Licence Type:</td>
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<tr>
<td>Block Numbers:</td>
<td>16/27a Rest of Block (Contract Area 2) Part A</td>
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<tr>
<td>Operator &amp; Equity:</td>
<td>Dana Petroleum (BVUK) Limited – 100% and Operator</td>
</tr>
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</table>

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2 Licence Synopsis

Licence P225 (blocks 16/17, 16/27, 20/04 & 30/27) was awarded to Phillips Petroleum Limited, Fina Exploration Limited, Agip (UK) Ltd, Century Power and Light Ltd and Oil Exploration (Holdings) on the 16th March 1972 as a traditional seaward licence in the 4th Licence round. Originally the licence comprised of the four separate blocks, with 16/27 forming just part of the licence.

Block 16/27a was created on 15th March 1978 after the mandatory relinquishment of approximately 50% of the block. Block 16/27a Rest of Block (Contract Area 2) Part A was created in January 1995.

The partnerships and sub-blocks changed frequently. Bow Valley Petroleum (UK) Ltd entered the block in September 2005 with the acquisition of Conoco’s and Eni’s interests leaving Fina Exploration Ltd as the other partner. GDF Britain Limited acquired Fina Exploration’s interests in January 2008 (GDF Britain Ltd later changed to GDF Suez E&P UK Ltd). In 2009 Dana Petroleum (BVUK) Ltd took over Bow Valley. GDF Suez withdrew from the licence in December 2014 leaving Dana as the only party left in the acreage. Figure 1 shows P225 – Block 16/27a.
Figure 1: Location map showing extent of Block 16/27a Rest – P225
3 Work Programme Summary

Original 4th round licence covered multiple blocks. Any work programme would have been fulfilled prior to the creation of licence P225 16/27a Rest. Recent commitments on the block were met by the drilling of 16/27a-8 by Bow Valley.

There are no outstanding commitments on the licence.

4 Database

Several 3D seismic datasets cover block 16/27a(N). The data used for the latest evaluation was the PGS MegaMerge.

A considerable number of wells, both exploration and development, have been drilled on and in the vicinity of block 16/27a(N). The key wells used in this evaluation are detailed in Table 1.

<table>
<thead>
<tr>
<th>Well</th>
<th>Year</th>
<th>Operator</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>16/27-1z</td>
<td>1975</td>
<td>Phillips</td>
<td>P&amp;A Oil</td>
</tr>
<tr>
<td>16/27a-2z</td>
<td>1980</td>
<td>Phillips</td>
<td>P&amp;A Oil &amp; Gas</td>
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<tr>
<td>16/27a-3</td>
<td>1981</td>
<td>Phillips</td>
<td>P&amp;A Gas w/ Oil shows</td>
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<td>16/27b-4,4z</td>
<td>1982</td>
<td>Gulf Oil</td>
<td>P&amp;A Dry hole</td>
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<td>16/27b-5</td>
<td>1986</td>
<td>Chevron</td>
<td>P&amp;A Oil shows</td>
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<td>16/27a-6</td>
<td>1991</td>
<td>Phillips</td>
<td>Suspended Gas/Condensate well</td>
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<tr>
<td>16/27a-7</td>
<td>1991</td>
<td>Phillips</td>
<td>P&amp;A Gas/Cond Shows</td>
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<td>16/27a-8</td>
<td>2008</td>
<td>Bow Valley</td>
<td>P&amp;A Dry</td>
</tr>
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<td>16/26-1A</td>
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<td>Transocean Oil</td>
<td>P&amp;A Oil</td>
</tr>
<tr>
<td>16/28-4</td>
<td>1979</td>
<td>BP</td>
<td>P&amp;A Oil</td>
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<tr>
<td>16/28-15z</td>
<td>1990</td>
<td>BP</td>
<td>P&amp;A Dry</td>
</tr>
</tbody>
</table>

Table 1: Exploration well database
5 Prospectivity Update

P225 lies within a prolific hydrocarbon producing province though Block 16/27a(N) is relatively under-explored. Only one well has been drilled on 16/27a(N), well 16/27a-8, which targeted stacked Tertiary prospects. Wells 16/27a-6 and 16/27a-7 were drilled just outside of part-block 16/27a N, targeting potential Lower Cretaceous Britannia field extensions. Both wells found thick Britannia Formation sandstones. Figure 2 shows the typical stratigraphic column for the area.

Block 16/27a directly overlies the site of Jurassic doming and the triple junction (of the Witch Ground, South Viking and Central Grabens) of the failed North Sea rift system. The rift system was significant throughout the Jurassic and persisted into the mid-Cretaceous. Lower Jurassic and Middle Jurassic sediments are typically absent in the block either due to non-deposition, or erosion following the Middle – Jurassic thermal doming and uplift event.

A major phase of extension occurred during the Oxfordian to Kimmeridgian resulting in the development of asymmetric graben and tilted fault blocks in the South Viking graben. This was accompanied by the uplift of the Fladen Ground Spur. The Fladen Ground spur acted as a source for Upper Jurassic clastic sediments.
Figure 2: Summary Stratigraphic Column for 16/27 Area

Figures 3 shows the key structural elements of the block 16/27a(N) area.
In the South Viking Graben Upper Jurassic syn-rift deposition of deep marine sediments such as the deep water Brae conglomerates took place. The southern most part of the South Viking Graben saw the deposition of shallower water sediments such as the shallow marine sandstones seen at Glamis. These may be present in 16/27.

The structural architecture developed at end Jurassic times persisted up into the lower Cretaceous and influenced the Britannia Formation sandstone deposition. The marine turbidite depositional system of the Lower Cretaceous consisted of two depositional fairways adjacent to the Halibut Horst, the South Halibut Basin and the larger Witch Ground Graben. Over 250m of Britannia sandstones were deposited in the deepest parts of the Witch Ground Graben with the inherited end Jurassic architecture controlling the accommodation space.

Fault activity was largely ended by the late Upper Cretaceous leading to the development of a relatively uniform thickness Ekofisk Formation.

In the Palaeocene, subsidence once again created accommodation space and the large deep marine turbidite fan complexes of the Andrew and Forties Formations developed. By the
Eocene, this turbidite deposition had filled the deep marine basin floor topography. Since the deposition of the Alba sand complexes (mainly in the southwest of the study area) and their early remobilization, the area has generally received only mudstones into relative deep-water environments.

The primary source rock is the Kimmeridge Clay Formation (KCF). The Kimmeridge Clay is the primary source for hydrocarbons throughout the Outer Moray Firth and South Viking Graben area.

16/27a-8

Well 16/27a-8 (Figure 4) was a deviated exploration well drilled by Bow Valley in 2008 to evaluate four stacked tertiary targets. The three uppermost targets, K, I1 and I2 (Figure 5) all exhibited anomalous seismic amplitudes and were interpreted as turbidite channel features. The lowermost target (H) was a mapped low relief anticlinal feature at Palaeocene Balmoral Sand level.

![Figure 4: Map showing location of 16/27a-8 well](image)

No significant sands or shows were encountered at the K and I2 target levels. The Lothian I1 target sands were confirmed present but wet. A high percentage of these sands at I1 level proved to be unexpectedly dominated by strong calcite cement, completely occluding porosity in part and with more the appearance and physical characteristics of limestone rather than sand. This is the likely cause of the anomalous seismic amplitudes.
The well failed to reach the deepest target, the Palaeocene Balmoral sand, due to irredeemable mechanical failure in the high-angle toe section of the deviated well.

Downhole data acquired comprises cuttings samples, limited MWD logs and mudlog records. No side wall cores, pressures or tests were taken. The well was permanently abandoned as a dry hole.

Figure 5 shows a seismic line through the targets.

Figure 5: Seismic line showing 16/27a-8 well targets (Data courtesy of PGS)

Figure 6 shows the logs acquired and the stratigraphic interpretation.
Figure 6: 16/27a-8 logs and Stratigraphic Summary

Figure 7 shows the remaining prospectivity that has been identified on Block 16/27a(N).

Figure 7: Map showing remaining prospectivity
Enroll Prospect

The Enroll prospect is a 4 way dip closure at BCU level on the SW flanks of the Fladen Ground Spur, potentially containing Upper Jurassic Glamis type sands (Figure 8). The presence of Upper Jurassic Volgian age sandstones has been confirmed by the 16/26-1a well. This well has 108ft of net sand with oil shows. Enroll is immediately updip of this well (Figure 9). The overall COS of this prospect is 31.5% with the main geological risk being reservoir presence. The P50 recoverable resource is 6.6MMboe. However, the crest of the prospect lies in Block 16/26.

Figure 8: BCU depth map showing Enroll structure
Edzell Prospect

The Edzell prospect is a three way dip closure at BCU level on the SE flanks of Fladen Ground Spur potentially containing Upper Jurassic Glamis sandstones. It is located at the tip of the spur where the South Viking Graben bounding fault dies out. It is interpreted that shallow marine sand deposition may have occurred via a relay ramp in the bounding fault rather than Brae type conglomerates that were deposited adjacent to the steep bounding fault. See Figures 10 & 11.

The COS is 14.4% and the main geological risks are reservoir presence, due to the irregular distribution of Upper Jurassic sand in the area, and also trap effectiveness. The P50 recoverable resource is 4.7MMboe.
Figure 10: Regional BCU depth map & zoom-in showing Edzell prospect

Figure 11: Seismic line showing Edzell prospect (Data courtesy of PGS)
Cairn Toul Prospect

The Cairn Toul prospect is an inverted terrace with a four way dip closure at BCU level. The underlying section was originally predicted to contain Volgian shallow marine sandstones (Glamis Formation or equivalent) as well as Skagerrak. However, the Glamis Formation is not now believed to be present and only the Skagerrak remains prospective (Figures 12 & 13). However, the COS is only 10% and the P50 recoverable volumes are 5.13 mmboe with P50 in place volumes of 17.75 MMbbls.

Figure 12: Regional BCU depth map Cairn Toul prospect
The three remaining prospects (Enroll, Edzell & Cairn Toul) are considered to be too high risk and the on block reserves too small to make them commercially viable.

6 Clearance

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