PROSPEX 2017

UKCS Exploration and Appraisal Performance 2017

Nick Richardson
Head of Exploration & New Ventures

13th December 2017
UKCS Context

Oil price

Government response

Industry outcomes

2017
2016
2015
2014

E&A wells

Production (MMboepd)

Production efficiency (%)

Unit operating costs ($)

SCT & PRT Reduced
£20m for Seismic
£180m for OGTC

£1.3bn Fiscal Package

£20m for Seismic

Wood Review
Scotland’s Expert Commission

HMT Driving Investment

£5m OGA Data & Studies
Decom Tax Transfer

2014
2015
2016

22
26
31

1.65
1.6
1.4

73
71
65

16
21
30
OGA Exploration Plan

- Release of 2016 Gov-Funded Seismic & Additional Data: Q4 2017
- Data Reporting/Retention Consultation: Q4 2017
- Complete National Data Repository Levy Consultation: Q1 2018
- Publish Regional Studies and Play Element Maps: Q1 2018
- Announce Awards from 30th Licensing Round: Q2 2018
- Launch 31st Round: mid-2018
- Revise Yet-to-Find Estimates in Mature and Frontier Areas: Q4 2018

OGA delivering to agenda set out in 2017 Activity Plan
E&A Stewardship Expectations

E&A Work Programme
- Annual E&A work programme
- Resource evaluations
- Pre, syn & post drill evaluations & weekly drilling reports
- OGA involvement prior to investment decisions

Subsurface Data
- Common JV data sets
- Evaluation of best available data, technologies and tools
- Focus on quality geophysical data sets and workflows

Licence Activity
- Executed JOA 6 months from licence award
- Notify OGA of licence decisions in good time
- OGA notified of farm-out or divestment prior to activity commencing

Co-authored with industry, outline “good practice”, need to be followed
Yet-to-Find Potential

- In consultation with Exploration Task Force, OGA has revised the UKCS Yet-to-Find Methodology
- Prospect Inventory Clean-up
- Extended to ‘Unmapped’ Yet-to-Find

YTF Range 2-6-9 billion boe, OGA update 4Q 2018
2017/18 Offshore Licensing Rounds

31st Offshore Round will open in mid-2018 covering Frontier Areas

96 Applications
239 Blocks
68 Companies
Licence Round Storyboard

2016 to mid-2017
Innovate Licences
Undeveloped Discovery Packs
CNS Regional Maps

25th July 2017
Announcement of the 30th Offshore Licensing Round

22nd August 2017
30th Round Technology Event with OGTC

21st November 2017
30th Round Closed

Q2 2018
30th Round Licence Awards

Until Mid-March 2018
Licence Application Assessments (OGA/BEIS/HSE)

27th November 2017
Release of 2016 Seismic Data & SNS Regional Maps

mid-2018
31st Round Launch

OGA encouraging industry to pick up pace of exploration activity

OGA Management of Exploration Portfolio

end-2018
Revised Yet-to-Find Estimate
OGA working with operators to ensure quality well activity is undertaken.
2017 Exploration Drilling
Provisional Results – so far…

• To date 16 wells concluded at an average well cost of £21.5 mm – halved since 2014

• 172 MMboe potentially commercial recoverable resources in 7 discoveries

• 38% commercial, 44% technical success rate

• CoS risking accurate, but success volumes over-predicted
  • Industry risked resource prediction
    1047 MMboe; OGA 242 MMboe

• Finding cost $2.5/boe @ $/£ 1.25

2017 costs and commerciality show significant improvement
Driving Investment Plan Commits to Stable, Continuously Improving Fiscal Terms

UK Offers a highly attractive fiscal regime on a full-cycle basis

- £40m for new geophysical surveys & £5m Regional Studies
- Introduction of new basin-wide Investment Allowance
- Supplementary Charge reduced from 32% to 10%
- Petroleum Revenue Tax permanently reduced from 50% to 0%

Autumn 2017 Budget announcement on Transferrable Tax Histories, PRT Deduction for Decommissioning Liabilities

Internal Rate of Return

Source: Wood Mackenzie
Apache JV has successfully unlocked multiple discoveries around Beryl with broadband seismic.

Garten is downthrown block north of Buckland.

Fast-track development via Buckland infrastructure if successful.
West of Shetland 2018 - Lyon

- New players **Ineos** and **Siccar Point**
- Potential to be part of new gas hub
- Large amplitude anomaly, class III AVO
- Mean 1.4 TCF recoverable resource

Potential to unlock the Northern Gas Hub
2017 Appraisal Drilling
Provisional Results – so far…

- **20** MMboe progressed from technical to potentially commercial status
- **58** MMboe confirmed in potentially-commercial discoveries
- **19** MMboe added to existing fields and developments
- Finding costs have fallen, reflecting reduced average well costs

97 MMboe Appraised in 6 successes, at a total drilling cost of £264mm ($3.38/boe)
West of Shetland 2018 - Cambo

- New operator Siccar Point drilling Cambo with West Hercules rig prior to Lyon operations
- Appraisal well with extended test to confirm deliverability and connected volume
- Potential development on Corona Ridge south of Rosebank
West of Shetland 2018 - Cragganmore

- New JV Nexen & Ineos
- Vaila gas discovery with class II AVO response
- Large volume potential with uncertain extent and reservoir quality
- Appraisal well with DST to prove additional column and deliverability

Potential to unlock the Northern Gas Hub
Unlocking Undeveloped Discoveries

Remaining reserves

- Producing fields
- Ongoing developments
- Currently locked discoveries

350 undeveloped discoveries currently not being pursued across the UKCS of which 140 were part of the 30th Licensing Round. These may be unlocked by technology and other enablers.

Examples of technology

- Unmanned buoy
- Subsea storage
- Versatile Production Unit
- Spooled pipeline

Source – OGA

5 bnboe discovered to date with 2.4 bnboe in small pools and 150 small pools in open acreage
Free Subsurface Data

31st Offshore Licensing Round (2018)

Legend
- Area located in data pool
- Gas Escaped Heatfield
- Gas Field
- Oil Field
- 2016 OGA: Experiment area released
- 2017 OGA: New exploration released
- 2018 OGA: Available data
- Non-Esploitable
- Exploitable Legacy
- UKCS Disregarded Area

Revitalising Exploration

Free Subsurface Data

New, openly-available seismic and well data packages on the East Shetland Platform and South & West of Britain in support of the UK’s 31st Offshore Licensing Round (due to open mid-2018).

These Government-funded data packages will be delivered as workstations ready products, as well as industry standard formats, and include:

- Processed seismic data, pre-stack time migrated (full offset stack and angle stacks)
- New 3D broadband acquisitions (approx. 18,000 km) from South West Britain, Western Gresky and the East Shetland Platform (PGS)
- Reprocessed legacy 2D seismic data (approx. 21,000 km) from North West UK, South West Approaches, East Irish Sea, Celtic Sea, (Gurnian Bay, Morcambe Bay), Bristol Channel and English Channel
- Seismic acquisition and processing reports
- Database of released well data including processed well logs, cross-sections and deviation data
- Synthetic well logs
- Quality and magnetic data
- All data including field data available to order on media – handling and media charges apply

To download the data including shapefiles, visit CDA’s website:
www.ukshandpdata.com

gsa.correspondence@ogauthority.co.uk

Regional Reports

The OGA is also openly releasing a number of geological reports as part of the 31st Century Exploration Roadmap (C1XRPM – Phase 1). These studies were wholly-funded by the OGA to investigate the key subsurface uncertainties in the SW Approaches and East Shetland Platform areas.

East Shetland Platform Studies
- Finkelch & IG
  - Evaluation of the structural evolution of the East Shetland Platform area primarily using potential fields data (also integrating other available data sets)
  - Assessment of source rock potential using geochemical methods (incl. compilation & interpretation of available raw geochemical data, collection of new geochemical samples, compilation & interpretation of relevant seep data)

SW Approaches Studies
- Geikie & BGS
  - Compilation of processed gravimetric & magnetic potential field data across the SW Approaches & Western Europe
  - Comprehensive literature review of the Late and post-Vendian basins of Western Europe (specifically focused on source rock potential of the Late Carboniferous to Lower Permian interval)

Reports and supplementary data are available via:
http://data-ogauthority-updateme.angis.com

Further Information Available on OGA Stand
Data Reporting and Release

Open Data Site
- 30,000 downloads a month

Interactive Maps & OGA GIS server
- Most popular OGA website pages

Undeveloped Discoveries
- 7000+ downloads via CDA

2015 & 2016 OGA seismic
- > 6500 data package downloads via CDA

The appetite for data published by the OGA is high and increasing

The OGA is working towards an Open NDR with modern, cloud-based access
UKCS Petroleum Systems Project

21CXRM
Regional & Thematic Focus

Supporting Government
Seismic Programmes
Phase 1
Phase 2

Holistic UKCS Project
Data & Technology Focus

2015 - 2017
Today
2018 onwards

Moray Firth – Central North Sea Post Well Analysis

Overview of the 21CXRM Palaeozoic Project – a regional petroleum systems analysis of the offshore Caledonian and Devonian of the UKCS

21CXRM
Phase 1

Supporting Government
Seismic Programmes

Phase 2

Deep learning
open data
Machine learning
open source
• **Collaborative Partnership**, initiated by TLB, sponsored by the *Exploration Task Force*, supported by the *OGTC*

• **Initial Project** to identify missed pay opportunities using digital log data
  - Linked to East of Shetland Area Plan with fast turn-around results
  - Intend to publish majority of results openly (as far as IP rights allow)

• Will make use of >7000 wells on **both sides of Median Line**

• **Future Machine Learning Projects** in other areas using well and seismic data

**OGA planning training for geoscientists**

- python
- GNU Octave
- R
- TensorFlow
Key Messages

OGA is delivering on agenda set out in activity plan

UKCS continues to deliver commercial volumes through E&A

E&A successes delivered across a range of basins and plays

More must be done to stimulate E&A activity in UKCS

OGA, industry and government need to continue to work together