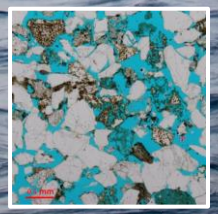
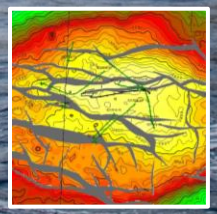
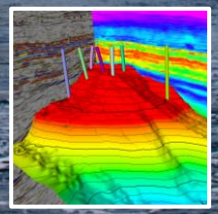
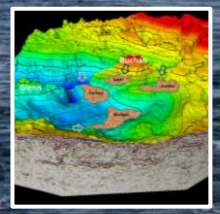
The Buchan Oil Field

Subsurface evaluation summary

JERSEY OIL&GAS



January 2021

Compelling results from dynamic modelling

Dynamic reservoir modelling conclusions

- P50 technically recoverable resources of 126 MMstb oil
- >50% increase on previous estimates
  - Prior estimates derived from decline curve analysis
- Forecast production to be achieved using deviated wells placed in crestal locations, together with water injection and down-hole electric pumps (ESPs)

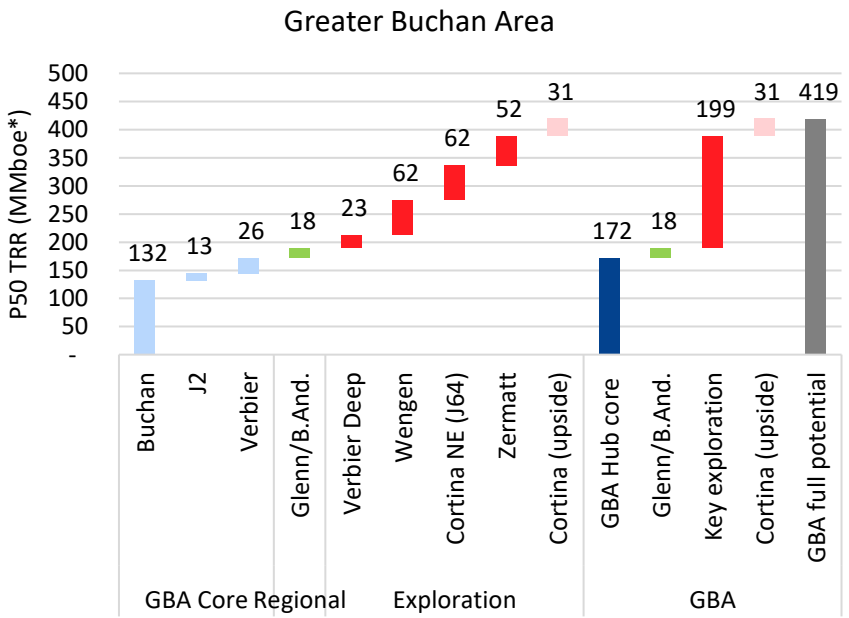
Methodology

- Dynamic models were constructed by Schlumberger using their proprietary INTERSECT high resolution reservoir simulation software
- The new dynamic model used inputs from the high resolution 2018 PGS 3D seismic survey data
- The models fully incorporated all available subsurface information and successfully history matched 36 years of production data

Buchan key attributes

- Well-connected, conventional sandstone reservoir
- Dual porosity and permeability system
- Oil quality is light sweet crude at 33.5° API
- Expected ultimate recovery factor is 54% of P50 STOIIP
- Historic field production has to date recovered 29% of the P50 STOIIP estimate

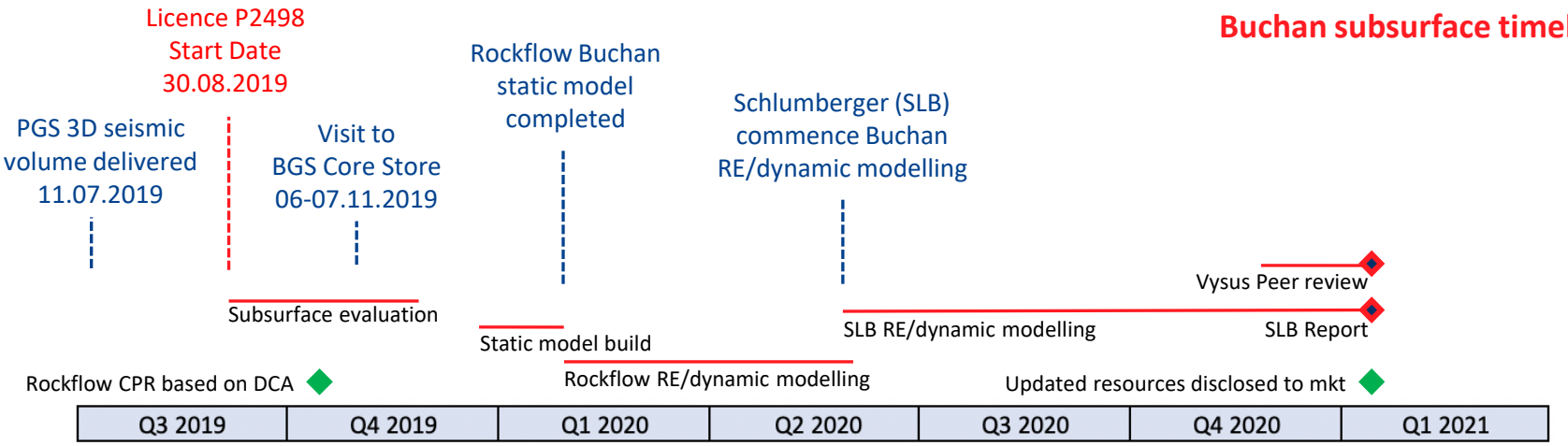
Buchan Contingent Resource Estimates (Oil)			
	P90	P50	P10
STOIIP (MMstb)	426	507	615
Remaining Technically Recoverable Resource Volumes (MMstb)	72	126	184
Historic Production (MMstb)	148	148	148
Total Recovery Factor	52%	54%	54%
Development Plan - Well Count	4 Producers 2 Water Injectors	5 Producers 2 Water Injectors	8 Producers 4 Water Injectors



>50% increase in forecast recoverable volumes from Buchan

*: includes associated gas

Buchan subsurface timeline & activities



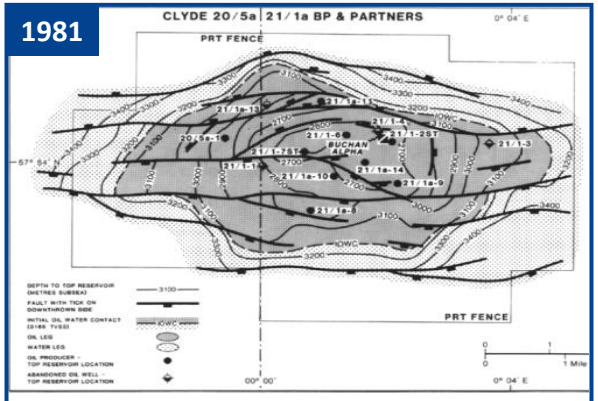
Buchan subsurface modelling incorporated:

- Petrophysics of all Buchan wells
- Seismic interpretation and depth conversion
- Core & fracture description
- Structural modelling
- Internal reservoir geometry
- 3D static model with complete uncertainty analysis
- Reservoir correlation
- Sedimentology analysis
- Core facies
- Core fractures
- Heavy mineral analysis
- Palynology
- Chemostratigraphy
- Dipmeter
- Image logs
- Fluid and rock properties
- Incorporating 36 years of historical performance data
- Production logging integration
- Reservoir pressure data

Comprehensive subsurface modelling resulted in
36 year history match and 40 year production forecast

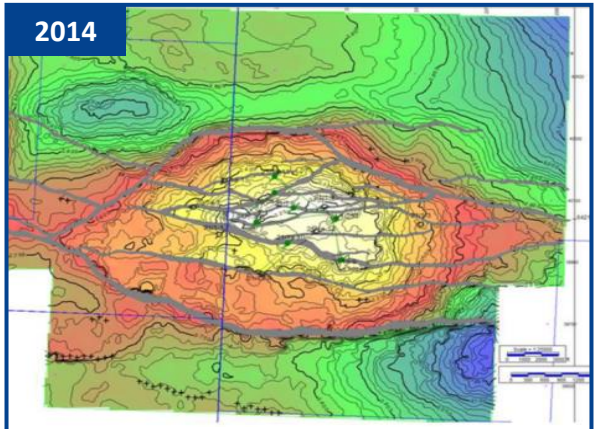
Evolution of Buchan field definition

1981



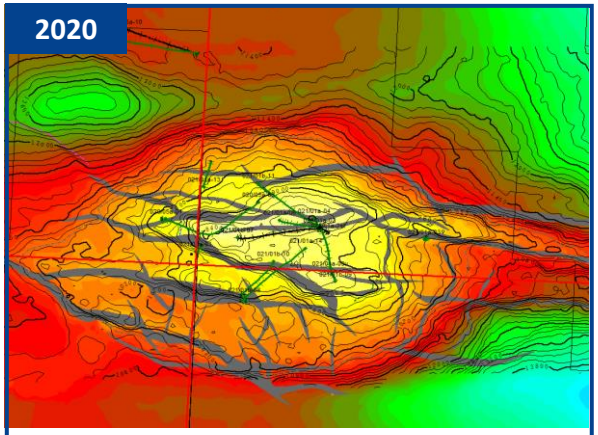
1981 Field developed on 2D seismic data with sanctioned reserves of c. 50 MMBBLS

2014



2014 AGR TRACS study on 1994 3D seismic data
Static model built with STOOIP of 508 MMstb

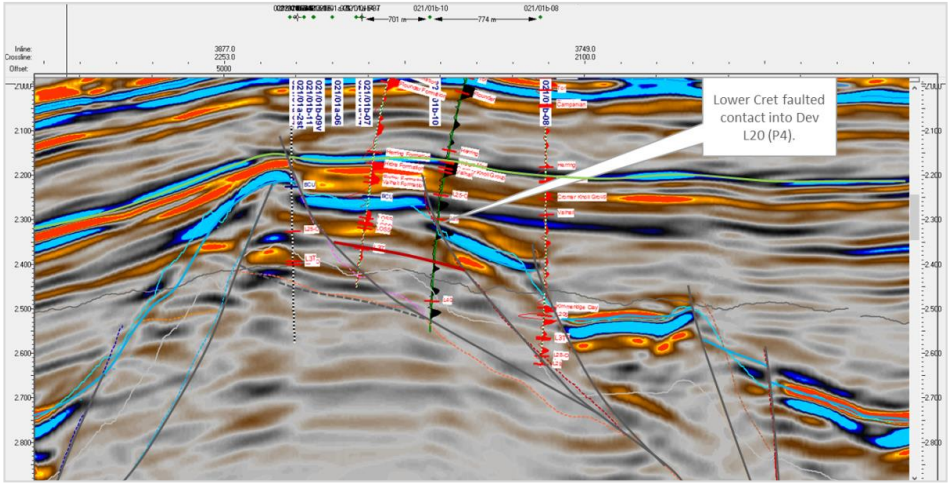
2020



2020 JOG PGS high resolution 3D seismic
Static model built with STOOIP of 507 MMstb

Earlier mapping only recognised E-W faulting

New seismic data has identified a secondary suite of N-S faults



Benefits of 2018 seismic data

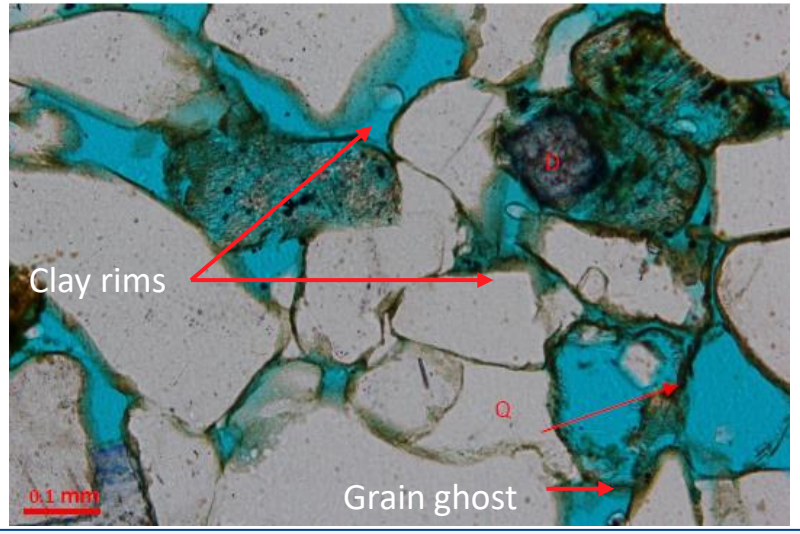
- Fault framework revision
- Reduced fault position uncertainty
- Lost section estimation
- Field-wide correlation and zonation
- Well-bore/fault correlation
- Fault intersection and flow indicators (PLT)
- Effective fracture network

Importance of high-resolution 3D seismic for structural understanding

Buchan reservoir observations

- Buchan produced 148MMstb of oil
- The fracture system alone cannot host this volume of oil
- PLT logs indicate many flow zones to be coincident with fault/fracture intersections suggesting flow into the wells is facilitated by fractures
- Producer B01 core reveals sparse fracturing over the specific flow zone depths with greater than 25% porosity in channel fill sandstones
- This demonstrates that oil inflow has come predominantly from matrix porosity of the conventional sandstone reservoir

Matrix porosity (blue)



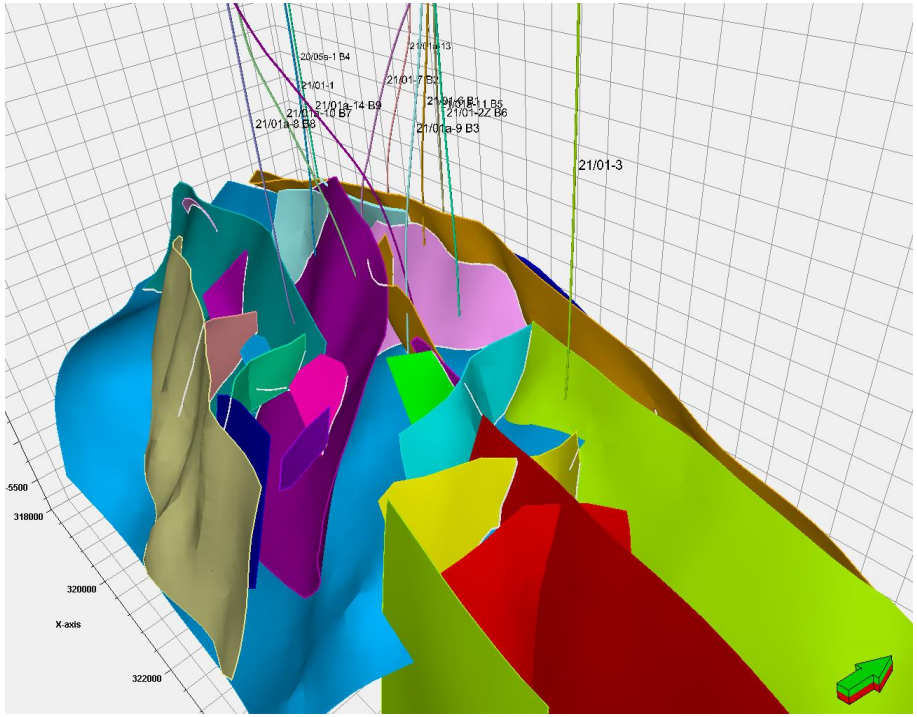
Cross-bedded, channel fill sandstone
Thick authigenic clay rims surround detrital grains, occlude pores and restricts quartz overgrowth. Plagioclase dissolution leaves grain ghosting clay rims; note lack of subsequent compaction.
Porosity – 16%

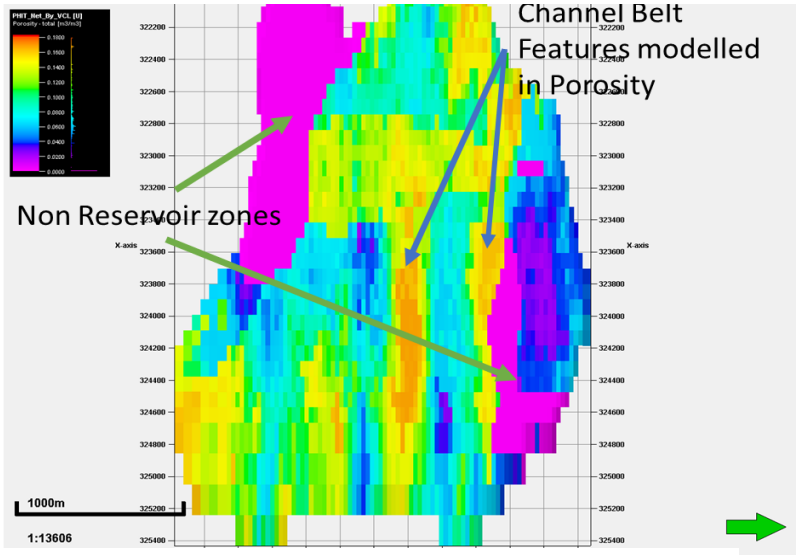
Buchan oil production is predominantly from matrix

Buchan – regional analogue to geological modelling

3D static model

- Newly constructed 3D geological model in Petrel
  - Incorporates more than 30 faults
  - Detailed correlations made across all wells to perform reservoir zonation
  - Property modelling (porosity, permeability, water saturation) honours depositional fabric

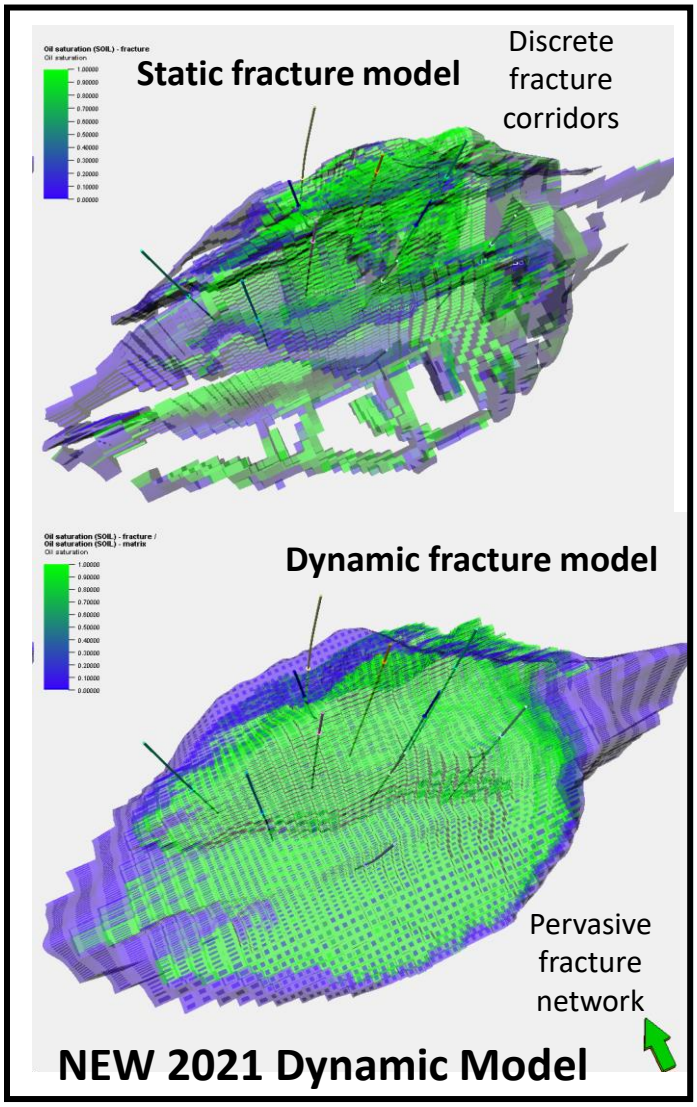




View of porosity model honouring the depositional fabric

Structural complexity and modern day analogue captured in geological model

Buchan history matching methodology



Dynamic modelling parameters

- Rock mechanics
- Fracture permeability
- Matrix properties
- Matrix-fracture transient interactions
- Matrix and fracture relative permeability

Updated methodology (2020/21)

A three-stage approach was taken for the Buchan history match:

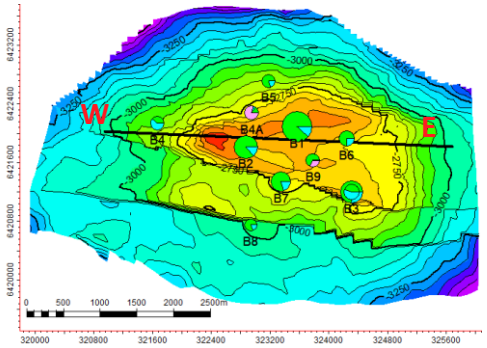
1. Match reservoir pressure profiles
2. Sensitivity study to understand role of fracture permeability on individual well performance
3. Sensitivity study to understand field-wide fracture permeability

Previous estimates

2019 Rockflow CPR used decline curve analysis and material balance methodologies

Complex dual porosity/permeability reservoir model successfully history matched by Schlumberger using high resolution INTERSECT software

Schematic section across Buchan oil field illustrating development plan



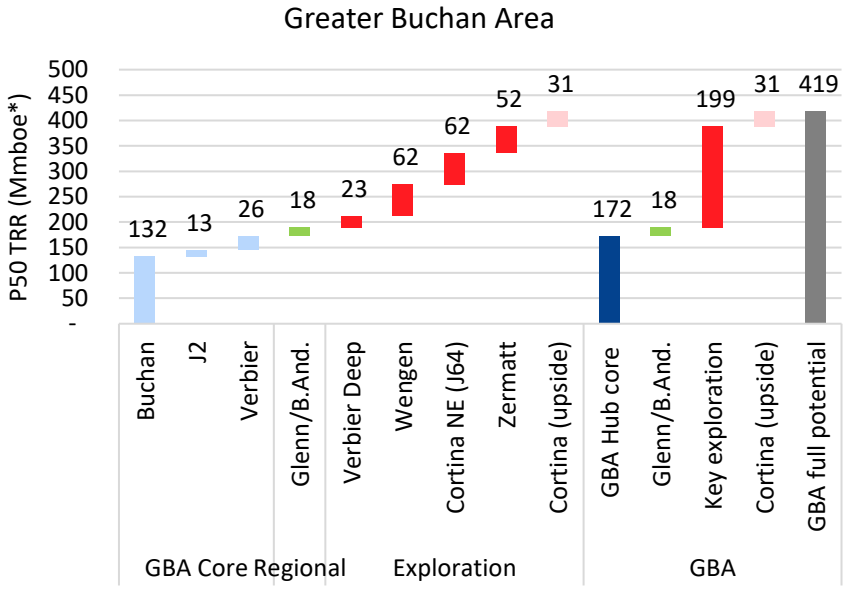
- New producers planned in core area
  - Crestally located, highly deviated well design to optimize reservoir exposure (drain hole lengths c.500m)
  - Wells optimally located to connect both matrix and natural fractures to enhance productivity
  - Water injectors in aquifer zone to maintain reservoir pressure
- Wells to target remaining dry oil zones (high in the structure)
  - Last known produced water level shows a 300m dry oil column
- Artificial lift planned

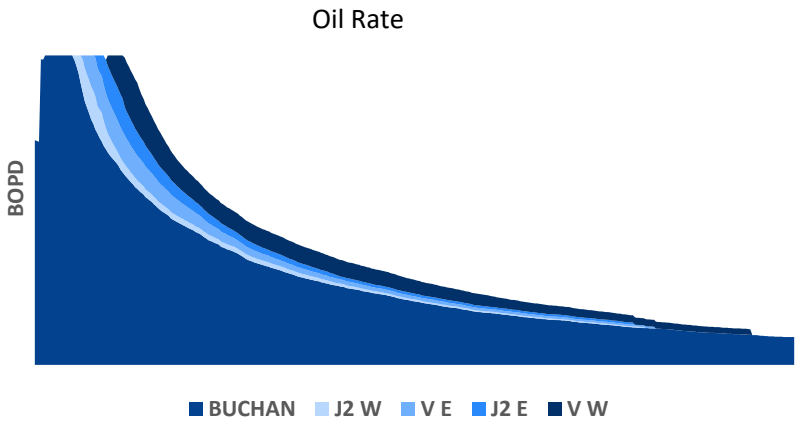
Highly deviated, optimally located wells in dry oil zones, supported by water injection all designed to maximise productivity from Buchan

Summary

Highly detailed and complex subsurface work now concluded

- Significant input from a very specialist and experienced team
  - Three key multi-disciplinary teams with more than fifteen people involved across JOG, Rockflow and Schlumberger
  - Peer reviewed by Vysus (formerly Lloyd's Register Energy Business) which fully endorsed the methodologies and results of the dynamic modelling
- Highly significant result with the core GBA hub volumes now over 170 mmboe
- Selected the development concept and finalising the Concept Select report and economics for submission to the OGA
- Upon conclusion (during Q1) of Concept Select JOG will be launching a sales process to bring an industry partner into the GBA development





Buchan volumes to drive the GBA hub development

*: includes associated gas