



Bridge Petroleum Limited

DEVEX 2018

Awakening a Dormant Giant: Subsurface Evaluation of the Galapagos Field Redevelopment (NW Hutton & Darwin)

M.Mulcahy, J.Tyrie and F. Wahid

8th May 2018

© Bridge Petroleum Limited 2018 all rights reserved

Disclaimer:

Please Read

This presentation may contain forward looking statements which involve subjective judgment and analysis and are subject to significant uncertainties, risks and contingencies, including those risk factors associated with the oil and gas businesses, many of which are outside the control of, and may be unknown to Bridge Petroleum. In particular, any forward looking statements speak only as of the date of this presentation, they assume the success of the strategy of Bridge Petroleum and they are subject to significant regulatory, business, competitive and economic uncertainties and risks. No representation, warranty or assurance (express or implied) is given or made in relation to any forward looking statement by any person (including by Bridge Petroleum, any of its related bodies corporate, directors, officers, employees or their representatives). In particular, no representation, warranty or assurance (express or implied) is given in relation to any underlying assumption or that any forward looking statement will be achieved. Actual future events may vary materially from the forward looking statements and the assumptions on which the forward looking statements are based. Given these uncertainties, readers are cautioned not to place undue reliance on such forward looking statements, and should rely entirely on their own independent enquiries, investigations and advice regarding any information contained in this presentation. Any reliance placed by a reader on the information contained in this presentation is wholly at the reader's own risk. The information in this presentation is provided for informational purposes only and does not take into account the investment objectives, financial situation and needs of any particular investor. Each of Bridge Petroleum and its related bodies corporate and affiliates and their respective directors, partners, employees, agents and advisers disclaim any liability for any direct, indirect or consequential loss or damages suffered by any person as a result of relying on any statement in, or omission from, this presentation.

Subject to any continuing obligations under applicable laws, Bridge Petroleum disclaims any obligation or undertaking to disseminate any updates or revisions to any forward looking statements in this presentation to reflect any change in expectations in relation to any forward looking statements or any change in events, conditions or circumstances on which any such statements are based. Nothing in this presentation shall under any circumstances create an implication that there has been no change in the affairs of Bridge Petroleum since the date of this presentation. All other disclosures as in previous presentations apply.

For the avoidance of doubt, nothing in this presentation is intended nor should be construed as an offer capable of acceptance. Any transaction that may be proposed in this presentation should be read as "subject to contract" until fully termed agreements are entered into with the relevant Bridge Petroleum entity v5.0

Headline Messages

1

Subsurface evaluation has highlighted that there are still significant remaining reserves which can be unlocked using tried and tested technology not available or applied in the original development

2

The evaluation benefits from excellent studies initiated by previous operators and the abundance of published literature and experience in this mature region of the UKCS Northern North Sea

3

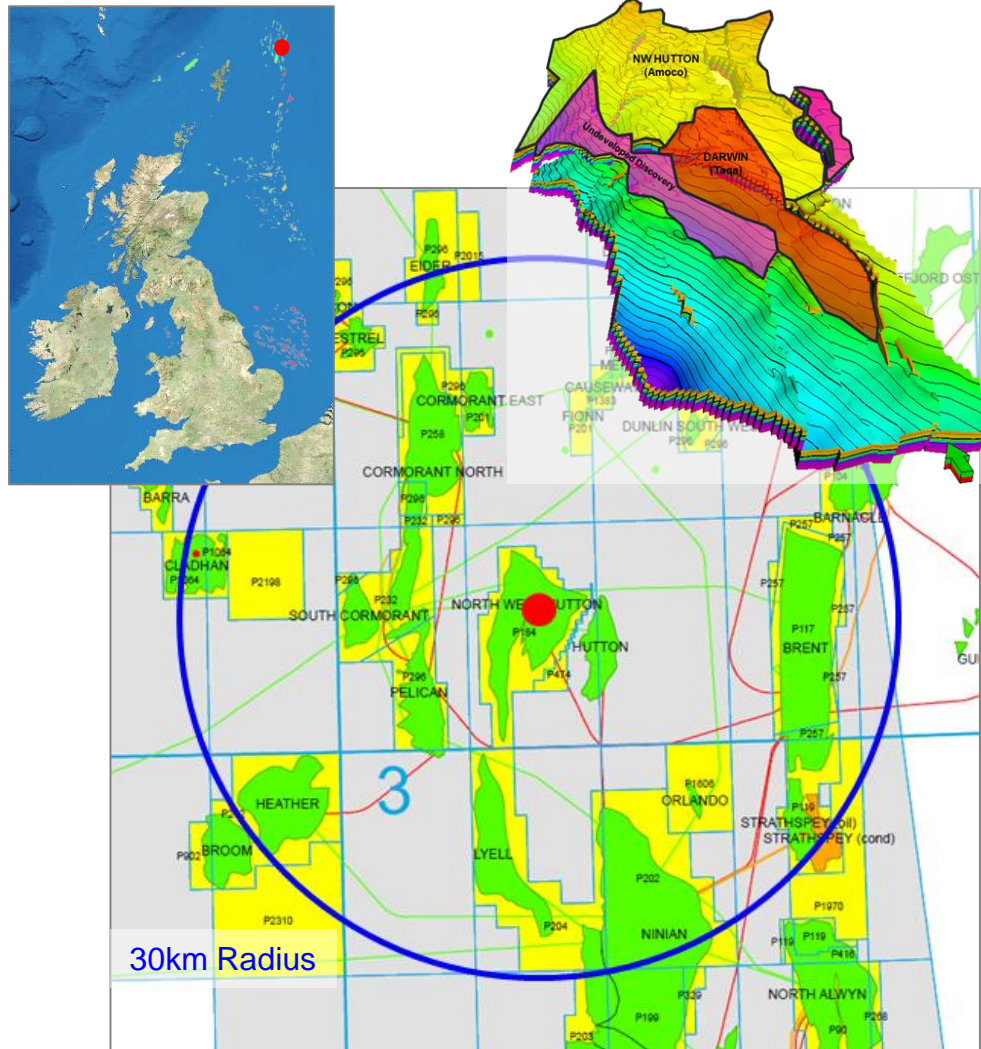
Working with a copious dataset to understand the historic development challenges provides an opportunity to apply the lessons learned from the start of the redevelopment

4

The NW Hutton Field has a difficult reputation among the industry, but looking at the wealth of data and separating myth from fact, identifies a dormant Brent giant awaiting redevelopment

The Galapagos Field, 211/27 East Shetland Basin, UKCS

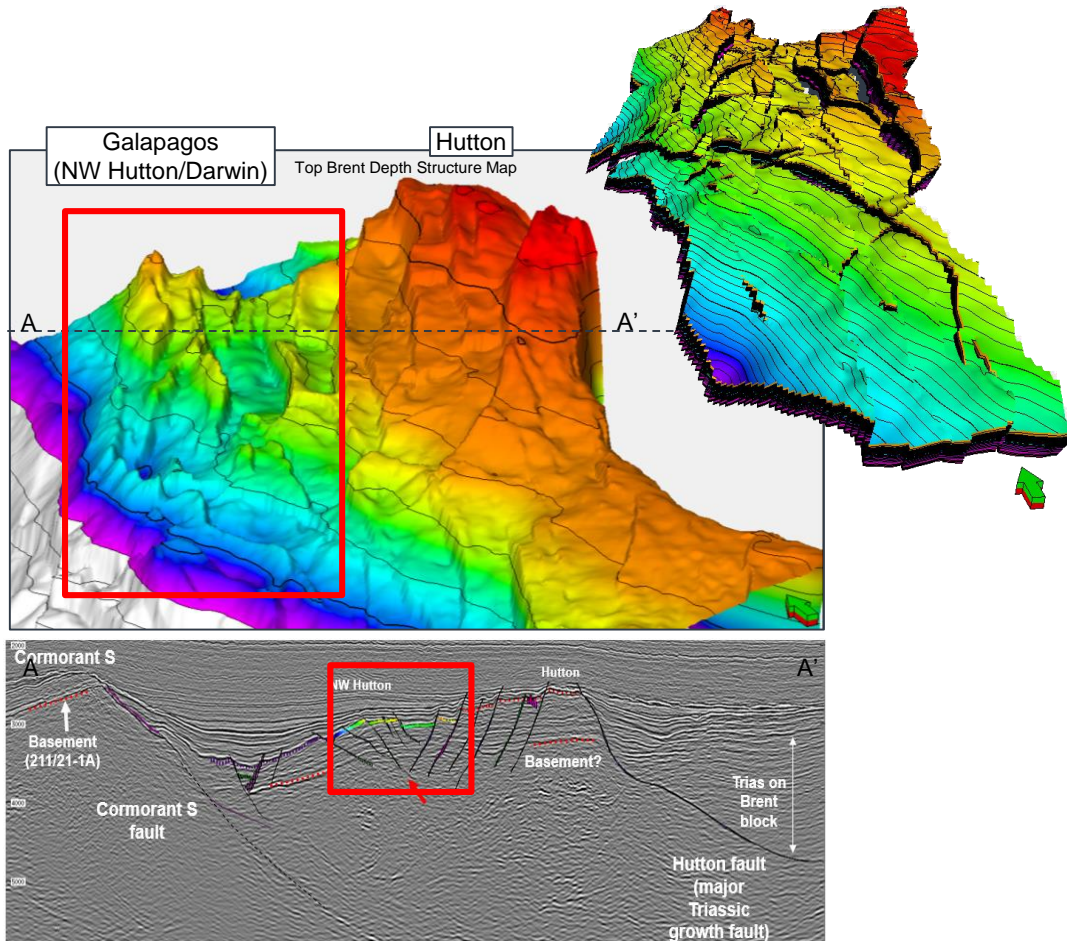
History of the development



- Galapagos is the NW Hutton Field and Darwin appraisal
- NW Hutton discovered in 1975, COP 2002
- Field extension appraised by Darwin wells in 2013
- NW Hutton peak production at 86,500 bopd from 4 wells
- Produced 124 mmbbls from 876 (P50) mmbbls STOIPP
- Reservoir management challenges
 - Well integrity & scaling issues
 - Very poor injectivity profile (well spacing, thief zones & short circuiting)
 - Low voidage replacement ratio (0.7)
- Operational challenges
 - High tortuosity complex wells, tricky access
 - Water handling constraints, limiting injection

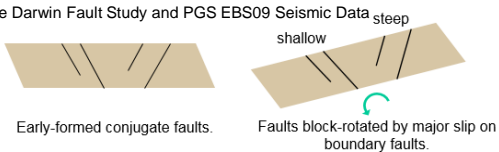
Galapagos Field Structural Setting

Excellent 2014 PDSM together with over 60 well penetrations results in high confidence mapping



- Field mapped as a terraced graben
- Each main terrace is bound by sealing faults *
- Within terraces the system is generally open *
- Minor faults within terraces act as either baffles or points of cross flow *
- Resulting tortuosity can create good sweep paths for injector/producer pairs
- Better fault plane definition and reservoir resolution identifies attic targets

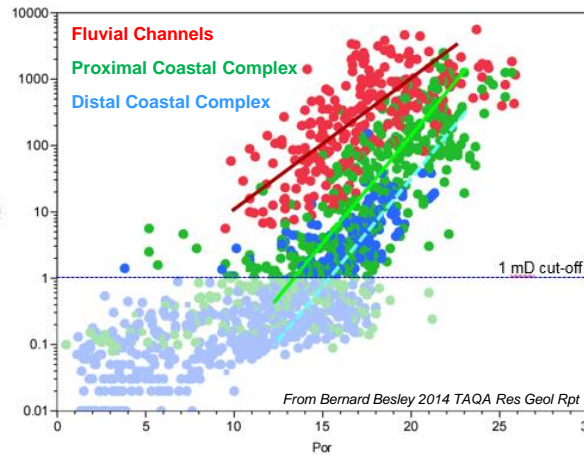
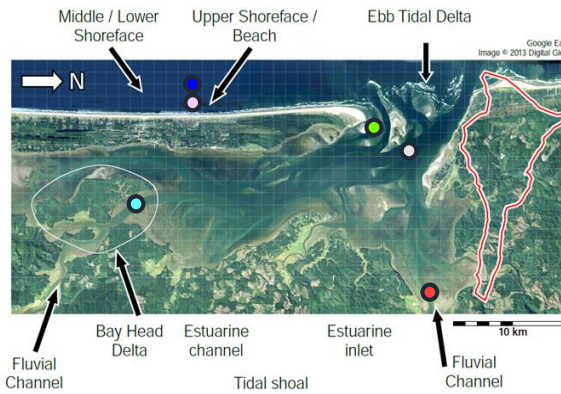
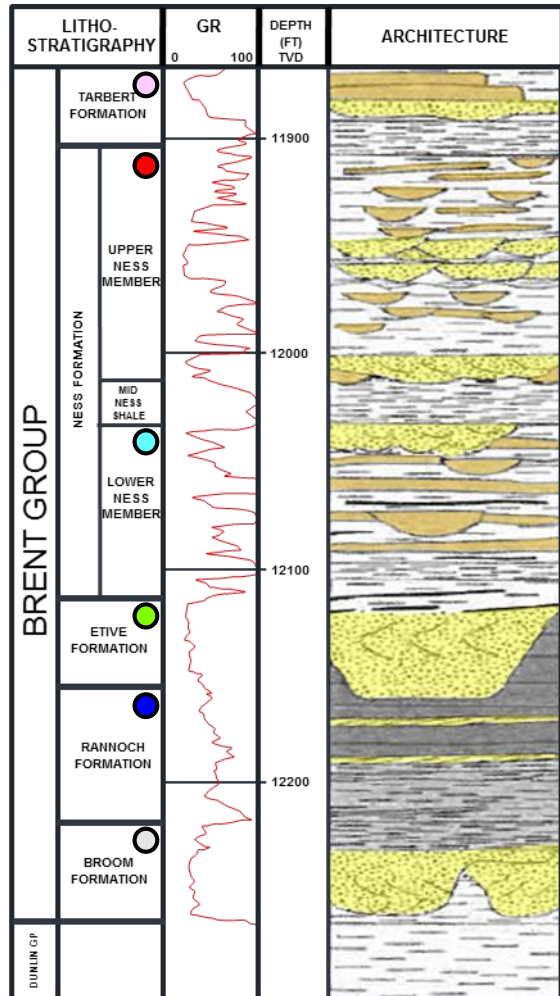
* Defined from multiple datasets including dynamic data, pressures, logs, pvt etc.



Galapagos Sedimentology

Brent reservoirs in the Galapagos Field with excellent reservoir quality

Modified from Flint et-al 1998

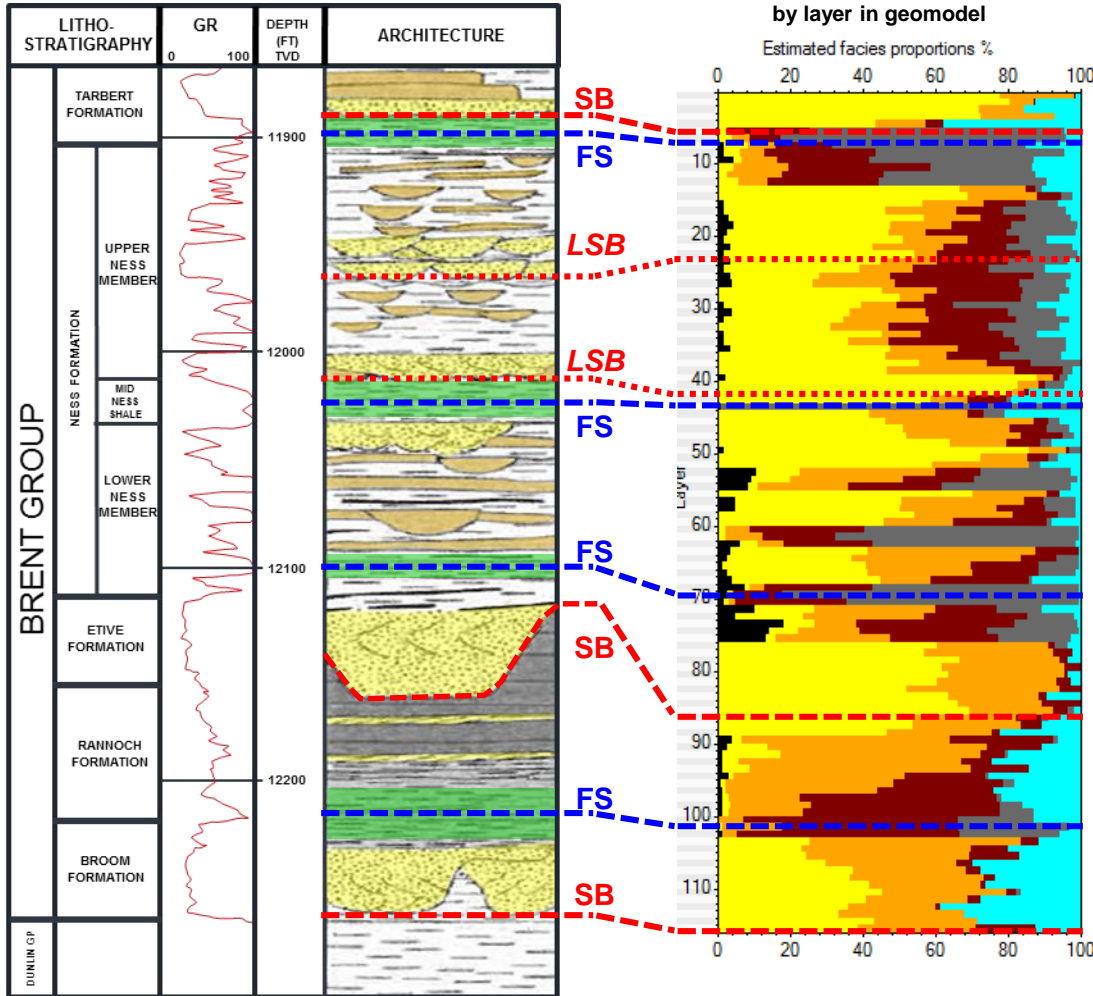


- Middle Jurassic wave dominated delta
- Excellent reservoir quality in all reservoir formations
- High permeability contrasts with fluvial channel sands dominating flow
- Vertical and lateral stratigraphic heterogeneity exists
- Significant stratigraphic control of dynamic behaviour of the field

Galapagos Sequence Stratigraphic Framework

Defines reservoir stacking patterns and predictability away from well control

Modified from Flint et-al 1998



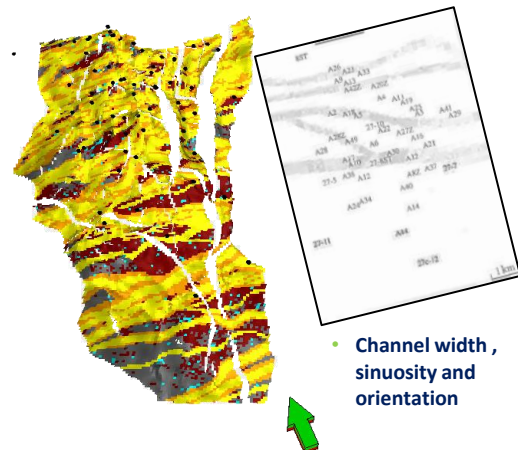
SB: Regional Sequence Boundary
 LSB: Localised High Frequency Event
 FS: Flooding Surface

- Upper Ness Amalgamated Channel Sets at LSB's
 - Lateral and vertical connectivity
 - Good pressure communication
 - Preferential water flood
- Laterally continuous shales at Flooding Surface
- Lower Ness/Etive Incision
 - Higher quality incised valley fill facies replaces lower quality shoreface Etive

Galapagos Static G&G Model

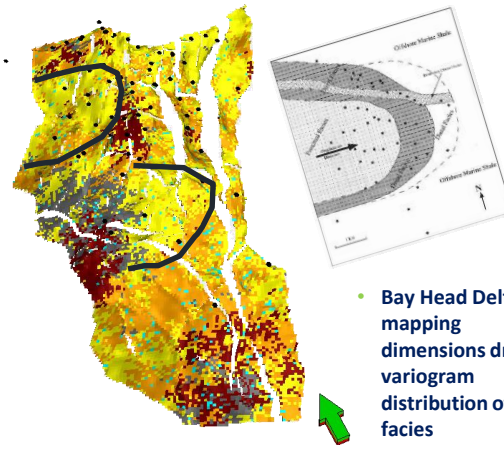
Honouring sedimentology, geometry & architecture

From Bernard Besley 2014 TAQA Res Geol Rpt



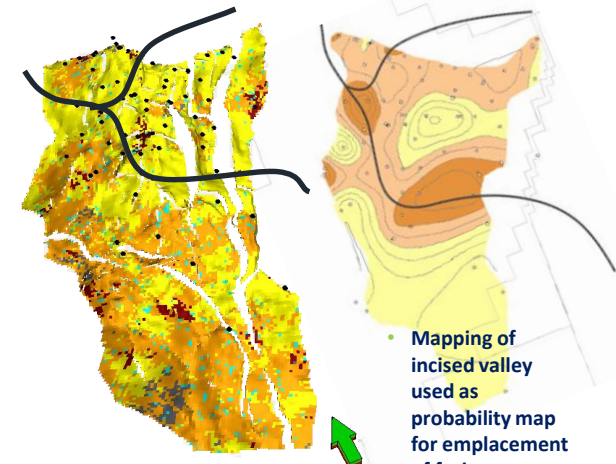
- Channel width, sinuosity and orientation

UPPER NESS



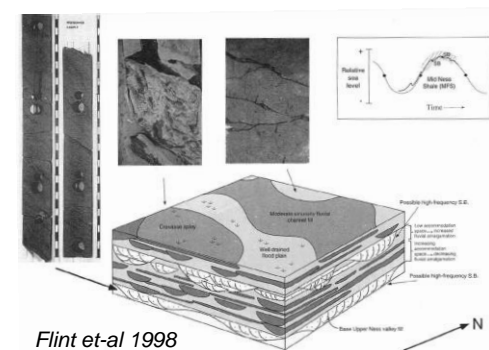
- Bay Head Delta mapping dimensions drive variogram distribution of facies

LOWER NESS

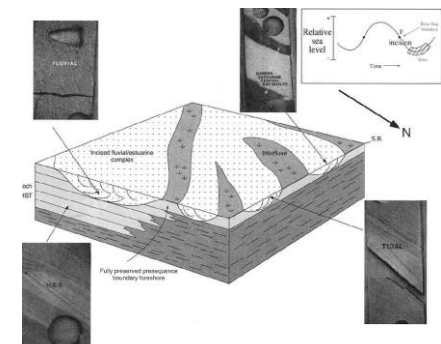
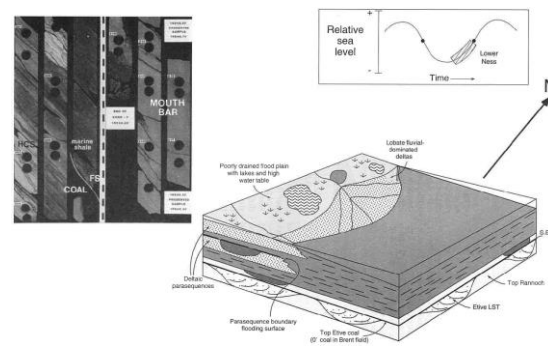


- Mapping of incised valley used as probability map for emplacement of facies

ETIVE



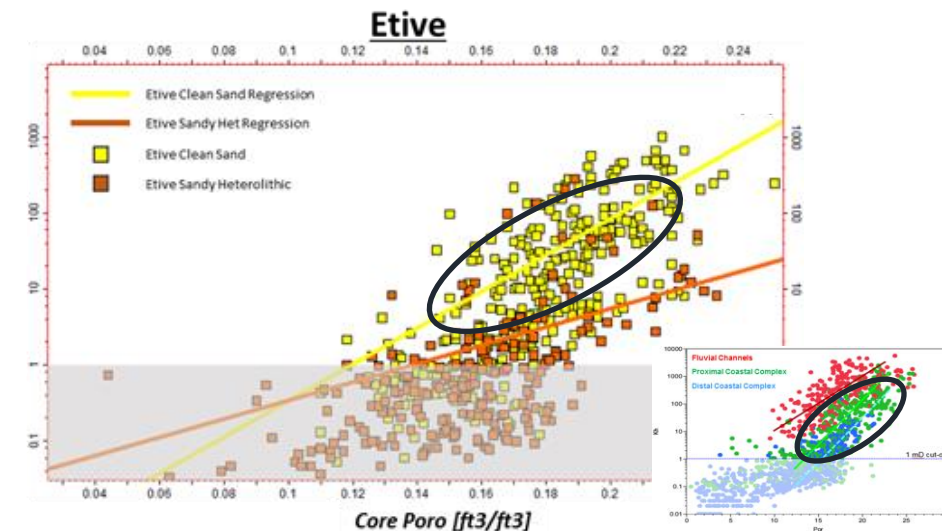
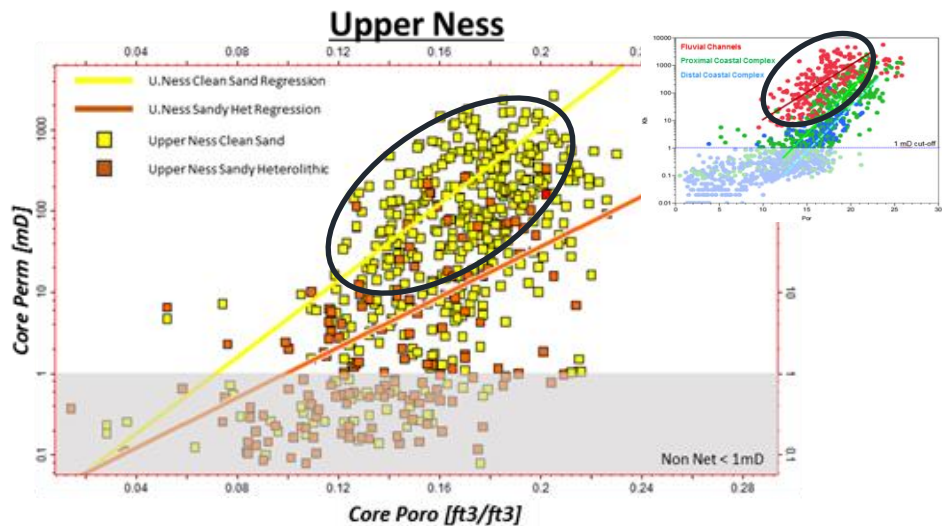
Flint et-al 1998



- Propagating results of studies and interpretations directly into the G&G Model
- Honouring geobody dimensions and orientations

Galapagos Reservoir Properties

Highlights the important role of Heterolithics, the unsung hero!



- Property distribution honours the sedimentology description by formation
- Sensitivity analysis on the dynamic data identifies
 - Connectivity of clean sands required to achieve RFT defined pressure communications within main terraces
 - Heterolithics properties need to be honoured, if too “tight” the pressure drops too quickly

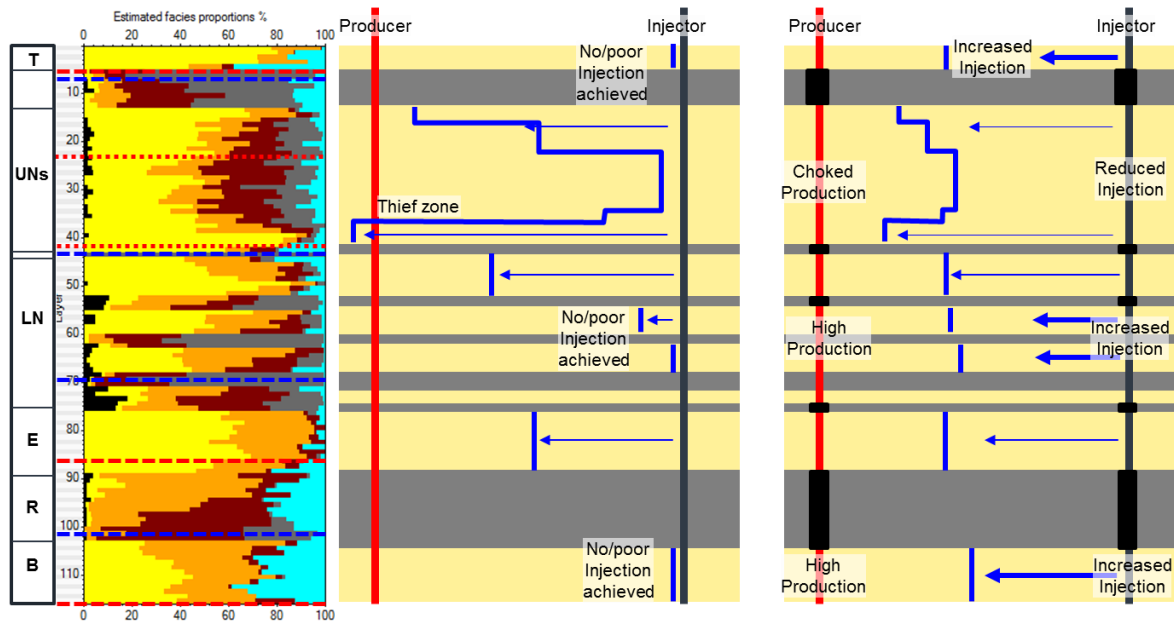
Galapagos Redevelopment Using Multi ICV/OCV Technology

Controlled production and injection to achieve more a efficient voidage replacement ratio across all stratigraphy

Conceptual Illustration

Historic Development
Blanket Perforations

Galapagos Development
Controlled Inj Profile

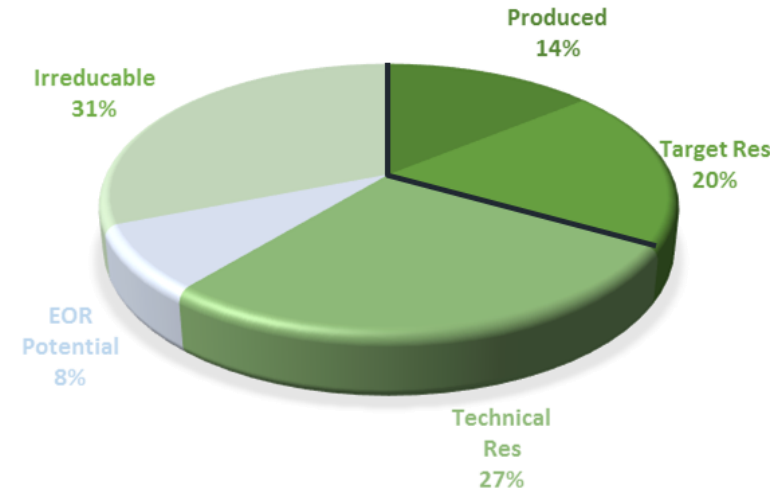
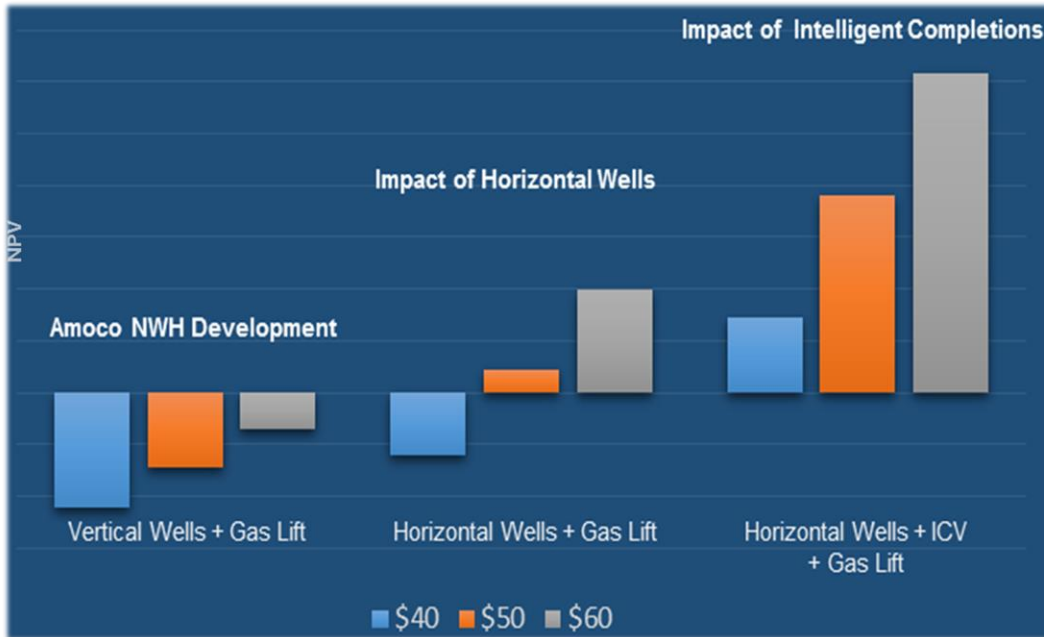


- Historic development generally had blanket perforations across all sands
- PLT identifies injection does not go into all perms/sands
- PLT identifies water is dominated by the highest Kh product
- Galapagos Development to use multi ICV/OCV system providing
 - Controlled & Managed injectivity/productivity across all sands (conformance is key!)
 - High Voidage Replacement Ratio and associated recovery

ICV = Inflow Control Valve, Producers
OCV = Flow Control Valve for Injectors

Galapagos Development

Screening development options identifies the value of the proven technology play



- Significant Prize identified when recovery factor benchmarked against other Brent Fields
- Proven technology drives value generation of what was perceived to be a challenged development
- Opportunity to apply lessons learned to safeguard the development

Headline Messages

1

Subsurface evaluation has highlighted that there are still significant remaining reserves which can be unlocked using tried and tested technology not available or applied in the original development

2

The evaluation benefits from excellent studies initiated by previous operators and the abundance of published literature and experience in this mature region of the UKCS Northern North Sea

3

Working with a prolific dataset to understand the historic development challenges provides an opportunity to apply the lessons learned from the start of the redevelopment

4

The NW Hutton Field has a difficult reputation among the industry, but looking at the wealth of data and separating myth from fact, identifies a dormant Brent giant awaiting redevelopment

THANK YOU

David Williams,
Managing Director
+44 7798 838485
David.Williams@bridgepetroleum.co.uk

Alex Spring FCMA
Finance Director
+44 7928 560273
Alex.Spring@bridgepetroleum.co.uk

Dr Fazrie Wahid
Development & Operations Director
+44 7492 744164
Fazrie.Wahid@bridgepetroleum.co.uk

Guy de Speville
General Counsel
+44 7881 750143
Guy.deSpeville@bridgepetroleum.co.uk

Andy Melvin
Origination Manager
+44 7702 855895
Andy.Melvin@bridgepetroleum.co.uk

Matt Mulcahy
Head of GeoScience
+44 7955 256914
Matt.Mulcahy@bridgepetroleum.co.uk

Jeb Tyrie
Subsurface Manager
+44 7517 169922
Jeb.Tyrie@bridgepetroleum.co.uk

Nick Chilcott
Wells Manager
+44 7977 286038
Nick.Chilcott@bridgepetroleum.co.uk

Contact.