

UKCS J-Area

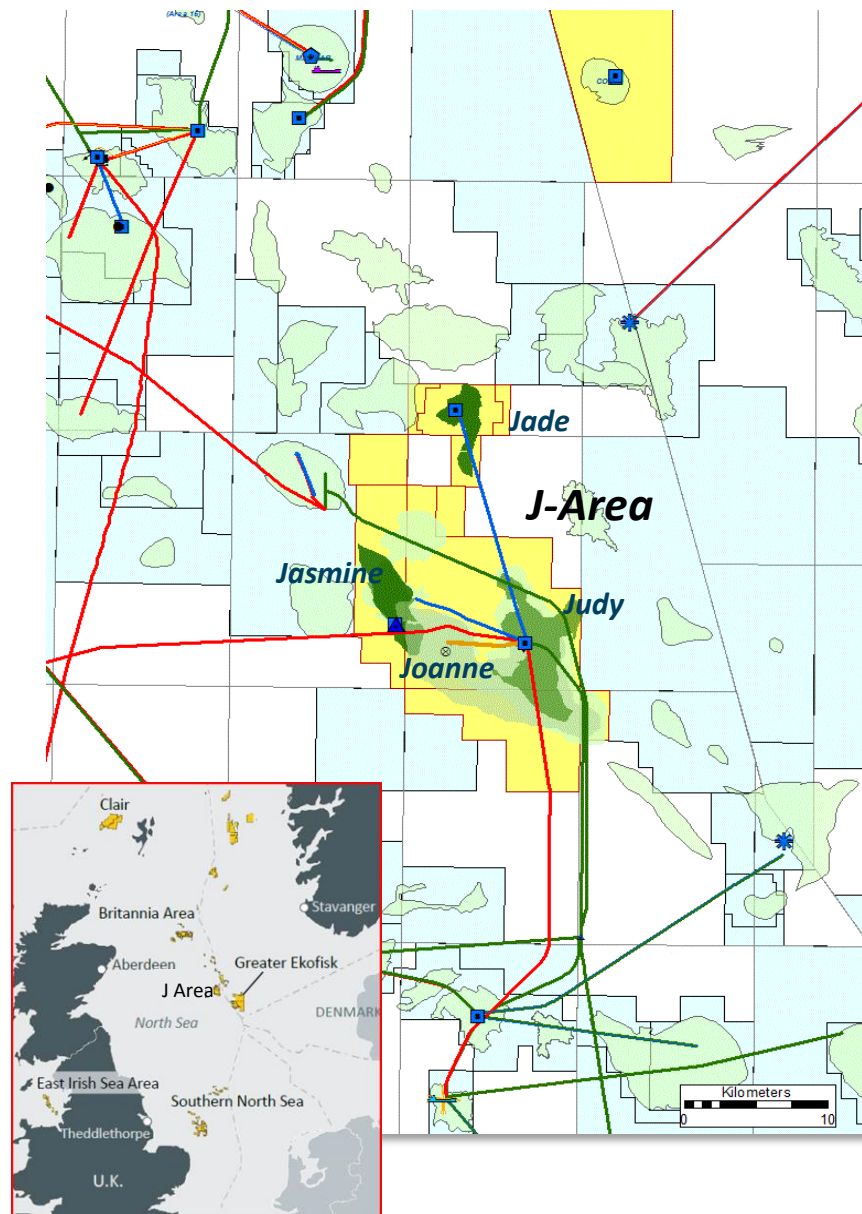
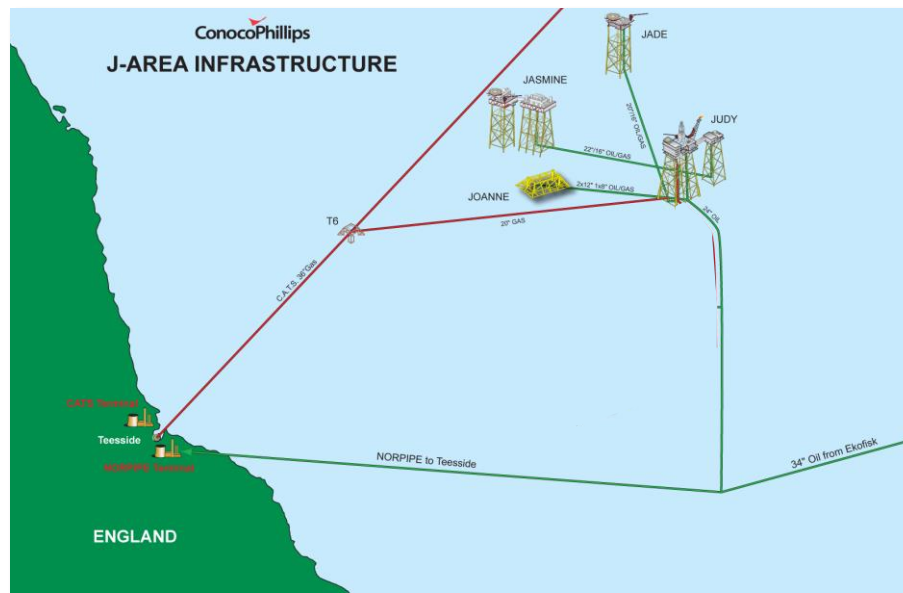
Maximising recovery through
active field management



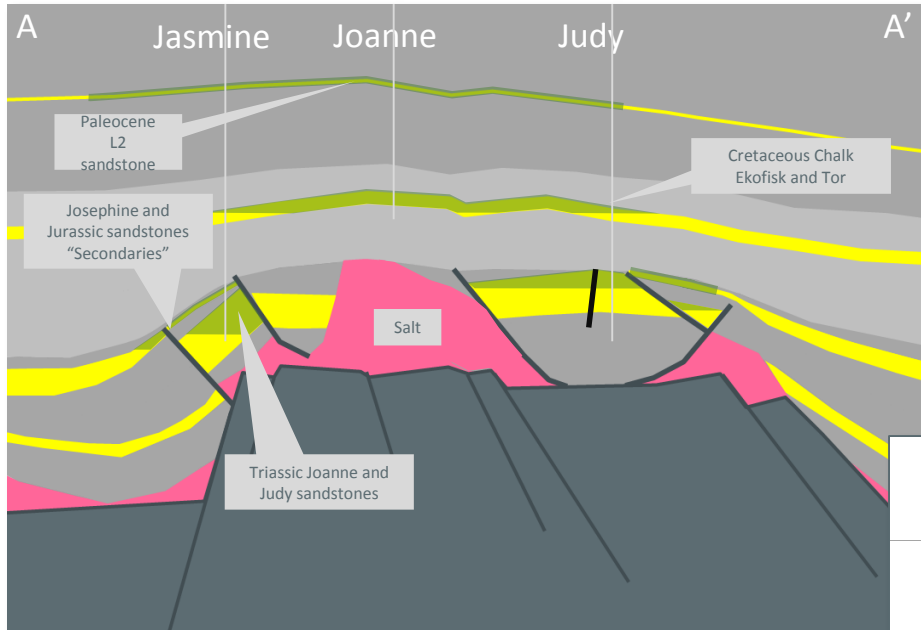
- What is J-Area?
- Where did J-Area begin, and where are we now?
- Focus areas
 - New wells
 - Production delivery & optimisation
 - Facility maintenance and optimisation
- The future – maintaining J-Area as a key Central Graben hub

J-Area – facilities and infrastructure

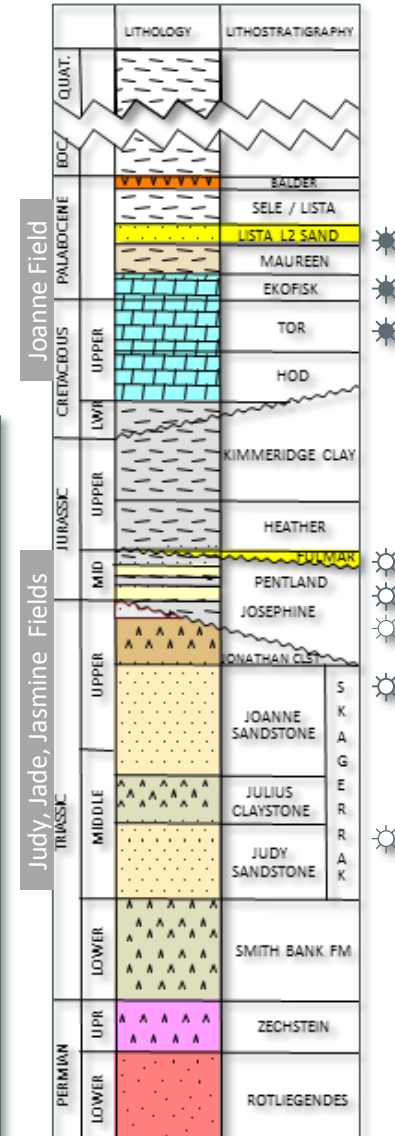
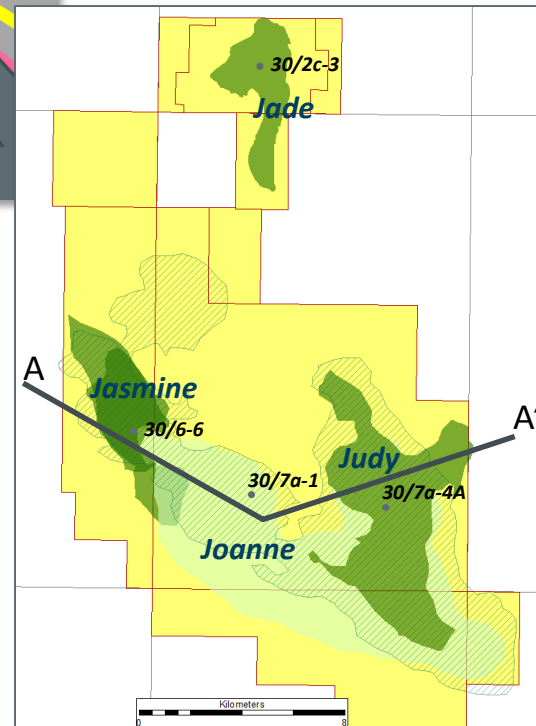
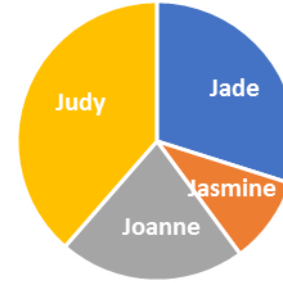
- Key Central Graben processing and export hub complex of five platforms and one subsea manifold
- Export via CATS and Norpipe
- Discovered 1984, first production 1995
- Produces a mix of gas condensate and volatile oil
- Produced 600 MMboe from 1995 to YE 2016



J-Area - subsurface

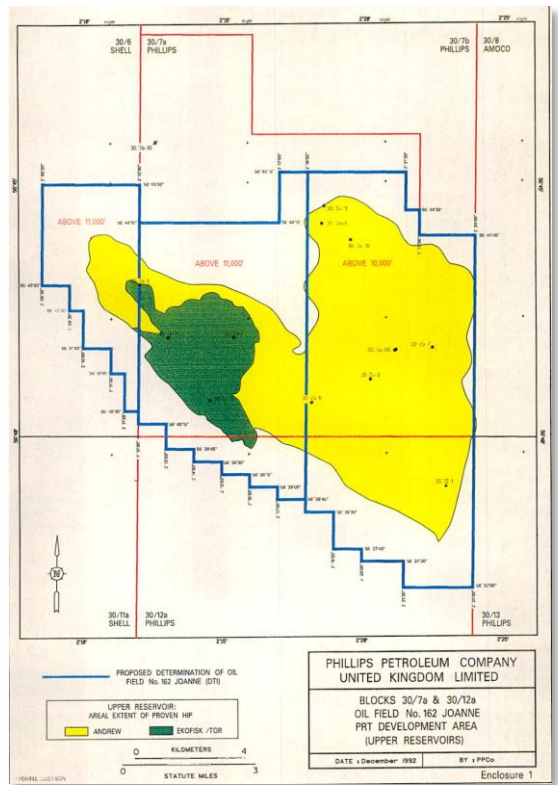


Production to date by field



- Complex of accumulations on the Josephine ridge
- Focal point for migration from flanking Jurassic basins
- Trapping structures related to mobile salt above basement high
- Palaeocene sandstone, Cretaceous Chalk and Triassic fluvial sandstone reservoirs

J-Area in 1992: Judy/Joanne development Annex "B"



- Conventional manned platform at Judy and subsea at Joanne
- Capacity 300 MMscf/d gas, 95 Mb/d liquid
- 16 Palaeocene/Chalk and 6 Triassic wells premised

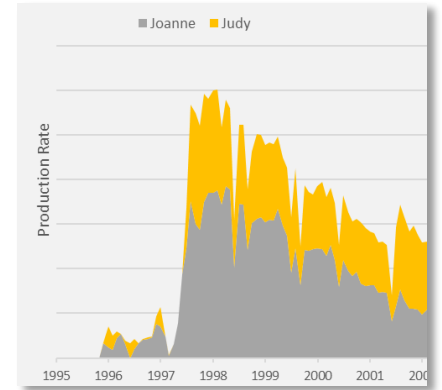
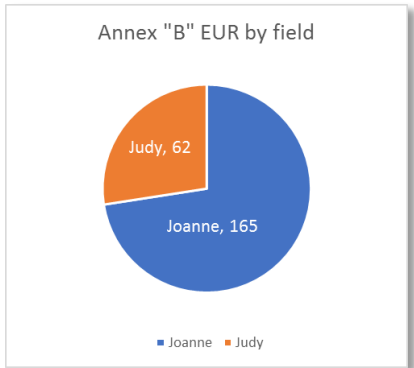
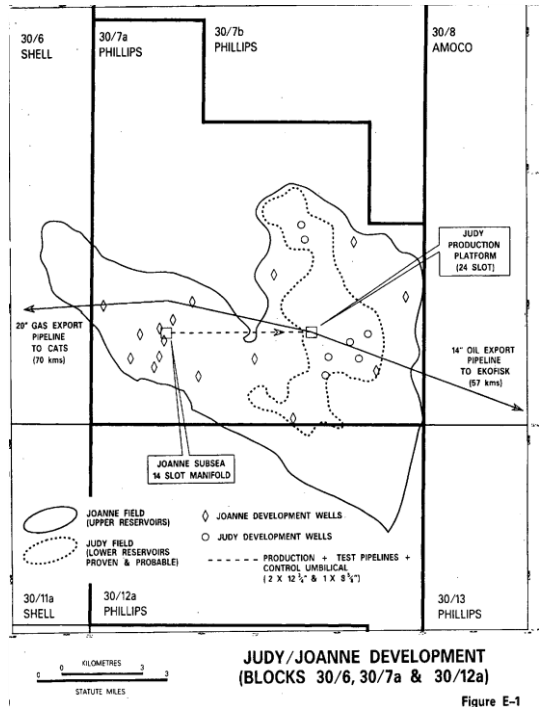
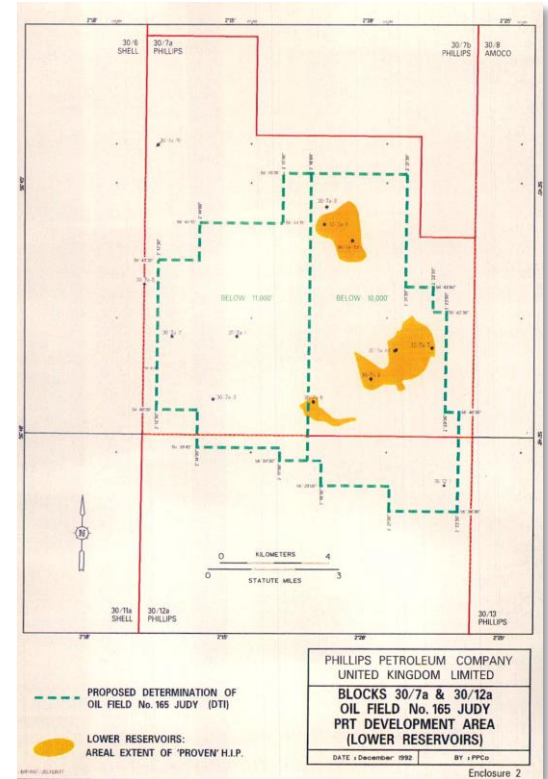
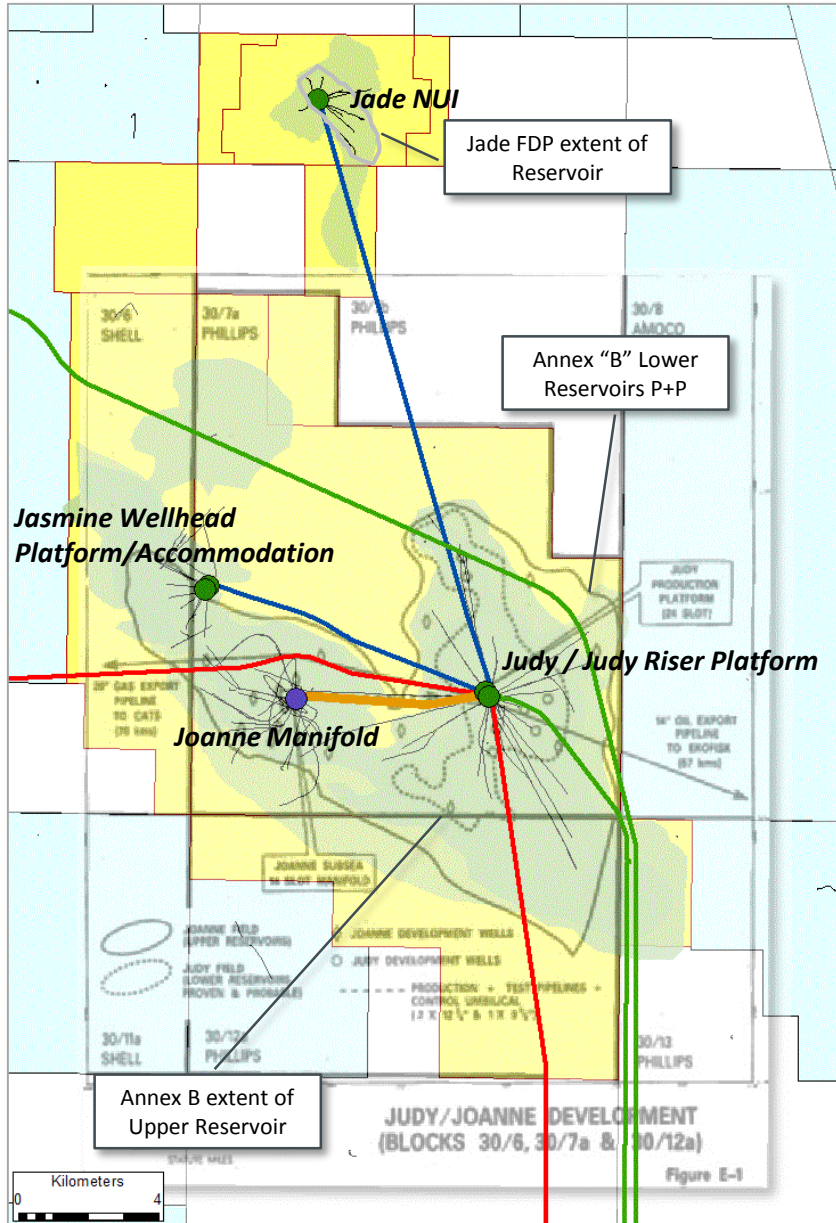
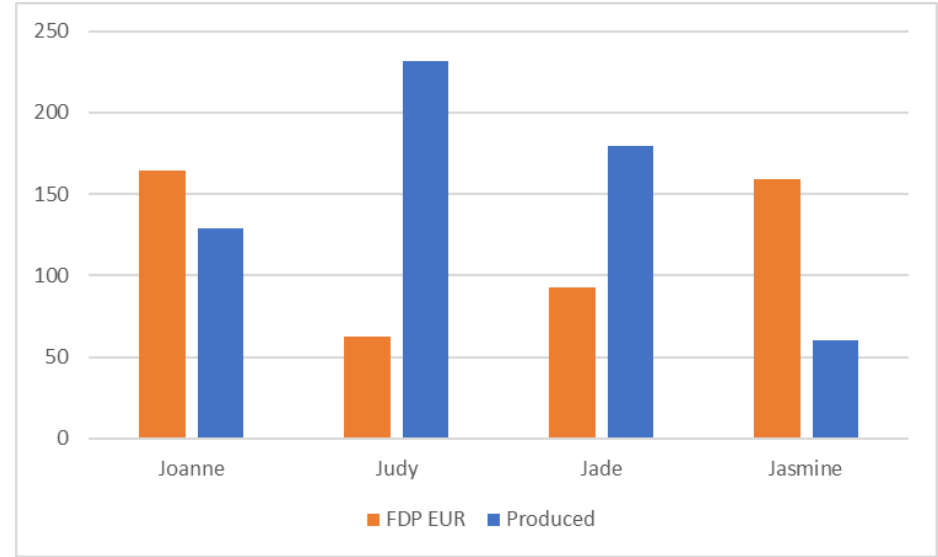


Figure E-1

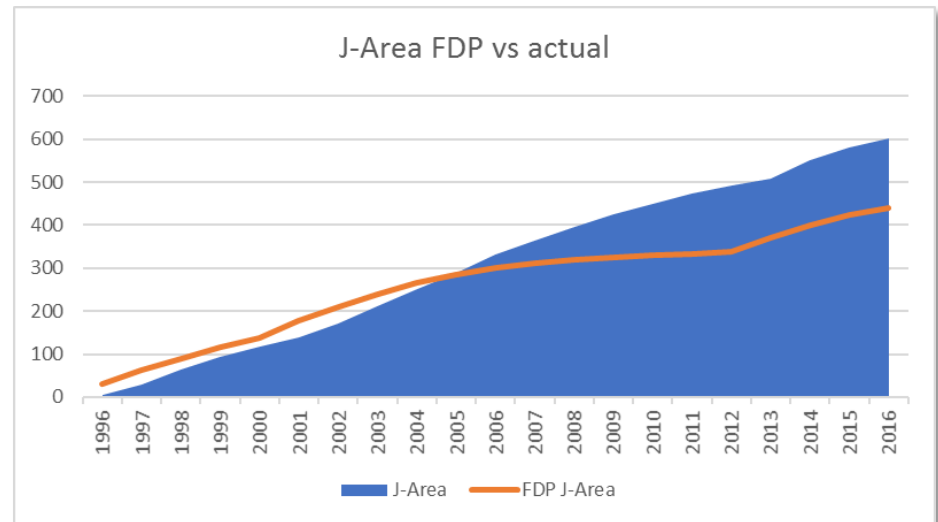
From 1992 to 2017



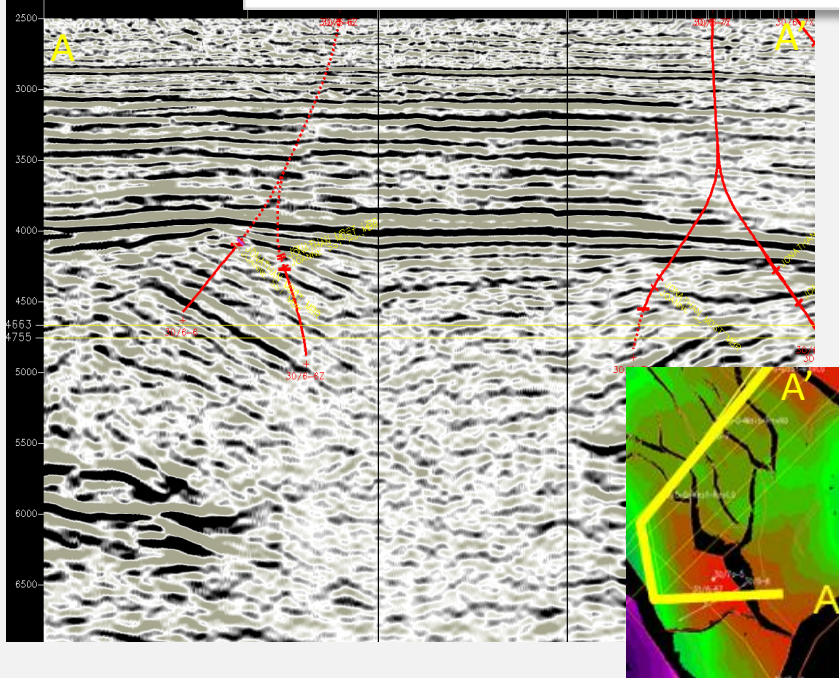
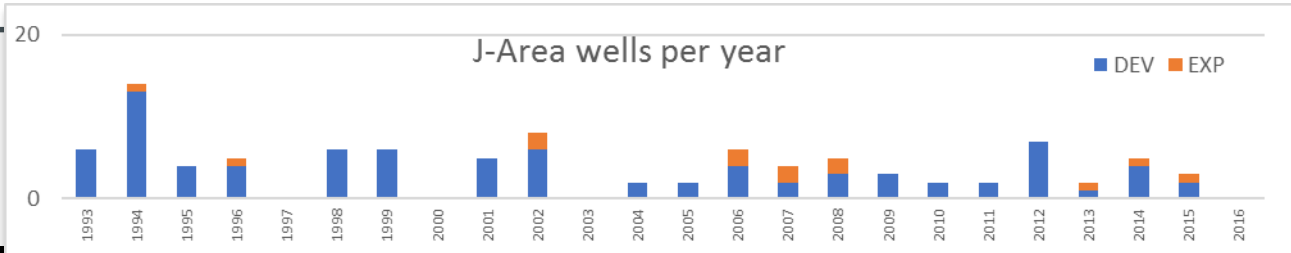
J-Area FDP vs actual MMboe gross



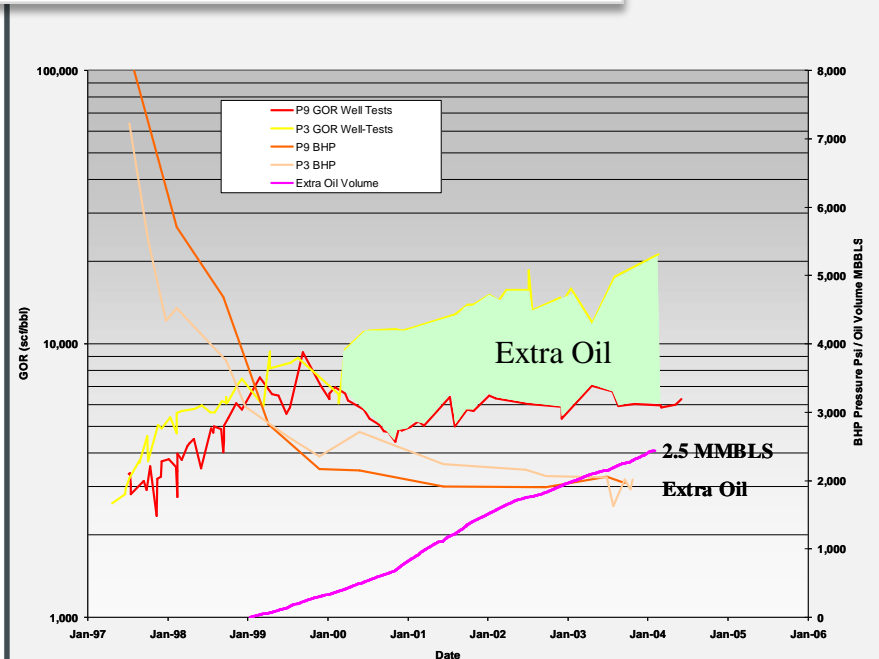
J-Area FDP vs actual



How did we get here? New data for ILX and infill drilling



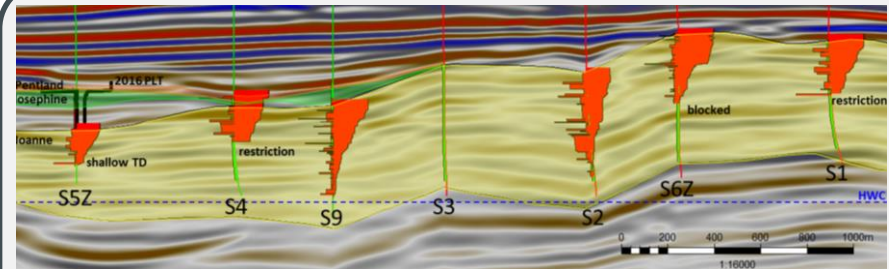
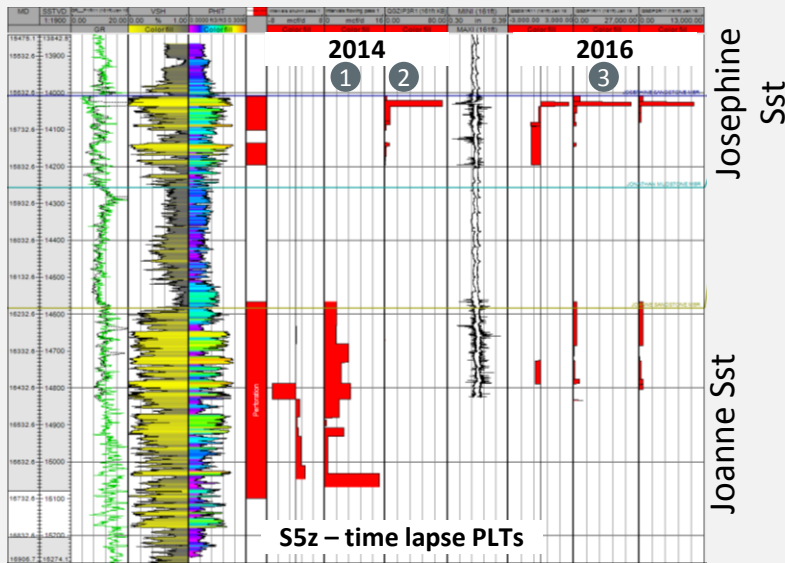
- Newly acquired or reprocessed seismic data led to new drilling campaigns:
 - 2001 to 2002: Judy un-appraised fault blocks
 - 2006: Jasmine discovery and development



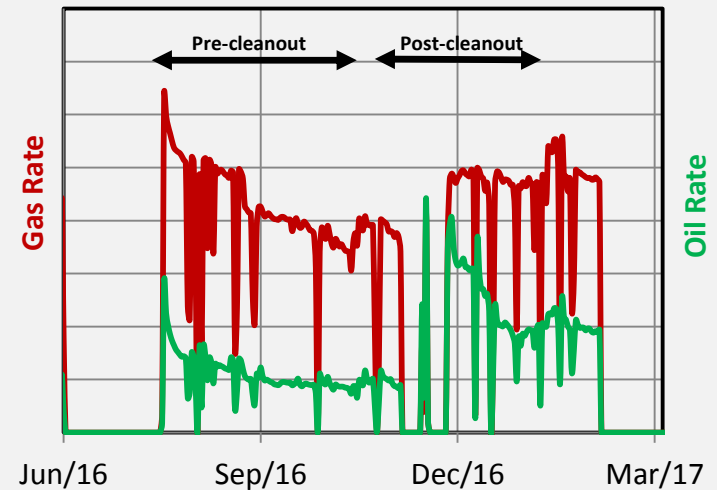
- New data and active reservoir monitoring
 - 2004: Judy targets identified from anomalous well behaviour
 - GOR modelling implied pressure support
 - Re-mapping indicated a well target to the south

Optimising existing well stock – PLT data and PO activity

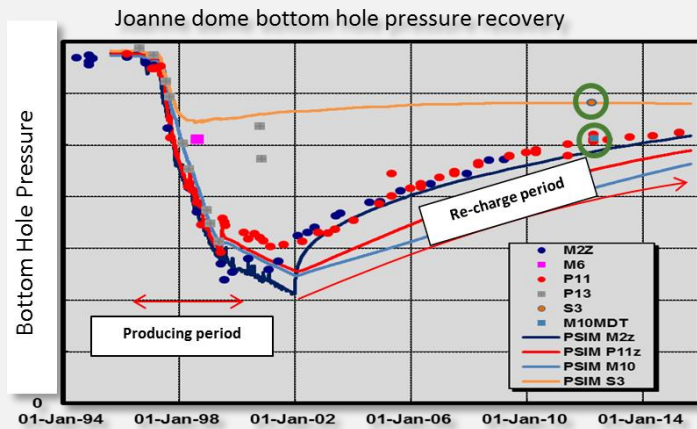
- “Secondary” Josephine Sandstone Member reservoir perforated in Jasmine well
- Significantly exceeded expectations
- Time-lapse PLT data has shown sustained nature of Josephine contribution
- Josephine target drilling candidates identified



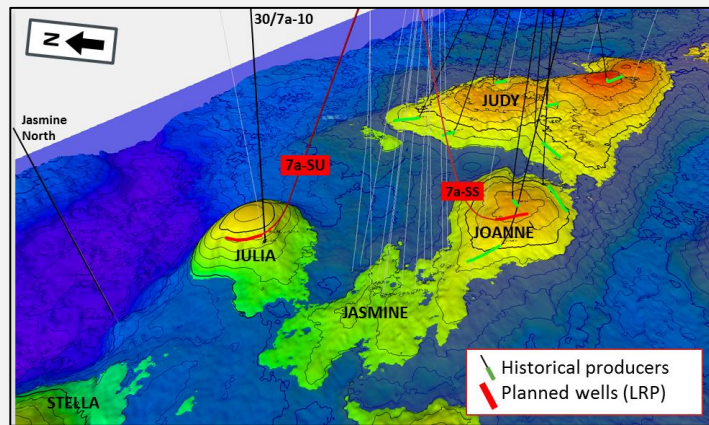
- PLT data from Jasmine wells showed no or limited production below hold-up depths in several wells
- Coiled tubing clean-out and reperforation led to significant sustained production uplift
- Additional clean out and reperf candidates identified



Where next - more new data supporting further drilling

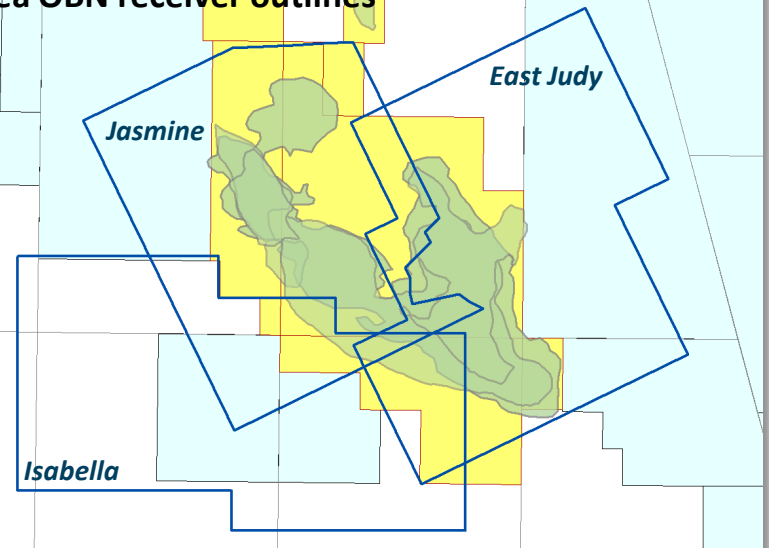


- 2013 - Direct pressure measurements confirmed Palaeocene reservoir pressure recharge



- 2012-2013 - Jasmine well penetrations proved extension of Palaeocene accumulation to west

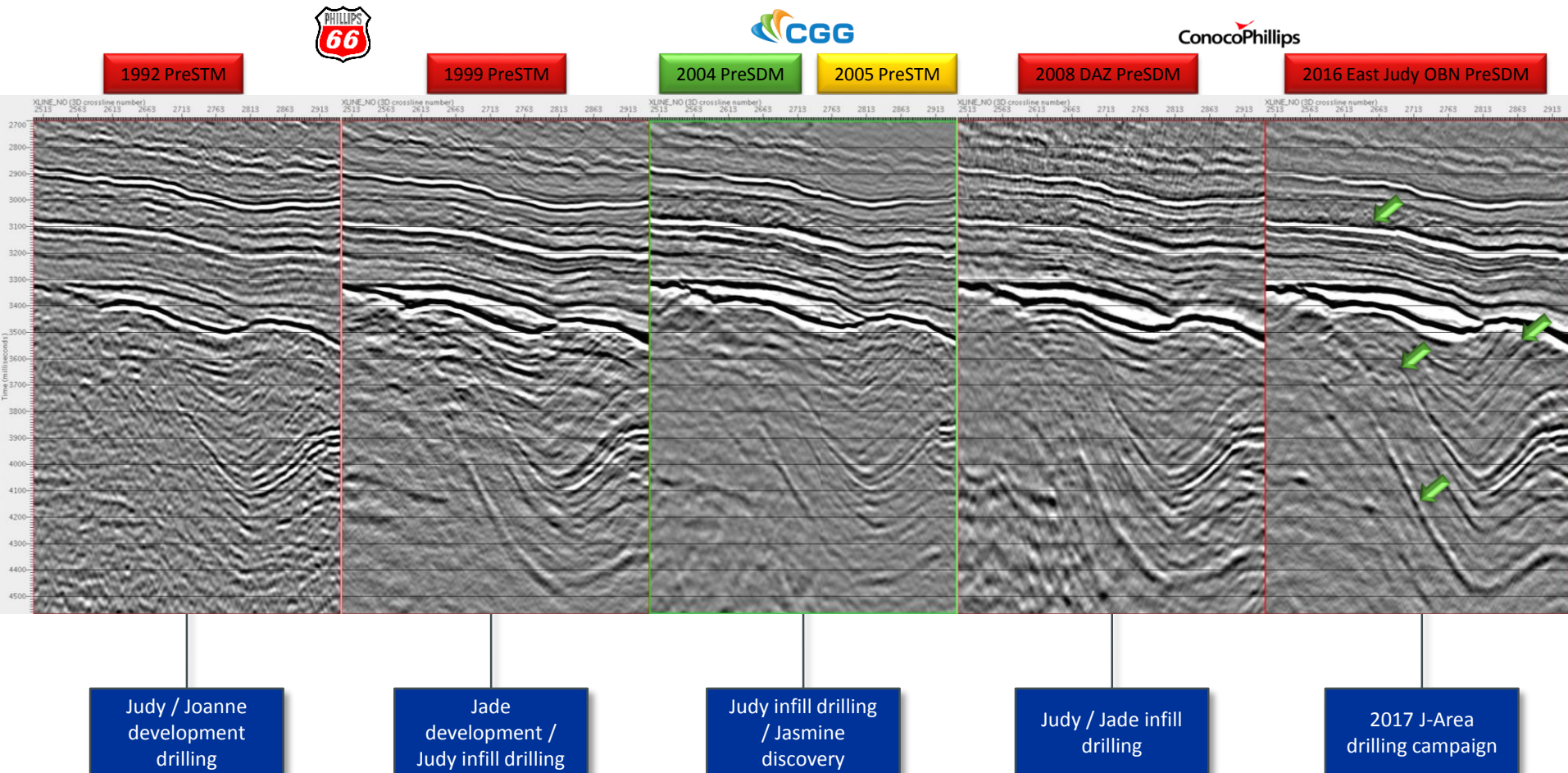
J-Area OBN receiver outlines



- Ocean Bottom Node seismic data acquired by ConocoPhillips over Jasmine (2011) and East Judy (2014) and by Apache over Isabella (2012)
- Sim-source and non-uniform source spacing (CSI) technology used on East Judy acquisition
- All three surveys co-processed in-house in 2015
- Significant image quality uplift, even in reprocessed data

Evolution of East Judy seismic data quality (1992–2016), IL1505

- ✓ Low frequency content
- ✓ Multiple attenuation
- ✓ Steep dip imaging
- ✓ Signal-to-noise ratio



Maximise Existing Production – facility optimisation

Objectives

- Continuously improve HSE Performance
- Optimise DOE
- Prepare the facilities for the long term: 2020+
- Fully exploit existing well count
- Maximise remaining field development potential

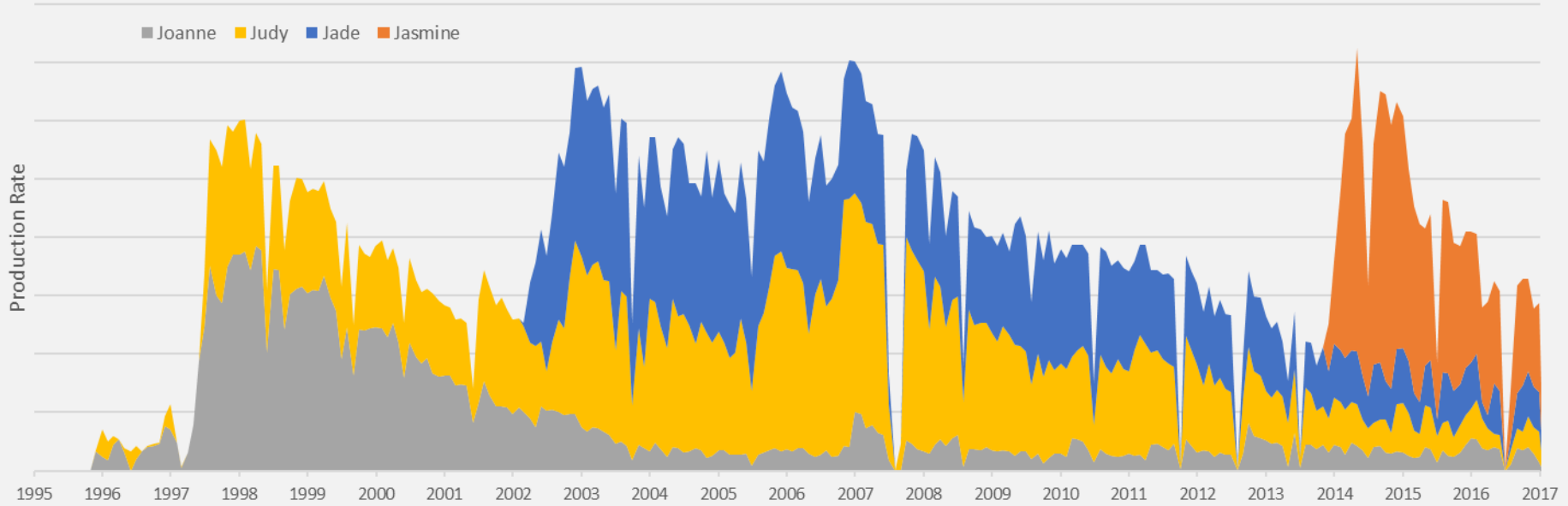
Actions

- Execute fabric maintenance programme
- Execute plant reliability improvements, and optimise shutdowns to improve base DOE
- Execute Judy Life extension project (control system upgrade)
- Optimise existing well stock (cycle well management, suction pressure reduction)
- Long term compression strategy - JCOP



J-Area history

J-Area Monthly Average Gross Production



Judy Joanne First production 1995, constrained due to commercial dispute

Jade discovery

Long offset 3D data acquired

Jade first production

CGGV Cornerstone multi-client data purchased

Jasmine discovery

CGGV data re-processed in-house

Jasmine first production

Jasmine OBN data acquired

East Judy OBN data acquired and co-processed with Jasmine OBN

Judy infill drilling

Judy infill drilling

Jade Judy Member infill

Judy infill drilling

Jasmine infill

Judy workovers

Jade workovers

Jasmine workovers

Judy GIM installed

Jade NUI installed

Suction pressure reduction

Install Jasmine infrastructure

Add Judy beds

Control system upgrade

JCOP

Key messages

- Longevity depends on active field management
- Investment in data is key to maximising potential
- For J-Area, focus areas have been
 - Maximising recovery by drilling new infill wells
 - Extending the field by drilling step-out exploration wells
 - Optimising production from existing wells
 - Facility maintenance and management

Acknowledgements

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