

Step-out Developments in the CNS Eocene Injectite Play

Challenges and opportunities, with examples from the Greater Catcher Area

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DEVEX 2024

Wednesday 29 May



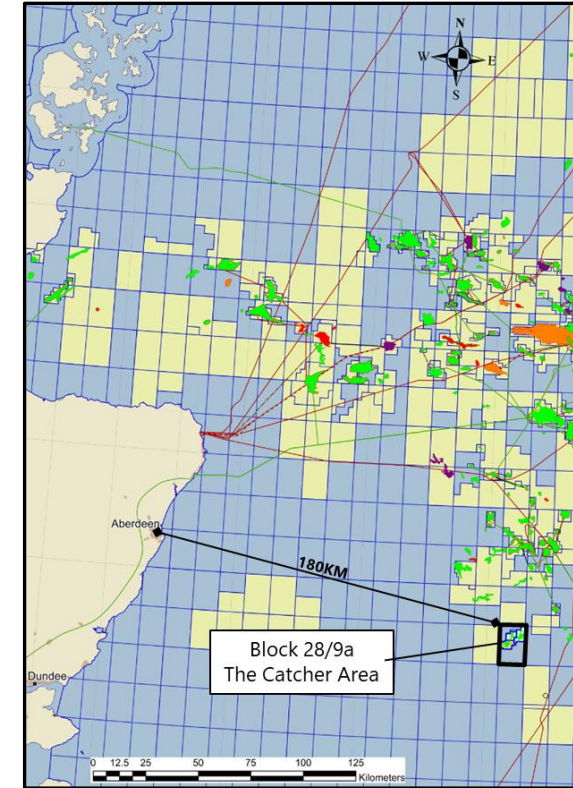
Agenda

Introduction to Greater Catcher Area	<i>Catcher timeline</i>
2022 drilling campaign	<i>Catcher North and Laverda development</i>
Laverda LP1	<i>Pre-drill vs. post-drill</i>
Catcher North CP7	
Burgman Far East BP6	
Summary	<i>Future development opportunities</i>

Introduction to Greater Catcher Area

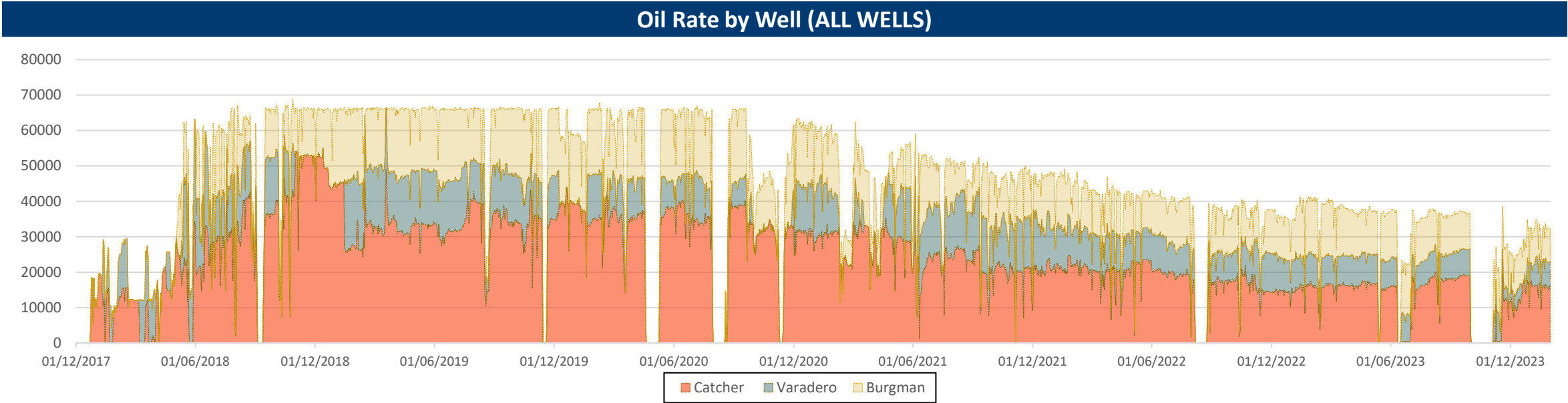
A successful subsea development in Block 28/9a UKCS

- Catcher, Varadero and Burgman Fields produced via the BW Catcher FPSO
- 21 development wells (17 Producers & 4 Injectors)
 - Catcher (9), Varadero (5), Burgman (7)
- First oil December 2017
 - c.100 MMbbls to date, significantly ahead of sanction expectations
- Water injection for pressure support and sweep. Gas re-injection for attic oil recovery
- Eocene Tay and Cromarty Sandstone Member injectite sands, excellent reservoir quality (35% PHI, >5D perm)
- Long distance migration of oil and gas from the Central Graben with secondary microbial gas from biodegradation of oil
- 4D seismic shot in 2021; second 4D monitor ongoing



Catcher timeline

Sustained oil production plateau of 66,000 bopd



Polarcus 2012 PSTM Repro

CGG 2020 PSDM Repro (4D baseline)

CGG 2021 Broadband PSDM Acq. (4D monitor)



3D Broadband
4D Difference
Time Shifts
Diffraction Image
ML Fault volume

Seismic

Wells



x18 wells drilled in Phase 1



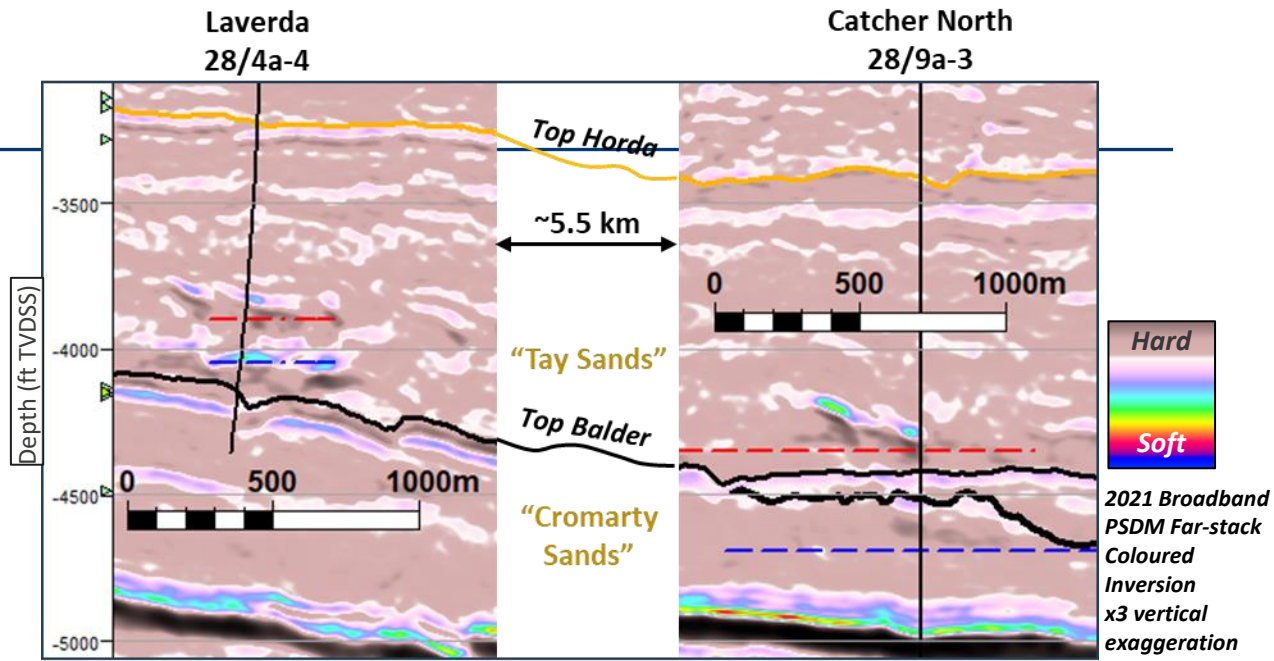
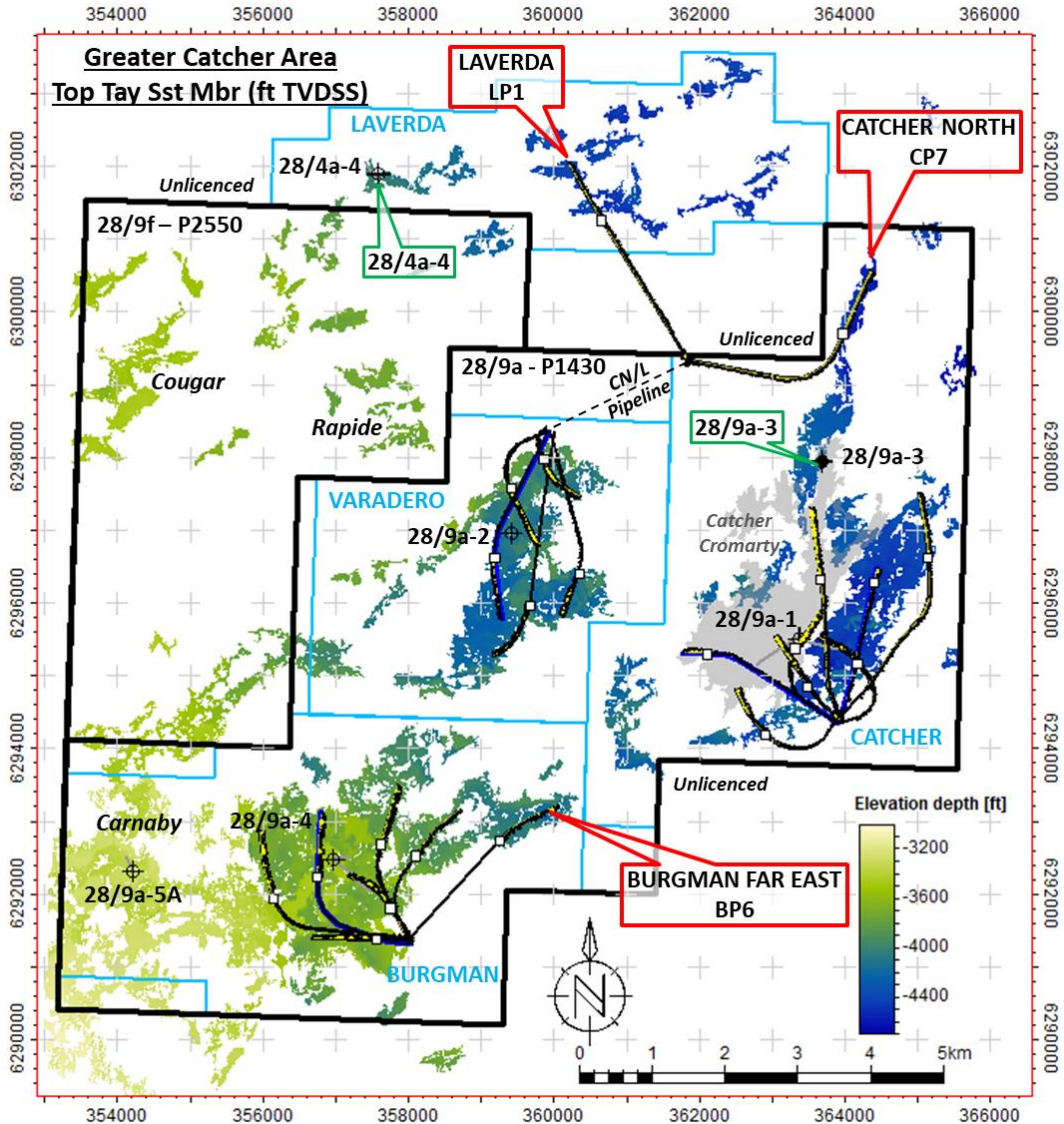
2020 Infill campaign (x1 well)



2022 Infill campaign (x3 wells)

Greater Catcher Area

2022 drilling campaign



--- MDT GOC

--- MDT OWC

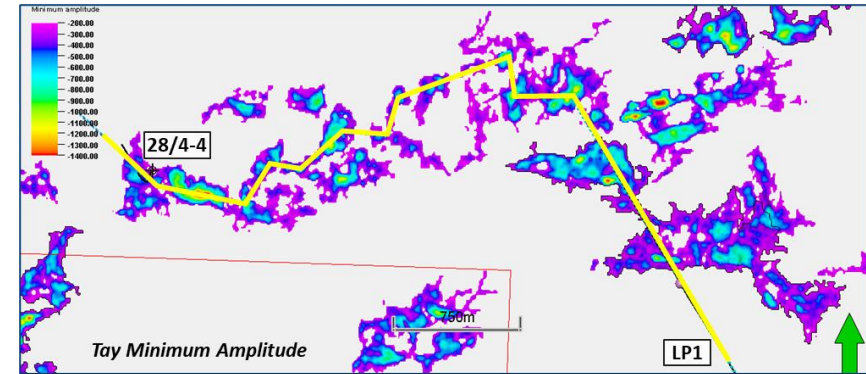
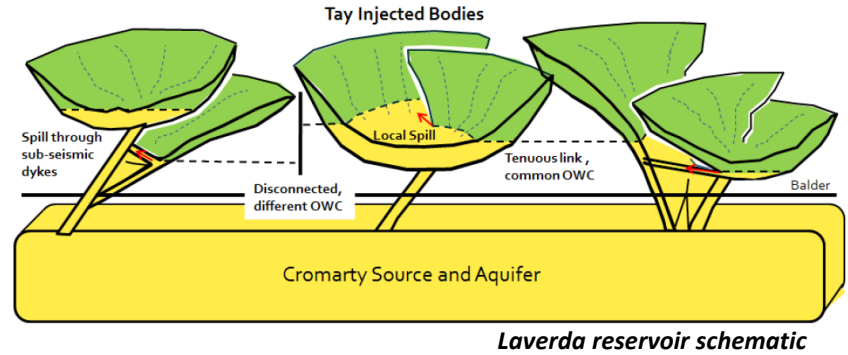
- 5 ft gas in Tay sands
- 12 ft oil in Tay sands
- 35 ft water in Cromarty sands
- Unclear correlation between seismic amplitude shut-offs and MDT fluid contacts
- 9 ft gas in Tay sands
- 14 ft oil in Cromarty sands
- 19 ft water in Cromarty sands
- Good correlation between seismic amplitude shut-offs and MDT fluid contacts

Combined two well Catcher North and Laverda development sanctioned by Premier Oil in 2019 with a new subsea template tied back to Varadero.

Wells to target the largest mapped STOIP in Laverda and Catcher North.

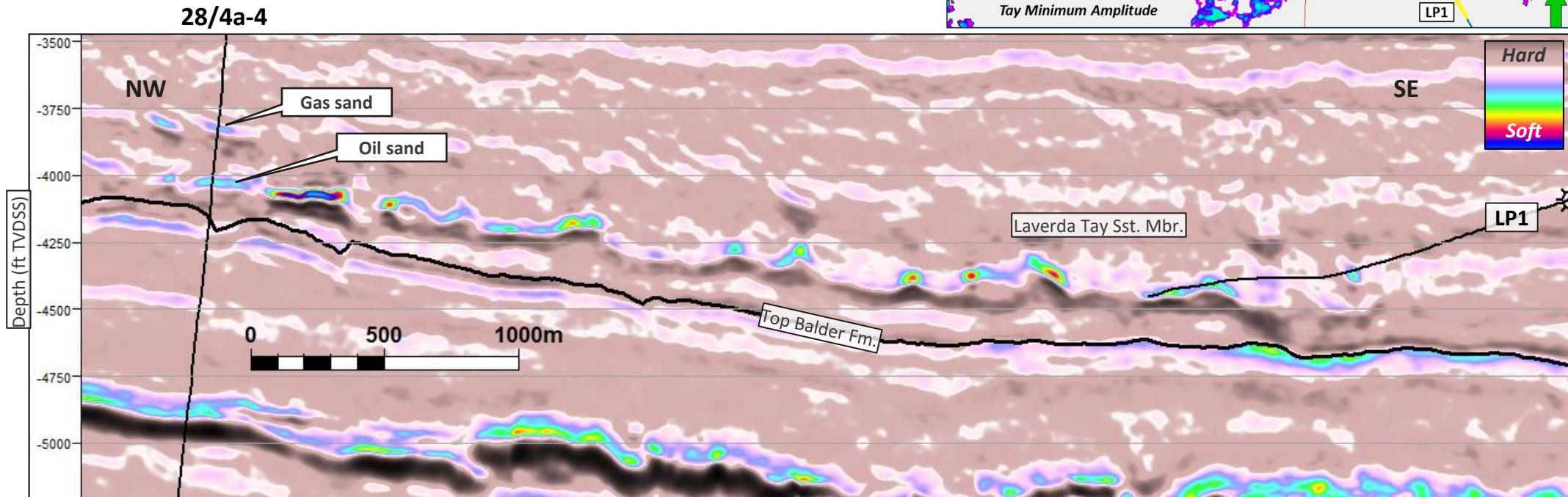
Laverda development concept

- DOWNDIP OF Laverda exploration well in area of largest mapped pay
- Reservoir geometries consistent with remobilised / injected Tay sands. Uncertain relationship to underlying Cromarty
- Target STOIIP interpreted to be ~11 MMstb



Key risks:

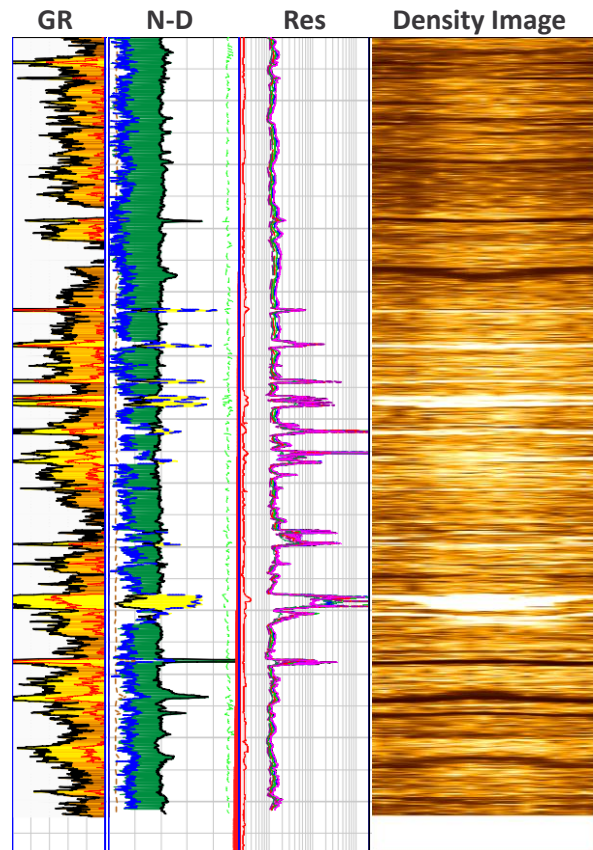
- Potential for local pockets of gas, but not of concern
- Missing the reservoir due to depth / position uncertainty



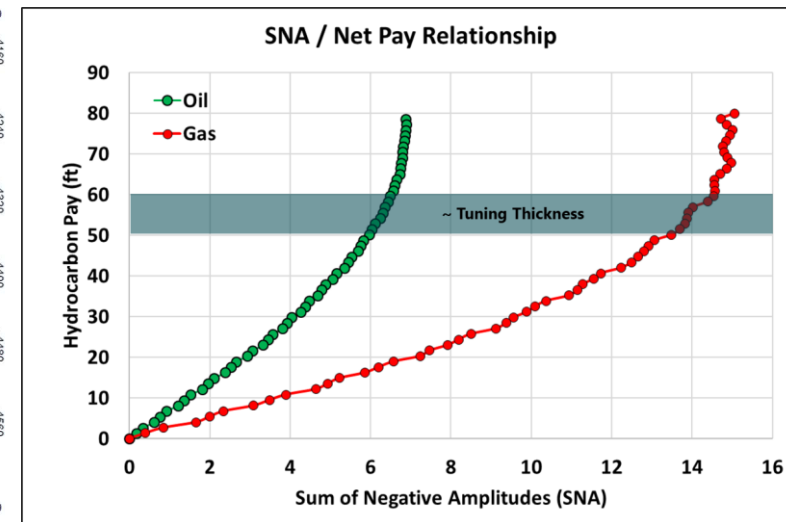
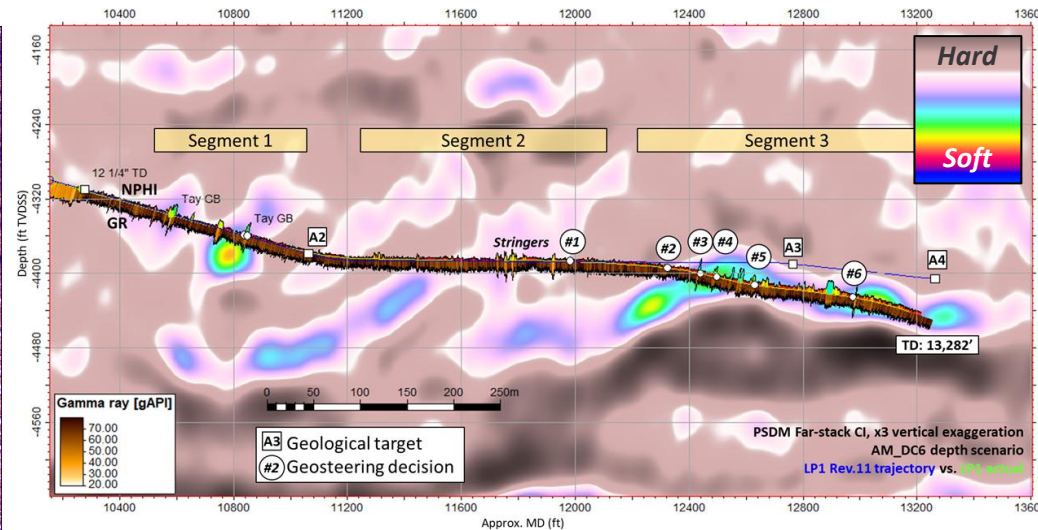
2021 Broadband PSDM Far-stack Coloured Inversion, x3 vertical exaggeration

Laverda LP1 well result

Gas discovery with thin reservoir



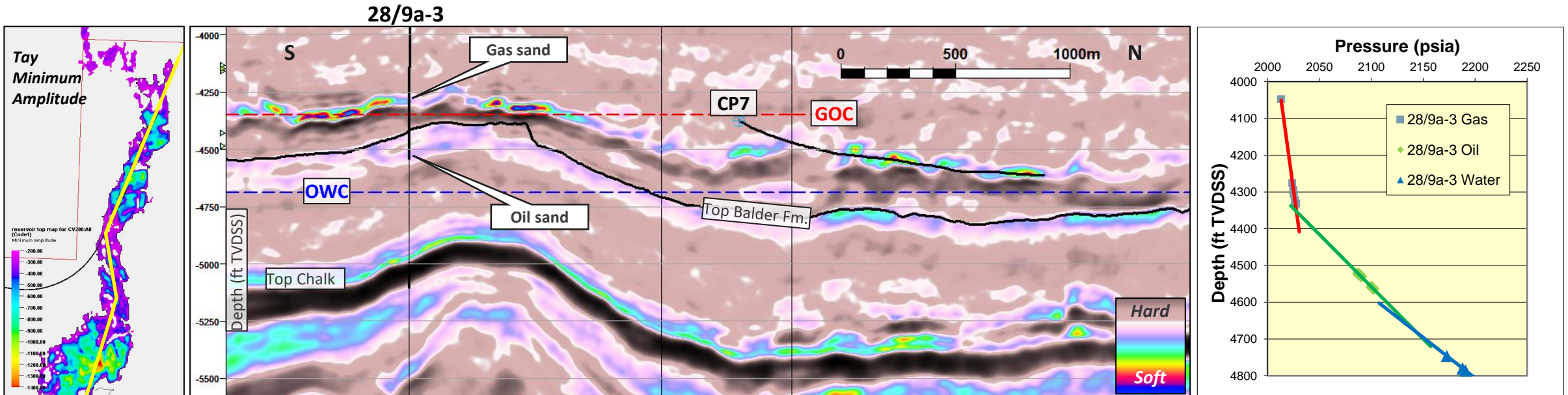
28/9a-L1, Segment 3 LWD logs



- LP1 well found sub-commercial quantities of gas instead of the prognosed oil
- Reservoir was substantially thinner than expected due to SNA Net Pay (Gas) relationship
- Down-dip oil column is likely to exist, though limited STOIIP interpreted
- Well was not completed and is currently suspended awaiting abandonment

- Key learnings: **Trapped pockets of gas can be located anywhere**
Very thin gas sands will give an 'oil-indicative' amplitude response

Catcher North CP7 development concept

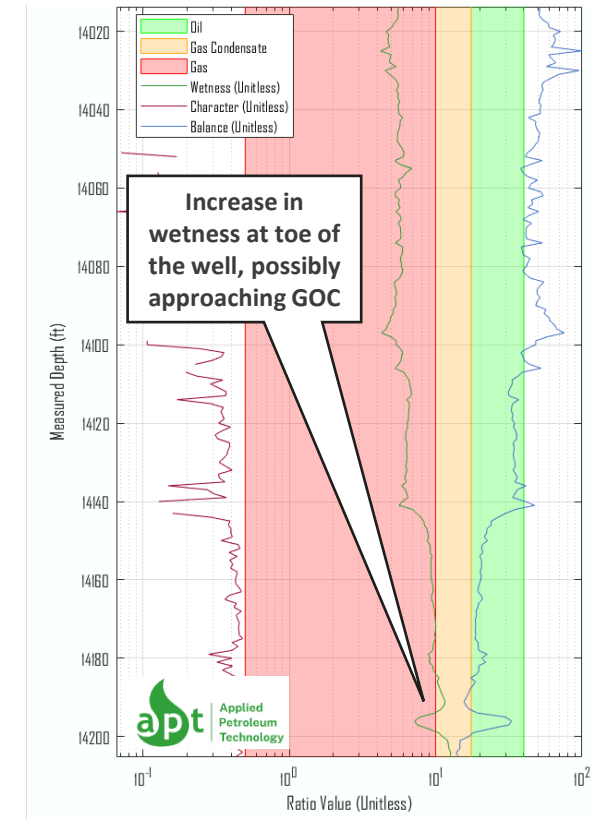
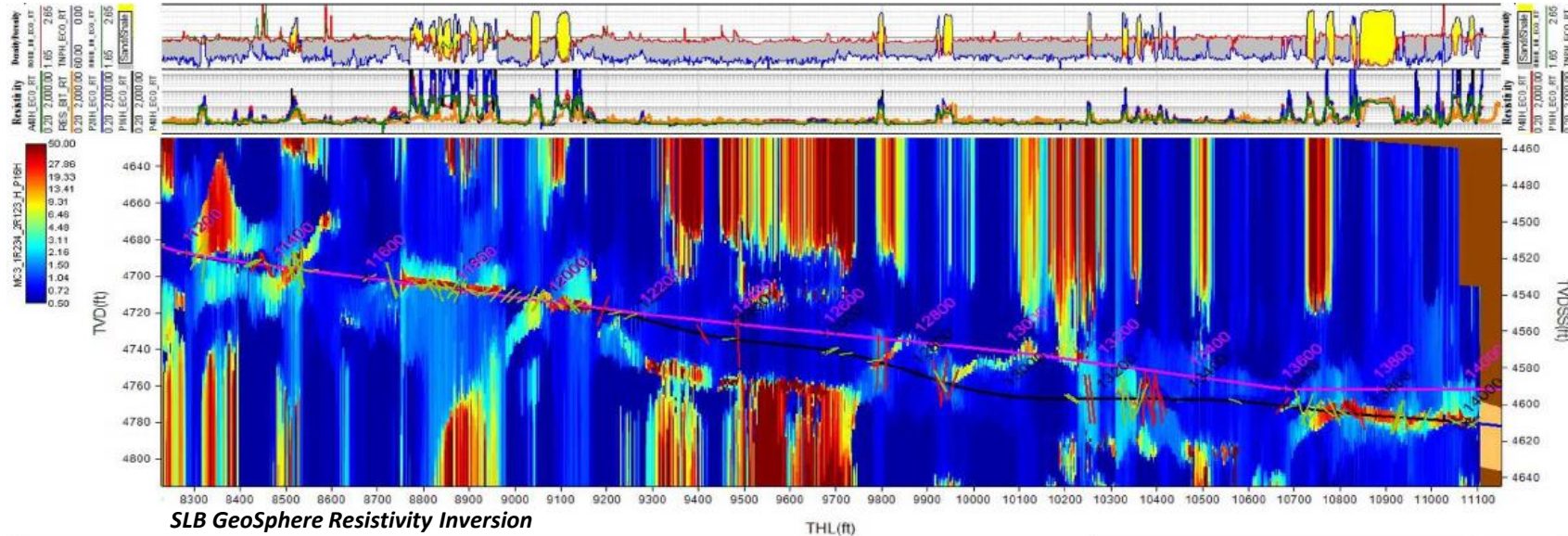


2021 Broadband PSDM Far-stack Coloured Inversion, x3 vertical exaggeration

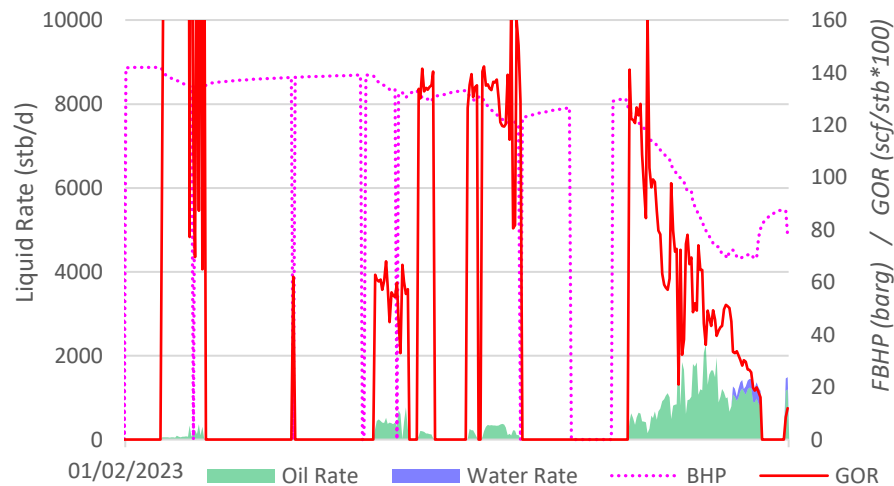
- Elongate injected Tay sandstone downdip of 28/9a-3 exploration well within Catcher Field
- GOC constrained by formation pressure data and seismic amplitude shut-off
- CP7 well targeting c. 10 MMstb STOIIP
- Key pre-drill uncertainties were gas presence (post-LP1 result), reservoir connectivity and aquifer support

Catcher North CP7 well result

Gas bearing reservoir with indications of oil



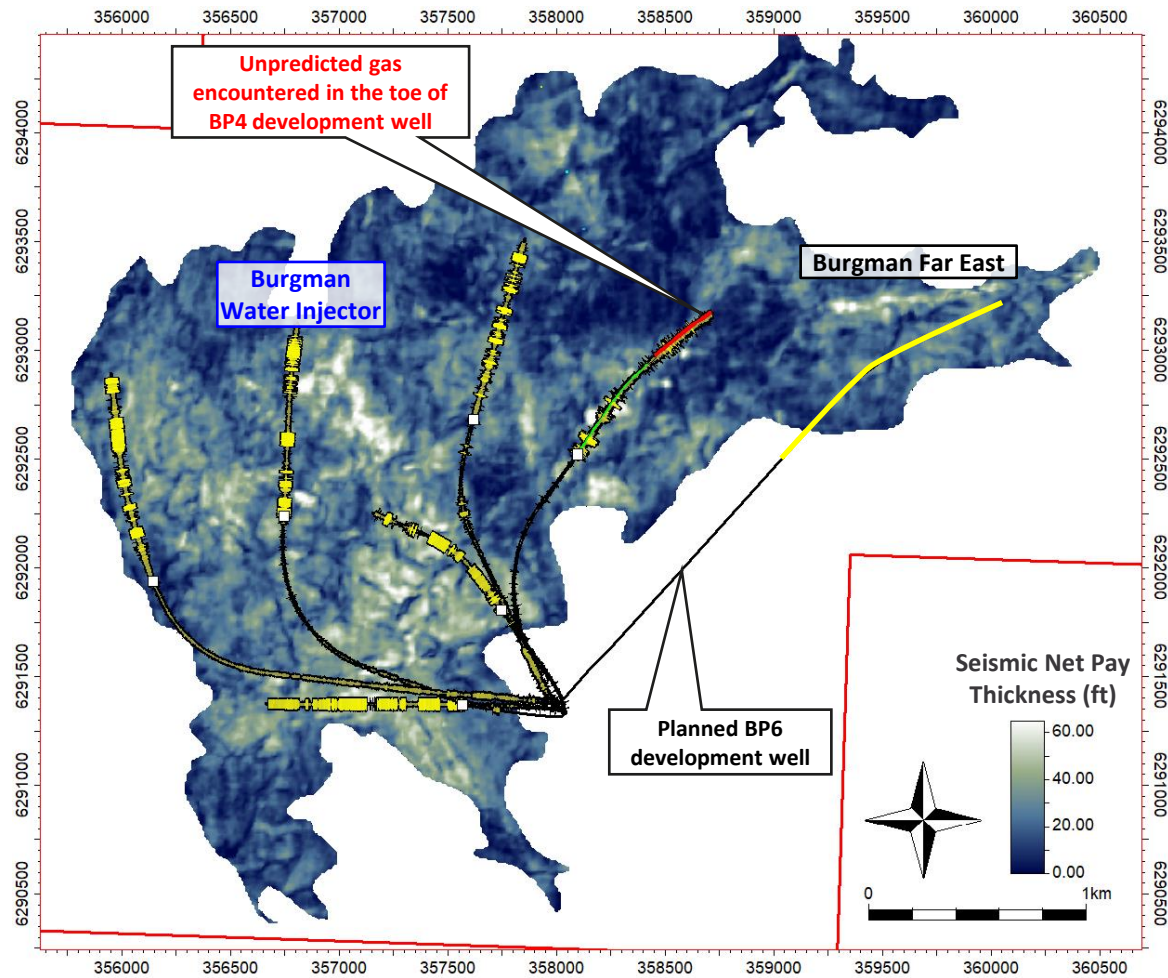
- As at Laverda, gas sands were encountered instead of the predicted oil
- Positive evidence for deeper oil within gas logs at toe of the well
- Decision was made to complete the well based on the gas being a commercial volume, with an upside of oil production from the well



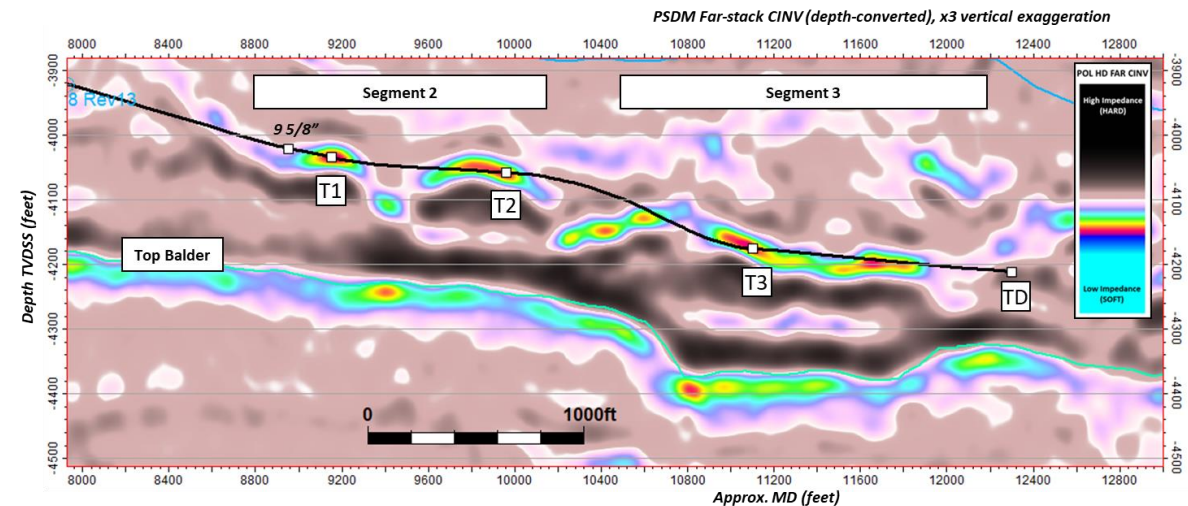
Production History

- Well initially produced gas
- Subsequently yielding oil, producing >1,000 stb/d
- Evidence for pressure support from underlying aquifer

Burgman Far East BP6 development concept

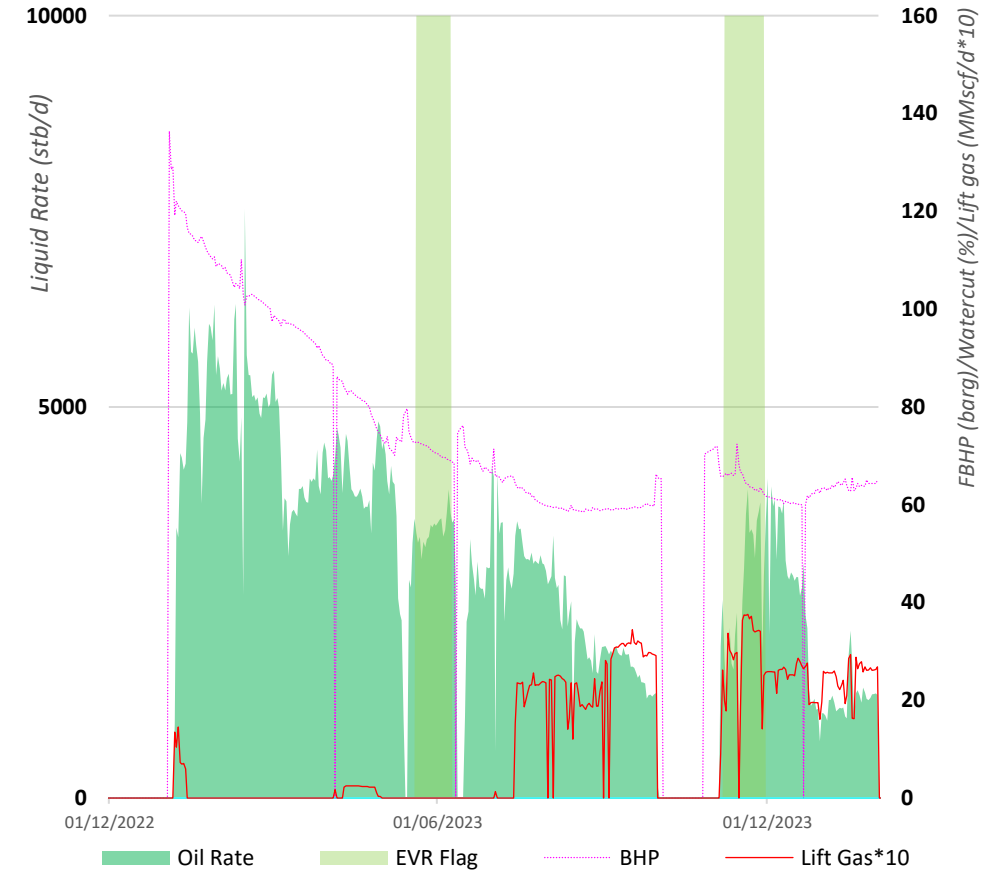
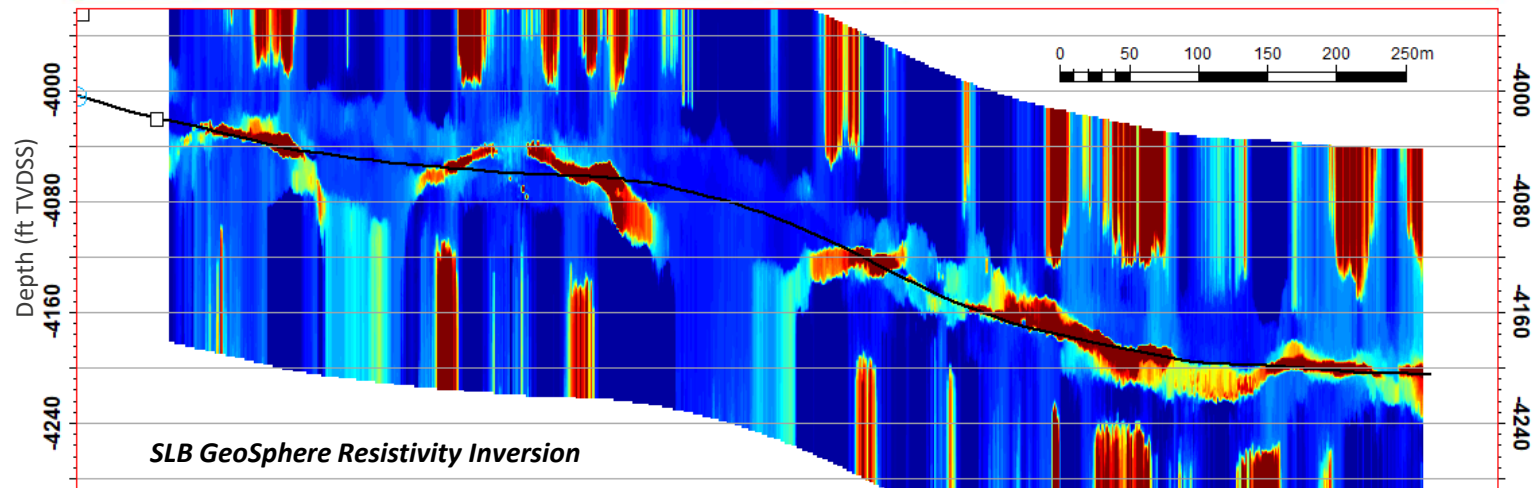
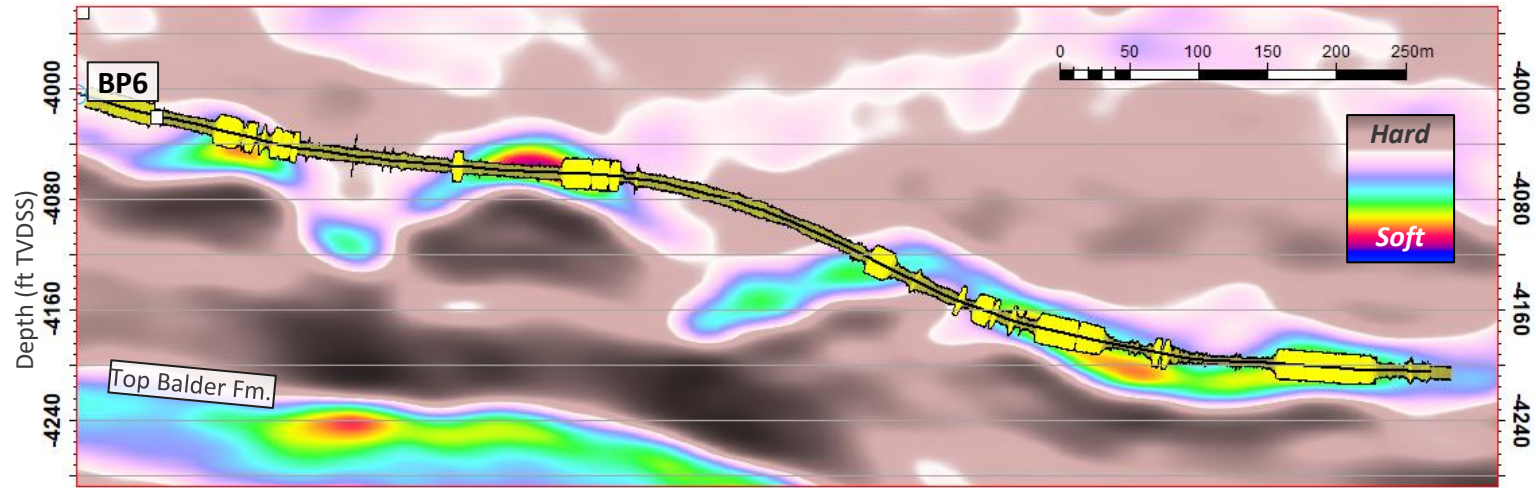


- Well in the 'Far East' of Burgman to access the area of mapped STOIP not interpreted to be drained by the existing well stock
- Produced under depletion, no aquifer or water injection support expected in the segment
- Likely no connection between Segments 2 & 3
- Targeting a mapped STOIP of c.11 MMstb



Burgman Far East BP6 well result

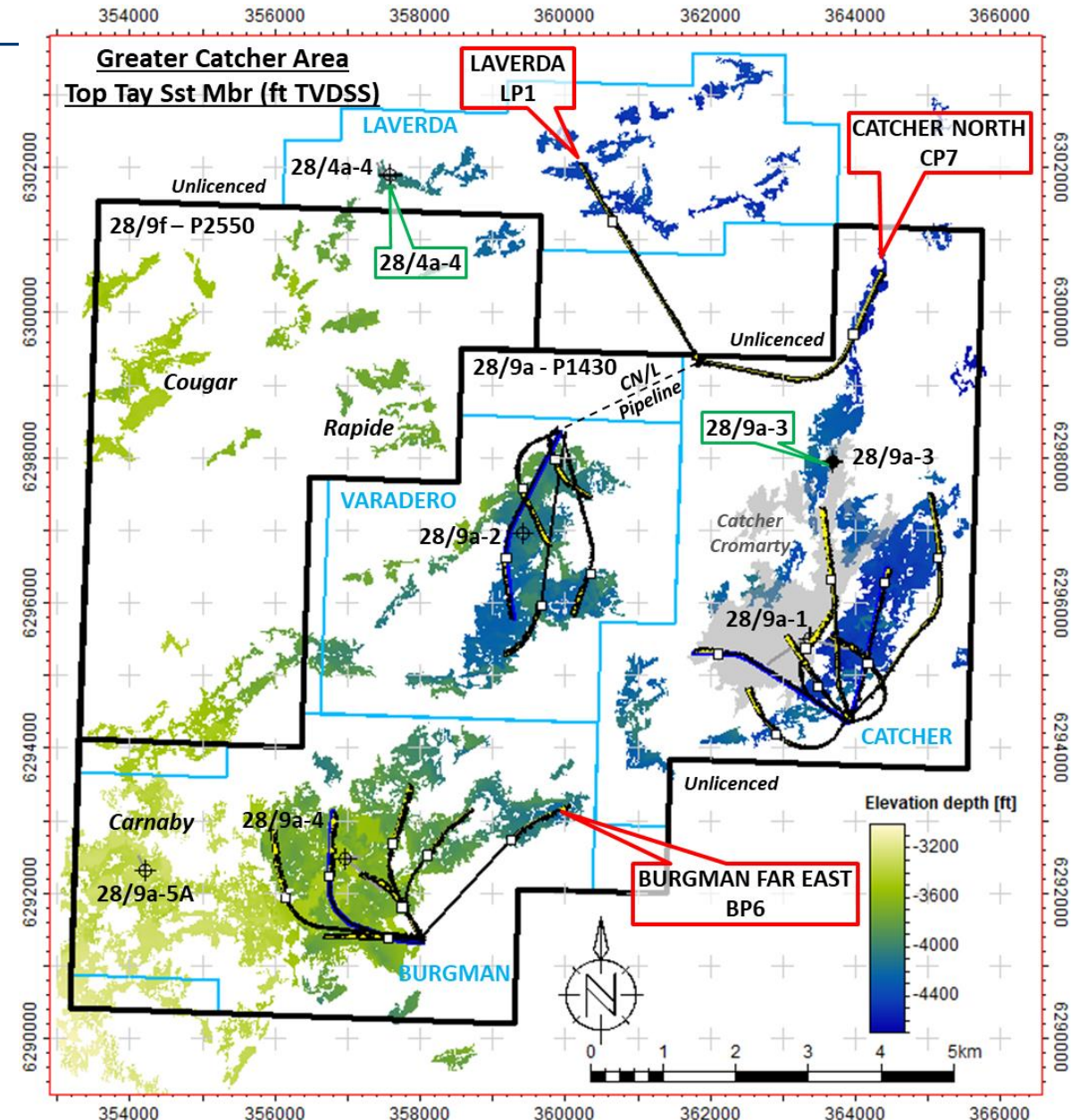
2021 Broadband PSDM Far-stack Coloured Inversion, x3 vertical exaggeration



- BP6 has been a successful well, meeting all pre-drill objectives, adding up to 6,000 bopd dry oil to the Catcher FPSO
- Well optimisation ongoing

Summary and future of Catcher asset

- 2022 drilling programme shows the challenges and opportunities with developing step-out targets beyond appraised field areas
- Laverda and Catcher North development wells both encountered results outside of the pre-drill prognosis
- Gas presence was not considered a large pre-drill risk because gas predictability had historically been good, and gas had always been associated with a substantial underlying oil column
- Injectite systems have excellent connectivity. However, minor stratigraphic non-juxtapositions can lead to local, variable GOCs
- CP7 has validated the gas-over-oil model, opening future opportunities to drill high in stratigraphy and produce out limited gas volumes, before producing oil. Maximises OWC stand-off
- BP6 has been a great success, adding valuable dry oil to the Catcher FPSO. An analogous target remains in Burgman North
- Learnings are being used in conjunction with 4D seismic to refine future development targets
- The Catcher development continues to exceed expectations





Thank you to the Catcher JV partners for permission to present.

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