18 August 2021

Companies Announcement Office
ASX Limited
Exchange Centre
Level 4, 20 Bridge Street
Sydney, NSW 2000

Dear Sir/Madam

PROFESSOR PETER COOK TO PRESENT AT THE CARBON CAPTURE AND STORAGE CONFERENCE ON WEDNESDAY 18 AUGUST

Please find attached Professor Peter Cook's presentation at the Informa Australia Carbon Capture and Storage (CCS) Conference on Wednesday 18 August.

BPH investee Advent has appointed of Professor Peter Cook as an advisor on geosequestration for its project in the Offshore Sydney Basin. Professor Peter Cook is an eminent Australian and international earth scientist. He is a leader in the development and application of carbon capture and storage (CCS) technologies and has published more than 30 papers and articles on greenhouse gas technologies, including the books "Clean Energy Climate and Carbon" and "Geologically Storing Carbon", and was an IPCC Co-ordinating Lead Author. He first drew attention to Australia's CCS opportunity more than 20 years ago, then going on to establish national CCS programs and research facilities through the Petroleum CRC and the Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC). In 2011, the University of Melbourne established the Peter Cook Centre for CCS Research.

With the Morrison Government's recent announcement of an additional $539.2m for hydrogen and CCS in May's budget, carbon capture is now a key part of Australia's transition towards clean energy and carbon neutrality. One of the priority technologies in Australia's Technology Investment Roadmap, CCUS technology has been identified by the International Energy Agency (IEA) as the only large-scale mitigation option available that can deliver the additional CO2 emissions reductions that would be necessary to meet the climate goals in 2050.

Authorised for release by

David Breeze
Executive Director

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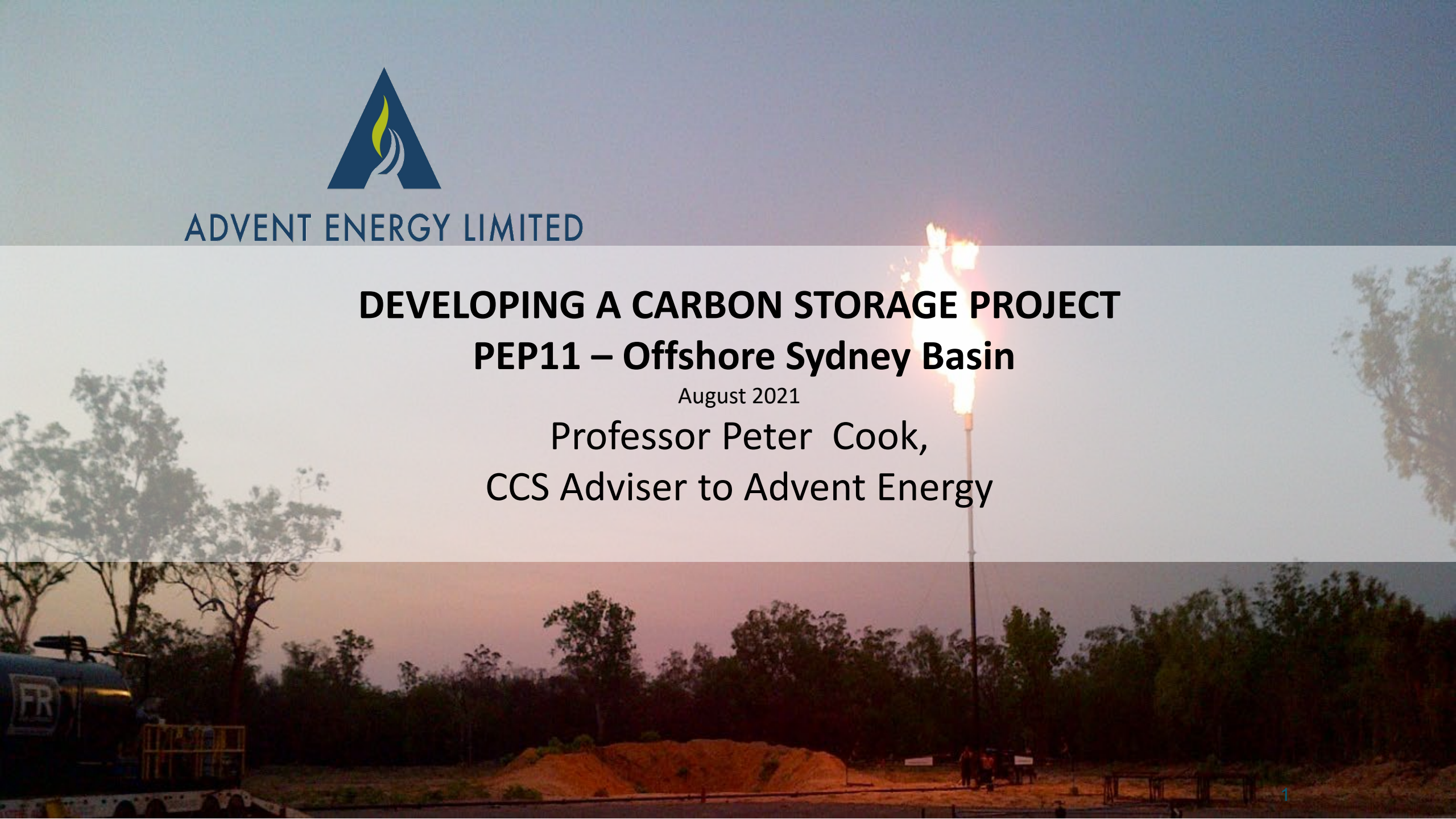
DEVELOPING A CARBON STORAGE PROJECT
PEP11 – Offshore Sydney Basin

August 2021

Professor Peter Cook,
CCS Adviser to Advent Energy



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IPCC Sixth Assessment Report 2021

"It is unequivocal that human influence has warmed the atmosphere, ocean and land

The scale of recent changes across the climate system as a whole and the present state of many aspects of the climate system are unprecedented

Global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in carbon dioxide (CO2) and other greenhouse gas emissions occur in the coming decades

Under scenarios with increasing CO2 emissions, the ocean and land carbon sinks are projected to be less effective at slowing the accumulation of CO2 in the atmosphere.

limiting human-induced global warming to a specific level requires limiting cumulative CO2 emissions, reaching at least net zero CO2 emissions"

CCS is an essential technology in the race to decrease global emissions of carbon dioxide

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THE TAKE HOME MESSAGES

- Advent Energy proposes to drill a gas exploration well, Sea Blue-1, in the offshore Sydney Basin.
- The exploration lease (PEP 11) is located close to the Newcastle-Hunter region - and major emission sources which will need to be cut if NSW is to meet its target of NET Zero by 2050.
- CCS is a key technology option to do this - and maintain an industrial base.
- There is presently no confirmed onshore geological storage site in NSW
- The offshore Sydney Basin has storage potential but has never been definitely evaluated due to lack of well data
- Sea Blue- 1 will provide the opportunity to cost-effectively assess CO2 storage potential.
- Confirmation of offshore geological storage potential would be a game changer for NSW and its NZE target

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The Advent Gas Project

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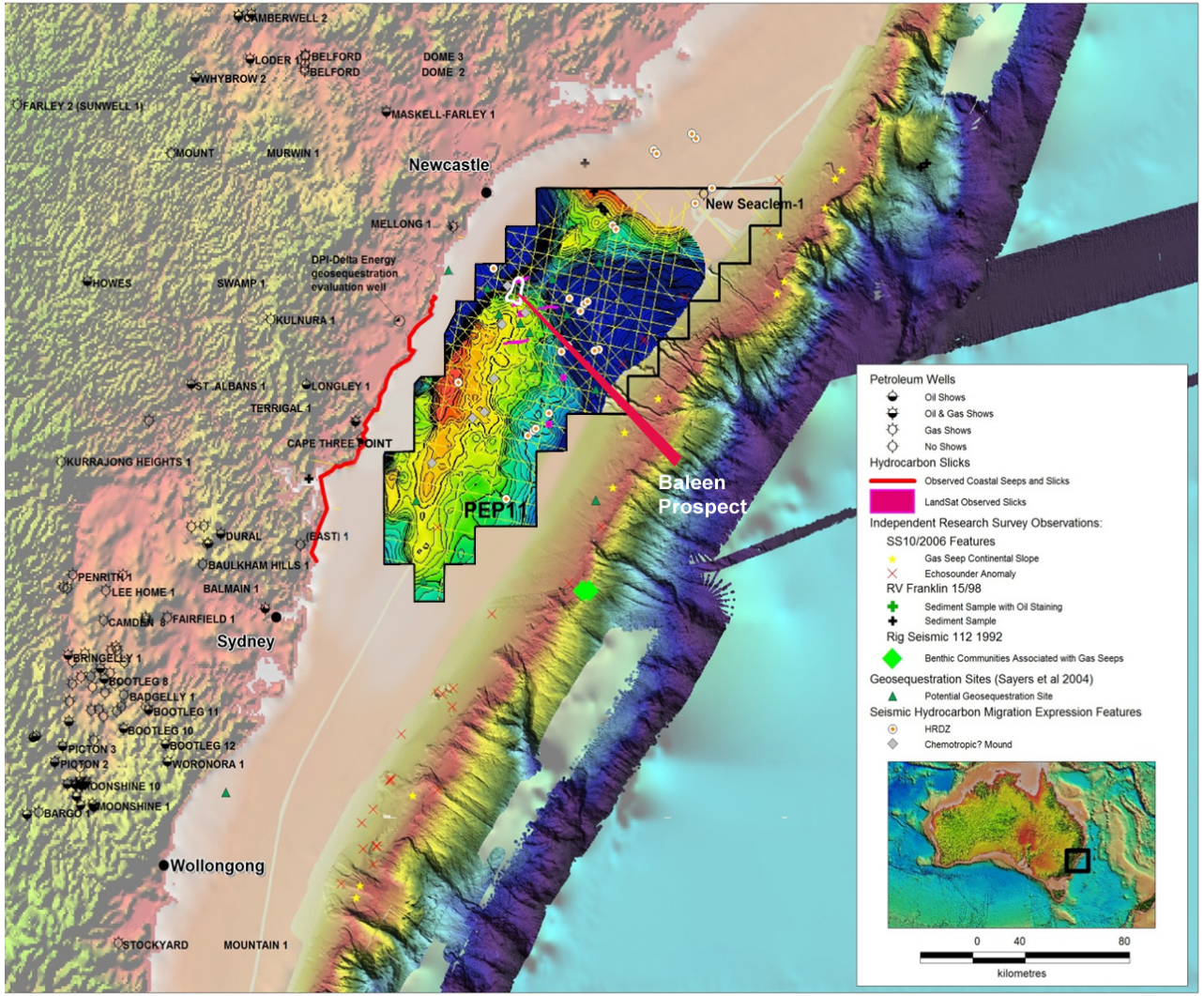
PEP11-85% Interest

PEP11– Offshore Sydney Basin:

- The Sydney Basin has excellent potential for discovery of natural gas
- PEP11 covers 4,649 km^2 on the doorstep of Sydney-Newcastle & extensive gas infrastructure (<50km).
- Current application to NOPTA to enable drilling as next step
- Significant interest in the project is driven by the gas market dynamics Shortfall forecast in gas supply east coast
- New gas fired power stations for NSW firming generation under consideration by power industry.
- All this has provided the impetus to Advent and its partners to propose a gas exploration well, Sea Blue -1.



PEP 11 Permit Boundary -Black Outline

PEP 11 Baleen Anticline AVO Anomaly

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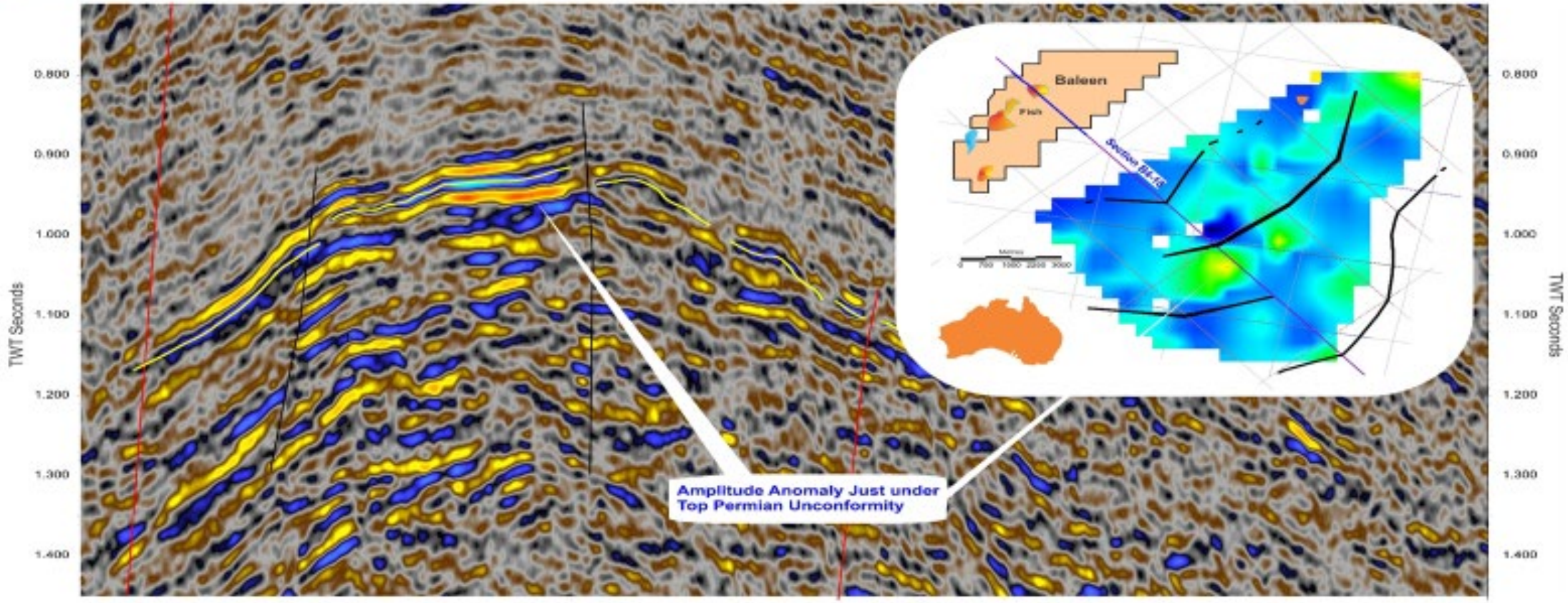
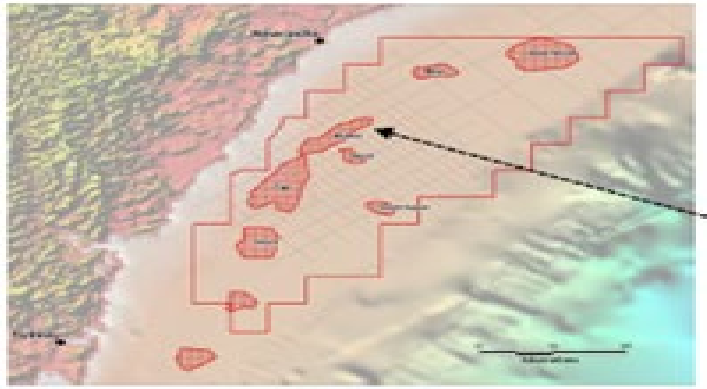


De risking target - Distinct amplitude (AVO) anomaly, phase change along strike and brightens with offset

The Advent Energy gas proposal

PEP11 Project



PEP11 Prospects & Leads

Illustrative graphic only – actual development plan may differ

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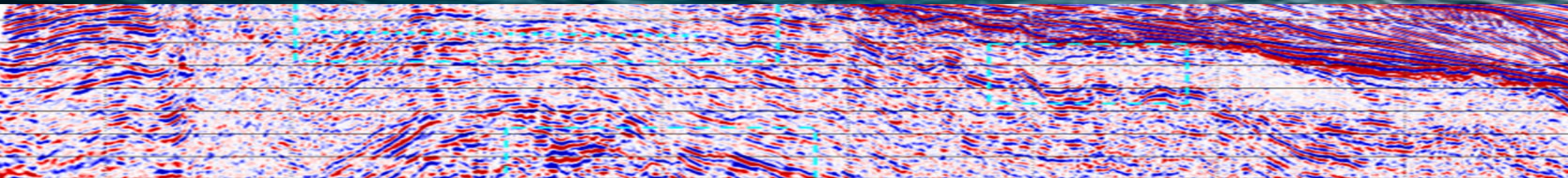
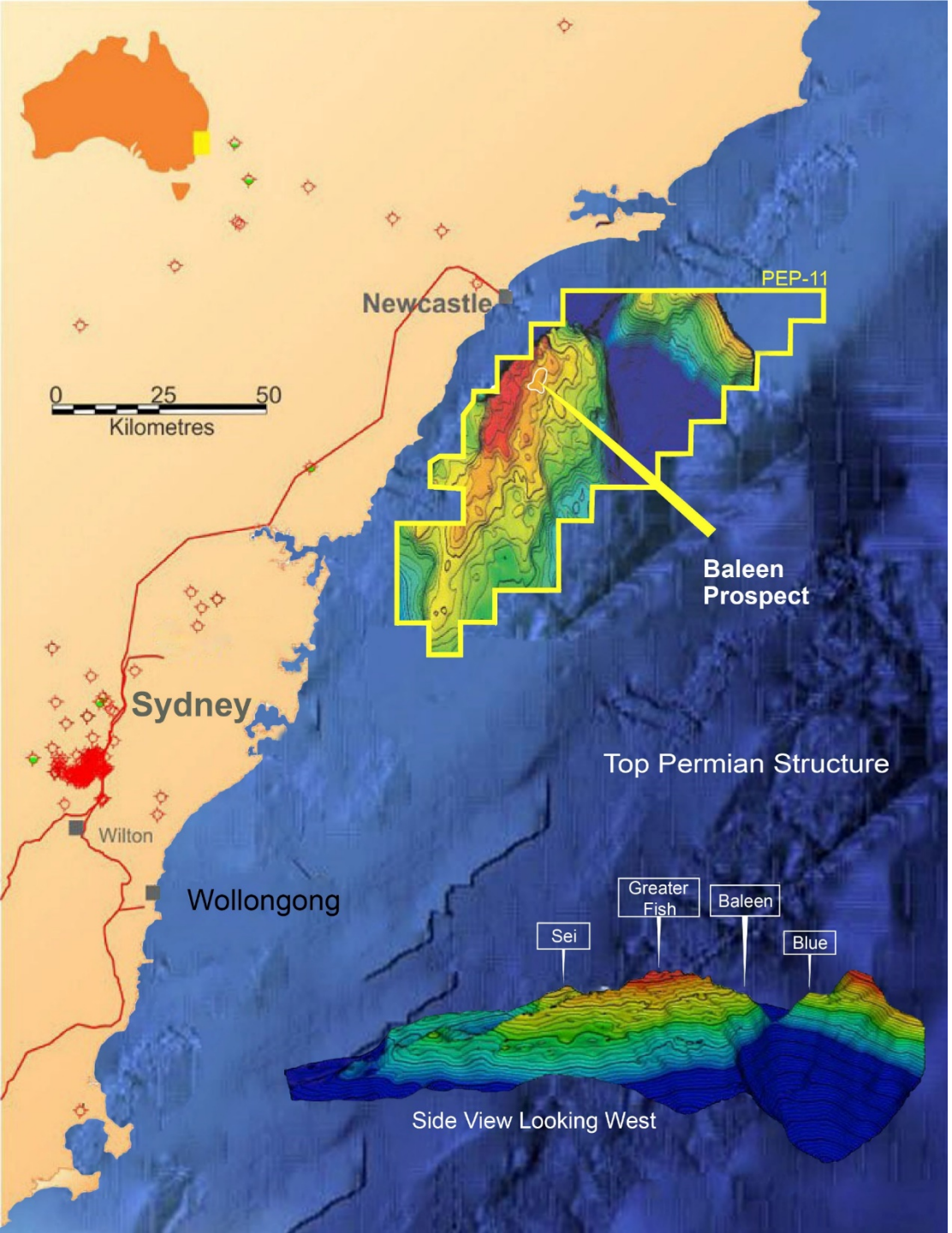
The Advent Carbon Storage Project



NET ZERO PATHWAY: CCS and Natural Gas

- Many of the same geological and engineering principles apply to carbon dioxide and methane so it is “familiar territory”
- CCS has been applied commercially by the gas industry since 1995 at Sleipner
- Depleted gas reservoirs offer one of the most promising storage targets for long term geological storage of CO_2 as they have a proven seal.
- It is also possible to use CO_2 as a “displacing agent” to help recovery and achieve enhanced gas recovery (EGR).
- In principle, EGR with CO_2 can be applied at various stages during gas production
- Gas is less carbon intensive than coal, but the gas industry recognises it still produces CO_2 which needs to be mitigated
- The future production of ‘blue’ hydrogen from gas will have to incorporate CCS



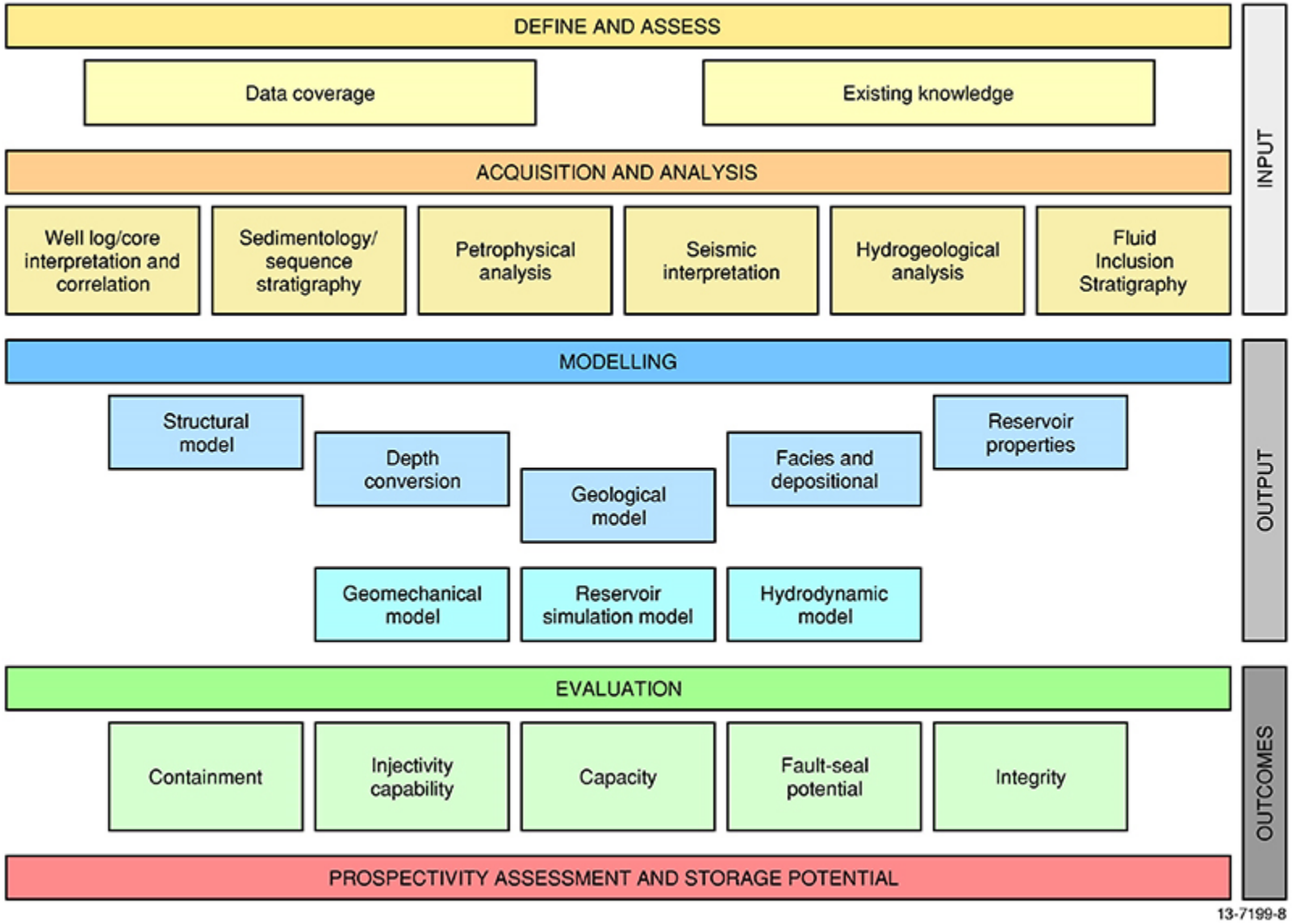
The proposed CCS Project

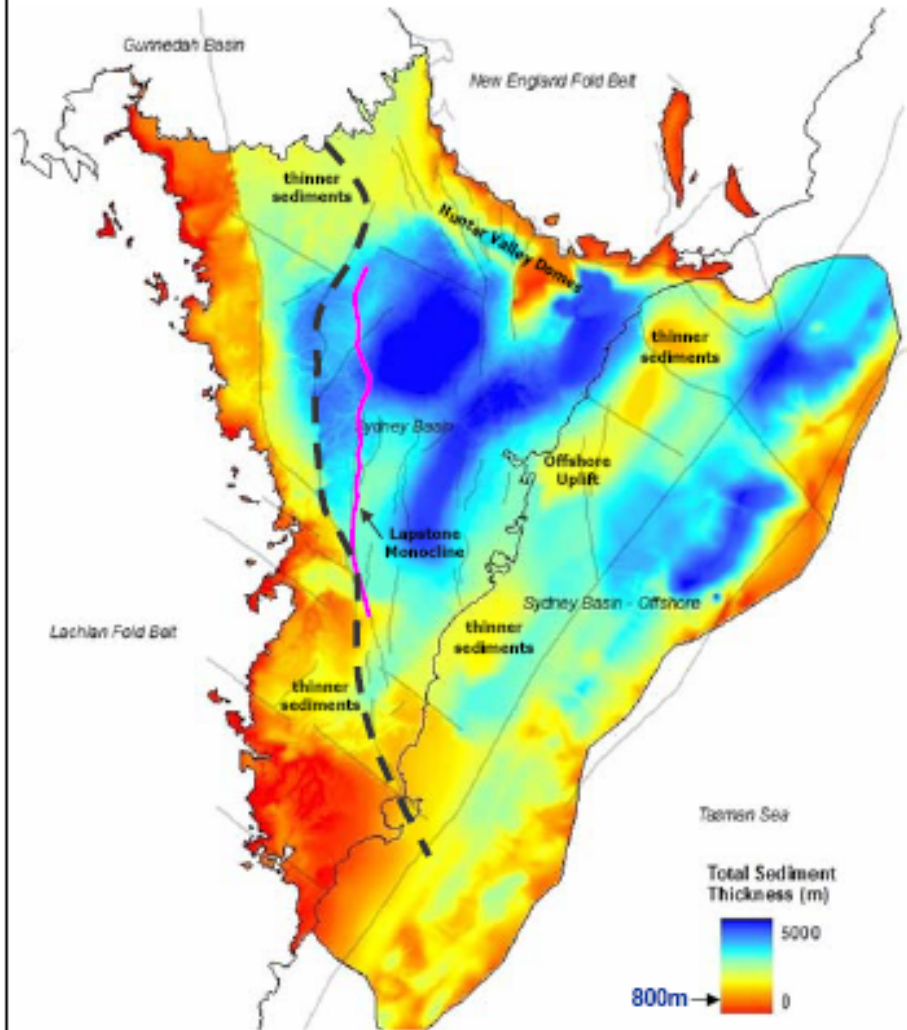
Factors in decisions regarding storage potential

- **Geology**
- **Data availability and prior knowledge**
- **Regulatory regime and lease conditions**
- **Location: distance from major emission sources**
- **Scale of the CO2 emissions**
- **Logistics of the site: existing infrastructure**
- **Environmental impact**
- **Resource impacts and synergies eg gas; present and future**
- **Community acceptance**
- **Politics of climate change**
- **Cost**

Workflow for the Petrel Sub-basin CO_2 storage study

GA, 2014





Total Sediment Thickness

The 'Total Sediment Thickness' isopach map (Figure 96) has been calculated from the difference between the pre-Permian SEEBASE™ surface and the digital elevation and bathymetry mosaic. Sediments are up to 5500m thick in the central basin.

Overall, 'Total Sediment Thickness' distribution reflects basement-controlled subsidence (rift and foreland settings), first-order depositional controls such basement topography and hinges, sediment preservation after subsequent episodes of deformation, and on-going erosion.

Sediments are thickest in the central Sydney Basin, although this region is largely constrained by the interpretation of potential field datasets and deeper wells such as East Maitland-1, Jerry Plains-1, Kurrajong Heights-1, Kirkham-1 and Dural South-1. Depocentres in the central basin have a north-northeasterly trend and are located eastward of the fundamental boundary defined by edge of thick Lachlan Fold Belt crust.

Total sediments are thinnest along the western margin of the basin due to both depositional controls (shallower basement) and reactivation. Sediment also thin south of the Hunter-Mooki Thrust due to reactivation and associated uplift. The influence of the Lapstone Monocline is also evident.

Although sediment thickness in the offshore region is less constrained, the thickest sediments are located seaward of the Offshore Uplift. Sediments thin towards the coast and over the Offshore Uplift.

The 800m thickness contour coincides with the colour transition from orange-to-yellow as shown on the legend. This can be used a guide to define areas of minimal sediment cover as required for supercritical CO_2 storage. Clearly, onshore areas west of the basement hinge, the Hunter Valley Domes domain, and the southernmost onshore Sydney Basin are unsuitable for storage due to inadequate sediment thickness alone. Offshore areas where sediment thin are also identified, although these areas are less constrained due to the nature of datasets used in the preparation of the isopach maps.

Figure 96: Total Sediment Thickness isopach map in metres represents the interval from the ground surface to the pre-Permian basement. The grid cell size is 500m. The thin grey lines are major faults extracted from the OZ SEEBASE™ structural interpretation (FrOG Tech, 2005), while the bold grey line is a fundamental basement boundary. The **dashed-blue** line indicates the possible onshore extent of uplift associated with mid-Cretaceous deformation.

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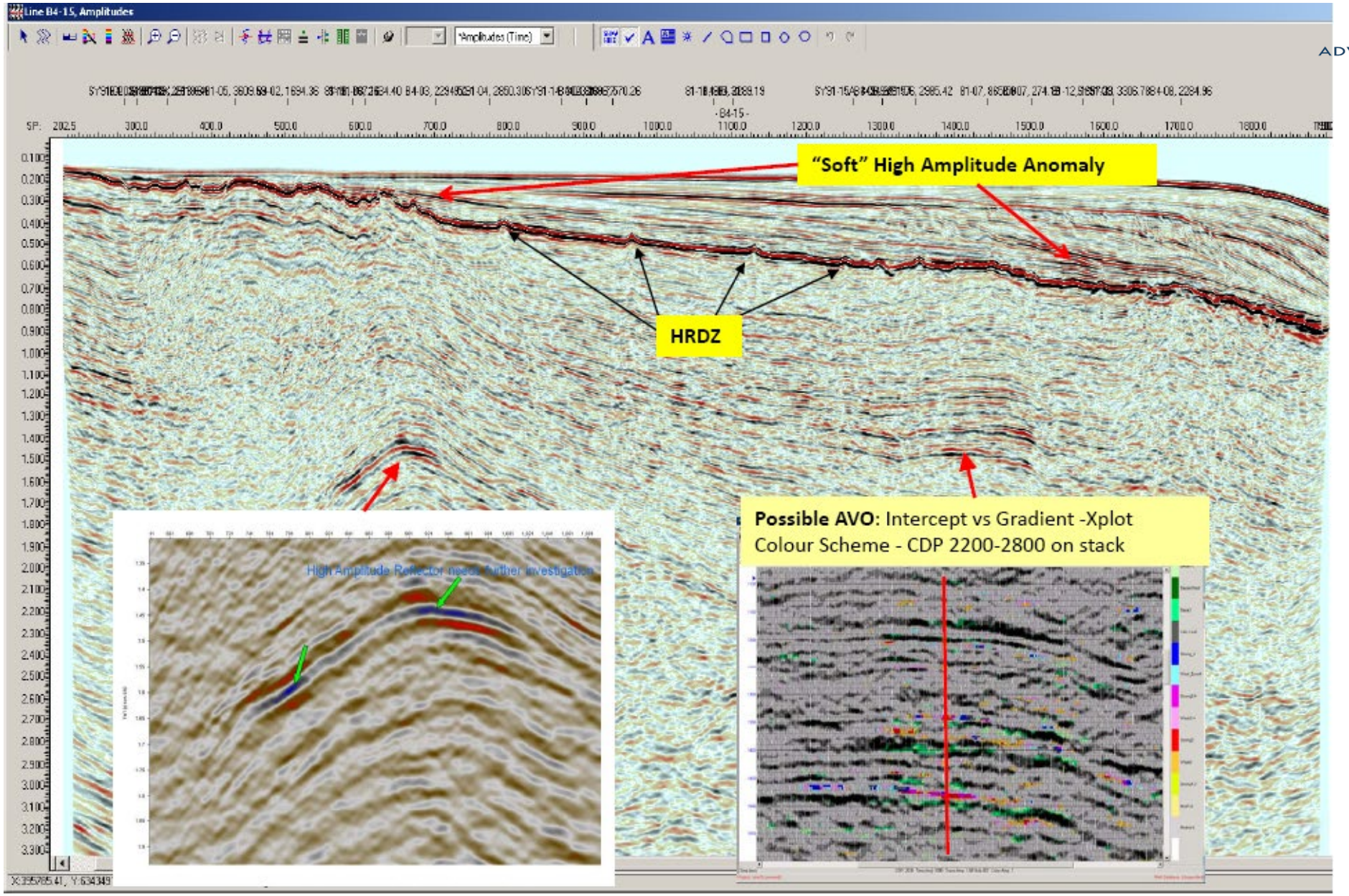
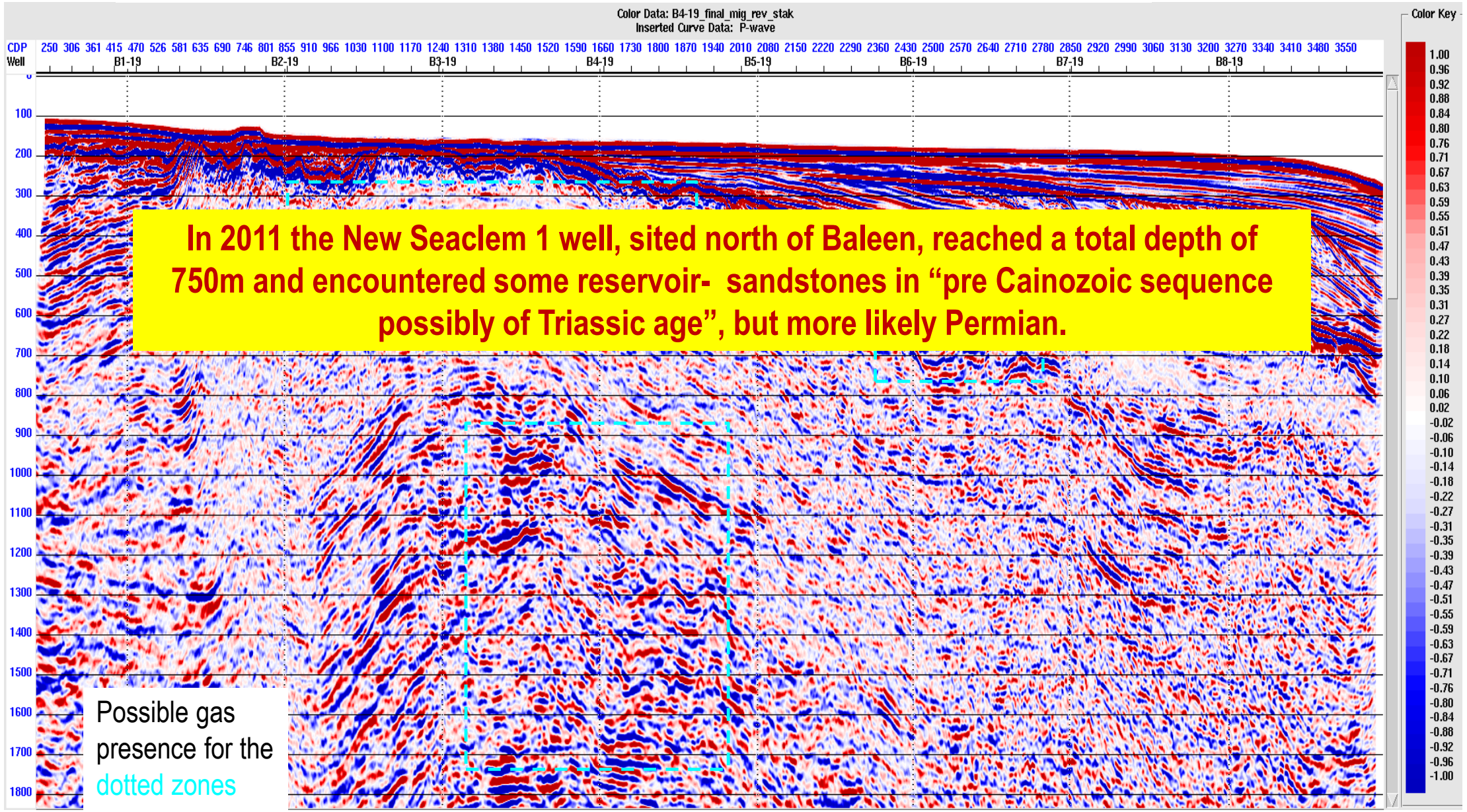

Line 84-15, Amplitudes
Amplitudes (Time)
-84-15-
"Soft" High Amplitude Anomaly
HRDZ
High Amplitude Reflector needs further investigation
Possible AVO: Intercept vs Gradient -Xplot
Colour Scheme - CDP 2200-2800 on stack


Color Data: B4-19_final_mig_rev_stak
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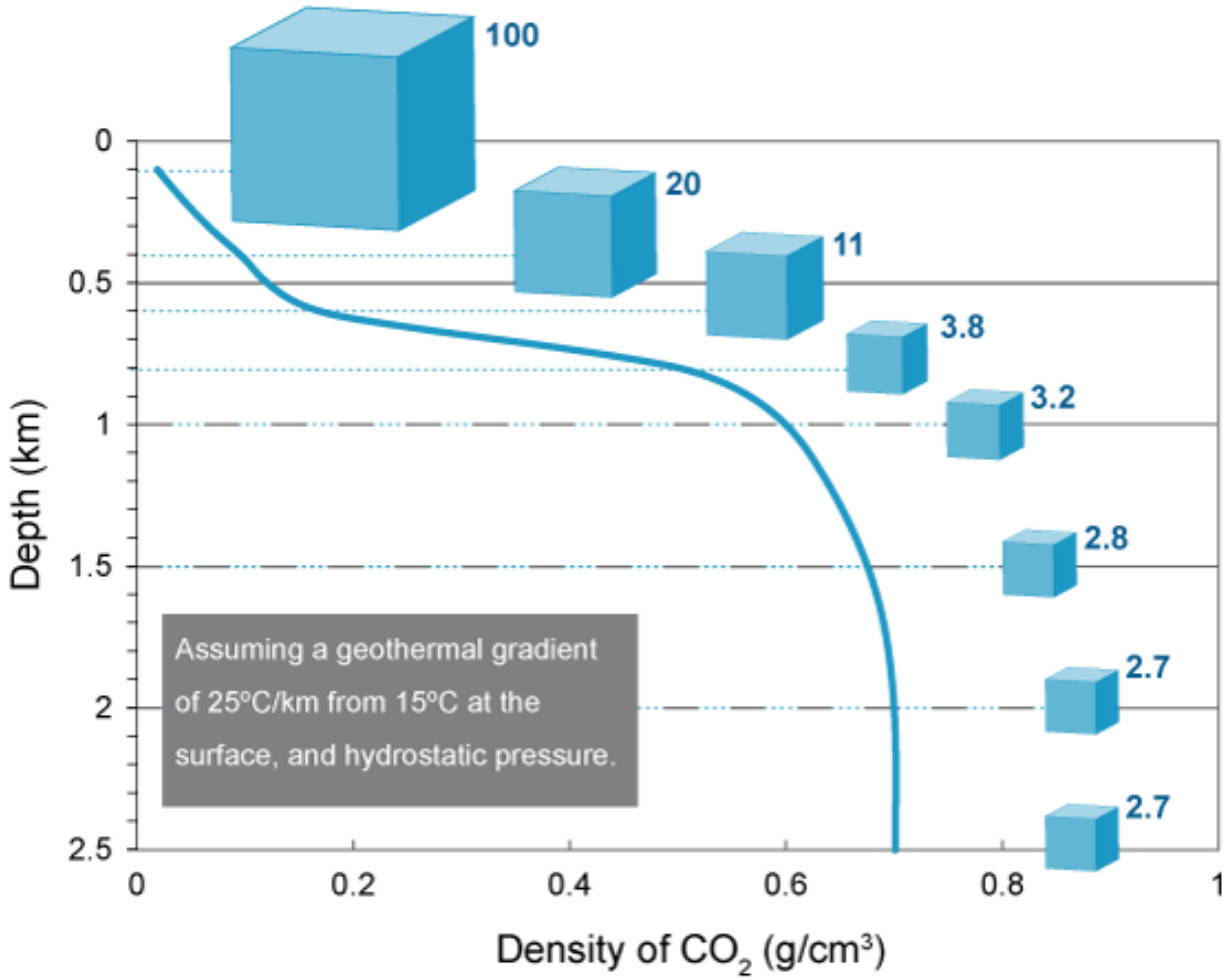
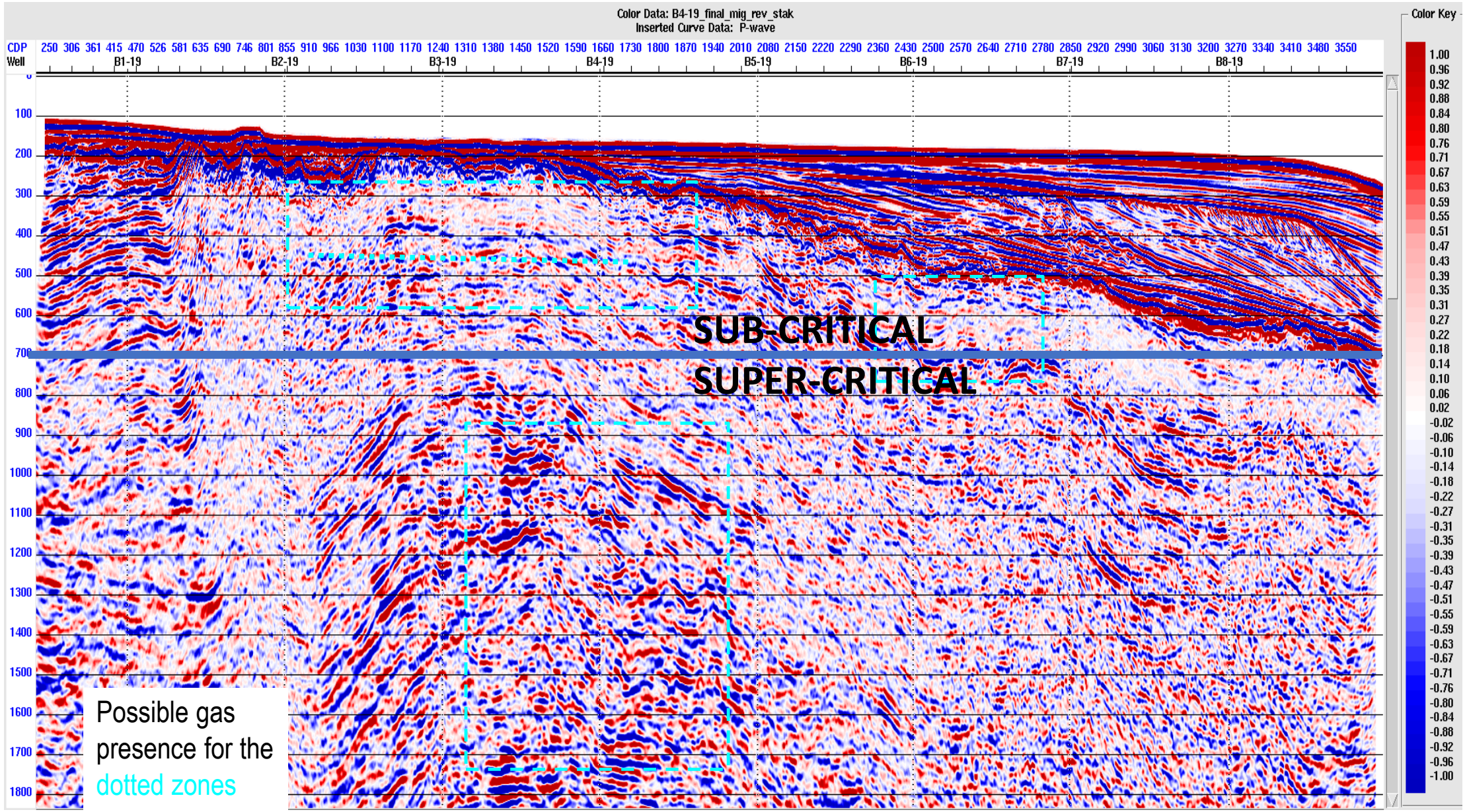
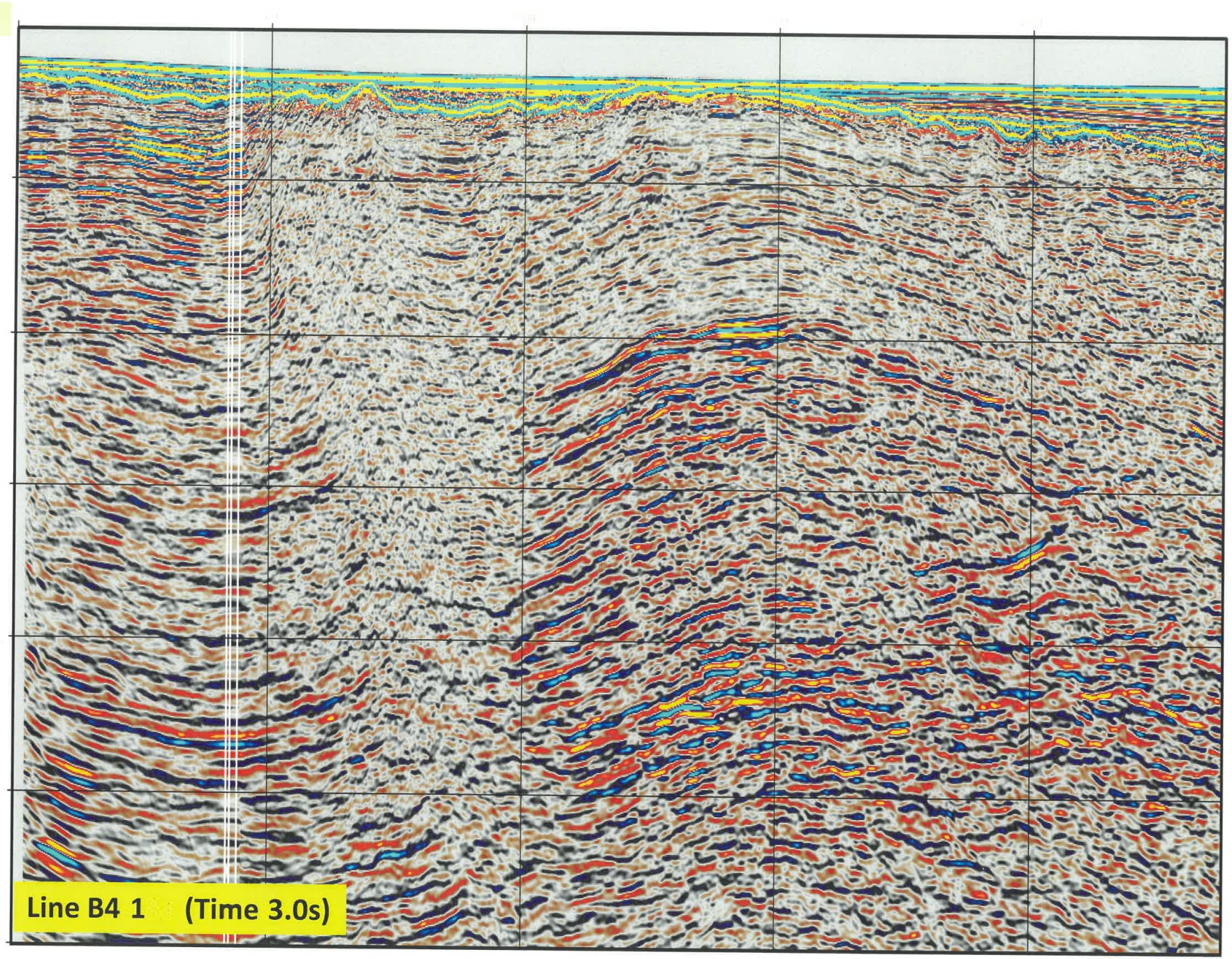
Well
B1-19
B2-19
B3-19
B4-19
B5-19
B6-19
B7-19
B8-19
In 2011 the New Seaclem 1 well, sited north of Baleen, reached a total depth of 750m and encountered some reservoir- sandstones in “pre Cainozoic sequence possibly of Triassic age”, but more likely Permian.
Possible gas presence for the dotted zones

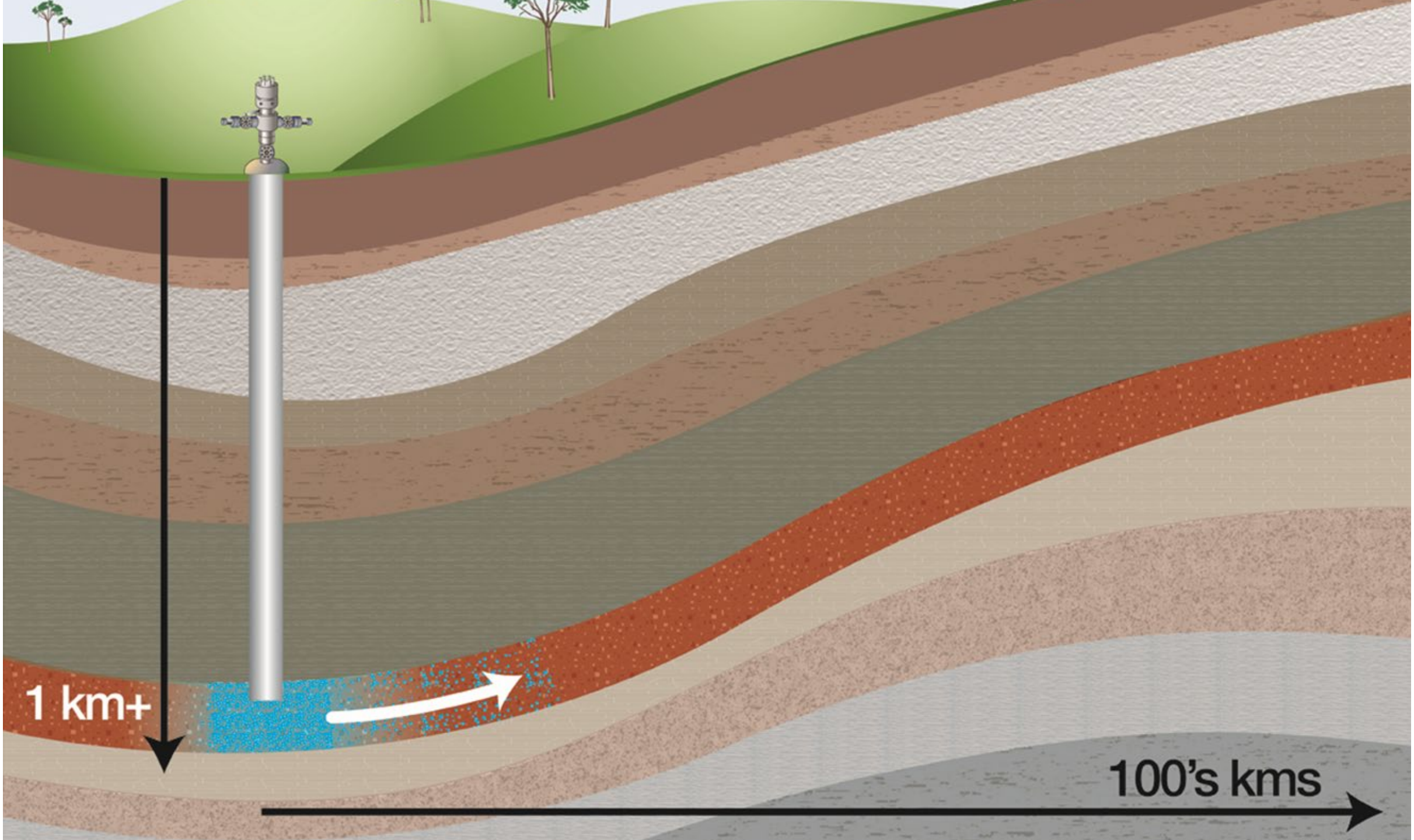
Variation of CO_2 density with depth, assuming hydrostatic pressure and a geothermal gradient of 25°C/km from 15°C at the surface



B4-19: Full stack migration seismic PEP 11




Line B4 1 (Time 3.0s)


1 km+
100's kms

Sea Blue 1 Well

30km offshore; water depth approx. 150m

Target 2100m but potential to go to 3000m

Outstanding opportunity to obtain storage data

Conventional coring cost > $1 million per core, and current subsurface data not adequate for developing a coring programme.

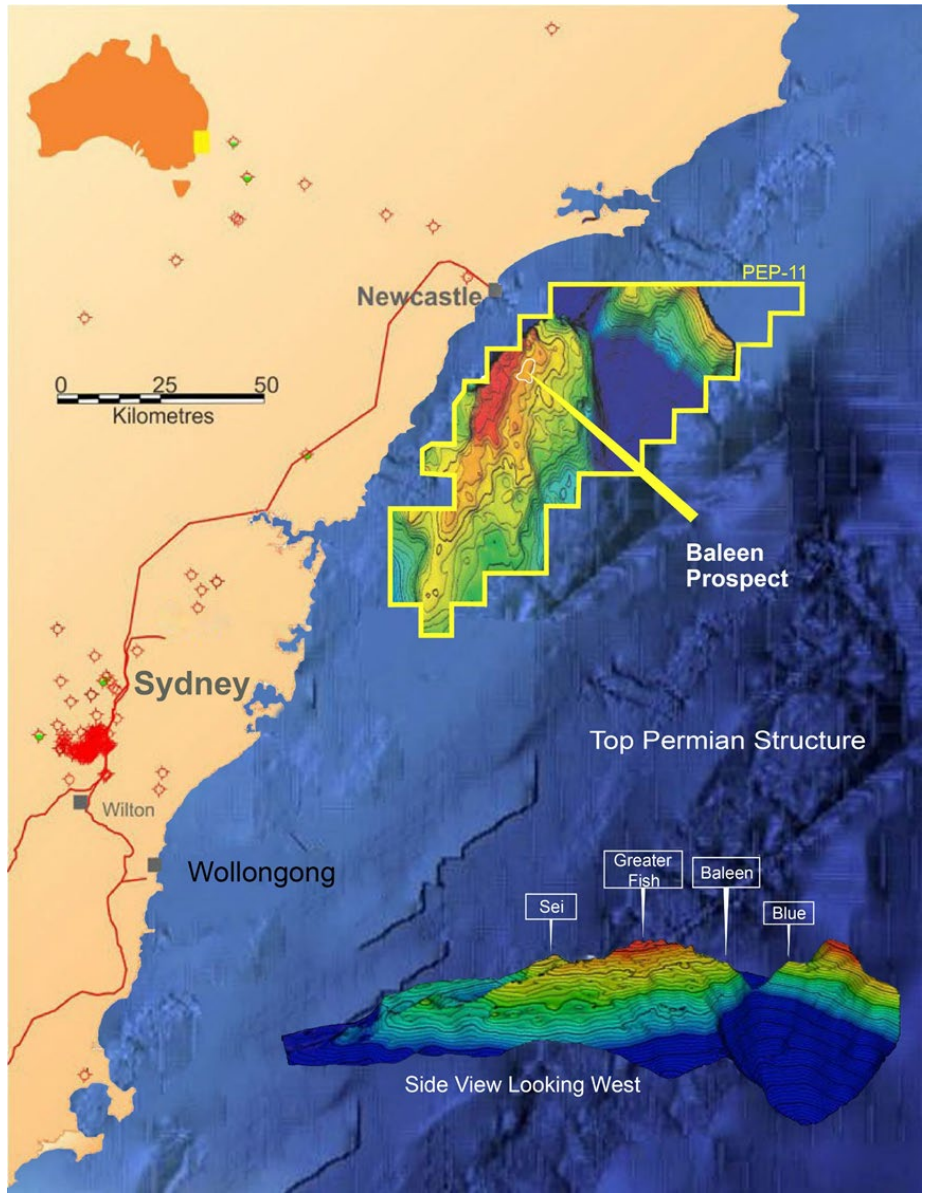
Proposal is to selectively use enhanced large diameter sidewall coring technology, once the well is drilled and logged

Can get up to 60 sidewall cores of 1.5 to 2.5 inch diameter in reservoirs and seals for determining storage potential

The proposed PEP 11 CCS Project

With Baleen and Sea Blue -1 as the starting point, what additional activities could be used to assess the carbon storage prospectivity of the offshore Sydney Basin?

- Sidewall cores of potential reservoirs and seals for extensive porosity and permeability measurements
- More comprehensive suite of well logs
- Deepen the well?
- Downhole testing of selected intervals?
- Reinterpret the 2D seismic using new core data
- Review use of OBN (Ocean Bottom Nodes) for enhanced seismic research and reservoir imaging?
- Comprehensive geomodelling post drilling
- Comprehensive dynamic modelling of possible CO_2 migration pathways
- Assessment of injectivity, capacity, security
- Financial feasibility
- Assess the future use of PEP 11 for CO_2 storage without and with a producing gas field



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IN CONCLUSION

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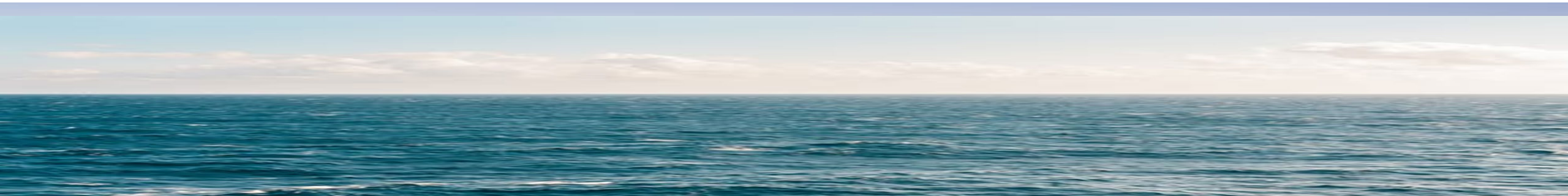

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