ASX ANNOUNCEMENT

15 July 2024

Significant Gas Play Potential Emerging in the South Nicholson Basin

Top End Energy Limited (**Top End** or the **Company**) (ASX:TEE) advises of preliminary outcomes from the detailed geophysical and geological evaluation undertaken on its recently acquired Exploration Permit (**EP**) 144 (the **Permit**), which is located in the South Nicholson Basin area of the Northern Territory (**NT**) of Australia.

HIGHLIGHTS

- Significant gas play fairway (up to ~3,500 km^2) has been identified on EP 144 based on offset drilling and seismic interpretation.
- NDI Carrara-1 deep stratigraphic well (3.5km East of EP144 boundary) intercepted multiple source rock intervals with total organic carbon (**TOC**) sampled up to 5.5%.
- Permit located proximate to the Northern Gas Pipeline, providing access to Mt Isa and the East Coast gas market.
- NDI Carrara-1 well also suggests localised presence of Hydrogen and Helium, with high Hydrogen concentration samples of up to 27% (air-corrected) acquired.
- Top End holds a 100% interest in EP144, which is the only granted permit in the South Nicholson basin in the Northern Territory.
- Low-cost near-term work program designed to prove presence of source rocks on EP 144 and acquire samples of Helium and Hydrogen.

Commenting on the growing potential of the EP 144 acreage in the South Nicholson Basin, Managing Director Oliver Oxenbridge said:

"Our initial work on the potential of EP 144 has delivered exciting outcomes. Our interpretation of the GA seismic lines indicates high probability of key source rock formations extending well into our acreage. When overlaid with the results from the Carrara-1 stratigraphic well, the potential for a highly prospective unconventional gas play fairway on EP 144 is readily evident. This is complemented further by Helium and Hydrogen potential also indicated across the basin. We now plan to refine our near-term work program for EP 144, which is expected to include further geophysical analysis, soil gas sampling, and targeted stratigraphic drilling."

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EP 144 and the South Nicholson Basin

EP 144 was acquired by Top End as part of its recently completed transaction with Minerals Australia Pty Ltd and Jacaranda Minerals Limited (wholly owned subsidiaries of Hancock Prospecting Pty Ltd)(the **Transaction**), which also saw the Company acquire EP 153 and EP 154 (refer *Figure 1*). For full details of the Transaction, refer to Top End ASX releases dated 27 February 2024 and 12 July 2024.

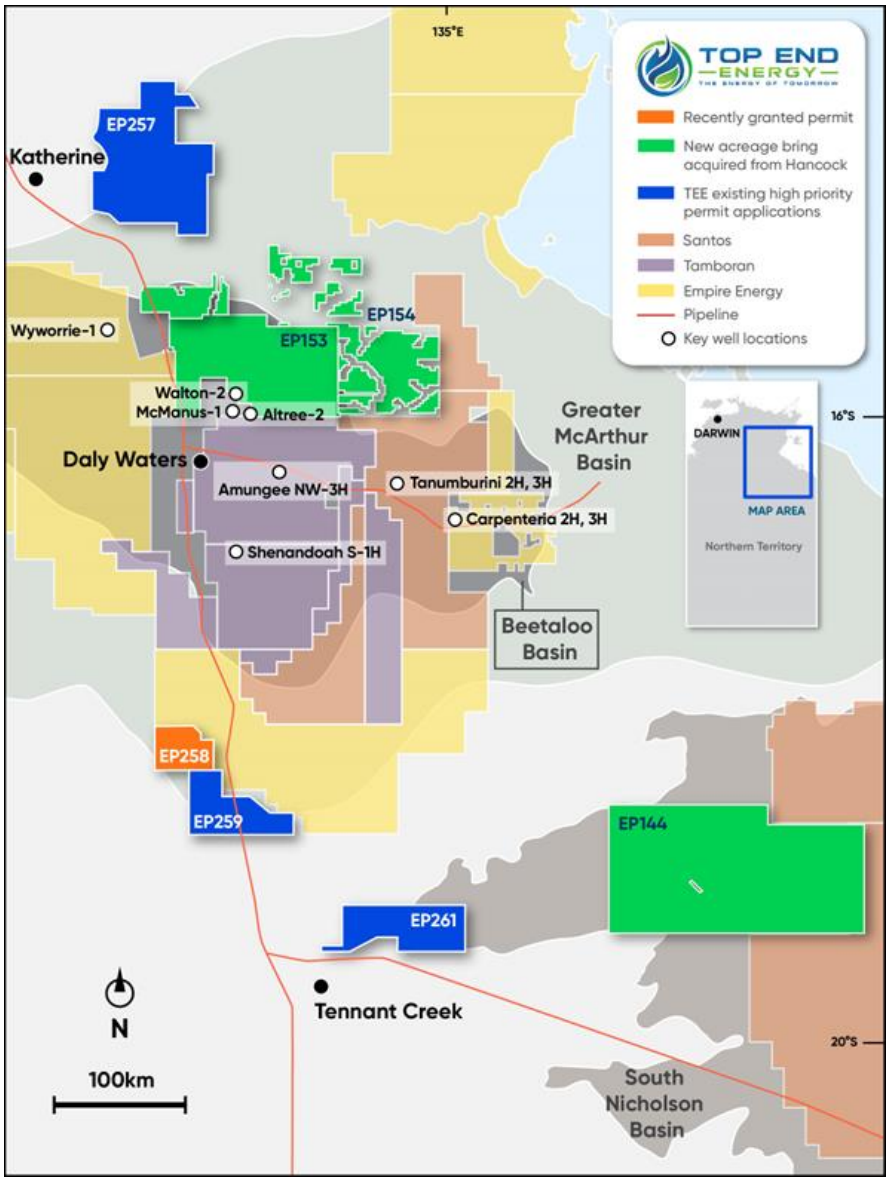


Figure 1: Location of EP 144 amongst broader Top End NT acreage portfolio

Located in the South Nicholson Basin, EP 144 represents highly prospective underexplored acreage in a proven hydrocarbon region, with potential ties to the Proterozoic shale plays of the Lawn Hill Platform and the Beetaloo Sub-basin Velkerri Formation. Santos Ltd (ASX:STO) is the only other energy company with a granted acreage position in the South Nicholson Basin (refer *Figure 2*).

EP 144 is strategically located in proximity to the Northern Gas Pipeline, which provides access to Mount Isa and the East Coast gas market. There is significant existing hard rock exploration and mining activity in the area (including Teck Resources, South32 and Endeavour Resources), providing potential opportunities for additional data sources, exploration collaboration and offtake counterparties.

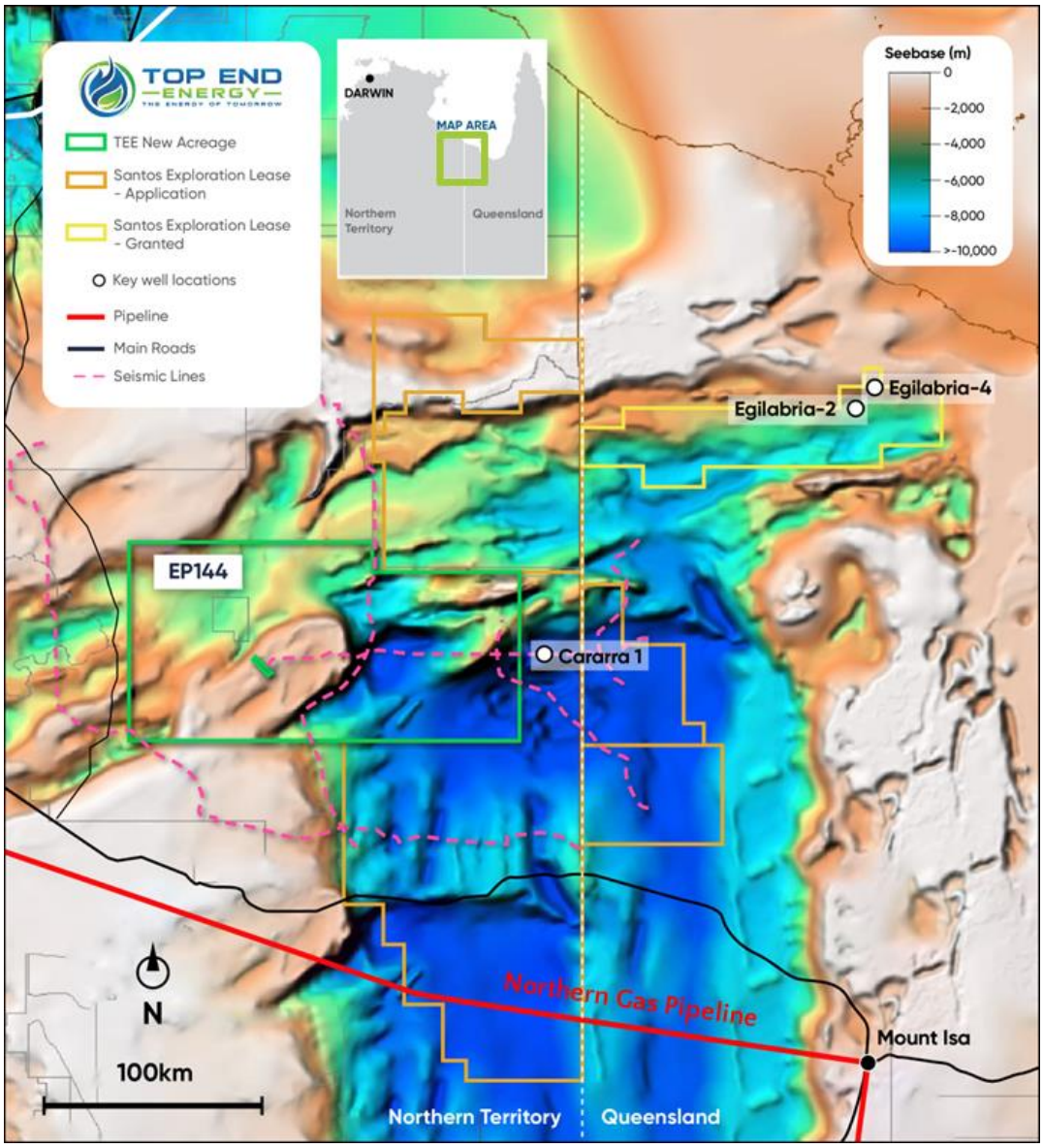


Figure 2: Regional setting of EP 144 including proximate infrastructure, surrounding well locations and existing seismic lines

A Co-existence and Exploration Agreement is in place with the Traditional Owners of the Permit, which is in year three of the initial five-year exploration period, and renewable for up to two further periods of up to five years each. Environmental Management Plans and Well Operations Management Plans have been approved for drilling of stratigraphic wells on the Permit, and the Company is engaging with pastoral lease holders to extend existing Land Access Agreements.

Appointment of new Exploration Manager

The Company is pleased to announce that it has appointed Trevor Brooks as its new Exploration Manager.

Mr Brooks brings significant subsurface and operational experience covering the full exploration and production cycle, including prospect generation and maturation, drilling operations, appraisal and development, joint venture and asset management.

Mr Brooks has extensive international tight-rock and unconventional experience across Australia, North America and the United Arab Emirates (**UAE**), having worked at Queensland Gas Company, BG and the Abu Dhabi National Oil Company (**ADNOC**).

Most recently, Mr Brooks was a consultant geologist working in the UAE exploring and appraising both Jurassic shale gas and Cretaceous tight-oil assets for ADNOC.

Mr Brooks holds a M.Sc. in Petroleum Geoscience from Royal Holloway University of London.

Mr Brooks assumes the role vacated by Marshall Hood, who has left to pursue another opportunity. The Company would like to thank Mr Hood for his valuable contributions over the past two years and wishes him well with his future endeavours.

Emerging EP 144 unconventional gas potential

Following execution of the agreement to acquire the Permit, the Company has undertaken a comprehensive review of existing data acquired across the South Nicholson Basin, and EP 144 specifically. This dataset included:

- NDI Carrara-1 stratigraphic well (TD 1,751m) drilled by Geoscience Australia (**GA**) in late 2020 under the *Exploring for the Future* (**EFTF**) program;
- Existing 2D seismic data acquired by GA in the area, including ~325 line kilometres across EP 144;
- Historic exploration wells drilled across the basin;
- Existing gravity and magnetic data sets; and
- Industry publications and peer interpretations.

Top End has identified the potential for two significant conventional and unconventional gas play fairways on the Permit:

1. The **Carrara Sub-basin Extension:** ~600km^2 (~125,000 acres) of high potential core play fairway with running room of up to ~1,200km^2 (300,000 acres); and
2. The **Alexandria Sub-basin**: ~1,100km^2 (~270,000 acres) of high potential core play fairway with running room up to ~2,300km^2 (~580,000 acres).

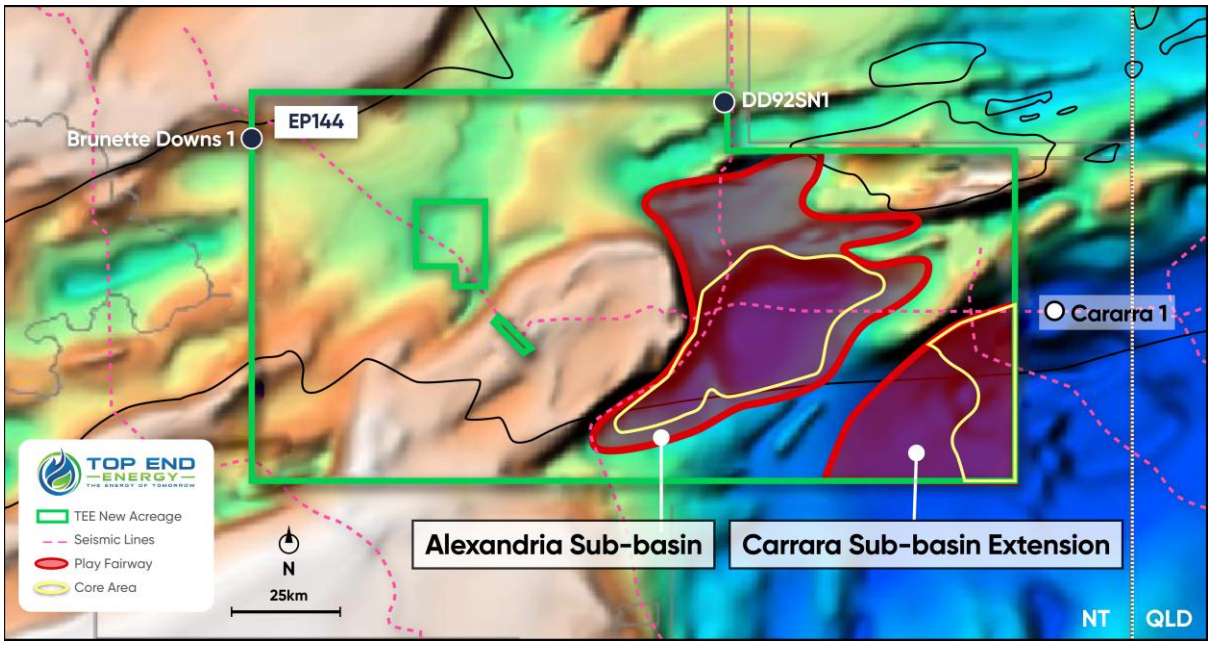


Figure 3: Identified gas play fairway on EP 144

Carrara Sub-basin Extension:

The GA EFTF program identified both source rocks and an undrilled sub-basin (the "Carrara Sub-basin"):

- NDI Carrara-1 well (3.5km East of EP 144) identified multiple active petroleum systems.
- Multi-stacked gas mature source rocks[1] within the Proterozoic Wide and Lawn super sequences with TOC samples up to 5.5 wt% (refer *Figure 4*).
- Similar depositional setting as the Velkerri Formation of the Beetaloo Sub-basin (Mesoproterozoic, 1417 Ma), with similar mineralogy and expected similar mechanical behaviour.
- Porosity of 3-7% sampled in target intervals, with Scanning Electron Microscope images confirming kerogen porosity development[2].
- Top seal presence, with gas shows observed directly below tight carbonate.
- Active multiple petroleum systems confirmed with gas shows correlating to kerogen rich intervals and shallow oil stains and bleeding observed on core[3].

[1] Geoscience Australia Leco TOC data (Exploring for the Future).
[2] Crombez, V., Delle Piane, C., Dewhurst, D. N. 2022. *NDI Carrara 1 sedimentology, microstructural analyses, and sequence stratigraphy (Appendix 3)*. CSIRO.
[3] Grosjean, E., Boreham, C., Jarrett, A., Butcher, G. 2022. *The energy resource potential of the Carrara Sub-basin revealed by new stratigraphic drilling.*

- 2D seismic identifies undrilled sub-basin with syn-rift sediments correlated to key source rock intervals – the Wide, Lawn and River super sequences.

Based on GA's data acquisition (2D seismic, NDI Carrara-1 well and core analysis), Top End believes there is strong potential for extension of the identified Carrara Sub-basin into the south-east portion of EP 144 with interpreted key source rock intervals – Wide, Lawn and River super sequences (refer *Figure 3 and Figure 5*).

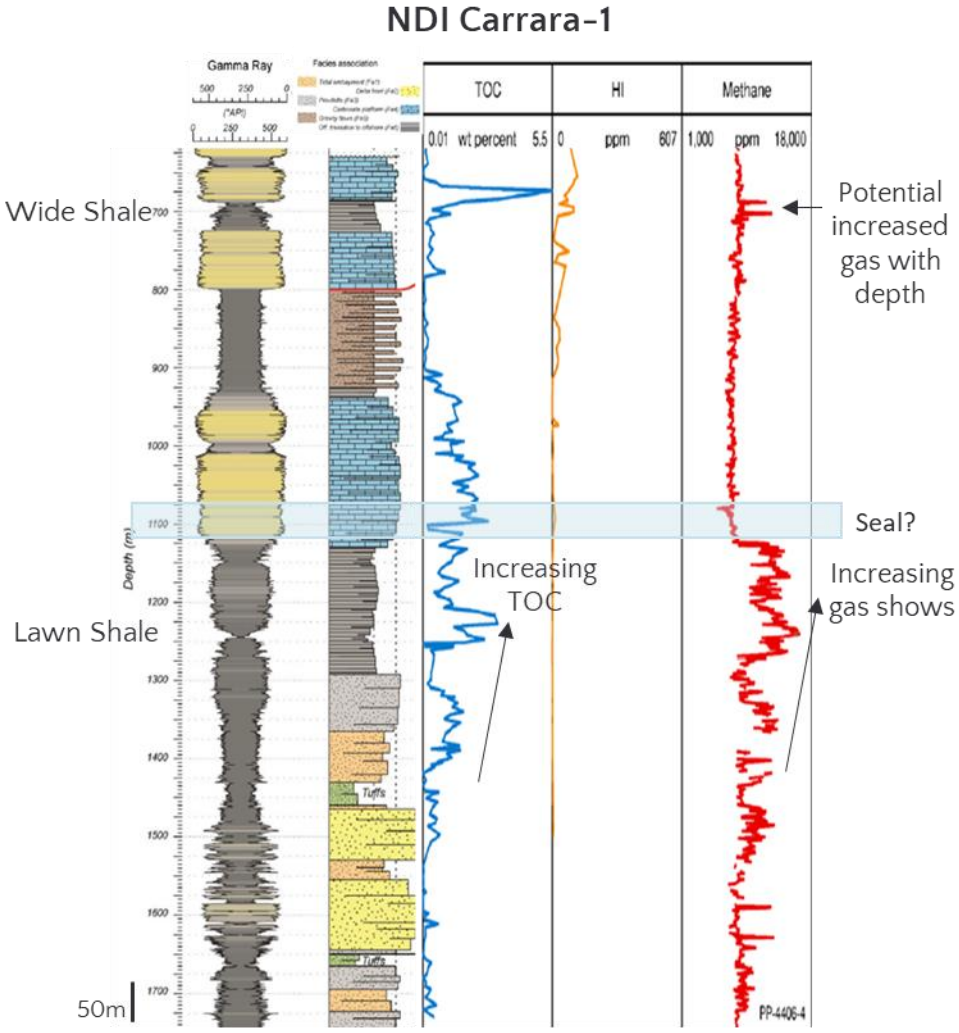


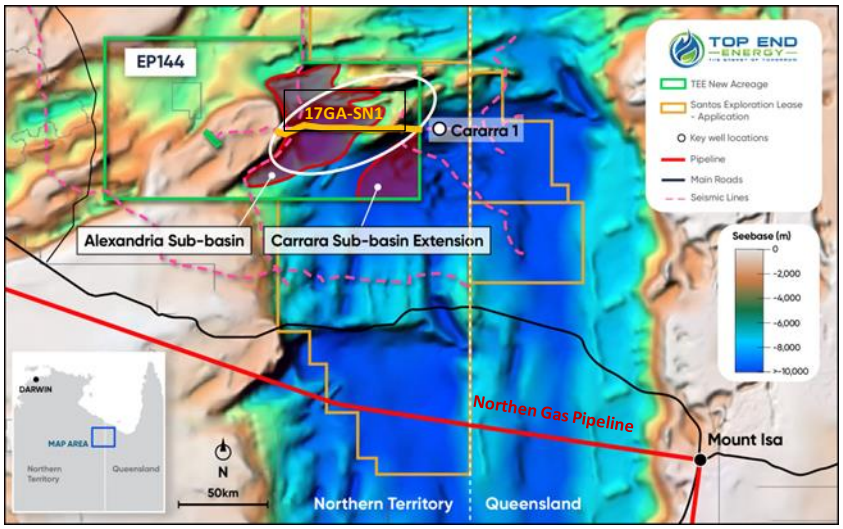
Figure 4: NDI Carrara-1 well log (with Top End edits) showing multiple source rock intervals[4,4]

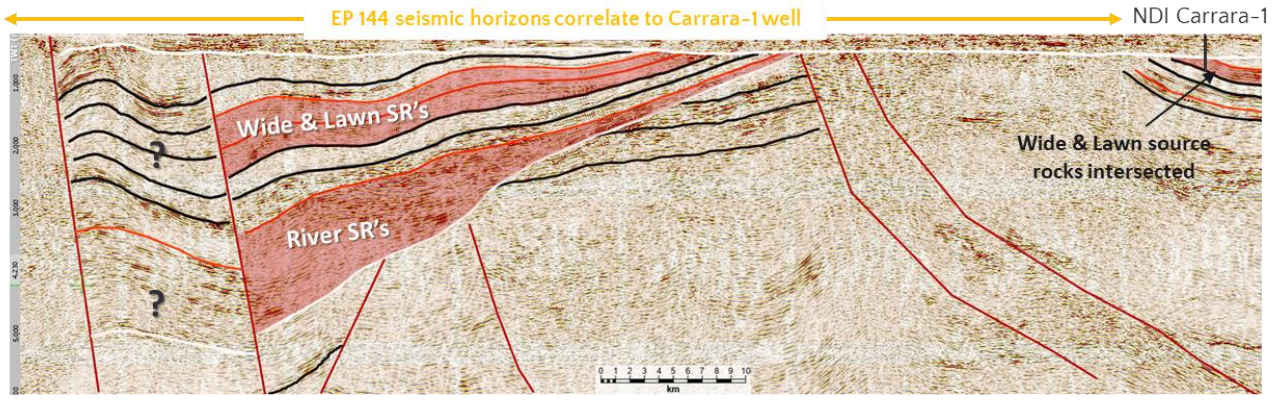
Alexandria Sub-basin:

Top End's interpretation of the 17GA-SN1 2D seismic line acquired by GA (refer *Figure 5*), supported by existing published interpretations (*Gibson & Edwards, 2020* and *Carr et al, 2020*), identifies the deposition of key source rock sequences within the undrilled

[4] Crombez, V., Delle Piane, C., Dewhurst, D. N. 2022. NDI Carrara 1 sedimentology, microstructural analyses, and sequence stratigraphy (Appendix 3). CSIRO

Alexandria Sub-Basin. The seismic interpretation indicates the presence, at gas-mature depth, of the Wide and Lawn shale source rocks intersected in the NDI Carrara-1 well. In addition, 2D seismic interpretation highlights the potential of the deeper River supersequence source rocks also being deposited (River sequence source rocks were not intercepted by the NDI Carrara-1 well due to shallower TD). Extrapolating on the key play elements identified in the NDI Carrara-1 well, the Company believes the Alexandria Sub-basin represents a significant multi-stacked unconventional gas play.





Potential Lawn and River sequence source rock (**SR**) interpreted presence in EP 144 (seismic line 17GA – SN1, Modified *Gibson and Edwards, 2020 and Carr et al, 2020*)

Figure 5: Interpretation of 17GA-SN1 seismic line suggests presence of multiple gas mature source rock intervals on EP 144

GA's geological cross-section connects proven source rocks from the Egilabria gas discovery to the Carrara Sub-basin, highlighting regional source rock deposition of the Wide and Lawn super sequences spans over 200km.

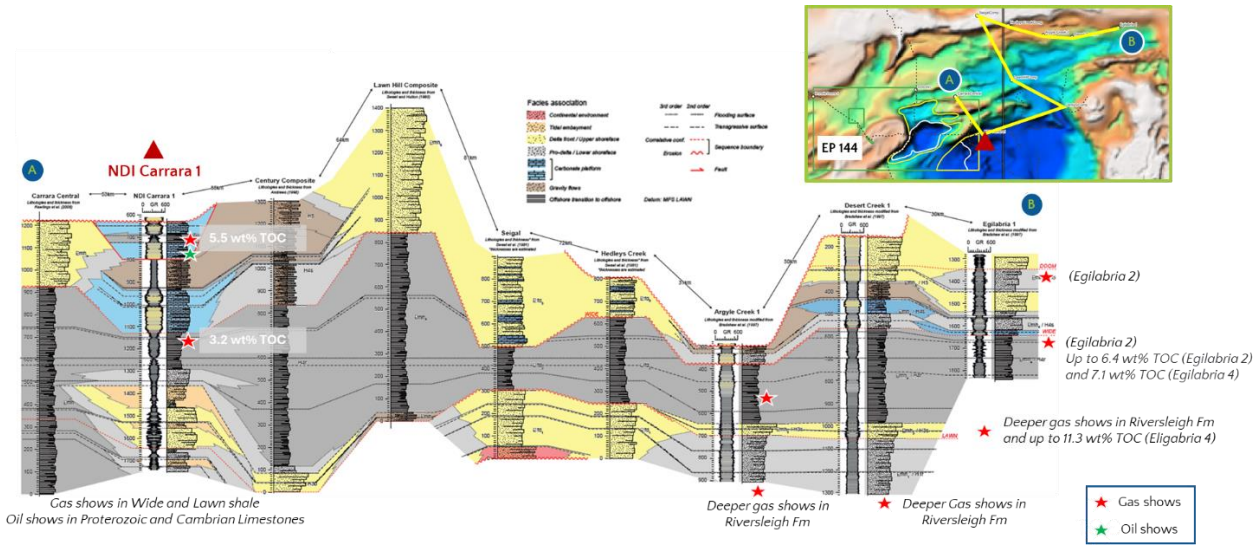


Figure 7: Cross-section connecting source rocks over 200km [5]

Top End's interpretation of the seismic acquired by GA identifies the same source rocks (Wide, Lawn and River super sequences) deposited in Alexandria Sub-basin.

The Company intends to prove the presence of the interpreted source rocks, with inversion structures identified from the 2D seismic serving as potential drilling targets.

Helium / Hydrogen potential also indicated

The Company is also excited by the potential for Helium and natural Hydrogen resource on the Permit. Possum belly gas samples collected from the NDI Carrara-1 well contained traces of both Helium and Hydrogen, with Hydrogen sampled at up to 27% mol (air-corrected)[6]. Helium was also present in samples collected during the Egilabria-2 well test (~0.9%)[7].

Potential Hydrogen gas seepage pathways and a potential structural trap in EP 144 have been identified on the 17GA-SN2 2D seismic line acquired by GA (refer *Figure 8*).

Surface depressions observed on satellite imagery in the area are potentially linked to the Hydrogen seepage pathways interpretated on the seismic.

Multiple potential sources of Hydrogen are thought to be linked to thick sequences of the Leichhardt Super Basin (1800 – 1760Ma).

[5] Cross-section: Crombez, V., Delle Piane, C., Dewhurst, D. N. 2022. *NDI Carrara 1 sedimentology, microstructural analyses, and sequence stratigraphy (Appendix 3)*. CSIRO; Geoscience Australia Leco TOC data (*Exploring for the Future*); Well completion reports for Egilabria 2, Egilabria 4, Desert Creek 1 and Argyle Creek 1.
[6] Boreham, C. J., Wang, L., Sohn, J., Jinadasa, N, Hong, Z., Chen, J., Grosjean, E. and Jarrett, A; 2022. *Exploring for the Future - NDI Carrara 1 gas geochemistry: molecular composition, carbon and hydrogen isotopes of hydrocarbon gases and the sources of molecular hydrogen and helium*. Record 2022/14. Geoscience Australia, Canberra.
[7] Gas Analysis Additional Report – Egilabria 2 DW1 for Armour Energy; Weatherford Laboratories (Australia) Pty Ltd; January 2013

The Company is planning a soil gas sampling program to test for elevated levels of Helium and Hydrogen across the focus area highlighted on *Figure 8*.

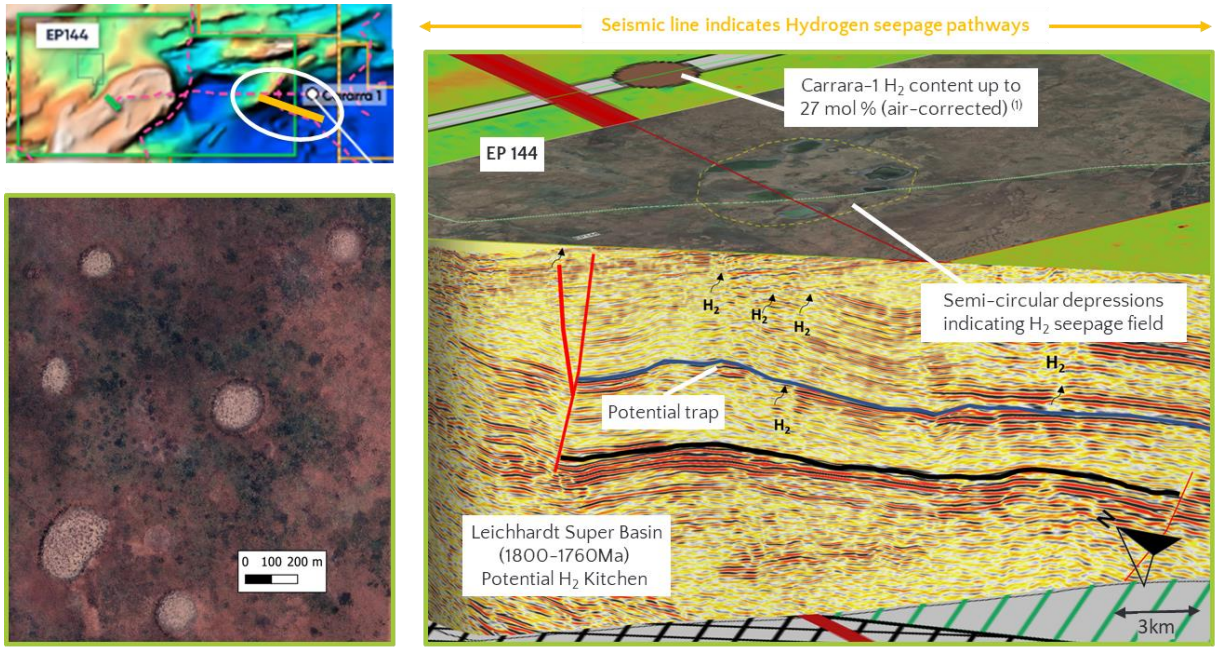


Figure 8: Natural Hydrogen system potential identified on EP 144 with surface depressions over indicated seepage pathways

Next steps

A planned near-term work program will focus on proving both the presence of identified source rock sequences in the Alexandria Sub-basin and the presence of elevated levels of Helium and / or Hydrogen in the proximity of the NDI Carrara-1 well. The program will include the following key activities:

- continued analysis of existing regional drilling, seismic and geophysical data to further inform and refine the Company's geological model;
- geophysical reprocessing and/or acquisition to help refine drilling locations;
- drilling of a stratigraphic well designed to intercept and sample source rock intervals; and
- soil gas sampling to test for elevated Helium and Hydrogen.

Key regulatory approvals are already in place for the purpose of drilling stratigraphic wells on the Permit, although the Company will likely relocate the approved drilling locations based on the interpretation of the latest available data.

In addition to Top End's planned work program, collaboration and data sharing activities will be pursued with mining companies undertaking active exploration programs on overlapping mining licenses targeting mineralisation in the same hydrocarbon source rock formations.

- END -

This announcement was authorised for release by the Board of Directors of Top End Energy Limited.

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About Top End Energy Limited

Top End aims to be a leading Australian diversified energy provider at the forefront of the energy transition. Combining an attractive portfolio of granted and in-application petroleum permits across Australia, intending to pursue complementary clean energy solutions and achieve a target of net zero (Scope 1 and 2) emissions.

For further information on Top End Energy Limited please visit www.topendenergy.com.au