

## ASX ANNOUNCEMENT

21 April 2023

### **High Natural Hydrogen/Helium Prospectivity Potential in NT**

Top End Energy Limited (**Top End** or the **Company**) (ASX:TEE) is pleased to provide an update on its natural Hydrogen screening study (the **Study**) covering its prioritised asset portfolio in the Greater McArthur Basin in the Northern Territory.

#### **HIGHLIGHTS**

- Phase I natural Hydrogen assessment completed including interpretation of source potential, migration, leakage and retention over key permits in the Northern Territory
- Highly prospective play fairways for natural Hydrogen identified across Company's prioritised NT acreage
- Key systems elements interpreted to be present for natural Hydrogen are also encouraging for the exploration of Helium, a valuable end product in short global supply
- Opportunity to conduct on-ground surveys tailored to natural Hydrogen and Helium on the back of Greater McArthur Basin licence awards
- Further develops the Company's strategy of pursuing clean end products to complement existing focus on exploring for natural gas as a key transitional fuel
- Q2 2023 grant of Exploration Permit (**EP**) 258 anticipated following approval of native title holders to enter into exploration agreement with the Company

#### **GREATER MCARTHUR BASIN STUDY**

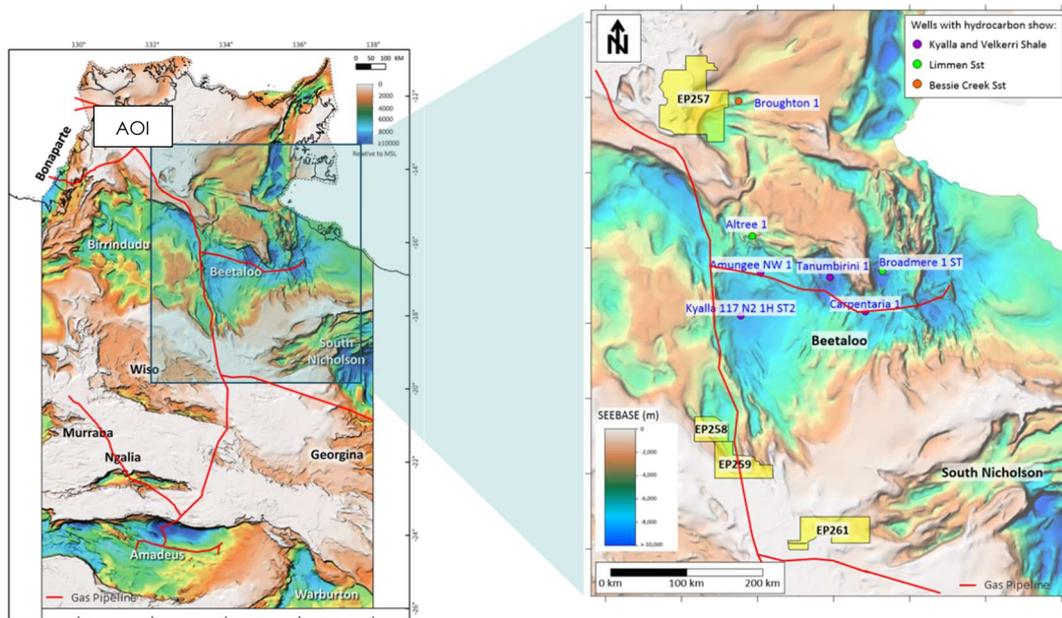
##### **Workflow**

The Company engaged Cryptid Energy Consultants (**Cryptid**) to conduct a desktop screening study into the natural Hydrogen potential of the prioritised area of interest (**AOI**), as shown in Figure 1. The objective of the Study was to assess the potential for the generation, migration and trapping of natural Hydrogen in underground reservoirs.

The workflow consisted initially of compiling a database of available technical data, papers, interpretations including basement lithologies, remote sensing and historical drilling results (**Data**).

The Data were then interpreted and assessed to generate play fairway maps across the AOI, with particular focus on TEE's permit applications. Natural Hydrogen play elements

were individually assessed including the presence of high natural Hydrogen concentrations in historical wells and water bores.



**Figure 1: Top End's Natural Hydrogen Study AOI and high graded permits**

## **Conclusions**

The outcomes of the Study suggest the AOI has the potential to be highly prospective for natural Hydrogen. Evidence of key natural Hydrogen systems elements has been identified across the AOI and further studies are being considered along with on-ground surveys to further mature this prospectivity. Natural Hydrogen systems elements interpreted to be present in the AOI are shown in Figure 2.

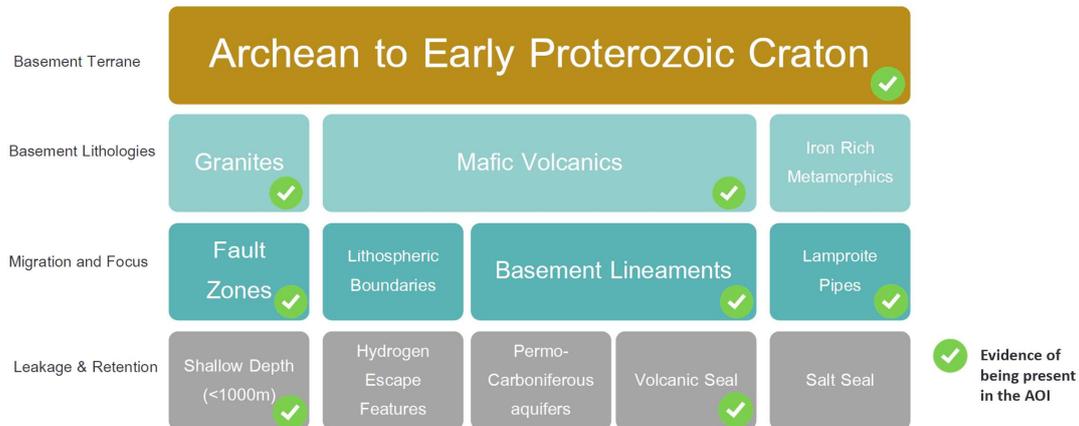
The presence of high Helium concentrations at the nearby Shenandoah-1A well indicates that the radiolysis of groundwaters is occurring in the McArthur Basin – an important datapoint for proving the generation of both natural Hydrogen and Helium in the AOI.

Additionally, a hydrogeochemical survey completed by Geoscience Australia in 2020<sup>1</sup> sampled high concentrations of dissolved Hydrogen and Helium in groundwater in the greater Tennant Creek area, and in the immediate vicinity of EP 258. These datapoints provide further evidence of natural Hydrogen and Helium charge systems being present in the AOI.

---

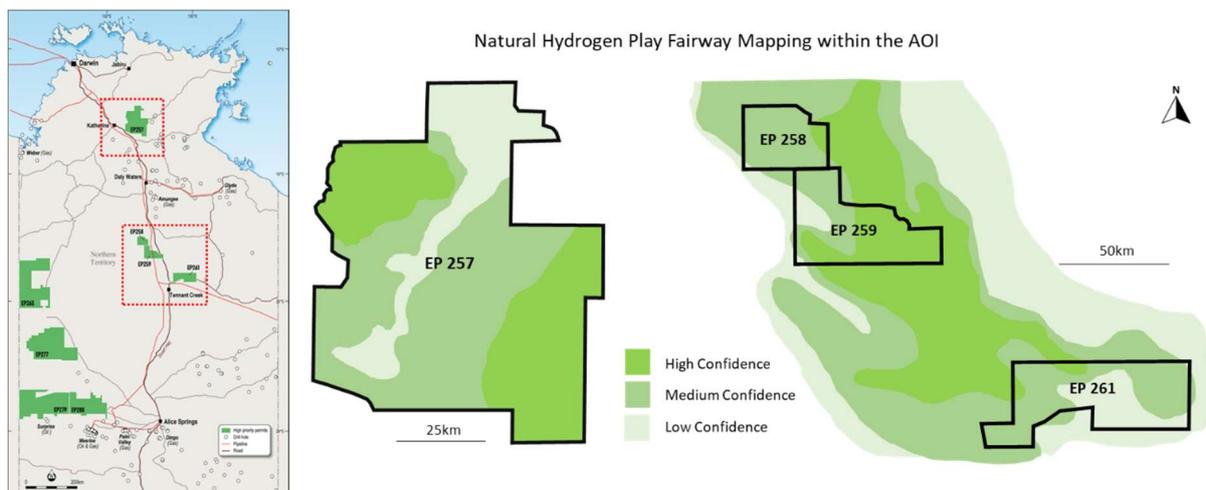
<sup>1</sup> Schroder, I., Caritat, P. de, Wallace, L., Trihey, J., Tobin, J., Boreham, C., English, P., Sohn, J., Palatty, P., Coghlan, R., Flower, C., Maher, P., Thorose, M.D., Long, I., Byass J. and Jinadasa, N. 2020. Northern Australia Hydrogeochemical Survey: final data release and hydrogeochemical atlas for Exploring for the Future. Record 2020/15. Geoscience Australia, Canberra.

## Natural Hydrogen Systems Elements



**Figure 2: Natural Hydrogen systems elements interpreted to be present in the AOI<sup>2</sup>**

The summary results of natural Hydrogen exploration play fairway element mapping over the AOI are shown in Figure 3, highlighting high confidence areas within the permits.



**Figure 3: Natural hydrogen exploration play elements mapping over the AOI**

### Forward Work Program

The Company will initiate activities tailored to the exploration for natural Hydrogen and Helium on EP 258, subject to grant, alongside the existing activities focused on the exploration of natural gas. Following receipt of notice that the native title holders for the Top End (Default PBC/CLA) Aboriginal Corporate have agreed to enter into an

<sup>2</sup> It should be noted that the absence of interpreted presence of a system element(s) in the Study does not necessarily evidence absence of actual presence. Similarly, the existence of significant natural Hydrogen systems does not require the presence of all elements shown in Figure 2.

exploration agreement with the Company<sup>3</sup>, TEE is working with both the Northern Territory Government and Northern Land Council towards executing the statutory Section 31 tripartite deed, required ahead of formal grant of the permit.

The Company recently appointed Xcalibur Aviation (Australia) Pty Ltd (**Xcalibur**) to undertake the acquisition of approximately 2,500 line kilometres of Falcon airborne gravity gradiometry (**AGG**) data over EP 258<sup>4</sup>. This survey will provide valuable data that can be integrated into the natural Hydrogen study.

The AGG will provide a better understanding into the location and orientation of structural lineaments and basin architecture including basement highs, deep seated faults and density contrasts between reservoirs and seals across the permit. The AGG dataset will provide further knowledge on the presence of key natural Hydrogen and Helium systems elements and will help to optimise the location and orientation of any future specialised natural Hydrogen and Helium focussed on-ground surveys. Studies into on-ground work programs including soil sampling and aquifer sampling will be assessed. These can be executed in parallel with Hydrocarbon exploration activities including 2D seismic acquisition, which is planned on EP 258 following the completion of the near-term AGG survey.

**In response to the completed Study, Top End Managing Director Oliver Oxenbridge commented:** *“The identification of highly prospective natural Hydrogen play fairways further enhances our view on the potential of the margins of the Greater McArthur Basin. We know that wells drilled in the Amadeus Basin have evidenced very high concentrations of both natural Hydrogen and Helium and it is exciting to have validation that similar key system components are also indicated to be present in our prioritised areas of focus in the Greater McArthur Basin. On the back of confidence gained from the conclusions of the Phase 1 Cryptid Study, we will continue to design our exploration activities to concurrently mature both Hydrocarbons and natural Hydrogen and Helium opportunities in the Northern Territory.”*

**- END -**

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

For more information please contact:

**Kelly Moore and Michelle Kennedy**  
**Joint Company Secretaries**  
**Company Secretary**  
**+61 8 6245 9836**  
[info@topendenergy.com.au](mailto:info@topendenergy.com.au)

---

<sup>3</sup> Please see ASX announcement “Native Title Holder Approval for EP258 Exploration Agreement” (3 April 2023).

<sup>4</sup> Please see ASX announcement “Appointment of Contractor for Gravity Gradiometry in NT” (1 March 2023).



### **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 in Queensland and the Northern Territory, with intentions to pursue complementary clean energy solutions and achieve a target of net zero (Scope 1 & 2) emissions.

For further information on Top End Energy Limited please visit [www.topendenergy.com.au](http://www.topendenergy.com.au)

### **About Cryptid Energy Consultants**

Cryptid Energy Consultants (Cryptid) are Perth-based experts in seismic and geological analysis for the oil and gas, natural Hydrogen, mining, CCS and geothermal industries. Cryptid specialise in prospectivity evaluation, regional studies and seismic facies mapping.

For further information on Cryptid Energy Consultants please visit [www.cryptidec.com](http://www.cryptidec.com)