



Ramsay 1 & 2 - Learnings from the First Natural Hydrogen Exploration Wells in Australia

AEP Conference – Perth May 2024
Dr. Josh Whitcombe - COO Gold Hydrogen

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Prospective Resource Statements

The Prospective Resource Statements for Natural Hydrogen and for Helium have been included in presentation under the approval of Mr Billy Hadi Subrata, Chief Engineer for Gold Hydrogen, who is a Qualified Petroleum Reserves and Resources Evaluator. Mr Hadi Subrata confirms that, as at the date of this announcement, there is no change to information or additional information, since the effective dates, that would materially change the estimates of prospective resources quoted.

QPRRE Statement – Natural Hydrogen

The Prospective Resource Statement for Natural Hydrogen in this presentation is based on, and fairly represents, information and supporting documentation prepared by independent consultants "Teof Rodrigues & Associates" with an effective date of 30 September 2021, and which forms part of the Company's Replacement Prospectus dated 29 November 2022. The Prospective Resource Statement, together with all relevant notes, also appears in the Company's ASX release of [13 January 2023](#).

QPRRE Statement - Helium

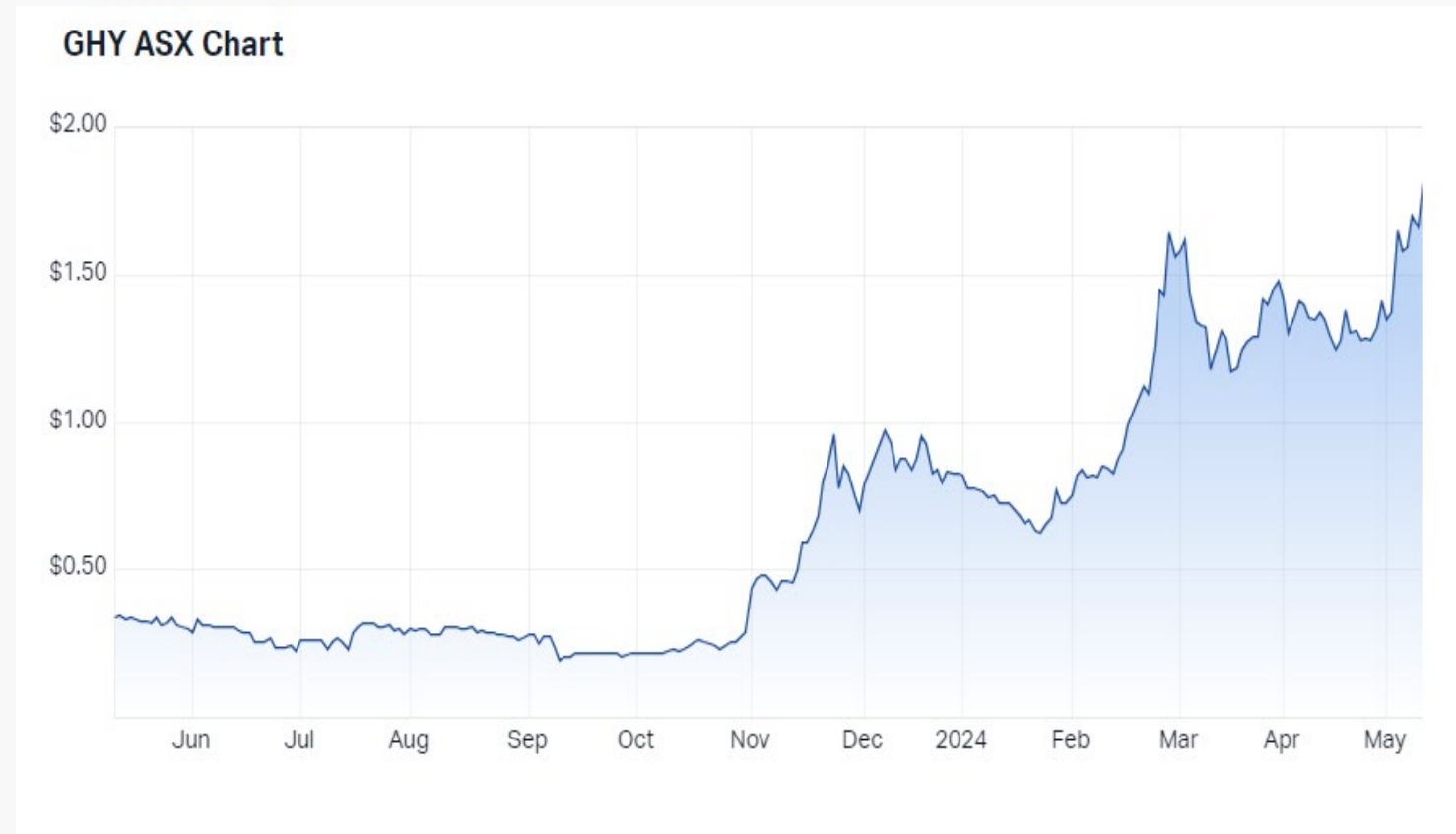
The Prospective Resource Statement for Helium in this announcement is based on, and fairly represents, information and supporting documentation prepared by independent consultants "Teof Rodrigues & Associates" with an effective date of 21 February 2024, and which was announced by the Company on that date together with the accompanying assumptions and notes.

Gold Hydrogen – Who are we?

Listed in Jan 2023

- Moved quickly to build an in-house team
- Worked with the SA Department of Energy and Mines (DEM) to secure all required approvals
- Spudded Ramsay 1, Australia's first dedicated natural hydrogen well on 11th October 2023

Share Price Performance (Previous 12 months)

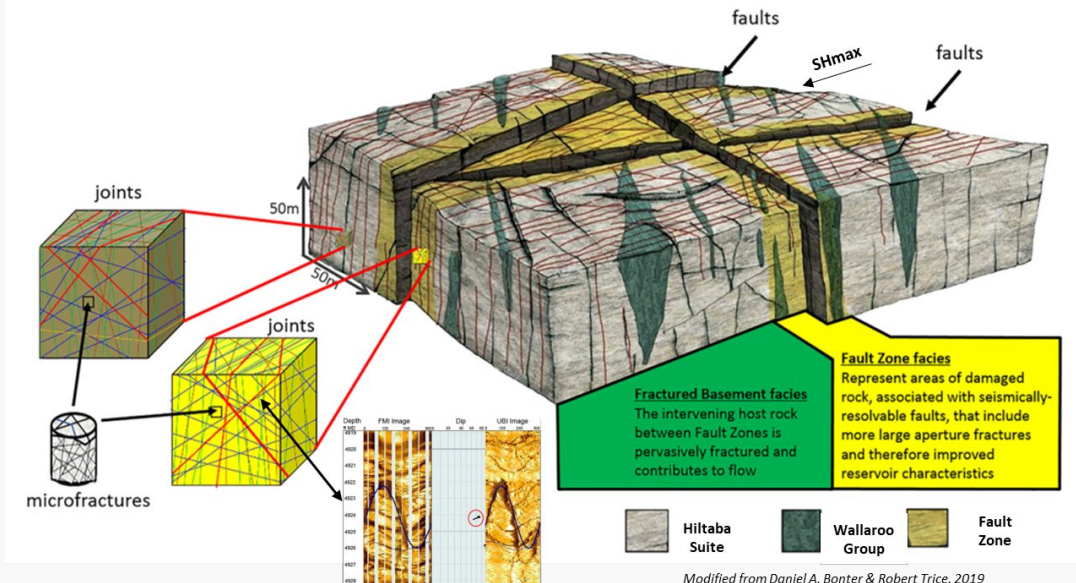
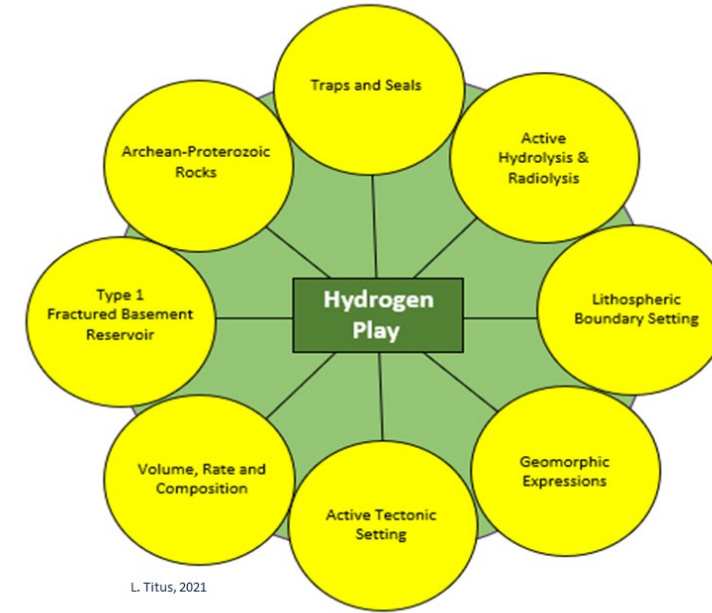


What is Natural Hydrogen?

Hydrogen gas that is naturally formed in the earth and not “manufactured”

Our Permit has:

- **Source & Generation** – radiolysis and hydrolysis of Proterozoic rocks. Area rich in iron-oxide-copper-gold+uranium (IOCG) deposits
- **Seals & Traps** – preservation time since deposition of Cambrian over source rocks, which include tight micrites and evaporites
- **Structure** – located on major lithospheric boundary and bend in the Tasman line of the Delamerian orogeny and within the setting of the tectonically active horst-graben Adelaide extensional rift
- **Reservoir** – massive-fractured-basement (MFB) play that extends >5-km in depth with discovered flows of up to 90% natural hydrogen



Potentially Lower Cost Natural Hydrogen Plus Helium

| | | |
|--|---|---|
| | <p>Title over natural hydrogen & helium resource occurrences and prospective areas</p> | <p>Certified Prospective Resource for natural hydrogen with an unrisks Best Estimate of 1.3 billion kilograms (see Slide 8) and unrisks Best Estimate of 41Bcf of helium with a mean average of 96 Bcf (see Slide 9)</p> |
| | <p>Flagship ‘Ramsay Project’, exploration permit granted, plus application permits</p> | <p>Ramsay Project 7,820 km² (green on map) is 100% owned by Gold Hydrogen. Other locations under exclusive application to Gold Hydrogen are a further 67,512 km²</p> |
| | <p>Ramsay 1 and Ramsay 2 exploration well results indicate Hydrogen and Helium</p> | <p>Preliminary gas sample analyses have yielded high purity levels of up to 73% hydrogen plus helium in high purity levels at up to 6.8% raw gas</p> |
| | <p>Enabling engagements with leading global hydrogen experts and contractors</p> | <p>Strategic engagements to date with CSIRO, SLB (Schlumberger), Total Seismic, Xcalibur, Savanna Energy Services</p> |
| | <p>Significant commercial and environmental competitive advantage</p> | <p>Naturally occurring hydrogen offers significant cost and emission advantages relative to other sources of hydrogen production. Global helium projects may be commercial from 1% purity or less and is rare and extremely valuable</p> |

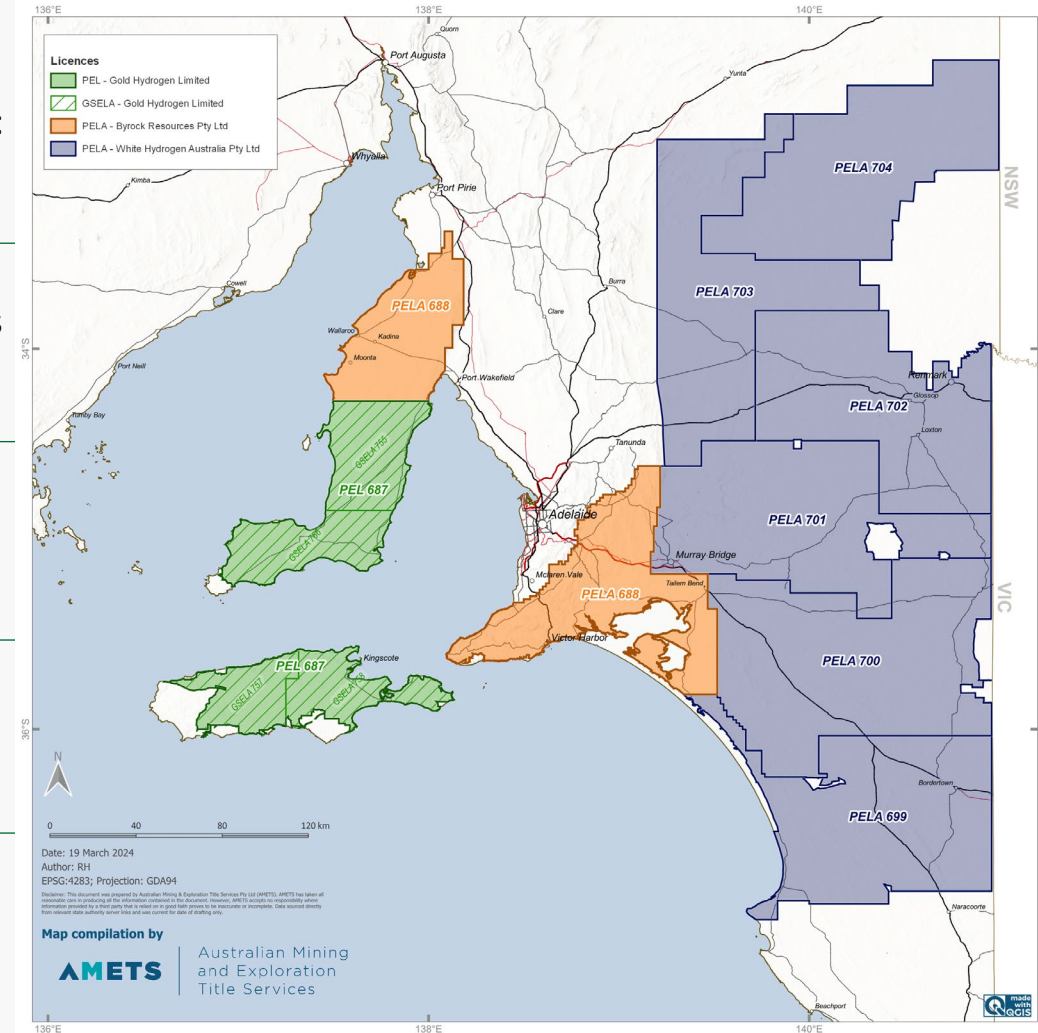
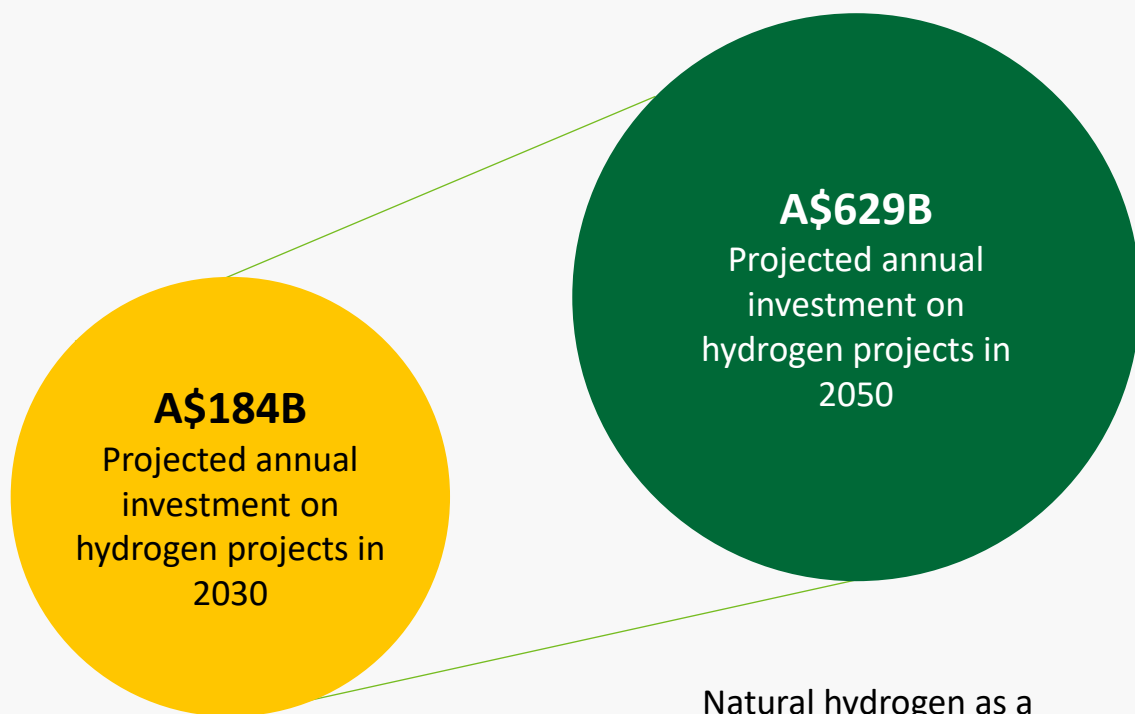


Figure: Overview of Gold Hydrogen tenements

Global Hydrogen Forecast

Substantial investment laying the foundation for Hydrogen use

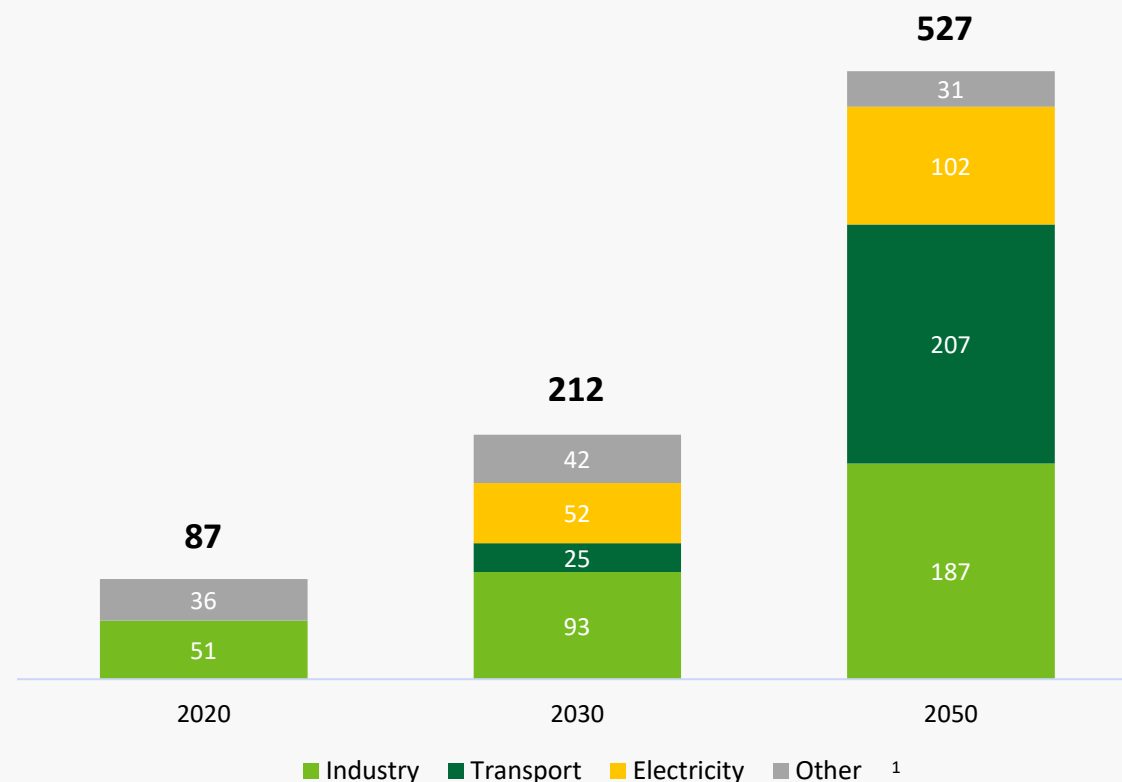


ESG push to decarbonise industries and economies is underpinning demand for hydrogen

Natural hydrogen as a carbon-neutral, low-cost source presents a very attractive opportunity to facilitate decarbonisation

Source: Frost & Sullivan Report - Page 29 of Gold Hydrogen Prospectus

Global Hydrogen Demand by Sector, Net Zero Emissions Target Scenario (Mt)



Source: International Energy Agency, Oct-2021
1. Other includes buildings, agriculture and refineries

Types of Hydrogen Production

Naturally occurring Hydrogen offers significant cost and / or carbon advantages relative to other Hydrogen production (manufacturing) processes

Gold Hydrogen is exploring for 'gold' or 'white' (natural) Hydrogen



| | Gold / White (natural) | Grey | Black/Brown | Blue | Green |
|---|------------------------|-------------|---------------|--------------------|--|
| Energy source | Natural hydrogen | Natural gas | Coal | Natural gas / coal | Renewables / biomass |
| Environmental impact | Low | High | Very High | Low | Low |
| No thermal process | ✓ | ✗ | ✗ | ✗ | ✗ |
| Production cost (A\$/kg) ^{1,2} | \$1.00 | \$5.60 | \$6.20-\$6.40 | \$10.20-\$10.30 | P: \$6.40-\$25.50 A: \$4.70-\$23.20 |
| Cost comparable to existing power generation ³ | ✓ | ✗ | ✗ | ✗ | ✗ |



Today, ~95% of all hydrogen produced is from natural gas

Source: Frost and Sullivan, Sep-2022 (Refer Gold Hydrogen Replacement Prospectus dated 29 November 2022)

1. Source: Christophe Rigollet¹, Alain Prinzhofer^{2,3}, Natural Hydrogen: A New Source of Carbon-Free and Renewable Energy That Can Compete With Hydrocarbons, First Break, Volume 40, Issue 10, Oct 2022, p. 78 – 84

DOI: <https://doi.org/10.3997/1365-2397.fb2022087>; "The Bourakébougou field, in Mali, represents the first natural hydrogen deposit studied both scientifically and industrially.

It gives us information on its renewability, on the natural flows involved and therefore on its sustainable exploitation. It is possible to estimate that the cost of operating hydrogen would be less than \$1/kg, which is significantly cheaper than any

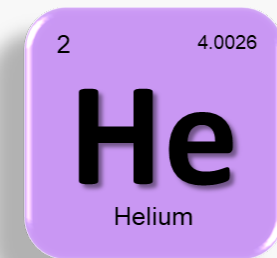
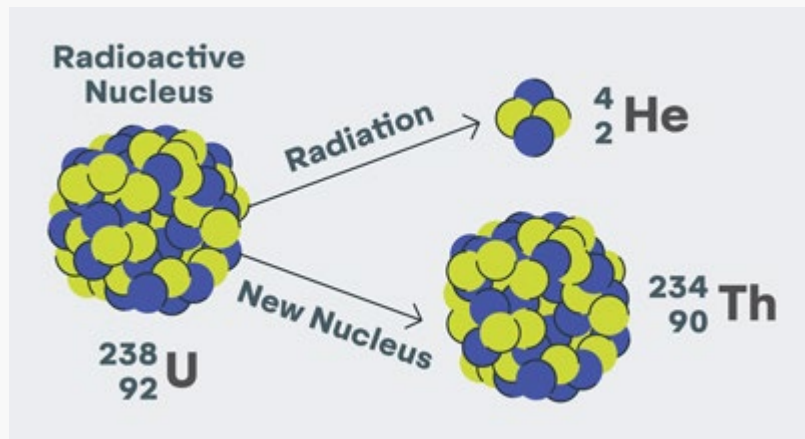
manufactured hydrogen, whether green, grey, or blue. Equivalent work is in progress in other continents, in order to be able to compare our knowledge of this Malian field with other fields in the world, which will make it possible to better ensure the industrial and societal interest of R&D for this new field."

2. P = Polymer electrolyte membrane electrolysis. A = Alkaline Electrolysis. Gold Hydrogen cost is an estimate

3. For industrial buyers, a hydrogen offtake price of €3 (\$4.50) per kg would be required to incentivise hydrogen production over power generation

Gold Hydrogen Prospective Resources (Using PRMS Guidelines)

Certified Prospective Helium Resources, Ramsay Field (PEL 687 Yorke Peninsula)



| Gold Hydrogen Unrisked Prospective Helium Resources, PEL 687 | | | |
|--|---------------------|----------------------|----------------------|
| SPE-PRMS Sub-Class Category | Low Estimate (Bscf) | Best Estimate (Bscf) | High Estimate (Bscf) |
| Prospect Ramsay Fault Block | 2 | 8 | 38 |
| Prospect South of Ramsay Fault Block | 5 | 33 | 205 |
| Total | 7 | 41 | 243 |

NOTE - All estimates are unrisked and aggregated arithmetically by category, hence caution that the aggregate low estimate maybe a conservative estimate and the aggregate high estimate maybe very optimistic estimate due to the portfolio effects of arithmetic summation. The estimated quantities of helium that may potentially be recovered by the application of future development project(s) relate to undiscovered accumulations. These estimates have both an associated risk of discovery (Pg), risk of development (Pd) and risk of commercialization (Pc). Further exploration, appraisal and evaluation is required to determine the existence of a significant quantity of potentially recoverable helium.

See ASX release of 21 February 2024 for full details and notes



Yorke Peninsula has granites widely distributed in the subsurface







Why the Yorke Peninsula? Historical Discovery

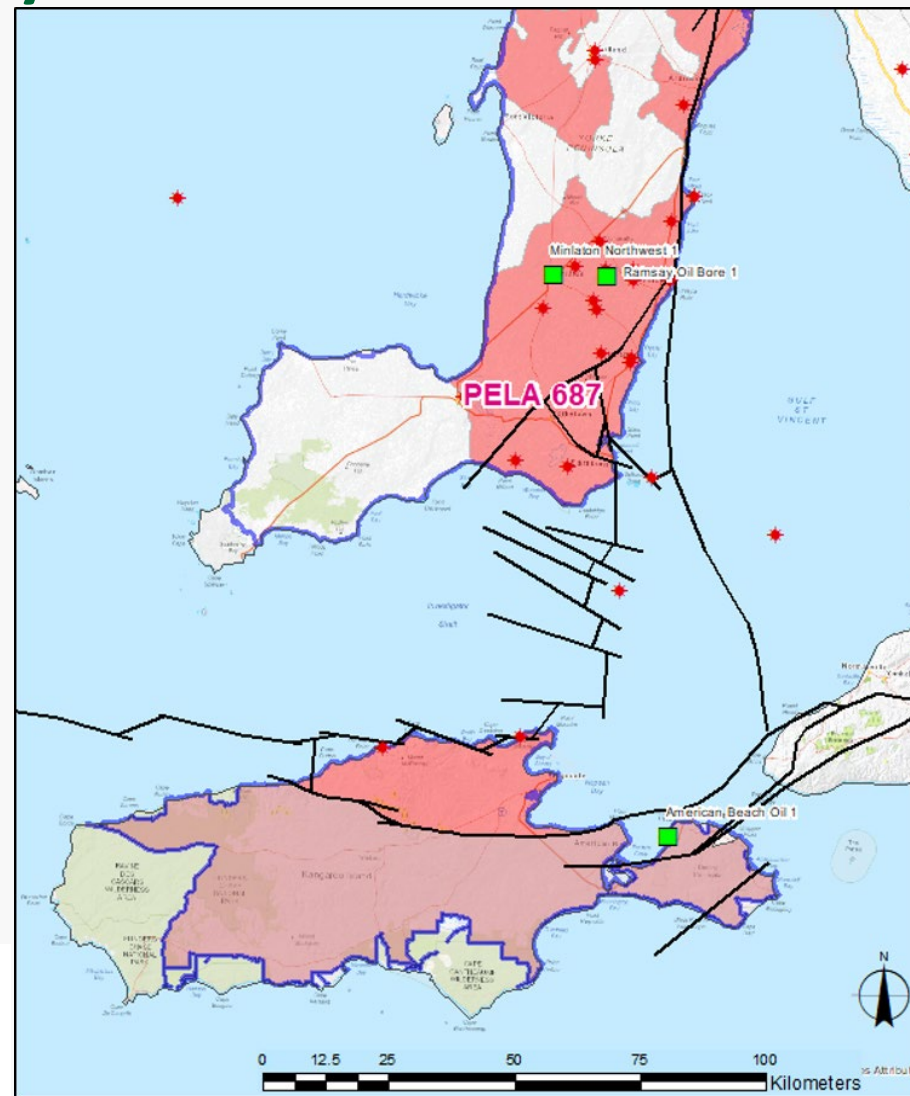
| Location | American Beach Borehole | | Ramsay Borehole | | |
|-----------------------------|-------------------------|-------------|-----------------|-------------|-------------|
| | Depth (m) | 187.4 | 289.5 | 240.8 | 262.1 |
| Sample Composition | | | | | |
| CO2 (%) | 5.3 | 0.5 | 0.2 | 0.8 | 0 |
| O2 (%) | 4.3 | 3.6 | 0 | 2.4 | 1.2 |
| C2 (%) | 0.5 | 0.0 | 0 | 0 | 0 |
| CO (%) | 0 | 0.0 | 0 | 0 | 0 |
| H2 (%) | 51.3 | 68.6 | 76 | 64.4 | 84 |
| CH4 (%) | 2.6 | 4.7 | 7.5 | 7 | 0 |
| N2 (%) by difference | 36 | 22.6 | 16.3 | 25.4 | 14.8 |
| Air Corrected Values | | | | | |
| CO2 (%) | 6.8 | 0.6 | 0.2 | 0.9 | 0 |
| H2 (%) | 65.6 | 83.3 | 76 | 73.1 | 89.3 |
| CH4 (%) | 3.3 | 5.7 | 7.5 | 7.9 | 0 |
| N2 (%) | 24.3 | 10.4 | 16.3 | 18.1 | 10.7 |

Table 1 – Shallow discovered natural hydrogen & associated gas compositions, Yorke Peninsula and Kangaroo, Island, SA

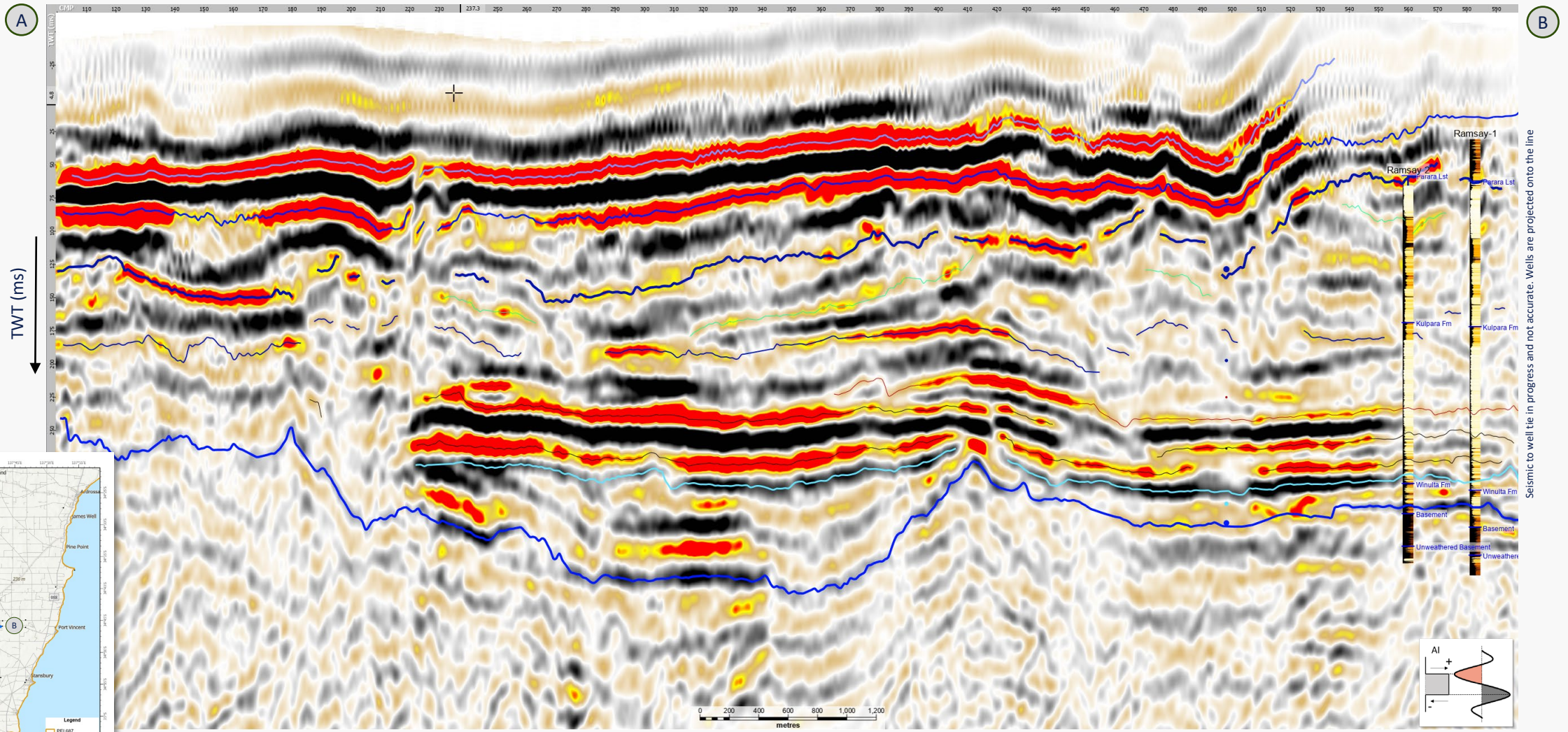
Bulletin No. 22, Department of Mines, Geological Survey of South Australia, The Search for Oil in South Australia, by L. Keith Ward, Consultant Geologist, reported the following, Page(s) 14 and 15 (20)

Legend

-  GOLD HYDROGEN PEL(A) 687
-  HYDROGEN DISCOVERY WELLS
-  HISTORIC PETROLEUM WELLS
-  MAJOR BASEMENT STRUCTURES
-  GAWLER HYDROGEN PLAY
-  KANMANTOO HYDROGEN PLAY

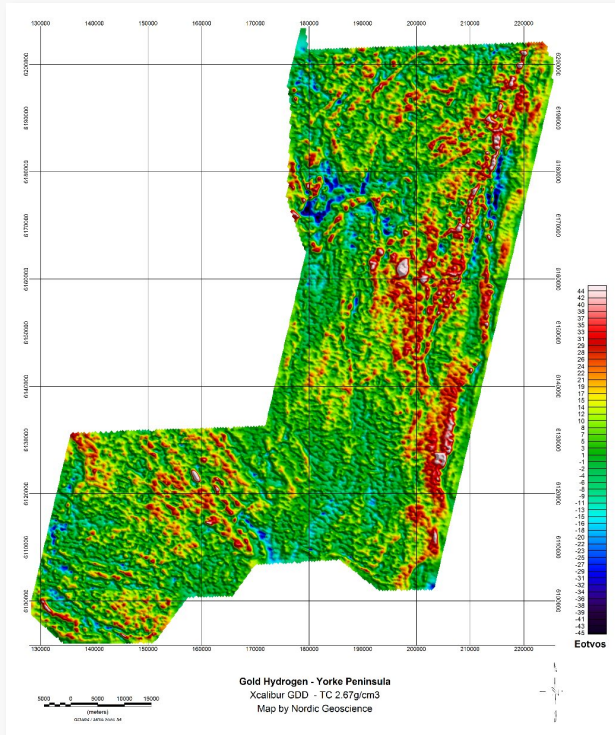


Ramsay Well on Existing Seismic Line Y82-A1

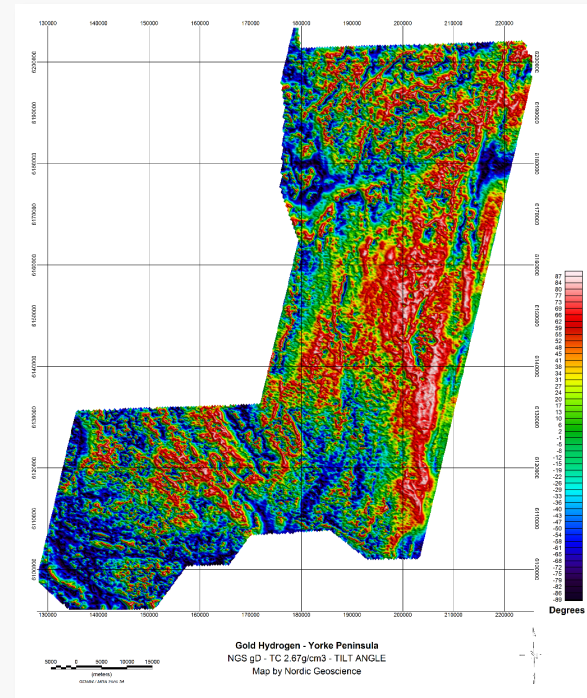


Multiple reprocessing iterations – velocities not initially correct

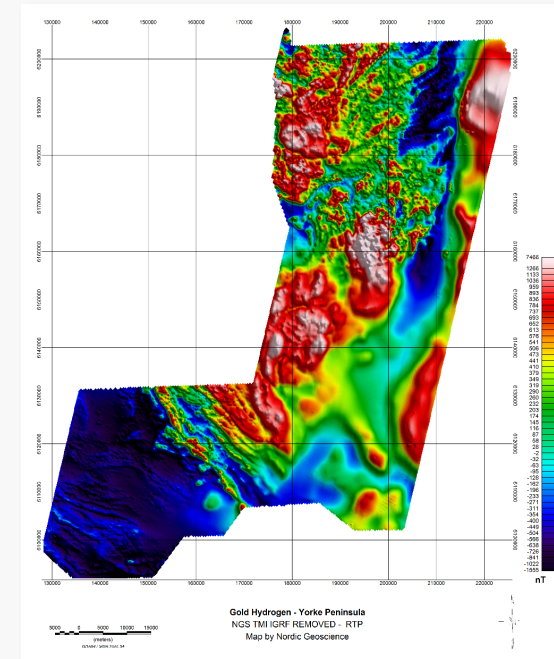
Falcon AGG Survey Completed mid 2023



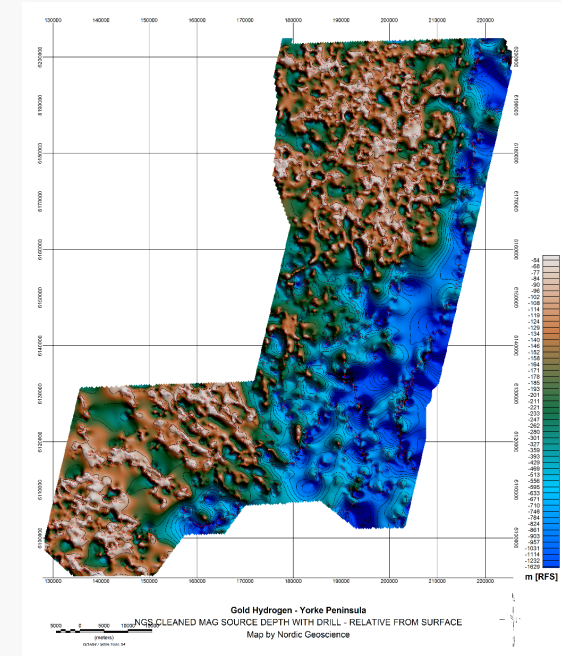
Terrain corrected gravity measurement.



Tilt angle attribute from terrain corrected gravity.



Total magnetic intensity reduced to the pole

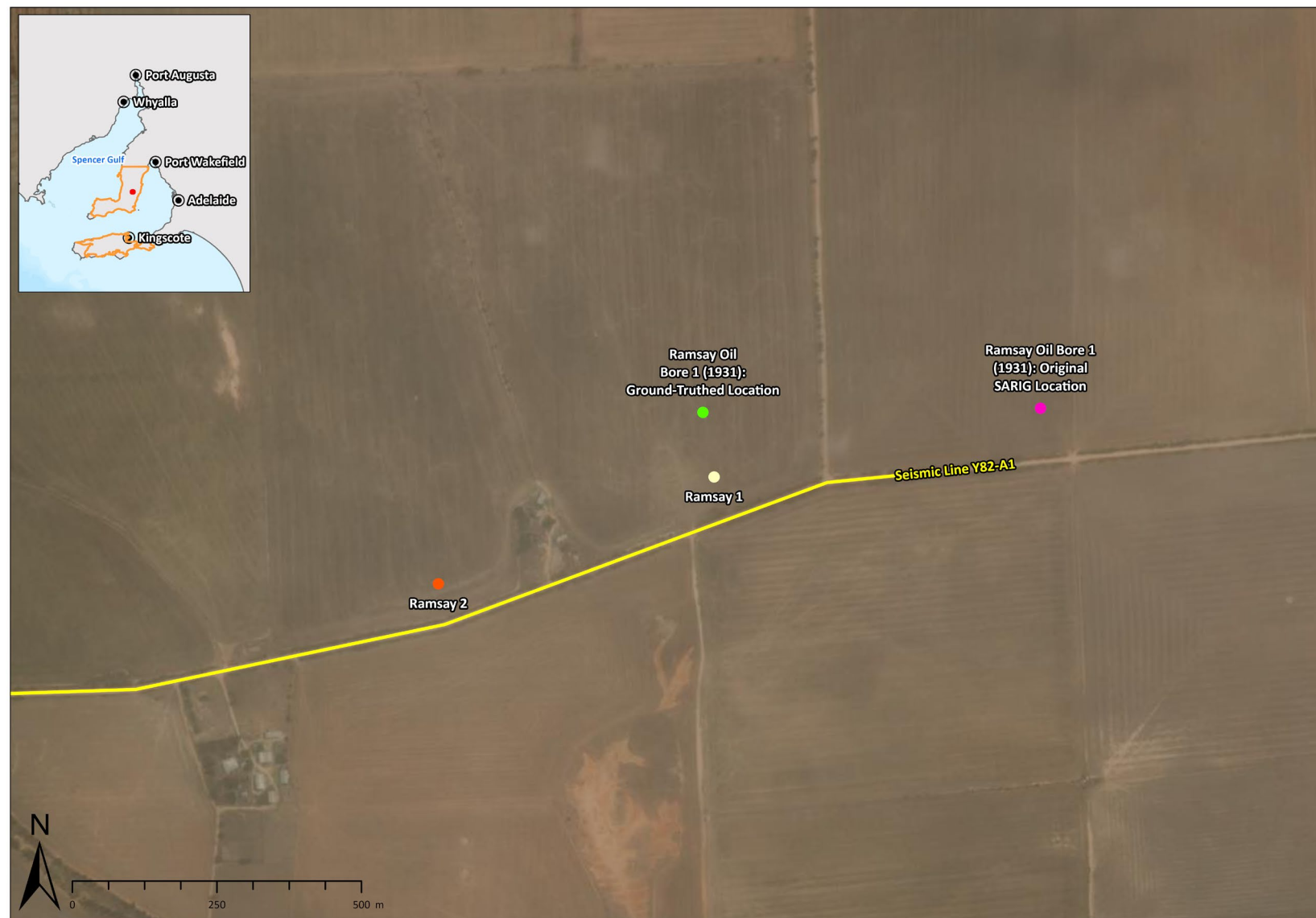


Predicted depth to basements from surface derived from magnetic data

Lack of density contrast between limestones and basement reduces options to predict basement depth

Drill Program Preparation – Well Location & Land Access

- Uncertainty on exact historical bore location
- End of an old seismic line
- Working with landowner for minimal disturbance
- Regulations – Petroleum Act but a hydrogen well
- DEM in SA were fantastic to work with and enabled all approvals to be obtained on time

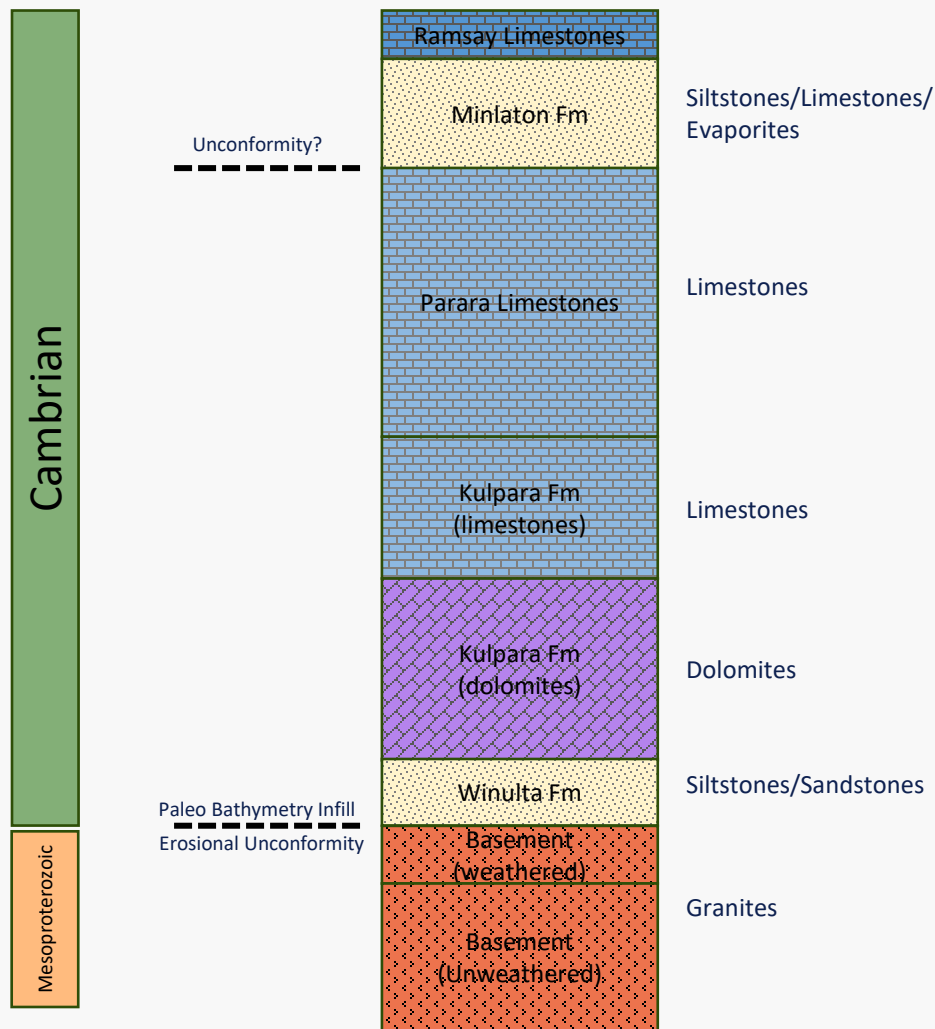


Ramsay 1 and Ramsay 2 Wells Successfully Drilled Q4, 2023

- Excellent Contractors willing to work with us and supported us in obtained approvals
 - Savanna Energy (Rig)
 - SLB (Cementing, Wireline, Mud Logging)
 - Petro Lab (Gas samples)
 - Coho Resources (Fluids)
 - Baker Hughes & Ulterra (Drill Bits)
- One crew with a break between wells
 - Learnings maintained
 - Great culture on site
- Stayed local and used local contractors where possible
- Site visits
 - Government, locals and landowners

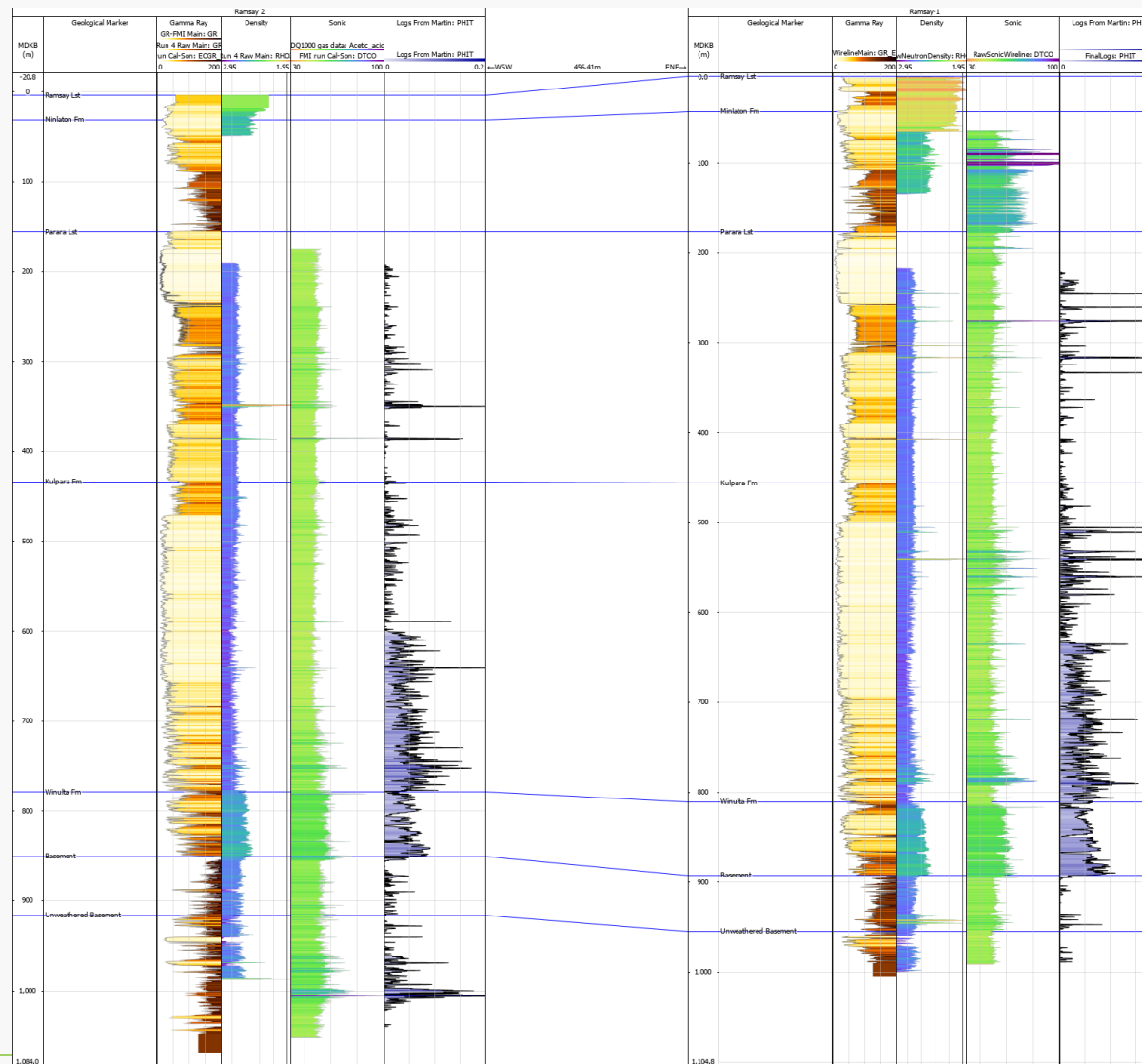


Ramsay 1 and Ramsay 2 Wells: Technical Analysis



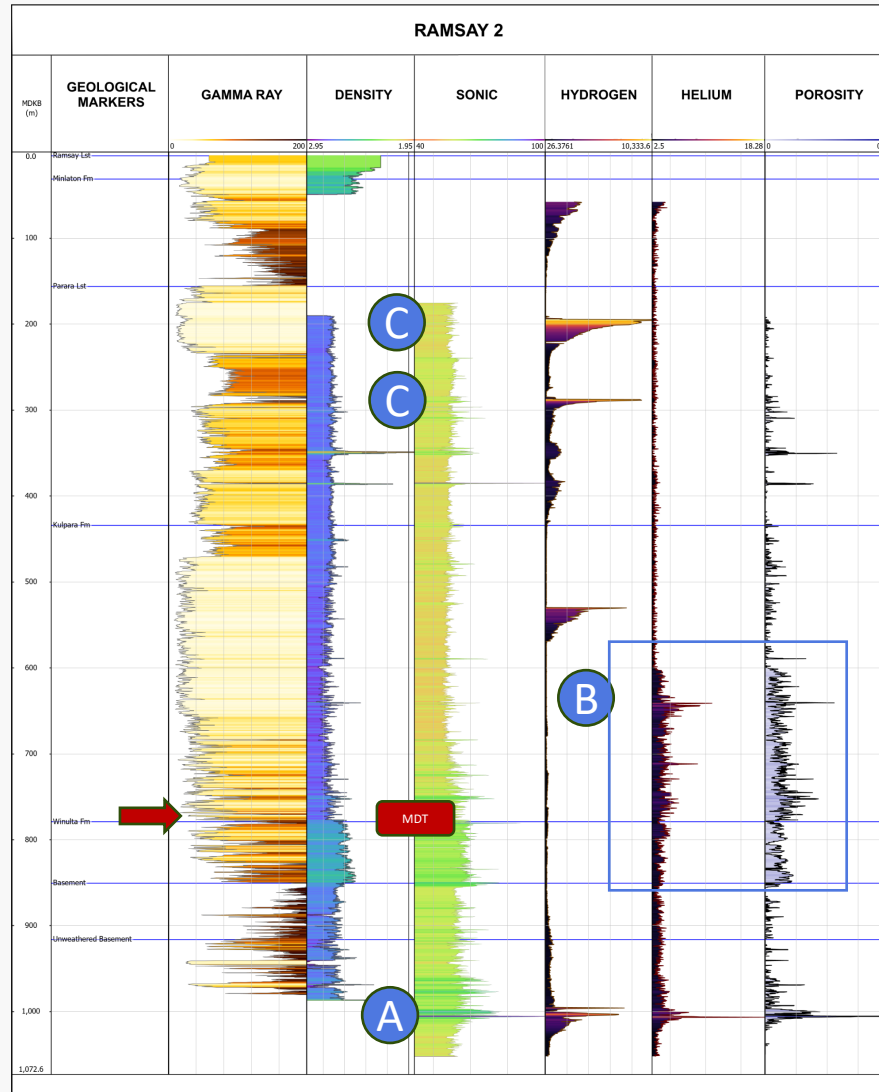
Ramsay 2

Ramsay 1



Ramsay 1 and Ramsay 2 Wells: Hydrogen and Helium

Ramsay 2



C

Spikes in the continuous hydrogen log from the mud gas in Parara limestones, related to hydrogen bearing fractures. Independent mud gas analysis confirms the hydrogen concentration measured by continuous mud gas logs

B

Increased helium in mud gas related to an increase in vuggy porosity in the base Kulpara Fm. Helium spike at 641mMD related to open fracture. MDT sample confirms high helium concentrations (17.5% in MDT from 778mMD)

A

Hydrogen and helium spike in basement related to a large open basement fracture and suggests hydrogen and helium generation at this location, with vertical migration the most likely model

MDT

Gas from MDT sample from 778 mMD reveals very high helium concentrations

What is Next...

- Phase 1 well testing completed in April, significant learns and additional testing being planned.
- Hydrogen and Helium are different to oil and gas, well testing needed to be adaptive
- Excellent well testing contractors
 - Well Pro (CTU and Nitrogen)
 - SGS (Flow-back Package)
 - MPC Kinetic (Perforating and Wireline)
 - Petro Lab and CSIRO (Gas and Water Sampling)
- DEM again very supportive in working through approvals to allow well testing under the Petroleum Act
- Regional seismic contracted for mid-year
- Return to Ramsay 1 and 2 for an extended well test
- Ramsay 3 and 4 later in the year
- Progressing Proof of Concept Pilot to allow Natural Hydrogen and Helium to be produced



Initial Well Testing

New Regional 2D Seismic - June & July



Existing seismic data is very sparse and only the blue lines are available for interpretation. The red seismic lines are poorly imaged paper sections only.



Ramsay 2DSS is planned for June 2024 and consists of 658km of modern 2D data covering the Ramsay project area and the potential exploration opportunities. Details of the program may change.



Questions?