30 October 2024

ASX Announcement

Helium-3 Confirmed at Ramsay Project

Isotopic analysis by Oxford University confirms Helium-3 within the Ramsay Project's world leading 36.9% purity[1] natural Helium system

Gold Hydrogen Limited (ASX:GHY) is pleased to announce exciting developments and confirm several major findings following the successful completion and an analysis of the inaugural drill program at its 100% owned Ramsay Project in South Australia:

1. **Ongoing Data Analysis and Positive Initial Results**

   Gold Hydrogen continues to receive and evaluate critical data from the Ramsay 1 and 2 wells, including geotechnical measurements, flow rates, and chemical compositions, which are continuing to show promising results.

2. **Breakthrough Helium-3 Confirmation at Shallow Depths**

   Oxford University, specialist noble gas research laboratory within its Department of Earth Sciences, has measured and confirmed the presence of Helium-3 (^{3}He) in gas samples taken from the Ramsay 2 well at depths from 280 meters to 1000 meters. The Oxford University Department of Earth Sciences analysis confirmation includes that:

   - Helium purity levels of 36.9%[1] rank among the highest ever recorded globally;
   - Levels of Helium-3 have been confirmed up to the magnitude of 901 ppt (atmospheric ^{3}He is 7.2 ppt); and
   - The isotopic analysis results from samples tested suggest up to 3.47ppb ^{3}He within a 36.9% Helium sample.

   As this is a highly specialised area in isotopic research, ongoing exploration, sampling and analysis will continue.

3. **Helium-3 is an Extremely Rare and Valuable Gas**

   Helium-3 (^{3}He), is an extremely rare gas to be found on Earth (7.2 parts per trillion (ppt) within the atmosphere) and represents only a tiny fraction of the planet's Helium production, and is primarily captured from the decay of Tritium in nuclear weapons. Information on naturally occurring Helium-3 (^{3}He) on Earth is extremely limited. The largest known source of Helium-3 is the Moon, with its surface soil containing Helium-3 (^{3}He) due to solar wind accumulation over billions of years. In contrast, Earth's Helium-3 (^{3}He) confirmations found in natural gas and volcanic emissions are extremely scarce.

[1] All Helium sample results have been corrected for air and nitrogen contamination

Commercial supplies of Helium-3 (^{3}He) could significantly impact the global energy market by providing a clean, efficient fuel for nuclear fusion, potentially revolutionizing energy production. Based on existing fusion technology (e.g. Tokamak fusion reactors developed by companies such as Commonwealth Fusion Systems[2]), Helium-3's use in fusion reactors could generate vast amounts of energy with zero or minimal radioactive waste, providing a sustainable alternative to current energy sources. The scarcity of Helium-3 on Earth as the fuel source for Tokamak reactors has been the major constraint on their scale-up and commercial use. This has led to a number of companies from countries including the USA, China and Russia pursuing plans to extract Helium-3 (^{3}He) from lunar regolith in the coming decade.

4. The Strategic Value of Helium-3[3]

In addition to nuclear fusion energy, Helium-3 is a highly valuable and rare isotope, indispensable in advanced fields such as quantum computing, cryogenics, medical imaging, and nuclear material monitoring. With its neutron absorption capability, Helium-3 plays an essential role in neutron detection and future technologies:

- Current prices for Helium-3 exceed $2,500 per litre (USD 70.8 million per McF or USD 18.7 million per kg), over 140,000 times the value of Helium-4; and
- This isotope is vital for nuclear fusion, a field seeing rapid advancements, especially through projects like Commonwealth Fusion Systems, backed by major stakeholders including the US Energy Department, Khosla Investments, and the Bill Gates founded Breakthrough Energy Ventures[2].

5. Collaboration and Innovation in Helium Extraction and Nuclear Fusion

Gold Hydrogen is in preliminary discussions with leading scientific and research organizations, some of which (such as Interlune) are being funded by the US Department of Energy, to advance technology for the separation of Helium-3 and Helium-4 in land-based systems.

6. Projected Market Impact and Future Resource Utilization[3]

With the ongoing developments in fusion energy, demand for Helium-3 is expected to surge. For example, a single 1 GW fusion plant may require up to 100 kg of Helium-3 annually, representing a potential market value of $1.4 billion per 1GW fusion plant.

[2] Foreign Policy News article (21 September 2021). Available at: https://foreignpolicynews.org/2021/09/21/with-the-fusion-breakthrough-by-commonwealth-fusion-systems-helium-3-is-becoming-a-national-security-issue-for-the-united-states/

[3] Edelgas public article (22 October 2024). Available at: https://www.edelgasgroup.com/Helium-3-market-report

7. Natural Hydrogen and Helium Resource Potential

Current and historical data confirms significant Natural Hydrogen and Helium presence across the PEL 687 permit area. Gold Hydrogen is preparing advanced drilling and exploration designs to optimize extraction. The Ramsay Project currently has Best Estimate Prospective Resources of 1.3 Billion kg for Natural Hydrogen, and 41 BcF for Helium. Refer Tables 6 and 7 for full details.

Together, the results achieved to date affirm that the Ramsay Project holds substantial commercial potential to ultimately become a major producer of Natural Hydrogen and Helium.

Gold Hydrogen looks forward to further exploration, and the continued progress of this groundbreaking initiative.

Gold Hydrogen Managing Director, Neil McDonald, commented:

"Helium-3 is an incredibly rare and valuable gas in high demand from the world's largest countries and companies. With advances in quantum computing and, especially, nuclear fusion, there's an urgent need for new Helium-3 supplies.

Commonwealth Fusion Systems (CFS), backed by investors such as Bill Gates Breakthrough Energy Ventures, Jeff Bezos, Khosla Investments, and the US Department of Energy, has made groundbreaking progress toward viable nuclear fusion technology. Further to breakthroughs such as at that of CFS, a company called Interlune, also backed by the Department of Energy, are advancing technologies to separate Helium-3 from domestic sources, eliminating the need for moon-based extraction — an approach that would otherwise cost billions of dollars.

To confirm Helium-3 within a land-based system, as we have at the Ramsay Project, could be revolutionary. With up to 100 kg of Helium-3 potentially needed annually to power a single 1 GW fusion plant, we're looking at the potential to participate in a substantial market forecast to be worth an estimated $1.4 billion per 1 GW fusion plant. This rare and recoverable resource could position Ramsay as a world-class project of strategic significance.

There is more research, work and exploration required to understand the source and generation of the Helium, and we will press forward on this exciting opportunity."

Further Background Information About Helium-3[4]

- **Helium-3 is extremely rare and valuable -** Helium-3 (^{3}He), a rare and highly valuable isotope that plays a critical role in cutting-edge industries.
- **Why Helium-3 is Critical -** Helium-3 is a non-radioactive isotope of Helium, prized for its neutron absorption capabilities and its unique role in neutron detection—vital for nuclear material monitoring—and low-temperature physics experiments plus nuclear detection and quantum computing. The Edelgas article also notes the growing interest in Helium-3's

[4] Edelgas public article (22 October 2024). Available at: https://www.edelgasgroup.com/Helium-3-market-report

potential applications in quantum computing and fusion energy, both considered groundbreaking fields that could shape future technologies.

- **Limited Supply and High Market Value -** Helium-3 is primarily produced from the decay of tritium, a rare material, making global supply extremely constrained. The United States remains the primary producer, with Russia and Canada offering limited contributions. Due to its scarcity, Helium-3 trades at around $2,500 per litre (USD 70.8 Million per McF or USD 18.7 Million per KG) and commands prices over 140,000 times higher than that for Helium-4 which is USD 400-500 per McF with a total market size of approximately $125 million annually at present time.
- **Future Opportunities and Market Growth -** The Edelgas article notes potential future sources of Helium-3, including lunar mining and exploring underground sources such as volcanic regions. These could significantly expand supply in the coming decades, particularly as Helium-3 is being evaluated for use in fusion reactors. It is reported that a single 1 GW fusion plant could require up to 100 kg of Helium-3 annually, representing a potential market worth $1.4 billion per 1 GW fusion plant.

Gold Hydrogen Chairman and former Foreign Affairs Minister, Alexander Downer, commented:

''These results confirming Helium-3 is a material development for our Ramsay Project. Superpowers China, Russia and the United States of America are planning exploration of the moon to mine for Helium-3 – and although we are at an early stage and more exploration and analysis needs to happen, we have found it here in South Australia which could be incredibly exciting not just for South Australia, but Australia as a whole.''

The Directors of Gold Hydrogen Limited (**Gold Hydrogen**, ASX: **GHY**, the **Company**) are pleased to provide an operational update on the Company's groundbreaking Ramsay Project on the Yorke Peninsula, prospective for both Natural Hydrogen and Helium.

How is Naturally Present Helium-3 (^{3}He) in the Subsurface Derived?

Naturally present Helium-3 (^{3}He) in the subsurface derives from rock that interacted with the deep Earth interior, the lower mantle being a primordial and undegassed material. For example, Mid-Ocean Ridge Basalts (MORBs) are mafic rocks derived from larger mantle domains that appear to sample deep mantle ^{3}He transported to the melting domain in the upper mantle by large-scale mantle convection. ^{3}He enrichment is quantified by ^{3}He/^{4}He ratios relative to the ^{3}He/^{4}He ratio in air (R/RA). Granitic basement rocks are formed by melting at the base of the continental crust and have very low range of 0.01-0.1 R/RA due to their high content of radioactive elements (U, Th) generating ^{4}He only and lack of mantle material interaction. Enrichment in ^{3}He in granitic basement can be a marker for intrusions of deep magmatic material or interaction with deep mafic rocks.

Ramsay Project Helium Samples and Analysis

Minimum R/RA values are consistent with Helium being generated in felsic crystalline basement by the radioactive decay of uranium and thorium. The more elevated values indicate enrichment in Helium-3 and may be associated with intrusive magmatic rocks. The highest ^{3}He content of 901 ppt was obtained from a well constrained, unfractionated high helium sample. Further exploration and more data will be needed to ascertain the processes involved in the Helium-3 enrichment, its source and generation.

^{3}He is primarily produced from the radioactive decay of tritium, a rare and controlled material. The source of tritium is from nuclear reactors or nuclear weapons. Tritium is produced as a by-product in nuclear reactors, particularly in heavy water reactors, where it is generated through neutron activation of lithium-6 or boron, or from deuterium (heavy hydrogen) in the reactor coolant. Once produced, tritium is stored until it decays into ^{3}He, which is purified and repurposed. This involves collecting the tritium and storing it in secure containers for a period typically around 12.3 years (the half-life of tritium), during which half of the tritium decays into ^{3}He. The ^{3}He is then extracted from these storage containers.

Naturally occurring and radioactive waste free production appears as an ideal alternative source of ^{3}He. Exploration for subsurface fluids with elevated Helium-3 content flowing to surface combined with innovative and low-cost separation represent a high-potential market space.

This is a highly specialised and technical field, with very little analogue data available from comparable third-party gas projects. Accordingly, these sample results and analyses require ongoing work to assist with the Company's understanding of their potential in the context of the Ramsay Project and its underlying geological systems.

Summaries of the laboratory results conducted by the Oxford University on the Ramsay 1 and Ramsay 2 wells are contained in Tables 1 and 2.

Further Background Information and Articles on Helium-3

https://www.edelgasgroup.com/helium-3-market-report

https://foreignpolicynews.org/2021/09/21/with-the-fusion-breakthrough-by-commonwealth-fusion-systems-helium-3-is-becoming-a-national-security-issue-for-the-united-states/

https://www.forbes.com/sites/roberthart/2022/12/13/nuclear-fusion-breakthrough-can-the-quest-for-clean-energy-finally-help-tackle-the-climate-crisis/

https://www.techno-science.net/en/news/china-considers-catapulting-helium-from-the-moon-to-earth-N25636.html

https://english.elpais.com/science-tech/2024-05-12/helium-3-mining-the-fuel-of-the-future-on-the-moon.html

Overview of Exploration Well Testing Operations on the Ramsay 1 and Ramsay 2 Wells

The primary objective of the Ramsay 1 and Ramsay 2 well testing program was to obtain gas and fluid samples for compositional and isotopic analysis. This has been achieved, with samples sent to established local and international third-party laboratories in Australia, London and Paris.

Secondary objectives of the well testing program included the recovery of Natural Hydrogen and Helium at surface from reservoir fluid and gas with pressure measurements. These objectives have also been achieved, with additional recovered samples dispatched to the same international third-party laboratories.

From the complete suite of well testing data being compiled and analysed, Gold Hydrogen will better understand the characteristics of the sub-surface formations and the potential Natural Hydrogen and Helium reservoirs. This data will assist the Company in gaining technical insights into how the Ramsay Project area could be further explored and appraised, including optimising future well designs and testing strategies, as well as providing input for a future pilot plant / proof-of-concept plant design.

Well Testing - Compositional Analysis Results - Helium

As previously reported, the Company recorded a concentration of Helium of up to 17.5%[5] , in the MDT sample taken at 778m during the drilling of Ramsay 2. During the Stage 1 well testing program, the Company obtained two (2) pressurised gas samples with Helium concentrations of 12.6%[5] at 642m, and 17.9%[5] at 712m and, during the Stage 2 well testing program, Ramsay 1 recorded gas to surface at the separator of purities up to 36.9%[5] on an air and nitrogen corrected basis (refer Figure 1 and Tables 3 to 5 below for full details). The recorded Helium concentrations showed a consistent increase during the Stage 2 flow testing period of Ramsay 1, and did not appear to have reached a stable value at the end of the testing period.

These Helium concentrations are currently believed to be the highest found in the world in a non-petroleum system. By comparison, a recent large discovery reported by Pulsar Helium found a Helium concentration of 13.8% (prior to any possible air-correction) from its Jetstream 1 well in Minnesota, USA[6].

Future Activities

Based on the integration of the drilling and testing results with the newly acquired Ramsay 2D data, Gold Hydrogen in the process of planning a new drilling and data acquisition campaign to delineate the Ramsay Natural Hydrogen and Helium accumulation.

This will involve a number of wells, specifically targeting the different pay zones within the identified structure and using a modified well design to enable testing of the different zones with zonal specific testing configurations. The data from these wells will constrain the pilot project area and design, with the aim of demonstrating the commercial production potential of both Natural Hydrogen and Helium from the Ramsay Project.

[5] All Helium sample results have been corrected for air contamination

[6] https://www.startribune.com/Helium-gas-drilling-iron-range-minnesota-pulsar-edelgas-duluth-metals/600351052/

In parallel, an extensive 3D seismic survey is being considered over the Ramsay Project area, to illuminate the stratigraphic and structural subsurface complexities, in order to facilitate detailed resource assessments and to optimise drilling locations for future exploration and appraisal wells.

The Ramsay 2D regional seismic data has revealed several Natural Hydrogen and Helium prospects, some of which will be tested with dedicated exploration wells. Selection and timing of these wells will be done in conjunction with the delineation drilling activities, in order to take advantage of the presence of the drilling rig and experienced crew.

Groundbreaking Exploration Testing for Both Natural Hydrogen and Helium

The Ramsay Project well testing program was the first dedicated Natural Hydrogen and Helium well test operation conducted in Australia, and to the Company's knowledge, it is likely one of only a few in the world.

The Company considers this to represent the initial steps of an exciting journey, which is not dissimilar to that undertaken by various world-renowned ad ultimately successful oil and gas projects, such as the early days in the CSG and shale industries. For those particular resources, the exploration and completion techniques were developed and optimised over time, improving project economics and ultimately leading to major projects being developed. The Company anticipates a similar path forward for its Natural Hydrogen and Helium prospective resources, although the timeframe may be quicker as drilling and completions technologies developed for other gas resources may be applicable to its Natural Hydrogen and Helium projects.

First Key Step on the Journey to Future Potential Development

The Company is of the view that the Ramsay Project contains significant prospective resources of both Natural Hydrogen and Helium, with large scale potential that it is aiming to appraise and develop over time and with continued success.

There is very little data available for dedicated Natural Hydrogen and Helium wells anywhere in the world due to the lack of analogue wells. To the Company's knowledge, the only Natural Hydrogen field currently in production is located in Mali, West Africa, where Natural Hydrogen production is used to power the small town of Bourakebougou. It has been reported that the Natural Hydrogen wells in Mali do not have any decline in production and are continually regenerating and producing at the same rate.[7]
Helium is extremely valuable and indicatively, longer-term contracted bulk pricing is expected to approximate USD450 or AUD$675 per Mcf (thousand cubic feet).[8]

Natural Hydrogen has a high energy content, and extracting it even in small quantities may prove commercial for localised applications. Furthermore, given that Helium was also found within both the Ramsay 1 and Ramsay 2 wells, being able to extract and process both gases in small quantities may provide potential short-term commercial and / or proof of concept opportunities to help progress the Ramsay Project.

[7] "Natural Hydrogen: a new source of carbon free and renewable energy that can compete with hydrocarbons", First Break Volume 40, October 2022 (available via www.goldHydrogen.com.au/technical-articles/)
[8] February 2024, www.nobleHelium.com.au , quoting Kornbluth Helium Consulting.

Ongoing 2024 Activities

To progress the current focus area of the Ramsay project, and to further explore the balance of PEL 687, a large scale (circa 570km) regional 2D seismic project has been finalised, and is now in the process of being interpreted and analysed alongside the Company's other datasets. The objectives for the seismic program were to assist in the delineation of the potential Natural Hydrogen and Helium accumulation(s), and to support the identification of future drilling targets on the Yorke Peninsula.

Planning is also underway for further exploration activities which includes testing of additional prospective structures, and the design of a potential 3D seismic survey over the larger Ramsay area.

Important Risk Commentary

It is important to note that there remain both geological and potential development risks associated with the Ramsay Project and the Company's commercial and business objectives. These risks relate to the presence, recovery and potential volumes of both Hydrogen and Helium, but also due to the location of the resource within agricultural areas and the proximity to National Parks on both Yorke Peninsula and Kangaroo Island, requiring significant landholder and community engagement. The worldwide, Federal and South Australian Government and industry efforts to secure Hydrogen as an alternative energy source provides confidence that any technical and social concerns may be overcome.

About Gold Hydrogen

Gold Hydrogen is focused on the discovery and development of world class Natural Hydrogen and Helium gases in a potentially extensive province in South Australia. This region has recently had its Natural Hydrogen and Helium potential confirmed by the Company via its maiden drilling campaign. The domestic and global demand for Hydrogen and Helium, combined with new exploration techniques and experienced personnel, provides Gold Hydrogen with an extraordinary opportunity to define and ultimately develop a new Natural Hydrogen and Helium gas province.

The combined permit area of the Gold Hydrogen group is approximately 75,332km^2. Gold Hydrogen holds one granted exploration license (the Ramsay Project - PEL 687) and its two 100% owned subsidiary companies (White Hydrogen Australia and Byrock Resources) hold an additional seven (7) applications for Natural Hydrogen and Helium exploration within South Australia. Gold Hydrogen is also the preferred applicant for four (4) gas storage exploration licenses applications (GSELA) covering an area of 8,107km^2 within the Yorke Peninsula portion of PEL 687 in South Australia. These storage licence applications are in addition to the granted exploration licence and application licences.

The group's permit areas are characterised by low population densities, cooperative stakeholders and aspects of the natural environment suited to the exploration and development of a future Natural Hydrogen and Helium gas province. Gold Hydrogen places considerable importance on close liaison with landholders, traditional owners and all other stakeholders, and this approach has led to the grant of its key tenement PEL 687 in South Australia. The Company intends to continue to invest in these efforts.

About Interlune

Interlune, a natural resources company, has recently grant funding from the U.S. Department of Energy to pursue new technology that would separate Helium-3 from domestic Helium supplies. Notably, the proposed approach would not require the production of additional tritium, which is used for nuclear weapons and decays into Helium-3 over time. Currently, tritium decay is the only meaningful source of Helium-3 production on Earth, and it is not scalable enough to meet rising demand. Technology advancements such as this may help to ultimately establish a commercial market for Helium-3 in tandem with other technological developments expected to fuel Helium-3 demand.

About Commonwealth Fusion Systems

Commonwealth Fusion Systems is a US based company which was spun out of the Massachusetts Institute of Technology in 2018. It has raised USD2 Billion in capital with the aim of delivering an energy transition based on nuclear fusion technology.

Further Information

Further information on the Gold Hydrogen group, its projects, and its Board and Management can be found on the Company's website (www.goldhydrogen.com.au) together with a copy of the Company's Replacement Prospectus of 29 November 2022.

Gold Hydrogen also has accounts on LinkedIn and Twitter (@GHY_ASX), and copies of market releases will be emailed to all interested parties who register via info@goldhydrogen.com.au

This announcement has been authorised for release by the Managing Director.

On behalf of the Board
Karl Schlobohm
Company Secretary

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Prospective Resource Statements

The Prospective Resource Statements for Natural Hydrogen and for Helium have been included in this announcement under the approval of Mr Billy Hadi Subrata, Chief Technical Officer 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.

Forward Looking Statement / Future Performance

This announcement may contain certain forward-looking statements and opinion Forward-looking statements, including projections, forecasts and estimates, are provided as a general guide only and should not be relied on as an indication or guarantee of future performance and involve known and unknown risks, uncertainties, assumptions, contingencies and other important factors, many of which are outside the control of the Company and which are subject to change without notice and could cause the actual results, performance or achievements of the Company to be materially different from the future results, performance or achievements expressed or implied by such statements. Past performance is not necessarily a guide to future performance and no representation or warranty is made as to the likelihood of achievement or reasonableness of any forward-looking statements or other forecast. Nothing contained in this announcement, nor any information made available to you is, or and shall be relied upon as, a promise, representation, warranty or guarantee as to the past, present or the future performance of Gold Hydrogen Limited.

Figure 1. Ramsay 1 Testing the open Helium Zone – concentrations increasing as testing continues as measured from the separator (corrected for air and Nitrogen contamination)

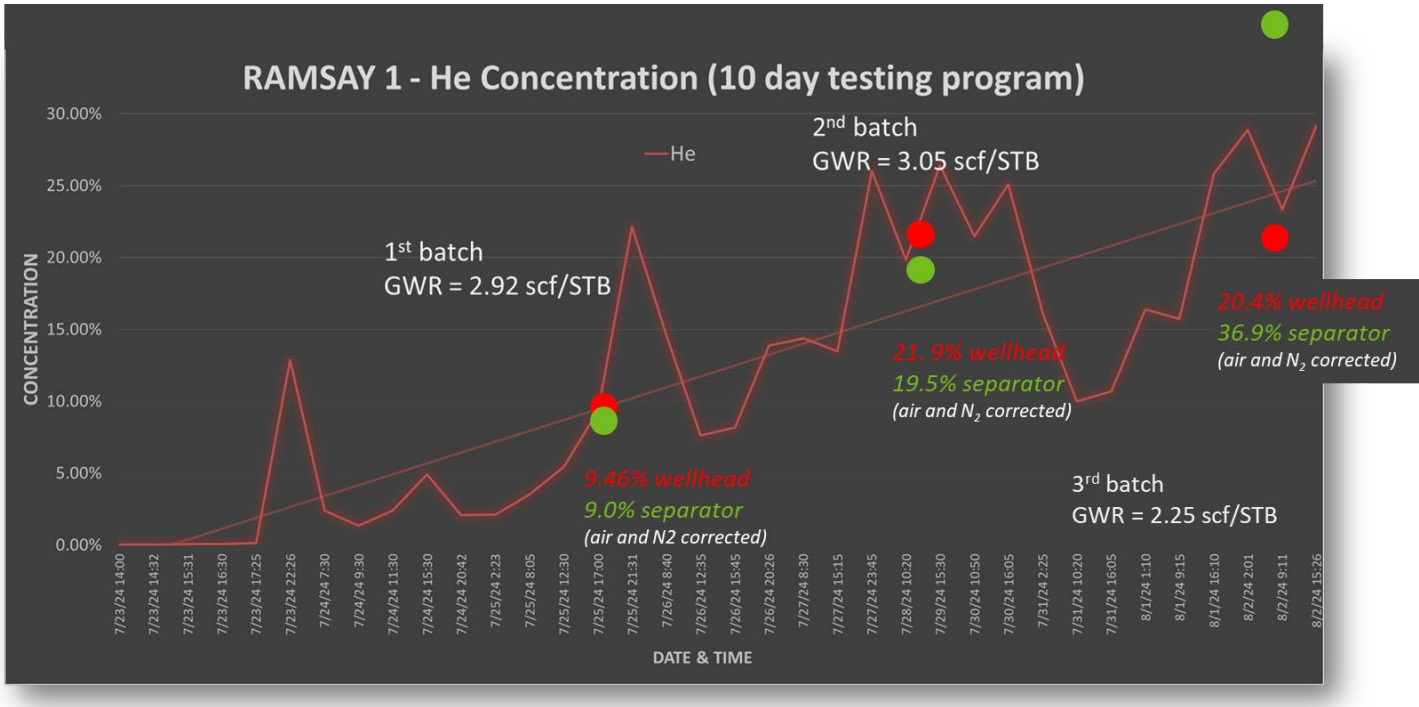

Table 1: Summary of Helium-4 (^{4}He) and Helium-3 (^{3}He) Results (Oxford University) in Ramsay 2

Name:	Ramsay 2					
Location	UTM zone 53 GDA2020					
X	747,707.85					
Y	6149385.46					
Permit	PEL687					
Entity holders	Gold Hydrogen 100%					
Zones tested	Zone 1_sample 11	Zone 2-3_sample 19	Zone 4_sample 32	Zone 5_sample 46	Zone 6_sample 62	Zone 7_sample 79
Resources	Hydrogen-Helium	Helium	Hydrogen	Hydrogen	Hydrogen	Hydrogen
Formation	Basement	Kulpara Fm	Kulpara Fm	Parara Limestone	Parara Limestone	Parara Limestone
Gross thickness and net pay thickness	>200m Gross	180m Gross	155m Gross	406m Gross	406m Gross	406m Gross
Geological rock type	Basement	Dolomite	Limestone	Limestone	Limestone	Limestone
Depth of the zones tested	1002 mMD	712mMD	530 mMD	384 mMD	343 mMD	289 mMD
Type of test	Noble gas abundance and isotopic quantification					
Phase recovered	Gas	Gas	Gas	Gas	Gas	Gas
[^{4}He], ccSTP/ccSTP ^{3}He/^{4}He R/Ra ^{3}He ppt	1.44E-07 3.23E-07 0.23 0.05	6.52E-04 9.26E-09 0.0066 6.04	4.21E-08 1.72E-06 1.2306 0.07	5.54E-07 6.84E-08 0.0489 0.04	3.05E-08 1.55E-06 1.11 0.05	1.59E-07 7.57E-07 0.5408 0.12
Flow rates, choke size, volumes recovered	**TBA**					
Fracture stimulation	Yes	None	Yes	None	None	Yes
Material non-hydrocarbons	N_2, H_2, He, CO_2	N_2, H_2, He, CO_2	N_2, H_2, He, CO_2	N_2, H_2, He, CO_2	N_2, H_2, CO, CO_2	N_2, H_2, He, CO_2

Table 2: Summary Table of Helium-4 (^{4}He) and Helium-3 (^{3}He) results (Oxford University) in Ramsay 1

Name:	**Ramsay 1**		
Location	**UTM zone 53 GDA2020**		
X	748,208.07		
Y	6149545.7		
Permit	PEL687		
Entity holders	Gold Hydrogen 100%		
Zones tested	Zone 1_sample 8	Zone 2-3_sample 109451	Zone 2-3_sample 109477
Resources	Hydrogen-Helium	Helium	Helium
Formation	Basement	Kulpara Fm	Kulpara Fm
Gross thickness and net pay thickness	>200m Gross	180m Gross	180m Gross
Geological rock type	Basement	Dolomite	Dolomite
Depth of the zones tested	970 mMD	900 mMD	900 mMD
Type of test	Noble gas abundance and isotopic quantification		
Phase recovered	Gas	Gas	Gas
[^{4}He], ccSTP/ccSTP ^{3}He/^{4}He R/Ra ^{3}He ppt	3.42E-04 9.65E-09 0.0069 3.30	5.34E-02 9.31E-09 0.0067 497.39	9.59E-02 9.39E-09 0.0067 900.51
Flow rates, choke size, volumes recovered	**TBA**		
Fracture stimulation	None	None	None
Material non-hydrocarbons	N_2, H_2, He, CO_2	N_2, H_2, He, CO_2	N_2, H_2, He, CO_2

Table 3: Sample Analysis from Ramsay 2 Well Testing for Helium (as released 17 October 2024)

Name:	Ramsay 2		
Location (UTM zone 53 GDA2020)			
X	747,707.85		
Y	6149385.46		
Permit	PEL687		
Entity holder(s)	Gold Hydrogen 100%		
Zones tested	1 (MDT)	2	3
Resources	Helium with minor Hydrogen	Helium with minor Hydrogen	Helium with minor Hydrogen
Formation	Kulpara Dolomite	Kulpara Dolomite	Kulpara Dolomite
Gross thickness and net pay thickness	180m Gross	180m Gross	180m Gross
Geological rock type	Dolomite	Dolomite	Dolomite
Depth of the zones tested	778mMD	712mMD	642mMD
Type of test	Pressure test - commingled zone test for few hours follow by overnight build up	Pressure test - commingled zone test for few hours follow by overnight build up	Pressure test - commingled zone test for few hours follow by overnight build up
Phase recovered	Water	Water	Water
Corrected H2 and He concentration in gas recovered from downhole sample	17.52% He	17.9% He	12.6% He
Flow rates, choke size, volumes recovered	Refer to Stage 2 well test	Refer to Stage 2 well test	Refer to Stage 2 well test
Fracture stimulation	None	None	None
Material non hydrocarbons	Nitrogen, Hydrogen	Nitrogen, Hydrogen	Nitrogen, Hydrogen

Table 4: Sample Analysis Table – Ramsay 1 Well – Stage 2 - Helium (as released 17 October 2024)

Name:	Ramsay 1
Location (UTM zone 53 GDA2020)	
X	748,208.07
Y	6149545.7
Permit	PEL687
Entity holders	Gold Hydrogen 100%
Zones tested	Zone 2 and 3
Resources	Helium
Formation	Kulpara Dolomite
Gross thickness and net pay thickness	180m Gross
Geological rock type	Dolomite
Depth of the zones tested	900 mMD
Type of test	Commingled pressure test
Phase recovered	Water
Corrected H2 and He concentration in gas recovered from downhole sample	36.9% He
Flow rates, choke size, volumes recovered	1 Mscf/day gas constraint by pump capacity and flow intermittently with water; choke size 20/64 inch; volumes recovered 0.55 Mscf
Fracture stimulation	None
Material non hydrocarbons	Nitrogen, Hydrogen

Table 5: Summary of Preliminary Results on Additional Helium Samples (as released 2 August 2024)

Name:	**Ramsay 2**		
Location (UTM zone 53 GDA2020)			
X	747,707.85		
Y	6149385.46		
Permit	PEL687		
Entity holders	Gold Hydrogen 100%		
Zones tested	Zone 1	Zone 2 and 3	Zone 7 and 8
Resources	Helium	Helium	Hydrogen
Formation	Granite Basement	Kulpara Dolomite	Parara Limestone
Gross thickness and net pay thickness	>200m Gross	180m Gross	406m Gross
Geological rock type	Granite	Dolomite	Limestone
Depth of the zones tested	1002mMD	712 mMD	197mMD and 289mMD
Type of test	Pressure test	Commingled pressure test	Commingled pressure test
Phase recovered	Gas/Water	Gas/Water	Gas/Water
Corrected H2 and He concentration in gas recovered from downhole sample	20% to 25% He	20% to 25% He	42% H2 (still increasing)
Flow rates, choke size, volumes recovered	TBA		
Fracture stimulation	None	None	None
Material non hydrocarbons	Nitrogen, Hydrogen	Nitrogen, Hydrogen	Nitrogen, Helium

Table 6: Prospective Resource Statement for Natural Hydrogen

Gold Hydrogen's Ramsay Project: Prospective Resources* of Hydrogen in '000 Tonnes – 30 Sept 2021									
PEL	**Prospects**	**SPE PRMS Sub-class**	**1U Low Estimate**	**2U Best Estimate**	**Mean**	**3U High Estimate**	**Pg**	**Pd**	**Pc**
PEL 687	**All Prospects and Leads**		**207**	**1,313**	**4,187**	**8,820**	**22%**	**48%**	**10%**
Yorke Peninsula									
PEL 687	Ramsay FB	Prospect	124	931	2,712	6,989	22%	50%	11%
PEL 687	Ramsay Lst	Prospect	10	70	191	492	26%	50%	13%
PEL 687	Maitland	Lead	7	26	40	92	17%	35%	6%
Kangaroo Island									
PEL 687	Navigator	Lead	34	152	280	678	19%	40%	8%
PEL 687	Kanmantoo	Prospect	32	134	237	569	25%	40%	10%

***This estimate of Natural Hydrogen Prospective Resources must be read in conjunction with the notes in the Company's ASX release of 13 January 2023.**

It should be noted that the estimated quantities of Natural Hydrogen that may potentially be recovered by the application of a future development project(s) relate to undiscovered accumulations. These estimates have both an associated risk of discovery and a risk of development. Further exploration, appraisal and evaluation is required to determine the existence of a significant quantity of potentially recoverable Natural Hydrogen.

Notes to Table 6:

1. This reserves statement presents Gold Hydrogen's Prospective Resources. Gold Hydrogen currently has no Reserves and no Contingent Resources.
2. Estimates are assessed to comply with the ASX Listing Rules for Prospective Resources and SPE-PRMS 2018 with the understanding that naturally occurring hydrogen may be considered a hydrocarbon since it has energy content and can be used stand alone and/or blended with sales gas. "U" implies Prospective Resources.
3. Per ASX Listing Rules 5.28.4 and 5.28.5 estimates are unrisked and aggregated arithmetically by category, hence caution that the aggregate low estimate may be a very conservative estimate and

the aggregate high estimate may be a very optimistic estimate due to the portfolio effects of arithmetic summation.

4. Probabilistic methods are used to prepare the estimates. The distribution of the estimates is the "full distribution" and has not been truncated by application of the MEPS (minimum economic pool size concept).
5. The Reference Point is at the wellhead/edge of lease (i.e. wellhead facilities) so the estimates have no deduction for flare, vent or fuel consumed in operations.
6. Pg (Chance of Geologic Discovery), Pd (Chance of Development) and Pc (Chance of Commerciality = Pg x Pd) are calculated as a weight average of the P50's of the H2 ('000 Tonnes) of the prospects.
7. Pg incorporates Play Risk and Prospect Risk.
8. Pd incorporates an assessment across all SPE-PRMS Commerciality Criteria (i.e. not just economics).
9. Information in the table is rounded. Some totals in the tables may not add due to rounding.
10. Gold Hydrogen owns 100% of PEL 687 which has been issued under South Australian legislation.
11. This reserves statement:
    a. is based on, and fairly represents, information and supporting documentation prepared by the qualified petroleum reserves and resources evaluators listed in note 14 below. Details of each qualified petroleum reserves and resources evaluator's employment and professional organisation membership are set out in note 14 below;
    b. has been approved by Luke Titus, who is a qualified petroleum reserves and resources evaluator and whose employment and professional organisation membership details are set out in note 14 of this reserves statement;
    c. is issued with the prior written consent of Luke Titus and Teof Rodrigues & Associates ("TRA" - involving Teof Rodrigues, Paul Strong, and Greg Horton, whose employment and professional organisation membership details are set out in note 14 of this reserves statement) as to the form and context in which the estimated Natural Hydrogen resources and the supporting information are presented.
12. There is no change to information or additional information, since the effective date of 30 September 2021, that Gold Hydrogen and TRA are aware of that would materially change the estimates in this reserves statement.
13. Gold Hydrogen engages independent experts TRA to evaluate reserves and resources.
14. Qualified Petroleum Reserves and Resources Evaluators are:

Name	**Employer**	**Professional organisation**
Luke Titus	Gold Hydrogen	SPE
Teof Rodrigues	Teof Rodrigues & Associates (TRA)	SPE, PESA
Paul Strong	Teof Rodrigues & Associates	GSL, AAPG, PESA
Greg Horton	Teof Rodrigues & Associates	SPE

Table 7: Prospective Resource Statement for Helium

Gold Hydrogen Prospective Resources* of Helium in Bcf - Ramsay Project (PEL 687 Yorke Peninsula) 21 February 2024										
PEL	**Prospects**	**SPE PRMS Sub-class**	**Formation**	**1U Low Estimate**	**2U Best Estimate**	**Mean**	**3U High Estimate**	**Pg**	**Pd**	**Pc**
PEL 687	**All Prospects**		**All Formations Total**	**7**	**41**	**96**	**243**	**17%**	**60%**	**10%**
PEL 687	**Ramsay Fault Block**	**Prospect**	Kulpara Formation	0.8	3.6	7.0	17.1	29%	60%	17%
			Winulta Formation	0.1	0.6	1.6	4.0	12%	60%	7%
			Fractured Basement	0.7	3.8	6.9	16.7	13%	60%	8%
			Total	**2**	**8**	**15**	**38**	**20%**	**60%**	**12%**
PEL 687	**South of Ramsay Fault Block**	**Prospect**	Kulpara Formation	2.1	12.8	30.5	77.6	23%	60%	14%
			Winulta Formation	0.3	2.4	7.7	19.8	8%	60%	5%
			Fractured Basement Hilbata Suite	1.6	10.3	25.5	65.2	12%	60%	7%
			Fractured Basement Yorke Peninsula Heel	1.4	7.7	17.0	42.7	12%	60%	7%
			Total	**5**	**33**	**81**	**205**	**16%**	**60%**	**10%**

***This estimate of Helium Prospective Resources must be read in conjunction with the notes in the Company's ASX release of 21 February 2024.**

It should be noted that the estimated quantities of Helioum that may potentially be recovered by the application of a future development project(s) relate to undiscovered accumulations. These estimates have both an associated risk of discovery and a risk of development. Further exploration, appraisal and evaluation is required to determine the existence of a significant quantity of potentially recoverable Helium.

Notes to Table 7

(1) This table presents Gold Hydrogen's Prospective Resources for Helium in the Ramsay Field of Yorke Peninsula only. Gold Hydrogen currently has no Reserves and no Contingent Resources.

(2) Estimates are assessed to comply with the ASX Listing Rules for Prospective Resources and SPE-PRMS 2018. SPE have provided guidance regarding the Extension of PRMS Principles to Non-Hydrocarbon/Non-Traditional Situations including Helium (and Hydrogen).
Refer: *https://www.spe.org/en/industry/reserves/non-hydrocarbons/*

(3) Per ASX LRs 5.28.4&5 estimates are unrisked and aggregated arithmetically by category, hence caution that the aggregate low estimate may be a very conservative estimate and the aggregate high estimate may be a very optimistic estimate due to the portfolio effects of arithmetic summation.

(4) Probabilistic methods are used to prepare the estimates. The distribution of the estimates is the "full distribution" and has not been truncated by application of the MEPS (minimum economic pool size) concept.

(5) The Reference Point is at the wellhead/edge of lease (ie. wellhead facilities) so the estimates have no deduction for flare, vent or fuel consumed in operations.

(6) Pg (Chance of geologic Discovery), Pd (Chance of Development) and Pc (Chance of Commerciality = Pg x Pd) are calculated as a weight average of the P50's of the Helium Bcf (Billion Cubic Feet) of the prospect formations.

(7) Pg incorporates Play Risk and Prospect Risk.

(8) Pd incorporates an assessment across all SPE-PRMS Commerciality Criteria (ie. not just economics).

(9) Information in the table and throughout the Report is rounded. Some totals in the tables may not add due to rounding.

(10) Gold Hydrogen owns 100% of PEL 687 which has been issued under South Australian legislation.

QPRRE Statement

The Prospective Resource Statement in this announcement is based on, and fairly represents, information and supporting documentation prepared by independent consultants "Teof Rodrigues & Associates" (Mr Teof Rodrigues, Mr Paul Strong and Mr Greg Horton) and Mr Billy Hadi Subrata, Chief Technical Officer for Gold Hydrogen, with an effective date of 21 February 2024.

The Prospective Resource Statement has been included in this announcement:

(1) under the approval of Mr Billy Hadi Subrata, Chief Technical Officer for Gold Hydrogen, who is a Qualified Petroleum Reserves and Resources Evaluator; and

(2) with the prior written consent of Mr Billy Hadi Subrata and "Teof Rodrigues & Associates" (Mr Teof Rodrigues, Mr Paul Strong and Mr Greg Horton) as to the form and context in which the helium prospective resource statement and supporting information are presented.

The employment and professional organisation membership details of Mr Billy Hadi Subrata, Mr Teof Rodrigues, Mr Paul Strong and Mr Greg Horton are as follows:

Name	Employer	Professional organisation
Billy Hadi Subrata	Gold Hydrogen	SPE
Teof Rodrigues	Teof Rodrigues & Associates	SPE, PESA
Paul Strong	Teof Rodrigues & Associates	GSL, AAPG, PESA
Greg Horton	Teof Rodrigues & Associates	SPE