

Quarterly Activities Report for the Period Ended 30 June 2024

GOLD HYDROGEN LTD (ASX:GHY)

Shares on Issue
159.7 million

Market Capitalisation
A\$175m (at A\$1.10 per share)

Directors
Rt Hon Alexander Downer (Chair)
Neil McDonald (Managing Director)
Roger Cressey (Executive Director)
Katherine Barnett (Non-Executive Director)

Company Secretary / CFO
Karl Schlobohm

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HIGHLIGHTS FOR THE JUNE QUARTER

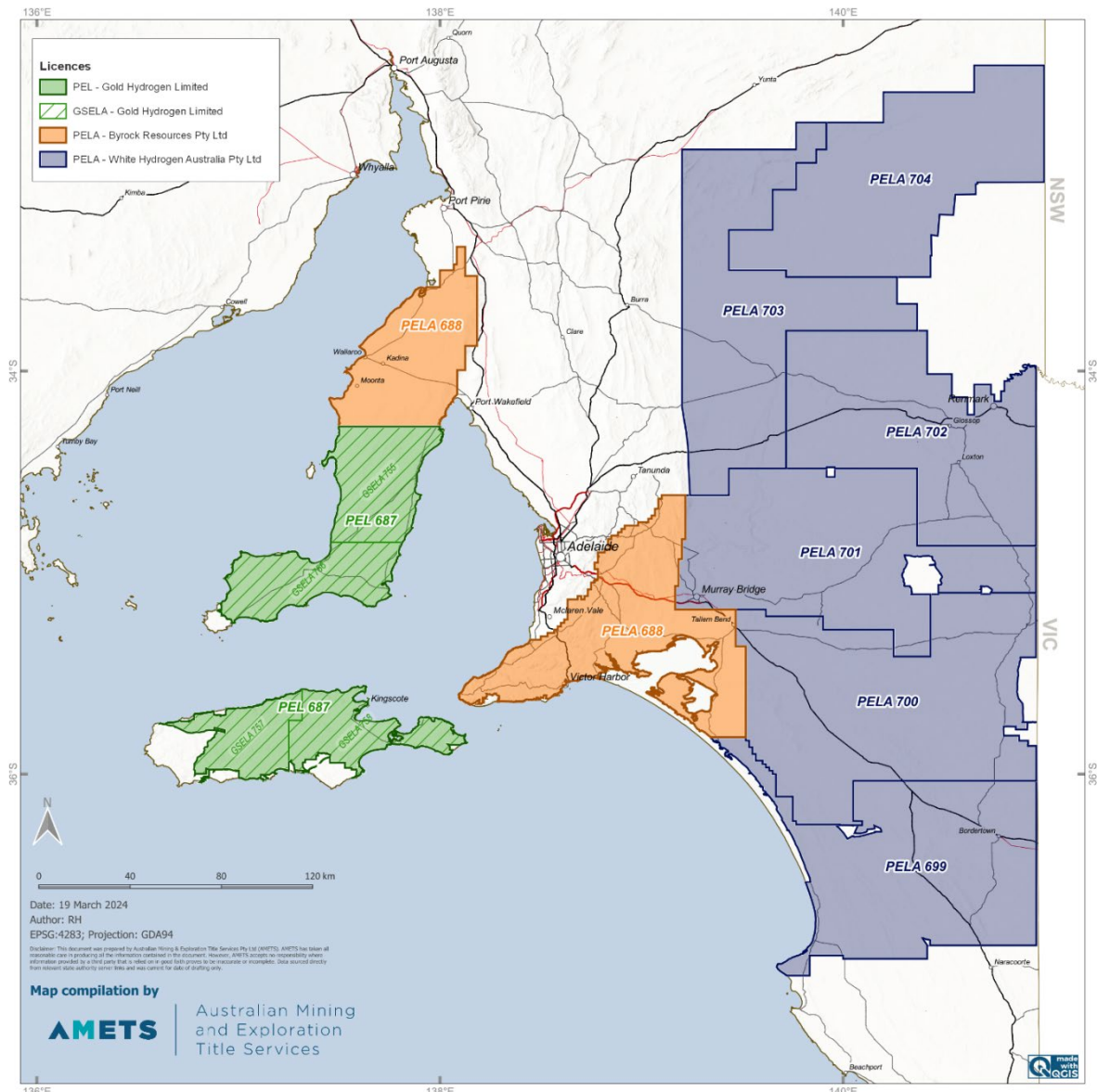
- Stage 1 of exploration well testing confirms Natural Hydrogen and Helium results encountered during drilling, with both Natural Hydrogen and Helium detected at surface.
- Natural Hydrogen levels up to 95.8% (air-corrected) encountered across 7 zones in Ramsay 2, with the highest purity result recorded at 531m depth.
- Helium levels up to 17.5% (air-corrected) encountered in Ramsay 2, with the highest purity result recorded at 777.5m.
- A 180m thick Helium pay zone was identified as part of the exploration well testing program at Ramsay 2, as outlined in Figure 2.
- Stage 2 of exploration well testing commenced after the end of the Quarter, and continues to focus on lifting formation water from each well through tubing to the surface with the intention to facilitate gas flow to surface.
- Ramsay 2D regional seismic survey commenced over the Company's flagship Ramsay Project, within PEL 687 on the Yorke Peninsula in South Australia. The survey has been conducted by Terrex, and was completed shortly after the end of the Quarter, covering approximately 570 line kilometres.
- The analysis and interpretation of the Ramsay 2D seismic survey data– together with the results from its stage 1 and stage 2 exploration well testing program – will assist the Company to optimize future drilling locations and well designs across the Yorke Peninsula.

EXPLORATION AND TECHNICAL ACTIVITIES

General Background

Gold Hydrogen is focused on the discovery and development of world class Natural Hydrogen and Helium gases in a potentially extensive and world class Natural Hydrogen and Helium province in South Australia. The domestic and global demand for Hydrogen, combined with new Natural Hydrogen exploration techniques and experienced personnel, provides Gold Hydrogen with an extraordinary opportunity to define and ultimately develop a new Natural Hydrogen gas province. Further to this, Helium is extremely rare and expensive, there is limited world-wide production and almost nil production of Helium in Australia. Gold Hydrogen is well placed to potentially prosper from this opportunity.

Figure 1 – Gold Hydrogen PEL 687 and PELA’s located in South Australia.



The combined permit area of the Gold Hydrogen group which is prospective for Natural Hydrogen and Helium is approximately 75,332km². Gold Hydrogen holds one granted petroleum exploration license (PEL 687) and its two 100% owned subsidiary companies (White Hydrogen Australia and Byrock Resources) hold an additional seven (7) applications within South Australia (refer Figure 1).

Gold Hydrogen is also the preferred applicant for four (4) gas storage exploration license applications (GSELA) covering an additional 8,107km² within the renewable energy zone of PEL 687 of the Yorke Peninsula region of South Australia. A summary of the status of the group's petroleum and storage licence tenure as at the end of the Quarter is outlined in **Appendix A**.

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

The primary objective of the Stage 1 well testing program for the Ramsay 1 and Ramsay 2 exploration wells was to obtain downhole gas and fluid samples for compositional and isotopic analysis under near reservoir conditions. Ongoing sample analysis is being undertaken by established local and international third-party laboratories. This objective has been achieved by the initial testing program, and the downhole samples are the subject of on-going technical analysis.

Secondary objectives of the program included the recovery of Natural Hydrogen and Helium at surface from reservoir fluid. This objective was achieved. Surface sampling at the well site was conducted by SGS together with Petro Lab and assistance from CSIRO. The surface samples were sent to various local and international laboratories for full gas composition and noble gas isotope analysis. Whilst a range of results have been received, some results (such as isotopic analysis) are expected to take several months to fully complete.

The results received to date have confirmed the range and quality of the gas purities encountered by the Company during the Q4, 2023 drilling campaign and as previously announced by the Company on 6 and 19 December 2023 and 25 March 2024. This includes Helium recorded at up to 17.5% purity (air corrected) from an MDT sample taken at 777.5m from the Ramsay 2 well, and up to 95.8% (air corrected) for Natural Hydrogen with the highest purity recorded at 531m in the Ramsay 2 well (**refer Table 1**). These results are believed to be amongst the highest ever recorded purities for Helium and Natural Hydrogen in the world. Stage 2 testing will be used to confirm initial indications of higher helium purity levels throughout 180m the formation to help further understand the significant helium spikes during initial testing as per the log image in **Figure 2**.

From the well testing data obtained, Gold Hydrogen is advancing its understanding of the characteristics of the Natural Hydrogen and Helium reservoirs, as well as the composition of the reservoir fluids and gasses. The data obtained will assist the Company in gaining technical insights into how the Ramsay Project area could be further explored and appraised, including future well designs and testing designs, as well as providing input for a future pilot plant / proof-of-concept plant design.

Conclusion of Stage 1 Exploration Well Testing Program

The on-site operations for the Stage 1 exploration well testing campaign for both the Ramsay 1 and Ramsay 2 wells were completed during the Quarter. Testing and sampling results received during the Quarter from both Ramsay 1 and 2 have showed consistency in results and data to those collected from the drilling program conducted by the Company in Q4, 2023. It has become apparent that the Ramsay Natural Hydrogen and Helium gas field contains two (2) distinct systems in the form of free gas and dissolved gas in water, which is a very encouraging sign.

The Ramsay 1 well test was conducted as an open hole well test to test formation inflow. Nitrogen injection was used to clean up the well and remove any fluids that remained downhole. It was found that the formation was quite permeable, as there was formation fluid influx coming into the well after the Nitrogen lift, with Natural Hydrogen recovered at surface.

The Ramsay 2 well test was very specific and detailed, as seven (7) individual zones were tested. These Natural Hydrogen and Helium zones were identified based on open hole logs and mud gas data from the DQ1000 logs recorded during the Q4, 2023 drilling campaign.

In addition, it was found that the Natural Hydrogen gas in Ramsay 2 was more concentrated in the shallow depths (i.e. above 600m), highlighting that there is a structural vertical migration pathway for Natural Hydrogen to move upwards from the basement formation, where it is likely being generated.

From the different formations tested in the Ramsay 2 well, a constant fluid influx was observed during the Stage 1 well test, indicating the permeability of the tested formations. A further reservoir engineering analysis is underway to calculate a more detailed estimate of the formation permeability and potential productivity at each particular depth.

Figure 2 - Ramsay 2 logs over the lower hydrogen and helium zone in the Kulpara Fm with perforation zones indicated targeting the spikes in the hydrogen and helium mud gas logs.

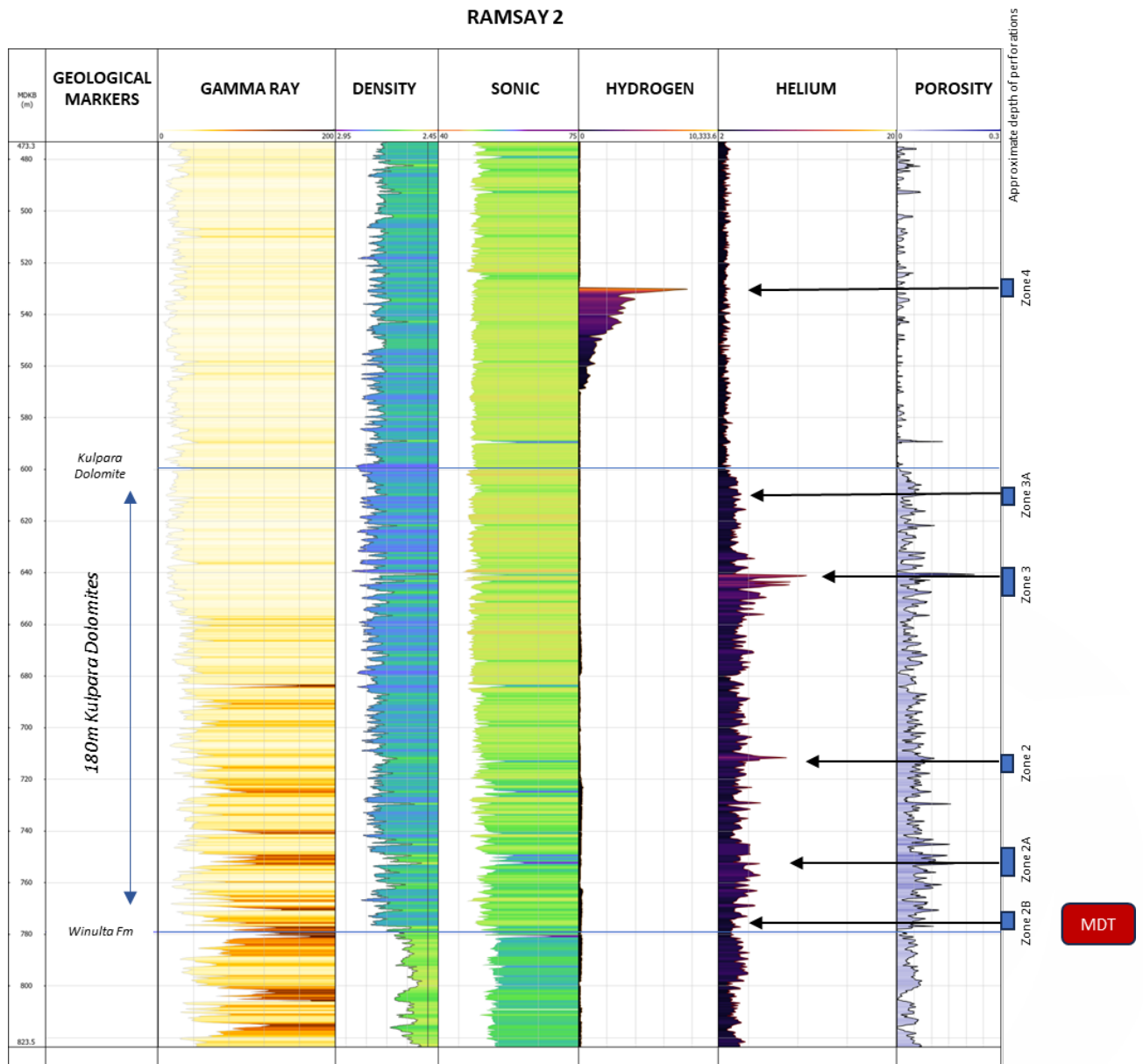


Figure 3 – Exploration Well Testing Equipment on Site at Ramsay 2



Stage 2 of Exploration Well Testing

Stage 2 of the Company’s exploration well testing program commenced after the end of the Quarter, and is currently focussed on lifting the formation water from each well through tubing to the surface with the intention to facilitate free gas flow to surface.

Commencement of 2D Seismic Survey

Seismic data acquisition was undertaken by Terrex on public roads across the Yorke Peninsula, and was completed shortly after the end of the Quarter. Analysis and interpretation of the survey data has commenced and will be carried out over a further period of approximately six (6) weeks. The survey covered approximately 570 line kilometres.

The results of the Ramsay 2D seismic survey when combined with the Company’s other data sets, such as the airborne survey data, soil-gas survey data, historical offset well data, and the Ramsay 1 & 2 drill log data and flow test data, will assist the Company in planning future well locations and well designs.

The main objectives of the acquisition of a modern regional seismic program are to assist in the delineation of Ramsay Natural Hydrogen and Helium project, identify potential other Natural Hydrogen and Helium accumulation(s), to support the identification of future drilling targets and to assist in the transition of prospective resources to contingent resources of discovered accumulations.

Figures 4A and 4B – Terrex Seismic Equipment on the Yorke Peninsula



Figure 5 – Proposed Maximum Seismic Survey Area – PEL 687 on the Yorke Peninsula



Table 1 – Ramsay 2 Natural Hydrogen and Helium Results – Stage 1 Well Testing

Name:	Ramsay 2	
Location (UTM zone 53 GDA2020)		
X	747,761.61	
Y	6149371.41	
Permit	PEL687	
Entity holders	Gold Hydrogen 100%	
Zones tested	MDT zone, Zone 2 and 3	Zone 4 to 8
Resources	Helium	Hydrogen
Formation	Kulpara Dolomite	Kulpara/Parara Limestone
Gross thickness and net pay thickness	180m Gross	406m Gross
Geological rock type	Dolomite	Limestone
Depth of the zones tested	612m, 642m, 712m, 754m, and 777.5mMD	197m, 289m, 346.5m, 385m, and 531mMD
Type of test	Commingled test on zone 2 and 3 for few hours followed by overnight build up	Pressure test on single zone for few hours followed by overnight build up
Phase recovered	Gas/Water	Gas/Water
Corrected H2 and He concentration in gas recovered from downhole sample	Up to 17.5% He	Up to 95.8% H2
Flow rates, choke size, volumes recovered	TBA in next extended flow test in Q2/Q3 2024	
Fracture stimulation	None	None
Material non hydrocarbons	Nitrogen, Hydrogen	Nitrogen, Helium

** Insufficient information is presently available to determine net pay thickness.*

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 be potentially developed over time.

There is very little data available for dedicated Natural Hydrogen wells anywhere in the world due to the lack of analogue wells. Accordingly, there is inherent uncertainty with regard to the expected outcomes of the Ramsay 1 and Ramsay 2 exploration well testing program. 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 Bourakébougou. 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.¹

Helium is extremely valuable and indicatively, longer-term bulk pricing is expected to approximate USD450 per Mcf (thousand cubic feet).²

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 Natural Hydrogen and Helium, but also due to the location of the current and potential project sites within agricultural areas and proximal to National Parks on both the 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.

Sustainable Minerals Group Pty Ltd

In 2023 Gold Hydrogen commissioned Xcalibur Multiphysics to undertake a gravity-magnetic-digital terrain geophysical survey covering ~10,529-line km over the mainland Yorke Peninsula area of PEL 687 (refer ASX releases of 21 March 2023 and 3 May 2023).

The interpretation of the airborne survey data was received by the Company in the third quarter of 2023 (refer ASX release of 9 August 2023). As well as a range of information to assist the Company with its understanding of its Natural Hydrogen and Helium plays, the data also indicated a discreet area containing a number of anomalies, indicative of potential iron-oxide, copper and / or gold mineralisation.

Accordingly, the Company incorporated a new 100% owned subsidiary, Sustainable Minerals Group Pty Ltd, and applied for a mineral exploration licence over the relevant area. In April 2024, the South Australian Department for Energy and Mining confirmed the grant of EL 6988 for a period of 6 years, with an expenditure commitment of only \$50,000 over the first 2 years. This new EL is reflected in the tenement schedule in Appendix A.

¹ "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/)

² February 2024, www.noblehelium.com.au, quoting Konbluth Consulting.

Table 2 – 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	1313	4187	8820		22%	48%	10%
Yorke Peninsula										
PEL 687	Ramsay FB	Prospect	124	931	2712	6989		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.**

The Company confirms that it is not aware of any further new information or data that materially affects the estimates of Natural Hydrogen Prospective Resources (as originally estimated on 30 September 2021), and that all material assumptions and technical parameters underpinning the estimates continue to apply and have not materially changed.

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.

Table 3 – 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 Helium 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.

FINANCIAL REPORTING

Exploration expenditures that were capitalised relate to the Company's flagship Ramsay Project (PEL 687) over the Yorke Peninsula / Kangaroo Island.

Exploration Expenditures – Item 1.2(a) of Quarterly Cashflow Report

Nature of Expenditure	Amount
Airborne and seismic surveys and sub-surface studies	\$73,470
Environmental and permitting costs	\$19,660
Native Title, land access and licence fees	\$571,336
Drilling and related activities	\$3,643,049
Total	\$4,307,515

Payments to Directors – Item 6.1 of Quarterly Cashflow Report

Payments consisted of fees paid for Executive Director and Non-Executive Director services, pursuant to written agreements and employment contracts, totalling \$262,397 for the June 2024 Quarter (although some payments made during the Quarter related to prior periods).

Reporting Against IPO Use of Funds

The Company remains on track with regard to its forecast spending and activities as outlined in its 29 November 2022 Replacement Prospectus. The amount of funds expended on exploration expenditure as originally forecast will be partially offset or supplemented via access to R&D offset funding.

Use of Funds Figures Reported Net of GST	Prospectus 2-year period	FY23 Total	Sep-23 Quarter	Dec-23 Quarter	Mar-24 Quarter	Jun-24 Quarter	Cumulative Total
Native Title, Land Access and Licence Fees	\$ 1,490,223	\$ 78,702	\$ 90,901	\$ 85,589	\$ 75,922	\$ 73,470	\$ 404,584
Environmental and Permitting Costs	\$ 690,250	\$ 192,477	\$ 364,766	\$ 46,570	\$ 26,480	\$ 19,660	\$ 649,953
Airborne and Seismic Surveys and Sub-surface Studies	\$ 2,747,320	\$ 1,678,066	\$ 69,695	\$ 462,440	\$ 135,841	\$ 571,336	\$ 2,917,377
Drilling and Related Activities	\$ 10,303,493	\$ 538,164	\$ 128,837	\$ 6,301,124	\$ 2,406,057	\$ 3,643,049	\$ 13,017,232
Less: R&D Refund Received from Australian Taxation Office	\$ -	\$ -	\$ -	\$ -	\$ (1,912,083)	\$ -	\$ (1,912,083)
Total Exploration, Field Development and Drilling Related	\$ 15,231,086	\$ 2,487,409	\$ 654,199	\$ 6,895,724	\$ 732,216	\$ 4,307,515	\$ 15,077,062
Corporate and Administrative Costs	\$ 3,523,500	\$ 1,384,533	\$ 500,719	\$ 1,364,379	\$ (328,281)	\$ 576,169	\$ 3,497,519
IPO Related Costs	\$ 1,351,129	\$ 1,052,072	\$ -	\$ -	\$ -	\$ -	\$ 1,052,072
Total Use of Funds	\$ 20,105,715	\$ 4,924,013	\$ 1,154,918	\$ 8,260,103	\$ 403,935	\$ 4,883,684	\$ 19,626,653

(a) The total gain in exploration & evaluation assets has been offset by the R&D refund amount received by the Company in accordance with Australian Accounting Standards.

(b) Approximately \$490,000 in corporate and administrative costs was offset by \$297,500 in interest received on term deposits, and approximately \$521,000 in net GST on purchases made by the Company.

This report has been authorised for release by the Board.

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QPRRE Statements

The Prospective Resource Statements for Natural Hydrogen and Helium have been included in this report 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 report, there are no changes to information or any additional information, since the effective date of each prospective resource report (refer below), that would materially change the estimates of prospective resources quoted.

QPRRE Statement – Natural Hydrogen

The Prospective Resource Statement for Natural Hydrogen in this report 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 report 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.

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.

Appendix A

Overview of the Gold Hydrogen Group's PEL, PELAs, GSELA's and EL

Permit	Project Name	Gold Hydrogen Interest	Applicant	Geologic Area & Basin	Size (km ²)	Term	Grant Date	Application Date	Expiry Date	Status	Act
PEL 687	Ramsay	100%	Gold Hydrogen Limited	Stansbury Basin & Kanmantoo Trough	7,820	5 years	22/7/21	-	21/07/26	Granted	PGEA 2000
EL 6988	Warooka	100%	Sustainable Minerals Group Pty Ltd	Stansbury Basin & Kanmantoo Trough	542	6 years	10/4/24	-	9/4/30	Granted	MA 1971
PEL(A) 688	Kanmantoo	100%	Byrock Resources Pty Ltd	Stansbury Basin & Kanmantoo Trough	9,962	5 years	-	12/5/21	-	Pending	PGEA 2000
PEL(A) 699	Robe	100%	White Hydrogen Australia Pty Ltd	Padthaway Ridge-Kanmantoo Platform & Otway Basin	9,624	5 years	-	19/7/21	-	Pending	PGEA 2000
PEL(A) 700	Padthaway	100%	White Hydrogen Australia Pty Ltd	Padthaway Ridge-Kanmantoo Platform & Troubridge Basin	9,748	5 years	-	19/7/21	-	Pending	PGEA 2000
PEL(A) 701	Troubridge	100%	White Hydrogen Australia Pty Ltd	Kanmantoo Platform & Troubridge Basin	9,750	5 years	-	19/7/21	-	Pending	PGEA 2000
PEL(A) 702	Renmark	100%	White Hydrogen Australia Pty Ltd	Kanmantoo Platform & Renmark Trough	9,563	5 years	-	19/7/21	-	Pending	PGEA 2000
PEL(A) 703	Boucat	100%	White Hydrogen Australia Pty Ltd	Kanmantoo Platform & Renmark Trough	9,015	5 years	-	3/8/22	-	Pending	PGEA 2000
PEL(A) 704	Baratta	100%	White Hydrogen Australia Pty Ltd	Kanmantoo Platform & Renmark Trough	9,850	5 years	-	19/7/21	-	Pending	PGEA 2000
GSEL(A) 755	Maitland	100%	White Hydrogen Australia Pty Ltd	Stansbury Basin	2,470	5 years	-	28/4/22	-	Pending	PGEA 2000
GSEL(A) 756	Yorke town	100%	White Hydrogen Australia Pty Ltd	Stansbury Basin	2,272	5 years	-	28/4/22	-	Pending	PGEA 2000
GSEL(A) 757	Flinders	100%	White Hydrogen Australia Pty Ltd	Kanmantoo Trough	1,780	5 years	-	28/4/22	-	Pending	PGEA 2000
GSEL(A) 758	Penneshaw	100%	White Hydrogen Australia Pty Ltd	Kanmantoo Trough	1,585	5 years	-	28/4/22	-	Pending	PGEA 2000

The only change during the Quarter was the grant of EL 6988, per the second line of the table.