27 May 2024
ASX Announcement

Ramsay Project
Stage 1 - Interim Exploration Well Testing Update

Highlights:

Completion of Stage 1 Well Testing: Interim Results for Ramsay 1 and Ramsay 2 Confirmed:

- **World-Leading Purity Levels**:
  - **Natural Hydrogen**: Purity levels up to 95.8% H2 (air corrected) across 7 zones with the highest recorded at 531m depth.
  - **Helium**: Previous air-corrected purity levels up to 17.5% He, with potential for higher purity levels to be confirmed in Stage 2 testing to help further understand the significant helium spikes during initial testing as per the log image in Annexure 1.

- **Successful Downhole Pressure Confirmation:**
  - Natural hydrogen and helium flowed to the surface, achieving the primary objective before formation water encroachment impeded further flow testing. This is a crucial result ahead of Stage 2 testing program discussed below.

- **Hydrogen Extraction Across All Tested Zones:**
  - Seven zones tested in Ramsay 2 (250m to 1000m) confirmed natural hydrogen brought to the surface, validating purity levels from Ramsay 1 and 2, as well as the original 1931 Ramsay Oil Bore results.

- **Helium Extraction from 180m Thick Pay Zone:**
  - Helium was extracted from a 180m thick pay zone in the Kulpara Dolomite section at depths from 612m to 777m in the Ramsay 2 well. This 180m zone has shown significant helium spikes during initial testing as per the log image in Annexure 1.

- **Ongoing Composition Testing and Analysis:**
    - Extensive testing and sampling in conjunction with CSIRO, SGS, and Petro Lab. Samples have been sent for specialist composition and isotopic analysis to world-leading laboratories in Australia and overseas. Further updates on technical analysis will be provided as they become available.

- **Confirmed High Permeability:**
    - Unexpectedly high permeabilities were demonstrated in the Kulpara dolomites and within fractures of the Kulpara and Parara limestones, indicating the formations are permeable and producing fluids and associated gas after a period of shut-in. This is a significant de-risking milestone for the Company.

- **Next Stage of Testing:**
    - Based on promising Stage 1 results, the Company will proceed to an extended exploration well testing program. This includes flow testing both Ramsay 1 (open hole) and Ramsay 2 (cased and perforated) to understand future well performance. Stage 2 will involve installing a downhole pump to remove formation fluid (water) while monitoring gas rates and composition at the surface. Success in this phase will help determine potential flow rates and accumulation metrics, optimize future well designs, and contribute to the design of a proof-of-concept Natural Hydrogen and Helium pilot plant. It should be noted that due to the pioneering nature of the project works to date, any further detection of free-flowing gas to surface will be highly encouraging for the future of the Ramsay Project, bearing in mind that future wells are likely to be drilled in more optimal locations.

Gold Hydrogen Managing Director, Neil McDonald said: *"To specifically test 7 zones in Ramsay 2 from 200m to 1000m and to have confirmed Natural Hydrogen can be extracted to the surface from all 7 zones, plus confirming that Helium can be extracted to surface from a 180m gross thick pay zone, is a remarkable result. These results are believed to be amongst the highest ever recorded purities in the world for Helium at 17.5% (air corrected) and for Natural Hydrogen at 95.8% (air corrected).*

We look forward to finalising our detailed plans and our contractual arrangements for Stage 2 exploration well testing to commence early third quarter 2024. We are well on the journey of aspiring to produce both Natural Hydrogen and Helium at commercial levels as we ultimately progress. We have very large prospective resources for both gases, and that is only over a portion of the Ramsay Project permit."

Detailed Discussion:

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.

Overview of well Exploration 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 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 initial stage of the well testing program included the recovery of Natural Hydrogen and Helium at surface from reservoir fluid. This objective was achieved by the stage 1 testing program. Surface sampling at the well site was conducted by SGS together with Petro Lab and assistance from CSIRO. The surface samples have been sent to various local and international laboratories for full gas composition and noble gas isotope analysis. Whilst a range of results have now 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 778m 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 Annexure B). 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 Annexure 1.

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 have been concluded. Testing and sampling results received to date 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 MD), 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 now underway to calculate a more detailed estimate of the formation permeability and potential productivity at each particular depth.

Future Activities

Stage 1 of the well testing program has been a successful building block for the determination of the Company's shorter and longer term future activities. Gold Hydrogen is now planning to proceed with Stage 2 of its exploration well testing program, which will involve the mobilisation of existing specialised equipment to lift the water from each well via a downhole pump, allowing the water to flow into the tubing, to facilitate free gas flow to surface via the annulus. The gases from both the formation fluid and the annulus will be recombined downstream of a separator, with combined volume and flow rate measurement.

Accordingly, if successful, the Stage 2 testing program will assist with the determination of potential flow rates and accumulation metrics. However, it should be noted that due to the pioneering nature of the project works to date, any detection of further free-flowing gas to surface will be highly encouraging for the future of the Ramsay Project, bearing in mind that future wells are likely to be drilled in more optimal locations. Further, this information will assist with the optimization of future well designs, and also feed into the design of a future proof-of-concept Natural Hydrogen and Helium pilot plant.

Groundbreaking Exploration Testing for Both Natural Hydrogen and Helium

This well testing program is 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 be the start of an exciting journey, which is not dissimilar to that undertaken by various world-renowned and ultimately successful oil and gas projects, like 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 our 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 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 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.[1]

Helium is extremely valuable and indicatively, longer-term bulk pricing is expected to approximate USD$450 or AUD$675 per Mcf (thousand cubic feet).[2]

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.

[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.

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 regional 2D seismic acquisition project has now been contracted to commence in June 2024, and which is expected to take weeks for acquisition. The objectives for the seismic program are 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 drilling activities later in the year.

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.

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

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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.

Table 1 – 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.

QPRRE Statement – Natural Hydrogen

The Prospective Resource Statement for Natural Hydrogen 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 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.

Table 2 – 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.**

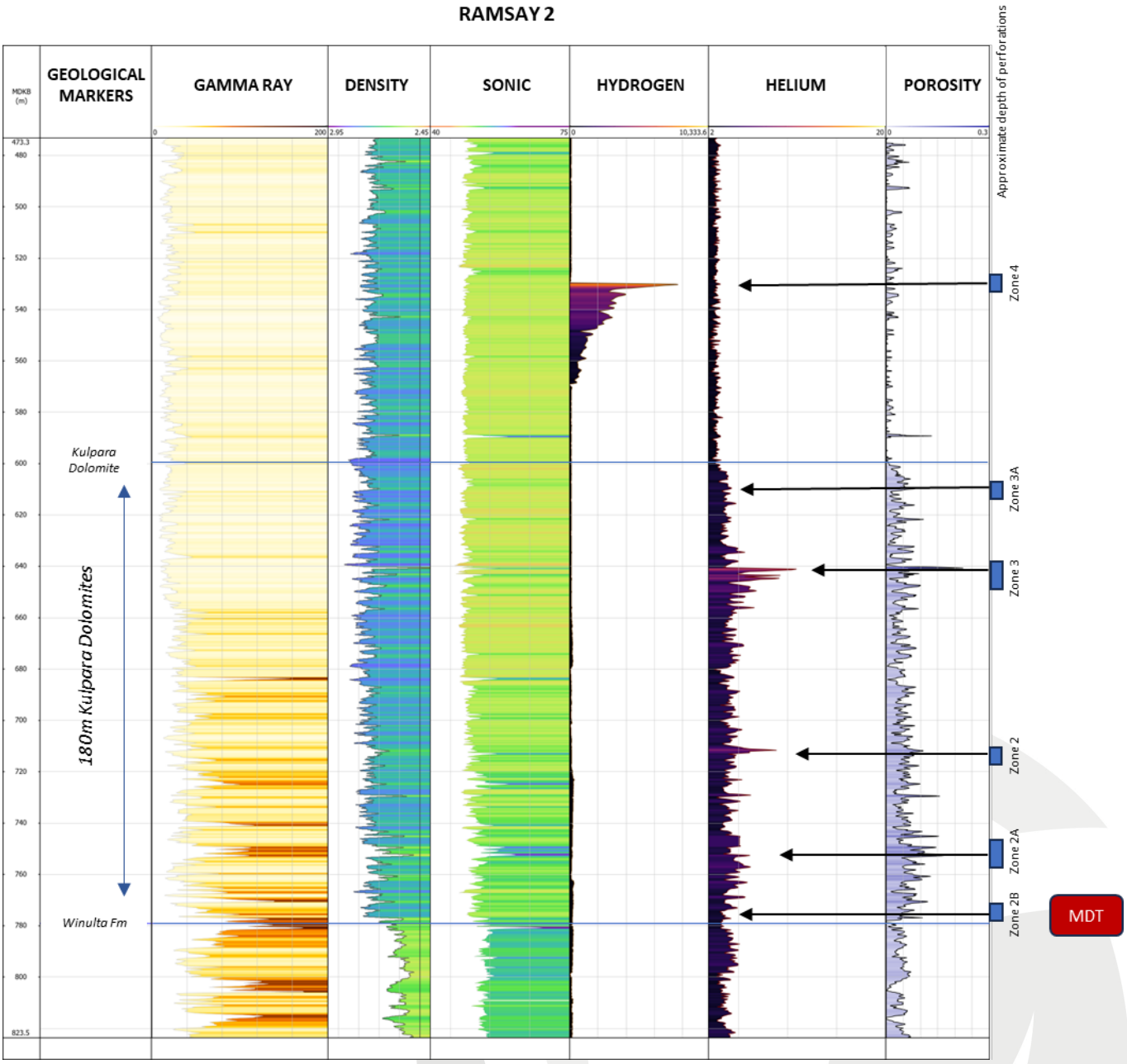
It should be noted that the estimated quantities of Helium that may potentially be recovered by the application of a future development project(s) relate to undiscovered accumulations. These estimates have both an associated risk of discovery and a risk of development. Further exploration, appraisal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

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.

Annexure A

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



Annexure B

Summary Table of Ramsay 2 Stage 1 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