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SUCCESSFUL PROOF OF HAZER PROCESS USING AN ALTERNATE REACTOR

- **Successful demonstration of Hazer process using an alternate reactor at pilot plant scale**
- **Average graphite + hydrogen production rates of ca. 7.5 kg/day achieved**
- **Highest production rates of the Hazer Process to date marking a significant milestone**
- **Reactor provides an alternative scale-up option to accelerate Hazer's commercialisation path**
- **Potential commercial scale application using existing off-the-shelf equipment.**

PERTH, AUSTRALIA 27th June 2018: Hazer Group Limited ("Hazer" (ASX:HZR)) is pleased to announce it has successfully produced graphite and hydrogen in a Rotary Tube Reactor (RTR), providing another potential pathway to commercialise the Hazer Process.

The successful demonstration was undertaken at a US based commercial scale equipment supplier on a toll basis, with the Hazer process tested using an existing off-the-shelf reactor configuration that is in common use across various commercial scale industries. The test facilities are purpose built to demonstrate proof of concept and generate test data required for further scale-up.

Over the course of testing, an average production rate of ca. 7.5 kg/day (unpurified graphite + hydrogen content) was achieved. This marks the largest daily production rate of the Hazer Process to date, and provides an alternative scale-up option to accelerate the company's pathway to a commercial sized plant.

There are some operating condition and flexibility constraints with this reactor and a larger number of reactors needed for a given production capacity compared to the Fluid Bed Reactor, however initial tests demonstrated promising hydrogen and graphite purity which may have superior advantages for certain cases.

Hazer Group acting CEO, Mark Edwards said: "This proof of concept demonstration using an alternate reactor demonstrates the flexibility of our technology. The very positive outcomes enhance and diversify Hazer's technology application portfolio and provide increased optionality to support development of different business case opportunities that target specific process integration scenarios".

The below diagram shows a summary development path of the different reactor technologies.

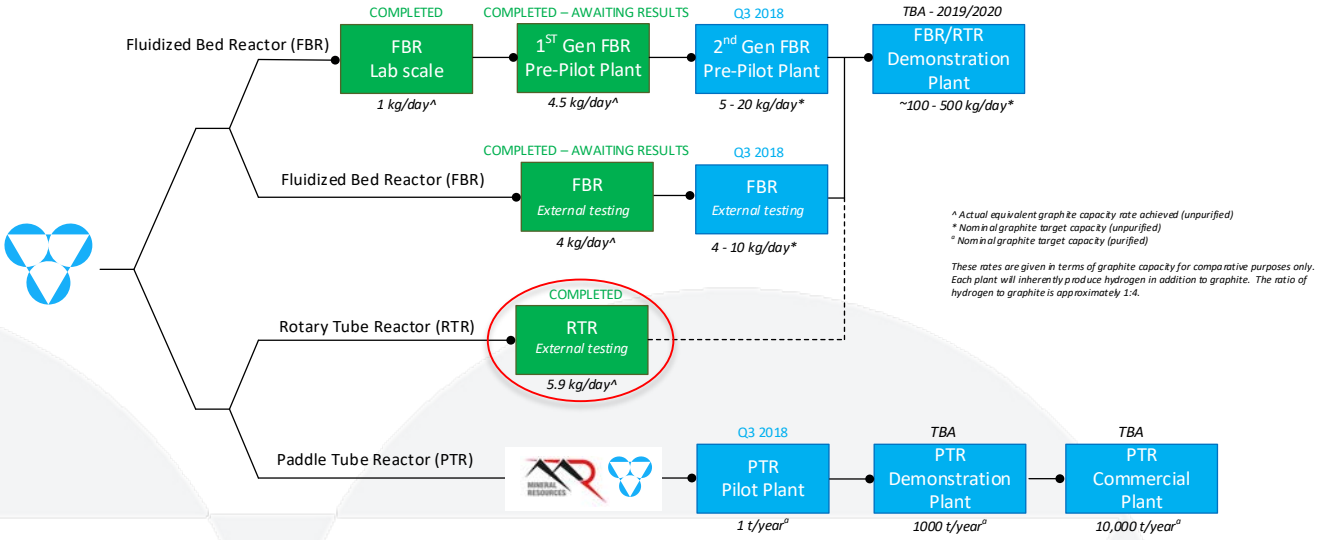


Figure: The RTR (circled in red) contributes to the overall development of a commercial pathway.

PROOF OF CONCEPT TESTING:

The RTR reactor system is based on moving bed reactor technology, using a mechanical device for mixing. The reactor design makes use of off-the-shelf equipment configurations that are in common use across various commercial scale industries, and can include for on-line catalyst addition and graphite product removal, with the anticipated ability to operate in a sequential-batch or fully continuous mode at commercial scale.

Multiple trials over a week were performed at various reaction conditions, with no operational upsets. Progressive improvements were made in production capacities, product yields and graphite quality throughout the planned test schedule (see below). Based on this preliminary test work, system configuration and design improvement opportunities have already been identified.

GRAPHITE PURITY:

The graphite product harvested directly from the reactor, prior to purification, showed non-optimised purity levels of ca. 84%, based on Thermo-Gravimetric Analyses (TGA) of the product. X-Ray Diffraction (XRD) analyses (below) of the graphite also confirm the highly graphitic nature of the raw graphite material.

These initial purity levels are extremely encouraging, given that Hazer has previously demonstrated the production of both 99% and 99.95% purity graphite from raw 86% graphite.

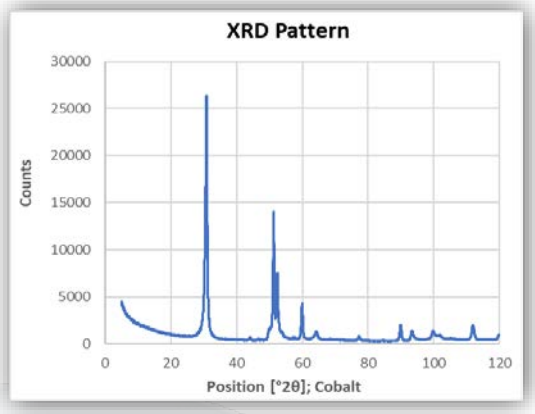


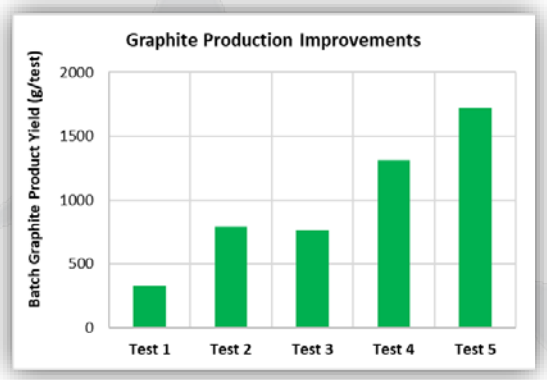
Figure: Graphite product unloaded from the reactor (left) and XRD analyses confirming the graphitic nature of the product (right).

PRODUCTION RATES:

Average production rates of ca. 7.5 kg/day, equating to 5.9 kg/d, 84 m% graphite product and 1.6 kg/d hydrogen content production, were achieved.

Production rates were confirmed through physical weight measurement of the graphite products and the calculation of hydrogen production rates from gas analyses and reaction stoichiometry of the reactor's product gas. Average production rates are reported with reference to cumulative production over the duration of synthesis testing periods.

In the course of testing, progressive increases in production (totalling a >500 % increase from the first to the last test) were attained using the same equipment (see below). Potential for further production intensity improvements have also been identified.



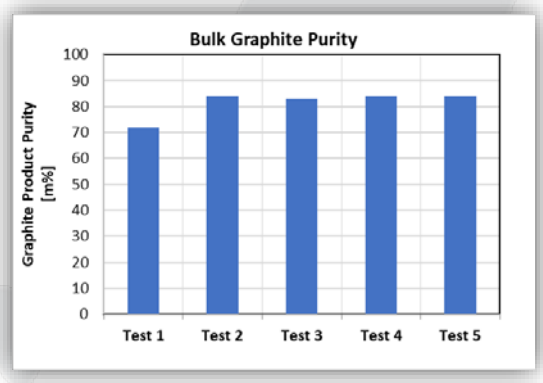


Figure: Graphite production improvements (left) and Graphite product purities achieved (right) over the course of the test program.

The demonstrated production rate is at a scale similar to that proposed for Hazer's 2nd generation Pre-Pilot Plant reactor system currently under construction. This allows for comparative evaluation of the two reactor systems' performances, with a view to illustrate specific benefits associated in specific process integration scenarios.

Based on typical current commercial scale implementation of RTR reactor systems and linear extrapolation of current production results, each commercial scale reactor could potentially produce between 60 and 450 tonnes of total products per annum, depending on selected reactor size and business case requirements. This would equate to approximately 95 tonnes of un-purified hydrogen and 355 tonnes of 84 m% graphite per annum, per reactor.

METHANE CONVERSION AND HYDROGEN PRODUCTION:

Gas analyses confirmed achievement of the targeted methane conversion at > 45 %, with a resultant, hydrogen purity of > 60 vol.%.

This conversion level was specifically targeted and could be achieved as a "per pass" conversion, i.e. without the need to recycle gas back to the reactor and is suitable for direct hydrogen purification using standard off-the-shelf gas purification processes such as Pressure Swing Adsorption (PSA) technology

APPLICATION OF ALTERNATE REACTOR:

This trial has provided further reference data and understanding of the Hazer process and is an alternative potential reactor system that will be assessed against Hazer's Pre-Pilot Plant fluidised bed reactor technology and the Pilot Plant reactor technology being developed in conjunction with MRL.

Further development of this reactor system will be considered once the comparative economic benefits and performance of each reactor system is determined.

This trial has also provided some larger quantities of sample graphite that may be used for application testing.

[ENDS]

ABOUT HAZER GROUP LTD

Hazer Group Limited ("Hazer" or "The Company") is an ASX-listed technology development company undertaking the commercialisation of the Hazer Process, a low-emission hydrogen and graphite production process. The Hazer Process enables the effective conversion of natural gas and similar feedstocks, into hydrogen and high quality graphite, using iron ore as a process catalyst.

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