GREEN CRITICAL MINERALS

ACQUISITION OF ADVANCED GROUNDBREAKING GRAPHITE TECHNOLOGY TO PRODUCE SALEABLE VHD GRAPHITE BLOCKS

- Acquisition of advanced technology which converts graphite into saleable very high-density graphite blocks (‘**VHD Graphite’**) which can be used in a wide variety of applications, including:
  - **Materials for the defence and nuclear industries;**
  - **Electrical Discharge Machining (‘EDM’);**
  - **Thermal Energy Storage (‘TES’) systems**;
  - **High performance electronics;**
  - **Aerospace;**
  - **Semiconductors; and**
  - **Heat sink appliances / parts.**
- Provides GCM the opportunity to expand its product suite further downstream and into the industrial and electronics market, with an **estimated annual value in excess of US$680 billion[1].**
- The proprietary technology**, invented by world renowned and leading Materials and Engineering Scientist Professor Charles Sorrell and team from the University of New South Wales** (‘**UNSW**’) has been proven to produce VHD Graphite blocks with industry leading **material properties, some of which have never been achieved in commercial graphite production.**
- **VHD Graphite has amongst the highest thermal conductivity ever recorded for any bulk material[2], reaching 617 W/m·K** along the grain, making it an exceptional material for heat management applications such as solar-thermal systems, nuclear reactors, and high-performance electronics.

[1] Lone Star Technical Minerals, 2024, Yahoo Finance October 2024.
[2] Determined from literature review conducted by leading materials and engineering scientists from the University of NSW under the guidance of Professor Charles Sorrell.

- **Electrical resistivity**—measured at **1.2 µΩ·m** along the grain—**is the lowest value ever recorded for any bulk graphite yet produced[3].** This positions VHD Graphite as an ideal material for **battery electrodes** and **fuel cells**, where the goal is to minimise resistance and maximise the flow of electrical current.

- Importantly, the proprietary production process **does not require any specialised infrastructure or complex manufacturing techniques** and is a potential disruptor to the high value graphite shape and block market.

- The manufacturing process can **produce graphite products in 24-36 hours using lower graphitisation temperatures**, compared to traditional synthetic graphite production which requires **up to 12 weeks of processing at extremely high graphitisation temperatures**.

- VHD Graphite's properties are superior or comparable to those of nuclear and pyrolytic graphite, which can sell for over US$1,000/kg in premium markets. This makes VHD Graphite **highly competitive in high-value applications where performance is critical, with the potential of disrupting** the pyrolytic and nuclear graphite markets, due to its outstanding thermal conductivity and low electrical resistivity, combined with the cost advantages of its proprietary, energy-efficient manufacturing process.

- The technology acquisition has been made on exceptional terms, with no upfront consideration by GCM. The vendor's confidence in the product is demonstrated by the deferred payment structure, where **consideration will only be due after GCM achieves key revenue milestones of $5mil, $20mil & $50mil of gross revenue respectively**.

- GCM plans to move VHD Graphite into production within the next 12 months, leveraging its proprietary technology to quickly capitalise on its market potential. This timeline highlights the simplicity and low cost to bring this technology into commercialisation.

Green Critical Minerals Ltd ('GCM' or 'the Company') a mineral exploration and development company which holds earn-in rights for up to 80% of the McIntosh Graphite Project (see announcement on 15 June 2022) and a 100% interest in its Boulia, Glencoe and North Barkly tenements is pleased to announce it is it has entered into a binding technology purchase agreement with Cerex Pty Ltd (**'Cerex'),** an unrelated party, which will see it acquire 100% rights to a late-stage graphite technology which produces saleable graphite blocks from graphite powder.

[3] Determined from literature review conducted by leading materials and engineering scientists from the University of NSW under the guidance of Professor Charles Sorrell.

This technology mixes graphite with pre-cursors and heating, resulting in very high-density graphite blocks ('**VHD Graphite**') which can be used in a wide variety of applications.

Given the unique properties of VHD Graphite it is expected that the final product will be able to be produced in a mould, allowing a large variety of graphite shapes and blocks to be manufactured. This will be a revolutionary step for the graphite industry, providing a significant competitive advantage for this graphite technology.

GCM Managing Director Clinton Booth commented *"The acquisition of this VHD Graphite technology represents a significant milestone for GCM, aligned with our strategy to move to revenue generating operations expediently through opportunities where we have a significant competitive advantage. This technology is at an advanced stage of product development and is ready to move to demonstration level, with the potential for near term commercialisation, coupled with significant upside through further R&D to the premium graphite markets like high performance electronics, semiconductors, heat sinks, electrical discharge machining and the defence and nuclear industries, leveraging VHD's incredible properties which are better or comparable to Pyrolytic graphite properties."*

"*We believe this technology will potentially revolutionise the graphite market, with the ability to produce VHD Graphite at a fraction of the cost of pyrolytic graphite, providing GCM a significant competitive advantage. We are extremely pleased to have concluded this agreement, which has been achieved on the back of an extended engagement with the inventor and made possible due to the shared vision of both the inventor and GCM to bring new and innovative products to market, and to support global decarbonisation efforts.*"

With the acquisition of the groundbreaking VHD Graphite technology, GCM is positioned to make significant strides in the global market for graphite-based products. This breakthrough technology, developed by leading researchers at the UNSW represents a quantum leap in both the properties and applications of graphite. It offers unique performance characteristics that have the potential to transform high-value industries, from **semiconductors** to **heat management systems** to **industrial energy storage** to **EDM** to **batteries and fuel cells** and to **nuclear**.

Figure 1 - VHD Graphite Block Produced from the Proprietary Cerex Inventor Process

INTRODUCING VHD GRAPHITE: A GAME-CHANGING MATERIAL

What makes VHD Graphite so revolutionary? The answer lies in its unique **microstructure** and **production process**. Unlike conventional graphite, which tends to be porous, isotropic, and laden with impurities, VHD Graphite is designed from the ground up to achieve optimal performance across multiple key areas.

Developed through a **self-assembly process**, VHD Graphite exhibits unparaleled **density, alignment, and purity**—of which some qualities that have never before been achieved in commercial primary synthetic graphite production.

VHD Graphite is not just another form of carbon. It represents a new class of material with properties that are tailor-made for high-value applications. For instance, its **thermal conductivity** is the highest ever recorded for any bulk material, reaching **617 W/m·K** along the grain. This far exceeds the thermal conductivity of conventional iso-mould or extruded synthetic graphite and even outperforms materials like copper, traditionally known for their heat management properties.

Meanwhile, its **electrical resistivity**—measured at **1.2 μΩ·m** along the grain—is the lowest of any bulk graphite ever produced. Such anisotropic properties make VHD Graphite ideal for applications that require both high electrical conductivity and thermal insulation, such as in high performance **heat sinks for electronics and automotive applications** or **battery electrodes**.

Record-Breaking Thermal Conductivity for Maximum Heat Dissipation

One of the most critical properties of any heat sink material is its thermal conductivity, which determines how quickly and efficiently it can **absorb and transfer heat away** from the source. The thermal conductivity of a material is measured in **watts per meter per kelvin (W/m·K)**, indicating how well heat moves through the material.

VHD Graphite's thermal conductivity measuring at an astounding **617 W/m·K** along the grain, makes it the **most efficient bulk material** for heat transfer in heat sinks. By comparison:

- **Copper**, traditionally considered an excellent conductor, has a thermal conductivity circa **400 W/m·K**.
- **Aluminium**, another commonly used material for heat sinks, has a thermal conductivity of **205 W/m·K**.
- **Conventional synthetic iso-moulded graphite** typically achieves only **100-200 W/m·K**, less than a third the thermal conductivity of VHD Graphite.

This significant advantage in **heat transfer efficiency** allows VHD Graphite to **dissipate heat faster and more effectively**, preventing **thermal buildup** in critical components like **microprocessors**, **high-performance computing units**, **high-performance heat sinks** and **power electronics**.

For high value industries where dealing with **intensive thermal loads** is critical, this makes VHD Graphite a compelling material of choice for designing **next-generation heat sinks**, at a crucial time with the rapid adoption of AI, machine learning, quantum computing and the subsequent expansion of data centres globally demanding more advanced **thermal management solutions** for better processing abilities.

HOW VHD GRAPHITE IS MADE: EFFICIENCY AND INNOVATION

VHD Graphite is not only superior in terms of its properties—it is also far more efficient to produce than conventional graphite. Traditional synthetic graphite production requires up to **12 weeks** of processing at extremely high temperatures (up to **2900°C**), making it energy-intensive and expensive.

In contrast, VHD Graphite can be produced in just **24-36 hours** at significantly lower temperatures. This reduction in processing time and energy consumption translates to major manufacturing cost and emission competitive advantages, relative to premium graphite, such as pyrolytic graphite, which sells for US$1,000/kg.

Moreover, the production of VHD Graphite does not require any specialised infrastructure or complex manufacturing techniques. This offers the potential for scale and global expansion as demand for high-performance materials continues to grow in industries like **high-performance electronics, semiconductors, renewable energy**, and **electric vehicles**.

Key Properties of VHD Graphite

To appreciate the full value of VHD Graphite, it's essential to understand its core properties[4]:

- **Thermal Conductivity**: The highest of any bulk material[1], with **617 W/m·K** along the grain, making it ideal for heat management applications such as **solar-thermal systems**, **nuclear reactors**, and **high-performance electronics**.
- **Electrical Conductivity**: Exceptionally low resistivity of **1.2 µΩ·m** along the grain[1], making it highly efficient for use in **batteries**, **fuel cells**, and **electrodes**.
- **Density**: Bulk density of **2050 kg/m³**, significantly higher than conventional graphite, which increases its durability and performance in high-stress environments.
- **Purity**: Achieves **99%+ purity**, far exceeding typical graphite products, which are often contaminated with additives that degrade performance.
- **Anisotropy**: Highly directional properties, with thermal and electrical conductivity varying by a factor of **50x** depending on the orientation. This allows for precise engineering of components that require both **conductive** and **insulating** capabilities.
- **Net-Shape Forming**: VHD Graphite's **net-shape forming** allows for production into precise, ready-to-use components with minimal machining, reducing material waste and lowering production costs.

All of these attributes were studied in detail over several years by acquiring a large range of commercial graphite and subjecting them to identical testing. This work was performed under the supervision of Professor Charles Sorrell at the UNSW. The outcomes are in Appendix 1 Comparison of the Properties of Various Graphite Types.

These properties set VHD Graphite apart from anything currently available on the market, and they provide the potential to open up a range of exciting commercial applications as discussed above.

Applications With Immediate Market Potential

VHD Graphite's properties make it uniquely suited for a variety of **high-growth, large industries which are projected to exceed US$2.1 trillion by 2030**[4]. Below are some of the most promising applications which we see VHD Graphite has the potential to disrupt:

1. Heat Sinks and Thermal Management in Electronics

As electronic devices become more powerful, the need for efficient **thermal management** is paramount. Overheating can reduce the lifespan of electronics and compromise their performance. VHD Graphite, with its record-breaking thermal conductivity, and 100% structural alignment (enabling directional and efficient funneling of heat), and machinability can be used as **heat sink** material in **high-performance computing**, **semiconductors, data centres**, **AI,** and **consumer electronics**. Its ability to rapidly dissipate heat makes it an attractive solution for industries that require **high-efficiency cooling**. VHD Graphite heat sinks afford for smaller heat assemblies due to its high efficiency thermal performance

Figure 2 - Example of Commercial Graphite Heat Sink

2. Solar-Thermal Energy Storage

Another area of immense potential for VHD Graphite is **solar-thermal energy storage**. Solar-thermal systems convert sunlight into heat, which can then be stored and converted into electricity. One of the main challenges in this field has been finding materials that can efficiently store and release heat without significant losses. VHD Graphite solves this problem with its **high heat capacity** and **thermal conductivity**, allowing it to store **12-20% more heat** than conventional graphite and transmit heat up to **13 times faster**.

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[4] Lone Star Technical Minerals / Yahoo Finance 2024

In an era where governments and corporations are increasingly focused on **decarbonising energy grids**, VHD Graphite could become a critical component in the rollout of large-scale **solar-thermal plants**, helping to make renewable energy more reliable and cost-effective.

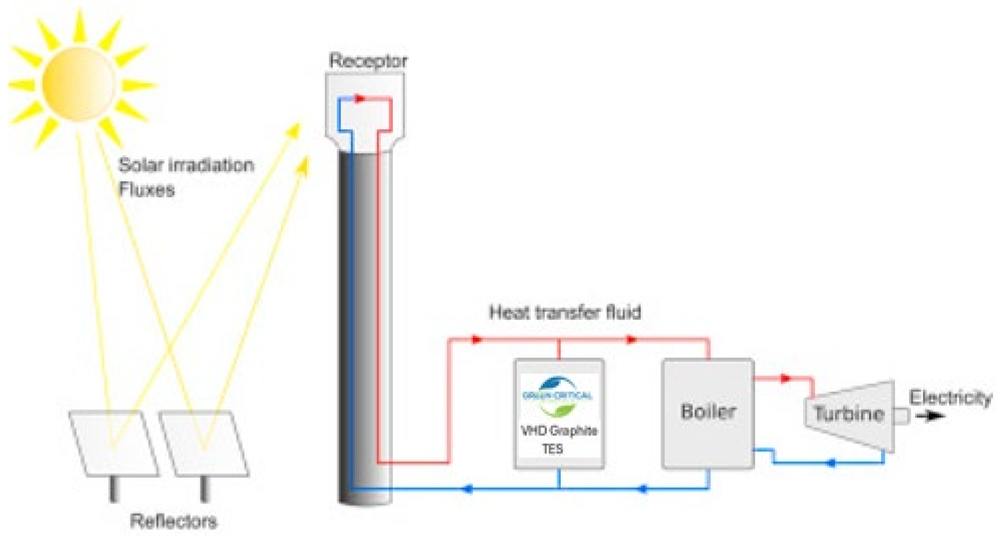

Figure 3 Example of Solar-Thermal Energy System

3. Batteries and Fuel Cells

As the world transitions toward a clean energy future, the demand for advanced **battery technologies** has never been higher. VHD Graphite's superior electrical conductivity and low resistivity make it the ideal material for **lithium-ion battery electrodes**, where performance and efficiency are critical. Its ability to store energy efficiently also positions it as a front-runner for use in **fuel cells**, where energy density and power output are key factors.

The global battery market demand is projected to grow at a CAGR of 9.0% from 2023 levels and **exceed US$3.9 billion by 2030**[5], driven by the rise of **electric vehicles (EVs)** and the growing need for **grid-scale energy storage** and **AI technologies**. As battery manufacturers seek to improve the performance and lifespan of their products, the incorporation of VHD Graphite could provide them with the edge they need to stay competitive.

4. Industrial Applications: Smelting and Metal Casting

In heavy industries such as **aluminium and steel smelting**, materials are exposed to extreme temperatures and mechanical stress. VHD Graphite's unmatched thermal conductivity, low electrical resistivity and short manufacturing time, and more cost-effective and energy-efficient manufacturing process make it potentially a lower cost and high quality alternative to traditional synthetic graphite in such industries. In addition to its economic and environmental advantages, the high density, low porosity, and resistance to oxidation of VHD Graphite make it potentially

[5] Wood Mackenzie, 2024

a viable competitor to existing graphite **electrodes, crucibles** and **casting moulds**, a market where graphite electrodes alone are forecast to **exceed US$3.9 billion by 2023**[6]**.**

A Growing Market for High-Performance Graphite

The potential market for VHD Graphite spans multiple high-growth industries. As the world continues to move towards **electrification**, **AI centres**, **renewable energy**, and **advanced manufacturing**, the demand for graphite materials that offer superior thermal and electrical properties will only increase. GCM's acquisition of this technology positions it at the forefront of new and potentially disruptive technologies.

Material	Thermal Conductivity (W/m·K)	Comments
Diamond (Natural)	2200	Exceptional but impractical for large-scale applications due to high cost and sourcing issues
Pyrolytic Graphite (anisotropic)	**Up to 1000**	Highly conductive but very expensive to produce
VHD Graphite (anisotropic)	**617**	**Record-breaking for bulk graphite, ideal for high-performance thermal applications**
Silver	430	Highly conductive but expensive and heavy
Copper	400	Excellent thermal conductor, widely used in heat sinks, but heavier and more expensive
Aluminium	205	Common in heat sinks due to its lightweight properties, though less conductive than copper
Silicon Carbide	120-270	Used in high-temperature applications but lower conductivity than VHD Graphite
Graphite (isotropic)	100-200	Conventional graphite with lower thermal performance than VHD Graphite
Tungsten	170	Dense and expensive, used in specific high-temperature applications
Magnesium	160	Used in some lightweight heat sinks but has lower thermal conductivity than aluminium or copper
Silicon	150	Used in electronics, but less conductive than graphite or metals like copper

Table 1 - Comparison of Thermal Conductivity in Bulk Materials for Thermal Management[7]

[6] Wood Mackenzie, 2024.
[7] Table compiled from research conducted by GCM

Key Insights:

- **VHD Graphite** outperforms **copper**, **aluminium**, and other common materials in **thermal conductivity**, which makes it ideal for **next-generation heat sinks** and other **high-heat dissipation applications**.
- **Natural Diamond** (non-bulk material) has the highest thermal conductivity of any known material, but its **cost**, **size** and **limited availability** make it impractical for most commercial and industrial uses.
- **Metals like copper and silver** are frequently used for thermal management but are heavier, more expensive, and still less thermally conductive than VHD Graphite.

Acquisition Summary

With the acquisition of this **advanced graphite technology**, GCM sets itself apart from other block or shape graphite developers, seeking to generate revenue from block, shapes, and rod graphite sales by **bypassing the complexities of mining**, moving directly towards the commercialisation of **high-value VHD graphite blocks** at a low commercialisation cost from a proven technology.

The key terms of the acquisition are presented in Appendix 2 Technology Acquisition Deal Terms.

Notwithstanding the proposed acquisition, GCM will continue to be a mineral exploration and development company after entering into the proposed transaction.

Next Steps

Customer Adaption

GCM will explore the potential simplicity and adaptability of the manufacturing process, demonstrating and confirming the ability to cost effectively manufacture graphite products to specific customer requirements or specifications e.g. shape, thermal conductivity, electrical resistivity, flexural strength, tensile strength, etc. With this manufacturing capability GCM expects this technology to produce a suite of products, being attractive to large markets and premium markets, including semiconductors, high performance electronics, thermal management, aluminum, defence, EDM, glass manufacturing, and nuclear.

Commercialisation Plan

GCM is finalising its detailed commercialisation plan for VHD Graphite. This plan will prioritise products and markets, seeking to bring products to market quickly, whilst also conducting activities which will facilitate the development of a suite of products over time.

GCM has budgeted incurring expenditure in the order of $500k over the next 12 months for the completion of the commercialisation process. This limited budget highlights the simplicity and low cost to bring this technology into commercialisation and revenue generation, with activities including:

1) Engagement of a Head of Research and Development.
2) Further evaluation and understanding of potential application markets.
3) Laboratory fit-out.
4) Production of samples at pilot plant scale, including validation of laboratory-scale sample fabrication and properties.
5) Scale-up to commercial production-scale, producing sample fabrication and properties.
6) Marketing and qualification of sample products for commercial sales.

Any further funding that is required (and the quantum) will depend on how the commercialisation process progresses and will be determined by the Board at that time.

Cerex Pty Ltd is the 100% owner of VHD Graphite, whose sole director is Professor Charles Sorrell. Professor Sorrell is the inventor of the VHD Graphite technology and its intellectual property. To date GCM has undertaken the following due diligence: received confirmation from the University of NSW that it does not claim any ownership over VHD Graphite and its intellectual property; confirmation from the other participants in the invention of VHD Graphite that they hold no ownership over VHD Graphite; validated with third parties the previous work undertaken performed the VHD Graphite intellectual property; due diligence in respect of Cerex entity, confirming company particulars (including officers) and that the entity is in good standing. GCM confirms that further due diligence will be undertaken during the commercialisation process.

Authorisation

The provision of this announcement to the ASX has been authorised by the Board of Directors of Green Critical Minerals Limited.

Forward Looking Statements

The information contained within this announcement relates to laboratory test work on third party graphite material which demonstrates the potential of the technology. For the avoidance of any doubt, this announcement does not contain any public report of Exploration Results, Mineral Resources or Ore Reserves for the purposes of the JORC Code (2012)

This release contains estimates and information concerning our industry and our business, including estimated market size and projected growth rates of the markets for our products. Unless otherwise expressly stated, we obtained this industry, business, market, and other information from reports, research surveys, studies and similar data prepared by third parties, industry, and general publications, government data and similar sources. This announcement also includes certain information and data that is derived from internal research. While we believe that our internal research is reliable, such research has not been verified by any third party. Estimates and information concerning our industry and our business involve a number of assumptions and limitations. Although we are responsible for all of the disclosure contained in this announcement and we believe the third-party market position, market opportunity and market size data included in this announcement are reliable, we have not independently verified the accuracy or completeness of this third-party data. Information that is based on projections, assumptions and estimates of our future performance and the future performance of the industry in which we operate is necessarily subject to a high degree of uncertainty and risk due to a variety of factors, which could cause results to differ materially from those expressed in these publications and reports

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Appendix 1 Comparison of the Properties of Various Graphite Types[8]

Parameter	Unit	Direction	VHD Graphite Block	Pyrolytic	Nuclear	Electrode	Mechanical A	Mechanical B	Extruded	Isostatically Pressed
Bulk Density	Kg/m3	-	**2050**	2190	1830	1760	1700	1700	1700	1640
Relative Density	%	-	**90.5**	96.6	80.8	77.7	75.0	75.0	75.0	72.4
Apparent Porosity	%	-	**1.5 – 4.0**	0.5 – 1.5	9 – 10	14 – 15	6 – 7	14 – 15	15 – 16	17 – 18
Electrical Resistivity	µΩ.m	Along Grain	**1.223**	1.320	9.595	8.331	22.347	11.376	8.680	9.764
		Across Grain	**31.388**	41.509	10.000	9.347	26.000	27.642	10.194	10.924
Flexural Strength	MPa	Along Grain	**8.0**	87.5	20.3	12.8	36.3	28.8	13.4	20.9
		Across Grain	**4.9**	35.6	17.8	7.7	31.4	24.6	12.6	19.1
Degree of Anisotropy[A]	Comparative		**25.7**	31.4	1.0	1.1	1.2	2.4	1.2	1.1

A – Determined by comparison of electrical resistivities across grain and along grain: [$r_{across\ grain}/r_{along\ grain}$]

[8] Determined from test work performed at the UNSW laboratories. UNSW is ranked 31 in the entire world (and number 1 in Australia) for **engineering & technology** (QS World University Rankings by Subject 2024: Engineering & Technology).

Appendix 2 Technology Acquisition Deal Terms

The Company has entered into a binding term sheet ('**Term Sheet**') with Cerex Pty Ltd ('**Cerex**') to purchase a 100% interest in the VHD Graphite technology on the following key terms and conditions:

1. Technology: Process which converts graphite powder into graphite shapes and blocks producing very high-density graphite with certain industry leading properties.

2. Acquisition Rights: The Company will acquire a 100% interest in the VHD Graphite Technology upon achieving commercialisation.

3. Commercialisation: The stage at which the Company has completed the development and optimisation of the VHD Graphite technology to the point where the Company's Board is ready for commercial manufacturing, marketing, and sale to customers.

4. Deferred Consideration: Following the Company receipting gross revenue of:
    a. $5,000,000 the Company will make an initial payment to Cerex of $500,000.
    b. $20,000,000 the Company will make an additional payment to Cerex of $2,000,000.
    c. $50,000,000 the Company will make a final payment to Cerex of $2,500,000.

5. Commercialisation Expenditure: The Company is responsible for all costs to progress the VHD Graphite technology to commercialisation.

6. Termination Rights:
    a. If conditions precedent, which are for the exclusive benefit of the Company, are not satisfied or waived within six months from the date of execution of the Terms Sheet either party may terminate the Terms Sheet.
    b. If the Company has not achieved Commercialisation within sixty (60) months from the Execution Date, Cerex may terminate the Terms Sheet.

7. Additional terms: Customary representations, warranties and indemnities are included in the agreement.