Pure Resources Advances CNTF Thermal IP with Rice University

Carbon Nanotube Fibre Thermal IP Platform Targeting Next Generation Solutions for AI & Defence

HIGHLIGHTS

- **U.S. advanced materials platform established.** R&D collaboration with Rice University underway, the global leader in carbon nanotechnology and where the 1996 Nobel Prize in Chemistry was awarded for the discovery of the fullerene family of carbon molecules.
- **Clear pathway to downstream success**. Program structured to allow progress from research utilising the Company's Garnet Hills Project to downstream opportunities and potential access to U.S. government supported scale up
- **Exposure to high growth end markets.** IP development targeting potential use in AI data centre infrastructure, defence systems and advanced electronics where thermal constraints are a critical bottleneck
- **Active U.S. government funding strategy.** Engagement underway across Department of Energy and Department of Defence funding programs aligned to development of the IP to advanced materials and thermal management
- **Early end user engagement.** Discussions progressing with hyperscale, defence and advanced manufacturing groups for joint development and testing
- **World class technical leadership.** Program led by Matteo Pasquali, Director of Rice Carbon Hub and global pioneer in carbon nanotube fibre, supported by a multidisciplinary research team spanning thermal physics, heat transfer and advanced textile manufacturing

- **Vertically integrated development model.** End to end program from the Company's Garnet Hills Project graphite feedstock qualification through to fibre production, textile architecture and system level thermal performance
- **Strategic mine to market linkage.** Garnet Hills graphite positioned as a proprietary upstream feedstock within a U.S. based advanced materials and defence aligned value chain
- **Defined execution program.** Eight workstream pipeline covering fibre synthesis, thermal benchmarking, textile prototyping, durability testing and system integration
- **Rerate framework established.** Positioning Pure within a U.S. defence and AI infrastructure ecosystem with multiple catalysts across technical milestones, potential funding outcomes and downstream development

ANNOUNCEMENT

Pure Resources Limited (ASX:PR1) ("**Pure**" or "**Company**") is pleased to provide an update and elaborate on its recently announced sponsored research and development collaboration with Rice University (Houston, Texas) to research and develop the use of graphite materials in advanced thermal management systems based on Carbon Nanotube Fibre (**CNTF**) heat sink architectures.

COMMENTARY

Rocco Tassone – Chief Executive Officer

> *"Rice University is the institution where the field of carbon nanotechnology was founded and where the commercial translation of carbon nanotube fibre is most advanced anywhere in the world. Anchoring our thermal platform with Professor's Pasquali, Preston, Wehmeyer and Sanchez places Pure in a research vector that is already capitalised, already defence aligned, and already commercially validated through DexMat.*
>
> *"This collaboration is deliberately architected as a vertically integrated pipeline from fibre chemistry through to knitted heat exchange structure, because the thermal bottleneck in AI compute and directed energy systems is a systems problem, not a conductivity problem. Our objective is to convert that*

architecture into jointly owned intellectual property, and then into a U.S. defence and energy funded industrial platform with measurable commercial pilots.

"Garnet Hills is the upstream complement to this strategy. Qualifying our own large flake graphite, is materially more valuable to shareholders than selling concentrate into a commodity market."

Rocco Tassone, CEO Pure Resources Limited

DETAIL

Potential for US Government Funding Initiatives

A central pillar of the future advancement of the jointly owned intellectual property under the research and development program is the systematic pursuit of U.S. Government funding across both the Department of Defence (**DoD**) and the Department of Energy (**DoE**). This work has advanced. The Company, in coordination with the Rice research team, has identified a pipeline of federal programs that align directly with the CNTF thermal management thesis and has commenced or completed applications to multiple vehicles.

Early End User Collaboration

As part of the Rice research program, Rice and the Company has commenced engaging prospective end user corporations whose operations sit directly on the thermal bottleneck that CNTF architectures are designed to address. This engagement is for the purpose of better understanding the direction in which the intellectual property research and development program should take. Multiple organisations across hyperscale data centre infrastructure, defence prime contracting and advanced electronics manufacturing have expressed a direct interest in collaborating on the intellectual property program.

The significance of end user engagement at this stage of the program cannot be overstated. It validates the potential of the Garnet Hills downstream strategy and thermal pain points the Rice program is targeting are real, urgent and unsolved by incumbent metal based solutions. It also creates a pathway for accelerated translation: rather than completing a full research cycle and then seeking commercial partners, Pure is building the end user relationship in tandem with the science. This approach is deliberately modelled on best practice defence technology transition frameworks where the end user voice is embedded into the research program from inception.

A Collaboration Anchored at the Birthplace of Carbon Nanotechnology

Rice University is widely regarded as the institutional birthplace of carbon nanotechnology. In 1985, Rice chemists Richard Smalley, Robert Curl and Harold Kroto discovered buckminsterfullerene (C_{60}), the discovery for which they were awarded the 1996 Nobel Prize in Chemistry. That discovery opened the field of fullerene and nanotube science and seeded four decades of continuous investment at Rice in carbon nanomaterial synthesis, characterisation, scale up and commercialisation.

Rice's subsequent establishment of the Smalley Curl Institute and, more recently, the Carbon Hub, a multi industry consortium focused on a zero emissions future built on hydrogen and high performance carbon materials, has consolidated the university's leadership across the full carbon nanotechnology value chain: from catalytic synthesis of single walled carbon nanotubes, through solution spinning of continuous carbon nanotube fibres, to integration into textiles, composites and engineered thermal systems.

Pure's R&D collaboration is deliberately structured to sit at this centre of gravity. The Company is not sponsoring a generic materials testing programme; it is embedding itself into the research group that first demonstrated neat carbon nanotube fibre spinning at laboratory scale and that today leads the translation of that chemistry into industrial heat management, conductor and structural applications.

Research Team: A Vertically Integrated Pipeline

The collaboration deliberately assembles four complementary Rice principal investigators so that the program spans the full technology stack from fibre through to deployed heat exchange structure. No single discipline can deliver a next generation thermal platform; Pure's research and development program is designed to ensure that synthesis, transport physics, systems level thermal fluids engineering and scalable textile manufacturing are coupled from day one.

The Rice University Team and Principal Investigator: Professor Matteo Pasquali

Professor Matteo Pasquali is the A.J. Hartsook Professor of Chemical and Biomolecular Engineering, Professor of Chemistry, and Professor of Materials Science and NanoEngineering at Rice University. He is the founding Director of Rice's Carbon Hub and a former Director of the Carbon Nanotechnology Laboratory.

Prof. Pasquali is among the most highly cited researchers globally in the field of carbon nanomaterials and complex fluid processing. His work has accumulated in excess of 24,500 career citations and his publications span fibre rheology, liquid crystalline dope processing, solution spinning of CNT fibres, and integrated systems level demonstrations of CNTF in high performance applications. He has been continuously funded by the U.S. Department of Defense, the U.S. Department of Energy, NASA and the Air Force Office of Scientific Research, among others.

In 2015, Prof. Pasquali and Dr. Dmitri Tsentalovich cofounded DexMat, Inc., the Rice University spinout commercialising neat carbon nanotube fibre under the “Galvorn” brand. DexMat has raised institutional capital from Shell Ventures, DCVC and the U.S. Department of Energy’s ARPA-E, and is scaling production of CNT fibre for applications in lightweight conductors, shielding and composite reinforcement. DexMat is an important reference point for the commercial viability of the underlying chemistry; Pure’s program with Rice is differentiated from DexMat’s product line in that it is focused on architected thermal structures, specifically the integration of fibre into 3D knit and woven heat exchange geometries, rather than the raw conductivity of spun fibre alone.

Prof. Pasquali’s portfolio of demonstrations includes carbon nanotube fibres with tensile strength exceeding that of Kevlar, thermal and electrical conductivity in the metallic range, and, critically for Pure, the demonstration that neat CNTF can be processed on standard textile equipment, opening a manufacturing pathway that is simply not available to machined metals.

Professor Daniel J. Preston: Thermal Fluids and Phase Change Heat Transfer

Assistant Professor of Mechanical Engineering at Rice and principal investigator of the Preston Innovation Laboratory. Prof. Preston holds a PhD in Mechanical Engineering from MIT and is a recognised authority on high flux phase change heat transfer, condensation on structured surfaces, electro hydrodynamic thermal transport and soft thermal fluidic systems. He has been recognised with the NSF CAREER Award and multiple early career recognitions from the U.S. Department of Defense. Responsibility within the program: steady state and transient thermal characterisation of CNTF heat sinks, two phase and immersion cooling integration, and benchmarking against incumbent copper, aluminium and vapour chamber references.

Professor Geoff Wehmeyer: Nanoscale Heat Transport

Assistant Professor of Mechanical Engineering at Rice. Prof. Wehmeyer holds a PhD in Mechanical Engineering from the University of California, Berkeley, with postdoctoral research at Stanford, and his research group specialises in the measurement and engineering of thermal transport in nanostructured materials, including carbon nanotubes, graphene and phase change media. Responsibility within the program: quantitative characterisation of thermal conductivity and interfacial thermal resistance in CNTF yarns and textiles, directional anisotropy mapping, and development of multi scale thermal models that link fibre level transport to system level performance.

Professor Vanessa Sanchez: Architected Textile Manufacturing

Assistant Professor at Rice with a joint appointment spanning Materials Science and NanoEngineering and Mechanical Engineering. Prof. Sanchez trained at the Harvard John A. Paulson School of Engineering and Applied Sciences and the Wyss Institute for Biologically Inspired Engineering, and is a leading authority on programmable 3D knitted and woven functional textiles, including the translation of advanced fibres into soft robotic, wearable and structural systems. Responsibility within the program: translation of CNTF yarn into 3D knitted and woven heat exchange architectures, design for manufacture on industrial flat bed and circular knit platforms, and process qualification for recyclable textile heat exchangers.

Carbon Nanotube Fibre Overview

Carbon nanotube fibre is a continuous, neat fibre spun from aligned single- and few walled carbon nanotubes. It combines specific thermal and electrical conductivity in the range of copper with a density approximately one fifth that of copper, tensile strength surpassing Kevlar, and the ability to be processed on textile equipment into yarns, braids, knits and wovens.

The thermal management problem in AI compute and next generation defence systems is not, at root, a conductivity problem, incumbent copper is already an excellent conductor. It is a systems problem: mass per watt rejected, directional control of heat flow, surface area to volume ratio, geometric flexibility for integration, and lifecycle cost including end of life recyclability. Machined metal heat sinks have essentially exhausted the optimisation space on each of these axes.

The CNTF research being undertaken seeks to unlock a fundamentally different design paradigm. Because the fibre can be knitted or woven, the engineer designs the architecture of the heat exchange structure including loop geometry, stitch density, layer stacking, and fibre orientation rather than subtracting material from a metal billet

Overview of Target Applications

The intellectual property development program is directed at end markets where the constraints on conventional metal heat sinks are most acute and where the value of a step change in thermal architecture is highest.

Hyperscale AI data centre infrastructure
Rack level power densities at leading edge AI training clusters are moving from tens of kilowatts toward in excess of 100 kilowatts per rack, driven by the progression to GB200 class and successor accelerator platforms. The global data centre cooling market is projected to exceed US$60–$70 billion annually by 2030. CNTF cold plate and manifold architectures offer mass, surface area and recyclability advantages that compound across facility scale deployments.

Directed energy weapons and AESA radar
Directed energy weapon systems and active electronically scanned array radars are thermally limited platforms: the duty cycle, range and lethality of these systems is a direct function of the heat rejection architecture. CNTF enables lightweight, conformal, directionally engineered heat exchange structures that integrate with platform geometries unavailable to machined metal. The addressable U.S. defence thermal management segment sits within a broader defence thermal critical subsystems market exceeding US$40–$50 billion annually.

Airborne and space based RF platforms
Mass and volume are the dominant cost drivers on airborne and space platforms. A 3–5x reduction in mass per watt rejected, combined with RF compatible materials behaviour, is a direct enabler of higher capability payloads on the same platform class.

EV battery pack and semiconductor packaging
Commercial proof points outside defence include EV battery pack thermal management and advanced semiconductor packaging, both of which face rising volumetric power densities and increasingly stringent end of life recyclability regulation. Pure has identified one of these adjacencies as a medium term commercial pilot target.

Mine to Market Linkage: Garnet Hills Project

The Garnet Hills Project is 100% owned by Pure, holds a granted mining lease, and sits immediately adjacent to GCM Corporation Ltd's (ASX: GCM) McIntosh Graphite Project in the Kimberley region of Western Australia. Recent petrographic work on Garnet Hills has confirmed large to jumbo flake graphite with typical flake size averaging ~200 µm and occurrences exceeding 300 µm, hosted in clean, inclusion free, high grade metamorphic rocks.

Garnet Hills feedstock will be an input for CNTF precursor and for hybrid carbon architectures. The commercial value of this linkage is not derived from selling concentrate into conventional markets; it is derived from qualifying Pure's proprietary upstream feedstock inside a live, defence aligned advanced materials research vector. The intellectual property generated on Garnet Hills performance is jointly owned and is directly applicable to downstream commercialisation.

Pathway Framework

Pure's pathway is sequential and deliberately structured:

- de risk the underlying science through a funded program with the world's leading CNTF research group
- co own the intellectual property generated from that program
- position the Company, and the feedstock from the Garnet Hills Project, into potential U.S. defence and energy funding vehicles
- translate into downstream opportunities for the Garnet Hills Project in a non defence adjacency to establish unit economic reference points

The Company's pathway framework is anchored in comparable transactions in which ASX listed companies have been rerated on the back of U.S. defence credentialed research and board architecture. Pure is building the equivalent architecture around a research vector whose science is already de risked by four decades of Rice leadership in carbon nanotechnology and a decade of DexMat commercial validation on the underlying fibre.

Overview of CNTF IP Research Objectives and Workstream Pipeline Ahead

The intellectual property research and development program is structured around eight integrated workstreams. Each workstream has defined deliverables, characterisation protocols and decision gates. Data and intellectual property generated across all workstreams is jointly owned by Pure and Rice under the Sponsored Research Agreement.

- **Workstream 1**: Feedstock qualification. Characterisation of feedstock from Garnet Hills
- **Workstream 2**: Fibre synthesis and spinning. Production of neat CNT fibre at laboratory and pilot scale, targeting yarn grade specifications suitable for downstream textile processing.
- **Workstream 3**: Thermal transport characterisation. Measurement of axial and transverse thermal conductivity, interfacial thermal resistance, and temperature dependent behaviour across the relevant operating window for AI and defence platforms.
- **Workstream 4**: 3D knitted and woven architectures. Design and fabrication of candidate heat exchange geometries on industrial textile equipment, with design of experiments across stitch topology, density and fibre orientation.
- **Workstream 5**: Heat exchanger benchmarking. Steady state and transient thermal performance testing of CNTF structures against matched copper and aluminium references, under air, liquid and two phase cooling regimes.
- **Workstream 6**: RF and electromagnetic co design. Evaluation of CNTF heat exchange structures in environments where electromagnetic interference, RF transparency or shielding is a co requirement, relevant to AESA and DEW platforms.
- **Workstream 7**: Durability, life and recyclability. Accelerated thermal cycling, vibration and environmental testing; end of life reprocessing protocols exploiting the single material textile form factor.
- **Workstream 8**: Integration and scale pathway. System level integration trials with representative cold plate, rack level and airborne geometries.

AUTHORISATION

Approval & Release

This announcement is approved for release by the Board of Pure Resources Limited.

Mr Quinton Meyers
Non-Executive Chairman
Pure Resources Limited

ABOUT

About Pure Resources

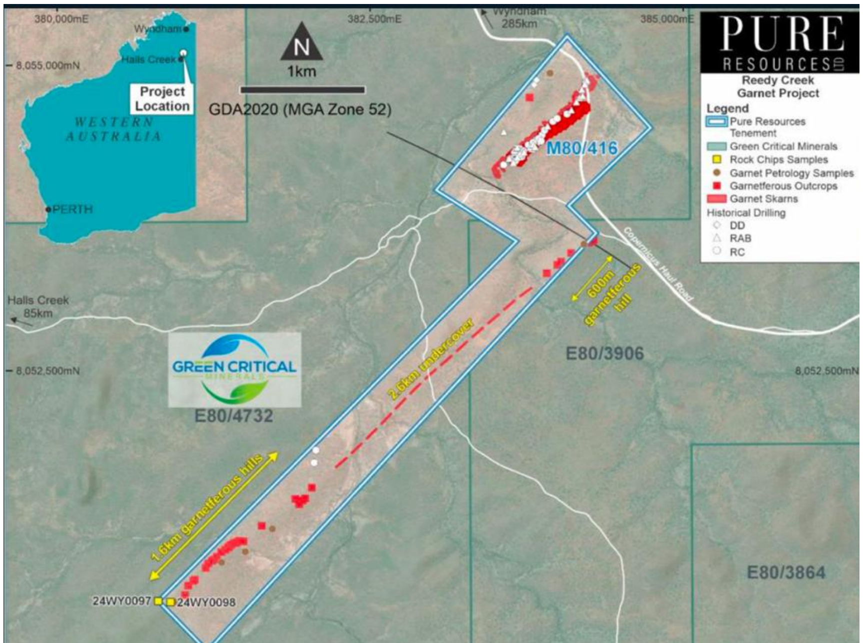
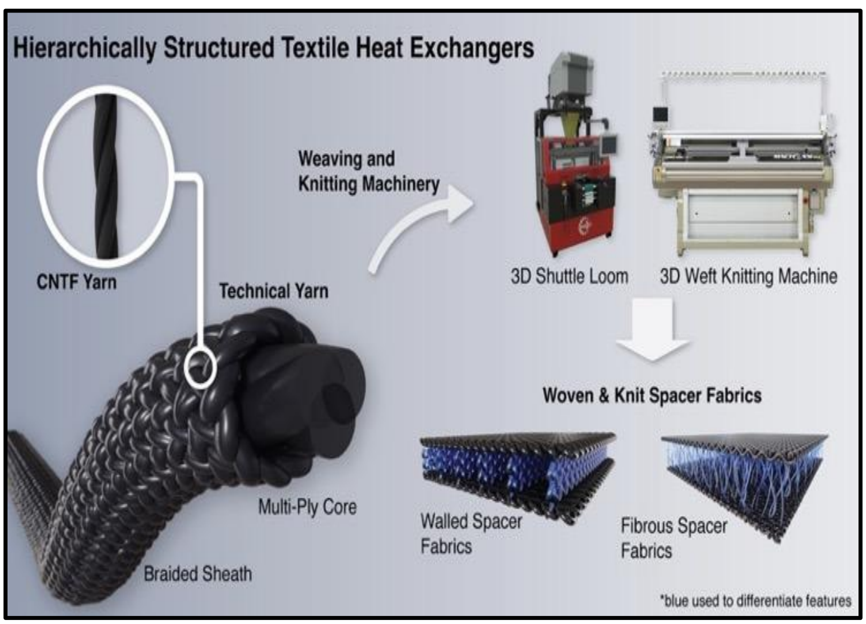


Figure 1 - Graphite Sample locations at M80/416



Pure Resources Limited (ASX: PR1) is an ASX listed advanced materials and critical minerals company pursuing an integrated mine to market strategy.

The Company's 100% owned Garnet Hills Project provides upstream exposure graphite and garnet under a granted mining lease in Western Australia.

Pure is executing a downstream strategy anchored by a funded R&D collaboration with Rice University focused on Carbon Nanotube Fibre thermal management technology for AI data centre infrastructure and defence applications.

CNTFs are not just an incremental improvement, they represent a step change in materials capability. Through advanced materials science, they unlock lighter, stronger and more conductive systems that redefine performance across defence, energy and advanced manufacturing. This is not evolution, it is a fundamental revolution in what materials can do.

DISCLAIMER

Forward Looking Statements

Statements contained in this release, particularly those regarding possible or assumed future performance, costs, dividends, production levels or rates, prices, resources, reserves or potential growth of Pure Resources, are, or may be, forward looking statements. Such statements relate to future events and expectations and, as such, involve known and unknown risks and uncertainties. Actual results and developments may differ materially from those expressed or implied by these forward looking statements depending on a variety of factors.

INVESTOR & MEDIA CONTACTS

Quinton Meyers
admin@pureresources.com.au
+61 8 9388 0051