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RENASCOR RESOURCES

ASX: RNU

ASX Release

26 April 2023

Battery Anode Material Study Update

Project optimisation study nears completion, incorporating increase in PSG production capacity; long-lead time procurement and FEED tender commencing for upstream operation

Highlights:

- Renascor Resources Limited (ASX: RNU) (Renascor) is in the advanced stages of an updated and optimised Battery Anode Material Study (**BAM Study**) for its proposed vertically integrated graphite mine and manufacturing operation in South Australia. The BAM Study is assessing an increase in the Stage 1 Purified Spherical Graphite (**PSG**) production capacity from 28,000tpa, as well as additional staged expansion of PSG operations[1].
- Following the approval of the Program for Environment Protection and Rehabilitation for its upstream Mine and Concentrator[2], the BAM Study will reflect an accelerated commencement of construction of the upstream operation, with procurement of long-lead time items and tendering for front-end engineering and design (**FEED**) commencing in the current quarter.
- All engineering deliverables for the BAM Study have been completed on the upstream Mine and Concentrator, with remaining works focused on finalising technical documentation to support project financing, detailed design and procurement.
- Engineering deliverables have been received for the downstream PSG facility, based on an optimised purification process, with on-going works assessing key support infrastructure.
- Renascor expects to complete the BAM study in July 2023.

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Renascor Resources Limited (ASX: RNU) (**Renascor**) is pleased to provide an update on the optimised Battery Anode Material Study (**BAM Study**) for its proposed vertically integrated graphite mine and manufacturing operation in South Australia.

The BAM Study is in an advanced stage and, pending completion of revised cost estimates, Renascor expects to complete the BAM Study in July 2023.

Commenting on the BAM Study, Renascor Managing Director David Christensen stated:

> *Our technical team is making excellent progress on our updated, optimised Battery Anode Material Study which seeks to increase our projected PSG production capacity to meet the growing demand for graphite in lithium-ion batteries.*
>
> *Engineering work on the upstream mining and processing plant is complete and has given us sufficient confidence to commence long-lead item procurement and move to the front-end engineering and design stage.*
>
> *We are also nearing completion of engineering and design work on the downstream operation, which will incorporate an increase in production capacity for our eco-friendly, state-of-the-art PSG facility in Bolivar, South Australia.*
>
> *We look forward to the completion of the BAM Study and our transition into the construction phase of a long-life operation that will produce globally competitive, 100% Australian-made battery anode material."*

Figure 1. Artist's rendition of Renascor's proposed PSG facility in Bolivar, South Australia

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Discussion

The BAM Study is assessing a vertically integrated operation in South Australia that will combine the Siviour Graphite Deposit in South Australia, the largest reported graphite Reserve outside of Africa[3]; and a state-of-the-art processing facility in South Australia to manufacture PSG through Renascor's eco-friendly purification process.

The BAM Study, which builds on previous feasibility studies for both the planned upstream and downstream operations[4], is assessing an increase to the previously planned PSG production capacity of 28,000tpa and additional staged expansions to meet projected demand.

Release of the optimised BAM Study is pending completion of the remaining work programs described below and the finalisation of cost estimates. While it is anticipated that the estimated capital costs will be subject to inflationary pressures, Renascor expects the improvements in productivity and the strong graphite market outlook will ensure the BAM project will continue to demonstrate robust returns and support a favourable final investment decision later this year.

Upstream Mine and Concentrator

The upstream portion of the BAM Study is based on a definitive feasibility study (**DFS**) completed in November 2019 (the **2019 Upstream DFS**)[5] and incorporates design improvements and other modifications identified from subsequent work programs, including large-scale commercial pilot trials, variability test work and value engineering studies.

The process design for the upstream Concentrator in the BAM Study continues to be based on optimising graphite recovery and grade through froth flotation in a conventional graphite flowsheet. Ore from the mine will be crushed in stages, followed by grinding, flotation, filtering and drying before being prepared for transport to the downstream facility.

Following locked-cycle and pilot flotation trials completed in 2021[6] and further processing and variability trials undertaken in 2022, Renascor has incorporated changes to the regrind and cleaning circuits to improve the removal of gangue and finer material to better permit consistent production of battery-grade feedstock to meet customer specifications.

Other modifications to the 2019 Upstream DFS relate to support infrastructure following more recently completed design and engineering studies. These include revised engineering designs related to the installation of infrastructure associated with the proposed desalination facility, incorporating more detailed geotechnical assessments completed in early 2023, as well as supplementing grid-power supply with on-site solar.

Work on the upstream portion of the revised BAM Study is nearing completion, with all engineering deliverables completed on the Mine and Concentrator. Remaining works are focused on finalising technical documentation to enable detailed design, early procurement and completion of the proposed construction schedule.

Following the approval of the Program for Environment Protection and Rehabilitation[7], the BAM Study construction schedule will reflect an accelerated commencement of operation of the upstream Mine and Concentrator operation.

In preparation for this accelerated upstream development schedule, Renascor is commencing procurement of long-lead time items and tendering for front-end engineering design of the Mine and Concentrator.

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Downstream PSG Facility

The downstream portion of the BAM Study is based on a Prefeasibility Study (**PFS**) completed in February 2019 (the **2019 Downstream PFS**)[8] and is assessing an increased production capacity for PSG via an increased scale of both the milling and purification circuits. The BAM Study is based on the establishment of the downstream operation at the proposed site in Bolivar, South Australia that Renascor secured last year from South Australian Government-owned utility SA Water[9].

The process design for the downstream plant continues to be based on a conventional milling process to micronise and spheronise graphite, followed by a purification circuit that avoids the use of hydrofluoric (**HF**) acid to achieve lithium-ion battery grade PSG.

Improvements to the process are noted below:

- *Milling circuit*. The milling circuit is being expanded to permit a throughput capacity of up to 100% of the expected production of Graphite Concentrates from the upstream operation. Additional changes to the milling circuit include adding streams that permit the spheronisation of finer flake, thereby permitting the production of both a primary larger PSG product and finer secondary PSG products. The changes are based on equipment trials that resulted in aggregate yields of 65% (versus 50% used 2019 Downstream PFS and 2020 BAM study)[10].

- *Purification circuit.* The purification circuit is similarly being expanded to permit the processing of increased volumes of Spherical Graphite that will pass through the downstream milling circuit. Additional changes to the purification circuit include the incorporation of an optimised purification flow-sheet. The original purification design, adopted in the 2019 Downstream PFS, was based on performing a caustic roast, followed by a multi-step leaching process[11]. Following optimisation trials on Siviour Spherical Graphite in 2021[12] and 2022, Renascor modified the process design to commence with leaching, to be followed by a caustic roast and a secondary leach. Renascor considers this updated design to offer better efficiencies in meeting customer specifications and offer potential operating savings through lower water usage.

Other modifications to the 2019 Downstream PFS include detailed infrastructure and construction planning for the proposed downstream site in Bolivar, South Australia. Electricity and gas is to be provided through connection to local networks and water is to be provided from SA Water's adjacent waste treatment facility, with the inclusion of a water treatment facility with the ability to recycle wastewater.

Downstream engineering deliverables based on the optimised process design were received earlier this month, with ongoing works focused on finalising the water treatment system and electricity supply infrastructure.

Completion of Optimised BAM Study

Completion of the optimised BAM Study is expected in July, pending completion of the remaining work programs described above and finalisation of cost estimates. While it is anticipated that the estimated capital costs will be subject to inflationary pressures, Renascor expects the improvements in productivity and the strong graphite market outlook will ensure the BAM project will continue to demonstrate robust returns and support a favourable final investment decision later this year.

This ASX announcement has been approved by Renascor's Board of Directors and authorised for release by Renascor's Managing Director David Christensen.

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This report may contain forward-looking statements. Any forward-looking statements reflect management's current beliefs based on information currently available to management and are based on what management believes to be reasonable assumptions. It should be noted that a number of factors could cause actual results, or expectations to differ materially from the results expressed or implied in the forward-looking statements.

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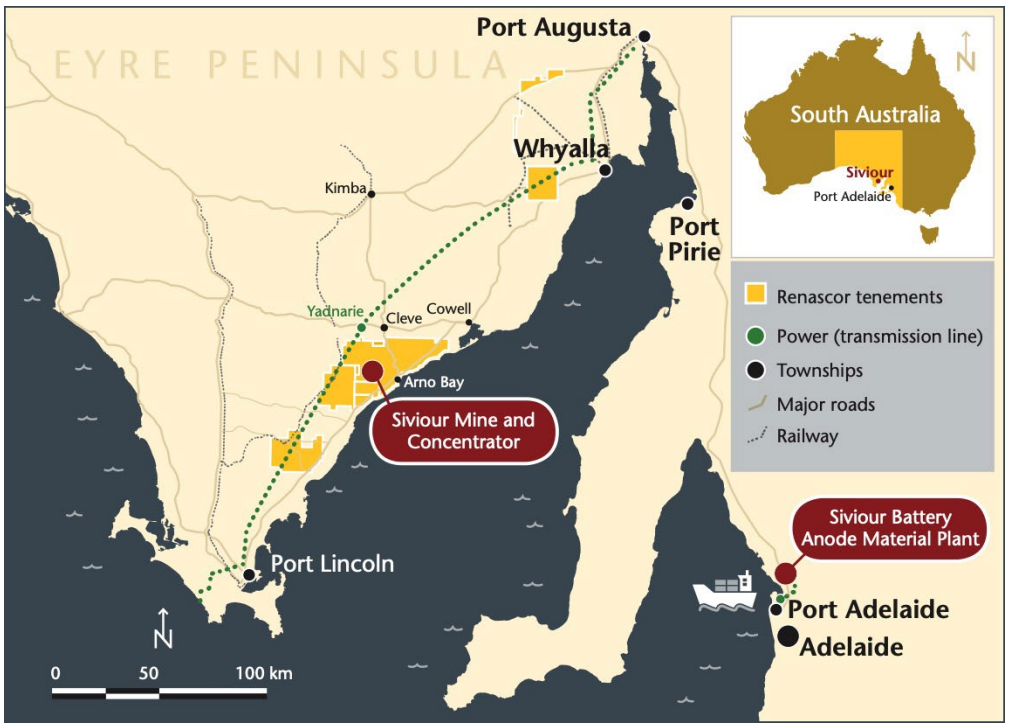
Appendix

The World-Class Siviour Graphite Project

Renascor Resources Limited (**ASX: RNU**) ("**Renascor**") is committed to powering the clean energy transition through the development, in Australia, of a vertically integrated graphite mine and manufacturing operation to produce 100% Australian-made, sustainable and ethically-sourced battery anode material for the lithium-ion battery market.

Renascor's Battery Anode Material Manufacturing Operation in South Australia comprises:

- **the Siviour Graphite Deposit** - the world's second largest Proven Reserve of Graphite and the largest Graphite Reserve outside of Africa[13];
- **the Siviour Graphite Mine and Concentrator** - a conventional open-pit mine and crush, grind, float processing circuit delivering world-class operating costs in large part due to the favourable geology and geometry of Renascor's Siviour Graphite Deposit; and
- **a Battery Anode Material Production Facility** - where Renascor will manufacture Purified Spherical Graphite using an eco-friendly processing method before being exported to lithium-ion battery anode manufacturers.



HF-free

Figure 1: Project location.

The 100% Renascor owned Siviour Graphite deposit is unique in both its near-surface, flat-lying orientation and its scale as one of the world's largest graphite Reserves. The favourable geology and size of the deposit will allow Renascor to produce Graphite Concentrate at a low-cost over a 40-year mine life.

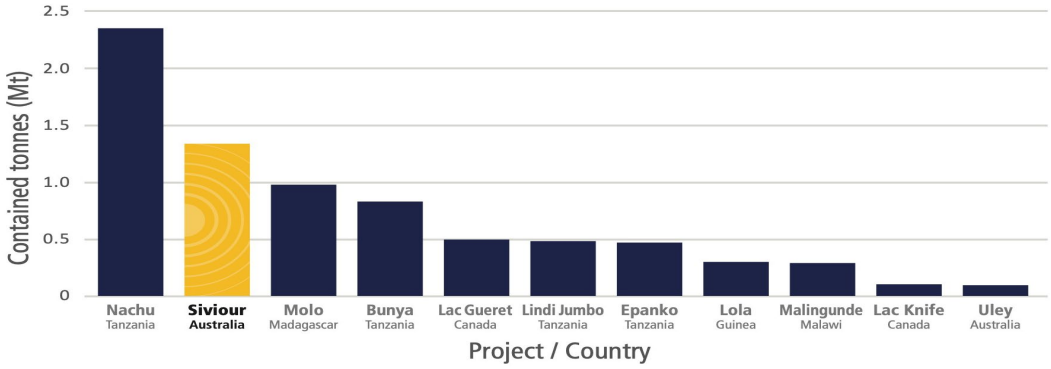


Figure 2. Global graphite Proven Reserves

Renascor intends to leverage this inherent advantage and develop a vertically integrated operation to manufacture high value PSG from a low-cost graphite concentrate feedstock and provide a secure cost-competitive supply of battery anode raw material into the rapidly growing lithium-ion battery market.

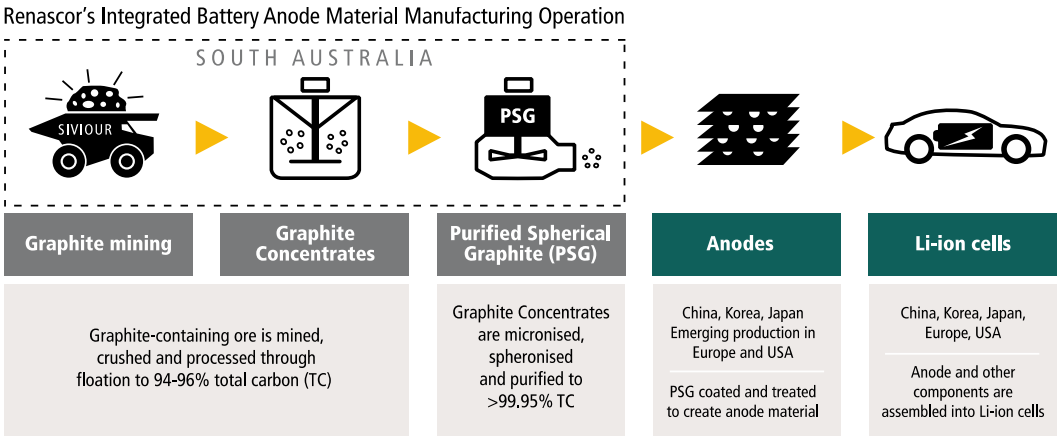


Figure 3: Renascor's vertically integrated Mine and Concentrator and Downstream PSG production facility within the Electric Vehicle supply chain.

[1] Studies to date have considered an initial Stage 1 production capacity of 28,000tpa PSG. See Renascor ASX announcement dated 1 July 2020.
[2] The PEPR was lodged by Renascor's wholly-owned subsidiary Ausmin Development Pty Ltd, the registered holder of the Mineral Lease for Siviour.
[3] Renascor ASX announcement 21 July 2020
[4] Renascor completed a definitive feasibility study for the upstream operation in November 2019 (see Renascor ASX announcement dated 11 November 2019) and a prefeasibility study for the downstream operation in February 2019 (see Renascor ASX announcement dated 21 February 2019). In July 2020, Renascor completed a Battery Anode Material Study that integrated the results of the previous studies (see Renascor ASX announcement dated 1 July 2020).
[5] See Renascor ASX announcement dated 11 November 2019.
[6] Additional mineral processing work completed since the original Siviour DFS includes locked cycle flotation tests that achieved graphite recovery of up to 94.5%, as compared to 91.0% in the Siviour DFS (Renascor ASX announcement dated 12 July 2021) and pilot trials conducted at an independent commercial graphite facility that achieved graphite purities of up to 97.5% total carbon with graphite recovery of 93.2% (Renascor ASX announcement dated 28 July 2021) versus the Siviour DFS, which adopted average purities of approximately 94% total graphitic carbon (Renascor ASX announcement dated 28 July 2021).
[6] See Renascor ASX announcement dated 11 November 2019, page 17.
[7] The PEPR was lodged by Renascor's wholly-owned subsidiary Ausmin Development Pty Ltd, the registered holder of the Mineral Lease for Siviour.
[8] See Renascor ASX announcement dated 21 February 2019.
[9] See Renascor ASX announcement dated 20 September 2022.
[10] See Renascor ASX announcement dated 10 January 2022.
[11] See Renascor ASX announcement dated 21 February 2019, p. 12.
[12] See Renascor ASX announcement dated 13 December 2021.
[13] Renascor ASX announcement 21 July 2020

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