

**ASX Release**

August 12, 2019

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RNU

**Developing  
Australia's Largest  
Graphite Deposit****Positive Results from Advanced Process Design Tests Support  
Production of High Value Spherical Graphite**

- Advanced process design tests offer further support for the proposed downstream spherical graphite operation at Renascor's 100%-owned Siviour Graphite Project in South Australia (see Renascor's Siviour Spherical Graphite Pre-Feasibility Study (**Spherical PFS**), Renascor ASX announcement dated 21 February 2019).
- Purification tests using more eco-friendly caustic roasting have successfully produced battery-grade spherical graphite ("**Spherical Graphite**") from Siviour. Caustic roasting offers environmental advantages over the traditional hydrofluoric acid purification process.
- The test programs have confirmed the process design parameters adopted in the Spherical PFS and offered potential operational costs savings through reduced roasting time and reagent consumption. The work also provides further confidence in the marketability of the Spherical Graphite product.
- Sample Spherical Graphite material produced from test programs is now being prepared for dispatch to potential offtake and strategic partners.
- Concurrently, Renascor is also nearing the completion of the Definitive Feasibility Study for the production of graphite concentrates from Siviour, with results expected next month

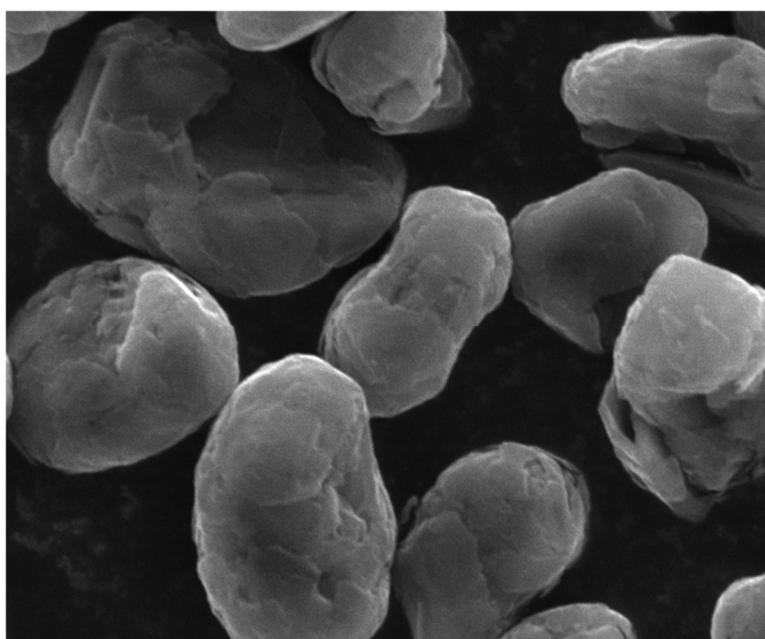


Figure 1. Spherical graphite produced from Siviour graphite concentrates (EM Image; HV 20.00 kV, field of view approximately 100 microns)

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Renascor Resources Limited (ASX: RNU) is pleased to announce the results of recent process design tests undertaken on Siviour graphite concentrates using the caustic roasting purification process.

The results offer further support for the proposed spherical graphite operation at Renascor's 100%-owned Siviour Graphite Project in South Australia, as described in Renascor's Siviour Spherical Graphite Pre-Feasibility Study (**Spherical PFS**). See Renascor ASX announcement dated 21 February 2019.

Commenting of the test results, Renascor Managing Director David Christensen stated:

*"The Spherical PFS demonstrated strong potential for Renascor to produce competitively-priced, purified spherical graphite for the growing market for lithium-ion battery anodes."*

*The results today offer further confirmation that Siviour can achieve these competitive margins through the use of a more environmentally friendly caustic roasting purification process, which avoids the use of hydrofluoric acid."*

*With nearly all natural flake spherical graphite used in lithium-ion batteries currently sourced from Chinese production facilities using hydrofluoric acid, these results demonstrate Siviour's potential to offer strategic diversification of supply in a manner that is both cost-competitive and environmentally sensible."*

#### Overview

Earlier this year, Renascor completed the Spherical PFS, which confirmed the opportunity to unlock further value from the Siviour Graphite Project through Australia's first integrated graphite concentrate and spherical graphite operation.

The Spherical PFS concluded that Siviour could produce purified Spherical Graphite at a projected gross cash operating cost of US\$1,962.<sup>1</sup> Currently, nearly all purified natural flake graphite is produced in China, with costs estimated at between US\$2,000 and US\$2,700 per tonne.

Renascor considers the market for Spherical Graphite, which is used in lithium-ion battery anodes, to offer high potential for significant returns due to the projected growth of the lithium-ion battery market.

The demand for Spherical Graphite has grown in recent years, resulting in increasing prices for Spherical Graphite (see Figure 2), with potential for further increases if the lithium-ion battery market continues to grow.

<sup>1</sup> See RNU ASX announcement dated 21 February 2019, pp 2-3 and 20. The Spherical PFS projected total gross operating costs of US\$1,962 per tonne, which could be reduced to a net cost of US\$1,412 per tonne through the sale of a recarburiser bi-product at a projected cost US\$500 per tonne.

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Graphite Prices: Jun 2017 - Jun 2019

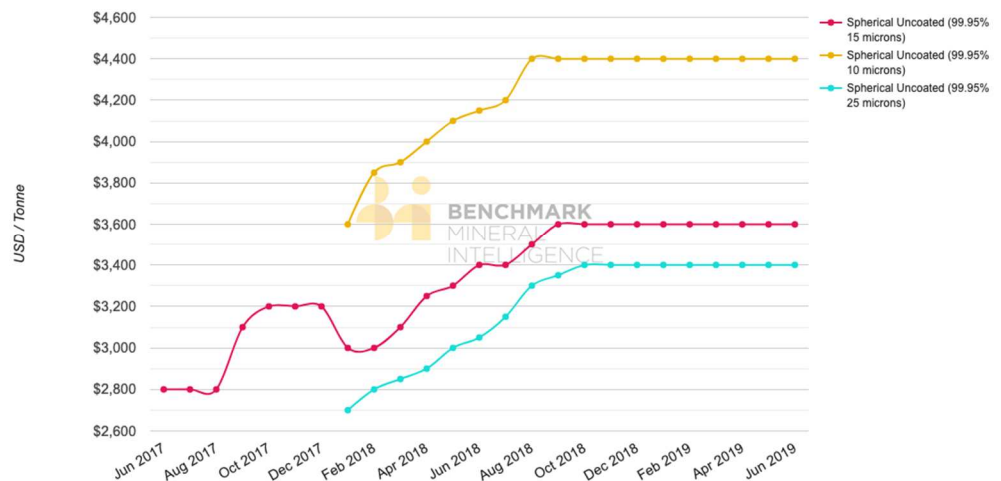


Figure 2. Price of uncoated purified spherical graphite (Source: Benchmark Minerals Intelligence)

To further advance its Spherical Graphite production strategy, since the completion of the Spherical PFS, Renascor has undertaken additional process design tests to optimise and confirm operating parameters adopted in the Spherical PFS.

### Description of test work

Spherical Graphite must generally be purified to at least 99.95% Total Carbon (TC) to be used in lithium-ion battery anodes.

Renascor's previous Spherical Graphite purification programs included tests involving both caustic roasting, as well as hydrofluoric acid purification. In both cases, Renascor successfully produced +99.95% TC, battery-grade anode material from Siviour graphite concentrates. See Renascor ASX announcement dated 21 February 2019, p. 10.

For purposes of the Spherical PFS, Renascor adopted a caustic roasting technique in which Siviour graphite concentrates are combined with a caustic solution and then roasted at low temperature before being leached with hydrochloric acid.

One advantage of the caustic process is that it does not use hydrofluoric acid, the method generally adopted in China, which currently supplies the vast majority of Spherical Graphite produced from natural flake concentrates. Due to its high toxicity, the use and disposal of hydrofluoric acid presents environmental management challenges.

A further advantage of caustic roasting involves potential cost savings, with lower reagent and health and safety costs.

To confirm the process design parameters adopted in the Spherical PFS for the use of caustic roast purification, Renascor undertook additional purification tests that included further examination of caustic roast and subsequent leach conditions. The program was



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overseen by a European graphite specialist<sup>2</sup> with expertise in the production of natural flake graphite for use in lithium-ion battery anodes.

Initial purification tests were performed on samples of graphite concentrates from Siviour. The samples originated from a pilot production program in China that produced 95% TC graphite. See Renascor ASX announcement dated 31 October 2018.

These graphite concentrates were subsequently micronised and spheronised using a conventional cascading mill. Samples of the spheronised graphite from this process were then combined with a caustic solution for the caustic roasting process, before undergoing leaching and drying.

The tests successfully produced +99.95% TC, battery-grade anode material, with an average grade of 99.965% TC. A summary table is presented in Table 1 below.

Sample ID	Total Carbon (TC)
TC-3534	99.959%
TC-3535	99.958%
TC-3536	99.966%
TC-3537	99.980%
TC-3538	99.978%
TC-3539	99.957%
TC-3540	99.943%
TC-3541	99.980%
<b>Average</b>	<b>99.965%</b>

Table 1. Test results

Additional purification tests were also performed on graphite concentrates produced from a bulk sample production program undertaken at SGS Lakefield in Canada. See Renascor ASX Announcement dated 31 August 2018.

These tests first replicated the Spherical PFS design criteria using a caustic solution, before performing a low temperature roast and hydrochloric acid leach. The tests successfully achieved high graphite purities in excess of 99.98% TC.

Further tests sought to assess alternative operating parameters to reduce reagent consumption and other operational costs. Key findings from these tests included potential cost savings in reduced roast temperature and corresponding decrease in energy consumption.

Additional tests assessed alternative leaching agents, substituting sulphuric acid for hydrochloric acid. The tests successfully produced battery-grade graphite, suggesting the opportunity to optimise reagent type and usage to achieve operational cost savings.

**Significance**

The results of these additional caustic roast test programs are significant for Renascor's strategy to produce purified Spherical Graphite because they offer further confirmation

<sup>2</sup> For confidentiality purposes, the identity of the European graphite specialist is not disclosed.

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that Siviour graphite concentrates are amenable to caustic roast purification to achieve +99.95% TC, battery-grade graphite.

The recent tests also further validate the process design parameters adopted in the Spherical PFS and suggest potential operational costs savings through reduced roasting time and reagent consumption.

Importantly, the recent test work demonstrates that these results can be achieved through the more environmentally friendly caustic roasting process.

Renascor expects that these results will also provide further confidence in the marketability of the Spherical Graphite product.

#### **Next steps**

The recent caustic roast purification test work has resulted in the production of further sample material, which is currently being prepared for dispatch to potential offtake and strategic partners.

Renascor's next steps in the development of its Spherical Graphite operation is expected to include advanced discussions with such parties and preparation for more advanced feasibility studies for the production of Spherical Graphite.

Concurrently, Renascor is progressing with the development of Definitive Feasibility Study for the production of graphite concentrates from Siviour, with results expected next month.

#### **Competent Person Statements**

*The information in this document that relates to metallurgical test work results is based on information compiled and reviewed by Mr Simon Hall, who is a Member of the Australasian Institute of Mining and Metallurgy. Mr Hall is a consultant to the Company. Mr Hall has sufficient experience relevant to the mineralogy and type of deposit under consideration and the typical beneficiation thereof to qualify as a Competent Person as defined by the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the JORC Code, 2012 Edition). Mr Hall consents to the inclusion in the report of the matters based on the reviewed information in the form and context in which it appears.*

#### **Bibliography**

1. Renascor ASX announcement dated 21 February 2019, "Spherical PFS Demonstrates Increased Returns for Siviour"
2. Renascor ASX announcement dated 31 October 2018, "Successful Pilot Plant Concentrate Production"
3. Renascor ASX Announcement dated 31 August 2018, "Successful Locked-Cycle Tests & Bulk Concentrate Production"

Renascor confirms that it is not aware of any new information or data that materially affects the information included in the original market announcements and that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. Renascor confirms that the form and context in which the Competent Person's findings

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are presented have not been materially modified from the original market announcement.

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