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Beowulf Mining Plc

("Beowulf" or the "Company")

Graphite Anode Materials Plant update

Beowulf (AIM: BEM; Spotlight: BEO), and its wholly owned Finnish subsidiary Grafintec Oy ("Grafintec"), are pleased to provide an update on test-work for the Graphite Anode Materials Plant ("GAMP").

Highlights

- Battery grade graphite produced from ongoing graphite anode materials test-work
- GAMP process flow-sheet under development by Grafintec and Dorfner Anzaplan GmbH ("Anzaplan")
- Optimisation work results in significant reduction in reagent and energy consumption
- Test-work results will serve as input parameters for the ongoing Pre-Feasibility Study ("PFS") and Environmental Impact Assessment ("EIA") for the GAMP

Ed Bowie, Chief Executive Officer of Beowulf, commented:

"Test-work is advancing at pace with results exceeding our expectations. We have produced an extremely high-grade anode material and, at the same time, managed to reduce the consumption of both energy and reagents in the process. These results bode very well for the forthcoming PFS and EIA."

Rasmus Blomqvist, Managing Director of Grafintec, commented:

"I am very pleased with the results from the latest test-work. The tests have demonstrated a robust process which can produce a graphite anode product with a purity of 99.99%, exceeding the typical industry requirements of 99.95%, at the same time as significantly reducing the process consumables. The optimised process will result in lower operating costs and produce less waste, and will therefore have a positive impact on the ongoing PFS and EIA.

"With a number of ongoing work-streams we look forward to updating the market in the coming months."

GAMP Testwork Update

Grafintec has completed a series of bench-scale tests on graphite concentrate to produce graphite anode material suitable for application in Lithium-Ion Batteries ("LIB"). The aim of the tests has been to optimise the GAMP process flow-sheet developed together with Grafintec's engineering partner Anzaplan.

<u>GAMP Process</u>

The GAMP Process is a three-step process where imported Mined Graphite Concentrate will be used to produce Coated Spherical Graphite ("CSPG") (See Figure 1). The process involves the following main steps:

- Spheronisation - the spheronisation process produces rounded graphite particles using a combined mechanical spheronisation and classification unit.
- Purification - the purification process uses a hydrometallurgical process flow-sheet developed by Grafintec in partnership with Anzaplan to produce high purity spheronised graphite ("SG") product.
- Coating - the purified SG is blended with petroleum needle coke and heated in a furnace to form a thin layer of carbon material around the purified SG forming CSPG.

The CSPG is then sold to Anode- and/or Battery manufacturers.

Figure 1: GAMP Process

<u>Focus of test-work</u>

The focus of this phase of test-work included the following:

- Spheronisation: to produce a high-yield of SG with high tap density.
- Purification: to produce a battery-grade product with a minimum 99.95 per cent. graphitic carbon ("Cg") content.
- Optimisation: to reduce reagent and energy consumption in the purification process and thus reduce the operating costs and the potential environmental impact of the process.
- Scalability: to develop a robust process that can be replicated for up-scaled test-work, provide input parameters for the PFS and EIA and ultimately to be developed on an industrial scale.

<u>Spheronisation test results</u>

The targets for the spheronisation tests were to produce two products, a medium SG product of 18 microns ("SG18") with a minimum yield of 50 weight ("wt.") per cent. and a fine SG product of 8 microns ("SG8") with a minimum yield of 10 wt. per cent. The SG18 fraction is the more important product and is typical for use in batteries for Electric Vehicles, whereas the SG8 product is more typically used for Hybrid Vehicle and Consumer Electronics battery applications.

Tap density is related to the shape and roundness of the particles and is a key parameter for the performance of graphite material in battery applications. The test-work successfully produced SG18 with a tap density of 0.95 grammes per centimetre cubed ("g/cm^3") (target >0.95 g/cm^3) and SG8 of 0.84 g/cm^3 (target >0.83 g/cm^3).

The yield of the process reflects the percentage of product produced from feed material and is therefore a measure of the overall efficiency. While the yield of the SG18 was 48.3 wt. per cent and slightly below the target of 50 wt. per cent., the target for the SG8 (10 wt. per cent) was exceeded with a yield of 12.7 wt. per cent. Therefore, the combined yield for the two products of 61 wt. per cent exceeded the combined target of 60 wt. per cent.

The SG18 product was used as feed for the subsequent purification test-work.

<u>Purification test results</u>

The purification process aims to increase the Cg content of the SG from approximately 95 per cent Cg to a minimum of 99.95 per cent Cg which is the typical industry requirement for battery-grade graphite. The bench-scale tests successfully produced a purified SG product of 99.99 per cent Cg well exceeding the battery-grade target.

Optimisation work on the process also reduced the reagent and energy consumption significantly, compared to previous test-work undertaken by Grafintec and Anzaplan, which will have a positive impact on the operating costs, production of waste material and therefore potential environment impacts of the process. The main chemicals sodium hydroxide and sulphuric acid used in the process were reduced by 25 per cent. and 82.5 per cent. respectively. In addition, the sodium hydroxide baking temperature was reduced by 33.3 per cent. from previous test-work. The combined impact of the reduced temperature and reagents results in an estimated 45 per cent. reduction in operating costs.

Ongoing Work and Next Steps

Grafintec and Anzaplan are currently producing additional purified SG based on the optimised process for Coating to produce CSPG. The Coating process is the final stage in the production of graphite anode materials and is carried out to further improve the electro-chemical and physical performance of the anode material.

A variety of workstreams are also ongoing to test the recyclability of the reagents used in the process to further decrease the overall reagent consumption and thus improve project returns.

The results from completed and ongoing workstreams are important input parameters for the ongoing PFS and EIA workstreams.

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