ASX Announcement **11 December, 2018**

Hexagon achieves 99.999% graphite purity from pilot scale McIntosh sample

HIGHLIGHTS

- **99.999 wt. % C purity achieved from large 20kg sample – confirming ability for McIntosh graphite to exceed carbon purity specification for the "Nuclear Graphite" industry.**
- **Previously the Company had announced similar purity for five, (sub 0.5kg) samples and is now increasing the scale of testing as the pilot and "downstream" feasibility programs are progressed.**
- **No notable levels of any potentially deleterious elements for most advanced high-tech applications, to include batteries, expandable graphite and electric arc furnace electrodes.**
- **Work on establishing a pilot facility for purification is well advanced as the Company focuses on fast-tracking opportunities to cash flow.**
- **Latest results:**
  - ✓ **are part of a focused program to establishing an electro-thermal fluidised bed purification furnace at pilot, qualification, and subsequently production scale; and**
  - ✓ **confirm the amenability of McIntosh flake to undergo this planned purification process to achieve exceptionally high purities for industry-leading low operating costs.**
- **Production of ultra-high purity, highly crystalline McIntosh flake graphite enables Hexagon to access unique, deep markets, and receive a premium price in value-added natural graphite product sales.**

OVERVIEW & COMMENTARY

Hexagon Resources Ltd (ASX: **HXG** or the **Company**) is pleased to report that follow-up purification test work on a large-scale, 19.5kg (43lbs) graphite sample from its McIntosh flake graphite project in Western Australia yielded, ultra-high purity, up to "five nines" (99.999%) graphite results. This further confirms and underpins Hexagon's downstream graphite strategy focussed on low-cost purification targeting high-end specialty markets.

Test work also confirmed virtually no notable concentrations of critical elements potentially deleterious to advanced batteries and to a number of other high-tech applications with the purified large sample batch.

NAmLab[1], Hexagon's US-based technical partner, successfully purified a 19.5kg batch of natural graphite concentrate from McIntosh grading 97.5 wt. % total graphitic carbon (TGC) to up to 99.9991 wt. % TGC. The purification process being simulated through this test work comprises an electro-

[1] NAmLab refers to Hexagon's US based technical partner whose identity cannot be disclosed due to confidentiality obligations.

thermal fluidised bed (EFB) furnace operating at approximately 2,500º C. EFB is an established technology particularly suited to the thin McIntosh flake where minor impurities are readily accessible, occurring on the flake surface as opposed to inter-grown within the flake layers. This means that exceptional purities and a high production rate can be achieved with a short flake residence time in the "hot-zone" of the furnace without any halide gas addition or hydrofluoric acid leaching being deployed in the final flow sheet.

Hexagon is targeting an industry leading thermal refining capability, which enables a low purification cost of less than US$600/t of concentrate feed. This compares very favourably to the estimated average cost of acid purification in China utilising mixed HF / H_2SO_4 acids with low environmental and occupational safety management standards.

"*Five-nines* purification results for a 20kg batch sample is another important outcome towards commercialising our downstream graphite process," Hexagon's Managing Director, Mike Rosenstreich said.

"Hexagon is targeting specific larger scale markets. We have seen that our flake is easily purified, and when refined through the highly productive EFB furnace technology available to us, we expect to achieve an industry-leading low purification cost, producing an ultra-high purity graphite material. The issue is not whether the material is 99.95% pure; but what is in that remaining 0.05% - with critical impurity specifications for each element generally at the 1 to 100 ppm level (i.e. .0001 wt.% and less). There is an increasing awareness of the importance of purity in mitigating risks in high-tech applications."

"The carbon purity level of our material exceeds standards for "Nuclear Graphites". In combination with its highly crystalline structure, ultra-high purity opens unique access into deep markets such as displacing, high cost synthetic graphite; an existing market twice the size of natural graphite."

Hexagon has a Joint Venture Agreement over its upstream, McIntosh Project with Mineral Resources Limited (ASX: **MIN**) under which MIN funds all project development work to achieving Commercial Production. Hexagon intends to use its 49% allocation of graphite concentrates as feedstock for its downstream processing strategy, which includes purification to add value to its graphite resource.

Hexagon allocated a major portion of the $7 million it raised in May 2018 towards establishing a prototype purification facility. A pilot scale facility is currently under construction at NAmlab and is expected to be available to Hexagon in mid-2019. Hexagon will utilise this facility to finalise design parameters of a larger-scale qualification furnace and also continue to generate samples for marketing purposes. The Company is in discussions with NAmLab to fast track the establishment of a larger scale facility to be utilised for production qualification with Hexagon's customers.

A scoping study evaluating the downstream business case is in progress and expected to be complete in early Q2, 2019. This will comprise purification and downstream processing into two product lines: Battery Materials and Electrode Lines (refer to Figure 1) with generalised product price expectations illustrated in Figure2. The key input parameters are: power costs, logistics and labour which drive the location of the downstream facilities – which ideally is close to either the upstream graphite concentrate source or the customers for the final products.

Figure 1: Planned Graphite Product Lines based on McIntosh flake source

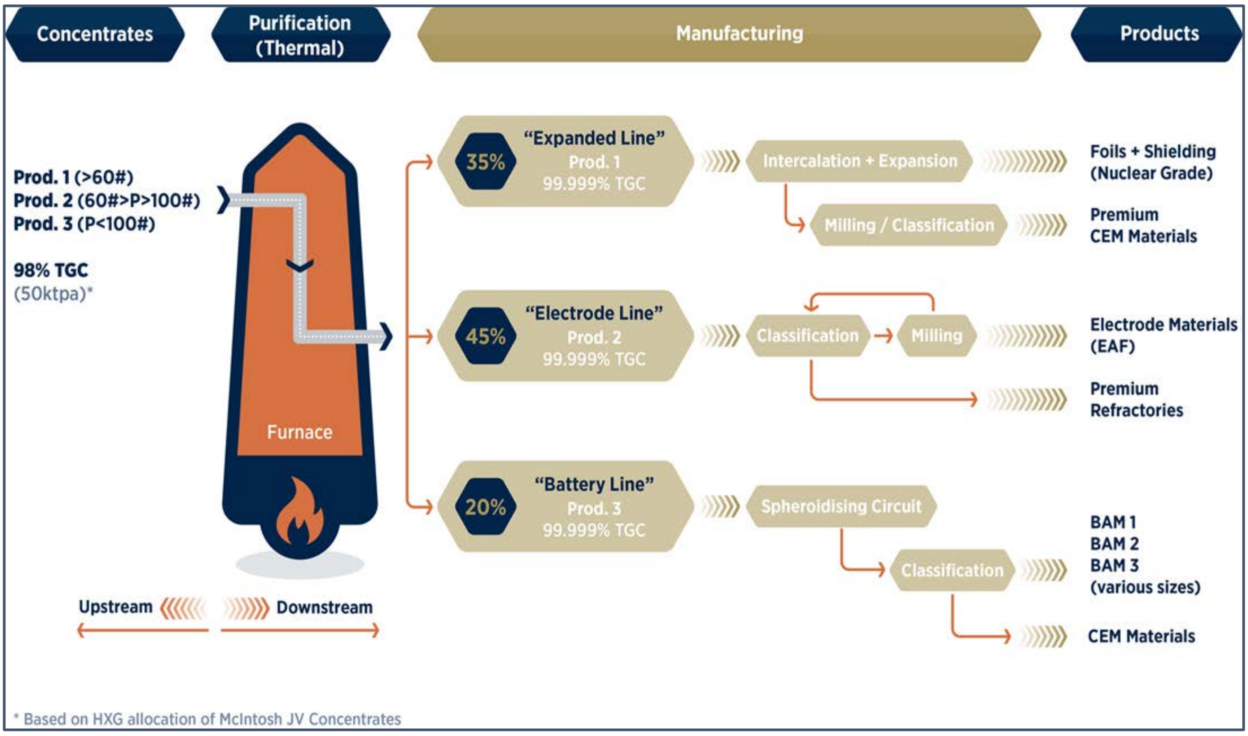


Figure 1 note: downstream test work currently underway on the following lines:

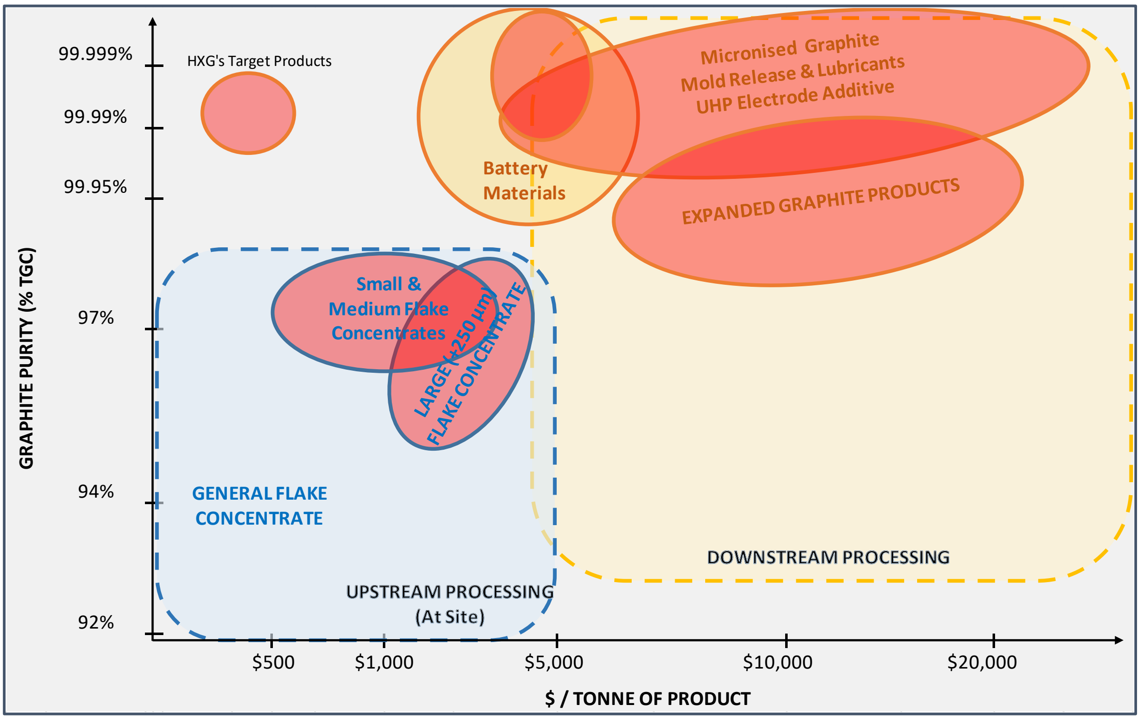
1. "Electrode" Line:

- Planned to comprise range of milled and classified graphite materials, including feedstocks to UHP electrodes (in EAF furnaces), high purity, ultra-fine lubricants and premium refractories used in speciality applications.

2. "Battery" Line for advanced battery applications:

- Battery Anode Material (**BAM**) in several, narrow size distribution specifications
- Conductivity Enhancement Materials (**CEM**)

Figure 2: HXG's Planned Product Lines for Upstream & Downstream; Price and Purity Matrix*



**Schematic concept diagram to illustrate relationship between purity and price for HXG's planned products.*

TECHNICAL DISCUSSION

Hexagon's US technology partner, NAmLab completed thermal purification test work on a 19.5kg (43lbs) sample of McIntosh graphite concentrate grading 97.5 wt. % TGC. Tests were aimed to generate simulation data for the design and operating parameters of Hexagon's planned EFB furnace(s) and demonstrate consistent purification results for a larger sample size.

In an EFB furnace, graphitic material is cascaded down into a counter current of upwelling nitrogen gas around a central electrode core and a crucible creating millions of short-lived electrical arcs to generate temperatures of between 2,000 and 3,000°C. This is a continuous process with purified graphite collecting at the base of the furnace and impurities and ultra-fines being carried up the furnace flu and ultimately captured in a scrubber and baghouse system. This is in contrast to slow, static thermal purification systems such as Acheson furnaces, which operate in a batch mode with very long (approximately 3 weeks) residence times.

For Hexagon's flake, the advantages of employing EFB furnaces include:

a. short-residence time (< 1 hour) required to volatilise the impurities due to the impurities located predominantly on flake surface and not embedded within the structure of flake as gangue;

b. uniformity of purification outcomes across the bulk feedstock;

c. precise control of the residence time via the counter-current control, and

d. the continuous nature of the operation.

These factors combined should achieve significantly lower operating costs than other graphite refining techniques.

To benchmark the EFB furnace performance, Hexagon also submitted a sub-sample from the same concentrate batch to a well credentialed laboratory[2] employing more traditional and widely utilised "Acheson style" furnaces – but with proprietary technical advances reducing the residence time to c. 8 days at 2,500 °C.

The purification outcomes utilising standard LOI carbon (C) analysis techniques were:

1. EFB prototype method:
   99.9991 wt. % TGC and 99.998 wt. % TGC to give average result of 99.999 wt. % TGC

2. Acheson Style:
   99.9845 wt. % TGC

Full ICP elemental analytical scans were run for both samples to determine the level of any potentially deleterious elements. A review of the results for typical battery contaminants such as silica, molybdenum, copper, aluminium, vanadium, uranium, iron, sulphur, tin or thorium indicated levels either below detection limits (sub ppm levels) or significantly below the specifications for advanced battery applications.

The refined concentrate grade of 99.999% wt. % TGC achieved is greater than the purity requirement of the advanced battery industry (i.e. 99.95 wt.% TGC) and even greater than the overall 99.995 wt.% TGC purity requirement identified in ASTM Standard D7219-08 "Standard Specification for Isotropic and Near-Isotropic Nuclear Graphite" – which is well understood by Hexagon. Material of this stated purity has average basket prices in excess of US $20,000 per tonne.

[2] Note: Acheson furnace test work was undertaken independently by Hexagon and not NAmLab.

It is important to understand that specification in relation to purity has two components; a minimum total graphitic carbon (TGC) content and a list of contaminants with maximum levels for each element. By way of example, a standard battery grade anode material (BAM) graphite has to have a minimum carbon content of 99.950 % wt. TGCC. That is, all impurities cannot exceed 0.05% or 500 ppm (parts per million). Note, in Hexagon's case impurities have already been reduced to .001% or less than 10 ppm. The second aspect of purity relates to "what is in that non-carbon 0.05%" because contaminants increase risk (e.g. risk of gassing inside a battery system), and the concentration of certain critical contaminants must be less than the specific maximum permitted level. Therefore, purity results must be qualified in conjunction with the data on graphite concentration of potentially deleterious elements. Naturally, the concentration of critical elements, such as arsenic, tin, molybdenum, antimony, silica, lead, cadmium, cobalt, nickel, iron, manganese, chrome, vanadium, copper, calcium and aluminium must be kept below their expected maximum levels, established in specifications for a particular battery manufacturer and cell model. Table 1 provides an elemental scan for the purified McIntosh concentrate focussing on critical battery contaminants indicating that battery contaminants comprise less than 9 ppm in total and each element falls well below the maximum limit specification.

COMMERCIAL IMPLICATIONS

Achievement of "5-Nines" purity at this larger, pilot scale sample size is another major milestone towards commercialisation that the Company is very excited about.

Hexagon is targeting enhanced purities with its natural crystalline flake graphite products in order to access higher-priced and higher margin market segments. This focused strategy also creates a more robust value proposition; namely lower impurities means lower risk for the customer and in any market downturns, McIntosh graphite would remain the preferred material in preference to the lower quality products.

The "premium" markets that Hexagon is targeting are some of the highest value in the industry sector, for example, those meeting or exceeding the ASTM Standard D7219-08 "Standard Specification for Isotropic and Near-Isotropic Nuclear Graphite", in excess of US $20,000 per tonne. As well, Hexagon's target markets have scale.

Many of these markets are currently supplied by synthetic graphite, which is a much larger market by volume and value than that of natural graphite. Examples of large volume markets that demand high purity and specific particle sizing include the electric arc furnace electrode market (e.g. iron, steel, magnesium, and aluminium smelting) which is a +1,000,000 tpa industry segment, the specialty refractory market comprising 80,000-120,000 tpa and the high grade mould release lubricant materials with a total market scale of 80,000 to 100,000 tpa.

Hexagon's current test work regimen is relevant to all these market segments and further test work and collaboration with customers is in progress to help focus our future product mix and specifications as the company matures to the level of commercial supply of its graphite. Pilot scale purification test work, is planned to transition to Qualification scale to lock in customer contracts and rapidly to full Production scale.

Table 1: ICP Elemental Scan of Purified McIntosh Graphite – critical battery impurities.

Element	Concentration PPM	Common* Max. Limit
S	7.4010	100
As	0.0000	1.0
Sn	0.4920	2.0
Mo	0.1538	2.0
Sb	0.0000	2.0
Si	0.5724	200
Zn	0.0000	2.0
Pb	0.0000	5.0
Cd	0.0000	5.0
Co	0.0000	3.0
Ni	0.0000	5.0
Fe	0.0000	30
Mn	0.0000	10.0
Cr	0.0000	5.0
V	0.0000	10.0
Cu	0.0000	5.0
Ca	0.0000	30
Al	0.0000	10

** Indicative for advanced battery grade graphite.*

COMPETENT PERSONS' ATTRIBUTIONS

Exploration Results and Mineral Resource Estimates

The information within this report that relates to exploration results, Exploration Target estimates, geological data and Mineral Resources at the McIntosh and Halls Creek Projects is based on information compiled by Mr. Mike Rosenstreich who is an employee of the Company. Mr. Rosenstreich is a Fellow of The Australasian Institute of Mining and Metallurgy and has sufficient experience relevant to the styles of mineralisation and types of deposits under consideration and to the activities currently being undertaken to qualify as a Competent Person(s) as defined in the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves and he consents to the inclusion of this information in the form and context in which it appears in this report.

Metallurgical Test Work Outcomes

The information within this report that relates to metallurgical test work outcomes and processing of the McIntosh material is based on information provided by a series of independent laboratories. Mr. Rosenstreich (referred to above) managed and compiled the test work outcomes reported in this announcement. A highly qualified and experienced researcher at NAmLab planned, supervised and interpreted the results of the NAmLab test work. Mr. Michael Chan of Hexagon Resources, Ltd. also reviewed the metallurgical test work outcomes. Mr. Chan is a Metallurgical Engineer and a Member of the Australasian Institute of Mining and Metallurgy. Mr. Chan and the NAmLab principals have sufficient relevant experience relevant to the style of mineralisation and types of test-work under consideration and to the activities currently being undertaken to qualify as a Competent Person(s) as defined in the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves and have consented to the inclusion of this information in the form and context in which it appears in this report.

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