BLACK CANYON

ASX Announcement

5 September 2023 ASX:BCA

Advancing Battery Grade HPMSM Development

- The Company has advanced a flowsheet design to produce **High Purity Manganese Sulphate Monohydrate (HPMSM)** suitable for the manufacture of cathode precursor used in lithium-ion batteries.
- Hydrometallurgical testwork on manganese oxide samples from the expanded HPMSM variability strategy has continued with the completion of acid leaching which is to be followed by multistage precipitation/purification and then crystallisation.
- Acid leach tests have **yielded excellent results with up to 99% extraction rates** from samples gathered from KR1, Balfour East, Pickering and Damsite prospects.
- Next steps involve precipitation and purification on the KR1 sample where the Company has recently discovered a significant zone of outcropping manganese mineralisation [1].
- The planned program is part of the expanded regional manganese oxide variability testwork to identify potential HPMSM manganese feedstock(s) from 100% owned tenement holdings across the Balfour Manganese Field.
- The recently completed 7,000m RC drill program was designed to establish Mineral Resource Estimate (MRE) potential across a number of these HPMSM feedstock sources.
- The demand for HPMSM continues to rise year on year with the USA and Europe actively seeking the establishment of independent supply chains within their own or free trade partner jurisdictions. The Company believes that downstream HPMSM production is a key growth opportunity and is actively pursuing its development.

Australian manganese explorer and developer, Black Canyon Limited (**Black Canyon** or **the Company**) (ASX:BCA), is pleased to announce HPMSM testwork has delivered high acid leaching extraction rates from manganese oxide material gathered across four sites from the Balfour Manganese Field. The Company has continued to advance a potential flowsheet designed to produce High Purity Manganese Sulphate Monohydrate (HPMSM).

Black Canyon Executive Director, Brendan Cummins, said:

"The HPMSM strategy is strongly supported by the evolution of Li-ion batteries and specifically cathode chemistries with battery technology developers increasing safety and energy density from more readily available materials, which includes higher manganese content across a growing range of battery platforms.

[1] BCA Announcement 23 August 2023 – Drill results confirm Manganese Discovery at KR1

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It is an exciting space as the demand for HPMSM is expected to continue over the coming decade with limited non-Chinese supply options. Western OEM supply managers have been very active in the lithium and nickel space, reflected in several transactions across a range of Australian and Canadian based projects. It is only a matter of time before the level of interest in manganese, particularly manganese sourced from Australia accelerates and Black Canyon is positioning itself to be ready for this demand."

"This HPMSM testwork has been applied to manganese oxide materials gathered across the Balfour Manganese Field, where the Company recently completed successful maiden RC drilling programs to establish Mineral Resource potential [1]. The identification of higher-grade manganese mineralisation that is outcropping or close to surface provides optionality for the development of standalone HPMSM feedstocks that may be permitted relatively quickly due to the potential lower impacts of a small footprint operation."

"The hydrometallurgical leaching and planned multistage purification stages should continue to demonstrate the amenability of manganese oxide ores to downstream processing. The technology to purify oxide ores has been established across other hydrometallurgical applications and we have been busy at the laboratory investigating several methodologies with the aim to minimise complexity where possible, potentially reduce CAPEX and define a reliable cost-effective flowsheet design."

Expanded HPMSM Feedstock Variability Studies (BCA 100%)

The Company is seeking to develop a low CAPEX, low impact mining facility that could be permitted and approved relatively quickly. This would potentially reduce the timeframes for Black Canyon to supply manganese oxide feedstock to a downstream HPMSM facility. Black Canyon has commissioned experienced environmental and approval advisors, Preston Consultants, to advise on the likely environmental studies, approvals and timeframes required for a campaign-based mining operation utilising simple beneficiation processes to upgrade the manganese oxide materials in preparation for hydrometallurgical processing into HPMSM.

Environmental surveys have commenced at KR1 and KR2 to gather initial baseline data so more detailed Autumn surveys can be planned and scheduled.

Black Canyon has continued to advance its feedstock variability studies to ascertain the amenability of various manganese ore sources to simple beneficiation, leaching and ultimately producing battery grade HPMSM. As part of the expanded variability study, the Company has completed the following:

1. Reviewed several manganese oxide targets from across the Company's 100% owned tenement portfolio within the Balfour Manganese Field.[2]
2. Collected 20kg to 30kg of manganese oxide material from shallow trenches across several priority sites.
3. The samples have been subject to initial crushing and assay to determine the *in situ* grade of the oxide samples (Table 1 and Figure 1).
4. A subset of samples was selected for beneficiation to further improve the manganese grade of the potential feedstock material.
5. Completed simple beneficiation comprising scrubbing and washing to ascertain the upgrading performance of the samples (Table 1).

[2] BCA Announcement 14 February 2023 – Exploration and Manganese Sulphate Update

Table 1. Oxide manganese targets showing in situ manganese grade and beneficiated manganese grade.

Target	Status	East GDA94	North GDA94	*In situ* Mn Grade (%)	Scrubbed/washed Manganese Upgrade			
					Size fraction	Mn grade (%)	Mn % Recovery	Mn Upgrade (%)
Pickering	RC drilled	255735	7467834	**14.8**	-38+1.18mm	**20.1**	61.3	35.5
Damsite	RC drilled	252428	7471312	**20.2**	-38+1.18mm	**31.1**	82.6	53.8
Balfour East	RC drilled	257186	7435086	**21**	-38+1.18mm	**31.4**	91.8	49.4
Hurricane		256541	7462987	**28.5**	-38+1.18mm	**33.8**	62.2	18.7
KR1	RC drilled	276813	7475563	**25**	-38+1.18mm	**36.6**	85.4	46.3
West Valley		267685	7533453	6.97	Not selected for further processing			
Mt Divide		269337	7534692	12	Not selected for further processing			

The expanded HPMSM strategy is in addition to the ongoing Flanagan Bore activities where the Company has established a Mineral Resource Estimate of **171 Mt @ 10.3% Mn**.[3] Flanagan Bore is part of the Carawine JV where Black Canyon has earnt a 75% interest.

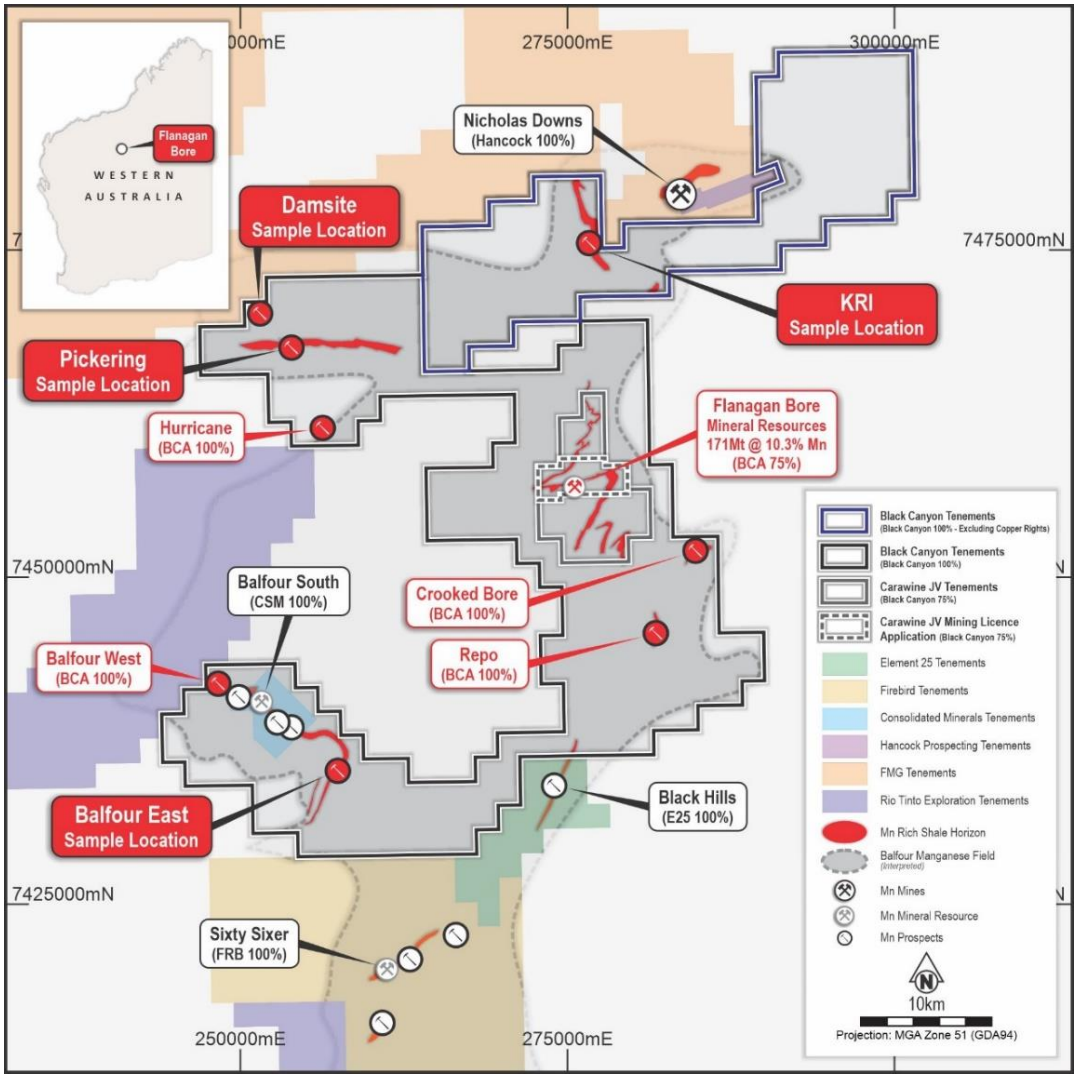

Figure 1. Manganese Oxide hydrometallurgical sample location and drill targets identified for the HPMSM variability studies which include KR1, Pickering, Hurricane and Balfour East.

[3] BCA Announcement 24 November 2022 – Flanagan Bore Mineral Resource Estimate Increased by 64%

Expanded HPMSM Leaching and Purification Program (BCA 100%)

Following review of the chemical analysis from the beneficiated samples, four samples were selected for detailed acid leaching testwork. The Company split 1kg subsamples and ground the material to 212 µm before applying a reductive acid leach (SO_2), which achieved between 86.0 and 99.2% manganese recovery to the pregnant liquor solution (PLS). The leach tests were maintained at 90°C once the initial exothermic reaction was completed. The results of the leach recoveries are presented in Table 2.

Following the successful leaching phase, the data has been reviewed and sample KR1 was selected for multistage precipitation/purification which will be followed by chemical extraction to concentrate the manganese in solution prior to crystallisation.

Table 2. Manganese leach recoveries from simple beneficiated ore

Target	Mn Head Assay (%)	Mn Leach Recovery (%)
Balfour East	30.7	99.2
Hurricane	34.7	98.8
KR1	**36.1**	**97.0**
Dam Site	31.3	86.0

HPMSM Strategy Rationale

Whilst manganese is primarily used in the steelmaking industry, a significant growth market is emerging in the electric vehicle (**EV**) sector. In an increasing number of EV battery compositions, manganese is used in the cathode and makes up a significant proportion of the battery volume. The introduction of the manganese into LFP batteries, high manganese iron-nickel and high lithium manganese compositions will likely see further demand for HPMSM.

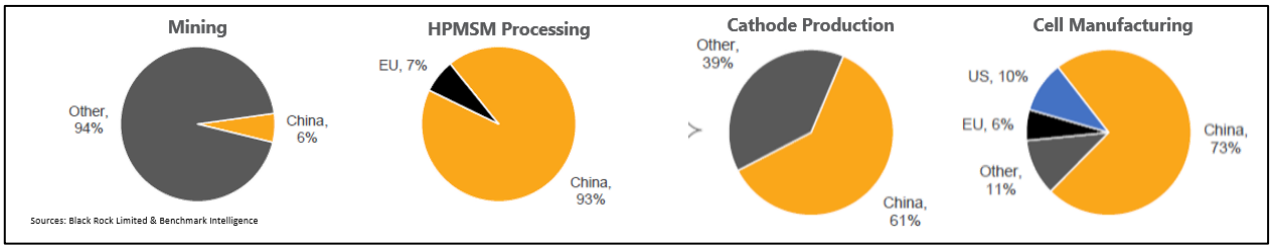

Figure 2. Current supply chain for HPMSM-cathode and cell production dominated by China

Currently, China dominates the HPMSM market, with over 90% of global production. Similar to other cathode precursor materials, the requirement for security and diversification of supply will become a significant factor inducing the establishment of additional supply outside of China, primarily for the American and European car manufacturing industries. The US Government has a critical mineral list that the Biden Administration identified as critical for domestic energy, electronics and defence that includes manganese. The Inflation Reduction Act recently approved by the US Government and the Free Trade Agreement between the US and Australia enables direct US investment into Australian critical mineral projects and will substantially incentivise electric vehicle and clean energy industries to establish operations in the US. This has continued to positively impact US and European investment in the development of new cathode or battery pack production capacity in parallel with joint ventures between automakers and battery manufacturers to meet growing EV demand. The potential benefit to Black Canyon is the rapid expansion of the manganese sulphate market beyond China and an interest in gaining access to long term physical supplies of manganese from a Tier 1 location like Australia.

This announcement has been approved by the Board of Black Canyon Limited.

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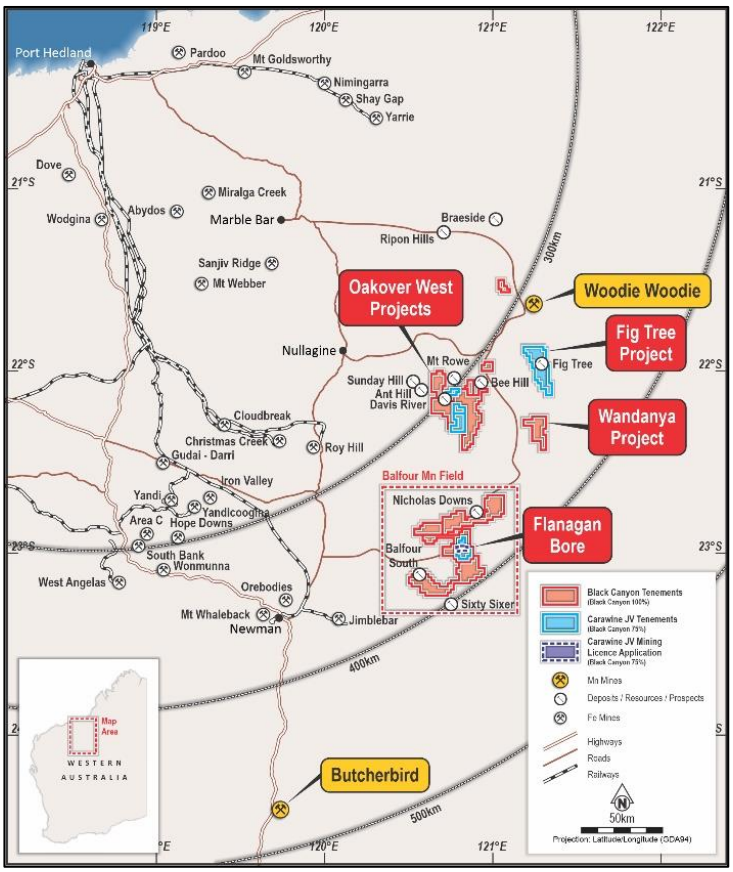
About Black Canyon



Black Canyon has consolidated a significant land holding totalling 2,400km^2 in the underexplored Balfour Manganese Field and across the Oakover Basin, in Western Australia.

The emerging potential for the Balfour Manganese Field is evident by the size of the geological basin, mineral resources identified to date, distance from port, potential for shallow open pit mining and a likely beneficiated Mn oxide concentrate product grading between 30 and 33% Mn. Black Canyon holds several exploration licenses 100% within the Balfour Manganese Field along with a 75% interest in the Carawine Joint Venture with ASX listed Carawine Resources Limited. A Mineral Resource (Measured and Indicated) of **171Mt @ 10.3% Mn** has been defined at Flanagan Bore which is part of the Carawine JV.[2]

Manganese continues to have attractive fundamentals where it is essential and non-substitutable in the manufacturing of alloys for the steel industry and a critical mineral in the cathodes of Li-ion batteries.

Compliance Statements

Reporting of Exploration Results and Previously Reported Information

The information in this report that relates to Exploration Results is based on, and fairly represents, information and supporting documentation reviewed by Mr Brendan Cummins, Executive Director of Black Canyon Limited. Mr Cummins is a member of the Australian Institute of Geoscientists, and he has sufficient experience which is relevant to the style of mineralisation and type of deposits under consideration and to the activity which has been undertaken to qualify as a Competent Person as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Mr Cummins consents to the inclusion in this release of the matters based on the information in the form and context in which they appear. Mr Cummins is a shareholder of Black Canyon Limited.

The information in this report that relates to metallurgical testwork results is based on information reviewed by Mr David Pass, who is a Member of the Australasian Institute of Mining and Metallurgy. Mr Pass is an employee of BatteryLimits and consultant to Black Canyon Limited. Mr Pass 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 Pass consents to the inclusion in the report of the matters based on the reviewed information in the form and context in which it appears.

For further information, please refer to ASX announcements dated 17 May 2021, 10 June 2021, 7 July 2021, 5 October 2021, 4 January 2022, 8 February 2022, 21 February 2022, 2 March 2022, 23 March 2022,13 April 2022, 9 June 2022, 7 September 2022, 15 September 2022, 11 October, 21 & 24 2022 November 2022, 5 December 2022, 28 December 2022, 14 February 2023, 27 March 2023, June 1 2023, June 14 2023, June 17 2023, July 14 2023 and 23 August 2023 which are available from the ASX Announcement web page on the Company's website. The Company confirms that there is no new information or data that materially affects the information presented in this release that relate to Exploration Results and Mineral Resources in the original market announcements.

Appendix 1. JORC 2012 Table 1

Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	• Shallow hand dug trench samples of *in situ* manganese and clay material comprising 1 to 2m trenches, dug down 20 to 30cm to produce a 20kg to 30kg per sample. • Each sample was described at the site and time of collection to ensure accurate records of sampled material. Samples were selected based on the identification of manganese mineralisation. • The samples are selective but representative of the outcrop from which they were taken. • Surface sampling is an industry wide field technique for establishing metal content to understand potential tenor of the underlying mineralisation.
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• Not applicable
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• Not applicable
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• All samples have been logged at the time and location of collection, enabling them to be placed in geological context. • All surface samples have been logged and photographed to high detail.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• Samples were collected dry and consisted of multiple chips and soil/clay material. • Samples were between a nominal 20kg - 30kg weight and placed directly in to numbered plastic buckets at the collection point. • Appropriate sample preparation and assay techniques were designated at the point of collection. • Single trench samples were collected.
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias)*	• The samples were submitted to NATA accredited ALSChemex Metallurgy in Balcatta • The 20 to 30kg samples were crushed and homogenised prior to splitting and assay to produce the *in situ* manganese grade. • The sample was analysed using method ME-XRF26s for manganese ores using fusion disc XRF for Fe,

Criteria	JORC Code explanation	Commentary
	and precision have been established.	SiO2, Mn, Al2O3, • Black Canyon did not insert standards or any other QAQC material. • The assay data has sufficient quality for the reporting of Exploration Results at this early stage of exploration and processing understanding.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• Assay results summarised in the context of this report have been rounded appropriately. • The results have been reviewed by other technical members of the Board. • The samples were not taken from drill holes so twinned holes don't apply. • No assay data has been adjusted.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• Sample locations were surveyed by a handheld GPS +/-5m, at the time of sample collection. • RL was not recorded and is not relevant to surface samples. • Coordinates reported are GDA Zone 51. • Location data is considered to be of sufficient quality for reporting of results at this early stage.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing, and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• Selective sampling based on field observation and outcrops identified as hosting potential for mineralisation. • Should not be considered representative of the rock mass as a whole but an indication of the local grade at surface
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• Samples are representative only of the material sampled and based on surface outcrops it is unknown if the samples have a bias related to orientation of structures or mineralised horizons.
Sample security	• *The measures taken to ensure sample security.*	• The samples were generally placed in plastic buckets or plastic bags and transported to Perth under the supervision if BCA staff. • The analysing laboratories will normally report any tampering or missing samples. • This is not considered a high risk given the Project location and transportation method.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• Not applicable at this early stage of exploration

Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• The trench samples were taken across tenements E46/1383, E46/1382, E46/1404, E46/1394 and E46/1396 • Black Canyon owns these licenses 100% • The tenements are subject to Native title and forms part of a Heritage Agreements with the Palyku-Jartay, Njamal and Karlka Nyiyaparli People
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Previous exploration work on the tenements is limited with the majority of the targets mentioned in this release never been drilled. • Black Canyon recently drilled the main targets mentioned in this release • The exception is Hurricane where FMG drilled a number of holes into the target and reported high grade manganese intersects.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• The tenements are located within the Balfour Manganese Field, the edges of which are defined by the Neoarchaean Fortescue Group. Most of the tenements are covered by quaternary alluvium, sheetwash and outcrop only exists within the southern part and consists of rocks of the Manganese Group, mainly the Encheddong Dolomite and Balfour Formation. The tenements contain widespread manganese scree associated with manganese enriched Balfour Formation shales. • Hydrothermal styles of mineralisation are typically located inside and at the contact between the Carawine Dolomite and the Pinjian Chert from the upper Hamersley Group. The mineralisation shows a distinct alteration halo with the core dominated by manganese radiating out to iron oxides such as goethite and limonite.

Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:*
	  ○ *easting and northing of the drill hole collar*
	  ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar*
	  ○ *dip and azimuth of the hole*
	  ○ *down hole length and interception depth*
	  ○ *hole length.*
	• *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*
		• All grab sample location data is presented in the text.
		• There are no drill holes reported in this release.

Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques,*	• No data aggregation has been undertaken on single point samples

Criteria	JORC Code explanation	Commentary
	maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated. • *Where aggregate intercepts incorporate short lengths of high-grade results and longer lengths of low-grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').*	• No drill widths or intervals reported
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• See body of the release for a tabulation of Mn *in situ* and upgraded assay results
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• Information considered material to the reader's understanding of the sampling and results have been reported in the body of the text
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• All information considered material to the reader's understanding and context of the results have been reported. • All trench sample data has been reported in the body of the text. • The main targets have now been drilled using RC drill techniques
Further work	• *The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• Further hydrometallurgical test work will continue on some of the samples mentioned in this release.