



**BeMetals Corp.**

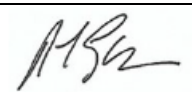
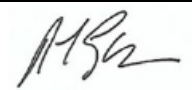
## **Technical Report - The Pangeni Project Northwest Province, Republic of Zambia**

**April 2018**

**Report No. AMC-RES-BMET-R20180410-ITR Pangeni Project  
20180619**

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The independent author acknowledges the helpful cooperation of BeMetals management and consultants, all of whom made any and all data requested available and responded openly and helpfully to all questions, queries and requests for material.

**TITLE PAGE**

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project Name:                       | The Pangen Project                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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| Effective Date of Technical Report: | 10 <sup>th</sup> April 2018                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Qualified Persons                   | <p>Mr Allan Lines, P.Geo (Association of Professional Geoscientists of Nova Scotia (APGNS) Member Number 0141) employed by African Mining Consultants as a Senior Consulting Geologist, was responsible for: Items 1-27.</p> <p>Mr Thomas Krebs, (Pr. Sci. Nat. 400146/11) South African Council for Natural Scientific Professions employed by Remote Exploration Services as a Principal Geologist authored Item 2.6.</p> <p>Mr John Wilton, (Pr. Sci. Nat., 400164/93) South African Council for Natural Scientific Professions employed by BeMetals Corp. as CEO, and President co-authored Items 1-11 and 13-24.</p> |

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## ABBREVIATIONS

| Acronym / Abbreviation | Description                                              |
|------------------------|----------------------------------------------------------|
| @                      | At                                                       |
| AAS                    | Atomic absorption spectroscopy                           |
| AC                     | Air-core drilling                                        |
| AiCu                   | Acid Insoluble Copper Grade                              |
| APGNS                  | Association of Professional Geoscientists of Nova Scotia |
| As                     | Arsenic                                                  |
| AsCu                   | Acid Soluble Copper Grade                                |
| Ba                     | Barium                                                   |
| Bi                     | Bismuth                                                  |
| c/w                    | Complete with                                            |
| CP                     | Competent Person                                         |
| Co                     | Cobalt                                                   |
| Cu                     | Copper                                                   |
| DD                     | Diamond drilling (core drilling also used)               |
| DRC                    | Democratic Republic of the Congo                         |
| EIZ                    | Engineering Institute of Zambia                          |
| F                      | Fellow                                                   |
| FQML                   | First Quantum Minerals Limited                           |
| GPS                    | Global positioning system                                |
| GS                     | Geological Society of London                             |
| ICP-AES                | Inductively coupled plasma atomic emission spectroscopy  |
| ICP-OES                | Inductively coupled plasma optical emission spectroscopy |
| ISO                    | International Organisation for Standardisation           |
| K                      | Potassium                                                |
| M                      | Member                                                   |
| Mo                     | Molybdenum                                               |
| MRE                    | Mineral Resource Estimate                                |
| Ni                     | Nickel                                                   |
| No.                    | Number                                                   |
| NPV                    | Net present value                                        |
| N/R                    | No result                                                |
| P.Geol                 | Professional Geoscientist or Professional Geologist      |
| Pb                     | Lead                                                     |
| QA                     | Quality assurance                                        |
| QC                     | Quality control                                          |
| QP                     | Qualified Person                                         |
| RC                     | Reverse circulation drilling                             |
| RST                    | Roan Selection Trust                                     |
| SAIMM                  | South African Institute of Mining and Metallurgy         |
| Sc                     | Scandium                                                 |
| SG                     | Specific gravity                                         |
| SoW                    | Scope of work                                            |
| TCu                    | Total Copper Grade                                       |
| Th                     | Thorium                                                  |
| U                      | Uranium                                                  |
| US\$                   | United States Dollar                                     |
| V                      | Vanadium                                                 |
| XRF                    | X-ray fluorescence                                       |
| Zn                     | Zinc                                                     |

## UNITS OF MEASUREMENT

| Unit                | Description                      |
|---------------------|----------------------------------|
| °                   | Degree                           |
| °C                  | Degree Celsius                   |
| %                   | Percentage                       |
| amsl                | Above mean sea level             |
| g                   | gram                             |
| g/l                 | Grams per litre                  |
| g/m <sup>3</sup>    | Grams per cubic metre            |
| g/t                 | Grams per tonne                  |
| h                   | Hour                             |
| h/a                 | Hours per annum                  |
| h/day               | Hours per day                    |
| km                  | Kilometre                        |
| km <sup>2</sup>     | Square kilometres                |
| koz.                | Kilo-ounce                       |
| kph                 | Kilometres per hour              |
| kt                  | Kilo-tonne                       |
| kt/m                | Kilo-tonne per month             |
| L                   | Litre                            |
| l/m <sup>2</sup> /h | Litres per square metre per hour |
| m                   | Metre                            |
| m <sup>2</sup>      | Square metre                     |
| m <sup>3</sup>      | Cubic metre                      |
| m <sup>3</sup> /a   | Cubic metres per annum           |
| m <sup>3</sup> /h   | Cubic metres per hour            |
| mg/L                | Milligrams per litre             |
| ml                  | Meter Level                      |
| mm                  | Millimetre                       |
| mh                  | Metres high                      |
| mw                  | Metres wide                      |
| Moz.                | Million-ounce                    |
| Mt                  | Million-tonne                    |
| Mt/a                | Million-tonne per annum          |
| ppm                 | Parts per million                |
| \$                  | United States Dollar             |
| \$/t                | United States Dollars per tonne  |
| t                   | Tonne                            |
| tpa                 | Tonnes per annum                 |
| t/d                 | Tonnes per day                   |
| t/h                 | Tonnes per hour                  |
| t/m <sup>3</sup>    | Tonnes per cubic metre           |
| µm                  | Micron                           |

## **1 SUMMARY (ITEM 1)**

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This Technical Report ("Report") was compiled by African Mining Consultants (AMC) for BeMetals Corp. (BeMetals) to provide an independent technical report for the Pangeni Project (the "Property"). The Report was written by Mr Allan Lines, P.Geo., Mr Thomas Krebs, Pr. Sci. Nat., authored item 2.6, Mr. John Wilton Pr.Sci.Nat., co-authored items 1-11 and 13-24.

Mr Allan Lines is an Independent Qualified Person as defined by NI43-101 guidelines as described in Section 2.5. Mr Thomas Krebs is an Independent Qualified Person as defined by NI43-101 guidelines as described in Item 2.5. Mr John Wilton, (Pr. Sci. Nat., 400164/93) is a Qualified Person as defined by NI43-101 guidelines as described in Section 2.5 employed by BeMetals Corp. as CEO, and President.

Mr Allan Lines, P.Geo. has provided independent comments on each relevant item of the report and accepts overall responsibility for the report as applicable and required. Mr Thomas Krebs was the independent author of Item 2.6 and completed the valid site visit. This Report summarises the findings from exploration programs completed by Copper Cross Zambia Ltd ("CCZ") during the period 2015 to 2017. There have been no previous technical reports released for the Pangeni Project by BeMetals Corp.

This report is an Independent Technical Report indicating the merit of the Property as being prospective to support further, copper focused, mineral exploration as detailed within. It reviews the quality of the early stage exploration work completed and associated results on the Property to date. This exploration work was completed by CCZ during 2015-2017 through an Earn-In Agreement with Pangeni Minerals Resources Limited ("PMRL") the 100% licence holder ("Licence Holder"). CCZ is a wholly owned subsidiary company of Manica Zambia Limited. BeMetals has secured rights through an overlying Earn-In Agreement with Manica Zambia and CCZ (or the "Vendor"), acknowledged by PMRL, to 72% interest in the property. BeMetals now intends to fund and complete additional early stage exploration studies of this Property.

### **1.1 PROPERTY DESCRIPTION AND OWNERSHIP**

The Property is located in the boundaries of large-scale exploration licence 19310-HQ-LEL ("Licence") in the Manyinga District of North-Western Province, Republic of Zambia. The Property is located approximately 255km west of the established mining centre of Solwezi. The approximate centre of the licence occurs at a latitude of 12°43'S and a longitude of 24°00'E and is accessible from Solwezi by the T5 or M8 tarred highways and secondary paved and gravel roads.

The Property totals 575.68km<sup>2</sup>. Pangeni Mineral Resources Limited (PMRL) is the 100% owner of the licence 19310-HQ-LEL issued by the Ministry of Mines and Minerals Development, Zambia. PMRL entered into an Earn-In Agreement with CCZ dated 12th June, 2015. The terms of this agreement provide for CCZ to earn rights to 90% interest in the Property through funding US\$ 2.7 million in exploration expenditures, delivering a technical study, and making cash payment of US\$ 700,000. Approximately US\$ 1,463,000 of the US\$ 2.7 million has been expended by CCZ since 2015 in a joint venture with Antofagasta Minerals.

BeMetals has secured the rights to earn a 72% interest in the Property through a binding letter, earn-in and option agreement with CCZ and Manica Zambia Limited ("Vendor"), dated 2nd November,

2017. CCZ is a wholly owned subsidiary company of Manica Zambia Limited. Through these rights BeMetals can initially acquire a 67.5% interest in the Property over a five-year period by expending US\$2.5 million on exploration, incurring cash payments of US\$1.45 million and issuing 500,000 shares, and delivering a preliminary economic assessment for the project. Following acquisition of the initial 67.5% interest, BeMetals can acquire an additional 4.5% (aggregate 72%) interest by completing a feasibility study and making a further cash payment of US\$750,000.

## 1.2 GEOLOGY AND MINERALISATION

The Property lies within the western extension of the Lufilian Arc, within the Domes Region, comprising Paleoproterozoic basement sequences overlain by Neoproterozoic Katangan meta-sediments that host the bulk of the copper-cobalt deposits within the Central African Copperbelt. The Property is broadly overlain by Kalahari Group sequences<sup>1</sup> which are interpreted to vary in thickness from 2 to 40m over approximately 80% of the Property.

The Property is geologically prospective for the deposit types listed below:

- Basement-hosted Cu ( $\pm$ Co  $\pm$ U) (Analogue: the Lumwana Deposit operated by Barrick Gold Corporation); and
- Sediment-hosted stratiform Cu ( $\pm$ Co) (Analogues: Zambian Copperbelt deposits e.g. the Nchanga and Konkola Deposits, operated by Konkola Copper Mines, a subsidiary of Vedanta Resources Plc., the Nkana and Mufulira Deposits operated by Mopani Copper Mines Ltd. and the Domes Region deposits e.g. the Sentinel and Kansanshi Deposits, operated by First Quantum Minerals Ltd.).

The mineralisation, identified within the Property to date, is characteristic of basement-hosted copper mineralisation in Zambia. Typically, it occurs in strongly foliated, locally mylonitic, quartz-biotite-muscovite-scapolite ( $\pm$ kyanite) schists.

Hypogene copper mineralisation predominantly occurs as chalcopyrite with lesser bornite, with chalcopyrite and bornite also commonly occurring as stringers, blebs, and to a lesser extent as salvages within quartz  $\pm$  carbonate veins. Chalcopyrite and bornite mineralisation is frequently parallel to foliation and possibly stretched due to shearing. Copper mineralisation is associated with weakly anomalous concentrations of Co, Mo, Ni, Zn, Sc and V.

## 1.3 STATUS OF EXPLORATION

Very little previous exploration had been conducted on the Property prior to 2014. Geochemical anomalies were first identified by Roan Selection Trust between 1958-64. Pangeni Mineral Resources Limited were granted the exploration rights over the Property in June 2014. Exploration programs since this date have included a fixed-wing airborne geophysical survey, regional geological mapping to support geophysical interpretations, and surface geochemical sampling.

Between June 2015 and April 2017, the funding and overall technical management of the mineral exploration of this licence was provided by Antofagasta Minerals in a joint venture earn-in agreement with Copper Cross Zambia Limited and Manica Zambia Limited (the "Vendor").

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<sup>1</sup> The Kalahari Group typically consists of un- to semi-consolidated quartzitic sands. The sands are aeolian deposits younger than Miocene in age (Key et al., 2001).

Initial exploration programs have identified eleven (11) priority exploration targets. Two of these targets (Central and South West) are more advanced and have been drill tested with a limited number of boreholes to date.

Targeting using both geochemical and geophysical datasets, and criteria derived from models of deposit formation in Zambia, culminated in exploration drilling (by the Vendor) towards the end of 2016. Five core drill holes were drilled by Blurock Mining Services, Kitwe, Zambia, completed under the supervision of Remote Exploration Services (Pty) Ltd. A total of 1,005.10m were drilled.

All five holes intersected hypogene copper mineralisation. The most significant intersection included borehole CT1: 6.1m @ 0.34%TCu and borehole SW1: 5.5m @ 0.48%TCu.

#### **1.4 CONCLUSIONS AND RECOMMENDATIONS**

The Property is located on the western extension of the Domes Region of the Zambian Copperbelt. The Domes region is known to host deposits, including the basement-hosted mineralisation of the Lumwana Deposit, and the sediment-hosted stratiform mineralisation of the Sentinel Deposit.

The exploration programs completed over the Property to date are appropriate for the style of mineralisation and type of deposit being explored. Basement-hosted and sediment-hosted stratiform base metal mineralisation are both considered with regards to the Property's exploration potential.

Boreholes intersected copper mineralisation at the Central and South West Targets, providing encouraging proof of concept for the geological models generated for the Property. The results of the exploration to date support the strategy for further exploration on the Property.

The independent author has reviewed and supports the proposed next steps for exploration programs across the Property as provided by BeMetals. The next phase of exploration work will include an approximately 2,400m drilling program of air-core boreholes (boreholes are planned to 40-50m depths) to test for potential mineralised extensions to the Central and Southwest Targets, under Kalahari Group cover. In addition, priority targets, identified during previous exploration programs, are to be tested. This exploration program is budgeted at approximately US\$300,000.

Further exploration of this Property will be motivated and designed following results from this air-core program.

## **2 INTRODUCTION (ITEM 2)**

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### **2.1 ISSUER**

BeMetals Corp. ("BeMetals" or the "Issuer") is a publicly owned company listed on the TSX Venture Exchange ("TSX-V"). BeMetals is seeking base metal exploration opportunities within the Central African Copperbelt ("CACB") and more advanced exploration/development projects elsewhere. BeMetals currently has one principal asset, the Pangení Project (the "Property").

### **2.2 PURPOSE OF THE REPORT**

The primary purpose of this Report is to provide an independent technical review of exploration work completed on the Property to date, the exploration potential generated by these results, and to assess the merits of the Property to support BeMetals' future exploration strategy.

The report is intended to be submitted to the TSX Venture Exchange (the "Exchange") and other regulatory bodies as part of BeMetals Qualifying Transaction (under the Corporate Finance Policy of the TSX Venture Exchange) for listing on the Exchange as a Tier 2 Mining Issuer.

### **2.3 TERMS OF REFERENCE**

The independent author has been requested by BeMetals to complete an Independent Technical Report on the Pangení Project ("Property") in the North-Western Province, Zambia. This report complies with disclosure and reporting requirements set forth in the Toronto Stock Exchange Manual, National Instrument 43-101 Standards of Disclosure for Mineral Project ("NI 43-101"), Companion Policy 43-101CP to NI 43-101, and Form 43-101F1 of NI 43-101.

The effective date for this Report is 10<sup>th</sup> April 2018.

This Report uses metric measurements. The currency used is U.S. Dollars (US\$).

### **2.4 SOURCES OF INFORMATION**

Reports and documents used in the preparation of this Report are referenced in Sections 3 and 19. The technical data was taken from historical assessment reports and databases provided by BeMetals and also provided to the author by independent consultants and third-parties, retained by BeMetals in their areas of expertise, as follows:

- Mr John Wilton – President and Chief Executive Officer, (Pr. Sci. Nat., 400164/93, FGS) BeMetals Corp.
- Remote Exploration Services (Pty) Ltd (RES):
  - Mr Brett van Coller – Managing Director (Pr. Sci. Nat. 400118/10)
  - Mr Peter Hollick – Technical Director (Pr. Sci. Nat. 400113/93)
  - Mr Thomas Krebs – Principal Geologist (Pr. Sci. Nat. 400146/11)
  - Mr Luke Viljoen – Project Geologist (Candidate Sci.100311/14)
  - Mr Mathew Hodge – Project Geologist (Candidate Sci. 100271/14)

- Dr Branko Corner – Geophysicist and Senior Technical Expert – CCZ (Pr. Sci. Nat. 400029/98)
- Mr Robbie Sparrow – Independent Consulting Geologist (FGS)

Contributions were also made to this Report by African Mining Consultants (AMC):

- Dr Ross McGowan – Managing Director (FGS)

It is of value to this document to note that the principals of the Vendor namely Dr. P. Hildebrand (Managing Director) and Dr. B. Corner (Senior Technical Expert) have been intimately involved with the Pangení Project since its inception. Also Mr. J. Wilton, (President and Chief Executive Officer of BeMetals) was formerly Regional Exploration Manager: Africa with Antofagasta Minerals and ultimately responsible for the Pangení Project since inception. This allows for significant continuity and focus of the planned exploration of this Property.

## **2.5 QUALIFIED PERSON**

The following served as the Qualified Person (“QP” or “author”) as defined in National instrument 43-101, Standards of Disclosure for Minerals Projects, and in accordance with Form 43-101(F):

- Mr Allan Lines, P.Geo (0141) employed by African Mining Consultants as a Senior Consulting Geologist, was responsible for the preparation of all sections of this Report.
- Mr Thomas Krebs, (Pr. Sci. Nat. 400146/11), employed by Remote Exploration Services as a Principal Geologist, authored item 2.6 and conducted the valid site inspection.
- Mr John Wilton, (Pr. Sci. Nat., 400164/93) employed by BeMetals Corp. as CEO, and President co-authored sections 1-11 and 13-24.

## **2.6 SITE VISITS**

I, Mr Thomas Krebs (Pr. Sci. Nat. 400146/11), independent qualified person visited the Pangení Project area most recently from 1st November to 3rd December, 2016. No additional work has been completed on the Property since this personal inspection on 30th November 2016 that could have a material impact on the scientific and technical information disclosed in the technical report, and therefore this personal inspection of the Property on 30th November 2016 is current.

During this period, the drilling of CT1, CT2, CT3, as well as SW1 and SW2 took place on site. Subsequent to completion of all drilling operations on site and prior to the demobilisation, I conducted a site visit to all drill sites as part of the environmental auditing on the 30th November 2016.

All drill collar positions were inspected to ensure that rehabilitation is in compliance with the environmental project brief (EPB). Each drill position coordinates were checked with a Garmin GPS CX60. Each drill sites and drill collar caps were photographed (Plate 2.6.1- 2.6.10 below).



**Plate 2.6.1:** Overview on CT1 position post rehab.



**Plate 2.6.2:** Drill Collar Cap of CT1



**Plate 2.6.3:** Overview on CT2 position post rehab.



**Plate 2.6.4:** Drill Collar Cap of CT2



**Plate 2.6.5:** Overview on CT3 position post rehab.



**Plate 2.6.6:** Drill Collar Cap of CT3



**Plate 2.6.7:** Overview on SW1 position post rehab.



**Plate 2.6.8:** Drill Collar Cap of SW1



**Plate 2.6.9:** Overview on SW2 position post rehab.



**Plate 2.6.10:** Drill Collar Cap of SW2

### **3 RELIANCE ON OTHER EXPERTS (ITEM 3)**

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This Report has been prepared by the author, who has relied upon, and believes there is a reasonable basis for this reliance, the following experts and expert reports:

#### **3.1 MINERAL TENURE**

The various agreements under which BeMetals holds rights to the mineral and surface title for the Property have not been viewed but not comprehensively investigated or confirmed by the author, who has fully relied upon, and disclaims responsibility for, information derived from legal experts for this Report through the following documents:

- Corpus Legal, 2016: Due diligence report in respect of Pangeni Mineral Resources Limited, Large-Scale Exploration Licence No.19310-HQ-LEL held by Pangeni Mineral Resources Limited and Copper Cross Zambia Limited addressed to BeMetals .
- BeMetals Metals, 2018: unpublished internal email prepared by BeMetals (13<sup>th</sup> March 2018).

This information was used in Section 4 of the Report.

#### **3.2 ENVIRONMENTAL AND WORK PROGRAM PERMITTING**

The author has reviewed information regarding the environmental permitting status of the Property through opinions and data supplied by experts retained by BeMetals Metals Corp. The author has fully relied upon, and disclaims responsibility for, information derived from legal experts for this Report through the following documents:

- Azurite Consulting, 2015. Proposed Large Scale Prospecting Licence 19310-HQ-LPL in Manyinga District by Pangeni Mineral Resources Ltd – Final Environmental Project Brief. Unpublished report submitted to the Zambia Environmental Management Agency in 2015.
- Zambian Environmental Management Agency (ZEMA), 2015. Approval letter for the Environmental Project Brief. Ref: ZEMA/INS/101/04/1 - Unpublished letter.

This information was used in Section 4 of the Report.

#### **3.3 COMMENTS ON SECTION 3**

Historical geological, geophysical and analytical data used in this report have been compiled by the author and, to the author's knowledge all of the survey data reported are factual.

The conclusions and recommendations in this Report reflect the author's best judgment in light of the information available at the time of writing. The author reserves the right to revise the Report, and its conclusions and recommendations, if additional information becomes known to it subsequent to the effective date of the Report. Use of this Report acknowledges acceptance of the foregoing conditions.

## 4 PROPERTY DESCRIPTION AND LOCATION (ITEM 4)

### 4.1 PROPERTY LOCATION

The Property is situated in the Manyinga District of North-Western Province, Republic of Zambia. The Property is located approximately 255km west of the established mining district centred on the town of Solwezi (Fig. 4:1).

The Property is centred on a latitude of 12°43'S and longitude of 24°00'E.



Fig. 4:1: Property location map (Source: RES, 2018).

### 4.2 MINERAL TENURE

The Property consists of the one large-scale exploration licence 19310-HQ-LPL. The licence is an irregular shaped polygon having 72 corner points giving a total surface area for the permit of 575.68km<sup>2</sup>. Prior to exploration activities the licence was surveyed in accordance with Zambian legislative requirements. This has been verified by the author by examining a copy of the pegging certificate supplied by BeMetals.

The dimensions of the Property are approximately 26km (east–west) by 22km (north–south). Information on surface area, grant and expiry dates, title holder and permitted substances was confirmed by the author on the website of the Flexicadastre (<http://portals.flexicadastre.com/zambia>) which presents mineral registry data for all mineral permits in the Republic of Zambia. Corner

coordinates have been verified by the author from a copy of the licence certificate supplied by BeMetals.

*Table 4.1: Exploration licence information for the Property*

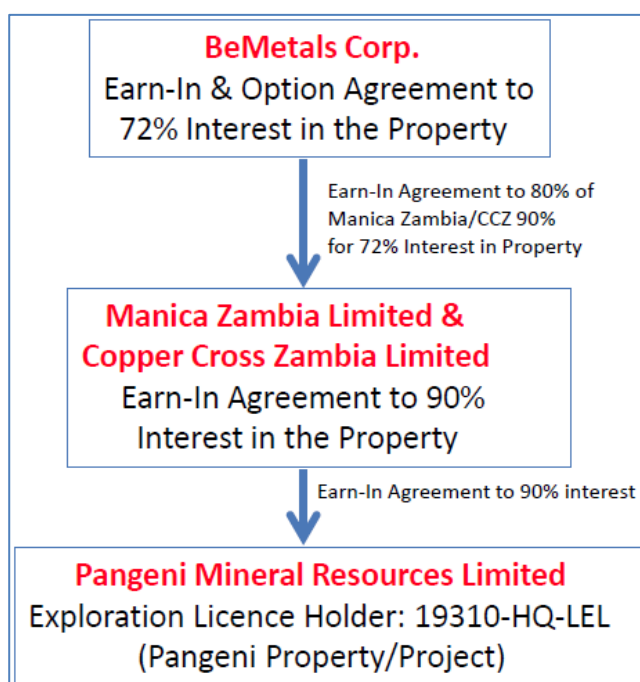
|                                      |                                   |
|--------------------------------------|-----------------------------------|
| <b>Permit Type</b>                   | Large-Scale Exploration Licence   |
| <b>Permit Number</b>                 | 19310-HQ-LEL                      |
| <b>Title Holder</b>                  | Pangeni Mineral Resources Limited |
| <b>Holding</b>                       | 100%                              |
| <b>Status</b>                        | Active                            |
| <b>Date of Application</b>           | 25/10/2013                        |
| <b>Date Granted</b>                  | 18/06/2014                        |
| <b>Expiry Date</b>                   | 18/06/2018                        |
| <b>Substances</b>                    | Co, Cu, Au, Pb, Zn                |
| <b>Surface Area (km<sup>2</sup>)</b> | 575.68km <sup>2</sup>             |

### 4.3 PROPERTY OWNERSHIP

Pangeni Mineral Resources Limited (“PMRL” or “Licence Holder”) is the 100% owner of the Large-Scale Exploration Licence No.19310-HQ-LEL (“the Property”) issued by the Ministry of Mines and Minerals Development, Zambia.

PMRL entered into an Earn-In Agreement with Copper Cross Zambia Limited (“CCZ”) dated 12th June, 2015. The terms of this agreement provide for CCZ to earn rights to 90% interest in the Property through funding US\$ 2.7 million in exploration expenditures, delivering a technical study, and making cash payment of US\$ 700,000.

Approximately US\$ 1,463,000 of the US\$ 2.7 million has already been invested by to date in a joint venture with Antofagasta Minerals.



BeMetals Corp (“BeMetals”) has secured the rights to earn a 72% interest in the Property through a binding letter, earn-in and option agreement with CCZ and Manica Zambia Limited, dated 2nd November, 2017. CCZ is a wholly owned subsidiary company of Manica Zambia Limited. Manica Zambia Limited and CCZ are hereafter defined as the “Vendor.” Through these rights BeMetals can initially acquire a 67.5% interest in the Property over a five-year period by expending US\$2.5 million on exploration, incurring cash payments of US\$1.45 million and issuing 500,000 shares, and delivering a preliminary economic assessment for the project. Following acquisition of the initial 67.5% interest, BeMetals can acquire an additional 4.5% (aggregate 72%) interest in the project by completing a feasibility study and making a further cash payment of US\$750,000.

At a mine development phase, and following a feasibility study, a once-off milestone payment would be payable, based upon total proven and probable mineral reserves, as follows: US\$2 million if less than 500kt contained copper, US\$3 million if the contained copper is between 500kt and 1,000kt, and US\$6m if greater than 1,000kt contained copper.

Upon commencement of production PMRL are entitled to a 1% Net Smelter Royalty following the royalty reduction payment, determined by an internationally recognised valuator, which is not to exceed US\$3.3 million.

The proposed transaction is intended to constitute BeMetals' Qualifying Transaction under the Corporate Finance Policies (the "Exchange Requirements") of the TSX Venture Exchange (the "Exchange").

Large Scale Exploration Licence ("LEL") – 19310-HQ-LEL remains in good standing and an application for renewal has been submitted by PMRL in line with the regulations of the Mines and Minerals Development Act, 2015, six months prior to the next renewal. CCZ and PMRL drafted all required technical and administration documents required for the renewal. PMRL, CCZ and BeMetals expect renewals to be issued in line with the provisions of the Mines and Minerals Development Act, 2015. In the unlikely event a licence renewal was not to be granted, and following designated appeal process, the company could lose its interest in the property.

In Zambia all rights for exploring and mining minerals are vested in the State. Prospecting must be carried out under a mining right granted under the Mines and Minerals Act No 11 of 2015, and issued by the Ministry of Mines and Mineral Development. Under the Mines and Minerals Act LELs are valid for a maximum period of 10 years and issued initially for 4 years with two subsequent renewals of 3 years. The two renewals include 50% licence area reduction. All exploration licences remain in good standing if the formal renewal date is exceeded until anytime when there is written notification of the offer letter to renew the licence from the Ministry of Mines and Minerals Development.

Copper mines in Zambia are subject to a royalty payable to the state of; 4 per cent when the norm price is less than US\$4,500 per tonne, 5 per cent when the norm price is US\$4,500 per tonne or more but less than US\$6,000 per tonne; and 6 per cent when the norm price is US\$6,000 per tonne or more.

Surface rights are governed by the Lands Act, chapter 184 of the Laws of Zambia. The property falls within customary tenure surface rights as with approximately 90% of the area of Zambia. The Mines and Minerals Development Act provides that the surface rights holder has to give written consent to a holder of a mining right to exercise any rights over their land. In instances when written consent is required, it should not be unreasonably withheld. The Senior Chief has provided a customary signed letter of consent for access to mineral exploration of 19310-HQ-LEL, and he is regularly updated with progress of the field activities.

#### **4.4 ENVIRONMENTAL LIABILITIES**

There are no known environmental liabilities associated with the property. The Zambian Environmental Management Agency ("ZEMA") approved, in September, 2015, the Environmental Project Brief ("EBP") for the property in accordance with the requirements of the Environmental Management Act No. 12 of 2011 and Impact Assessment Regulations Statutory Instrument No. 28 of 1997. This provides for full required environmental approval through the exploration phase of any mineral project.

**4.5 COMMENTS ON SECTION 4**

- Information from legal experts (Section 3.1) supports that the mineral tenure is valid.
- To the extent known by the independent author there are no environmental liabilities to which the Property is subject (Section 3.2).
- To the extent known by the independent author there are no other significant factors and/or risks that may affect access, title, or the right or ability to perform work, on the Property.

## **5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE & PHYSIOGRAPHY (ITEM 5)**

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### **5.1 PROJECT ACCESS**

#### **5.1.1 Air**

There are international airports at Lusaka (the capital city of Zambia) and Ndola which are easily accessible by commercial flights from neighbouring countries. There is a regional airport at Solwezi, the closest urban centre to the Property (Fig. 4:1).

Solwezi can be reached by air from Lusaka and Ndola with daily scheduled flights. In addition, the use of charter aircraft is common. There is a serviceable airstrip at Kabompo town.

#### **5.1.2 Road**

The principal road links to the Property are the T5/D286 or the M8/D286 tar roads from the town of Solwezi to Mwinilunga or Kabompo towns respectively. Solwezi can be reached from Ndola by the T5/T3 highways, tar-surfaced roads suitable for heavy goods vehicles throughout the year.

From Ndola there are highway links to the Tanzanian, Zimbabwean and Botswana borders, which are the principal crossings for the import and export of goods to and from the North-Western Province. Most mineral exports pass through Solwezi, Chingola, Kitwe and Ndola bound for ports in South Africa (via road) or Tanzania (via road, or rail link - from the Zambian town of Kapiri Mposhi).

Principal roads within the Property are gravel or laterite covered. These roads are serviceable in the dry season which is typically May to December.

#### **5.1.3 Rail**

The closest major rail links to the Property are in the towns of Chingola and Ndola. From Ndola there are rail links to the Tanzanian and Zimbabwean borders. The service is sporadic owing to both the condition of the rails and rail beds and the reliability of the locomotives and supplementary rolling stock.

### **5.2 PHYSIOGRAPHY AND CLIMATE**

The Property is situated on the Central African Plateau, on gently undulating topography at an elevation of 1,250m above mean sea level.

The principal water courses within the Property are the Kabompo, West Lunga, Manyinga, and Dongwe rivers. These are perennial and flow in a southerly direction eventually flowing into the Zambezi River.

The landscape consists of relatively flat to gently undulating miombo forest<sup>2</sup> covered plains, interspersed with open grass covered phreatic dambos or marshy wetland areas which hold semi-permanent water.

The miombo forest is common throughout Zambia and in the North-Western Province. Dambos and floodplains occur scattered throughout the site and often contain some riparian forest along the river banks.

The region has distinct dry and wet seasons from May to October and November to mid-April respectively. Rainfall averages between 1,100-1,400 mm per year, and rainfall of 1,500 mm per annum can be expected one year out of five. Annual temperatures range from winter minima of 6°-10°C to maxima of 25°-34°C (winter to summer months) peaking just prior to the onset of the rains. Mean annual humidity is consistently very high in the rainy season but <40% in the dry season.

Operating seasons are typically from May to December annually.

### 5.3 LOCAL RESOURCES AND SERVICES

Solwezi is an emerging mining centre, which has experienced recent growth in economic activity in the last few years associated with large-scale mining and mineral processing activities at the Kansanshi, Lumwana and Sentinel mines. At the Kansanshi mine, a copper smelter has recently been constructed which is operated by First Quantum Minerals Limited (FQML). A growing medium-sized service sector supports this mining activity. Due to Zambia's history as a mining-dominated economy there is a large, skilled and semi-skilled, workforce with experience in mining.

### 5.4 LOCAL INFRASTRUCTURE

The Property is currently isolated from public infrastructure. As many as four cellular phone network providers provide coverage across the North-Western Province in proximity to urban centres. Satellite phone coverage is currently required for the Property. There are no established settlements on the property, occasional nomadic settlements can be found along the Manyinga river.

Principal roads within the Property are gravel or laterite covered roads. These roads are serviceable in the dry season typically May to December. Temporary tented camp sites have been used for the exploration programs conducted to date. Water sources include the local river systems. Potable water has been brought into the tented camps for human consumption.

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<sup>2</sup> Miombo is the vernacular word for *Brachystegia*, a genus of tree comprising a large number of tree species together with *Julbernardia* species in woodlands

## 6 HISTORY (ITEM 6)

The Mwinilunga Mines Division (a division from Roan Selection Trust (RST)) prospected the Property from 1958 to approximately 1964. Very little historical data is retrievable from Government archives with respect to the amount and quantity of work completed.

Stream sediment surveys were followed by soil sampling and pitting in several localities. RST typically focused on geochemical anomalies proximal to vegetation clearings. They delineated several geochemical anomalies within the Property with the M49/B anomaly being the most significant (Fig. 6:1). Samples from pits excavated southwest of the M49/B clearing were found to be anomalous in copper.

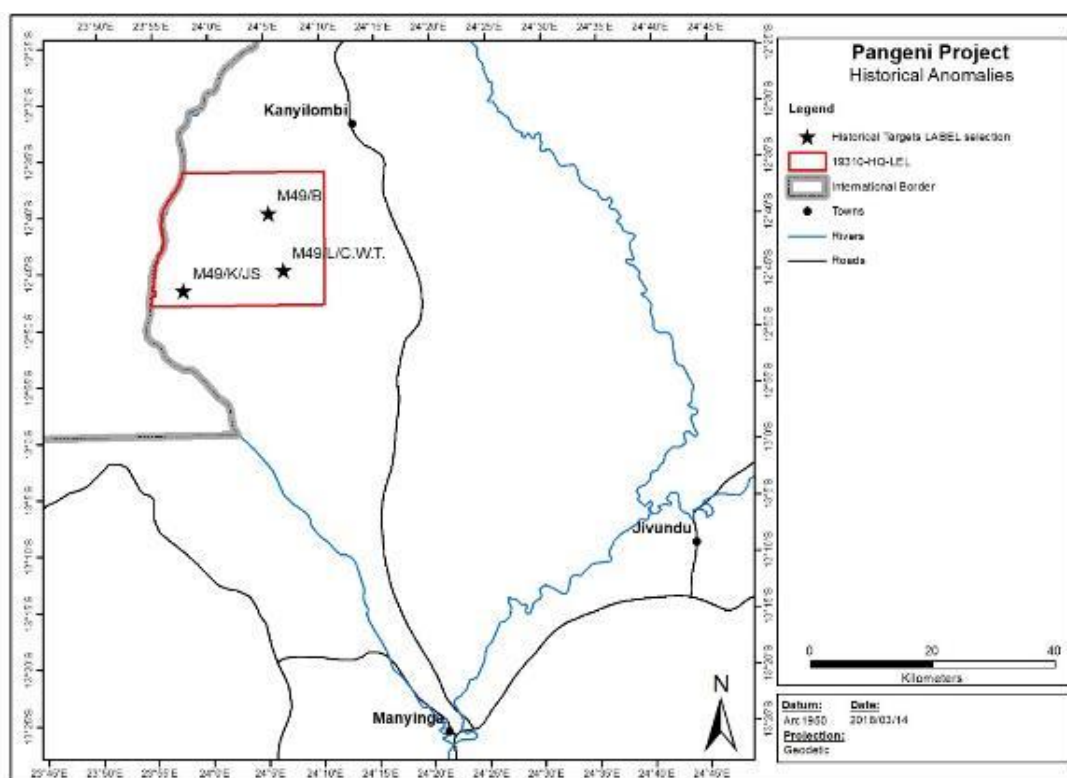


Fig. 6:1: Location of RST geochemical anomalies (Source: RES, 2018)

As far as is known, little exploration work was conducted over the Property subsequent to this until, in the early 2000s Phelps Dodge carried out limited geochemical sampling and pitting that returned unconfirmed copper anomalies in pit grab samples and in soil samples proximal to M49/B.

MGB Mining Limited held a large-scale exploration licence covering the Property in 2008. No previous exploration data or reports have been located for this period of tenure as of the effective date of this Report.

No drilling programs have been reported for the Property prior to 2016. No mineral resource estimates, mineral reserve estimates, or historic production have been reported for the Property at the effective date of this Report. There are no known records of expenditures of previous (prior to 2015) owners of the licence area available with the Ministry of Mines and Minerals Development.

## 7 GEOLOGICAL SETTING AND MINERALISATION (ITEM 7)

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### 7.1 INTRODUCTION

The information in this section has been prepared from published papers on regional geology, discussions with and presentations made by BeMetals personnel and Remote Exploration Services (Pty) Ltd (RES) and a drill core review program completed by AMC personnel in March 2018. Additional information was assembled from summary geological notes, plans, and sections provided by BeMetals and RES (Section 27).

### 7.2 REGIONAL GEOLOGY

The Property lies within the western segment of the Lufilian Arc<sup>3</sup> in the Domes Region (Section 7.2.2) (Porter GeoConsultancy, 2018), comprising Neoproterozoic Katangan meta-sediments that host the bulk of the copper-cobalt occurrences within the Central African Copperbelt (CACB) (Fig. 7:1).

The CACB metallogenic province is frequently divided into two distinct districts: the Zambian Copperbelt (ZCB) and the Congolese (or Katangan) Copperbelt (CCB) (Hitzman., 2005). The stratigraphic succession for the ZCB is displayed in Fig. 7:2.

#### 7.2.1 The Zambian Copperbelt (ZCB)

The Katangan sedimentary group overlies a composite basement, consisting of older, multi-deformed and metamorphosed, intrusions that are mostly of granitic affinity, and supracrustal metavolcanics-sedimentary sequences of the Lufubu Metamorphic Complex in Zambia (Selley et al., 2005). This basement is mainly Paleoproterozoic in age (~2.05 to 1.82 Ga) and forms inliers within, and marginal, to the Lufilian Arc.

The Lufubu Metamorphic Complex rocks are unconformably overlain by the Muva Group, a supracrustal metasedimentary sequence of conglomerates, orthoquartzites and metapelites that are assumed to be Mesoproterozoic in age (~1.3 to 1.05 Ga)(Selley *et al.*, 2005).

In the ZCB, the 4 to 10km thick, Neoproterozoic Katanga Supergroup (~880 to ~530 Ma) comprises the Lower Roan Group, the Upper Roan Group, the Mwashya Group and the Lower and Upper Kundelungu Groups. These sequences are thought to have been deposited within relatively restricted, fault controlled, northwest-southeast elongated intracontinental rift basins, occurring as horsts and half-grabens. These rift basins were the result of northeast-southwest directed extension, flanking a northwest-southeast trending basement high, now reflected by the younger Kafue Anticline (Porter GeoConsultancy, 2018).

The Lower Roan Group commences with the Mindola Clastics Formation, a variable sequence most commonly up to ~150 to 240m thick, composed of an oxidised suite of interbedded conglomerates, arenites, quartzites and lesser argillites. At the main deposits of the ZCB, it represents the footwall sequence, and contains a basal conglomerate that varies from a few tens of metres, to near 1200m thick on the northern margin of the Kafue Anticline, east of the Konkola and Nchanga Deposits (Porter GeoConsultancy, 2018).

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<sup>3</sup> The Lufilian Arc is part of a system of orogenic belts in southern Africa formed during the Pan-African orogeny, a stage in the formation of the Gondwana supercontinent. It extends across eastern Angola, the Katanga Province of the southern Democratic Republic of the Congo and the northwest of Zambia. The Arc is approximately 800km long.

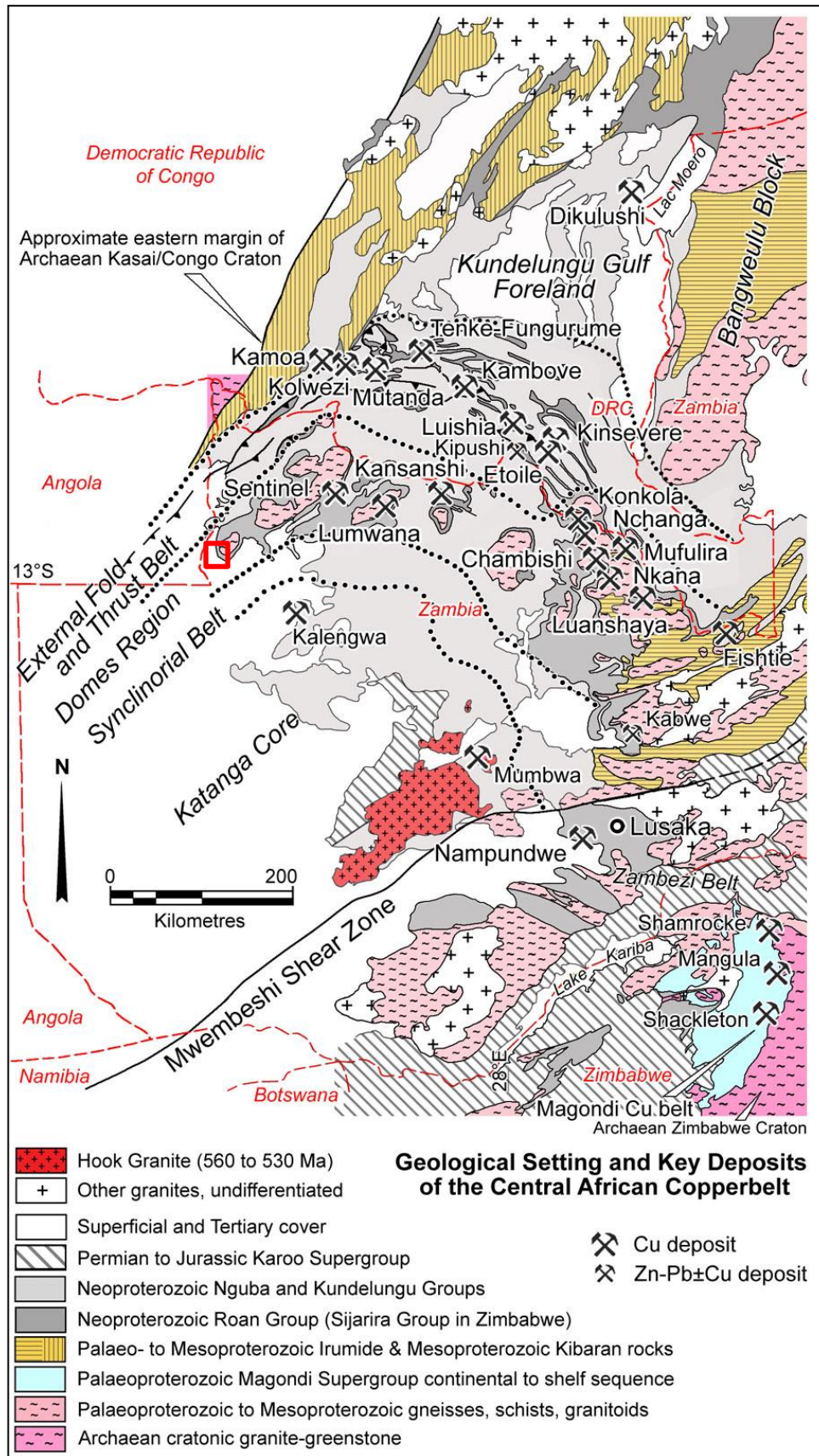


Fig. 7.1: Regional geological setting of the Central African Copperbelt (CACB) with key deposits located. The approximate location of the Property is displayed as a red outline (Source: Adapted from Porter GeoConsultancy, 2018).

Depositional centres were subsequently linked along principal faults, marking a transgression, reflected by the deposition of local finer facies of the Copperbelt Orebody Member, the basal unit of the Kitwe Formation. The Copperbelt Orebody Member (commonly referred to as the "Ore Shale", Porter GeoConsultancy, 2018) represents the culmination of early rift-stage extension and the first marine incursion within the Katanga basin in the Zambian Copperbelt. The unit is commonly 15 to 35m thick. It comprises carbonaceous and/or dolomitic siltstones, argillites, thin dolostones and fine sandstones, and hosts the bulk of the ore in the principal deposits of the Zambian Copperbelt (e.g. the Chambishi, Konkola, Luanshya, Mindola, Nchanga and Nkana Deposits).

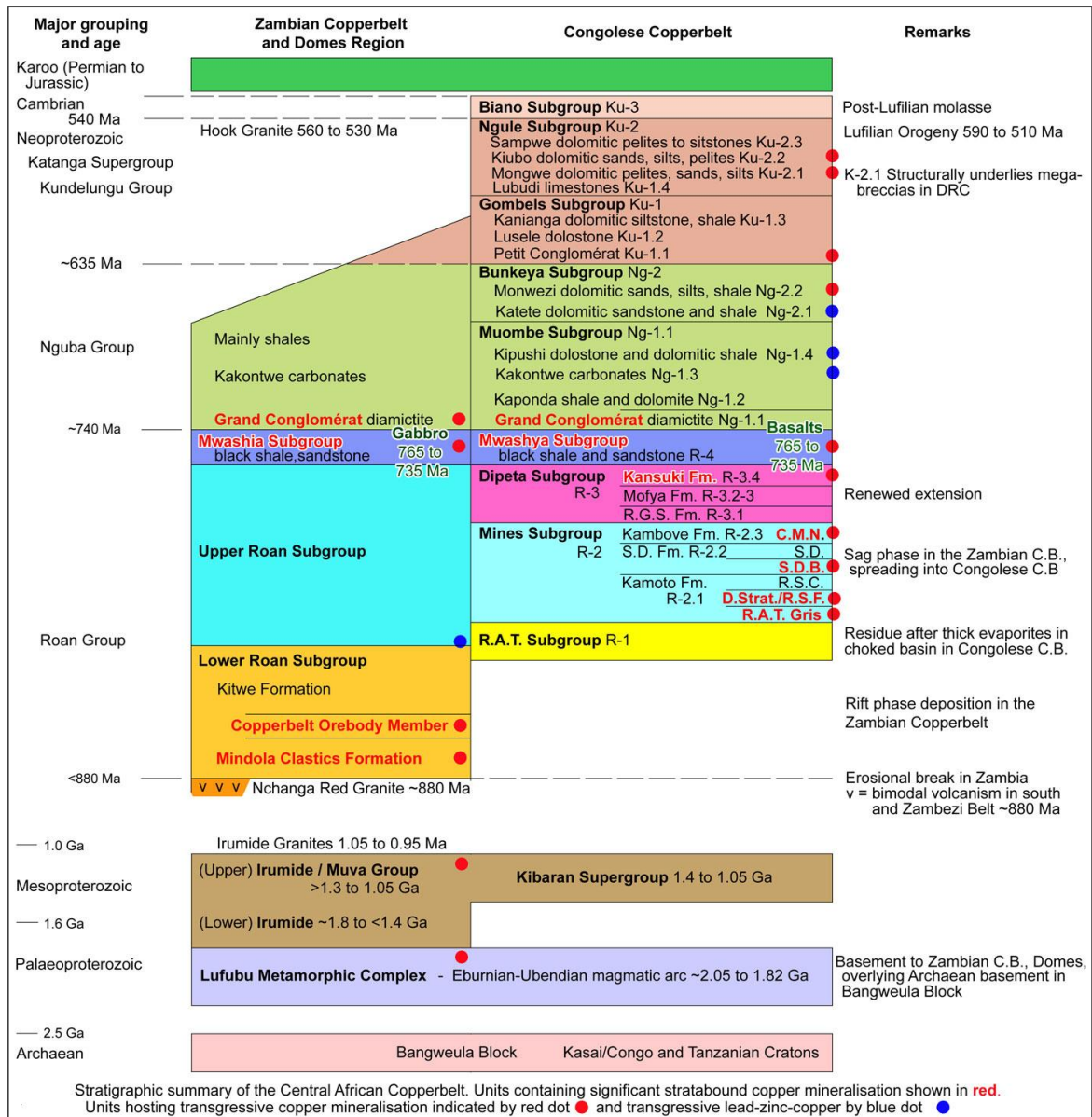


Fig. 7.2: Zambian Copperbelt (ZCB) stratigraphy (Source Porter GeoConsultancy, 2018)

The Upper Roan Group, comprises laterally extensive mixed shallow marine to lagoonal carbonate rocks and generally finer grained siliciclastic rocks with abundant evaporitic textures and mainly stratabound chaotic breccia (interpreted to represent the dissolution of evaporites). The sequence varies considerably in thickness, from <30 to 800m, and is characterised by metre-scale, laterally extensive cycles of upward-fining, sandstone, siltstone, dolomite, algal dolomite and local anhydrite.

The Upper Roan Group in Zambia is overlain across either a conformable transition, or an evaporite-facilitated breccia-detachment, by the 150 to 650m thick Mwashya (or Mwashia) Group, emplaced within a deepening marine setting. This sequence commences with a lower suite of reef to intertidal clastic carbonate rocks, mainly arenitic dolostone with lesser argillaceous dolostone. The Lower Mwashya is only poorly developed in Zambia (Porter GeoConsultancy, 2018).

The overlying succession is divided into upper and lower sequences, the Upper Kundelungu Group and older Lower Kundelungu Group (Nguba Group) at the base. These are mainly clastic sequences separated by tillites (or diamictites). The lower diamictite (locally known as the “Grand Conglomerate” Porter GeoConsultancy, 2018) is the host to the Kamoa Deposit in the Democratic Republic of the Congo (Broughton and Rogers, 2010). The diamictites are interpreted to be associated with Sturtian glaciations (~720Ma to 740Ma).

### 7.2.2 The Domes Region (West)

The Domes Region, which forms a broad arcuate trend, extends from the Angolan border, to obliquely intersect and overprint the Kafue Anticline in the east. Basement, in the form of the domal cores, acted as buttresses during the Lufilian orogeny. The western Domes Region (Fig. 7:3) is interpreted as a series of antiformal thrust stacks, developed above mid-to-lower crustal ramps, which are separated from the overlying Katangan Supergroup sediments by a major decollement (Bernau et al., 2012).

The Katangan meta-sedimentary rocks, surrounding Kabompo Dome, include a basal sequence of sandstones, siltstones, and conglomerates, grading up into a mixed siliciclastic-carbonate-evaporite sequence. These sediments have been extensively altered and modified to quartz-feldspar-phlogopite schists, dolomites, and talc-kyanite schists. The sequence is frequently capped by the Grand Conglomerate (Porter GeoConsultancy, 2018).

The setting of the Cu ( $\pm$ Co  $\pm$ U) mineralisation described at the Lumwana Deposit (Bernau et al., 2012) is in contrast to the widely reported Lower Roan-hosted deposits of the ZCB. The metamorphic grade of the host rock to the mineralisation, strong fabric development, transitional nature of contacts between gneiss and ore-schists and intercalations of ore-schist and slivers of gneissic basement suggest the deposit is hosted in basement to possible Lower Roan stratigraphy.

The Sentinel Deposit is hosted within the structurally thickened carbonaceous meta-pelitic rocks interpreted as part of the Mwashya Group (FQML, 2015).

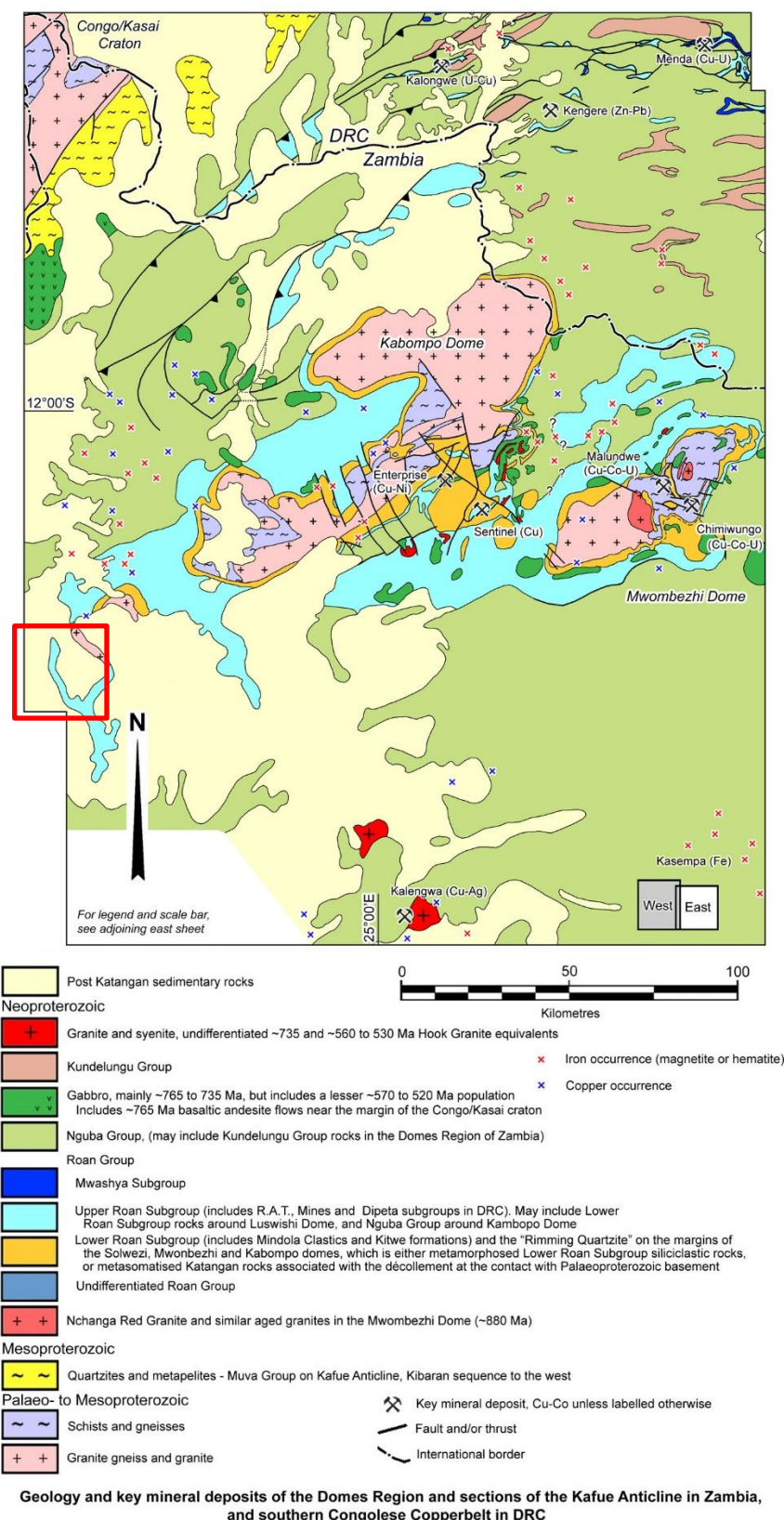


Fig. 7.3: Regional geological setting of the western Domes Region with the approximate location of the Property displayed as a red outline (Source: Adapted from Porter GeoConsultancy, 2018).

### 7.3 PROJECT GEOLOGY

The Property is located on the south-western segment of the Kabompo Dome in the western extension of Domes Region (Fig. 7:3). The local geological interpretation includes several northeast-southwest striking geophysical domains which are bounded by interpreted thrusts or decollements (RES, 2018) (Fig. 7:4).

#### 7.3.1 Stratigraphic Sequence

Geophysical interpretations suggest a complete stratigraphic sequence may be present locally, from Paleoproterozoic basement, overlain by interpreted Katangan Supergroup sequences, up through to the Lower Kundelungu (or Nguba) Group (RES, 2018) (Fig. 7:4).

Field mapping of the Property suggests a stratigraphic sequence may be present locally, from Paleoproterozoic basement, overlain by interpreted Katangan Supergroup sequences (RES, 2018; Sparrow, 2015) (Fig. 7:4). The independent author notes that no Lower Kundelungu Group sequences were observed in outcrop during 2015-2016 field programs. This is likely a result of Kalahari Group cover masking the bedrock geology.

The geology in the southeast of the Property is dominated by Paleoproterozoic basement sequences, that have been mapped in the field as a series of well-foliated schists and gneisses with variable quartz, feldspar, biotite, muscovite, kyanite (accessory) and garnet contents. Typically, these units exhibit a strong metamorphic and structural fabric and in places have boudinaged amphibolites incorporated within them.

To the northwest of the Property, northeast-southwest striking geophysical domains have been interpreted as Neoproterozoic Katangan Supergroup lithologies of the Lower and Upper Roan Groups overlain by the Mwashya Group. The units of the Lower Roan Group comprise red to pale yellow psammities with preserved sedimentary features in places. The Upper Roan Group comprise fine-grained grey pelites, pelitic schists and calcareous schists (Sparrow, 2015; RES, 2016). The lithological correlations are interpreted from limited outcrop and may represent other stratigraphic units within the Katangan. Future exploration drilling will determine, and confirm, definitive stratigraphic correlations.

Overlying these sequences is the Kalahari Group. The Kalahari Group typically consists of un- to semi-consolidated quartzitic sands, with pervasive metre to tens of metres-thick benches of ferricretes and silcretes (Sparrow, 2015). The sands are aeolian deposits (Key et al., 2001).

#### 7.3.2 Structure

The Pre-Katangan and Katangan sequences exhibit different levels of deformation across the Property, with structural orientations typical for this part of the Domes Region (RES, 2018). Basement units are intensely folded and sheared, with foliation possessing a preferred orientation towards the southeast on average.

Outcrop-scale tight folds are typically recumbent to gently inclined with axial planes dipping towards the southeast. Stretching lineations and rotational/kinematic microstructures suggest a main tectonic transport direction towards the northwest (RES, 2018). Shear zones, within the basement, interpreted from drill-intersected mylonitic units, dip south to southeast. Thrust-repeated Katangan

sequences within the basement in the central parts of the Property are interpreted along multiple northeast-southwest oriented shear zones.

In the northwest of the Property, Roan Group sequences commonly exhibit lower-levels of deformation in comparison to the basement. The Upper Roan and Mwashya Groups exhibit steep to shallow-dipping foliation towards the northwest.

Interpretations of airborne magnetics, and the orientation of mapped foliation, indicate possible basement domal structures within the central part of the Property (axial plane oriented northeast-southwest) plunging towards the northeast with the stratigraphy younging towards the northwest away from the fold core (RES, 2018). A later second fold generation, F2 (relatively open, with axial planes oriented approximately north-south), affects the Pre-Katangan and Katangan sequences across the Property. These folds refold F1 folds and foliation and have resulted in locally undulating foliation. The F2 folds are most observable in the northern parts of the Property where rock exposure is most common.

### 7.3.3 Mineralisation

There is no known outcropping mineralisation on the property. All information pertaining to mineralisation for the Property is derived from the results of the 2016 drill program and supporting studies (Section 10).

Hypogene copper mineralisation (chalcopyrite and lesser bornite) has been reported in all drill holes between depths of 40m and 220m. Mineralisation is recorded over widths of typically 1–6m. Typically it occurs in strongly foliated, locally mylonitic, quartz-biotite-muscovite-scapolite ( $\pm$ kyanite) schists (Fig. 7.5) interpreted as the potential equivalent to the “ore-schists” at the Lumwana Deposit (Bernau et al., 2012). These schists are intercalated within gneissic sequences.

Copper mineralisation dominantly occurs as chalcopyrite with lesser bornite, with chalcopyrite and bornite also commonly occurring as stringers, blebs, and to a lesser extent salvages within quartz  $\pm$  carbonate veins (Fig. 7.5). A significant amount of chalcopyrite and bornite is foliation-parallel and stretched due to shearing (analogous to observations from the Lumwana Deposit, Bernau et al., 2012). Copper mineralisation is associated with weakly anomalous concentrations of Co, Mo, Ni, Zn, Sc and V.

Medium to coarse mm to cm scale blebs of kyanite alteration have been identified in drill core. The occurrence of kyanite alteration may correlate with copper mineralisation. Kyanite alteration intensity does not appear related to copper grade. Petrographic studies suggest that kyanite is extensively replaced by scapolite (RES, 2017).

Scapolite alteration has been observed in drill core. This alteration is pervasive, forming significant centimetre scale bands with no observed lithological preference or association with mineralisation. Pervasive, and often intense, sericite alteration is extensive in drill core from the southwest of the Property. It can be often found associated with quartz  $\pm$  carbonate veining.

Both albite and silica alteration is observed in the core drilling from Central and Southwest Targets. Albite alteration intensity does not appear to be directly related to copper mineralisation (RES, 2018).

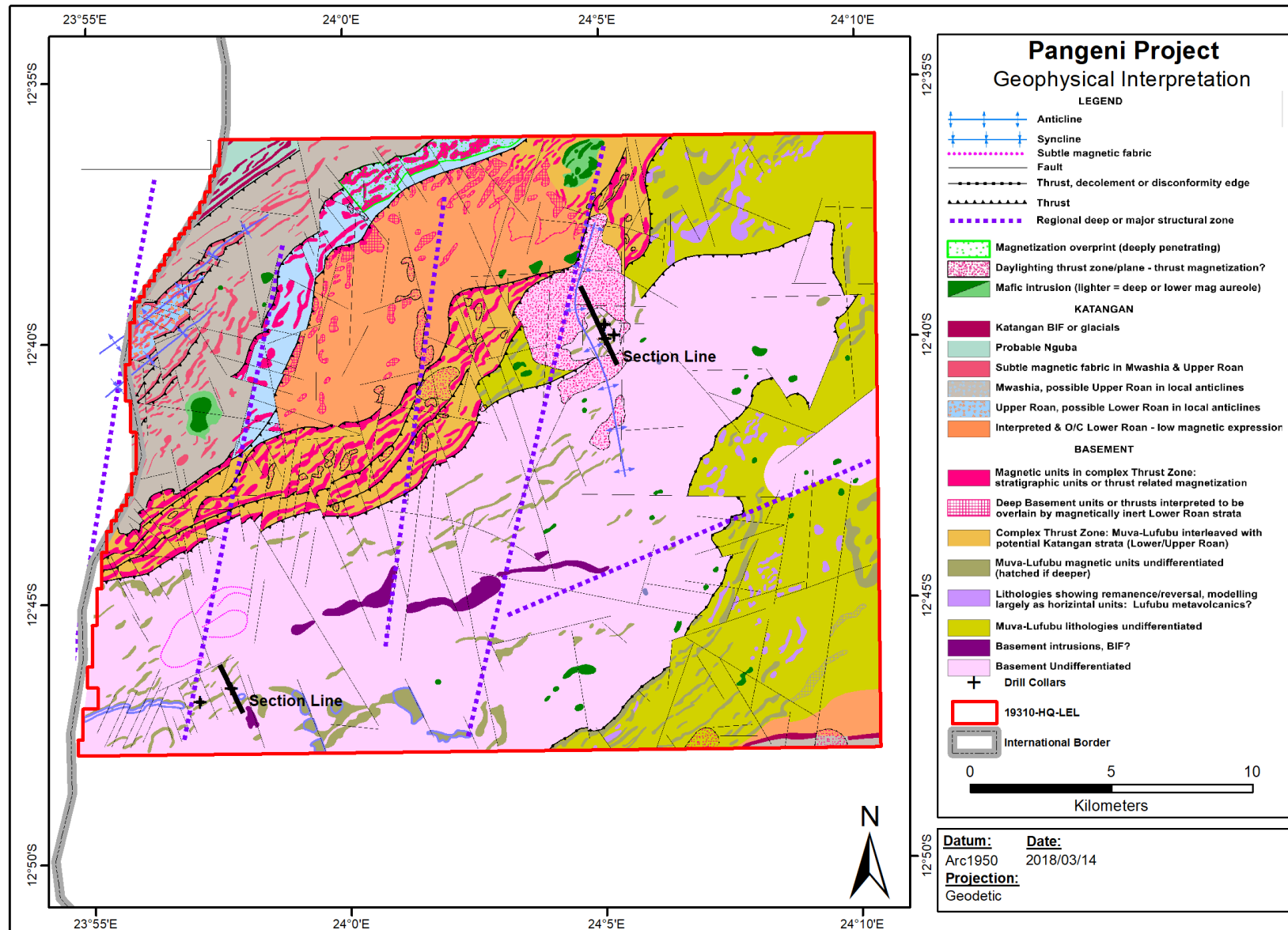
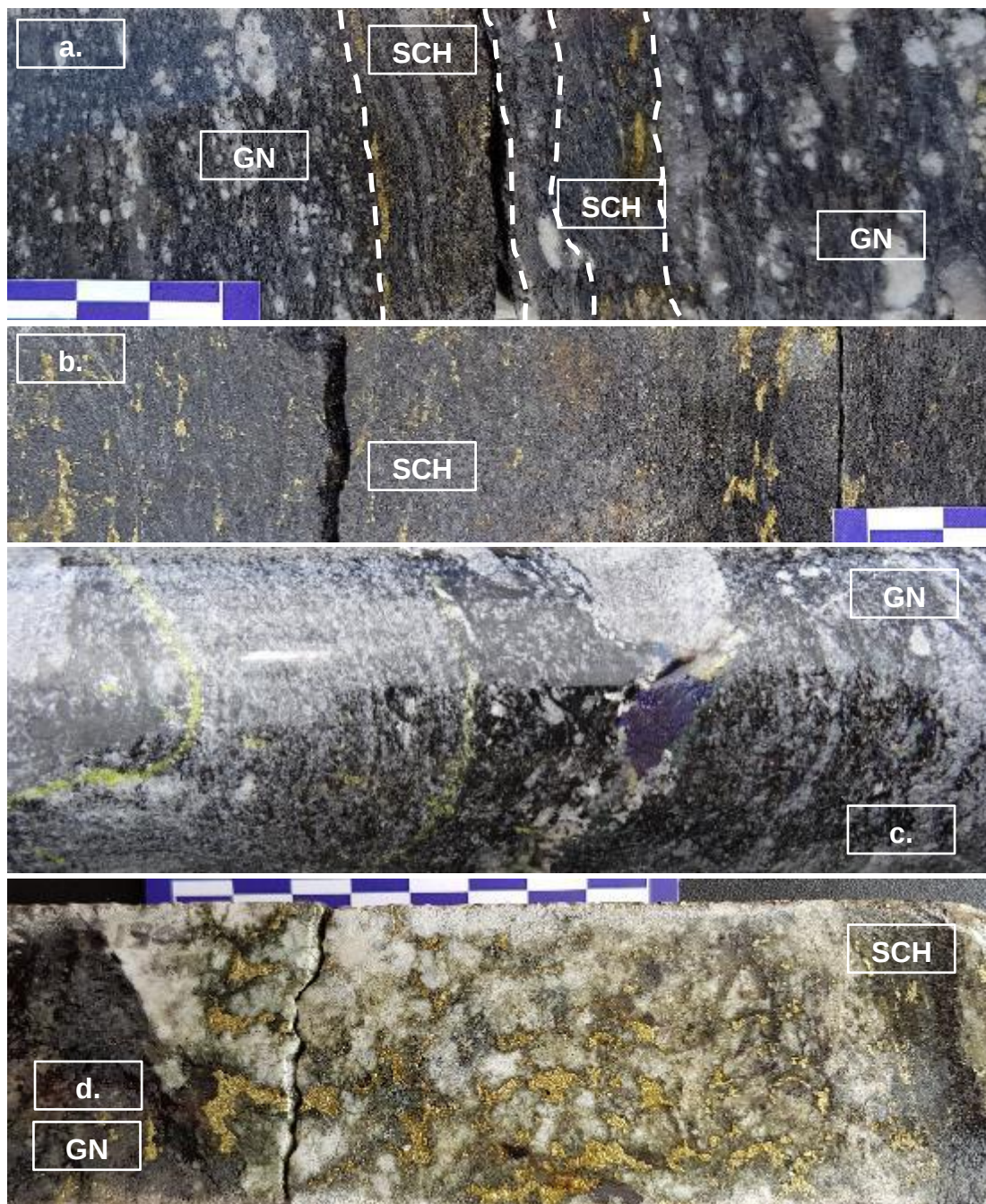


Fig. 7.4: Interpreted geological setting of the Property (Source: RES, 2018).



*Fig. 7:5: Representative core from drill holes CT1, CT3 and SW1 (Section 10) which outline the styles of mineralisation and the relationship between gneissic sequences (GN) and mylonitic schist units (SCH). a. Drill hole CT1 – 161.20m sulphide mineralisation aligned and deformed within prevailing fabric (0.3%TCu grade reported over sampled width). b. Drill hole SW1 – 147.50m chalcopyrite stringer mineralisation aligned within prevailing fabric. c. Drill hole CT3 – 198.00m bornite mineralisation occurring as blebs. d. Drill hole CT1 – 146.80m blebby chalcopyrite in quartz ± carbonate vein (1% TCu grades reported over sampled width). (Source: CCZ (“Vendor”) project database and AMC database - 2018).*

#### **7.4 COMMENTS ON SECTION 7**

The independent author is of the opinion :

- The understanding of the regional and project geology is sufficiently well understood at this stage of the exploration program.
- The Property is located in a geologically prospective section of the western Domes Region.
- The current geological interpretations indicate a number of potentially prospective host rock sequences within the mapped stratigraphy found across the Property.
- The mineralisation drilled to date on the Property, is typically basement-style (dominantly structurally controlled) and associated with lithologies potentially analogous to the “ore-schists” mapped at the Lumwana Deposit (Bernau et al., 2012).

## 8 DEPOSIT TYPES (ITEM 8)

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The Property is geologically prospective for the deposit types listed below.

- Basement-hosted Cu (analogues: the Lumwana Deposit and the Nyungu mineral occurrence (Sillitoe et al., 2015)).
- Sediment-hosted stratiform Cu-Co (analogues: Zambian Copperbelt Deposits e.g. Nchanga, Konkola, Nkana, and Mufulira, the Domes Region Deposits e.g. Sentinel, and Kansanshi and DRC Copperbelt Deposits e.g. Lonshi, Frontier, Kamoa-Kakula).

### 8.1 BASEMENT-HOSTED CU MINERALISATION

The Lumwana Cu-Co deposit is an example of a basement-hosted deposit within the Dome Region (Fig. 7:3) (Bernau et al., 2012). Mineralisation typically occurs within a biotite-muscovite-quartz-kyanite schist ("ore-schist"), occurring within gneissose units of the Mwombezhi Dome (Fig. 7:1). The Lumwana Deposit is thought to be formed by deformation, and associated metasomatic alteration and mineralisation, of the pre-Katangan basement (Bernau et al., 2012).

Many key features of the mineralisation encountered on the Property to date are analogous with basement-hosted deposits, in particular the Lumwana Deposit (Section 23). The following geological details (adapted from Sillitoe et al., 2015) can be applied and form the basis for future exploration programs:

- Mineralised bodies are typically stratabound, stacked and lenticular in nature;
- Mineralisation typically ranges from 1 to 10m in thickness;
- Strike extents of several kilometres are common;
- The host rocks are commonly schistose as a product of shearing of siliciclastic meta-sedimentary rocks;
- The mineralisation is typically both disseminated and contained in quartz  $\pm$  carbonate veinlets;
- Cobalt, nickel, uranium and molybdenite are common accessory constituents;
- There is a close spatial relationship with porphyroblastic kyanite and accompanying phlogopite, graphite  $\pm$  garnet; and
- There is commonly widespread evidence that sulphide minerals undergo stretching and migration into pressure shadows during shearing.

### 8.2 SEDIMENT-HOSTED STRATIFORM CU-CO MINERALISATION

Mapped Lower and Upper Roan Groups (Sparrow, 2015 RES, 2016), and interpreted potential Lower Kundelungu Group sequences, provide support for the potential for sediment-hosted stratiform Cu-Co mineralisation above the basement sequences (Sillitoe et al., 2015).

The following geological details (Hitzman et al., 2005 and McGowan et al., 2005) can be applied and form the basis for future exploration programs:

- Geological setting: Intracratonic rift; fault-bounded graben/trough, or basin margin, or epicontinental shallow-marine basin near paleo-equator; partly evaporitic on the flanks of basement highs; basal sediments highly permeable. Sediment-hosted stratiform copper deposits predominate in late-Mesoproterozoic to late-Neoproterozoic and late-Paleozoic rocks;
- Deposit types: Host rocks are reduced facies (grey-beds) and may include siltstone, shale, sandstone, and dolomite. These rocks typically overlie oxidised sequences of haematite-bearing, coarser-grained, continental siliciclastic sedimentary rocks (red-beds);
- Mineralisation: Deposits consist of relatively thin (generally <30m) sulphide-bearing zones, typically consisting of chalcocite–bornite–chalcopyrite–pyrite. Minerals are finely disseminated, stratabound, and locally stratiform. Framboidal or colloform pyrite is common. Copper minerals typically replace pyrite and cluster around carbonaceous clots or fragments;
- Mineralisation timing: Sulphides and associated non-sulphide minerals of the host rocks in all deposits display textures and fabrics indicating that all were precipitated after host-rock deposition. Timing of the mineralisation, relative to the timing of host-rock deposition, is considered variable, and may take place relatively early in the diagenetic history of the host sediments or may range to very late in the diagenetic or post-diagenetic history of the sedimentary host rock;
- Transport/pathway: Porosity in clastic rocks, allowing upward and lateral fluid migration; marginal re-activated (inverted) basin faults culminating in thrust duplexes during deformation events may be important; low-temperature brines; metal–chloride complexes;
- Metal deposition: Metals were characteristically deposited at redox boundaries where evaporite-derived brines, containing metals most likely extracted from red-bed aquifers, and basement units, encountered reducing conditions;
- Mineralisation controls: Reducing low pH environment such as marine black shale, and algal mats are important as well as abundant biogenic sulphides and pyritic sediments. High permeability of footwall sediments is critical. Boundaries between paleo-hydrocarbon fluids or other reduced fluids and oxidised fluids in permeable sediments are interpreted common sites of deposition;
- Alteration: The most dominant alteration minerals are phlogopite, sericite, quartz, and dolomite ( $\pm$  tourmaline and K-feldspar) associated with the main phases of mineralisation.
- Lithogeochemistry: Evidence for elemental association of As, Bi, Ba, Mo, U, V and Zn in the main copper-bearing mineralised zones (Bernau et al., 2012 and McGowan, 2003).

### **8.3 COMMENTS ON SECTION 8**

The independent author notes that:

- The mineralisation identified to date, within the Property, is typical of basement-hosted copper mineralisation in the Domes Region (Bernau et al., 2012; Sillitoe et al., 2015).
- Mapped Lower and Upper Roan Groups (Sparrow, 2015 and RES, 2016) and interpreted potential Lower Kundelungu Group sequences, in addition to recent research across the Mwombezhi Dome (Sillitoe et al., 2015), provide support for the potential for sediment-hosted stratiform Cu-Co mineralisation above the basement sequences in the Property.

## **9 EXPLORATION (ITEM 9)**

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Exploration activities on the Property were completed by the Vendor from 2015 to date in a joint venture with Antofagasta Minerals consisting of an airborne geophysical survey, geological mapping, and geochemical sampling. Exploration activities, qualifying as exploration for the purpose of BeMetals Qualifying Transaction for listing on the exchange, occurred from 2015 to date. A total of approximately US\$1,463,000 of expenditures have been completed on the Property by CCZ since 2015 in a joint venture with Antofagasta Minerals.

Item 9 documents and reviews the quality and associated results of the early stage exploration work completed on the property to date by the Vendor.

Remote Exploration Services ("RES") a geological consulting company conducted the field exploration activities. All such exploration activities and expenditures are reported by PMRL to the Ministry of Mines and Minerals Development in Zambia through required quarterly and annual submissions. All field exploration activities and reporting of field work with results documented in this Report were either carried out, or supervised by, RES personnel. All exploration activities were completed prior to the execution of the option agreement involving the Issuer (BeMetals) as detailed in Section 4.

Prior to commencement of field exploration in 2015, data acquisition and geological interpretations were completed. This work comprised the collation of the following:

- Geological maps (at various scales) obtained from the Zambian Geological Survey archives;
- Shuttle Radar Topographic Mission (SRTM) 1 Arc-Second Global digital terrain elevation data at a spatial resolution of approximately 30m and supplied by USGS as 1 degree GeoTIFF tiles (<https://earthexplorer.usgs.gov>);
- Landsat 8 ETM+ imagery (<https://earthexplorer.usgs.gov>); and
- Mineral occurrence data (USGS, 2017).

The collated data were used to identify potential outcrop, historical mineral occurrences and the extent of Kalahari Group cover.

### **9.1 EXPLORATION WORK**

#### **9.1.1 Grids and Surveys**

All surveys to date are in UTM co-ordinates, using the ARC1950 projection, Zone 35S.

In 2015, a topographic survey, as part of an airborne magnetic-radiometric survey, was flown over the Property, resulting in the production of a digital terrain model accurate to  $\pm 5\text{m}$ .

#### **9.1.2 Geophysics**

A fixed-wing airborne geophysical survey was completed over the Property in 2015. Geophysical data collection included magnetic, radiometric and elevation data. The survey area consisted of approximately 4,264 flight line-km. The survey contractor was Xcalibur Airborne Geophysics, South Africa. The survey was completed in August 2015 (Xcalibur, 2015). Table 9.1 lists survey parameters as follows:

Table 9.1: Airborne geophysical survey parameters (Source: RES, 2018).

| Parameter           | Description                                               |
|---------------------|-----------------------------------------------------------|
| Line Direction:     | 150 - 330° with respect to UTM Zone 35S coordinate system |
| Tie Line Direction: | 60 - 240 ° with respect to UTM Zone 35S coordinate system |
| Ground Clearance:   | 35 metres (hazard dependant)                              |
| Line Spacing:       | 150 metres                                                |
| Tie Line Spacing:   | 1500 metres                                               |
| Sample Spacing:     | Magnetics: 4m; Radiometrics 40m.                          |

The data was processed using the various industry-standard filtering techniques to aid in exploration.

### 9.1.3 Geological Mapping

Two phases of geological mapping were completed across the Property during the periods October-November 2015 and August-September 2016.

In 2015, geological mapping of the Property was performed by an independently-contracted geologist, Mr Robbie Sparrow (FGS). The geological mapping resulted in a series of 1:10 000 scale outcrop maps (Sparrow, 2015) that were subsequently integrated with regional geological maps to augment initial geophysical interpretations.

In 2016, additional geological mapping was completed by Mathew Hodge (Pr.Sci.Nat) and Luke Viljoen (Pr. Sci. Nat) of RES across the Property proximal to detected geochemical anomalies.

### 9.1.4 Geochemical Sampling

Geochemical sampling programs were designed to initially identify vectors to mineralisation. The programs included stream sediment, soil and termite mound sampling. Programs were constrained to areas where Kalahari Group cover was considered to be no more than 40m in thickness (Section 9.2.1).

Two phases of geochemical sampling were completed over the Property during the periods 2015 and 2016. The 2016 sampling program was designed to investigate targets derived from geophysical interpretations and historical geochemical copper occurrences (Section 6). A total of 6,036 samples were collected. The sampling methods are reported in Section 11.1.1. A summary of the soil sampling program is detailed in Table 9.2.

Table 9.2: Summary of geochemical samples collected during 2015/2016 on the Property. Geochemical samples were analysed by a combination of portable XRF (PXRF) (2827 samples) and ICP-OES (4907 samples).

| 2015 Sample Type | Line spacing (m) | Sample Spacing (m) | Samples Collected | QA/QC Samples | Total |
|------------------|------------------|--------------------|-------------------|---------------|-------|
| Grid (soil)      | 500              | 80                 | 1688              | 115           | 1803  |
| Dambo (sediment) | n/a              | 500                | 342               | 29            | 371   |
| Regional (soil)  | 1000             | 80                 | 694               | 75            | 769   |
| Termite (soil)   | n/a              | n/a                | 81                | 0             | 81    |

|                    |                    |                    |                  |                |              |
|--------------------|--------------------|--------------------|------------------|----------------|--------------|
| Interest (soil)    | n/a                | n/a                | 22               | 1              | 23           |
|                    |                    | <b>Sub-Total</b>   | <b>2827</b>      | <b>220</b>     | <b>3047</b>  |
| <b>2016</b>        | <b>Line</b>        | <b>Sample</b>      | <b>Samples</b>   | <b>QA/QC</b>   |              |
| <b>Sample Type</b> | <b>Spacing (m)</b> | <b>Spacing (m)</b> | <b>Collected</b> | <b>Samples</b> | <b>Total</b> |
| Regional           | 1200               | 80                 | 1348             | 75             | 1423         |
| Grid               | 600                | 40                 | 1861             | 101            | 1962         |
|                    |                    | <b>Sub-Total</b>   | <b>3209</b>      | <b>177</b>     | <b>3385</b>  |

The rationale for the planned sample locations can sub-divided into the following domains:

- **Grid** (soil) samples were situated over geophysical/historical geochemical anomalies and within the 40m Kalahari Group (Kalahari Cover) isopach, termite mounds within grids were sampled;
- **Dambo** (stream sediment) samples situated along dambo drainages in order to test for regional copper anomalism;
- **Regional** (soil) samples were collected as traverses across the license area within the 40m Kalahari sediment cover isopach;
- **Termite** mounds (soils) were selectively sampled across Property; and
- **Interest** (soil) samples were to be collected to test historical geochemical anomalies.

## 9.2 RESULTS OF EXPLORATION PROGRAMS

### 9.2.1 Geophysics

The magnetic and radiometric data (Fig. 9:1) was processed to assist with interpretation. The following filters were applied to the contractor-supplied Total Magnetic Intensity (TMI) aeromagnetic data:

- Reduction-to-the-pole (RTP) of the TMI
- First Vertical Derivative of the RTP (1VD)
- Second Vertical Derivative of the RTP (2VD)
- Analytical signal of the RTP (AS)
- Tilt derivative of RTP (TDR)
- Total horizontal derivative of the RTP (THD)
- Gaussian residual frequency filters were applied to each of the above so as to further improve on anomaly resolution.

The detailed outcrop mapping and geochemical sampling (Sections 9.2.2 and 9.2.3) enhanced the interpretations of geophysical data in terms of lithological and stratigraphic coding. The main results from the geophysical interpretations are:

- Depth analysis, using 2D Euler deconvolution, was completed on a number of profiles, to derive a Kalahari Group depth profile. Depth estimates were considered an important aspect of the geochemical data interpretations (Section 9.2.2).
- Significant structures, related to basin paleo-topography (e.g. normal, transverse, thrust), were interpreted (Fig. 7:4);
- Magnetically-evident lithological units and larger domains were polygonised; and

- A litho-stratigraphic map was compiled by geologically coding the mapped magnetic units and domains, based on regional stratigraphy mapped on the Property (Fig. 7:4 and Section 9.2.2).

### 9.2.2 Geological Mapping

The significant results from the mapping programs are as follows:

- The Property is interpreted to be underlain by sub-cropping late-Palaeozoic basement and Neoproterozoic Katangan Supergroup sequences.
- Scapolite alteration was observed in outcropping biotite-quartz-scapolite schists. Elsewhere, this has been interpreted as indicative of potential alteration associated with regional-scale mineralising systems (Selley et al., 2005). No copper oxide or sulphide mineralisation was observed during the mapping exercises.
- Mapping data was integrated with geophysical interpretations to produce conceptual geological cross-sections with targets for drill testing (Section 9.2.4).

### 9.2.3 Geochemical Sampling

Geochemical results were domained by regolith and reclassified by standard deviation intervals. The results from the geochemical sampling programs have confirmed the work completed by RST (Section 6).

Eight (8) additional geochemical exploration targets (in addition to confirming the three RST targets) were delineated using copper, cobalt and indicator element (Mo, Pb, Zn, Ni) geochemical signatures (Table 9.3 and Fig. 9:2).

The most significant geochemical results are reported in areas where the Kalahari Group cover is least significant (Fig. 9.2)

Two targets (the Central and South West Targets) were tested by the 2016 drilling program (Section 10).

*Table 9.3: Summary targets generated from 2015/2016 geochemical datasets.*

| Geochemical Target                       | RST Target         | Potential Target Stratigraphy / Structure                                                                     |
|------------------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------|
| PAN-001 / PAN-002                        |                    | Interpreted contact between Lower Kundelungu and Mwashya Groups. Possible domain bounding structural setting. |
| PAN-003                                  |                    | Upper Roan and Mwashya Group contact.                                                                         |
| PAN-005 / PAN-009                        |                    | Lower Roan Group - basal contact (?). Contact of interpreted thrust duplex.                                   |
| PAN-007 / PAN-008 / Central / South West | M49/B and M49/K/JS | Basement                                                                                                      |
| PAN-006                                  | M49/L/C.WT.        | Edge of basement                                                                                              |
| PAN-004                                  |                    | Lower Roan Group / antiform structure interpreted                                                             |

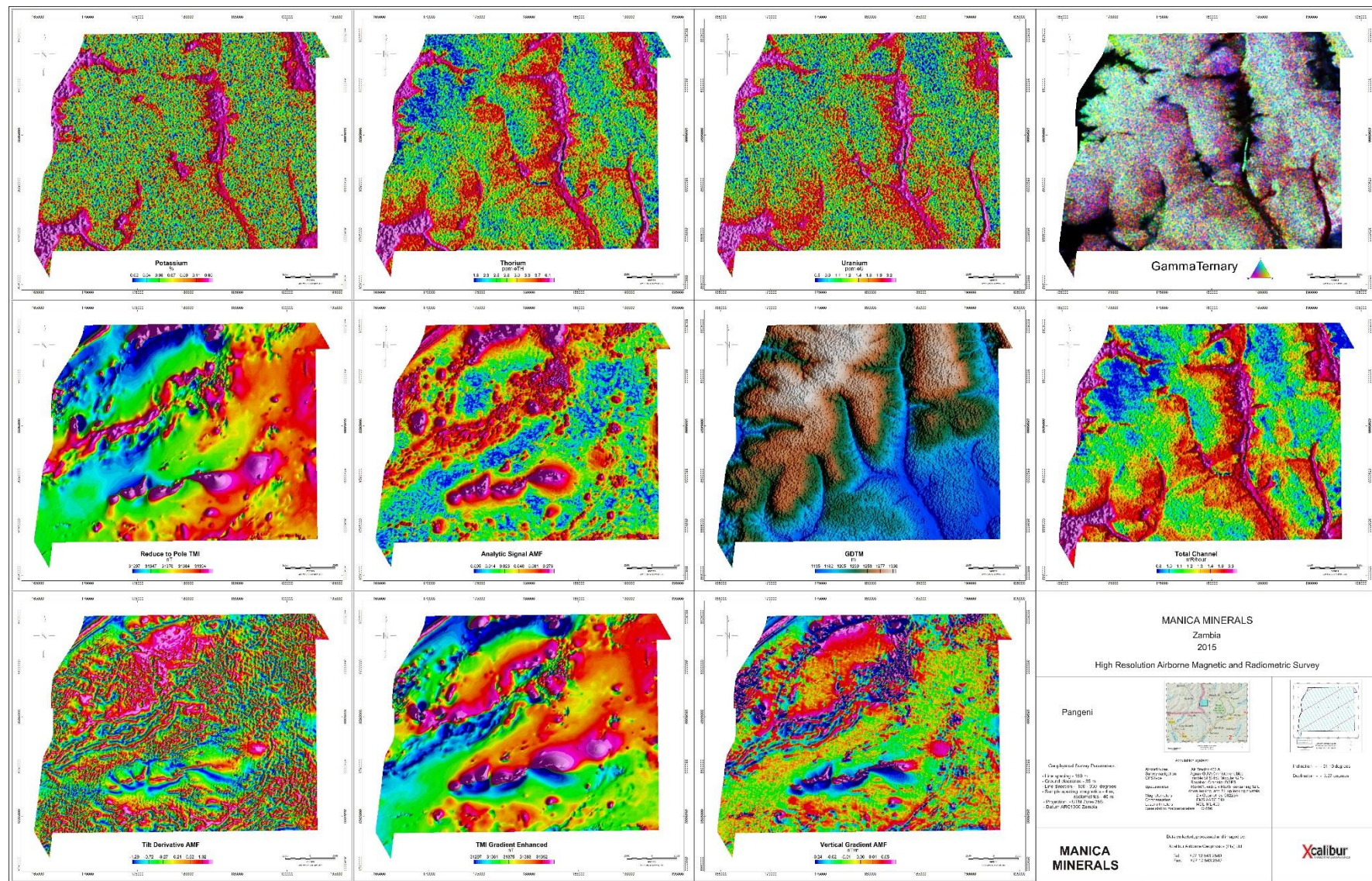


Fig. 9.1: Survey data collected over the Property (Source: Xcalibur, 2015).

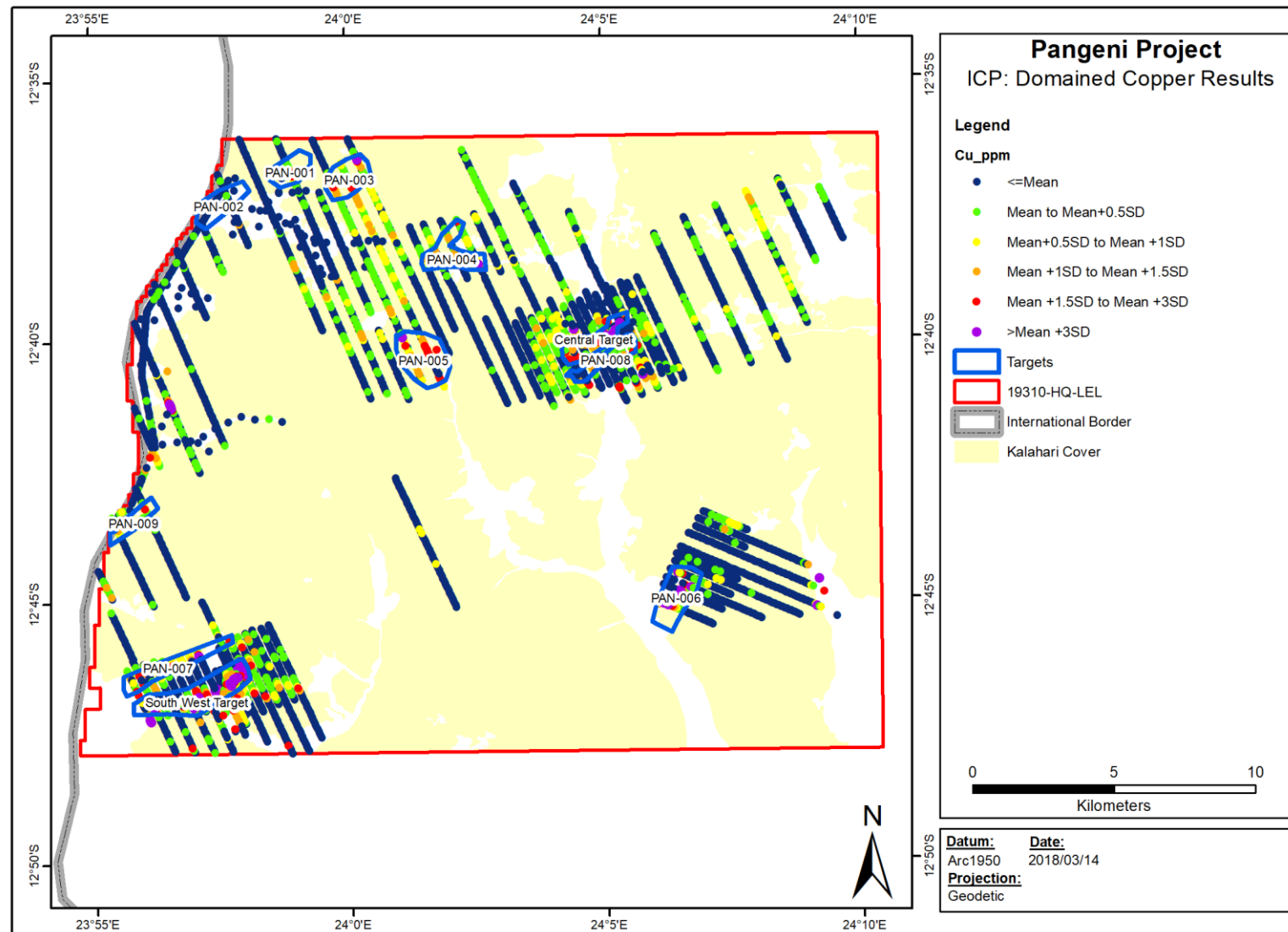


Fig. 9-2: Geochemical sampling results (ICP-OES - Cu assays) domained by regolith type, underlain by interpreted Kalahari Group sequences (Kalahari Cover) – exploration targets are displayed as blue polygons (Source: RES, 2018).

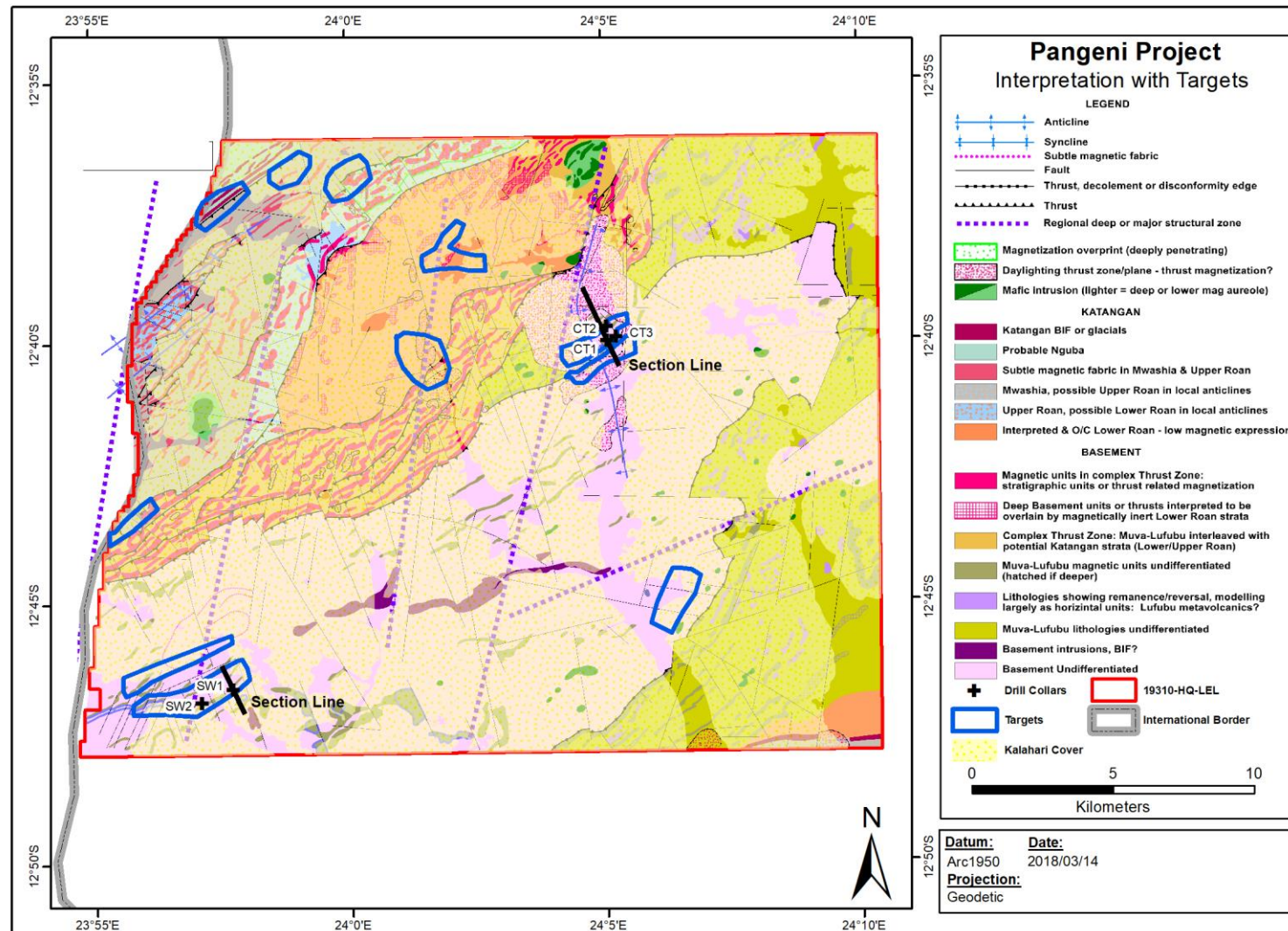


Fig. 9:3 Interpretative geological map produced from geophysical interpretations and field mapping data with geochemical targets overlain (Fig. 9:2). Location of interpreted cross-sections in Fig. 9:4 and Fig. 9:5 are displayed. (Source: RES, 2018).

## 9.2.4 Drill Program Targeting Results

Forward modelled sections, with geological interpretation, were compiled by Dr. Branko Corner for selected profile lines within the Property (RES, 2018) (Fig. 9:3 - Fig. 9:5). Field mapping data was used to enhance the profiles to produce cross sections which approximate to the observed geology. The modelled sections results were used to design the drill program completed in 2016 (Section 10).

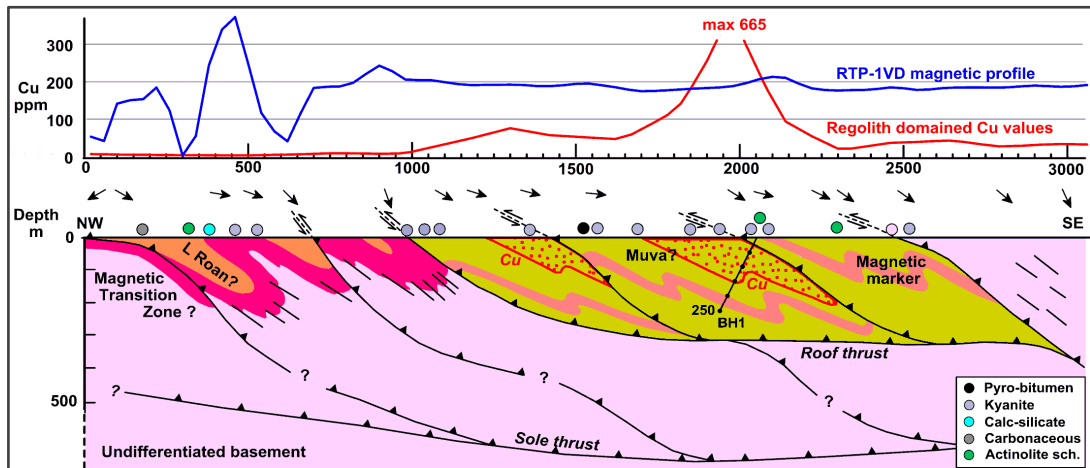


Fig. 9:4: Schematic geological section for the Central Target (Fig 9.3) compiled from field data and magnetic data. The section is interpreted to represent a flat-lying thrust system, with thrust related magnetisation and relicts of Muva Supergroup, and Lower and Upper Roan Group lithologies lying within undifferentiated basement. A number of structural models were considered. A roof thrust-bound duplex system resting on an imbricated sole thrust system was considered best fit for the observed field data (Source: RES, 2018). Note BH1 was a proposed hole and is representative of the location of drill hole CT1 (Section 10).

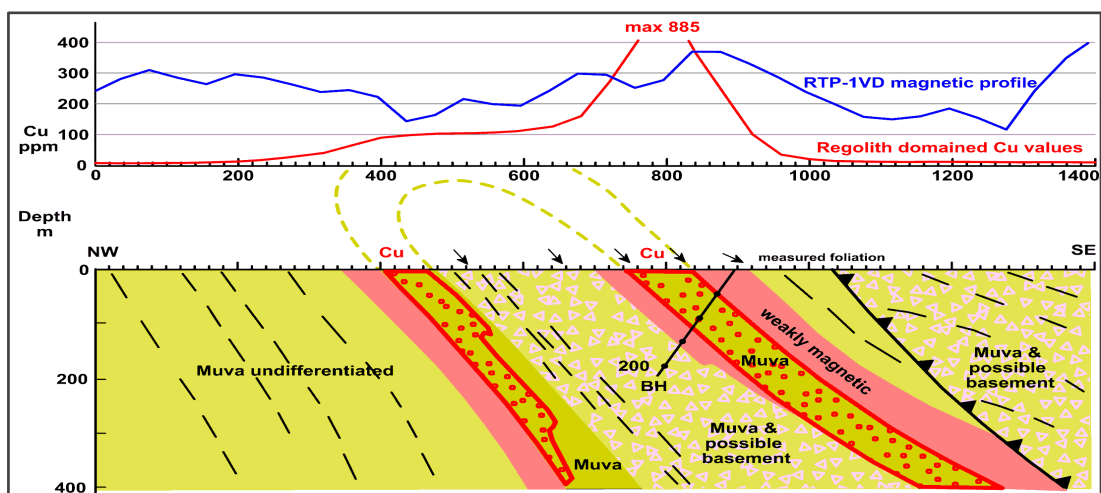


Fig. 9:5: Schematic geological section for the South West Target (Fig. 9:3) compiled from field data and magnetic data. The section is interpreted to represent mineralised Muva Supergroup meta-sediments that are potential limbs of a large antiform lying within undifferentiated Muva Supergroup and basement lithologies (Source: RES, 2018). Note BH was a proposed hole and is representative of the location of drill hole SW1 (Section 10).

### **9.3 COMMENTS ON SECTION 9**

In the opinion of the independent author:

- The sampling methods, sample quality and representivity for the exploration programs, completed by the Vendor, are appropriate for the style of mineralisation and type of deposit being explored.

There do not appear to be any factors that may have resulted in sample bias;

- Initial exploration programs, completed by the Vendor, have identified a number of priority grassroots exploration targets within the Property based on geological and geophysical interpretations, with support from geochemical sampling.
- Due to poor exposure (the Property is dominated by Kalahari Group cover) mapping surveys and current geophysical interpretations require further geological support from future drilling programs.

## 10 DRILLING (ITEM 10)

Drilling on the Property was completed by the Vendor in 2016 in a joint venture with Antofagasta Minerals and results provided a proof of concept from the core drilling program. Drilling activities, qualifying as exploration for the purpose of BeMetals Qualifying Transaction for listing on the exchange, occurred in 2016. A total of approximately US\$1,463,000 of expenditures have been completed on the Property by CCZ from 2015 to date in a joint venture with Antofagasta Minerals.

A core drilling program was completed in November 2016. The drilling contractor was Blurock Mining Services, Kitwe, Zambia. Core was obtained using wire-line methods. The drilling program, and all procedures, were implemented and supervised by RES personnel.

Core holes were used for reconnaissance exploration and geochemical anomaly investigation. Five (5) exploration drill holes were completed (Tables 10.1 and 10.2). A total of 1,005.10m were drilled. The Central and South West Target areas were tested (Fig. 9:3).

Table 10.1: Drill hole collar position for the Property (positions are provided in Arc1950).

| Hole ID | ARC 1950 |         |              |               | Azimuth | Inclination | Depth (m) |
|---------|----------|---------|--------------|---------------|---------|-------------|-----------|
|         | Northing | Easting | Latitude (S) | Longitude (E) |         |             |           |
| CT1     | 8598067  | 183336  | 12°40'00.55" | 24°05'05.66"  | 320     | -65         | 224.6     |
| CT2     | 8598565  | 183321  | 12°39'44.35" | 24°05'05.34"  | 320     | -65         | 125.7     |
| CT3     | 8598197  | 183658  | 12°39'56.44" | 24°05'16.37"  | 320     | -60         | 218.5     |
| SW1     | 8585671  | 170102  | 12°46'38.65" | 23°57'42.71"  | 320     | -60         | 220.7     |
| SW2     | 8585187  | 168998  | 12°46'53.97" | 23°57'05.95"  | 330     | -60         | 215.6     |

Table 10.2: Summary of drill hole core diameters and metres drilled.

| Target            | Hole Number      | HQ (m)        | NQ (m)        | Total (m)      |
|-------------------|------------------|---------------|---------------|----------------|
| Central Target    | CT1              | 69.40         | 155.20        | 224.60         |
|                   | CT2              | 59.30         | 66.40         | 125.70         |
|                   | CT3              | 41.80         | 176.70        | 218.50         |
|                   | <b>Sub-total</b> | <b>170.50</b> | <b>398.30</b> | <b>568.80</b>  |
| South West Target | SW1              | 77.80         | 142.90        | 220.70         |
|                   | SW2              | 62.80         | 152.80        | 215.60         |
|                   | <b>Sub-total</b> | <b>140.60</b> | <b>295.70</b> | <b>436.30</b>  |
| <b>Total</b>      |                  | <b>311.10</b> | <b>694.00</b> | <b>1005.10</b> |

### 10.1 PROCEDURES

#### 10.1.1 Geological Logging

Industry-standard logging methods, sampling conventions and geological codes were established for the project. Descriptions of colour, mineralogy, texture, lithology, regolith, oxidation, alteration and mineralisation (mineralogy, form, visual estimates) were completed. Structural features such as bedding, foliation, fold axial planes, joints, veins, and faults were measured for both geological and geotechnical purposes. All data, including photographic records, were digitised and stored in the project database.

All core was photographed, both wet and dry. Subsequent to core cutting and sampling, the core was re-photographed. The sampling methods are reported in Section 11.1.2.

### **10.1.2 Core handling**

RES personnel and Blurock drill operators ensured core trays were labelled correctly. Subsequent to each drill run, core blocks were inserted and marked with depths (m), approximate core loss or gain, and recovery. Core was washed prior to placement in core trays.

Trays were marked with the target name, drill hole identity number, the intersection interval (start and final depths in that box), an arrow indicating which direction is down-the-hole, and a sequential box number.

Any break in the core made during removal from the barrel was marked with an “x” on the core. When breakage of the core was required to fill the box, edged tools were used, and the end of every run was marked.

### **10.1.3 Recovery**

Core recovery and rock quality designation (RQD) were recorded. All data was digitised and stored in the project database. Drill core recovery averaged 80% in the weathered horizons and 99% in fresh rock. Overall average core recovery was 90%.

Core inspections by RES personnel documented the core recovery to be satisfactory.

### **10.1.4 Collar surveys**

Individual drill hole collar positions and elevations were captured using a handheld Garmin GPS. Collar coordinates were captured in ARC1950 Datum and UTM 35S coordinate system.

### **10.1.5 Downhole surveys**

In order to monitor the consistency and deviations in drill hole orientation, multiple downhole surveys were conducted for all drill holes using a Reflex EZ Shot (electronic single shot magnetic survey tool). The downhole surveys were completed at 25m and all data was digitised and stored in the project database.

### **10.1.6 Orientated drill core**

All drilled core was oriented for each 3m drill run by the drilling contractor using the Reflex ACT II RD Orientation tool.

Oriented core runs (and broken core pieces) were aligned utilising the orientation marks provided by the Reflex ACT II RD system. These core pieces were marked according to the confidence in orientation, with different orientation marks only within 10° of each other to be considered aligned.

A solid continuous line, drawn using a permanent marker, represents high confidence orientations, whilst low confidence was marked as dashed lines. Down hole half-ticks were marked on each core piece to ensure the core remained oriented during transport and handling.

## 10.2 PETROGRAPHIC STUDIES

A selection of thirty-three (33) drill core samples were submitted for petrographic study. Thin sections and polished sections were prepared for both transmitted light and reflected light microscopy. RES completed the petrographic study.

## 10.3 RESULTS & INTERPRETATIONS

The Central Target was drill tested by three (3) holes over 350m in strike length. Mineralised horizons dip locally at 40 to 50 degrees, in a south-easterly direction, generally parallel to the dominant foliation.

The South West Target was drill tested by 2 holes. The drill holes are separated by a distance of 1.2km. Mineralised horizons dip locally at 40 to 50 degrees, in a south-easterly direction, generally parallel to the dominant foliation.

The most significant copper intercepts are detailed in Table 10.3. Drill core sample results are presented in schematic down-hole log sheets (Figs. 10.2-10.6)).

*Table 10.3: Significant drill intercepts from the 2016 drilling programs.*

| Hole Id | From (m) | To (m) | Width (m) | TCu% |
|---------|----------|--------|-----------|------|
| CT1     | 39.0     | 45.1   | 6.10      | 0.34 |
| CT1     | 146.5    | 147.0  | 0.50      | 1.17 |
| CT1     | 160.0    | 161.5  | 1.50      | 0.62 |
| CT3     | 34.6     | 35.2   | 0.62      | 0.40 |
| CT3     | 176.0    | 182.0  | 6.00      | 0.35 |
| SW1     | 121.5    | 126.0  | 4.50      | 0.30 |
| SW1     | 142.5    | 148.0  | 5.50      | 0.48 |
| SW2     | 112.1    | 114.1  | 2.00      | 0.28 |

### Notes:

- The results detailed above are for selected mineralised intersections > 0.5m in length, >0.1%TCu in grade and allowing for up to 1m of internal dilution.
- The author cautions that true widths have not been determined as the level of detail needed to calculate accurate true widths is not yet available. As a result, down hole widths have been reported. The true widths are not expected to significantly change from the down hole widths described.

Copper assay values show the highest downhole concentrations in schistose-mylonitic units although not all of the units are mineralised. The hanging-wall and intercalated gneiss units are essentially devoid of copper mineralisation. This is analogous to observations from studies at the Lumwana Deposit (Bernau et al., 2012).

Additional observations include:

- Hypogene copper minerals logged are chalcopyrite and bornite. The mineralisation is typically both disseminated, blebby and along foliations with less frequent mineralisation contained in quartz ±carbonate veinlets;
- Chalcopyrite is additionally present in late cross-cutting quartz ± carbonate veins (Fig. 7.6d) possibly representing late remobilisation of chalcopyrite;

- There is evidence that the sulphide minerals underwent stretching during, syn-orogenic, shearing and migration into pressure shadows (analogous to observations in the Mwombezhi Dome, Sillitoe et al., 2015); and
- Copper mineralisation is associated with weakly anomalous concentrations of Co, Mo, Ni, Zn, Sc and V (Fig. 10.1)).

#### **10.4 COMMENTS ON SECTION 10**

In the opinion of the independent author:

- There are no significant drilling, sampling or recovery factors that could materially impact on the reporting of exploration drill results.
- The independent author cautions that true widths have not been determined as the level of detail needed to calculate accurate true widths is not yet available. As a result, downhole widths have been reported in this Report. The independent author notes that foliation is generally perpendicular to the core axis, therefore the downhole widths are a close representation of true widths.

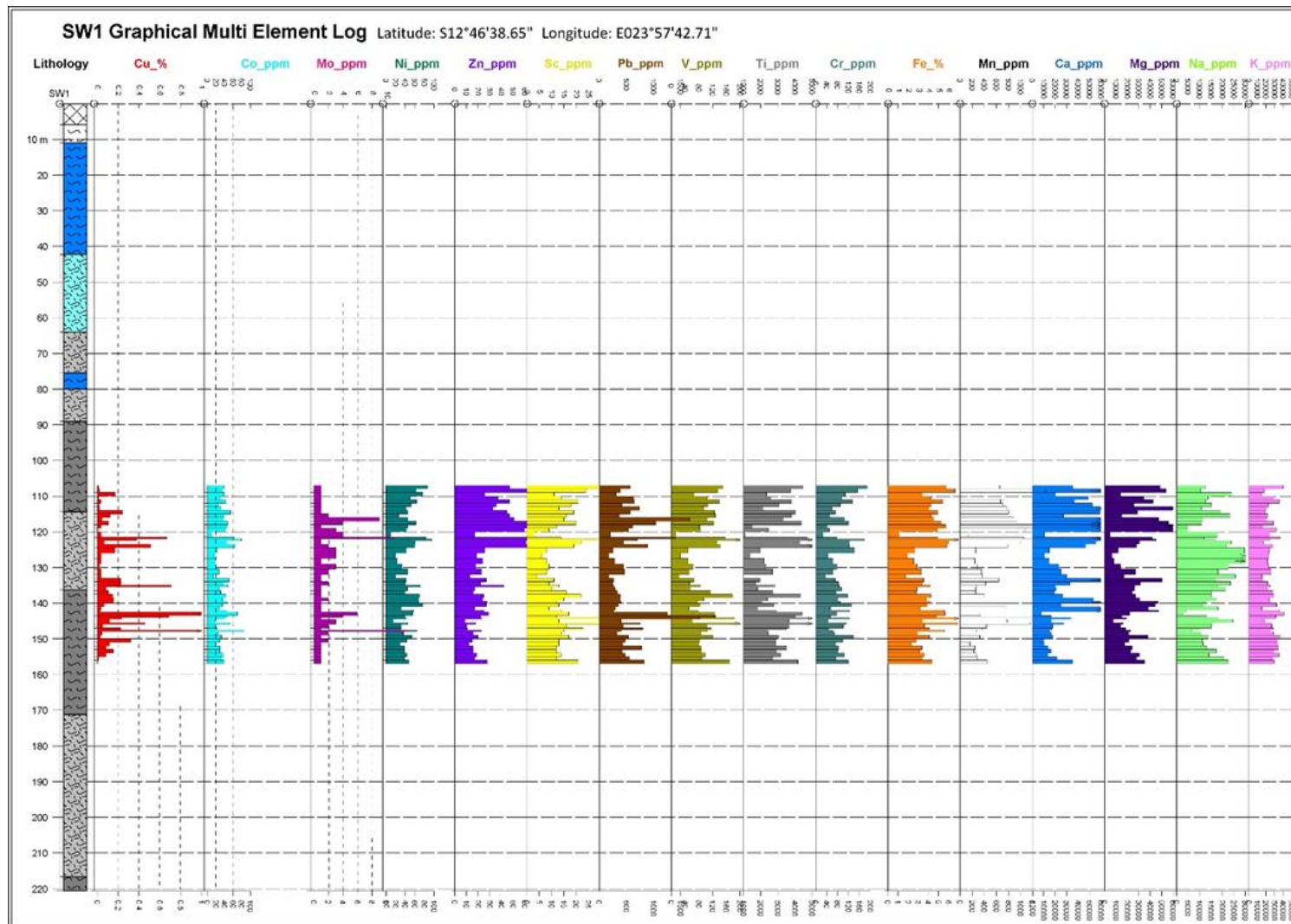


Fig. 10.1: Multi-element log (borehole – SW1).

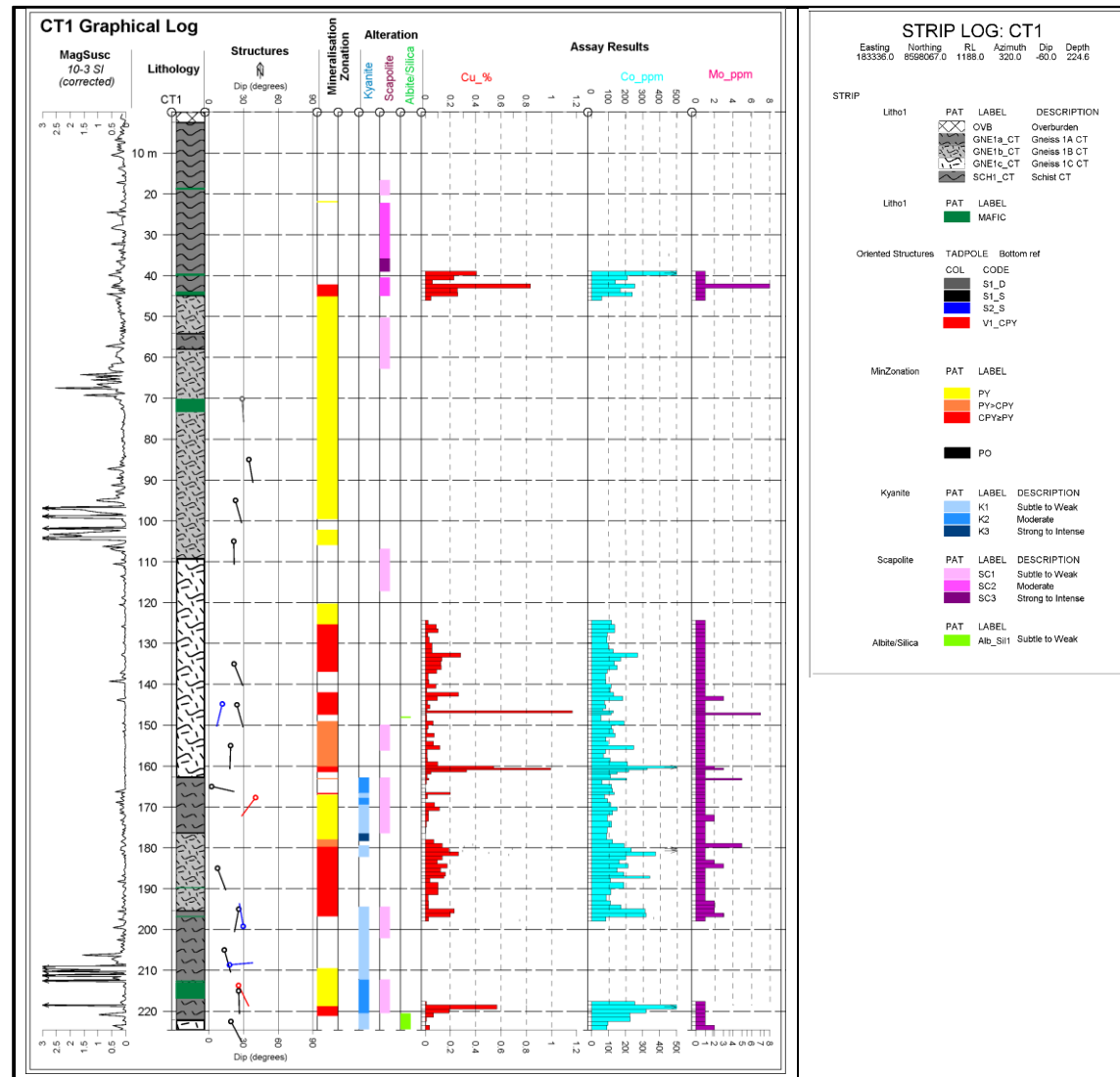


Fig. 10.2: Borehole CT1 – graphical log (alteration logged as kyanite was subsequently interpreted to be scapolite and/or kyanite replaced by scapolite).

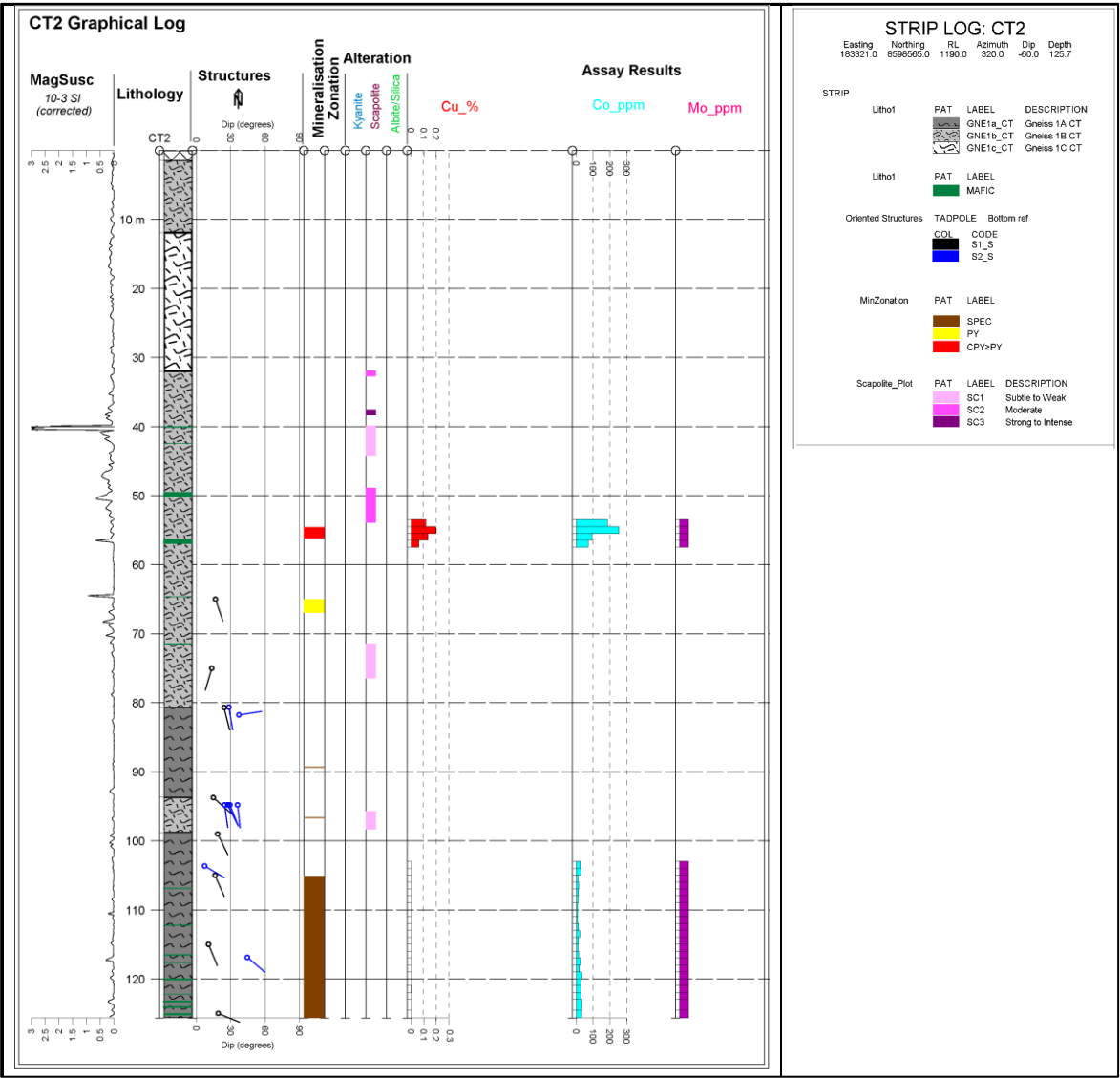


Fig.10:3: Borehole CT2 - graphical log (alteration logged as kyanite was subsequently found to be scapolite and/or kyanite replaced by scapolite).

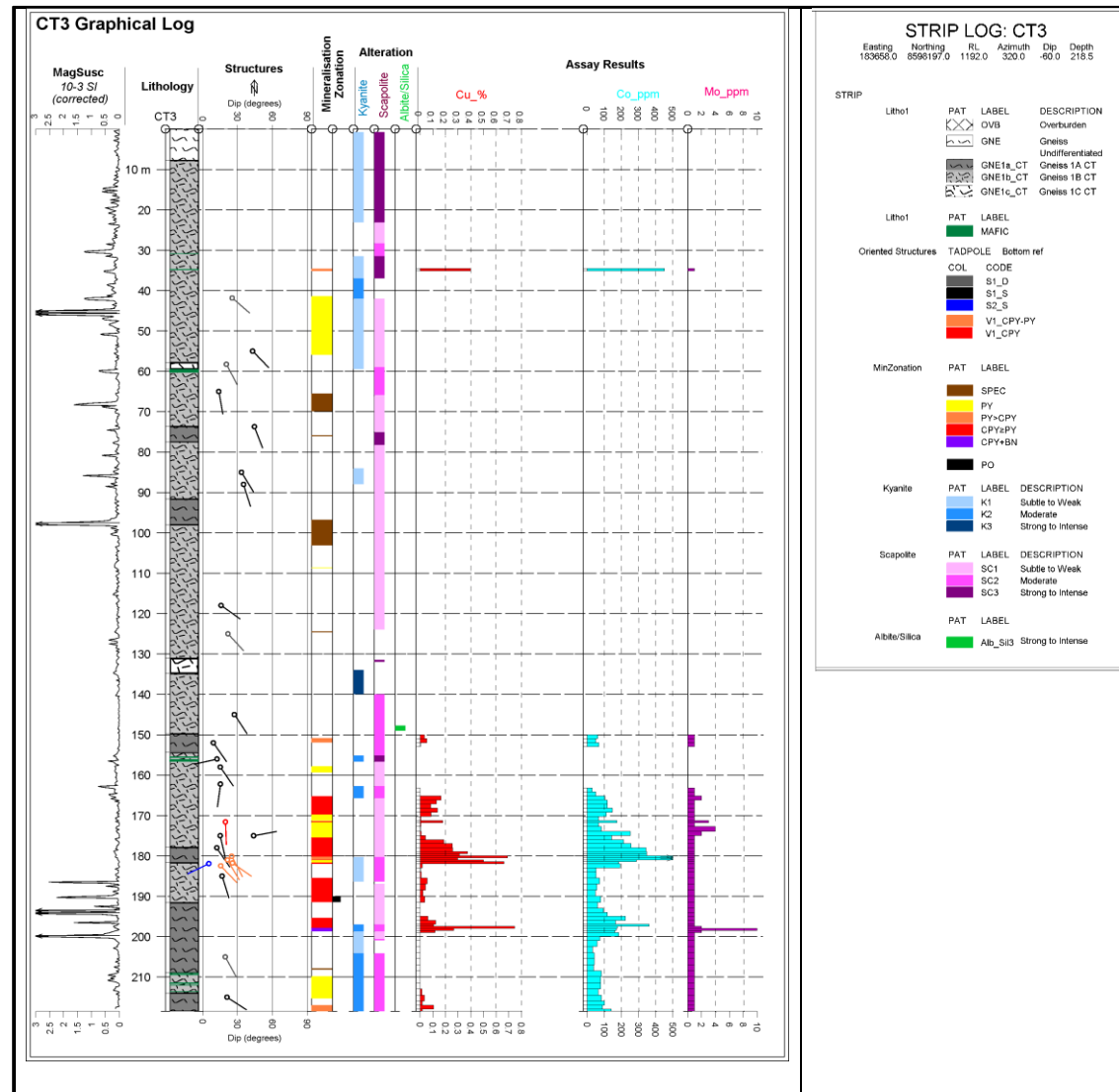


Fig.10:4: Borehole CT3 - graphical log. (alteration logged as kyanite was subsequently found to be scapolite and/or kyanite replaced by scapolite).

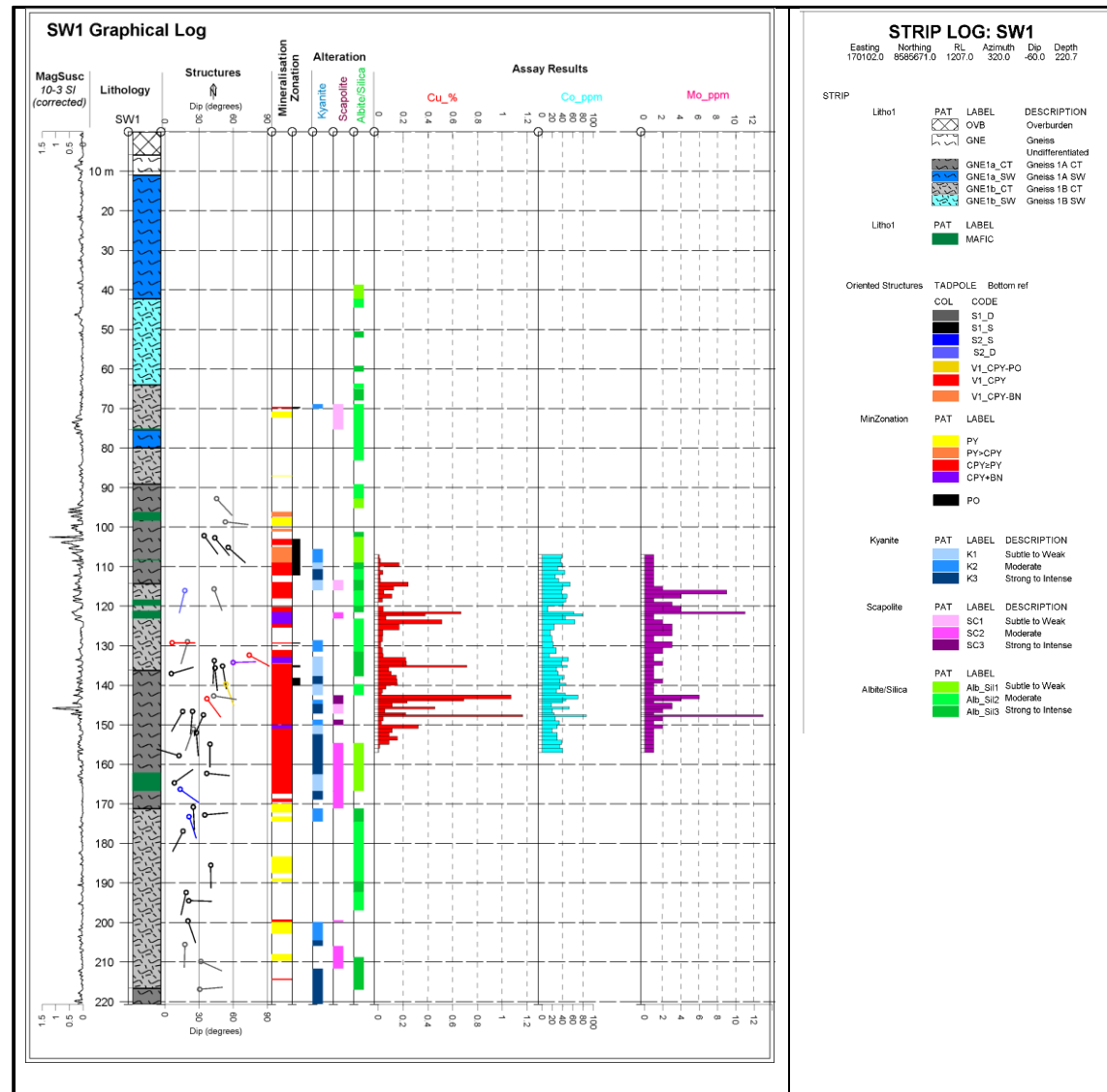


Fig.10:5: Borehole SW1 - graphical log (alteration logged as kyanite was subsequently found to be scapolite and/or kyanite replaced by scapolite).

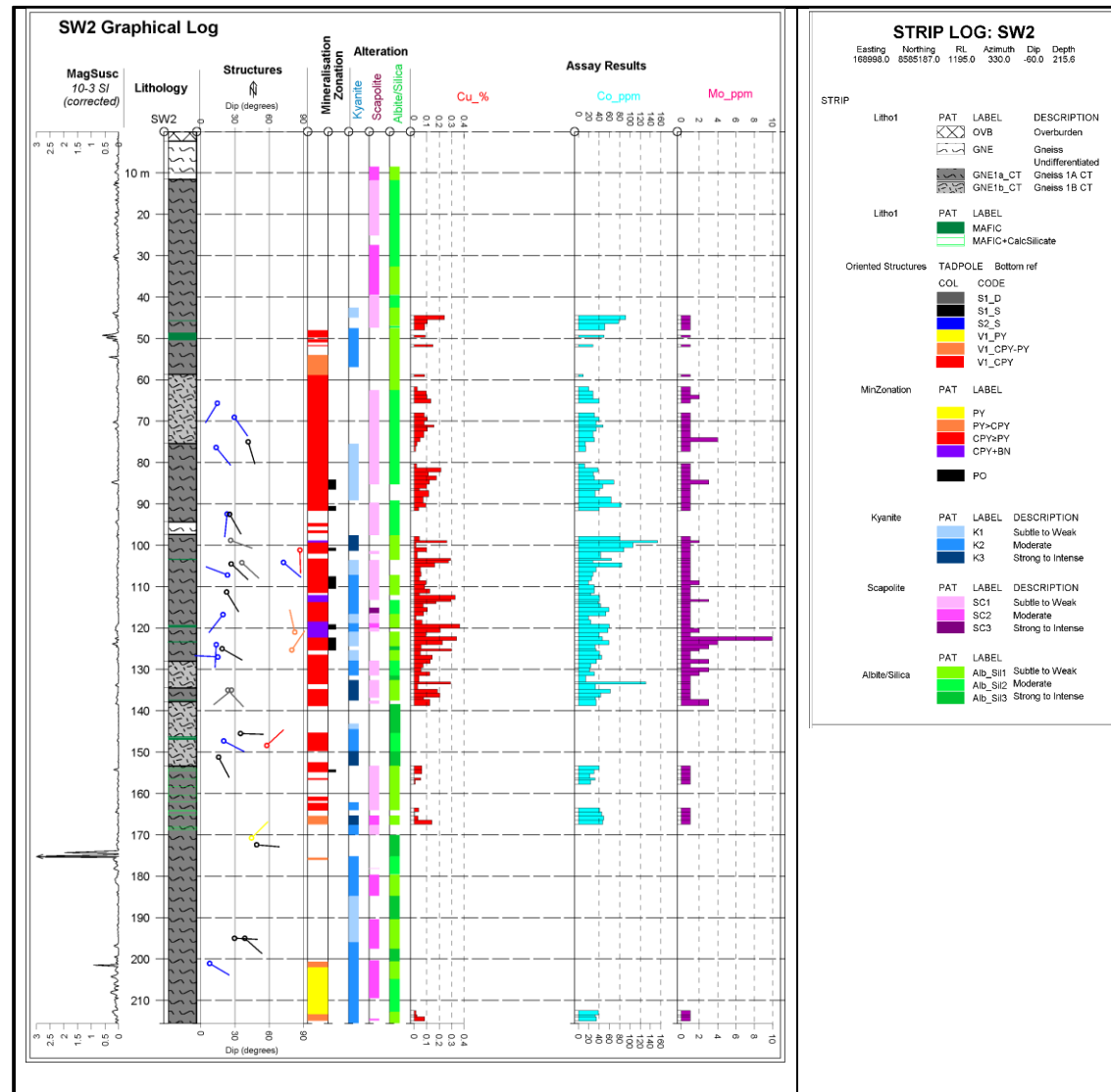


Fig.10:6: Borehole SW2 - graphical log (alteration logged as kyanite was subsequently found to be scapolite and/or kyanite replaced by scapolite).

## **11 SAMPLE PREPARATION, ANALYSES AND SECURITY (ITEM 11)**

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Sampling on the Property was completed by the Vendor from 2015 to date in a joint venture with Antofagasta Minerals and results provided a proof of concept from the core drilling program. Drilling activities, qualifying as exploration for the purpose of BeMetals Qualifying Transaction for listing on the exchange, occurred in 2016. A total of approximately US\$1,463,000 of expenditures have been completed on the Property by CCZ from 2015 to date in a joint venture with Antofagasta Minerals.

### **11.1 SAMPLING METHODS**

#### **11.1.1 Geochemical Sampling**

Soil samples were collected from the B-horizon depth (approximately 10cm depth) as 2–5 kg samples, and the sample location points were recorded using a hand-held GPS. Coordinates, site characteristics and geological observations were recorded at each site and electronically captured into the project database.

Dambo and termite samples were collected using the same methodology as for the soil sampling programs.

#### **11.1.2 Core Sampling**

Sample intervals were determined from visually estimated Cu-sulphide abundance with barren intervals sampled if within a wider higher-grade zone. Sample length intervals varied from 0.5-1.5m, with 1m intervals being typical. Sample intervals respected lithological and alteration boundaries.

Core samples were split along the absolute orientation line or alternatively along a relative orientation line. Each half-core piece was labelled with the relevant sample number prior to sampling. For consistency, the right half (looking down the hole) was sampled. Samples were individually double-bagged with a unique sample number tag placed in each bag.

QAQC samples were inserted by RES personnel (Section 12). All sample bags were placed in a single uniquely labelled polyethylene woven sack. Sealed sample sacks were submitted to Intertek-Genalysis, Chingola in Zambia for sample preparation.

### **11.2 ANALYTICAL AND TEST LABORATORIES**

Two independent laboratories were used for sample analysis. The laboratories are independent of BeMetals Corp. (the “Issuer”), CCZ/Manica Zambia (the “Vendor” and PMRL (the “Licence Holder”) and the Property (“Pangen Project”) as independence is described by Section 1.5 of NI 43–101.

For geochemical soil sampling, Scientific Services CC, Cape Town, South Africa (ISO 9001:2015 registered) was used. Intertek-Genalysis, Perth, Australia (part of the Intertek Group Plc) completed the analysis of core samples. Intertek-Genalysis, Australia is ISO 17025 accredited (Appendix 1).

### 11.3 SAMPLE PREPARATION AND ANALYSIS

#### 11.3.1 Geochemical Samples

Geochemical samples were transported to the appropriate mobile field-camp for drying and sieving to -180µm. An appropriate subsample was selected from the sieved sample, and the subsamples were placed into paper sachets for laboratory dispatch. Replicate and duplicate samples were inserted alternately every 10 samples by RES personnel. Samples were packaged in sealed batches of 100 according to sample number ticket books used and dispatched to RES, South Africa for analysis.

In 2015, 2,827 soil samples were initially analysed by a portable XRF (PXRF). Prior to analysis samples were further sieved and screened to -90µm .

In 2016, to enhance analysis detection limits, four consignments of samples were sent to Scientific Services CC, for ICP-OES analyses. Batches 1 and 2 included geochemical samples collected during 2015 programs. Batches 3 and 4 included geochemical samples collected during 2016 programs (Table 11.1).

*Table 11.1: Summary of geochemical samples submitted to Scientific Services for ICP-OES analysis.*

| Geochemical analysis method          | ICP-OES (Batch 1) | ICP-OES (Batch 2) | ICP-OES (Batch 3) | ICP-OES (Batch 4) |
|--------------------------------------|-------------------|-------------------|-------------------|-------------------|
| Geochemical Samples                  | 651               | 796               | 1481              | 1979              |
| CRMs                                 | 14                | 18                | 37                | 39                |
| Blank Samples                        | 24                | 17                | 16                | 20                |
| Laboratory Duplicates                | 11                | 18                | 31                | 41                |
| Scientific Services CC Blank Samples | -                 | 9                 | 21                | 20                |
| <b>Sub-Total</b>                     | <b>700</b>        | <b>858</b>        | <b>1586</b>       | <b>2099</b>       |

For all geochemical samples, a 0.5 g subsample was taken from the pulps, and digested using a strong acid digestion (HClO<sub>4</sub>:HNO<sub>3</sub>). Samples were analysed for Cu, Co, Ni, Pb, Zn, ±Mo, ± Sc using ICP-OES.

#### 11.3.2 Core Samples

Core samples were submitted to Intertek-Genalysis, Chingola, Zambia for sample preparation. Initially 4-5kg samples were crushed, homogenised, and split using a riffle splitter. A 1.2kg split sample was then pulverised and homogenised. A 50g sub-sample was prepared by Intertek-Genalysis for dispatch to Intertek-Genalysis, Australia for ICP-OES analysis. The coarse rejects, as well as the pulp rejects, are stored by CCZ in Kitwe, Zambia.

Half-core reference samples are stored in plastic core trays in a secure lockable storage facility in Kitwe, Zambia.

Diamond drill hole samples from 2016 were analysed for 33 elements on a 0.2g subsample of the pulp using a four-acid digest (Intertek-Genalysis method 4A/OE).

*Table 11.2: Summary of core samples submitted to Intertek-Genalysis for ICP-OES analysis*

| Geochemical Analysis method | ICP-OES (Method 4A/OE) |
|-----------------------------|------------------------|
| Drill Samples               | 307                    |
| CRMs                        | 16                     |
| Blank Samples               | 15                     |
| Laboratory duplicates       | 17                     |
| <b>Total</b>                | <b>355</b>             |

## **11.4 QUALITY ASSURANCE AND QUALITY CONTROL (QAQC)**

### **11.4.1 Geochemical Samples (ICP-OES Analysis)**

Geochemical samples, submitted in 2015 and 2016, have been conducted in accordance with satisfactory industry-standard practices with blank, duplicate and a range of Certified Reference Material (CRM) samples inserted at an average rate of between 5-7%.

All blank control samples were below the certified values and detection limits for all elements. Returned blank sample values demonstrate that contamination has been adequately controlled during sample preparation. The inserted CRM's have highlighted acceptable laboratory accuracy. Most CRM assayed values were within two standard deviations of the certified values verifying the precision of the primary laboratory. The inserted pulp duplicates highlight good precision between pairs of samples with more than 90% of the returned sample pair values been within 10% of the original sample value .

### **11.4.2 Core Samples (ICP-OES Analysis)**

Core samples submitted in 2016 have been conducted in accordance with satisfactory industry-standard practices with blanks, duplicates and a range of Certified Reference Materials (CRMs) samples each inserted at an average rate of 5% .

With regards to inserted blank samples, 13 out of 15 samples reported above certified levels. These results indicate contamination of samples at the sample preparation facility (RES, 2018). All analytical laboratory inserted internal blanks fell below the detection limit. These inconsistencies are not critical to the analysis of results and the results can be used for reporting of early-exploration drill results.

The inserted CRM's have highlighted acceptable laboratory accuracy. Most CRM assayed values were within two standard deviations of the certified values verifying the precision of the analytical laboratory.

A good correlation is observed for both the repeat and lab duplicate sample pairs. The coarse crush duplicate sample pairs show no significant variation and therefore the sample preparation method is repeatable and representative.

## **11.5 DATABASES**

Project data are stored in various digital files. Geological logs, collar, and down hole survey data were hand-entered and are stored in the project database. The project database is stored on a secured server at the RES offices, Cape Town, South Africa.

## **11.6 SAMPLE SECURITY**

Sample security included a chain-of-custody procedure that consists of filling out sample submittal forms that are sent to the laboratory with sample shipments to make certain that all samples are received by the laboratory. Prepared samples were shipped to the analytical laboratory in sealed sacks that are accompanied by appropriate paperwork, including the original sample preparation request numbers and chain-of-custody forms.

Paper and scanned records are kept for all assay and QAQC data, geological logging and down-hole and collar coordinate surveys.

**11.7 COMMENTS ON SECTION 11**

In the opinion of the independent author:

- The sample preparation, security and analytical procedures are adequate for the reporting of exploration results contained within this Report;
- Industry-standard sampling methods and sample chains of custody were established and administered by RES personnel on behalf of the Vendor;
- The QAQC sample preparation and analytical results procedures, both in terms of the RES blind inserts and laboratory QAQC protocols, are satisfactory and thus are believed to apply adequate controls on sampling preparation and analysis;
- During future exploration campaigns, contracted sample preparation laboratories will need to be adequately briefed with respect to the standard operating procedures for equipment and laboratory cleanliness to ensure minimal cross-contamination between samples. This is particularly important should future mineral resource estimations be required for the Property; and
- Audits of all sample preparation and analytical laboratories shall be performed during each phase of assaying of drilling samples to ensure compliance with the laboratories' stated methodologies and international best practices. Such audits are to be performed by Qualified Persons and records and reports of the findings of each audit maintained by the Issuer.

## **12 DATA VERIFICATION (ITEM 12)**

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### **12.1 QAQC REVIEW**

Comprehensive QAQC analysis was completed by RES, on behalf of the Vendor during the exploration and drilling programs from 2015-2017 (RES, 2016 and 2018). The independent author has reviewed various QAQC reports and documentation.

In addition the independent author has completed the following data verification:

- A review of the logistics and operational report for the airborne geophysical survey.
- A cross-check of the electronic databases for geochemical sampling and drilling against the original assay laboratory certificates.

Principal findings from the data verification are as follows:

- The parameters and tolerance limits for the airborne survey are acceptable for the location and terrain and conform to industry best practice,.
- The QAQC procedures have been satisfactory in ensuring that no material bias or issues associated with precision and accuracy have been introduced during the sampling and assay procedures.
- The electronic data provided represents an accurate reflection of the original data and is suitable for the reporting of exploration results.
- The QAQC procedures implemented for the Property to date, are appropriate for the style of mineralisation and type of deposit being explored.

No verification sampling of the exploration boreholes was conducted by the independent author.

In the opinion of the independent author the reports and procedures used are to a high standard. It is the independent author's opinion that all the data presented in this Report is factual and accurate and is adequate for the purposes of reporting in this Report.

### **12.2 COMMENTS ON SECTION 12**

In the opinion of the independent author:

- Results highlight that sample preparation and analysis may be accepted and provides representative results for the mineralisation reported.
- The data is adequate for the purposes of, and use in, this Report.

### **13 MINERAL PROCESSING AND METALLURGICAL TESTING (ITEM 13)**

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No mineral processing and metallurgical testwork studies have been completed for the Property.

## **14 MINERAL RESOURCE ESTIMATES (ITEM 14)**

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No mineral resource estimates have been undertaken for the Property.

## **15 ADJACENT PROPERTIES (ITEM 23)**

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Rio Tinto Exploration Zambia Limited hold large-scale exploration licences adjacent to the Property. This information is in the public domain and can be sourced on-line at the Zambia Mining Cadastre Portal, 2018.

Anglo Exploration Zambia Limited hold large-scale exploration licences approximately 100km southwest from the Property. This information is in the public domain and can be sourced on-line at the Zambia Mining Cadastre Portal, 2018.

## **16 OTHER RELEVANT DATA AND INFORMATION (ITEM 24)**

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The independent author is not aware of any relevant data or information not already presented in this Report.

## **17 INTERPRETATIONS AND CONCLUSIONS (ITEM 25)**

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The Property is located on the western extension of the Domes Region of the Zambian Copperbelt. The Domes region is known to host significant copper deposits, including the basement-hosted mineralisation of the Lumwana Deposit, and the sediment-hosted stratiform mineralisation of the Sentinel Deposit.

Initial exploration programs have identified eleven (11) priority exploration targets from soil geochemical surveys. Two of these targets (Central and South West) are more advanced and have been drill tested with a limited number of boreholes. The Property remains at an early exploration stage with only five boreholes having been completed on the Property to date (three boreholes at the Central Target and two at the Southwest Target). All five holes intersected hypogene copper mineralisation. The most significant intersections included borehole CT1: 6.1m @ 0.34%TCu and borehole SW1: 5.5m @ 0.48%TCu.

These boreholes intersected copper mineralisation at the Central and South West Targets, provide encouraging proof of concept for the geological models generated for the Property. The results of the exploration to date support the strategy for further exploration on the Property.

While results to date provide encouraging proof of concept of the geological models on this property the early stage nature of work completed to date means appropriate early stage exploration risk remains, as with all similar early stage exploration properties.

The independent author concludes the exploration programs completed over the Property to date are appropriate for the style of mineralisation and type of deposit being explored. Basement-hosted and sediment-hosted stratiform base metal mineralisation are both considered with regards to the Property's exploration potential.

## 18 RECOMMENDATIONS (ITEM 26)

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The independent author has reviewed and supports the proposed next step for an exploration program across the Property as provided by BeMetals.

The next phase of exploration work will include the drilling of air-core boreholes (approximately 40-50m deep) to test for potential mineralised extensions to the Central and Southwest Targets, under Kalahari Group cover. In addition priority targets, identified during previous exploration programs, are to be tested (Section 9, Fig. 9.2).

An orientation air-core program will be completed to test the applicability of this technique in this specific area. The program totalling approximately 2,400m.

The budget is summarised below.

Air-core Program Phase 1 (Orientation Survey):

|                                                            |              |
|------------------------------------------------------------|--------------|
| Project Management, Licence Fees, HSEC, Administration     | US\$ 76,000  |
| Air-core drilling, field geological and logistical support | US\$ 195,000 |
| Air-core sample analysis, QAQC and results interpretation  | US\$ 29,000  |
| Total                                                      | US\$ 300,000 |

The results from the above program will be integrated into the current geological interpretation. Based upon an assessment of applicability of this drilling method in the area and results from the aircore geochemical sampling further exploration will be motivated as appropriate.

Further, the independent author recommends:

- All future geochemical and drill program sample analysis should include multi-element analysis, in particular for As, Ba, Bi, Co, Mo, Pb, U, V, and Zn.
- During future exploration campaigns, contracted sample preparation laboratories will need to be adequately briefed with respect to the standard operating procedures for equipment and laboratory cleanliness to ensure minimal cross-contamination between samples. This is particularly important should future mineral resource estimations be required for the Property.

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## 20 CERTIFICATES OF QUALIFIED PERSONS

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### Certificate of Qualified Person

I, Allan W. Lines, B.Sc., P. Geo, reside in Lubumbashi, Haute Katanga Province, the Democratic Republic of the Congo.

I am employed as Senior Consulting Geologist with African Mining Consultants, an exploration, mining and environmental consulting company, 1564-65 Misesi Rd, Light Industrial Area, Kitwe, Zambia.

This certificate applies to the technical report entitled "Technical Report – The Pangeni Project", that has an effective date of 10<sup>th</sup> April 2018 (the "Technical Report").

I am a Professional Geologist registered and in good standing with the association of Professional Geoscientists of Nova Scotia (APGNS) Member Number 0141. I am a graduate of Mount Allison University (Sackville, New Brunswick, Canada) with a B.Sc. in Geology in 1995 respectively.

I have practiced my profession continuously for 23 years during which time I have been involved in mineral exploration and resource development on various mineral exploration projects and operating mines in Canada and Africa, with 13 years spent working on various mineral deposits of the Central African Copper Belt ("CACB"), responsible for the design and supervision of mineral exploration programs, environmental reporting, economic studies and mineral resource estimation on numerous projects.

As a result of my experience, qualifications and professional associations, I am a Qualified Person as defined in National Instrument 43–101 *Standards of Disclosure for Mineral Projects* (NI 43–101).

I have not yet visited the Pangeni Project (the "Property") due to passport/visa irregularities travelling from the DRC (my country of residence) to Zambia.

I am responsible for all sections of the Technical Report.

I am independent of BeMetals Corp. (the "Issuer"), CCZ (the "Vendor") and PMRL (the "Licence Holder") and the Property ("Pangeni Project") as independence is described by Section 1.5 of NI 43–101. I have had no previous involvement with the Property nor the Issuer.

I have read NI 43–101 and those portions of the Technical Report for which I am responsible have been prepared in compliance with that Instrument.

As of the date of this certificate, to the best of my knowledge, information and belief, the portions of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated: 10<sup>th</sup> April 2018

"signed and sealed"  
Allan W. Lines, B.Sc., P. Geo.

Address: 1564-65 Misesi Rd, Light Industrial Area, Kitwe, Zambia. P.O.Box 20106

## CERTIFICATE OF AUTHOR

I, Thomas Alexander Krebs, Pr. Sci. Nat (400146/11), do hereby certify that:

1. I reside in Durbanville, Western Cape, South Africa.
2. I am currently employed as principal geologist of Remote Exploration Services (RES) A9 Arden Grove Business Park, Racecourse Road, Milnerton, 7441, Cape Town, South Africa.
3. I received a BSc Degree in Earth Science from the University of Berne, Switzerland and a MSc Degree in Exploration Geology from the Rhodes University, South Africa.
4. I am a member in good standing of the South African Council for Natural Scientific Professions.
5. In 2006 I joined Creo Design, a geological consultancy based in South Africa, with roles for planning and implementing of advanced greenfields and brownfields exploration project for a variety of commodities with emphasis on base metals. In 2010 I joined Remote Exploration Services, a geological consultancy based in South Africa. Since then I have been involved in a variety of projects and commodities in Africa, with emphasis on geochemical exploration, target generation, and drill project management of mostly greenfields exploration projects. Planning, implementing and managing of diamond drilling projects for base metals and gold has been a focus ever since. As a principal geologist at RES, I am part of the Technical Committee and responsible for target generation, R&D projects, and the ongoing mentoring and training of RES geologists.
6. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
7. I am one of the qualified persons responsible for preparation of the Technical Report titled "Technical Report – The Pangen Project Northwest Province, Republic of Zambia", prepared for BeMetals Corp. and having an effective date of April, 2018. I have authored section 2.6 of this report.
8. My relevant experience with respect to this project includes extensive professional experience with respect to managing of exploration drilling projects in Africa, from planning, drill collar positioning, contractor management, geological logging, geochemical sampling, QAQC, to results interpretation. Furthermore, I have been involved in the Pangen Project since the conceptualising phase and was present on the ground during the entire duration of the core drilling and sampling aspects in 2016.
9. I visited the Pangen Project area most recently on 1<sup>st</sup> November to 3<sup>rd</sup> December, 2016. No additional work has been completed on the Property since this personal inspection on 30<sup>th</sup> November 2016 that could have a material impact on the scientific and technical information disclosed in the technical report, and therefore this personal inspection of the Property on 30<sup>th</sup> November 2016 is current.
10. I am employed by Remote Exploration Services, Geological Consultants and therefore independent of the Issuer, and Vendor applying all of the tests in section 1.5 of National Instrument 43-101 and National Instrument 43-101 Companion Policy Section 3.5.
11. I have read National Instrument 43-101 (NI 43-101) and this Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
12. As of the date of this Certificate, to my knowledge, information and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make this report not misleading.

Signed, sealed and dated this 18<sup>th</sup> day of June, 2018.

*"Original signed"*



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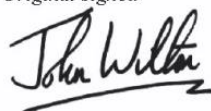
**CERTIFICATE OF AUTHOR**

I, John Wilton, Pr. Sci. Nat (400164/93) , do hereby certify that:

1. I reside in Penzance, United Kingdom.
2. I am currently employed as CEO and President of BeMetals Corp., Suite 3123, 595 Burrard Street, Vancouver, British Columbia, V7X 1J1.
3. I received a BSc Honors Degree in Geology from the University of Newcastle upon Tyne.
4. I am a member in good standing of the South African Council for Natural Scientific Professions.
5. In 1990 I joined Anglovaal Limited based in South Africa with roles in exploration, feasibility projects and business development for precious and base metals. In this time I was involved in a number of projects that lead to mine development and numerous international project assessments. In 1998 I moved to Namibia and was a principal member of both the discovery and resource development teams of what is now the Otjikoto Gold Mine, operated by B2 Gold. I was also intrinsically involved, as the exploration manager, in the 2005 IPO of TEAL Exploration onto the TSX as a listing of the Namibia, Zambia and DRC exploration and development assets of African Rainbow Minerals. Since 2005 I have been focused on base metal exploration, including the Central African Copperbelt, and worked with a number of internationally recognised researchers. From 2010 until 2017 I was the Regional Exploration Manager: Africa for Antofagasta Minerals, and was responsible for all of the company's exploration and business activities in Africa.
6. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
7. I am one of the qualified persons responsible for preparation of the Technical Report titled "Technical Report – The Pangeni Project Northwest Province, Republic of Zambia", prepared for BeMetals Corp. and having an effective date of April, 2018. I am responsible for all report sections.
8. My relevant experience with respect to this project includes extensive professional experience with respect to geology, mineral deposits and exploration activities in Africa and elsewhere. I have specific past exploration experience in the Zambia area since 2004 and with respect to the Pangeni Project. I have also co-authored two scientific publications on Zambian geology and mineral deposits.
9. I visited the Pangeni Project area most recently on 7<sup>th</sup> November to 27<sup>th</sup> November, 2016.
10. I am CEO and President of the Issuer and therefore not independent of the Issuer, applying all of the tests in section 1.5 of National Instrument 43-101 and National Instrument 43-101 Companion Policy Section 3.5.
11. I have read National Instrument 43-101 (NI 43-101) and this Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
12. As of the date of this Certificate, to my knowledge, information and belief, this Technical Report contains all scientific and technical information that is required to be disclosed to make this report not misleading.

Signed, sealed and dated this 1<sup>st</sup> day of June, 2018.

*"Original signed"*



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## APPENDIX 1

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### Genalysis Laboratory Services (Pty) Ltd Intertek-Genalysis

#### Method 4A/ (multi acid digestion in a Teflon tube)

The 4A/ digest involves the use of a mixture of acids ( $\text{HClO}_4$ ,  $\text{HNO}_3$ ,  $\text{HF}$  and  $\text{HCl}$ ) to dissolve most oxide, sulphide, carbonate and silicate mineral species. On digestion, these form soluble perchlorates which readily dissolve in  $\text{HCl}$ . The digestion is “near total”. Certain refractory minerals may, however, only partially dissolve. These include, amongst others, cassiterite, tantalite-columbite, rutile, zircon, xenotime and wolframite. Elements hosted in these minerals may not be completely taken into the solution. Some more volatile elements may be partially lost in the process e.g. chromium, arsenic and antimony. Silicon and boron are lost as volatile fluorides.

#### Method Description

The pulped samples are catch weighed at nominal 0.20g into a Teflon tube. The tube is placed in a rack and the digesting acids are added sequentially with nitric acid pre-oxidation of sulphides. The rack is placed on a “hot block” which provides even heat to decompose the sample and to ensure maximum dissolution. The perchloric ( $\text{HClO}_4$ ) acid is evaporated and the residue leached by boiling in  $\text{HCl}$ . The solution is transferred to a polystyrene tube where it is volumed and mixed. The solution is read via ICP-OES or ICP-MS instrumentation. Further dilutions may be required for reading on the ICPMS.

# NATA Accredited Laboratory

National Association of Testing Authorities, Australia  
(ABN 59 004 379 748)

has accredited

**Genalysis Laboratory Services Pty Ltd**  
**Intertek Genalysis**

following demonstration of its technical competence  
to operate in accordance with

**ISO/IEC 17025**

This facility is accredited in the field of

**CHEMICAL TESTING**

for the tests shown on the *Scope of Accreditation* issued by NATA



Jennifer Evans  
Chief Executive Officer

Date of accreditation: 20 September 1991

Accreditation number: 3244

Corporate Site Number: 3237



NATA is Australia's government-endorsed laboratory accreditor, and a leader in accreditation internationally.  
NATA is a signatory to the international mutual recognition arrangements of the International Laboratory Accreditation Cooperation (ILAC) and the Asia Pacific Laboratory Accreditation Cooperation (APLAC).

AP8-1-9 / Issue 1 / June 2011

**Scientific Services cc**  
**Consulting Analytical Laboratories**  
**SOP: Geochem Soil Sample Analysis**

Apparatus:

Lipped test tubes 18 x 150 mm  
Air bath sample racks, bottle top dispenser, test tube shaker Hotplate  
Top loader balance (3 decimals)

Reagents:

Perchloric acid (HClO<sub>4</sub>) Nitric acid (HNO<sub>3</sub>)  
Make up sufficient 1:1 solution of HNO<sub>3</sub>: HClO<sub>4</sub>  
De-ionizer water. Reference/certified Standards

Procedure:

1. Weigh 0.25g – 0.5g sample into clean, dry test tube.
2. Place tubes directly into air bath.
3. Weigh out at least two standards in positions mid row 1/3 and 2/3 in rack.
4. At least two blanks must go through whole procedure.
5. Add 2ml 1:1 HNO<sub>3</sub>:HClO<sub>4</sub> using bottle top dispenser.
6. Place air bath onto hotplate.
7. Set hotplate to medium temperature.
8. Remove rack from hotplate when just dry. Total time about 2.5 to 3.0hrs.
9. Allow to cool and add 10ml of 5% HNO<sub>3</sub>.
10. Place back onto the hotplate to warm to 'finger touch' heat to ensure the salts are dissolved.
11. Shake well using a test tube shaker. (best while still warm).

Measurements:

1. Transfer sample to ICP glass vials.
2. Calibrate the ICP:OES with sample matched standards.
3. Load the samples in ICP racks and load on the autosampler.
4. Run the QC first before the sample and check the required range.
5. Choose the best analytical emission lines for the project and paying attention to interferences.
6. Export the results to excel and report.

**CERTIFICATE**



**ISO 9001:2008**

DEKRA Certification GmbH hereby certifies that the company  
**Scientific Services cc**

**Scope of certification:**  
Testing and analysis of geological material

**Certified location:**  
Unit 3, Technosquare, 42, Morningside Ndabeni, Cape Town, 7405, South Africa

has established and maintains a quality management system according to the above mentioned standard. The conformity was adduced with audit report no. CA-16-023RA.  
This certificate is valid from 2016-06-25 to 2018-09-14  
Certificate registration no.: 90710409/2

  
Lothar Weinofen  
DEKRA Certification GmbH Stuttgart; 2016-06-13



   
Deutsche  
Akkreditierungsstelle  
D-ZNA-16029-01-01

DEKRA Certification GmbH \* Handwerkstraße 15 \* D-70565 Stuttgart \* [www.dekra-certification.de](http://www.dekra-certification.de)

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