crusader

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Crusader Confirms Lithium Potential at Manga and Signs MOU with Lepidico Ltd to Exploit Lithium in Brazil

Highlights

- Crusader to exploit lithium in Brazil by establishing Strategic Joint Venture (JV) with Lepidico Ltd (Lepidico)
- Crusader has identified significant lithium potential from rock chip sampling on its 100% owned Manga prospect located in central Brazil, which will be transferred to the JV
- Memorandum of Understanding (MOU) to establish the JV, signed with Lepidico, an Australian exploration and mineral processing technology company that owns "L-Max", a patented technology to extract lithium from mica ores
- MOU contemplates the establishment of a 50/50 JV to pursue a wide range of lithium opportunities in Brazil commencing with the Manga prospect
- Historic sampling and mapping at Manga has described lithium-rich mica (zinnwaldite) and lithium muscovite with whole rock results of up to 1.8% Li_2O
- Rock chip samples taken by Crusader in previous field seasons at Manga (targeting tin and indium) returned values of up to 1.3% Li_2O
- Specific analysis in academic papers of Manga's zinnwaldite (Li-rich mica) and the Li-muscovite minerals, returned results of up to 3.6% and 2.3% Li_2O respectively (these are not whole rock analyses)
- JV will have exclusive rights in Brazil to Lepidico's "L-Max" technology, and access to Lepidico mineral identification techniques for exploring for lithium.
- In addition to lithium, the L-Max technology generates sulphate of potash (SOP) as a salable by-product, which presents opportunities to generate a potential future revenue streams from the Brazilian agricultural sector.
- Crusader and Lepidico have already identified a significant mineralogical association between lithium mineralization and selected other elements, allowing for re-interpretation of Crusader's extensive in-country database.

Crusader's Managing Director Rob Smakman commented,

"Crusader remains focused on its gold and iron assets, specifically the development of the Juruena Gold project. The MOU provides the opportunity to partner with Lepidico's technical team, access their patented L-Max technology and allow the Manga lithium project to be advanced through a joint venture structure.

In addition to the Manga project, the JV will hold exclusive rights to the L-Max process technology within Brazil. Given this opportunity, we are reviewing the other known lithium projects in Brazil, many of which may be appropriate to L-Max.

We are pleased with this collaboration, matching Crusaders in-country expertise, with technical expertise specific to the processing of lithium and potentially potash in Brazil. Future actions of the partnership will seek to maximize the benefit to the shareholders of both JV parties."

Manga Lithium (Sn In) Project – Goias State, Brazil (100% Crusader)

The Manga Li Project (previously explored for tin and indium) is located in the NE of Goias state, Central Brazil. Crusader first applied for the ground when exploring for tin, indium and gold mineralisation in the region during 2007 and later mapped, soil sampled, rock chipped and drilled 15 reverse circulation holes (for 1,001m see Figure 1 below).

Drill results for the targeted tin and indium were modest, with better results including: *(Note that lithium was not directly tested in the drilling -nor the soil sampling program and that the samples were disposed of in 2012.)*

- 32m @ 670 ppm Sn and 8.4ppm In from 34m in MNRC011
- 27m @ 577ppm Sn and 8.6ppm In from 55m in MNRC010
- 2m@ 2,025ppm Sn and 20ppm In from 10m in MNRC012

(Please see the ASX Announcement from 17 September 2008 for a full list of drill results – available on Crusader website.)

The previous rock-chip program conducted by Crusader was assayed for multi-elements and includes some significant Li_20 results, as detailed in table 1 below. Li_2O grades of up to 1.3% were returned, within a zinnwaldite-rich greisen zone, proximal to the anomalous tin and indium bearing greisen. The rock chip-sampling program was undertaken targeting tin and indium and returned results up to 5% tin and 750ppm indium, noting that the tin and indium mineralisation was hosted in a different greisenised zone from the proximal zinnwaldite-rich and Li-rich muscovite greisen zones.

Further to the fieldwork, a geological technical data review[1] was undertaken and these described samples of zinnwaldite greisen and a li-rich muscovite greisen from Manga with results of up to 1.8% Li_2O (Manga is also referred to as 'Mangabeiras or Mangabeiras Massif' see Botelho & Moura 1998 and Moura 1993- see references below). These academic papers also refer to specific analysis of the zinnwaldite and the li-rich muscovite minerals (referred to as Li-phengite), with multiple analyses done on different mineral grains (from different rock samples). Results returned between 2.04% and 3.56% Li_2O for the zinnwaldite and 1.55% and 2.32% Li_2O for the Li-muscovite.

The literature also compares the geological setting and mineralisation style at Manga to the world-class Cinovec Sn, W, Li project in the Czech Republic, a project that has been mined for hundreds of years and is now being appraised for its lithium potential by fellow Australian listed explorer, European Metals (ASX:EMH).

Crusader has mapped various greisen's in the area over an extensive region and drilling also intersected different greisen facies. The soil sampling that was completed in 2007 was analysed with a hand-held XRF, which did not have the capacity to analyse the lithium content directly. Crusader has however, leveraging the technical experience of Lepidico, been able to use the historic XRF data to better understand the chemistry of the lithium mineralisation (based on Cinovec mineralisation style) and has been able to highlight exploration targets using certain other pathfinder elements, which are often associated with lithium mineralisation.

[1] Botelho N. F. & Moura M. A, Granite-ore deposit relationships in Central Brazil. Journal of South American Earth Sciences, Vol. 11, No 5, pp. 427-438, 1998
Moura M. A, A Zona greisenizada procipal do Macico estanifero Manga Beira (GO); Geologia, petrologia e ocorrencia de Indio (In). Dissertacao de Mestrado, Universidade de Brasilia, 1993

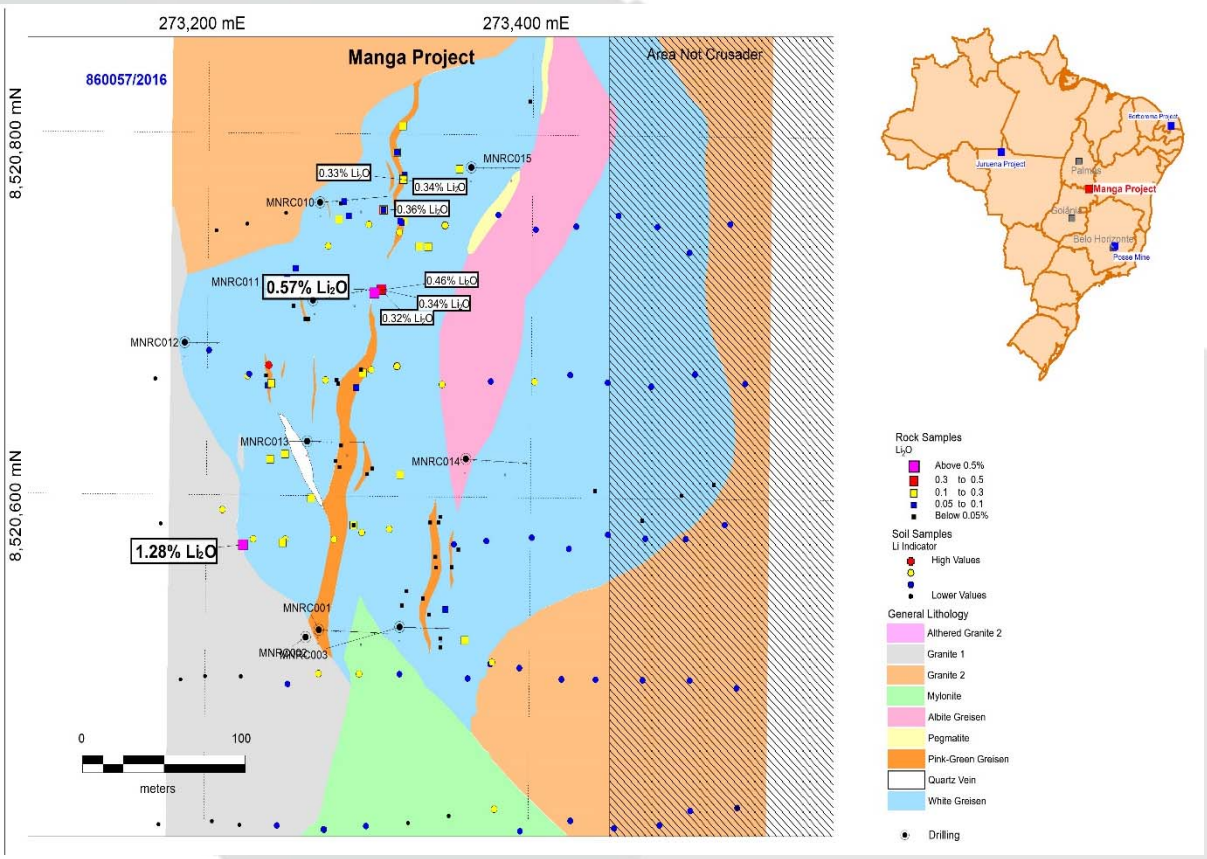

Figure 1: Geological map of the Manga zone with rock chips, soil results and drilling.

Figure 2: Reverse Circulation drilling at the Manga Prospect – April 2008

Figure 3: Greisenised rock sample from Manga, April 2007

Lepidico and the L-Max technology

Lepidico developed its L-Max technology for the recovery of lithium from lithium bearing micas including lepidolite, zinnwaldite and polilithionite. The process technology has been rapidly developed including a continuous mini plant test treating >350 kg of lepidolite to produce >99.5% lithium carbonate. The process also produces a range of valuable by-products including potassium sulfate (SOP), a fertilizer for application in the agricultural sector.

Corporately, Lepidico has recently entered into a 1 month Exclusivity Agreement with Platypus Minerals (ASX:PLP) to allow the parties to complete mutual due diligence for the purpose of investigating whether or not an agreement for the acquisition by Platypus of Lepidico or its assets can be agreed. Lepidico has indicated to Crusader, that Platypus is fully supportive of Lepidico signing this MOU.

Crusader & Lepidico JV

Crusader and Lepidico have signed a MOU, which outlines the terms for the formation of a JV, with an aim to commercialise lithium projects in Brazil. The JV will have the exclusive right to use the L-Max technology in Brazil with the strategy to develop and hold a portfolio of royalty interests from sub-licencing the technology in addition to deploying it for Crusader's Manga prospect.

For Lepidico the JV presents an opportunity to expand its exploration activities into Brazil with a well-established in-country partner, and the potential to unlock considerable value through application its L-Max technology.

It is intended that the JV Company will be based in Perth and will conduct business on normal commercial terms and conditions. The form of the JV Company and its jurisdiction will be determined based on relevant tax, financial and legal considerations.

The primary assets of the JV will be:

(i) the Manga Lithium Project
(ii) all other lithium projects as identified, licensed and/or acquired within Brazil after the date of signing of the MOU; and
(iii) an exclusive licence of Lepidico's lithium extraction technology for any new projects in Brazil.

The JV Company will be responsible for all holding costs (including mines department, environment, taxes, rent, and work fees) for the Manga and other lithium projects in Brazil.

The parties agree on their relative equity ownership in JV company to be:

- Crusader 50% (and operator)
- Lepidico 50%.

The JV remains subject to the execution of formal agreements and conditions precedent including respective board approvals. Crusader will keep the market updated on all material developments.

Lithium in Brazil - Summary

With the growth in investor interest in the lithium space, Brazil represents a unique opportunity for Crusader's shareholders to benefit from the company's extensive in-country experience and operating capacity.

The lithium market represents an exciting environment as many analysts predict higher future prices driven by the increase in demand for electrical vehicles and other lithium-ion battery uses where the number of new applications continues to multiply. Smart phones, tablets, laptops, and other consumer electronics demand more lithium. However, the largest driver for future lithium use will most likely be in electric vehicles and home batteries for solar panels.

Tesla Motors is developing a cheaper line of electric cars for release later this decade, and to achieve this it is constructing a $5-billion gigafactory to build 500,000 electric cars with the objective of lowering the cost of electric vehicles by at least 30 percent.

Tesla's biggest rival may be Build Your Dreams (BYD), a Chinese automaker backed by renowned investor, Warren Buffet. BYD also has global gigafactory ambitions and by the end of the year, according to Reuters, BYD should have 10 GWh of battery production capacity. Expansion on this capacity will be aided by a new factory in Brazil, currently under construction in Sao Paulo state.

In October 2015, the government of Brazil passed a bill that zeroed importation taxes for electric cars, and significantly reduced the importation taxes for certain hybrid cars. The Brazilian department of Mines has also declared Lithium as a strategic mineral due to its importance for high tech products.

The existing lithium reserves in Brazil have not been measured consistently, but there are known lithium ores in the country. These pegmatite hosted projects have been mined mainly as accessory minerals and to date, there appears to be minimal modern and systematic exploration for lithium.

In 2014, Brazil contributed ~400 tonnes of lithium to global output.

Top producing countries of Lithium in 2014

Country	2014 Production	% of Total
Australia	13,000	36%
Chile	12,900	36%
China	5,000	14%
Argentina	2,900	8%
Zimbabwe	1,000	3%
Portugal	570	2%
Brazil	400	1%
Total	**35,770**	**100%**
United States	*undisclosed*	

Source: http://investingnews.com/daily/resource-investing/energy-investing/lithium-investing/2013-top-8-lithium-producing-countries/

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About Crusader
Crusader Resources Limited (ASX:CAS) is a minerals exploration and mining company listed on the Australian Securities Exchange. Its major focus is Brazil; a country Crusader believes is vastly underexplored and which offers high potential for the discovery of world class mineral deposits. Crusader has three key assets:

Posse Iron Ore
The Posse Iron Ore Mine is located 30km from Belo Horizonte, a city acknowledged as the mining capital of Brazil and the capital of Minas Gerais state. The project had an indicated and inferred Mineral Resource estimate of 36Mt @ 43.5% Fe when mining began in March 2013. Posse is currently selling DSO into the domestic market. With an experienced mining workforce amongst a population of over 2.5 million people, the infrastructure and access to the domestic steel market around the Posse Project is excellent.

Borborema Gold
The Borborema Gold Project is in the Seridó area of the Borborema province in north-eastern Brazil. It is 100% owned by Crusader and consists of three mining leases covering a total area of 29 km² including freehold title over the main prospect area.
The Borborema Gold Project benefits from a favourable taxation regime, existing on-site facilities and excellent infrastructure such as buildings, grid power, water, sealed roads and is close to major cities and regional centres. The project's Ore Reserve includes Proven and Probable Ore Reserves of 1.61Moz of mineable gold from 42.4Mt @ 1.18g/t (0.4 & 0.5g/t cut-offs for oxide & fresh).
The measured, indicated and inferred Mineral Resource Estimate of 2.43Moz @ 1.10 g/t gold, remains open in all directions.

Juruena Gold
The Juruena Gold Project is located in the highly prospective Juruena-Alta Floresta Gold Belt, which stretches east-west for >400km and has historically produced more than 7Moz of gold from 40 known gold deposits.
The Juruena Project has been worked extensively by artisanal miners (garimpeiros) since the 1980s, producing ~500koz in that time. Historically there is a database of more than 30,000 meters of drilling and extensive geological data.

Competent Person Statement
The information in this report that relates to the Manga Li project exploration results, is based on information compiled or reviewed by Mr. Robert Smakman who is a full time employee of the company and is a Fellow of the Australasian Institute of Mining and Metallurgy. Mr. Smakman, has sufficient experience that is relevant to the type of mineralisation and type of deposits under consideration to qualify as a Competent Person as defined in the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr. Smakman, consents to the inclusion in the report of the matters based on this information in the form and context in which it appears.

Appendix

Table 1: Rock Chip sampling from the Manga Prospect

SAMPLES	EAST	NORTH	Li_2O (%)
MNRK 061	273320	8520612	0.14
MNRK 067	273247	8520574	0.14
MNRK 068	273223	8520573	1.28
MNRK 069	273248	8520623	0.22
MNRK 073	273239	8520662	0.29
MNRK 083	273281	8520753	0.17
MNRK 090	273320	8520752	0.15
MNRK 094	273183	8519790	0.21
MNRK 098	273330	8520738	0.15
MNRK 099	273355	8520781	0.15
MNRK 100	273336	8520738	0.22
MNRK224	273307	8520714	0.32
MNRK227	273307	8520714	0.34
MNRK228	273307	8520714	0.57
MNRK240	273308	8520758	0.36
MNRK244	273308	8520758	0.20
MNRK247	273308	8520758	0.19
MNRK248	273308	8520758	0.23
MNRK259	273308	8520758	0.14
MNRK277	273320	8520775	0.33
MNRK278	273320	8520775	0.16
MNRK279	273320	8520775	0.34
MNRK281	273320	8520775	0.20
MNRK299	273316	8520790	0.20
MNRK320	273308	8520758	0.23
MNRK323	273308	8520758	0.15
MNRK325	273320	8520775	0.20
MNRK335	273307	8520714	0.46
MNRK336	273320	8520775	0.28

Manga Project JORC Code, 2012 Edition

Section 1. Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections)

Criteria	JORC Code Explanation	Commentary
Sampling Techniques	• *Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as downhole gamma sondes, or handheld XRF instruments, etc.). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.*	• Samples reported are rock chip samples, collected by Crusader staff geologist. Rock chip samples were collected from various points across the tenement and from various rock types to establish the potential for mineralisation at Manga. • Samples were selected from various outcrops and rock types • Samples were typically 0.5-2.0kg.
Drilling techniques	• *Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc.) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc.).*	• No Drilling is reported
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• No Drilling is reported
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.* • *The total length and percentage of the relevant intersections logged.*	• No Drilling is reported
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken. If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.*	• No Drilling is reported • Sample preparation and analysis was undertaken by SGS-Geosol Laboratories ("SGS") in Brazil. The sample preparation method used by SGS-Geosol laboratories is presented in the following section.

Section 1 - continued

Criteria	JORC Code Explanation	Commentary
Sub-sampling techniques and sample preparation (cont.)	• *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second- half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• Blanks and duplicates were inserted into the sample stream at the rate of 1:40 and 1:25. No standards were inserted. • Samples are considered correct size for the material being sampled.
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc., the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.*	• SGS laboratory in Belo Horizonte was used by Crusader for analyses. • The samples were assayed for Li and multi-elements by Sodium Peroxide fusion ICP-MS finish. • NA • Sample duplicates were prepared for every 20 samples and blanks were inserted as samples every 40 samples. No Standards were submitted. The Lab performed repeat assays every 20 samples and one standard per batch. • No external check laboratory assays were completed by or Crusader.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• NA • NA • All sample data are recorded in Microsoft Excel spreadsheets and then stored in a digital database (Microsoft Access). Only Crusader's database administrator has the capacity to enter or change data. Standardised geological codes and checks have been employed to ensure standardised geological logging and required observations performed. The database is stored on a central server which is backed up weekly. Work procedures exist for all actions concerning data management. • Li2O assay results reported were calculated from Li elemental results by multiplying by 2.153, as per standard industry practise
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and downhole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.*	• Sample locations were recorded by the collecting geologist with a hand held GPS with an accuracy of generally +/-10m. • The grid system used for all data types, was in a UTM projection, Zone 23 Southern Hemisphere and datum South American 1969. No local grids are used.

Section 1 - continued

Criteria	JORC Code Explanation	Commentary
Location of data points (cont.)	• *Quality and adequacy of topographic control.*	• Topographic control in the area is basic. The topographic surface was sourced from digital satellite imagery (Aster). Further surveying work is planned prior to future resource estimation work.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• Samples spacing was dictated by outcrop availability and no pattern was followed. • No compositing was applied.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• NA • NA
Sample security	• *The measures taken to ensure sample security.*	• No specific measures were taken to ensure sample security. The samples were bagged and sealed individually and sent by local courier to the laboratory.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• No external audits were commissioned by Crusader.

Section 2. Reporting of Exploration Results

Criteria	JORC Code Explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• Results are from exploration tenement application number 860.067/2016 by the wholly owned subsidiary of Crusader, Cascar Brasil Mineração Ltda. There are no royalties (apart from the government royalty and the tenement is 100% owned by Crusader. The Manga tenement is not subject to any native title interests, no known historical sites nor wilderness or national park. Farming and mining are the main industries and land uses for the region. • The tenement is in good standing and there are no material impediments to operating in the area.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	No other company data has been discovered. Several Academic papers were referenced in the release, specifically the work by Dr. Nelson Botelho and Dr. Marcia Moura of the National University of Brasilia.

Section 2 – continued

Criteria	JORC Code Explanation	Commentary
Exploration done by other parties (cont.).		There work has been published in various respected journals and the veracity of their results are unquestioned. Other companies and or garimpeiros operating in the region are mining for Gold, Tin and Phosphate
Geology	• *Deposit type, geological setting and style of mineralisation.*	• The Manga project is in the Cavalcante-Campos Belos area, in the Brasília Fold Belt and its basement less than 50 kilometres west of the São Francisco Craton. Mineralisation is hosted by Zinnwaldite bearing greisen and Li-muscovite greisen, proximal to A- type, proterozoic aged granite.
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* o *easting and northing of the drill hole collar* o *elevation or RL (Reduced Level - elevation above sea level in metres) of the drill hole collar* o *dip and azimuth of the hole* o *down hole length and interception depth* o *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	• No drilling reported
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and / or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• Only grades above 0.15% Li2O were reported.
Relationship between Mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the downhole lengths are reported, there should be a clear statement to this effect (e.g. 'downhole length, true width not known').*	• NA

Section 2 – continued

Criteria	JORC Code Explanation	Commentary
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported. These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• See included Figure(s)
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• Exploration results reporting is considered representative
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples - size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• Historical exploration data is referenced in the announcement and includes soil sampling, geological mapping and drilling
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• Future exploration will continue to target the already identified mineralised areas.