Alpha **HPA**

ABN 79 106 879 690

The Manager Companies - ASX Limited
20 Bridge Street
Sydney NSW 2000

ASX: **A4N**
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(13 pages)

PRODUCT MARKETING AND PROJECT UPDATE

GLOBAL PRODUCT OUTREACH ACCLERATES

- **6 product orders received from global materials company**
- **4 individual product orders received and shipped to major German LED lighting company**
- **Micro-LED technology trend driving interest in Alpha's HPA and Al-Precursor #1**
- **Successful sapphire glass production using Alpha's HPA by ALOX Technology Corporation**
- **Commercial supply discussions with ALOX commenced**

CONTINUED PRODUCT IMPROVEMENTS AND DEVELOPMENT

- **HPA purity from production runs now reaching 99.9986% purity**
- **Successful development of sub 1-micron HPA powder for Li-B cathode applications**
- **Continued purity improvement on Al-cathode pre-cursor (Al-precursor #2)**

HPA FIRST PROJECT AGREEMENTS ADVANCED

- **Project ePCM bids received and under review**

The Board of Alpha HPA Limited ('Alpha' or 'the Company') is pleased to provide an update on product marketing activities for its HPA First Project, representing the evaluation and intended commercialisation of the production of ~10,000tpa equivalent of high purity alumina (HPA) and related high purity products using the Company's proprietary licenced solvent extraction (SX) and HPA refining technology.

PRODUCT MARKETING UPDATE

Alpha is currently engaged in an aggressive global marketing effort across its full range of high purity aluminas, boehmite and aluminium precursor products, spanning a diverse range of end users and applications as both direct engagements and via Traxys. The Directors are delighted with the level of end-user engagement with the Company's products and Alpha continues to prepare and ship test samples for product assessment, pursue end user supply negotiations and expand product sales into speciality markets.

6 product orders received from global materials company

During February 2021, Alpha received and shipped four high-purity product orders to the USA for product assessment by a global manufacturing and materials business. A further two product orders for this end-user are now being filled by the Company's Brisbane demonstration plant.

Continued product delivery to the LED lighting sector

Alpha has continued to engage with a range of end-users across the LED lighting sector, with the Company's products having direct applications in both the manufacture of sapphire wafer LED substrates (using HPA pellets) and the synthesis of aluminate LED phosphors (using HPA powder or Al-precursor #1).

In the September 2020 quarter, Alpha shipped three product samples to a German based LED lighting manufacturer for evaluation in the synthesis of aluminate LED phosphors. Additional market outreach into this sector saw a further two product orders shipped to a second German based LED manufacturer in the December 2020 quarter.

In February 2021, Alpha received and shipped a further four different product samples to a third major German based LED manufacturer. Products included 4N purity HPA powders across a range of particle sizings, as well as samples of Alpha's 5N Al-precursor #1, to be used in solid-state and wet-state phosphor synthesis testwork.

In total, Alpha has now shipped ten product samples globally specifically for LED phosphor testwork. Alpha understands the increased interest in its products is for use in the synthesis of aluminate phosphors is being driven by increasing demand for micro-LEDs. Micro LED technology is widely tipped to supersede OLED and backlit LCD display technology over the next ten years.

Further commentary on the micro-LED technology trend is provided in Appendix 1.

Successful sapphire glass production using Alpha's HPA by ALOX Technology Corporation

In late December 2020, Alpha completed a ~96kg test order shipment of HPA pellets to sapphire glass manufacturer ALOX Technology Corporation (ALOX), whose sapphire glass growth facilities are located in the USA.

ALOX Technology Corp. is an innovation company specializing in the production of premium sapphire crystal products using new crystal growth technology. ALOX is a growing company based in the USA and the EU. It cooperates with the world's largest manufacturing companies in the optics industry.

Using Alpha's HPA pellets, ALOX have now reported the successful growth of a ~90kg high-quality single crystal sapphire boule, with good clarity colour and no defects. No defects were detected under laser light inspection.

The boule was successfully slabbed into sapphire crystal ingots and gave a maximum rating for sapphire ingot yield.

Alpha HPA and ALOX are now in discussions on the commercial supply of high purity alumina pellets.

~90kg single crystal sapphire glass boule grown by AlOx using Alpha feedstock

PRODUCT DEVELOPMENT AND CONTINUOUS IMPROVEMENT

Alpha's technical team operating out of the Company's demonstration plant in Brisbane maintains a process of continued product improvement and development with a view to producing the highest quality aluminium products globally. The Company's interaction with end-users continues to refine Alpha's high purity product offering.

HPA purity now reaching 99.9986% purity

During December 2020 to February 2021, Alpha received regular purity assay data for its ongoing HPA product production campaigns, including the 96kg pellet order sent to AlOx. Production assays consistently reported HPA purity between 99.996% and 99.998% purity (20-30ppm impurities), with best results of 99.9986% purity (14ppm total impurities). These results represent ~150kg of high purity alumina production and consolidate Alpha's established trend of continued process and purity improvement.

These results are included as **Appendix 2**.

Successful development of sub 1-micron HPA powder for Li-ion battery (Li-B) cathode applications

Following interaction with a large Li-ion cathode materials manufacturer, Alpha has successfully developed process conditions to produce an ultra-fine (particle sizing <1 micron) alumina powder for Li-B cathode doping.

This product has additional applications in LED phosphor applications as well as surface conditioning (specialist polishing). Alpha has now manufactured and shipped 3 test product samples of this ultra-fine alumina powder for end-user testwork.

Continued purity improvement on Al-cathode precursor (Al-precursor #2)

Additional production batches of Alpha's Al-cathode precursor (Al-precursor #2) using improved process conditions have upgraded product purity to beyond the detection levels of the third party analytical techniques (ME-ICPMS), recording <1ppm total impurities – assay results included as **Appendix 3**.

Alpha is not aware of comparable purity levels for this product globally.

This precursor is used in the direct synthesis of aluminium bearing Li-ion battery cathode active materials, most notably NCA and NCMA cathode chemistries. Alpha has already distributed a test order of this product to a major European Li-B cathode materials manufacturer for testwork and is continuing to expand its market outreach to manufacturers of cathode active materials.

Product development projects underway

Product development projects which remain underway within Alpha's Brisbane facility include:

- The development of HPA pellets with bespoke specifications for a Japanese based specialist ceramics and sapphire glass manufacturer.
- The development of an HPA powder with bespoke specifications for both existing cathode and potential future cathode manufacturers.

HPA FIRST PROJECT AGREEMENTS ADVANCED

ePCM Update

Alpha has continued to progress the ePCM contractor process for the HPA First Project, co-ordinated from Alpha's Brisbane office.

- The Expressions of Interest (EOI) process for the ePCM contract concluded at the end of 2020 which gave Alpha sufficient information to proceed with the Request for Proposals (RFP) process with a smaller set of potential ePCM contractors.
- The RFP was issued in mid-January 2021 and submissions from participating ePCM contractors have been received.
- The engineering team is reviewing these submissions and are on track to have a recommendation to award an ePCM contract by end of March 2021.

Managing Director, Rimas Kairaitis, commented; *"Alpha's market outreach and product development activities continue to gather momentum with interest for our broadening suite of products underpinned by the intensifying trend toward de-carbonisation across the Lithium-ion battery and the LED/sapphire glass supply chains. The Company is delighted with the progress with ALOX Technology Corp and looks forward to further consolidating increased end-user interest into key counterparty agreements which in turn will enable us to complete our well advanced project financing discussions and move to FID."*

For further information, please contact:

Rimas Kairaitis
Managing Director
rkairaitis@alphaHPA.com.au
+61 (0) 408 414 474

Cameron Peacock
Investor Relations & Business Development
cpeacock@alphaHPA.com.au
+61 (0) 439 908 732

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About the HPA First Project

The Company's HPA First Project represents the evaluation and intended commercialisation of the production of ~10,000tpa equivalent of high purity alumina (HPA) and related products using the Company's proprietary licenced solvent extraction and HPA refining technology. The technology provides for the extraction and purification of aluminium from an industrial feedstock to produce 4N (>99.99% purity) alumina for the intended use within the lithium ion battery and LED lighting industry. Following a successful testwork program and completion of a Pre-Feasibility Study (PFS), updated in March 2019, Alpha has now completed Definitive Feasibility Study (DFS) based on the successful completion of its Pilot Plant program at its dedicated laboratory facility in Brisbane.

The Company has commenced full permitting, market outreach and project financing processes, with the expectation of positioning the HPA First Project to Final investment Decision.

Competent Persons Statement (Process Development Testwork)

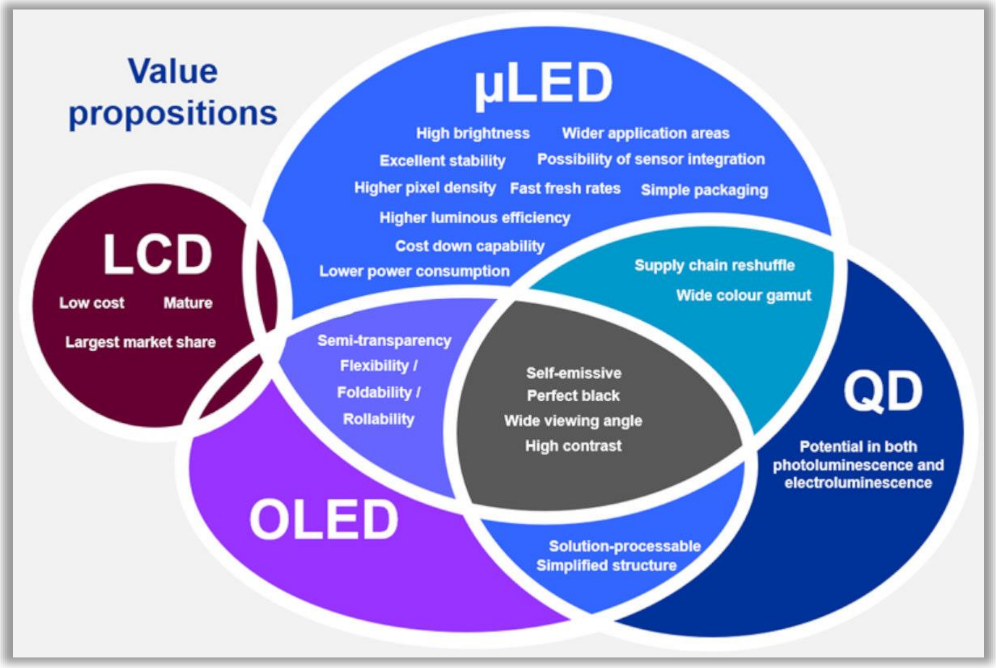
Information in this announcement that relates to metallurgical results is based on information compiled by or under the supervision of Dr Stuart Leary, an Independent Consultant trading as Delta Consulting Group. Dr Leary is a Member of The Australasian Institute of Mining and Metallurgy (AusIMM). Dr Leary has sufficient experience to the activity which he is undertaking to qualify as a Competent Persons under the 2012 Edition of the 'Australasian Code for reporting of Exploration Results, Mineral Resources and Ore Reserves'. Dr Leary consents to the inclusion of the technical data in the form and context in which it appears.

For further information on testwork results and processes see ASX announcements dated 14 December 2020, 27 October 2020, 8 October 2020, 28 September 2020, 28 July 2020, 19 June 2020, 21 May 2020, 23 April 2020, 25 March 2020, 17 March 2020, 10 December 2019, 21 November 2019, 10 October 2019, 23 September 2019, 28 August 2019, 5 August 2019, 25 July 2019, 2 July 2019, 3 June 2019, 17 April 2019, 7 March 2019, 4 December 2018, 20 November 2018, 6 September 2018, 31 August 2018, 9 July 2018, 30 April 2018, 26 April 2018, 21 March 2018, 6 March 2018, 21 February 2018, 8 December 2017, 30 November 2017, 29 November 2017, 24 November 2017 and 13 November 2017.

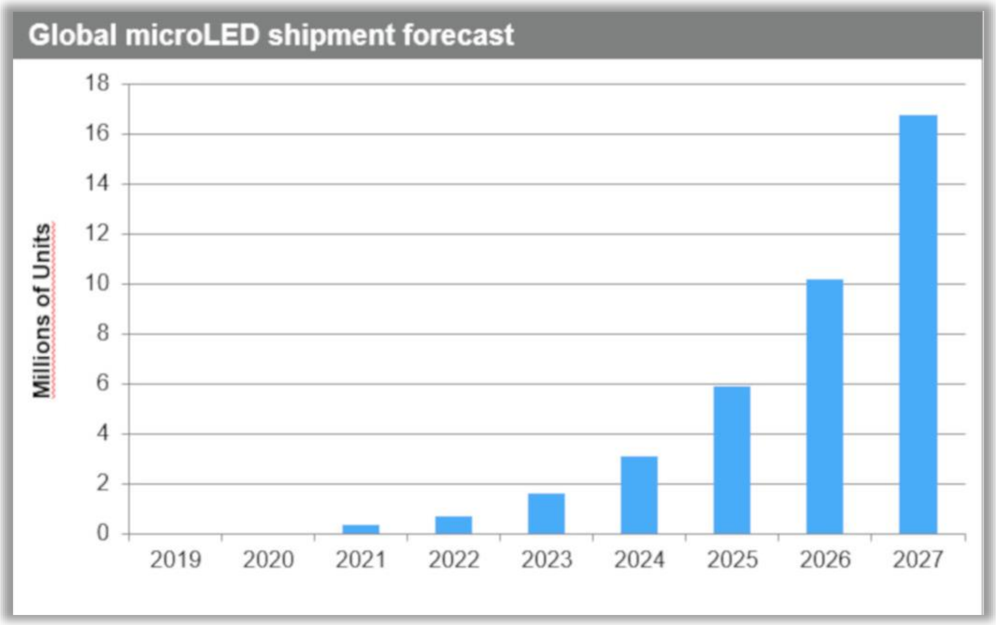
Appendix 1-Micro-LED's

The transition to micro-LED's is due to their multiple technology advantages such as wide colour gamut, high luminance, low power consumption, excellent stability and long lifetime, wide view angle, high dynamic range, high contrast, fast refresh rate, transparency, seamless connection, and sensor integration capability. The most aggressive projections for micro-LED demand suggests large scale micro-LED replacement of existing LED and OLED displays (TV's, displays, smartwatches and smartphones) and backlit LCD's (computer screens and monitors).

Current LED phosphor synthesis is dominated by solid state synthesis, which utilises high purity alumina as a key raw material. To meet the micro-LED demand is the requirement to manufacture LED phosphors with very small (nano) particle sizes. This trend favours the 'wet process' method for phosphor synthesis, which utilises Alpha's 5N Al-precursor #1.



Graphic: Micro LED's (µLED) multiple technology advantages in comparison to existing display technologies
Source (www.microled-info.com)



Graphic: Forecast growth in micro-LED's to 2027
Source (www.microled-info.com)

Appendix 2-Impurity Assays: HPA production assays #2

Date	22/12/2020	22/12/2020	23/12/2020	23/12/2020	23/12/2020	23/12/2020	23/12/2020	23/12/2020
Batch	C8B	C8B	C9B	C9B	C9B	C8B	C8B	C8B
Sample ID	S201221104	S201221105	S201221106	S201221107	S201221108	S201221109	S201221110	S201221111
Element	**[ppm wt]**	**[ppm wt]**	**[ppm wt]**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**
Ag	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Al	Matrix	Matrix	Matrix	Matrix	Matrix	Matrix	Matrix	Matrix
As	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
B	0.08	0.23	0.07	0.05	< 0.05	0.11	< 0.05	< 0.05
Ba	0.4	1.1	0.3	0.18	0.13	0.21	0.35	0.39
Be	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bi	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Br	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ca	8.7	10	7.4	7.7	8.5	5.8	5.8	7.8
Cd	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ce	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cl	0.51	0.36	0.35	0.34	0.19	0.17	0.33	0.86
Co	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Cr	2.4	4.5	3.3	2.9	5.3	2.4	2.8	3.4
Cs	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cu	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dy	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Er	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Eu	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
F	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Fe	1.3	4.5	2.2	1.4	5.4	< 1	1.1	2.4
Ga	0.39	1.1	0.26	< 0.1	0.17	2.5	0.23	0.31
Gd	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ge	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Hf	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Hg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ho	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
I	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
In	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ir	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
K	< 0.5	2.8	0.97	< 0.5	< 0.5	< 0.5	< 0.5	1.8
La	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Li	0.42	0.68	0.77	0.81	0.66	0.64	0.75	1.4
Lu	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mg	0.41	1.3	0.33	0.33	0.58	0.36	0.36	0.5
Mn	< 0.05	0.18	0.06	0.05	0.12	< 0.05	< 0.05	< 0.05
Mo	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Na	1.9	5	1.57	3.67	2.23	1.17	1.47	3.20
Nb	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Nd	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ni	< 0.5	0.7	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Os	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
P	0.91	1.4	0.93	1.1	0.59	0.22	0.49	0.48
Pb	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pd	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Pr	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pt	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Rb	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Re	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Rh	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ru	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
S	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Sb	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sc	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Se	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Si	1	2.5	1.3	1.7	0.89	0.81	0.57	5
Sm	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sn	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Sr	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ta	Electrode	Electrode	Electrode	Electrode	Electrode	Electrode	Electrode	Electrode
Tb	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Te	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Th	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ti	0.08	0.2	0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.1
Tl	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tm	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
U	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
V	< 0.05	0.11	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
W	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Y	5.2	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Yb	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Zn	1.3	2.4	0.88	0.77	< 0.5	< 0.5	< 0.5	0.61
Zr	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Impurities (ppm)	**25.0**	**39.1**	**20.7**	**21.0**	**24.8**	**14.4**	**14.2**	**28.3**
Purity %	**99.9975**	**99.9961**	**99.9979**	**99.9979**	**99.9975**	**99.9986**	**99.9986**	**99.9972**

Date	23/12/2020	23/12/2020	24/12/2020	24/12/2020	24/12/2020	24/12/2020	4/02/2021	4/02/2021
Batch	C9B	C9B	C9B Milled	A171-A215	A221- A233	C8 sinter puck	Composite Sinter Puck	Composite Sinter #6A
Sample ID	S201221112	S201221113	S201221114	S201221115	S201221116	S201221121	S210203195	S210203196
Element	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**
Ag	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Al	Matrix	Matrix	Matrix	Matrix	Matrix	Matrix	Matrix	Matrix
As	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
B	< 0.05	0.13	0.08	0.05	0.07	0.08	< 0.05	< 0.05
Ba	0.67	0.36	0.37	0.34	0.19	0.33	< 0.1	< 0.1
Be	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bi	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Br	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ca	6.9	7.1	7.6	9	7.2	10	6.7	9
Cd	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ce	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cl	0.26	0.71	0.38	0.14	0.2	0.17	0.2	0.4
Co	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Cr	10	2.7	4.7	2.7	7.3	4.9	2.7	2.4
Cs	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cu	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dy	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Er	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Eu	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
F	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Fe	17	1.6	5.7	< 1	2	5.8	< 1	< 1
Ga	0.26	0.21	0.39	0.31	0.14	0.23	< 0.1	< 0.1
Gd	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ge	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Hf	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Hg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ho	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
I	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
In	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ir	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
K	0.61	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2.1	2.1
La	0.39	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Li	1	0.43	0.37	0.65	< 0.05	0.5	0.77	0.61
Lu	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mg	0.65	0.29	0.72	0.43	0.38	0.45	0.46	0.37
Mn	0.34	< 0.05	0.13	< 0.05	0.2	0.12	0.17	0.15
Mo	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Na	1.27	0.83	1.33	1.50	1.20	5.10	6.8	9.7
Nb	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Nd	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ni	1.9	< 0.5	< 0.5	< 0.5	< 0.5	0.52	< 0.5	< 0.5
Os	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
P	0.68	< 0.1	< 0.1	< 0.1	< 0.1	1.3	1.2	1.1
Pb	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pd	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Pr	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pt	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Rb	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Re	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Rh	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ru	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
S	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Sb	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sc	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Se	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Si	1.4	1.8	2.7	0.94	1.4	1.2	0.87	0.78
Sm	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sn	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Sr	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ta	Electrode	Electrode	Electrode	Electrode	Electrode	Electrode	Electrode	Electrode
Tb	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Te	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Th	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ti	0.49	< 0.05	0.43	0.05	< 0.05	0.08	< 0.05	< 0.05
Tl	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tm	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
U	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
V	0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
W	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Y	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Yb	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Zn	1.2	1	1.2	1.2	0.77	0.83	< 0.5	< 0.5
Zr	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Impurities (ppm)	**45.1**	**17.2**	**26.1**	**17.3**	**21.1**	**31.6**	**21.970**	**26.610**
Purity %	**99.9955**	**99.9983**	**99.9974**	**99.9983**	**99.9979**	**99.9968**	**99.9978**	**99.9973**

Alpha HPA

Date	4/02/2021	5/02/2021	7/02/2021	7/02/2021	7/02/2021	9/02/2021	9/02/2021
Batch	Composite Sinter #6B	Composite Sinter #7	1kg Gamma	JM	Blend	C10 Sinter 5-8 -1	C10 Sinter 5-8 -2
Sample ID	S210203197	S210203198	S210203203	S210203204	S210203205	S210203207	S210203208
Element	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**
Ag	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Al	Matrix	Matrix	Matrix	Matrix	Matrix	Matrix	Matrix
As	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
B	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.09	0.28
Ba	0.2	0.13	0.29	0.41	0.35	0.18	< 0.1
Be	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Bi	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Br	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ca	8.9	7.2	11	13	13	7.6	7.8
Cd	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ce	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cl	0.17	0.24	0.22	0.14	< 0.1	< 0.1	< 0.1
Co	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.07	0.06
Cr	2.9	2.8	2.4	4	2.3	11	6.8
Cs	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cu	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dy	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Er	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Eu	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
F	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Fe	1.2	1.2	< 1	3	< 1	18	11
Ga	< 0.1	< 0.1	0.47	0.7	0.46	0.19	< 0.1
Gd	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ge	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Hf	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Hg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ho	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
I	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
In	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ir	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
K	1.8	1.6	1.3	2.9	1.1	0.69	1.8
La	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Li	0.76	1.1	< 0.05	0.22	0.1	1.6	1.3
Lu	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mg	0.39	0.51	0.37	0.55	0.41	0.47	0.26
Mn	0.08	< 0.05	< 0.05	0.09	< 0.05	0.23	0.15
Mo	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Na	8.1	16	3.9	13	10	7.3	7.3
Nb	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Nd	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ni	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2.2	1.4
Os	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
P	1.3	1.6	< 0.1	0.31	0.17	0.63	1.5
Pb	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pd	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Pr	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pt	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Rb	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Re	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Rh	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ru	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
S	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Sb	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sc	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Se	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Si	1.2	1.2	1.1	2.1	0.78	1.2	0.83
Sm	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sn	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Sr	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ta	Electrode	Electrode	Electrode	Electrode	Electrode	Electrode	Electrode
Tb	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Te	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Th	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ti	0.12	0.14	< 0.05	0.06	< 0.05	0.06	0.05
Tl	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tm	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
U	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
V	0.06	< 0.05	< 0.05	< 0.05	< 0.05	0.33	1.6
W	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Y	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Yb	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Zn	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.62	< 0.5
Zr	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Impurities (ppm)	**27.180**	**33.720**	**21.050**	**40.480**	**28.670**	**52.460**	**42.130**
Purity %	**99.9973**	**99.9966**	**99.9979**	**99.9960**	**99.9971**	**99.9948**	**99.9958**

Appendix 3-Impurity Assays: Assay of Al-precursor #2

Analyte	Al	Ag	As	Au	B	Ba	Be	Bi	Ca	Cd
Method	ME-ICP02	ME-MS02	ME-MS02	ME-MS02	ME-ICP02	ME-ICP02	ME-MS02	ME-MS02	ME-ICP02	ME-MS02
Unit	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Value	8.56	<0.001	<0.01	<0.001	<1	<0.1	<0.001	<0.001	<1	<0.001

Analyte	Ce	Co	Cr	Cs	Cu	Dy	Er	Eu	Fe	Ga
Method	ME-MS02	ME-MS02	ME-ICP02	ME-MS02	ME-MS02	ME-MS02	ME-MS02	ME-MS02	ME-ICP02	ME-MS02
Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Value	<0.001	<0.001	<0.1	<0.001	0.01	<0.001	<0.001	<0.001	<0.1	0.02

Analyte	Gd	Ge	Hf	Hg	Ho	In	K	La	Li	Lu
Method	ME-MS02	ME-MS02	ME-MS02	ME-MS02	ME-MS02	ME-MS02	ME-ICP02	ME-MS02	ME-MS02	ME-MS02
Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Value	<0.001	<0.01	<0.001	<0.001	<0.001	<0.001	<5	<0.001	<0.001	<0.001

Analyte	Mg	Mn	Mo	Na	Nb	Nd	Ni	P	Pb	Pd
Method	ME-ICP02	ME-ICP02	ME-MS02	ME-ICP02	ME-MS02	ME-MS02	ME-MS02	ME-ICP02	ME-MS02	ME-MS02
Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Value	<1	<0.1	0.00	<1	<0.001	<0.001	0.01	<5	0.00	<0.001

Analyte	Pr	Pt	Rb	Re	Sb	Sc	Se	Si	Sm	Sn
Method	ME-MS02	ME-MS02	ME-MS02	ME-MS02	ME-MS02	ME-MS02	ME-MS02	ME-ICP02	ME-MS02	ME-MS02
Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Value	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.001	0.01	<1	<0.001	0.00

Analyte	Sr	Ta	Tb	Te	Th	Ti	Tl	Tm	U	W
Method	ME-MS02	ME-MS02	ME-MS02	ME-MS02	ME-MS02	ME-ICP02	ME-MS02	ME-MS02	ME-MS02	ME-MS02
Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.1	<0.001	<0.001	<0.001	0.01

Analyte	Y	Yb	Zn	Zr
Method	ME-MS02	ME-MS02	ME-MS02	ME-MS02
Unit	ppm	ppm	ppm	ppm
Value	<0.001	<0.001	0.39	<0.001

TOTAL IMPURITIES (PPM)	0.44
PURITY	99.9999%

1. JORC CODE, 2012 EDITION – TABLE 1

1.1 Section 1 Sampling Techniques and Data

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

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	• Samples of high purity aluminium bearing precursor were taken as ~10g splits of homogenised, crystalline powder • Samples of high purity alumina powders were taken as ~10g splits of homogenised, crystalline powder • Samples of high purity alumina sintered pellets were taken as small edge chips of multiple pellets and composited
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• Not Applicable. The samples were generated from a feedstock of industrial chemicals.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• Not Applicable
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• Not Applicable
Sub-sampling techniques and Sample Preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material*	• Samples were presented as a homogenised, crystalline aluminium bearing precursor generated from a crystallisation and centrifuge process • Samples of high purity alumina powders were taken as ~10g splits of homogenised, crystalline powder • Samples of high purity alumina sintered pellets were taken as small edge chips of multiple pellets and composited

Criteria	JORC Code explanation	Commentary
	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.*	
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	• The purity analysis of the high-purity precursor was determined by ALS (Brisbane) The samples are dissolved to make a dilute solution which is able to be directly read on an ICP-MSS. The solution is analysed firstly, after further dilution, to report Aluminium and other elemental analysis. It is then directly read by ICP-MS, with no dilution, to lower detection limits for specific elements other than Aluminium. • The purity analysis of the high purity alumina powders and pellets was determined by EAG Eurofins (USA), using Glow Discharge Mass Spectroscopy (GDMS)
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.*	• Alpha HPA uses a third party 5N purity alumina sample as as standard
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• Not Applicable
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.*	• Not Applicable
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.*	• Not Applicable
Sample security	• *The measures taken to ensure sample security.*	• Duplicates of all samples submitted were retained at the Company's Brisbane laboratories to insure against any sample loss
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• Not applicable

1.2 Section 2 Reporting of Exploration Results

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

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• Not Applicable
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Not Applicable
Geology	• *Deposit type, geological setting and style of mineralisation.*	• Not Applicable
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* ○ *easting and northing of the drill hole collar* ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* ○ *dip and azimuth of the hole* ○ *down hole length and interception depth* ○ *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	• Not Applicable
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• Not Applicable
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').*	• Not Applicable
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.*	• Not Applicable

Criteria	JORC Code explanation	Commentary
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.*	• Not Applicable
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.*	• Not Applicable
Further work	• *The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• The Company is continuing operations at its pilot/demonstration facility in Brisbane.