EcoMag

ASX Release

KALIUM LAKES

Tuesday 26 November 2019

Kalium Lakes and EcoMag Investigate Sustainable Extraction of High Value Magnesium

Highlights

- **Kalium Lakes signs Term Sheet with emerging magnesium producer EcoMag Limited to investigate High Value Magnesium Joint Venture.**
- **Proposal to produce high purity hydrated magnesium carbonate, magnesium oxide and magnesium hydroxide.**
- **EcoMag has completed successful pilot scale trials on Beyondie SOP Project brine.**
- **8.52 Mt of existing Magnesium (Mg) JORC defined Mineral Resource already identified.**

Kalium Lakes Limited ACN 613 656 643 (KLL or Kalium Lakes) and unlisted, emerging magnesium producer EcoMag Limited (EcoMag) have signed a term sheet (Term Sheet) committing both companies to jointly undertake a feasibility study to evaluate the commercial extraction of magnesium from residual brines produced at the Beyondie Sulphate of Potash Project (BSOPP), for sale into international speciality chemical markets.

On confirmation that the extraction of magnesium is financially viable, the parties propose to negotiate a formal joint venture arrangement. KLL has already identified 8.52 Mt[1] of existing Magnesium (Mg) JORC defined Mineral Resource (see Resource Tables at Page 4).

The Term Sheet follows successful pilot scale trials by EcoMag of the residual brines from the BSOPP's pilot evaporation ponds during 2018 and 2019. The trials utilised a high magnesium content (up to 9%) feed brine to produce 99.5% pure hydrated magnesium carbonate (HMC) with relatively low levels of impurities and an overall recovery rate in excess of 95%.

As a result, the potential Joint Venture is proposed to extract very high purity HMC as a precursor compound to producing magnesium oxides and hydroxides (see Figure 1), which have current market prices between US$1,000 and US$2,000 per tonne.

Kalium Lakes' Managing Director, Brett Hazelden, commented: "Maximising shareholder value has resulted in our team continually investigating solutions to take full advantage of the resource at Beyondie. We see strong synergies with our Sulphate of Potash core business if we can leverage the technical expertise of EcoMag to extract and sell a magnesium product from our residual brine stream.

"The proposed Joint Venture would utilise our base infrastructure, including a gas pipeline, gas power station, accommodation village, access road and airstrip that has been constructed with Northern Australia Infrastructure Facility support.

EcoMag's Chief Executive Officer, Tony Crimmins, said: "The magnesium extraction will involve a separate, secondary process. We will recycle the residual brines from the potash evaporation ponds to produce a material that is sold for use in cleaning up the environment, both air and water, as well as in additional environmentally friendly products."

During the time that the Term Sheet is in place (being 12 months), EcoMag has agreed it will not enter into any arrangements with any other producers or prospective producers of potash within Western Australia in relation to the production of any of these products and Kalium Lakes has agreed not to enter into arrangements with any other entity to produce the products.

[1] These Mg mineral resources are not a production target and no forecast is made as to whether an ore reserve will be defined for the Mg mineral resources at the BSOPP, nor of financial outcomes.

The Beyondie SOP Project has already been granted Major Project Status by the Australian Federal Government, reflecting its national strategic significance to Australia.

Magnesium has been identified by the Australian Federal Government as one of six critical minerals important for industrial progress and emerging technologies. In August 2019, The Department of Industry, Innovation and Science published its "Outlook for selected Critical Minerals" offering significant potential for Australia, including magnesium (alongside niobium, rare earth elements, cobalt, antimony and tungsten) and noting projections of strong demand across the globe for decades to come, particularly in agriculture, construction, environmental and industrial applications.

World consumption - Magnesium is increasingly important for industrial and chemical markets

Magnesium markets were worth more than US$750 million in 2018, with the top magnesium importers being:

- *Germany (US$204 million)*
- *Canada (US$195 million)*
- *US (US$159 million)*
- *Japan (US$100 million)*
- *Republic of Korea (US$58 million)*

In 2017, the US was 47 per cent import reliant and consumed 620 kt of magnesium. In the US, 60 per cent of magnesium was used for agricultural, chemical, construction, environmental, and industrial applications. The remaining 40 per cent was used for refractories in the form of dead-burned magnesia, fused magnesia, and olivine.

Extract: "Outlook for Selected Critical Minerals: Australia 2019" Department of Industry Innovation and Science www.industry.gov.au/oce

High purity magnesium oxide is used across a diverse range of applications: industrial (including glass, steel, rubber, and coatings) construction (including specialty cements, construction panels and boards) environmental (including waste-water treatment and air filtration) agricultural (fertilisers and animal feeds) and for human consumption (in foods, beverages, supplements and pharmaceuticals).

Magnesium hydroxide is used primarily in wastewater treatment and flu gas desulfurization, increasingly replacing caustic soda because of its ease of handling and environmental benefits. Magnesium hydroxide is also increasingly used as a flame retarding additive in plastics manufacture, replacing alumina trihydrate which breaks down at lower temperatures. The magnesium additive is also halogen-free, making it more environmentally friendly.

EcoMag General Manager, Shaun Triner (left) and KLL Managing Director, Brett Hazelden at the Term Sheet signing.

Kalium and EcoMag are initiating a joint research and development project to optimise the conditions required to maximise the purity and therefore the price, of the magnesium specialty chemicals. Subject to a positive feasibility study outcome, the companies will then consider how best to fund any capital requirements covering the joint venture construction and operation of a magnesium plant to be co-located at Beyondie, alongside the Sulphate of Potash plant. There is no guarantee of construction or feasibility.

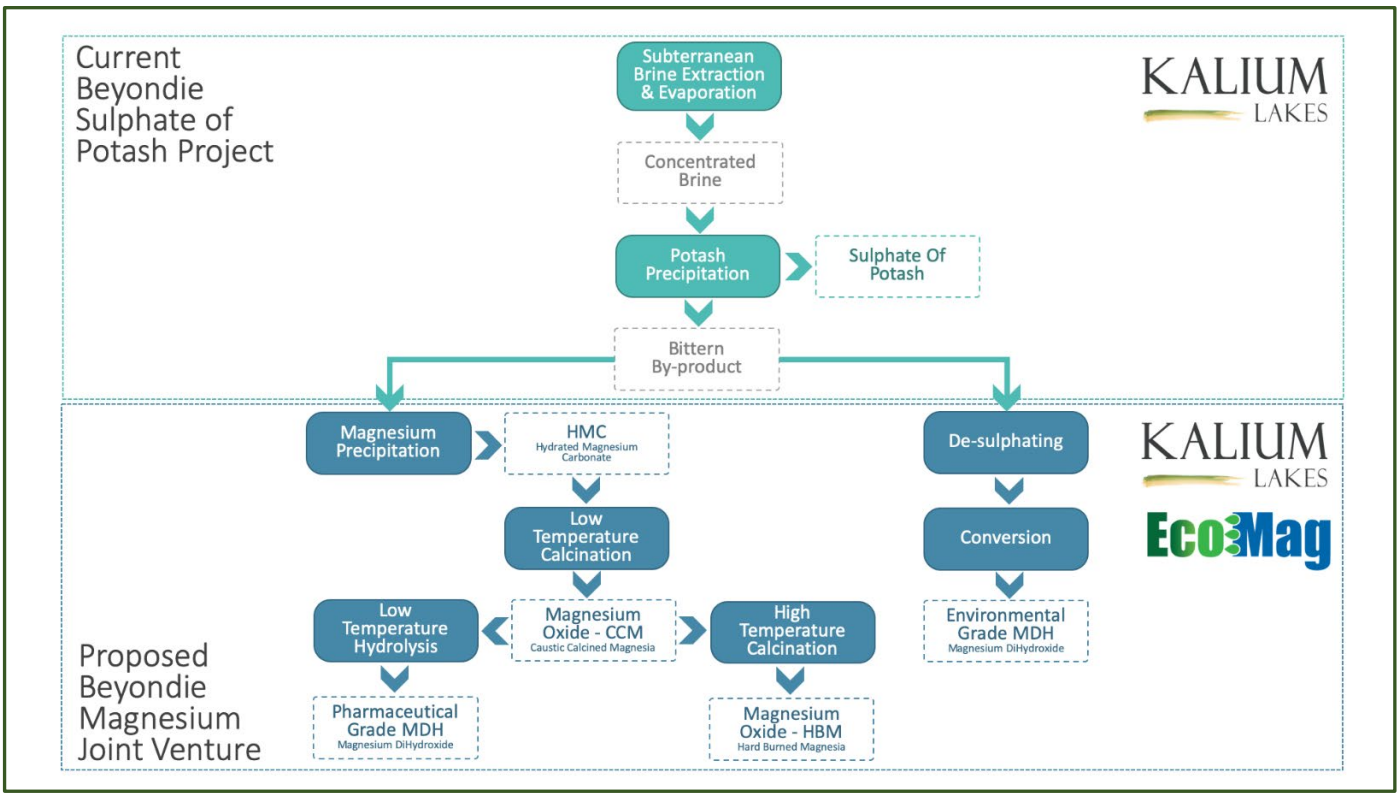


Figure 1: Proposed Magnesium Product Pathways

EcoMag General Manager, Shaun Triner (left) and KLL Managing Director, Brett Hazelden (right), at the EcoMag Pilot Facility in Karratha in 2018. Inset: Sample of Hydrated Magnesium Carbonate produced during the 2018 trials.

Annual Mineral Resources and Ore Reserves Statement - Resources Tables with Magnesium Highlighted as at 22 November 2019

Measured Mineral Resources

Aquifer Type	Volume (10^6 m^3)	Total Porosity (-)	Brine Volume (10^6 m^3)	Specific Yield (-)	Drainable Brine Volume (10^6 m^3)	K Grade (mg/L)	K Mass (Mt)	SO_4 Grade (mg/L)	SO_4 Mass (Mt)	Mg Grade (mg/L)	Mg Mass (Mt)	SOP Grade (kg/m^3)	K_2SO_4 Mass (Mt)
Lake Surface Sediments	118	0.47	56	0.17	20	7,116	0.14	19,292	0.38	6,488	0.13	15.87	0.31
Alluvium	96	0.33	32	0.12	11	2,940	0.03	7,959	0.09	3,195	0.04	6.56	0.07
Palaeovalley Clay	799	0.35	282	0.06	47	4,609	0.22	14,475	0.68	4,088	0.19	10.28	0.49
Sand and Silcrete	228	0.33	75	0.21	48	5,643	0.27	17,282	0.83	5,062	0.24	12.58	0.60
Fractured / Weathered Bedrock	304	0.24	72	0.08	23	4,648	0.11	14,995	0.34	4,668	0.11	10.37	0.24
Total Resources	**1,546**		**516**		**149**	**5,155**	**0.77**	**15,606**	**2.33**	**4,742**	**0.71**	**11.50**	**1.72**

Indicated Mineral Resources

Aquifer Type	Volume (10^6 m^3)	Total Porosity (-)	Brine Volume (10^6 m^3)	Specific Yield (-)	Drainable Brine Volume (10^6 m^3)	K Grade (mg/L)	K Mass (Mt)	SO_4 Grade (mg/L)	SO_4 Mass (Mt)	Mg Grade (mg/L)	Mg Mass (Mt)	SOP Grade (kg/m^3)	K_2SO_4 Mass (Mt)
Lake Surface Sediments	477	0.45	215	0.11	53	5,993	0.32	18,526	0.99	6,705	0.36	13.36	0.71
Alluvium	1,380	0.36	494	0.13	186	5,090	0.95	14,151	2.63	4,197	0.78	11.35	2.11
Palaeovalley Clay	1,478	0.33	494	0.07	101	6,000	0.61	16,876	1.71	5,451	0.55	13.38	1.36
Sand and Silcrete	332	0.31	104	0.21	69	4,833	0.34	13,841	0.96	4,311	0.30	10.78	0.75
Fractured / Weathered Bedrock	5,505	0.23	1,243	0.06	325	5,846	1.90	17,277	5.61	5,318	1.73	13.04	4.24
Total Resources	**9,173**		**2,550**		**735**	**5,591**	**4.11**	**16,197**	**11.91**	**5,058**	**3.72**	**12.47**	**9.17**

Inferred Mineral Resources

Aquifer Type	Volume (10^6 m^3)	Total Porosity (-)	Brine Volume (10^6 m^3)	Specific Yield (-)	Drainable Brine Volume (10^6 m^3)	K Grade (mg/L)	K Mass (Mt)	SO_4 Grade (mg/L)	SO_4 Mass (Mt)	Mg Grade (mg/L)	Mg Mass (Mt)	SOP Grade (kg/m^3)	K_2SO_4 Mass (Mt)
Lake Surface Leaching	N/A	N/A	N/A	N/A	80	5,373	0.43	16,986	1.36	3,632	0.29	11.98	0.96
Alluvium	2,064	0.45	929	0.11	98	6,239	0.61	18,663	1.82	6,872	0.67	13.91	1.36
Palaeovalley Clay	22,929	0.35	8,025	0.05	401	5,724	2.30	17,185	6.90	6,230	2.50	12.76	5.12
Sand and Silcrete	1,785	0.31	553	0.21	116	5,073	0.59	15,384	1.79	5,391	0.63	11.31	1.31
Total Resources	**26,777**		**9,507**		**695**	**5,647**	**3.92**	**17,068**	**11.86**	**5,881**	**4.09**	**12.59**	**8.75**

Exploration Target *

Geological Layer	Maximum Thickness (m)	Coverage (km^2)	Sediment Volume (10^6 m^3)	Porosity (-)	Total Stored Brine (10^6 m^3)	Specific Yield (-)	Drainable Brine (10^6 m^3)	K Grade (mg/L)	K Mass (Mt)	SO_4 Grade (mg/L)	SO_4 Mass (Mt)	Mg Grade (mg/L)	Mg Mass (Mt)	K_2SO_4 Mass (Mt)
Alluvium	6	157	942	0.4	377	0.10	94	2,000	0.2	6,100	0.5	2,300	0.2	0.4
Clays	20	1,148	22,960	0.45	10,332	0.03	689	1,800	1.2	5,500	3.8	2,100	1.4	2.8
Basal Sands	7	108	756	0.35	265	0.18	136	1,600	0.2	5,000	0.7	1,900	0.3	0.5
Total					**11,000**		**920**	**1,800**	**1.6**		**5.0**		**1.9**	**3.7**
Alluvium	12	157	1,884	0.5	942	0.18	170	3,500	0.6	9,600	1.6	3,900	0.7	1.3
Clays	50	1148	57,400	0.55	31,570	0.08	2,500	3,300	8.3	9,100	22.8	3,700	9.3	18.4
Basal Sands	10	108	1,080	0.45	486	0.28	140	3,200	0.4	8,700	1.2	3,500	0.5	1.0
Total					**33,000**		**2,810**	**3,300**	**9.3**		**25.6**		**10.4**	**20.7**

Note: Errors are due to rounding.

* The Kalium Lakes Beyondie SOP Project "Exploration Target" is based on a number of assumptions and limitations and is conceptual in nature. It is not an indication of a Mineral Resource Estimate in accordance with the JORC Code (2012) and it is uncertain if future exploration will result in the determination of a Mineral Resource or that the Exploration Target will add to the economics of the BSOPP.

About EcoMag Limited:

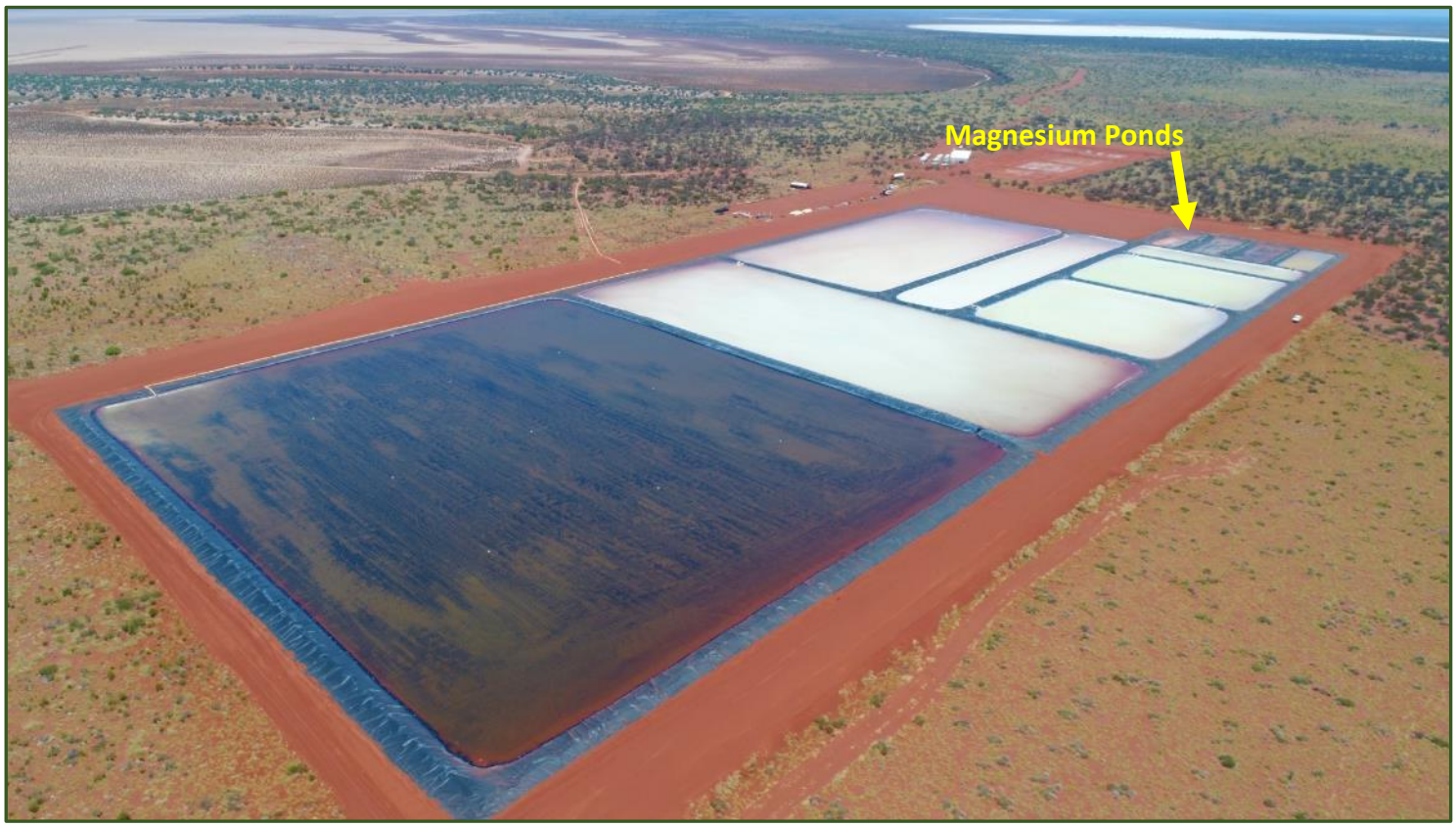
EcoMag Limited is an unlisted Australian public company established in 2015 to produce and sell a range of specialty chemicals derived from magnesium extracted from brines (hypersaline water). The company utilises a process co-invented by EcoMag Chief Technology Officer, Professor Tam Tran and subsequently developed, piloted and optimised by EcoMag to extract high purity magnesium compounds from subterranean brines and the waste bitterns generated as a by-product by salt producers (including common sea-salt and potassium salts).

Magnesium oxides and organics are used in a range of high-value environmental, agricultural, construction, industrial and pharmaceutical applications. EcoMag continues to invest in an expanding portfolio of advanced magnesium materials in collaboration with research institutions in Australia and overseas.

Headquartered in Sydney where it operates a boutique scale processing plant, with an engineering and approvals office in Perth, EcoMag has completed a feasibility study regarding the construction and operation of a plant capable of producing 80,000 tonnes per year of high purity hydrated magnesium carbonate and is evaluating a number of potential brine sources and locations.

EcoMag Direct Specialty Chemicals offers reagent quality magnesium chemicals to universities, corporate laboratories, testing facilities and other research organisations in Australia, with plans to expand to overseas sales over time. EcoMag also has a strategic collaboration in place with ASX listed Abundant Produce Limited (ASX: ABT) regarding the development, prototyping, testing and sale of magnesium based over-the-counter therapies offering natural, non-opioid relief from muscle and joint pain, headaches and migraines, and a range of skin disorders including psoriasis, eczema and rosacea.

For more information refer to www.ecomagnesium.com and www.ecomagdirect.com



Beyondie SOP Project - Large Scale Pilot Evaporation Ponds – January 2018.

Forward-Looking Information

Certain information in this document refers to the intentions of Kalium Lakes, but these are not intended to be forecasts, forward looking statements or statements about the future matters for the purposes of the Corporations Act or any other applicable law. The occurrence of the events in the future are subject to risk, uncertainties and other actions that may cause Kalium Lakes' actual results, performance or achievements to differ from those referred to in this document. Accordingly Kalium Lakes and its affiliates and their directors, officers, employees and agents do not give any assurance or guarantee that the occurrence of these events referred to in the document will actually occur as contemplated.

Statements contained in this document, including but not limited to those regarding the possible or assumed future costs, performance, dividends, returns, revenue, exchange rates, potential growth of Kalium Lakes, industry growth or other projections and any estimated company earnings are or may be forward looking statements. Forward-looking statements can generally be identified by the use of words such as 'project', 'foresee', 'plan', 'expect', 'aim', 'intend', 'anticipate', 'believe', 'estimate', 'may', 'should', 'will' or similar expressions. These statements relate to future events and expectations and as such involve known and unknown risks and significant uncertainties, many of which are outside the control of Kalium Lakes. Actual results, performance, actions and developments of Kalium Lakes may differ materially from those expressed or implied by the forward-looking statements in this document. Such forward-looking statements speak only as of the date of this document. There can be no assurance that actual outcomes will not differ materially from these statements. To the maximum extent permitted by law, Kalium Lakes and any of its affiliates and their directors, officers, employees, agents, associates and advisers:

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Compliance Statements

The information in this document is extracted from the report titled "TECHNICAL REPORT FOR THE BEYONDIE SULPHATE OF POTASH PROJECT, AUSTRALIA, JORC (2012) and NI 43-101 Bankable Feasibility Study" and dated 17 September 2018 (**Report**), that relates to Exploration Targets, Exploration Results, Mineral Resources and Ore Reserves and is based on information compiled by Thomas Schicht, a Competent Person who is a Member of a 'Recognised Professional Organisation' (RPO), the European Federation of Geologists, and a registered "European Geologist" (Registration Number 1077) and Anke Penndorf, a Competent Person who is a Member of a RPO, the European Federation of Geologists, and a registered "European Geologist" (Registration Number 1152). The Report was announced to the ASX by KLL on 18 September 2018 as part of an announcement entitled "Bankable Feasibility Study Completed with Exceptional Financial Outcomes" and on 4 March 2019 KLL announced to the ASX an update entitled "Lower Operating Cost and Increased Production For BSOPP".

Kalium Lakes confirms that it is not aware of any new information or data that materially affects the information included in the above announcements and, in the case of estimates of Exploration Targets, Exploration Results, Mineral Resources and Ore Reserves, KLL confirms that all material assumptions and technical parameters underpinning the estimates in the relevant announcement continue to apply and have not materially changed. Kalium Lakes confirms that the form and context in which the Competent Persons' findings are presented have not been materially modified from the original announcements.

Thomas Schicht and Anke Penndorf are full-term employees of K-UTEC AG Salt Technologies (K-UTEC). K-UTEC, Thomas Schicht and Anke Penndorf are not associates or affiliates of Kalium Lakes or any of its affiliates. K-UTEC received a fee for the preparation of the Report in accordance with normal professional consulting practices. This fee was not contingent on the conclusions of the Report and K-UTEC, Thomas Schicht and Anke Penndorf will receive no other benefit for the preparation of the Report. Thomas Schicht and Anke Penndorf do not have any pecuniary or other interests that could reasonably be regarded as capable of affecting their ability to provide an unbiased opinion in relation to the Beyondie Potash Project.

K-UTEC does not have, at the date of the Report, and has not had within the previous years, any shareholding in or other relationship with Kalium Lakes or the Beyondie Potash Project and consequently considers itself to be independent of Kalium Lakes.

Each of Thomas Schicht and Anke Penndorf have sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the JORC 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Thomas Schicht and Anke Penndorf consent to the inclusion in the Report of the matters based on their information in the form and context in which it appears.

*** ENDS ***

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