ioneer successfully produces Battery Grade Lithium Hydroxide from Rhyolite Ridge Pilot Plant feedstock

Thursday, 21 January 2021 – ioneer Ltd (ioneer or the Company) (ASX: INR), an emerging US lithium–boron producer, today announced that its metallurgy and process engineering team successfully converted lithium carbonate produced at its pilot plant, into battery grade lithium hydroxide, a key milestone in ioneer's lithium hydroxide development path. This demonstrates ioneer's ability to provide both high purity technical grade lithium carbonate and battery grade lithium hydroxide to the burgeoning battery EV sector.

ioneer is highly focused on securing offtake agreements for its lithium products having already placed under binding offtake initial boric acid production. The ability to supply both lithium carbonate and lithium hydroxide creates a significant advantage for the Company. Managing Director, Bernard Rowe said:

> "Rhyolite Ridge will be well positioned to meet both North American and global demand for Lithium carbonate and battery grade lithium hydroxide. As the premier US Project, ioneer will be uniquely situated to supply the future US electric vehicle platforms of automotive OEMs. Benchmark Mineral Intelligence predicts that US demand for lithium carbonate and lithium hydroxide could exceed 344kt by 2025 with nearly no domestic supply. Additionally, Tesla's Gigafactory is located 203 miles northwest of the Project site.
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> The world is in an important transition where renewable power and the electrification of transportation will play an ever more important role. The successful and timely delivery of ioneer's Rhyolite Ridge Lithium- Boron Project in Nevada is a critical early effort to secure the United States an economic, and sustainable domestic supply of this material which is a lynchpin for electrification."

The below table compares the lithium hydroxide produced from Rhyolite Ridge ore against typical industry specifications for battery grade lithium hydroxide.

Elements	Units	Industry Battery Grade Lithium Hydroxide [2]	Ioneer Rhyolite Ridge Lithium Hydroxide
Lithium Hydroxide	wt%	56.5%	> 56.5
Sodium	ppm	≤ 20	< 10
Potassium	ppm	≤ 10	< 10
Iron	ppm	≤ 5	< 2
Calcium	ppm	≤ 15	5.5
Sulphate	ppm	≤ 100	12
Chlorine	ppm	≤ 20	< 50
Aluminum	ppm	≤ 10	< 4
Magnesium	ppm	≤ 10	< 2
Carbon Dioxide	wt%	≤ 0.35	< 0.3

[2] *Source: https://livent.com/wp-content/uploads/2020/01/QS-PDS-1021-r5.pdf*

In the DFS study completed in April 2020[1], the Project produced ~20,600 tonnes per annum (tpa) of lithium carbonate for the first three years, before converting to the production of battery-grade lithium hydroxide in year four for the life of mine at 22,000 tpa LOM. Boric acid production averaged 174,400 tpa LOM.

The test work was successful in simulating major unit operations at a bench scale, producing lithium hydroxide meeting typical battery grade lithium hydroxide specifications. Future engineering and test work programs will target further impurity management, scale up and circuit integration.

Lithium hydroxide is the second largest chemical produced by the lithium industry and has recently had the highest growth rate of all lithium products. This trend is expected to continue due to the growth in higher-nickel chemistry cathode materials for automotive and energy storage markets. Demand for battery grade lithium hydroxide is expected to overtake that of battery grade lithium carbonate in 2021.

The largest incremental cost in the conversion of lithium carbonate to lithium hydroxide is typically energy, including both power and heat. ioneer's cost to produce battery grade lithium hydroxide from lithium carbonate will be materially lower than industry norms because of several Project specific factors:

- Ideal quality, technical-grade lithium carbonate produced in the main plant;
- Excess steam and power generated by the sulphuric acid plant;
- High lithium recoveries due to recycle stream back into main plant; and
- A reduction in reagent costs achieved through the recycling of calcium carbonate back into the main plant.

Stepping back, ioneer has successfully produced boric acid, lithium carbonate and now lithium hydroxide from the Rhyolite Ridge ore, reinforcing ioneer's unique position in the lithium industry with multiple revenue products.

Photo: Samples of three products produced from Rhyolite Ridge Ore: Lithium Hydroxide, Lithium Carbonate and Boric Acid

This ASX release has been authorised by ioneer Managing Director, Bernard Rowe.

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ABOUT IONEER

ioneer Ltd is the 100% owner of the Rhyolite Ridge Lithium-Boron Project located in Nevada, USA, the only known lithium-boron deposit in North America and one of only two known such deposits in the world. The Definitive Feasibility Study (DFS)[1] completed in April 2020 confirmed Rhyolite Ridge as a world-class Lithium and Boron Project that is expected to become a globally significant, long-life, low-cost source of lithium and boron vital to a sustainable future.

COMPETENT PERSONS STATEMENT

The information in this report that relates to Exploration Results is based on information compiled by Bernard Rowe, a Competent Person who is a Member of the Australian Institute of Geoscientists. Bernard Rowe is a shareholder, employee and Managing Director of ioneer Ltd. Mr Rowe has 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 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' (JORC Code 2012). Bernard Rowe consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

In respect of production targets referred to in this report and previously disclosed, the Company confirms that it is not aware of any new information or data that materially affects the information included in the public report titled "ioneer Delivers Definitive Feasibility Study that Confirms Rhyolite Ridge as a World-Class Lithium and Boron Project' announced 30 April 2020. Further information regarding the production estimates can be found in that report. All material assumptions and technical parameters underpinning the estimates in the report continue to apply and have not materially changed.

[1] Refer ASX release titled 'ioneer Delivers Definitive Feasibility Study that Confirms Rhyolite Ridge as a World-Class Lithium and Boron Project' announced 30 April 2020.

Appendix 1

Rhyolite Ridge Lithium-Boron Project, Nevada, USA

JORC Code, 2012 Edition – Table 1

Section 1 Sampling Techniques and Data

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.*	A 24 tonne bulk sample was collected for the purpose of processing through the company's pilot plant located at Kemetco Research Inc, Richmond BC, Canada. The sample comprised material from a surface pit excavated into in-situ bedrock material. The bulk sample pit measured 12 metres by 12 metres and a maximum depth of 1 metre. The bulk sample pit was excavated and sampled by ioneer in April, 2019. The entire sample was crushed to -25mm before being transported to the pilot plant.
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 as no drilling was undertaken for the exploration results being reported.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.*	Not applicable as no drilling was undertaken for the exploration results being reported.

Criteria	JORC Code explanation	Commentary
	• *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.*	
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 as no drilling was undertaken for the exploration results being reported. The bulk sample pit was not logged as it was entirely within the one rock unit (B5) that represents part of the Upper Zone of the Rhyolite Ridge Mineral Resource.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	No sub-sampling was undertaken. The entire sample was collected, crushed and then transported to the pilot plant. The nature, type and quality of the sample preparation technique is considered appropriate. The sample is considered representative of the in-situ rock for the Upper Zone lithium-boron mineralisation. It is not intended to be representative of the entire deposit. The sample size and type are considered to be appropriate for a pilot plant bulk sample of this type.

Criteria	JORC Code explanation	Commentary
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 bulk sample was processed by Kemetco Research Inc using a purpose-built pilot plant located in Richmond BC, Canada. The process flowsheet for the pilot plant was developed as part of the Rhyolite Ridge Definitive Feasibility Study (DFS) and is described in detail in the public report titled "ioneer Delivers Definitive Feasibility Study that Confirms Rhyolite Ridge as a World-Class Lithium and Boron Project" announced 30 April 2020. Lithium hydroxide produced from the pilot plant was analysed by Kemetco Research Inc of Richmond, Canada using ICP. The analytical results being reported are qualitative and only relate to the lithium hydroxide produced from lithium carbonate from the pilot plant. The methods and procedures are appropriate for the type of mineralisation and the techniques are considered to be total. Grades are not being reported.
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.*	Not applicable as no intersections are being reported. There has been no adjustment to analytical data.
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.*	The location of the bulk sample site is 424 709E and 4185 960N. It is located at the northern end of the Mineral Resource and is entirely within the Resource. The location was surveyed by DGPS and is accurate to within one metre. The coordinates are shown in UTM Zone 11, NAD83 grid system.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.*	Not applicable as only a single bulk sample site is being reported.

Criteria	JORC Code explanation	Commentary
	• *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 as the data is not being used for a Mineral Resource estimation. No sample compositing was undertaken.
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.*	The bulk sample was excavated into sub-horizontal strata to a maximum depth of one metre. The orientation is considered appropriate and provides unbiased sampling of the mineralisation within the applicable part of the deposit. The sample is not intended to be representative of the entire deposit.
Sample security	• *The measures taken to ensure sample security.*	The bulk sample was crushed and stored on-site and then transported by truck to Kemetco. ioneer personnel supervised the collection, processing and transportation of the bulk sample to Kemetco.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	Not applicable as no audits were undertaken for the exploration results being reported.

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 license to operate in the area.*	The mineral tenement and land tenure for the South Basin of Rhyolite Ridge comprise 386 unpatented Lode Mining Claims (totalling approximately 3,150 hectare (Ha); claim groups SLB, SLM and RR are held by ioneer Minerals Corporation, a wholly owned subsidiary of ioneer Ltd. The Competent Person is not aware of any 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 relating to the 386 Lode Mining Claims for the Project. The mineral tenement and land tenure referenced above excludes 241 additional unpatented Lode Mining Claims (totalling approximately 2,000 Ha) for the North Basin which are located outside of the current South Basin Project Area. These additional claims are held by ioneer subsidiaries (NLB claim group; 160 claims) or they hold an option to acquire 100% ownership of the claims (BH claim group; 81 claims).
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	There have been two previous exploration campaigns targeting Li-B mineralisation at the Project site. US Borax conducted surface sampling and drilling in the 1980s, targeting B mineralisation, with less emphasis on Li mineralisation. A total of 57 drill holes (totalling approximately 14,900 m) were drilled in the North Basin area, with an additional 12 drill holes (unknown total meterage) in the South Basin area. American Lithium Minerals Inc and Japan Oil, Gas and Metals National Corporation (JOGMEC) conducted further Li exploration in the South Basin area in 2010-2011. The exploration included at least 465 surface and trench samples and 36 drill holes (totalling approximately 8,800 m), of which 21 were core and 15 were RC. Data collected from this program, including drill core, was made available to ioneer.
Geology	• *Deposit type, geological setting and style of mineralisation.*	The Li-B mineralisation at Rhyolite Ridge occurs in two separate Miocene sedimentary basins; the North Basin and the South Basin, located within the

Criteria	JORC Code explanation	Commentary
		Silver Peak Range in the Basin and Range terrain of Nevada, USA. The South Basin is the focus of the Study presented in this Report. The South Basin stratigraphy comprises lacustrine sedimentary rocks of the Cave Spring Formation overlaying volcanic flows and volcaniclastic rocks of the Rhyolite Ridge Volcanic unit. The Rhyolite Ridge Volcanic unit is dated at approximately 6 mega-annum (Ma) and comprises rhyolite tuffs, tuff breccias and flows. The Rhyolite Ridge Volcanic rocks are underlain by sedimentary rocks of the Silver Peak Formation. Li-B mineralisation is interpreted to have been emplaced by hydrothermal/epithermal fluids travelling up the basin bounding faults; based on Li-B grade distribution and continuity it is believed the primary fluid pathway was along the western bounding fault. Differential mineralogical and permeability characteristics of the various units within the Cave Spring Formation resulted in the preferential emplacement of Li-B bearing minerals in the M5, B5 and L6 units. Li-B mineralisation occurs in isolated locations in some of the other units in the sequence, but with nowhere near the grade and continuity observed in the aforementioned units. For further information on Geology refer to public report titled "ioneer Delivers Definitive Feasibility Study that Confirms Rhyolite Ridge as a World-Class Lithium and Boron Project" announced 30 April 2020.
Drill hole information	• *A summary of all information material to the under-standing 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*	Not applicable as no drilling was undertaken for the exploration results being reported.

Criteria	JORC Code explanation	Commentary
	• *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.*	
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.*	Not applicable as no data aggregation was undertaken for the exploration results being 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 down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	Not applicable as no widths or lengths of mineralisation are being reported.
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported. These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	Not applicable as no significant discovery is being reported and no drill hole data is included in the exploration results being reported. The location of the bulk sample site is included above in this table.
Balanced Reporting	• *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.* • *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades*	The report is believed to include all representative and relevant information and is believed to be comprehensive.

Criteria	JORC Code explanation	Commentary
	and/or widths should be practiced to avoid misleading reporting of Exploration Results.	
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples - size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	All material information has been reported in the current and previous reports released by the Company. The Company completed a Definitive Feasibility Study on the Rhyolite Ridge Project in April 2020. For more information refer to public report titled "ioneer Delivers Definitive Feasibility Study that Confirms Rhyolite Ridge as a World-Class Lithium and Boron Project" announced 30 April 2020.
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.*	Refer to public report titled "ioneer Delivers Definitive Feasibility Study that Confirms Rhyolite Ridge as a World-Class Lithium and Boron Project" announced 30 April 2020.