

## Karinga Lakes Potash Project (KLPP) – Establishment of Joint Venture with Consolidated Potash Corporation

- **Consolidated Potash Corp. (CPC) satisfies requirements to acquire initial 15% of KLPP and establish a Joint Venture with Verdant Minerals as per the Joint Venture Agreement announced to the ASX on 10 August 2017.**
- **First high-purity sulphate of potash (SOP) samples produced from KLPP brine/salt feedstock utilising CPC's innovative aMES™ technology.**
- **Through the expenditure of A\$1 million, CPC has successfully completed significant bench scale and pilot test work as well as a Scoping Study based on the utilisation of aMES™ technology for the potential development of KLPP.**
- **This work underpins the potential to progress detailed feasibility studies for the development of an initially small scale sulphate of potash (SOP) production operation.**
- **CPC has the right to earn an additional 25% in the project by spending a further A\$2 million.**
- **Verdant Minerals and CPC will evaluate strategic opportunities to unlock value from both the KLPP project and the aMES™ technology package more broadly.**

Verdant Minerals Ltd (ASX: **VRM**) and Lions Bay Capital Inc. (TSX-V: **LBI**), parent company of Consolidated Potash Corporation) are pleased to provide the following update regarding the Karinga Lakes Potash Project (KLPP), located in the Northern Territory, Australia.

### BACKGROUND

In September 2015, Verdant Minerals engaged a subsidiary of CPC to perform bench-scale studies using its proprietary aMES™ technology in order to improve the proposed KLPP flow sheet and identify opportunities to improve the KLPP development concept more broadly. The investigative studies confirmed that the aMES™ technology was able to efficiently concentrate potassium salts and remove impurities from the KLPP feedstock, two critical functions required in any potash project flow sheet.

In August 2017, Verdant Minerals and CPC entered into a concurrent Joint Venture (JV) and Technology Licensing Agreement allowing CPC to acquire up to 40% of the KLPP, by making a staged investment of up to \$3 million. (*As announced to the ASX on 10 August 2017.*)

During the ensuing 18-month period from August 2017 through to January 2019, with the support of Verdant Minerals, CPC has performed a range of aMES™ test work, studies and associated technoeconomic modelling on the KLPP, culminating in the preparation of a Scoping Study, which satisfied the requirements for CPC to acquire an initial 15% interest in the KLPP.

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**MAJOR PROJECTS** – Ammaroo Rock Phosphate | Karinga Lakes Sulphate of Potash

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## ABOUT THE aMES™ TECHNOLOGY

The rationale for pursuing an innovative strategy for the development of the KLPP based on the aMES™ technology platform was driven by the potential to optimise the project development pathway, with a specific emphasis on improving the core process flow sheet. For a given application, the aMES™ technology can potentially simplify the process from feedstock (brine and/or salts) to product (SOP, MOP, Li compound), and thereby create value by improving, processing efficiency, product recovery, product quality and reagent use.

Whilst each project is invariably unique, the key advantages of the aMES™ technology generally include:

- Recovery of high-purity minerals, reagents & water
- Effective technology, highly efficient use of water and energy
- Real opportunity for substantial project capex & opex savings
- Powerful technology for improved environmental outcomes

## SCOPING STUDY OVERVIEW

In collaboration with CPC's strategic research and development partner (Victoria University), an extensive and iterative sequence of experimental studies were performed on a range of brines and salts sourced from the KLPP. The series of experiments were based on the core aMES™ technology platform and were designed to investigate key brine processing parameters including several dissolution, crystallisation and kinetic factors, which collectively constituted the basis of initial process flow sheet development efforts.

In order to further optimise and validate the performance of the aMES™ flow sheet and generate important process design and performance data, a scaled-up (containerised) Pilot Plant was constructed in late 2018 by CPC and Victoria University. The core equipment for the scaled-up aMES™ Pilot Plant was sourced from a partner of CPC and Victoria University, a major water industry equipment supplier (OEM) and further modified to incorporate proprietary equipment and processes associated with the aMES™ technology.

Development of the scaled-up aMES™ Pilot Plant with the support of established and credible partners, is a critical step in the commercialisation path for the technology as it provides valuable engineering data required to further scale-up the technology towards commercial deployment, including potentially at the KLPP.



Scaled-up aMES™ Pilot Plant Installed at Victoria University.

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Following commissioning of the aMES™ Pilot Plant, the preferred process flow sheet was adopted as the basis of evaluating optimal project development concepts, whilst giving consideration to the specific KLPP brine chemistries, project location and infrastructure availability and requirements. Detailed process modelling studies were subsequently performed and refined to develop an understanding of the optimal mass and energy balances, information which informed the development of process and equipment specifications for the purposes of seeking pricing guidance from key vendors including several strategic partners. A prominent consulting process engineer experienced in evaluating similar process technologies was subsequently engaged to develop a technoeconomic model, which assisted Verdant Minerals and CPC interpret the potential suitability of developing the KLPP through the adoption of the aMES™ technology.

Whilst many of the technical and financial details regarding the aMES™ technology remain commercially sensitive at this time, the KLPP partners acknowledge that the studies performed to date have been a success and provide a solid basis to progress to more detailed feasibility studies and the subsequent potential development of the KLPP, subject to customary requirements including statutory approvals and land access agreements.

### **KLPP Scoping Study - Key Findings**

- All technical aMES™ objectives and milestones were satisfied during the investigative experimental phase.
- An effective aMES™ flow sheet for producing high-grade halite, sylvite, leonite and SOP was developed, including alternate flow sheets to accommodate changes in feedstock composition.
- SOP was produced from intermediary salts produced through the preferred aMES™ flow sheet. Importantly, SOP was produced at room temperature, without the use of any reagents or external reactants, a major advantage over conventional flow sheets.
- Whilst not yet fully optimised, the produced SOP was of an ultra-pure grade (>K<sub>2</sub>O-52), not dissimilar to soluble SOP products sold at a substantial price premium to more common agricultural grade SOP.
- Identified several important strategies which simplify the development of the KLPP by potentially eliminating the requirement for flotation, process steam, gas pipeline and a freshwater bore field, which collectively represent major costs in the traditional potash production flowsheet.
- The likely elimination of process reagents, offsite bore field and more complete brine processing, also represent substantial environmental advantages expected to further improve the environmental footprint of the proposed KLPP, which are likely to assist during the permitting phase of the project.

### **Cutting-Edge R&D**

The aMES™ technology is based on a decade of high-calibre R&D and consists of a novel integration of proven technologies combined with proprietary process intellectual property (IP) including patents, expertise and knowhow to provide a robust and effective technology with substantial advantages over older industrial processes.

As a founding member of the Australian Research Council (ARC) Research Hub for Energy-Efficient Separation (EESep), Activated Water Technologies (AWT, a subsidiary of CPC) is a recipient of competitively awarded Australian Government grant funding. In addition to CPC's core activities, CPC is delivering a world-class R&D program within the EESep Research Hub with a specific focus on the commercialisation of the aMES™ technology for direct application at the KLPP.

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CPC acknowledges the support provided by the Australian Government through the ARC Research Hub for Energy-Efficient Separation and thanks its collaborators, most specifically the dedicated R&D team at Victoria University's Institute of Sustainable Industries & Liveable Cities, led by Professor Mikel Duke.

## RESOURCE POSITION

The KLPP potash resource is a brine hosted resource where the potassium and sulphate is dissolved in brines that are contained within aquifers below the dry salt lake (playa) surface. The delineated potash resource is contained within a series of lakes with the average thickness of the identified resource of approximately 15m.

Resource Category	Potassium (tonnes)	SOP (tonnes)	Schoenite (tonnes)
Measured	2,600,000	5,800,000	13,000,000
Indicated	210,000	460,000	1,100,000
Inferred	950,000	2,100,000	4,900,000
<b>Total</b>	<b>3,800,000</b>	<b>8,400,000</b>	<b>19,000,000</b>

Additional information about the basis of preparation of the KLPP resource can be found in the 20 February 2014 ASX announcement and has not changed since. It should be noted that the JORC Code (2012) was not designed for use in connection with minerals that are dissolved in brines. It is generally accepted that geological uncertainties are greater when dealing with the estimation of brine resources.

The sulphate of potash (SOP) tonnage represents the in-situ brine with no recovery factor applied. It will not be possible to extract all of the contained brine by pumping or trenching; the amount which can be extracted depends on many factors including the permeability of the sediments, the drainable porosity, and the recharge dynamics of the aquifers.

### KLPP Stage-1 Focus

The KLPP development scenario evaluated in the aMES™ Scoping Study was based on an initial, relatively small (Stage-1) 25,000tpa SOP production scenario for a nominal project life of 20 years, indicating a net SOP resource utilisation of approximately 500,000t, which represents less than 10% of the SOP identified within the Measured Resource Category. Due to the relatively low-proportion of SOP extraction required in Stage-1 of the development scenario outlined in the Scoping Study, initial brine extraction is focused on Lake Miningere which is in close proximity to the Lasseter Highway and the Adelaide-Darwin rail corridor.

Lake Miningere represents an ideal feedstock for the KLPP as the average brine concentration during an extended production test contained a stabilised average potassium concentration of 8,740mg/L, one of the highest potassium brine concentrations reported in Australia and almost twice the average brine concentration of other major SOP projects in Australia. The relatively high-grade brine from Lake Miningere reduces the brine volume handling requirements, further reducing the project footprint and enhancing overall project performance.

Detailed hydrogeological modelling performed for Verdant Minerals by Groundwater Geoscience including studies performed subsequent to the 2014 Resource Assessment for KLPP, highlight the potential of Lake Miningere to provide the majority of brine required in the first 10 years of the envisaged Stage-1 (25,000tpa SOP) KLPP development scenario. The KLPP partners remain confident that the extensive SOP resource delineated across the KLPP portfolio is sufficient to underpin an initial development, with opportunities for subsequent staged expansion of SOP production capacity.

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## NEXT STEPS

As a result of meeting the Stage-1 JVA requirements, including the, i) technical KPI's, ii) key deliverables, iii) the Scoping Study, and iv) an aggregate investment of \$1 million; CPC has now earned an initial 15% interest in the KLPP. In light of the encouraging progress with the aMES™ technology, most recently in the form of the Scoping Study, the KLPP partners intend to explore various options to unlock value from the extensive resource delineation and process development work performed to date. The primary objective of this strategic initiative is for both Verdant Minerals and CPC (through its parent company, Lions Bay Capital) to be able to demonstrate, in due course, a more substantial and visible market valuation for this asset and potentially transformative technology opportunity.

Preliminary discussions with prospective partners and investors highlight a strong appetite for the KLPP and associated aMES™ technology license to be consolidated and specifically focused on driving the KLPP through to development, through the commercialisation of the aMES™ technology. Whilst the strategy beyond the existing JV agreement is yet to be considered, the KLPP partners believe the strategic potential may present the opportunity to unlock substantial value not currently reflected in the market capitalisation of either Verdant Minerals or Lions Bay Capital.

## MANAGEMENT COMMENTARY

In commenting on today's announcement, Mr. Chris Tziolis, Managing Director of Verdant Minerals said:

*"As one of the early-movers in the Australian SOP sector, we understood the importance of identifying high grade SOP resources in proximity to major transport infrastructure. Following our resource appraisal work, we recognised that advancing the KLPP was going to require an innovative approach to move the project forward. In this regard, we've been working with CPC since 2015 to demonstrate the performance of the aMES™ technology on brines sourced from the KLPP and develop a more optimal project development concept. Through this collaboration, CPC have recently delivered us a Scoping Study for the KLPP, which provides us with encouragement that the aMES™ technology provides a potentially viable alternative pathway for developing the project."*

*Based on the findings outlined in the Scoping Study, we believe this supports further evaluating the strategic and technical potential of KLPP. With our current efforts firmly focused on advancing the Ammaroo Phosphate project towards a development decision, we expect our recent experience with Ammaroo will assist greatly in accelerating the potential development of the KLPP".*

Mr. Bahay Ozcakmak, Managing Director of CPC and Executive Director of Lions Bay Capital, also commenting on today's announcement said:

*"We are pleased to have been able to work diligently with our partners including Verdant Minerals to deliver a positive Scoping Study for the Karinga Lakes Potash Project. During a recent North American roadshow, discussions with prospective investors and partners regarding the KLPP have been very well received, providing us with further confirmation that we are well placed to build a ground-breaking brine technology company based on our core aMES™ technology platform."*

*We first approached Verdant Minerals (formerly Rum Jungle Resources) in early 2015, as we identified the KLPP as an excellent opportunity for CPC to showcase the disruptive and transformative potential of the aMES™ technology. Together with our partners, we have worked methodically to develop optimal aMES™ flow sheets and modelling energy & material balances; whilst maintaining a rigorous commercial focus to ensure our proposed project development concepts are viable and an improvement on more conventional options. Our recent finalisation of the KLPP Scoping Study provides us with a strong platform to pursue the potential development of the KLPP, through detailed feasibility studies, continued scaled up pilot test work and the commercialisation of the aMES™ technology more broadly.*

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*Many of our fundamental achievements including the systematic recovery/production of high-grade halite (NaCl), sylvite (KCl) and other compounds from complex brines, are also critical and common steps in the processing of complex lithium rich brines, highlighting the broader market opportunity for commercialising the aMES™ technology.*

*Finally, and most importantly, we'd like to congratulate our team, partners and everybody involved in achieving this important milestone and look forward to our continued collaboration with Verdant Minerals to drive the KLPP forward as well as explore how we may be able to collaborate more broadly, with respect to commercialising the aMES™ technology. Through the course of our collaboration with Verdant Minerals, it has been immensely rewarding to have our cutting-edge R&D acknowledged by our industry peers, including as the recipient of multiple prestigious ARC grant awards that have supported our commercialisation efforts."*

- ENDS -

### FOR ADDITIONAL INFORMATION



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### **About Verdant Minerals (ASX: VRM)**

Verdant Minerals is focused on the discovery, development and operation of fertiliser and industrial mineral projects, located in close proximity to existing transport infrastructure, focused on the Northern Territory of Australia.

The Company's portfolio of projects includes:

- Developing the 100% owned world class Ammaroo Phosphate Project located approx. 200km south-east of Tennant Creek and 300km north-east of Alice Springs in the Northern Territory;
- A portfolio of Sulphate of Potash projects in the Northern Territory; and
- The Dingo Hill Silica Project in the Northern Territory, which has the potential to produce high purity quartz.

### **About Consolidated Potash Corporation (subsidiary of Lions Bay Capital, TSX-V: LBI)**

CPC is focused on the commercialisation of aMES™ - the activated Mineral Extraction System, an innovative process technology suitable for the recovery of minerals, reagents and water from aqueous solutions. CPC believes the aMES™ technology has the potential to improve many operations in the energy and mining sectors, globally. Alongside CPC's technology position, the company is assembling a portfolio of strategic investments, which includes an initial 15% interest in the Karinga Lakes Potash Project in NT in Australia, as well as an initial 50% interest in a promising lithium project in New Mexico in the United States of America.

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## Forward Looking Statements

This announcement has been prepared jointly by Verdant Minerals Ltd and Consolidated Potash Corporation, (both individually, and collectively the "Issuer" or "Issuers"). It is not intended to be and does not constitute an offer to sell, or a solicitation of an offer to buy or sell, securities in the Issuer.

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