



**DANAKALI**  
create. nurture. grow

ASX Release:

17 November 2021

## Update: Magnesium Chloride

**Colluli will produce significant tonnes of high purity Magnesium Chloride ( $MgCl_2$ ) as a by-product of its Sulphate of Potash production process**

### Highlights

- Colluli will produce potentially economic  $MgCl_2$  from two sources at its Sulphate of Potash (SOP) production operation. The value of  $MgCl_2$  and any derivative products including Magnesium Oxide ( $MgO$ ) or Magnesium (Mg) does not form part of our current financial, economic or FEED studies.
- The two sources, being primary Bischofite brine from our process plant and secondary Bischofite ore from our mine have a potential combined production capacity of 55.8 Mt of  $MgCl_2$  in the first 60 years from Modules 1 and 2 alone.
- $MgCl_2$  is a primary feedstock in the production of  $MgO$  and Mg.

Danakali Limited (ASX: DNK) (**Danakali, the Company**) is pleased to provide a market update on the Magnesium Chloride market potential and export capacity from the Colluli Project. DNK has previously stated its JORC-2012 compliant SOP reserve of 1.1Bt and the JORC-2012 compliant 85Mt of Kieserite mineral resource and JORC-2012 compliant 347Mt of Rock Salt mineral resource. With the process design complete and the mass balance finalised we are now able to look specifically at the value of the by products that will be produced from our process plant.

Whilst Colluli's primary focus is to develop the Colluli Project with the intention of exporting premium SOP to its target markets, the test results demonstrate high purity  $MgCl_2$  is produced as a direct by-product of Colluli's SOP production and it is suitable for potential export to regional markets or beneficiation. Bischofite brines from Module 1 and 2 from SOP production alone will produce an estimated 27.0 Mt of  $MgCl_2$  in the first 60 years at an annual production rate of 450,000 tonnes.

$MgCl_2$  is used in the production of Magnesium Oxide ( $MgO$ ) in addition to its other primary applications in the agriculture, chemical, steel, automotive and construction industries.  $MgO$  is a feedstock for Magnesium (Mg) metal.

**Danakali Chairman, Seamus Cornelius** said: *Colluli is a tremendously large, rich and versatile ore body. We remain focused on funding the development of the Colluli Project to produce high quality SOP in the first instance, but we know that Colluli has the potential to produce many other valuable products. If an economic analysis of the beneficiation of our  $MgCl_2$  from the bischofite brine stacks up, our current mass balance equations suggests we could potentially produce up to 115ktpa of Mg from the  $MgCl_2$  produced from SOP modules 1 and 2. Beneficiation to Mg will require substantial energy input which may be satisfied from the geothermal potential in the area".*

The Colluli Potash Project (**Project, Colluli**) is 100% owned by Colluli Mining Share company (**CMSC**), a 50:50 Joint Venture between Danakali Limited (**DNK**) and Eritrean National Mining Corporation (**ENAMCO**)



### Codes:

ASX: DNK, SO3-FRA,  
SO3-BER.  
US Level 1 ADR's OTC-  
DNKLY,  
CUSIP.23585T101

### Highlights:

The world's largest JORC compliant solid salt, Sulphate of Potash (**SOP**) reserve, 1.1Bt

Aiming to be the world's first Zero Carbon SOP Producer

Development underway towards production

### Financial facts:

Issued capital: 367.25m  
Share price: A\$0.51  
Market cap: A\$187.3m



For personal use only

## MAGNESIUM BEARING SALTS AT COLLULI

**MAGNESIUM BEARING SALTS AT COLLULI**

**TWO SOURCES OF MAGNESIUM BEARING SALTS**

- Bischofite ore
- Bischofite waste brine stream from the plant (tailings pond)

**PROCESSING PLANT**

**PLANT FEED MATERIAL**

**OPEN CUT MINING**

**ORE BODY**

**STRATIFICATION AT COLLULI**

- CLASTIC
- ROCK SALT
- SYLVINITE
- UPPER CARNALLITITE (CONTAINS KEISERITE)
- BISCHOFITITE
- LOWER CARNALLITITE (CONTAINS KEISERITE)
- KAINITITE (CONTAINS KEISERITE)

**CARNALLITE BRINE TANK**












**KAINITE BRINE TANK**

**TAILS BRINE POND**

**CARNALLITE POND**

**BISCHOFITE POND (MgCl<sub>2</sub>)**

**KAINITE POND**

| MAGNESIUM COMPOUNDS POTENTIAL AT COLLULI  |  |  |   |   |
|---|--|--|---|---|
| ↓   | <b>BISCHOFITE ORE</b><br><br>61.4 Mt <sup>(3)</sup>     | <b>BISCHOFITE BRINE</b><br><br>76.5Mt <sup>(3)</sup>  | <b>ORE + BRINE</b><br><br>137.9 Mt <sup>(3)</sup>       |   |
|   | <b>MAGNESIUM CHLORIDE</b><br><br>28.8 Mt <sup>(3)</sup> | <b>MAGNESIUM CHLORIDE</b><br><br>27 Mt <sup>(3)</sup> | <b>MAGNESIUM CHLORIDE</b><br><br>55.8 Mt <sup>(3)</sup> | <b>PRODUCED IN COLLULI</b><br><br><b>PRODUCED BY 3<sup>rd</sup> PARTIES</b> |
|   | <b>MAGNESIUM OXIDE</b><br><br>12.2 Mt <sup>(3)</sup>    | <b>MAGNESIUM OXIDE</b><br><br>11.4 Mt <sup>(3)</sup>  | <b>MAGNESIUM OXIDE</b><br><br>23.6 Mt <sup>(3)</sup>    |   |
| <b>MAGNESIUM CHLORIDE APPLICATIONS</b><br><br>Used in the production of magnesium, manufacture of fertilisers, textile and paper manufacture, and cements; in refrigeration and fireproofing; and as a deicing agent.  |  |  |   |   |
| <b>MAGNESIUM OXIDE APPLICATIONS</b><br><br>Exceptionally important material in steel production, catalysis, toxic waste remediation, or as additives in refractory products, paint, manufacture of fertilisers, animal foodstuff, building materials and superconductor products |  |  |   |   |

(3) Colluli Mineral Resource estimate. Figures relate to the FEED estimate of 60 years. The mine is estimated to have a production life of more than 200 years



**DANAKALI**  
create. nurture. grow

This announcement authorised for release by the Board of Danakali Limited.

For more information, please contact:

## Danakali

Seamus Cornelius

Executive Chairman

+61 8 6266 8368

Mark Riseley

Head of Corporate Development & IR

+61 8 6266 8368

Visit the Company's website: [www.danakali.com](http://www.danakali.com)

Follow Danakali on LinkedIn: [www.linkedin.com/company/danakali-limited](https://www.linkedin.com/company/danakali-limited)

Subscribe to Danakali on YouTube: [www.youtube.com/channel/UCbGKN4-M4IOvPKxs9b-IJvw](https://www.youtube.com/channel/UCbGKN4-M4IOvPKxs9b-IJvw)

### About Danakali

Danakali Limited (ASX: DNK) (**Danakali**, or the **Company**) is an ASX listed potash company focused on the development of the Colluli Sulphate of Potash Project (**Colluli** or the **Project**). The Project is 100% owned by the Colluli Mining Share Company (**CMSC**), a 50:50 joint venture between Danakali and the Eritrean National Mining Corporation (**ENAMCO**).

The Project is located in the Danakil Depression region of Eritrea, East Africa, and is ~75km from the Red Sea coast, making it one of the most accessible potash deposits globally. Mineralisation within the Colluli resource commences at just 16m, making it the world's shallowest known potash deposit. The resource is amenable to open cut mining, which allows higher overall resource recovery to be achieved, is generally safer than underground mining, and is highly advantageous for modular growth.

The Company has completed a Front-End Engineering Design (**FEED**) for the production of potassium sulphate, otherwise known as Sulphate of Potash or **SOP**. SOP is a chloride free, specialty fertiliser which carries a substantial price premium relative to the more common potash type; potassium chloride (or **MOP**). Economic resources for production of SOP are geologically scarce. The unique composition of the Colluli resource favours low energy input, high potassium yield conversion to SOP using commercially proven technology. One of the key advantages of the resource is that the salts are present in solid form (in contrast with production of SOP from brines) which reduces infrastructure costs and substantially reduces the time required to achieve full production capacity.

The resource is favourably positioned to supply the world's fastest growing markets. A binding take-or-pay offtake agreement has been confirmed with EuroChem Trading GmbH (**EuroChem**) for up to 100% (minimum 87%) of Colluli Module I SOP production.

Development Finance Institutions, Africa Finance Corporation (**AFC**) and African Export Import Bank (**Afreximbank**), have obtained formal credit approval to provide CMSC with US\$200M in senior debt finance. The credit documentation was executed in December 2019, allowing drawdown of CMSC senior debt on satisfaction of customary conditions precedent. This represents the majority of funding required for the development and construction of the Colluli.

Project execution has commenced, and the Company's vision is to bring Colluli into production using the principles of risk management, resource utilisation and modularity, using the starting module (**Module I**) as a growth platform to develop the resource to its full potential.

### Forward looking statements and disclaimer

The information in this document is published to inform you about Danakali and its activities. Danakali has endeavoured to ensure that the information enclosed is accurate at the time of release, and that it accurately reflects the Company's intentions. All statements in this document, other than statements of historical facts, that address future production, project development, reserve or resource potential, exploration drilling, exploitation activities, corporate transactions and events or developments that the Company expects to occur, are forward looking statements. Although the Company believes the expectations expressed in such statements are based on reasonable assumptions, such statements are not guarantees of future performance and actual results or developments may differ materially from those in forward-looking statements.

Factors that could cause actual results to differ materially from those in forward-looking statements include market prices of potash and, exploitation and exploration successes, capital and operating costs, changes in project parameters as plans continue to be evaluated, continued





**DANAKALI**  
create. nurture. grow

availability of capital and financing and general economic, market or business conditions, as well as those factors disclosed in the Company's filed documents.

There can be no assurance that the development of Colluli will proceed as planned. Accordingly, readers should not place undue reliance on forward looking information. Mineral Resources and Ore Reserves have been reported according to the JORC Code, 2012 Edition. To the extent permitted by law, the Company accepts no responsibility or liability for any losses or damages of any kind arising out of the use of any information contained in this document. Recipients should make their own enquiries in relation to any investment decisions.

Mineral Resource, Ore Reserve, production target, forecast financial information and financial assumptions made in this announcement are consistent with assumptions detailed in the Company's ASX announcements dated 25 February 2015, 23 September 2015, 15 August 2016, 1 February 2017, 29 January 2018, and 19 February 2018 which continue to apply and have not materially changed. The Company is not aware of any new information or data that materially affects assumptions made.

No representation or warranty, express or implied, is or will be made by or on behalf of the Company, and no responsibility or liability is or will be accepted by the Company or its affiliates, as to the accuracy, completeness or verification of the information set out in this announcement, and nothing contained in this announcement is, or shall be relied upon as, a promise or representation in this respect, whether as to the past or the future. The Company and each of its affiliates accordingly disclaims, to the fullest extent permitted by law, all and any liability whether arising in tort, contract or otherwise which it might otherwise have in respect of this announcement or any such statement.

#### **Competent Persons Statement (Sulphate of Potash and Kieserite Mineral Resource)**

Colluli has a JORC-2012 compliant Measured, Indicated and Inferred Mineral Resource estimate of 1,289Mt @ 11% K2O Equiv. and 7% Kieserite. The Mineral Resource contains 303Mt @ 11% K2O Equiv. and 6% Kieserite of Measured Resource, 951Mt @ 11% K2O Equiv. and 7% Kieserite of Indicated Resource and 35Mt @ 10% K2O Equiv. and 9% Kieserite of Inferred Resource.

The information relating to the Colluli Mineral Resource estimate is extracted from the report entitled "Colluli Review Delivers Mineral Resource Estimate of 1.289Bt" disclosed on 25 February 2015 and the report entitled "In excess of 85 million tonnes of Kieserite defined within Colluli Project Resource adds to multi agri-commodity potential" disclosed on 15 August 2016, which are available to view at [www.danakali.com.au](http://www.danakali.com.au). The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and, in the case of estimates of Mineral Resources or Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.

#### **Competent Persons Statement (Sulphate of Potash Ore Reserve)**

Colluli Proved and Probable Ore Reserve is reported according to the JORC Code and estimated at 1,100Mt @ 10.5% K2O Equiv. The Ore Reserve is classified as 285Mt @ 11.3% K2O Equiv. Proved and 815Mt @ 10.3% K2O Equiv. Probable. The Colluli SOP Mineral Resource includes those Mineral Resources modified to produce the Colluli SOP Ore Reserves.

The information relating to the January 2018 Colluli Ore Reserve is extracted from the report entitled "Colluli Ore Reserve update" disclosed on 19 February 2018 and is available to view at [www.danakali.com.au](http://www.danakali.com.au). The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and, in the case of estimates of Mineral Resources or Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.

#### **Competent Persons Statement (Rock Salt Mineral Resource)**

Colluli has a JORC-2012 compliant Measured, Indicated and Inferred Mineral Resource estimate of 347Mt @ 96.9% NaCl. The Mineral Resource estimate contains 28Mt @ 97.2% NaCl of Measured Resource, 180Mt @ 96.6% NaCl of Indicated Resource and 139Mt @ 97.2% NaCl of Inferred Resource.

The information relating to the Colluli Rock Salt Mineral Resource estimate is extracted from the report entitled "+300M Tonne Rock Salt Mineral Resource Estimate Completed for Colluli" disclosed on 23 September 2015 and is available to view at [www.danakali.com.au](http://www.danakali.com.au). The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and, in the case of estimates of Mineral Resources or Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.

#### **Competent Persons Statement (Magnesium Chloride)**

Magnesium Chloride in the Bischofite brine is generated as a byproduct of SOP production due to the reaction of Carnallite and Kainite, with minor contribution from the Kieserite also present in the ore. Reported Magnesium Chloride from the Bischofite ore was calculated based on the expected quantity of Bischofite to be mined over the first 60 years of operation, taken at 90% pure Bischofite. Reported amount of byproduct Magnesium Chloride in the Bischofite brine was calculated based on the mass balance for the Colluli plant (Mass Balance Output – Colluli Mass Balance Rev3 Base Case Y 3 – 5 C S 60 40 with Harvest) which is expected to be the average operating conditions over the first 60 years of operation. The mass balance was generated by Global Potash Solutions (GPS, Saskatoon, SK, Canada) using the software SysCAD, while the underlying basis for the mass balance was an extensive series of tests performed at the Saskatchewan Research Council (SRC, Saskatoon, SK, Canada). GPS and SRC are both independent experts in the production of MOP and SOP, who have no business relationship with Danakali other than undertaking those individual technical consulting assignments as engaged, and being paid according to standard per diem rates.



**DANAKALI**  
create. nurture. grow

#### AMC Consultants Pty Ltd (AMC) independence

In reporting the Mineral Resources and Ore Reserves referred to in this public release, AMC acted as an independent party, has no interest in the outcomes of Colluli and has no business relationship with Danakali other than undertaking those individual technical consulting assignments as engaged, and being paid according to standard per diem rates with reimbursement for out-of-pocket expenses. Therefore, AMC and the Competent Persons believe that there is no conflict of interest in undertaking the assignments which are the subject of the statements.

#### Quality control and quality assurance

Danakali exploration programs follow standard operating and quality assurance procedures to ensure that all sampling techniques and sample results meet international reporting standards. Drill holes are located using GPS coordinates using WGS84 Datum, all mineralisation intervals are downhole and are true width intervals. The samples are derived from HQ diamond drill core, which in the case of carnallite ores, are sealed in heat-sealed plastic tubing immediately as it is drilled to preserve the sample. Significant sample intervals are dry quarter cut using a diamond saw and then resealed and double bagged for transport to the laboratory. Halite blanks and duplicate samples are submitted with each hole. Chemical analyses were conducted by Kali-Umwelttechnik GmbH, Sondershausen, Germany, utilising flame emission spectrometry, atomic absorption spectroscopy and ion chromatography. Kali-Umwelttechnik (KUTEC) has extensive experience in analysis of salt rock and brine samples and is certified according by DIN EN ISO/IEC 17025 by the Deutsche Akkreditierungsstelle GmbH (DAR). The laboratory follows standard procedures for the analysis of potash salt rocks chemical analysis (K<sup>+</sup>, Na<sup>+</sup>, Mg<sup>2+</sup>, Ca<sup>2+</sup>, Cl<sup>-</sup>, SO<sub>4</sub><sup>2-</sup>, H<sub>2</sub>O) and X-ray diffraction (XRD) analysis of the same samples as for chemical analysis to determine a qualitative mineral composition, which combined with the chemical analysis gives a quantitative mineral composition.