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## ASX Release

7 December 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.
- Colluli has two sources of Bischofite ( $MgCl_2$ ), the preferred being primary Bischofite brine from our process plant as a by-product of decomposition and the second, Bischofite ore that will be mined and reports to tailings.
- The combined mined Bischofite ore and processed Bischofite brine have a potential combined production capacity of 55.8 Mt (See Figure 2) of  $MgCl_2$  in the first 60 years from Modules 1 and 2 alone.
- The Bischofite brine from the plant (27 Mt over 60 years) will report to the bischofite pond and is DNK's first choice for selling  $MgCl_2$  as it is already purified from the production process.
- $MgCl_2$  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 together with rationale on the Magnesium Chloride market potential and export capacity from the Colluli Project. By way of background, DNK previously stated its JORC-2012 compliant SOP reserve (See Appendix A & B), of 1.1Bt<sup>(1)</sup> and the JORC-2012 compliant 85Mt (See Appendix D) of Kieserite resource<sup>(2)</sup> and JORC-2012 compliant 347Mt of Rock Salt @ 96.9%<sup>(3)</sup>.

Colluli's primary focus is to develop the Colluli Project to produce and export premium SOP to its target markets. As outlined below, the test results demonstrate Colluli will produce 450,000 tonnes per annum of high purity  $MgCl_2$  as a direct by-product of Colluli's SOP production, that will be suitable for either 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 (equivalent to 115 kT as Magnesium).

### Development of the Production Target for Magnesium Chloride

The Mass Balance required for detailed design of the process plant for the Colluli Project was based on the original FEED study<sup>(1)</sup>, and complemented by recent research performed at the Saskatchewan Research Council (SRC, Saskatoon, SK, Canada). The research at SRC focused on ore separation by flotation and resulted in optimization of the process with respect to crush size, collector type and dosage, amongst other things. Work at SRC was also performed to optimize the conversion of Leonite/KCl into SOP.

Results from the research at SRC have been incorporated into the process design resulting in the optimized Mass Balance. Programming for the Mass Balance was performed by Global Potash Solutions (GPS, Saskatoon, SK, Canada) using the software SysCAD. Production targets for the by-product Magnesium Chloride are based on the average operating conditions expected over the first 60 years of plant operation.

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\$0.42  
Market cap: A\$152.8m

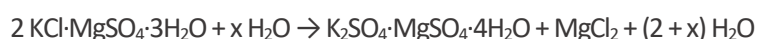


The Mass Balance provides annual production of 472,000 tonnes of SOP product using the following inputs:

Input	Input Million Tonnes Per Annum	Average Grade
Kainitite Ore	1.353	50.9%
Carnallitite Ore	1.212	38.6%
Sylvinitite Ore	0.810	23.2%
Seawater	1.803	Not applicable
Ground Water	0.714	Not applicable

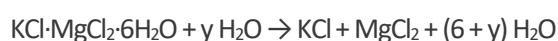
The ore minerals will be recovered by open-cut mining after removal of the overlying layers of clastics, rock salt and Bischofite. The seawater will be sourced from the Red Sea and delivered to site by pipeline. The groundwater will be from pit dewatering as well as boreholes.

While processing the ore, Carnallite and Kainite are decomposed by water to generate the by-product Magnesium Chloride according to the reactions:



**Kainite**

**Leonite**



**Carnallite**

Plant operations results in conversion of the ores into SOP product, with a first-pass recovery (of potassium) of 41.7%. By-product brine from the processing plant is directed to a series of evaporation ponds which precipitate Kainite and Carnallite in sequence as outlined in FEED studies. These minerals are recovered and directed back to the plant to provide an overall recovery of 71.4%. Brine discharged from the Carnallite evaporation pond comprises the by-product Magnesium Chloride as a Bischofite brine. Module 1 of Colluli's plant operations generates 1.278 M tonnes of Bischofite brine annually, with a composition of 35.2% Magnesium Chloride (w/w%) which equates to 450,000 tonnes of  $\text{MgCl}_2$ . In turn, 60 years production of  $\text{MgCl}_2$  is equivalent to 27Mt.

Estimation of the amount of Magnesium Chloride generated assumes that the underlying research work, as reflected in the Mass Balance, accurately represents performance of the full-scale plant.

Quantifying the production volumes of Magnesium Chloride does not impact the FEED<sup>(4)</sup> capital or operational costs (See Appendix C). A FEED<sup>(4)</sup> revalidation process is being undertake to incorporate the learnings of the Test Work, Water Intake Treatment Area (WITA) redesign and efficiencies of using salt



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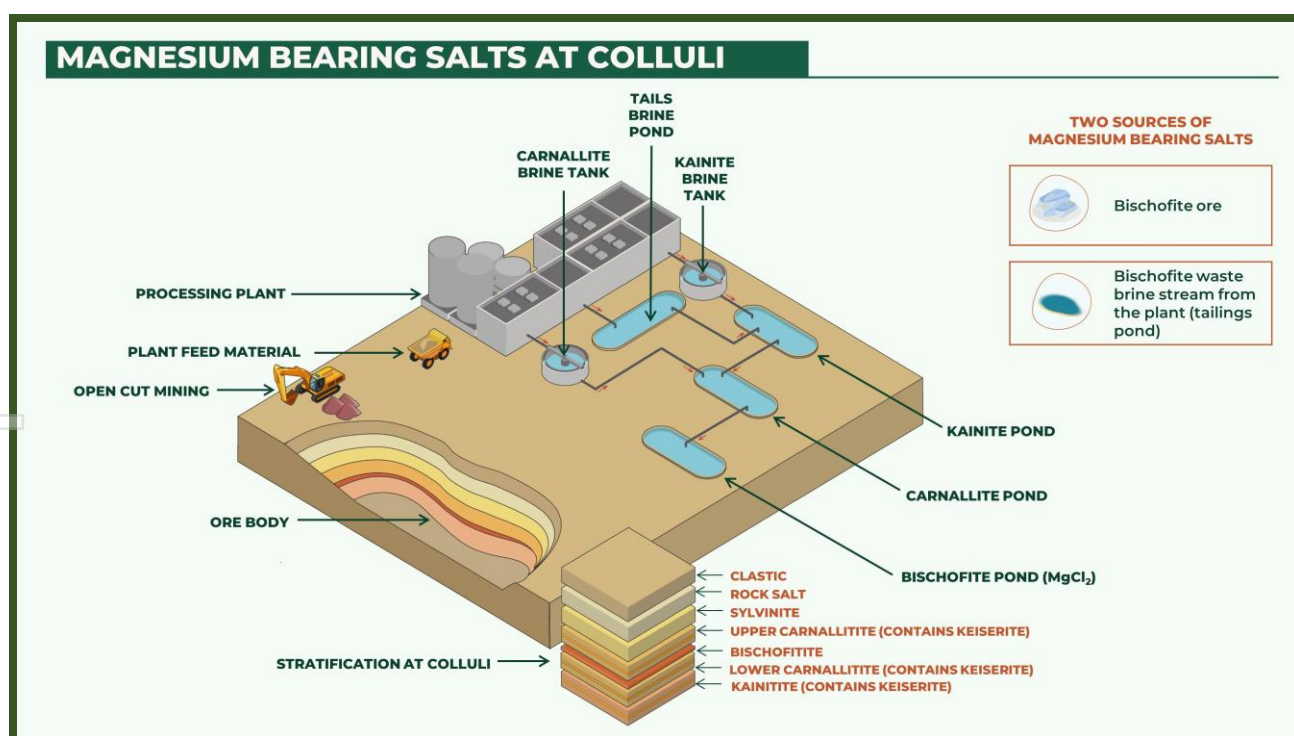
water in the production process. DNK will incorporate any impact of COVID-19, inflation rates and transportation costs in the revalidation.

MgCl<sub>2</sub> 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 production.

**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<sub>2</sub> from the bischofite brine stacks up, our current mass balance equations suggests we could potentially produce up to 115ktpa of Mg from the MgCl<sub>2</sub> produced from SOP module 1. Beneficiation to Mg will require substantial energy input which may be satisfied from the geothermal potential in the area”.

- (1) ASX Announcement 29 April 2021.
- (2) ASX Announcement 15 August 2016.
- (3) ASX Announcement 23 September 2015.
- (4) ASX Announcement 29 January 2018

**Figure 1:** Magnesium bearing salts at Colluli.

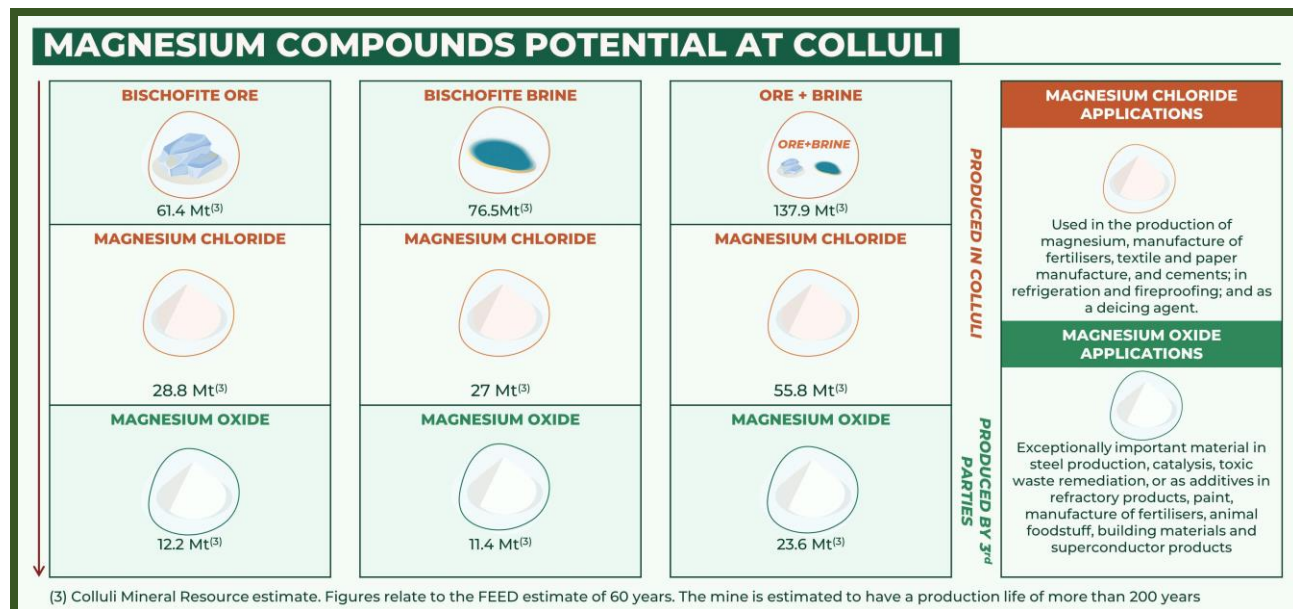






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**Figure 2:** Bischofite Ore and Bischofite Brine Produced at Colluli and Potential  $\text{MgCl}_2$  Production in first 60 years.



Note: 28.8Mt of  $\text{MgCl}_2$  is the potential production capacity from the 61.4Mt Bischofite Ore returned to tailings from the mining process in the first 60 years.

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

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## 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 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)**

Production performance, including the by-product Magnesium Chloride, was modeled with the Mass Balance by Global Potash Solutions (GPS) using the software SysCAD. GPS was on the management team responsible for overseeing the research program and ensured that the Mass Balance accurately reflects the results of the research. Development of the Mass Balance was supervised by Don Larmour, CEO and founder of Global Potash Solutions. Mr. Larmour is a member of the Association of Professional Engineers and Geoscientists of Saskatchewan (SK, Canada) with over 41 years of experience in the potash industry.



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### **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.





## Appendix A

JORC Code 2012 - Table 1, Section 4

### Section 4 Estimation and Reporting of Ore Reserves

(Criteria listed in section 1, and where relevant in sections 2 and 3, also apply to this section)

The below table has been included for the purposes of complying with ASX LR 5.16 (production targets) and not in respect to an updated ore reserve statement.

Criteria	Explanation	Commentary
<b>Mineral Resource estimate for conversion to Ore Reserves</b>	<ul style="list-style-type: none"> <li>Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.</li> <li>Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.</li> </ul>	<ul style="list-style-type: none"> <li>Ore Reserve estimate based on the Mineral Resource reported by AMC in the report "Colluli Mineral Resource Estimate", 16 March 2015. Refer to South Boulder Mines Ltd (now Danakali Ltd) ASX release 25 February 2015 for the updated Colluli Mineral Resource estimate, "Colluli Review Delivers Mineral Resource Estimate of 1.289Bt" (website: <a href="http://www.asx.com.au/asxpdf/20150225/pdf/42wv88cwpjmtkh.pdf">http://www.asx.com.au/asxpdf/20150225/pdf/42wv88cwpjmtkh.pdf</a>)</li> <li>Colluli open pit Ore Reserve based on Measured and Indicated Mineral Resources of 1,255 Mt @ 11% K<sub>2</sub>O, comprising: <ul style="list-style-type: none"> <li>Sylvinitite rock unit: 250 Mt @ 13% K<sub>2</sub>O</li> <li>Carnallitite rock unit: 383 Mt @ 8% K<sub>2</sub>O</li> <li>Kainitite rock unit: 621 Mt @ 12% K<sub>2</sub>O</li> </ul> </li> <li>Ore Reserve based on 3D resource block models "mdclock_a2.dm" for Area A and "mdclock_b2.dm" for Area B, developed in January 2015 from geostatistical assessment of predominantly diamond drillhole sample results.</li> <li>Mineral Resource converted to Ore Reserve by developing diluted resource model and applying pit optimization and mine scheduling to determine economically viable blocks to recover and process.</li> <li>The Mineral Resources are inclusive of Mineral Resources modified to produce Ore Reserves that can be economically mined.</li> </ul>
<b>Site visits</b>	<ul style="list-style-type: none"> <li>Comment on any site visits undertaken by the Competent Person and the outcome of those visits.</li> <li>If no site visits have been undertaken indicate why this is the case.</li> </ul>	<ul style="list-style-type: none"> <li>The Competent Person for Ore Reserves completed a site inspection of the Colluli project in February 2015 and viewed the proposed mine, process and camp infrastructure, and also: <ul style="list-style-type: none"> <li>Assessed data collection methods and techniques</li> <li>Inspected the proposed port site at Massawa and the product haulage route</li> <li>Visited communities nearest the project site.</li> </ul> </li> </ul>
<b>Study status</b>	<ul style="list-style-type: none"> <li>The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.</li> <li>The Code requires that a study to at least pre-feasibility study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that</li> </ul>	<ul style="list-style-type: none"> <li>Colluli studied to Feasibility Study (FS) standard. FS sometimes referred to as a Definitive Feasibility Study (DFS).</li> <li>Additional Front-End Engineering Design (FEED) study completed to advance the Project definition to a level of development that supports a capital cost estimate of ±10% level of accuracy.</li> <li>Construction at Colluli is yet to commence.</li> <li>The mine plan is technically achievable given the assumptions used as</li> </ul>





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	<p>is technically achievable and economically viable, and that material Modifying Factors have been considered.</p>	<p>the basis for the project.</p> <ul style="list-style-type: none"> <li>• The project is economically viable when considering the expected revenues and costs to achieve those revenues, assuming a project commissioning date in Quarter 3, 2020.</li> <li>• Material Modifying Factors were considered.</li> </ul>
<b>Cut-off parameters</b>	<ul style="list-style-type: none"> <li>• The basis of the cut-off grade(s) or quality parameters applied.</li> </ul>	<ul style="list-style-type: none"> <li>• Breakeven processing cut-off grade used for Ore Reserve estimation.</li> <li>• Cut-off grade calculated using: <ul style="list-style-type: none"> <li>– Adopted long-term SOP price of US\$567/t product was used in mine planning. Financial modelling was subsequently completed using an SOP price of US\$569/t product. Cut-off parameters were not adjusted because the difference in total ore tonnes at each price is negligible (less than 0.02%).</li> <li>– Processing, administration, overhead and associated sustaining capital cost of US\$15.20/t processed.</li> <li>– Product logistics and associated sustaining capital cost, and water logistics of US\$75.34/t product.</li> <li>– Ore mining differential cost of US\$2.77/bcm (ore related mining costs that are additional to waste mining costs).</li> <li>– Royalty costs of 3.5% of revenue.</li> <li>– Process recovery of 85% for K<sup>+</sup> and SO<sub>4</sub><sup>2-</sup> from sylvite, carnallite and kainite mineral species hosted within Sylvinitite, Carnallitite and Kainitite rock units.</li> <li>– Costs for processing plant production rate of 944 ktpa of SOP.</li> </ul> </li> </ul>
<b>Mining factors or assumptions</b>	<ul style="list-style-type: none"> <li>• The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimization or by preliminary or detailed design).</li> <li>• The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.</li> <li>• The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.</li> <li>• The major assumptions made and Mineral Resource model used for pit and stope optimization (if appropriate).</li> <li>• The mining dilution factors used.</li> <li>• The mining recovery factors used.</li> <li>• Any minimum mining widths used.</li> </ul>	<ul style="list-style-type: none"> <li>• Open pit mining method: <ul style="list-style-type: none"> <li>– For potash and rock salt – 110 t class surface miners direct loading 90 t class rear dump trucks. Method commonly used in potash and phosphate open pit operations and is well understood. Similar continuous miner technology is used in underground potash and phosphate mines.</li> <li>– Clastic overburden and bischofitite – 110 t class excavators and 90 t class rear dump trucks. Clastic overburden pushed down to excavators by 50 t track bulldozers. Method commonly used in open pit operations and well understood.</li> </ul> </li> <li>• Choice of mining method to enable the selective extraction of the potash ore units, minimising mining dilution and ore loss, and eliminating the requirement for drill and blast. Excavators utilised for bulk waste movement. Staggered benches in the pit development to level stripping ratio over the mine-life, enhance project economics and provide consistent plant feed.</li> <li>• Optimum pit limits determined using Geovia Lerchs-Grossman computer software given the project assumptions.</li> <li>• Process plant feed targets maintained in the mine schedule using Minemax Scheduler mine scheduling software.</li> <li>• Pit designs developed using Datamine computer software.</li> <li>• Geotechnical design parameters applied in pit design supported by analyses of laboratory testing of drill samples:</li> </ul>



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	<ul style="list-style-type: none"> <li>• The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.</li> <li>• The infrastructure requirements of the selected mining methods.</li> </ul> <ul style="list-style-type: none"> <li>– Clastic overburden: Batter angle of 23° to 15° for slope heights ranging in height up to 10m to 50m. Berm width of 40m at the toe of the clastic overburden, located in rock salt.</li> <li>– Carnallite and Bischofite: Batter angle of 20°, berm width of 8m, and maximum batter height of 25m.</li> <li>– All other potash units and rock salt: Batter angle of 70°, berm width of 8m, and maximum batter height of 20m.</li> </ul> <ul style="list-style-type: none"> <li>• Pit designs developed for two scenarios: <ul style="list-style-type: none"> <li>– Detailed pit design to provide inventory for the period of economic assessment.</li> <li>– Life of mine pit designs for Ore Reserve estimation purposes, based on the final pit limits from pit optimisation. Detailed design for Area B not completed as it is not expected to be mined for approximately 80 to 90 years. Instead an average overall pit slope angle of 19° was applied in Area B, based on the overall slope angle resulting from the Area A detailed design.</li> </ul> </li> <li>• Mineral Resource model assumptions detailed in Section 3, Table 1. Refer to South Boulder Mines Ltd (later Danakali Ltd) ASX release 25 February 2015 for the updated Colluli Mineral Resource estimate, “Colluli Review Delivers Mineral Resource Estimate of 1.289Bt” (website: <a href="https://bit.ly/3IfbSZq">https://bit.ly/3IfbSZq</a>).</li> <li>• Production schedule based on 944 ktpa SOP production, to give a mine life of approximately of 190 years. Life of mine average plant throughput rate is 5.8 Mtpa and the life of mine average mining rate is 30 Mtpa.</li> <li>• Colluli area topography is characterized by a flat salt plain in the area of mineralisation, bordered by an anhydrite ridge approximately 20m above the salt plain. All pits, dumps and roads designed to FS standard to ensure designs practically achievable.</li> <li>• 0.3 m “skin” of dilution included at each ore to waste contact. Dilutant acquires the grade of the underlying resource model block. Result is inclusion of approximately 7.5% dilutant at a grade of 3.7% K<sub>2</sub>O, and ore loss of 0.6% at a grade of 4.1% K<sub>2</sub>O, for a net increase of 6.9% in ore tonnes and an increase of 2.3% in contained K<sub>2</sub>O, based on the findings of the FS.</li> <li>• Minimum mining width of 80m was generally applied in the detailed design of mining panels.</li> <li>• Inferred Mineral Resources were considered as waste for optimization and financial evaluations.</li> <li>• Mine waste stored in both in-pit and ex-pit waste storage landforms.</li> <li>• Infrastructure included in the mine plan includes dewatering facilities, heavy vehicle workshop, administration facilities and supporting communication and computing facilities.</li> </ul>
<p><b>Metallurgical factors or assumptions</b></p>	<ul style="list-style-type: none"> <li>• The metallurgical process proposed and the appropriateness of that process to the style of mineralization.</li> <li>• Whether the metallurgical process is well-tested technology or novel in</li> </ul> <ul style="list-style-type: none"> <li>• The Colluli process plant flowsheet combines steps that are individually well established for potash ores, but the detail of the process flowsheet is commercially sensitive. Details are contained in the DFS and FEED documents and have been reviewed by an expert to the satisfaction of the Competent Person.</li> </ul>



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nature.

- The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.
- Any assumptions or allowances made for deleterious elements.
- The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.
- For minerals that are defined by a specification, has the Ore Reserve estimation been based on the appropriate mineralogy to meet the specifications?
- The process uses the combination of salts in the orebody to produce potassium sulphate (SOP).
- Process brine will be treated in evaporation ponds to precipitate potassium bearing salts which will be recycled to the plant for recovery.
- The SOP product will be dried and sized to produce granular, standard, and potentially soluble, SOP products which will be shipped for export through the port of Massawa.
- The overall process flow sheet includes eight main areas:
  - Ore receipt, secondary crushing, ore storage and reclaim.
  - Ore pulping and deslime.
  - Sylvinite and Carnallite processing.
  - Kainite processing.
  - Process and waste storage ponds with recycle of selected streams.
  - SOP production.
  - SOP drying, sizing and compaction for SOP products.
  - Product load-out and haulage.
- The proposed metallurgical process is well understood and appropriate for the deposit. The processing method is the most commonly used, low cost process for the production of potassium sulphate via the addition of potassium chloride (sylvite) with kainite from the kainite. Kainite represents approximately 50% of the Colluli resource with the remaining salts comprising sylvinite and carnallite which are commonly used for the production of potassium chloride. Using these well understood processing principles, the ore containing sylvite and carnallite can be decomposed, and then recombined with decomposed kainite to convert the potassium chlorides to potassium sulphate.
- Bench scale metallurgical test work and pilot testing was completed to determine:
  - Chemical and mineral analysis of the samples
  - Sylvinite characteristics (clay content, liberation, flotation ability).
  - Kainite characteristics (clay content, liberation, flotation ability).
  - Decomposition rates and retention times.
  - Feed to brine ratios.
  - Decomposition ratios.
  - Precipitate sizing.
  - Pond evaporation tests.
  - Alternate flotation methods.
  - Sensitivity to kainite grade fluctuations
  - Sensitivity to decomposition water quality
  - Caking potential and anti-caking agents



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	<ul style="list-style-type: none"> <li>– Compaction of raw SOP into product size fractions</li> <li>• Geological domaining considered in metallurgical testwork, which was carried out separately for sylvinite, carnallite, kainite rock types where appropriate. Mineralogy also considered.</li> <li>• The metallurgical test work samples are representative of mining schedules and the DFS and FEED level of economic assessment.</li> <li>• Overall metallurgical recovery factor of 85% is estimated for K<sup>+</sup> and SO<sub>4</sub><sup>2-</sup> from sylvite, carnallite and kainite mineral species hosted within Sylvinite, Carnallite and Kainite rock units.</li> <li>• Process flowsheet and metallurgical assumptions based on testwork of diamond drilling samples and confirmed by pilot plant testwork which successfully demonstrated production of SOP from Colluli ore.</li> <li>• Pilot plant tests produced over 100 kg of SOP at over 96% purity compared to typical industry product purity of 94%. Chloride levels were less than 0.1%, lower than existing producers which show chloride levels at approximately 0.5%. Results repeatable with a diverse range of feed material.</li> </ul>
<b>Environmental</b>	<ul style="list-style-type: none"> <li>• The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterization and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.</li> <li>• Social and Environment Impact Assessment (SEIA) documentation has been prepared by the consulting company MBS Environmental (MBS) and DNK.</li> <li>• SEIA is approved by the Eritrean Ministry of Energy and Mines.</li> <li>• Eritrea is signatory to a number of international agreements and treaties which have been taken into consideration in the planning and development of the project.</li> <li>• Mine waste material characterisation is complete. All mine waste demonstrated low potential for acid mine drainage. Water leachate analysis showed very low levels of environmentally significant metals and metalloids.</li> <li>• Physical and chemical characterisation of process waste is complete. Process wastes are not anticipated to have any acid mine drainage potential or to generate environmentally significant levels of leachable trace metals and metalloids.</li> <li>• None of the infrastructure for the project will be located on agricultural or residential land.</li> </ul>
<b>Infrastructure</b>	<ul style="list-style-type: none"> <li>• The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.</li> <li>• Colluli Project is located in the Danakil region of Eritrea approximately 350 km by road south-east of the capital city, Asmara, and 230 km by road from the port of Massawa.</li> <li>• Colluli is a greenfields project comprising the mine and process facilities at the Colluli site, and a seawater abstraction and desalination plant at Anfile Bay.</li> <li>• Existing access, infrastructure and services include: <ul style="list-style-type: none"> <li>– Air travel to Eritrea via an international airport in Asmara.</li> <li>– Shipping via the Red Sea port at Massawa.</li> <li>– Exploration camp at Colluli.</li> </ul> </li> <li>• Colluli is characterised by a very dry and hot climate, however rain fall intensity during storms can be high.</li> </ul>





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	<ul style="list-style-type: none"> <li>• All infrastructure and equipment will be designed for climatic conditions.</li> <li>• Colluli is not connected to the national power grid. Power at the mine site will be from a heavy fuel oil onsite power plant providing an 11 kV supply which will be stepped down to lower voltages as required. Distribution will be via both underground and overhead power lines.</li> <li>• Product export will be facilitated through the existing port of Massawa with product bulk loaded into twenty-foot equivalent (TEU) containers.</li> <li>• The Colluli accommodation camp will be located at the mine site and will provide accommodation for all personnel. The camp will contain mess facilities, laundry, recreation facilities, and camp administration and maintenance buildings.</li> <li>• Existing Colluli access road between Marsa Fatuma and the Colluli site will be upgraded as part of project execution.</li> <li>• Water for all areas of operations will be sourced from saline water sources at site and from the sea at Anfile Bay and pumped via dedicated pipelines to Colluli.</li> <li>• The desalination process at Anfile Bay will employ reverse osmosis.</li> <li>• Sewage from the accommodation camp and plant ablutions will be treated in a package sewage treatment plant. Waste oils will be used as fuel in the product dryer. Wherever possible, solid wastes will be recycled.</li> <li>• The process requires evaporation ponds and tailings storage facilities located on the saltpan.</li> <li>• Surface water and drainage: the mine area is located between the Sariga and Galli-Colluli rivers. Seasonal discharges from these river systems to the saltpan will be mitigated using diversion bunds designed to divert surface water away from critical mine areas whilst minimising downstream impacts.</li> <li>• Site buildings will be fit-for-purpose and will include a main administration building, a clinic and emergency response building, workshops, warehouse, reagent storage compound, ablution blocks and crib rooms, laboratory and gatehouse. A helipad is available if required.</li> <li>• Fuel for mining equipment and power generation will be stored in bunded steel tanks providing ten day's supply.</li> <li>• Communications will comprise a site radio system, process controls, and a VSAT satellite link for voice and data connection. The project area is covered by the national mobile network.</li> <li>• Local staff will be employed wherever possible, in conjunction with African and international expatriates. Camp facilities will be provided for all staff with buses used for staff transport to Asmara or nearby major centres.</li> </ul>
<b>Costs</b>	<ul style="list-style-type: none"> <li>• The derivation of, or assumptions made, regarding projected capital costs in the study.</li> <li>• The methodology used to estimate operating costs.</li> <li>• Capital costs estimated from first principles by specialist consultants. The estimates assumed: <ul style="list-style-type: none"> <li>– EPCM contract strategy</li> <li>– New equipment prices for all fixed infrastructure.</li> </ul> </li> </ul>



	<ul style="list-style-type: none"> <li>• Allowances made for the content of deleterious elements.</li> <li>• The source of exchange rates used in the study.</li> <li>• Derivation of transportation charges.</li> <li>• The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.</li> <li>• The allowances made for royalties payable, both Government and private.</li> </ul>	<ul style="list-style-type: none"> <li>– Competitive market pricing from local and international contractors</li> <li>– Factored estimates using known costs from previous projects.</li> <li>– Individual assessment in accordance with the preliminary design drawings and material take offs (MTO) based on drawings, structured to the Work Breakdown Structure (WBS) by plant areas and disciplines and a combination of market driven and in-house pricing applied to the capex line items</li> <li>• Development capital is estimated at US\$322M for Phase I and includes mine development capital and working capital. An additional US\$245M will be spent in Years 4 and 5 for the Phase II expansion.</li> <li>• Phase 2 development capital includes off site water infrastructure to support the water requirements of module 2. An alternative option has been investigated which supplies the water requirements for module 2 from the project site. This alternative option realises improved project economics but is not the basis of the Ore Reserve estimate.</li> <li>• Capital and operating costs presented in US dollars as at June 2017 to an accuracy of +/- 10%.</li> <li>• Process operating costs developed from first principles analysis of fixed costs (labour, G&amp;A, infrastructure) and variable costs associated with power and consumables.</li> <li>• Mine operating costs developed from first principles, on a contractor mining basis, to consider the equipment productivity expected for each bench in the design and the unit costs to be applied to the equipment. Costs based on mining contract tender for the first 5 years of operation and extrapolated from year 6 of production onwards.</li> <li>• Average unit operating costs (Includes mine gate costs, product logistics and royalties) for the period of economic assessment are US\$242 per tonne of SOP produced.</li> <li>• Exchange-rate assumptions taken from the XE.com website dated 1 June 2017. Exchange rate assumptions: <ul style="list-style-type: none"> <li>– AUD1.352 to USD1.00</li> <li>– ERN15.356 to USD1.00</li> <li>– EUR0.889 to USD1.00</li> <li>– CNY6.857 to USD1.00</li> <li>– ZAR13.12 to USD1.00</li> </ul> </li> <li>• Transport costs were quoted by an Eritrean logistics company. Massawa port handling fees were applied. SOP is assumed to be sold free on board (FOB) with no allowance for post-shiploading costs.</li> <li>• Processing costs estimated from first principles. Final product requires no further treatment or refining.</li> <li>• Royalty of 3.5% of revenue, payable to the Eritrean government, included in the financial evaluation.</li> </ul>
<b>Revenue factors</b>	<ul style="list-style-type: none"> <li>• The derivation of, or assumptions made regarding revenue factors including head grade, metal or</li> </ul>	<ul style="list-style-type: none"> <li>• Head grade estimated using geostatistical techniques in 3D modelling of diamond drilling results.</li> </ul>



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	<p>commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.</p> <ul style="list-style-type: none"> <li>• The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.</li> </ul>
<p><b>Market assessment</b></p>	<ul style="list-style-type: none"> <li>• Product will be in standard (-2mm) and granular (-4mm +2mm) form</li> <li>• Long term SOP price estimate of US\$567/t SOP, FOB at Massawa, used in Ore Reserve estimation. Price in the range of SOP prices observed in the past several years, adjusted for the port of export. Refer to "Cut-off parameters" section for additional comment.</li> <li>• Financial modelling of a shorter period of 60 years was considered when determining project NPV. A long-term price estimate was applied across the 60 years which equates to the long run marginal cost methodology. The resulting average price was US\$569/t SOP, FOB Massawa.</li> <li>• Contract product haulage from Colluli to the Port of Massawa has been estimated at US\$73/t SOP sold for product haulage including diesel.</li> </ul> <ul style="list-style-type: none"> <li>• SOP is a regularly traded commodity and is sold predominantly by way of supply contracts in a closed market.</li> <li>• The status of any supply contracts involving DNK is commercially sensitive and is therefore not disclosed.</li> <li>• DNK completed customer and competitive analysis, which is commercially sensitive and is therefore not disclosed.</li> <li>• Colluli is geographically well located to supply Asia, India and the Middle East, and can also supply Europe and America.</li> <li>• Price forecasts were based on marketing analysis, specific to the Colluli potash project, by CRU Consulting, who have assessed supply-demand for both potassium chloride and potassium sulphate. Raw material input costs, export taxes and logistics costs have all been considered as part of the analysis and the relative position of the Colluli project on the global cost curve considered.</li> <li>• The forecasts provided to DNK were based on detailed market intelligence, and a team of industry experts.</li> <li>• Colluli will produce primary SOP. Approximately 50% of the world's SOP is produced by primary processes with the remainder using secondary process involving the conversion of potassium chloride to SOP by adding sulphuric acid in a high cost thermal conversion process. This provides price support to the lower cost primary producers such as Colluli.</li> <li>• The assumed price combines the anticipated price for standard product (56% of output) and a premium price for granulated product (44% of output).</li> <li>• Ongoing demand for SOP globally is expected and attributed to increasing world population, declining arable land, disposable income and dietary changes, and under-application of potassium fertilisers in developing countries. Combined annual demand growth rates of 1% are expected until 2040.</li> <li>• Expandability of existing operations outside of China is constrained and there are limited greenfield development projects for primary production of SOP at an advanced stage. No new projects outside of China are expected to commission prior to 2019.</li> <li>• Analysis of the China market demonstrates that when SOP and MOP prices converge, switching takes place with a preference for SOP over MOP. Colluli's cost structures suggest growth well beyond the current</li> </ul>



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		SOP market size is possible.
<b>Economic</b>	<ul style="list-style-type: none"> <li>The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.</li> <li>NPV ranges and sensitivity to variations in the significant assumptions and inputs.</li> </ul>	<ul style="list-style-type: none"> <li>It is not practical to assess the total project economic analysis due to the long timelines involved.</li> <li>The economic assessment therefore is based on an economic period of review of 60 years, with production assumed to commence in Quarter 3, 2020.</li> <li>Discount rate of 10% "real" used for long term financial analysis.</li> <li>Pit shell optimizations generated using undiscounted cash flows.</li> <li>All evaluations conducted in "real" currency with a reference date of 1 July 2018.</li> <li>Provision was made for corporate tax at 38% of operating profit.</li> <li>No Value Added Tax (VAT) or Goods and Services Tax (GST) payable.</li> <li>The 60 year economic assessment estimates are NPV of US\$883M; IRR of 29.2%.</li> <li>NPV is mainly sensitive to SOP price. Reducing SOP price by 10% reduces NPV from US\$883M to US\$663M (-25%), whilst reducing the price by 20% reduces the project NPV to US\$437M (-50%). Increasing the SOP price by 10% increases NPV by 25% to US\$1,102M.</li> <li>NPV is less sensitive to changes in operating costs. A 20% increase in operating costs reduces the project NPV to US\$695M (-21%).</li> <li>NPV reduces by 5% to US\$842M when development capital is increased by 20%.</li> <li>To determine sensitivity, analysis of a case that considers Phase II not being built, shows the Phase I only economic assessment estimates are NPV of US\$505M; IRR of 28.1%; Payback period of 3.25 years.</li> </ul>
<b>Social</b>	<ul style="list-style-type: none"> <li>The status of agreements with key stakeholders and matters leading to social licence to operate.</li> </ul>	<ul style="list-style-type: none"> <li>Colluli is a joint venture between the Eritrean National Mining Company and DNK, via the equally owned Colluli Mining Share Company (CMSC).</li> <li>Socio-economic and cultural heritage baseline reports have been undertaken and reviewed by the DOE.</li> <li>Socio-economic and cultural heritage impacts have been assessed and have been documented as part of the SEIA process. A number of social impact management plans have been developed as part of the SEIA process.</li> <li>DNK has implemented a Stakeholder Engagement Program and is actively engaging with a wide range of project stakeholders.</li> <li>No resettlement programs will be required.</li> <li>There are believed to be no social related issues that do not have a reasonable likelihood of being resolved.</li> </ul>
<b>Other</b>	<ul style="list-style-type: none"> <li>To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:</li> <li>Any identified material naturally</li> </ul>	<ul style="list-style-type: none"> <li>Seasonal discharges from the Sariga and Galli-Colluli river systems to the saltpan will need to be mitigated. Appropriate measures are designed to protect infrastructure at Colluli and along the product haulage route.</li> <li>A liquefaction assessment recommended that pit slopes be managed</li> </ul>





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	<p>occurring risks.</p> <ul style="list-style-type: none"> <li>• The status of material legal agreements and marketing arrangements.</li> <li>• The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.</li> </ul>	<p>by:</p> <ul style="list-style-type: none"> <li>– providing additional features in the pit design;</li> <li>– installing monitoring equipment;</li> <li>– developing action /response plans;</li> <li>– engaging appropriate consultants to monitor and provide recommendations</li> </ul> <ul style="list-style-type: none"> <li>• Weather conditions at site are hot and dry, with low rainfall and a high salt environment. Equipment and infrastructure was specified that is fit-for-purpose, and appropriate operating procedures will be developed and implemented for construction and operations.</li> <li>• In 2017, CMSC signed Heads of Agreements (HOAs) with a number of prominent offtake parties comprising distributors, traders, and end-users.</li> <li>• Interest in procuring CMSC product remains high, with the aggregate demand in the HOAs totalling 850 ktpa.</li> <li>• Marketing is currently in the process of converting these HOAs to Binding Bankable offtake agreements.</li> <li>• CMSC signed a Mining Agreement with the Government of the State of Eritrea on the 31st January 2017. The agreement covers the mining and exploration licence areas.</li> <li>• Seven Mining Licenses covering 63km<sup>2</sup> were subsequently granted, which cover the Ore Reserve area required for the first sixty years of mining and the proposed sites for the open pits, waste dumps, process plant, associated infrastructure. The mining licence is valid for a maximum period of 20 years or the life of the deposit, whichever is shorter. The license may be renewed for a maximum period of ten years on each renewal; subject to the licensee demonstrating the continued economic viability of mining the deposit and that the licensee has fulfilled the obligations specified in the license and is not in breach of any provisions.</li> <li>• An additional exploration tenement to the west of the mining licence area, with undefined mineralisation, was awarded to CMSC in October 2017.</li> <li>• Land was granted to the Colluli Potash Project for the development of coastal facilities including a product export terminal at Anfile Bay on 6 June 2014, subject to economic viability and social and environmental conditions being met. The Anfile Bay export terminal will not be developed as part of this FS.</li> </ul>
<b>Classification</b>	<ul style="list-style-type: none"> <li>• The basis for the classification of the Ore Reserves into varying confidence categories.</li> <li>• Whether the result appropriately reflects the Competent Person's view of the deposit.</li> <li>• The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).</li> </ul>	<ul style="list-style-type: none"> <li>• Measured Mineral Resources convert to Proved Ore Reserves.</li> <li>• Indicated Mineral Resources convert to Probable Ore Reserves.</li> <li>• Inferred Mineral Resource regarded as waste for optimization and evaluation purposes.</li> <li>• The Colluli Ore Reserve estimate appropriately reflects the Competent Person's views.</li> <li>• No Probable Ore Reserve was derived from Measured Mineral Resources.</li> </ul>
<b>Audits or</b>	<ul style="list-style-type: none"> <li>• The results of any audits or reviews of</li> </ul>	<ul style="list-style-type: none"> <li>• The process design and design criteria, metallurgical testwork, plant</li> </ul>



## reviews

Ore Reserve estimates.

configuration and process equipment list presented in the PFS were reviewed both internally and by recognised industry independent experts and were found to be appropriate and fit for purpose.

- No material change to the process flow design has occurred between DFS and FEED.
- The process design and design criteria, metallurgical testwork, plant configuration and process equipment list presented in the DFS were reviewed by a recognised industry expert and were found to be appropriate and fit for purpose.
- The front-end engineering design (FEED) scope and report reviewed all aspects of the DFS and recommended changes to improve performance and reduce cost. It also improved the cost estimate accuracy to  $\pm 10\%$ .
- The Competent Person is not aware of any other audits or reviews of the 2015 Colluli DFS or 2018 FEED reports.

## Discussion of relative accuracy/ confidence

- Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.
- The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.
- Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.
- It is recognized that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.

- In the Competent Person's view, the Colluli DFS and FEED achieve the required level of confidence in the modifying factors to justify estimation of an Ore Reserve. The DFS and FEED determined a mine plan and production schedule that is technically achievable and economically viable.
- FEED capital and operating cost estimates are based on quoted prices and rates from competitive tenders, material take-offs from drawings, and allowances.
- The Ore Reserve classification has low sensitivity to changes in the Modifying Factors and no conversion of Measured Mineral Resource to Probable Ore Reserve was required.
- Review by independent experts of the process design at the PFS stage indicated that there are no major flaws in the process design, plant configuration and process recovery. No material changes were made to the process design for DFS or FEED. Modifying factors are unlikely to change sufficiently with further study to materially change the Ore Reserve.
- Detailed design and analysis was based on a 60 year economic period of review with sufficient sustaining capital allowed to enable regeneration of critical items over the 60 year period.
- Adopted long-term SOP price of US\$567/t product was used in mine planning. Financial modelling was subsequently completed at an SOP price of US\$569/t product following recommendations from the marketing specialists. Cut-off parameters were not adjusted because the difference in total ore tonnes at each price is negligible (less than 0.02%). This difference in long-term SOP pricing is immaterial to the Ore Reserve estimate.



## Appendix B

**Table 1: Colluli SOP Mineral Resource<sup>(5),(6)</sup>**

		Measured		Indicated		Inferred		Total	
Area	Rock unit	Mt	K2O equiv.	Mt	K2O equiv.	Mt	K2O equiv.	Mt	K2O equiv.
Area A	Sylvinite	66	12%	38	11%	10	8%	115	11%
	Carnallite	55	7%	190	9%	6	16%	251	9%
	Kainitite	86	12%	199	11%	1	10%	285	11%
Area B	Sylvinite	24	15%	122	13%	5	12%	150	13%
	Carnallite	25	6%	114	7%	8	7%	147	7%
	Kainitite	48	13%	289	13%	4	13%	341	13%
Sub-total	Sylvinite	90	13%	160	13%	15	9%	265	12%
- Areas A	Carnallite	80	7%	303	8%	15	11%	398	8%
& B	Kainitite	133	12%	488	12%	5	12%	626	12%
Total		303	11%	951	11%	35	10%	1,289	11%

The Colluli SOP Mineral Resource also comprises an 85Mt Kieserite Mineral Resource<sup>(5)</sup>.

**Table 2: Colluli SOP Ore Reserve<sup>(5)</sup>**

	Total		Probable		Total		
Occurrence <sup>(6)</sup>	Mt	K2O equiv.	Mt	K2O equiv.	Mt	K2O equiv.	K2SO4 equiv. Mt <sup>(7)</sup>
Sylvinite (KCl.NaCl)	77	15.0%	173	12.1%	250	13.0%	
Carnallite (KCl.MgCl2.H2O)	77	6.9%	279	7.8%	356	7.6%	
Kainitite (KCl.MgSO4.H2O)	131	11.8%	363	11.2%	494	11.4%	
Total	285	11.3%	815	10.3%	1,100	10.5%	203



**Table 3: Colluli Rock Salt Mineral Resource<sup>(5)</sup>**

Classification	Mt	NaCl	K	Mg	CaSO <sub>4</sub>	Insolubles
Measured	28	97.2%	0.05%	0.05%	2.2%	0.23%
Indicated	180	96.6%	0.07%	0.06%	2.3%	0.24%
Inferred	139	97.2%	0.05%	0.05%	1.8%	0.25%
Total	347	96.9%	0.06%	0.05%	2.1%	0.24%

(5) ASX announcements 25-Feb-15, 23-Sep-15, 30-Nov-15 and 15-Aug-16

(6) The Ore Reserve estimate contains dilutant material; only Sylvite, Carnallite and Kainite mineral species from Sylvinite, Carnallitite and Kainitite rock types contribute to recovered product

(7) Equivalent K<sub>2</sub>SO<sub>4</sub> (SOP) sourced from Sylvite, Carnallite and Kainite mineral species only, shown prior to the application of processing losses





## Appendix C

### Key Colluli FEED economic estimates and outcomes <sup>(8)</sup>

	Module I <sup>(9)</sup>	Module I & II <sup>(10),(11)</sup>
100% of the Project (equity / pre-debt basis)		
Annualised SOP production	472ktpa	944ktpa
Strip ratio (waste:ore)	1.9	2.1
Module I development capital <sup>(12)</sup>	US\$302M	
Incremental Module II development capital <sup>(11),(12)</sup>		US\$202M
Capital intensity	US\$640/t	US\$534/t
Incremental Module II capital intensity <sup>(12)</sup>		US\$427/t
Average mine gate cash costs <sup>(13)</sup>	US\$165/t	US\$149/t
Average total cash costs <sup>(13),(14)</sup>	US\$258/t	US\$242/t
Average annual undiscounted free cash flows <sup>(13)</sup>	US\$88M	US\$173M
Post tax NPV (10% real)	US\$505M	US\$902M
Post tax IRR	28.1%	29.9%
Module I payback period <sup>(15)</sup>	3.25 years	
Danakali's 50% share of the Project (post-debt basis)		
Average annual undiscounted free cash flows <sup>(13)</sup>	US\$43M	US\$85M
Post finance NPV (10% real)	US\$242M	US\$439M
Post finance IRR	29.7%	31.3%

(8) Economic estimates and outcomes reported in US\$ real

(9) Assumed that Module I is 60% debt / 40% equity funded

(10) Module II production expected to commence in year 6

(11) Assumed 100% funded from project cash flows and third-party debt

(12) Including contingency, excluding sustaining and working capital

(13) Average for first 60 years of production

(14) Includes mine gate cash costs, product logistics, and royalties

(15) Represents payback from date of first production



## Appendix D

**Table 4: Kieserite contained by Resource Classification**

	Measured		Indicated		Inferred		Total		
	Mt	Contained Kieserite (Mt)	Mt	Contained Kieserite (Mt)	Mt	K2O equiv.	Mt	Contained Kieserite (Mt)	Kieserite %
Sylvinit	90	0	160	0	15	0	265	0	0.03
Carnallit	80	16	303	59	15	3	398	78	20
Kainit	133	2	488	7	5	0	626	9	1
Total	303	18	951	66	35	3	1,289	87	7