



South Boulder Mines

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South Boulder Mines to build on robust feasibility study for Colluli

South Boulder Mines (ASX:STB) has completed a positive Pre-Feasibility Study "PFS" for its Colluli 50/50 Joint Venture Potash project in Eritrea.

Colluli hosts a JORC Resource of 1,289 million tonnes of open pittable ore containing 260 million tonnes of recoverable Potassium Sulphate or Potash that is also known as (SOP).

Potassium Sulphate is geologically scarce with only two green-field projects that have completed a Definitive Feasibility Study.

The Colluli resource has a potential mine life exceeding 100 years

PFS estimates give Colluli the lowest capital intensity of all advanced SOP projects globally.

Mine gate operating cost estimates place Colluli in the bottom quartile of the industry cost curve.

Average total costs "Free On Board" at Afile Bay are estimated at US\$210 per tonne of SOP, and in the 5th year at US\$189 per tonne.

Modular development approach significantly de-risks the project and potentially increases development speed.

Massive resource provides substantial opportunity for future growth.

Technical review committee comprising industry experts endorse process design, testwork, process flow diagrams and equipment lists.

Global production of SOP from brines and chemical processes have an average cost range of US\$350 to over \$500 per tonne and highlights the competitiveness of the Colluli project economics.

Applying a constant sales price of US\$588 per tonne of SOP produces a robust Internal Rate of Return of 22.3% rising to 24.7%.

This is forecast to generate an EBITDA to South Boulder Mines for its 50% interest of ~US\$50M/ A\$63.5M per year, rising to ~US\$105M / A\$133.4M in the 5th year.

SOP resources produce a fertiliser that is chloride or salt free. SOP is in high demand because it improves soil, aids water retention, yield, nutrient value, taste, colour, texture and is widely applied to fruit, vegetables, and rice, and wheat.

Global usage of SOP is less than 6 kilograms per hectare with China, Italy, and Mexico consuming ~30 kilograms per hectare, and the U.S. with over 100 kilograms per hectare. Increasing global societal wealth will drive SOP demand for larger volumes of higher nutritional crops.

South Boulder Mines is part of a peer group of listed developers that have completed preliminary studies on underground, open pit and brine style potash resources that carry a median Enterprise Valuation "EV" of \$0.88 per tonne of defined resource.

Price: A\$0.25

Market Cap: A\$37.457M

1 Year Share Price Graph



Share Information

Code: STB

Listing: ASX

Sector: General Mining

Website: www.southbouldermine.com.au

Company Synopsis:

South Boulders (ASX: STB) flagship project is the world class Colluli Potash Fertilizer Project in Eritrea. .

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Proactive Investors has calculated a 12 month price target range of \$0.40 to \$0.45 based on the median SOP Peer Group EV/tonne, discounting for project development and sovereign risk (see Analysis and Valuation).

ASX Code: STB
Recommendation: Speculative Buy
Sector: Materials
12 Month Price Target: 0.40 - 0.45

Current Share Price: \$0.23
52 Week -: High: \$0.28/Low: \$0.15
Ordinary Shares: 149M
Milestone Shares: Nil
Options: 28M
Cash: \$9.0M

Market Cap: A\$35.0M
Enterprise Value: \$26.0M

BACKGROUND

South Boulder Mines Ltd (ASX:STB) is an ASX listed resources company that is currently developing the large Colluli Potash Project located in Eritrea, East Africa. Potash is a generic term that is used to describe a variety of potassium bearing minerals and manufactured chemicals that are used primarily as fertiliser.

The Company has been actively exploring for potash at Colluli since 2009. Colluli is the world's shallowest deposit with mineralisation commencing at a depth of 16 metres that can be developed at very low cost utilising open pit mining. The resource is located 75 kilometres from the Red Sea coast and is proximate to the world's fastest growing markets.

MAP ONE: LOCATION OF COLLULI IS CLOSE TO RED SEA ROUTES AND GLOBAL MARKETS

COLLULI POTASH PROJECT, ERITREA A ONE HUNDRED YEAR PLUS MINE LIFE RESOURCE

The Colluli Potash Project is a 50/50 joint venture with the Eritrean National Mining Company "ENAMCO" and is held 100% by the Colluli Mining Share Company with South Boulder and ENAMCO each holding a 50% interest. ENAMCO is the mining Investment arm of the Eritrean Government.

Colluli is located in South Eritrea and includes a license area that covers 400 square kilometres and is part of the Danakil potash belt that extends for a strike distance of 350 kilometres. Current developers on the belt include South Boulder, Allana, and Circum.

The project area is 350 kilometres from the capital of Asmara, 180 kilometres from the port of Massawa, and within 75 kilometres of the Red Sea coast town of Gelalo.

The Colluli resource was originally independently estimated by Ercosplan Ingenieurgesellschaft Geotechnik und Bergbau mbH in April of 2012 and was reported by South Boulder as compliant with Canadian National Instrument 43-101 and the Australia JORC Code and defined a resource of Potassium bearing salts that included:

- Measured Resource of 262 million tonnes
- Indicated Resource of 581 million tonnes
- Inferred Resource of 173 million tonnes



- Total Resource: 1,016 million tonnes. This includes an individual estimate of potassium bearing salts of 110 million tonnes of Sylvinitite, 309 million tonnes of Carnallitite, and 597 million tonnes of Kainitite.

AMC consultants recently updated the Mineral Resource for the current Pre-Feasibility Study and included an upgrade to K₂O (potassium) status to comply with the JORC 2012 code:

- Measured and Indicated Resource (with 94% of the resource in this category) of 265 million tonnes of Sylvinitite at a K₂O equivalent grade of 12%, containing 31.8 million tonnes of K₂O

- Measured and Indicated Resource (with 96% of the resource in this category) of 398 million tonnes of Carnallitite at a K₂O equivalent grade of 8% containing 31.8 million tonnes of K₂O

- Measured and Indicated Resource (with 99% of the resource in this category) of 626 million tonnes of Kainitite at a K₂O equivalent grade of 12% containing 75.1 million tonnes of K₂O

- Total Measured and Indicated Resource (with 97% of the resource in this category): 1,289 million tonnes of K₂O equivalent grade of 10.76% containing 152.7 million tonnes of K₂O.

- On a contained K₂SO₄ (potassium Sulphate) equivalent basis: 260 million tonnes of Potassium Sulphate on a 100% recovery basis.

The potash bearing mineralisation is overlain by 10 to 70 metres of clastic sediments and in most locations is capped by 10 to 20 metres of upper rock salt. The uppermost potash layer includes sylvite or KCl that is up to 10 metres in thickness and overlays carnallitite and bischofite zones that vary from 3 to 25 metres in thickness. The lowest layer contains kainitite that varies from 5 to 15 metres in thickness and is bedded upon a lower layer of rock salt that marks the lowest extent of the mineralisation.

All of these three salts are suitable for the production of potash fertilisers with currently defined resources sufficient for a 100 year mine life, and represent a globally significant potash resource.

COLLULI PROJECT SUMMARY FOR 2014 AND EARLY 2015

The Joint Venture Partners made strong progress on the Colluli Project over the course of 2014 which included:

- Completion of studies to process all potassium bearing salts from the resource along with mine plans to extract the salts

- Secured access to Anfile Bay for an export shipping route

- Initiated a Pre-Feasibility Study to produce potassium sulphate using a simple ambient temperature, high potassium yield process

- Submitted first tranche of environmental baseline assessments

- Completed above market strategic share placement to Kam Lung Investment Development with option for further equity investment upon securing a binding offtake agreement for potassium sulphate

- Completed pre-feasibility drilling for infrastructure locations and pit designs

- Completed pre-feasibility process plant design and process flow diagrams

- Produced high grade potassium sulphate using Colluli salts and pre-feasibility processing design.

- Achieved highly favourable metallurgical test results



- Reduced infrastructure requirements by evaluating alternate plant configuration
- Completed robust Pre-Feasibility Study in early 2015

PRE-FEASIBILITY STUDY DEMONSTRATES ROBUST RESULTS FOR A PRODUCTION START IN 2018

South Boulder Mines completed a Pre-Feasibility Study for Colluli that evaluated a two module mine development over a 30 year economic modelling period. The resource will be mined via open pit mining that employs conventional removal of potassium bearing salts utilising surface mines and rigid body haul trucks. The surface miners eliminate the need for blasting and simplify the processing plant infrastructure by removing the need for primary crushing.

The study was undertaken by Lycopodium Minerals and included input from a number of West Australian engineering companies and other industry experts that included Knight Piesold, AMC Consultants, Global Potash Solutions, PRDW, the Saskatchewan Research Council, MBS Environmental and ENAMCO.

PHASE ONE: DEVELOPMENT OF CULLULI

Development Capital for Phase One is estimated at US\$442 million and includes US\$48 million as a contingency (+/- 25%). This includes construction of a road to a 900,000 tonne per annum export terminal, and mining and process infrastructure for production of 425,000 tonnes of SOP per year, with a production start-up date projected for 2018.

A breakdown of direct capital expenses includes (1) process plants and ponds US\$165 million (2) mine development and infrastructure US\$71 million (3) water supply, product road and port US\$49 million (4) support infrastructure US\$10 million for a total of US\$295 million.

Indirect capital costs include (1) engineering, procurement and construction management US\$37 million (2) indirect construction costs US\$27 million (3) owners costs US\$35 million for a total of \$99 million. A contingency fee is estimated at US\$48 million for a grand total of direct and indirect capital costs of US\$442 million.

Sustaining capital for the first 5 years of mine life is estimated at \$194 million.

Average SOP for "Free On Board" at Anfile Bay is estimated at US\$588 per tonne. Average mine gate cash costs at US\$162 per tonne, and average total cash costs that include mine gate costs, logistics and royalties at US\$210 per tonne. This produces an extremely healthy after tax Internal Rate of Return of 22.3%.

Post Tax Net Present Value (discounted at 10%) is estimated at US\$462 million, with South Boulder's equity interest at US\$206 million.

Phase One undiscounted cash flow on a cumulative basis (life of mine) is estimated at US\$2,645 million, and produces annual free cash flows of approximately US\$100 million or an EBITDA of US\$50 million / A\$63.5 million to South Boulder for its 50% equity in Colluli.

PHASE TWO: DEVELOPMENT

Development Capital for Phase Two is estimated at US\$282 million and includes a 15% contingency which will be partially funded from free cash flows from Phase One production. Annualised production of SOP is set to increase from 425,000 to 850,000 tonnes in the fifth year of the project.

Direct capital costs include (1) process plants and ponds US\$179 million (2) mine development and infrastructure \$7 million (3) water supply, product road and port US\$14 million (4) support infrastructure US\$3 million for a total of US\$203 million.

Indirect capital costs include (1) engineering, procurement and construction management US\$18 million (2) indirect construction costs US\$27 million (3) owners costs of US\$3 million for a total of US\$48 million. A contingency fee is estimated at US\$31 million for a grand total of direct and indirect capital costs of US\$282 million.



Sustaining capital in Phase Two is estimated at \$91 million.

Average SOP for Free On Board at Anfile Bay is estimated at a constant US\$588 per tonne. Average mine gate cash costs drop from US\$162 to \$141 per tonne, and average total cash costs drop from US\$210 to \$189 per tonne. This boosts after tax Internal Rate of Return from 22.3% to 24.7%.

Post Tax Net Present Value (discounted at 10%) increases from US\$462 to US\$846 million, with South Boulder's equity interest increasing from US\$206 to \$397 million.

Phase Two undiscounted cash flow on a cumulative basis increases from US\$2,645 to \$5,134 million. This produces annualised free cash flow boost from approximately US\$100 to US\$210 million or an EBITDA of US\$105 / A\$133.4 million to South Boulder.

OPERATING COSTS PER TONNE OF SOP EXPORTED

Operating costs for Phase One include (1) mining operation US\$82.71 per tonne (2) processing US\$58.34 per tonne (3) general and administration US\$20.92 per tonne for a sub total mine gate cost of US\$161.97 per tonne.

Shipment costs include (1) trucking to port US\$6.49 per tonne (2) ship loading US\$20.93 per tonne. Royalties will add US\$ 20.61 per tonne for total cash costs of US\$210.00 per tonne.

Phase Two operating costs include (1) mining operation US\$71.53 per tonne (2) processing US\$57.89 per tonne (3) general and administration US\$11.37 per tonne for a sub total mine gate cost of US\$140.79 per tonne.

Shipment costs include (1) trucking to port US\$6.48 per tonne (2) ship loading US\$20.87 per tonne. Royalties will add US\$20.60 per tonne for total cash costs of US\$188.74 per tonne.

PROJECT ELEMENTS

The Colluli Potash Project includes (1) an open pit potash mine (2) ore processing facilities adjacent to the open pit (3) evaporation ponds for salt production (4) product export terminal at Ras Hafele in Anfile Bay on the Red Sea coast (4) new 75 kilometre product haulage road connecting the mine site and port facility (5) seawater pipeline from Anfile Bay to the mine site, and (6) accommodation camp and administration facility at the mine site.

MAP TWO: COLLULI MINE SITE LAYOUT INCLUDING AREA A & B

Two open pit deposits will be initially developed within Area A and utilise conventional truck and shove techniques and continuous miners capable of extracting seven million tonnes of ore and waste per year. This will be sufficient for a 500 year mine life at a production rate of 425,000 tonnes per year of SOP.

Overburden and waste will be stockpiled at the mine site, and clean rock salt will be stockpiled separately in anticipation of future sales. Life of mine strip ratio is a low 2.19, and will reduce by 14% during Phase Two scale up of production to 850,000 tonnes per year of SOP.

PROCESSING METHOD

Ore containing sylvite and carnallite will be extracted and decomposed in a brine pond. Kainitite will be extracted and decomposed in a separate brine pond. The decomposed sylvite, carnallite and kainitite will then be recombined under ambient conditions to trigger a spontaneous reaction to produce a high yield K20 / potassium sulphate or SOP.

Potassium yields will be further improved by utilising a series of ponds that will collect excess brines exiting the process plant. The plant site is ideally located to capture highly favourable ambient conditions that will drive solar evaporation and precipitate and concentrate potassium salts that will circulate and recirculate through the pond system and process plant.

DIAGRAM ONE: LAYOUT OF PROCESS TO PRODUCE SOP

SHIPMENT



Four or five trucks will complete twelve to fifteen truck movements to deliver 80 tonnes of SOP to the export facility each day. Barges will be loaded by a mobile crane for delivery to tankers waiting in deep water.

ERITREA

Eritrea is a stable jurisdiction with a reputation for clear government policy that employs a mixed legal system of civil, customary and Islamic religious law.

Since formal independence from Ethiopia in 1993 the country has faced many economic problems that include a lack of resources and chronic drought. About 80% of the population is engaged in subsistence agriculture.

According to the CIA Fact book Eritrea reported a GDP growth rate of 7% in 2013, and a per capita GDP of US\$1,200.

GLOBAL POTASH MARKET

Key drivers of growth in the fertiliser markets include a global population that is increasing by 80 million people each year to a current 7.29 billion, decreasing arable land, and changing dietary preferences. As economies develop their populations demand higher protein diets and an increased intake of fruit and vegetables.

The total global potash market includes production of four different types of product for a total annualised output of 64 million tonnes and includes:

- Production of 2 million tonnes of NOP or Potassium Nitrate which is a mix of potassium and nitrogen nutrients that is utilised to feed chloride sensitive crops that require additional nitrogen
- Production of 2 million tonnes of SOP-M or Sulphate of Potash Magnesia which is a mix of potassium, sulphur, and magnesium nutrients that is a specialty fertiliser used on high value crops with limited production
- Production of 6 million tonnes of SOP or Sulphate of Potash which is a mix of potassium and sulphur nutrients for chloride (salt) intolerant and specialty crops such as fruits, vegetables, nuts, beans, and coffee
- Production of 54 million tonnes of MOP or Potassium Chloride which is a potassium nutrient that is applied to staples such as wheat and corn that are chloride tolerant

CHART ONE: PROJECTED GROWTH OF SOP OVER NEXT DECADE

Parthenon Analysis and EPM Mining project a 4% annualized growth rate for Sulphate of Potash over the next decade resulting in an annualised increase from 6 to 8 million tonnes of production.

Potassium Sulphate is geologically scarce with only one green-field project that has completed a Definitive Feasibility Study, and three are at Preliminary Feasibility Study stage.

CHART TWO: RED LINE IS SOP AND GREY IS MOP SELLING PRICE FOR NORTH AMERICAN MARKETS

Potassium Sulphate "SOP" has held a historic premium over Potassium Chloride "MOP" that has averaged around 35% but currently attracts a premium of 80%

CHART THREE: SOP PRICE DIFFERENTIAL OVER MOP ON A TIMELINE

The price differential between SOP and MOP reflects lack of new supply of SOP with price differential increasing since 2012. MOP supply has grown considerably over the same timeline.



Major suppliers of SOP include Compass Minerals in Utah USA, SOM in Salar de Atacama, Chile, Xinjiang Luobupo in Lop Nor, China, and several smaller producers located within the European Union.

CATALYSTS FOR SOUTH BOULDER VALUATION GROWTH

- Bankable Feasibility Study underway with completion set for end of Q2, 2015
- Maiden reserve estimate completed in Q2, 2015
- Social Environmental Impact Assessment completed Q3, 2015
- Mining License Application filed and issued Q4, 2015
- Funding application commenced in Q1, 2016 and completed in Q3, 2016
- Detailed engineering studies commenced in Q2, 2016 and completed in Q4, 2016
- Phase One construction commenced in Q4, 2016
- Production forecast for 2018

ANALYSIS AND VALUATION

South Boulder Mines carries a current market capitalization of \$35.0 million that includes cash of \$9.0 million for an Enterprise Valuation for its 50% interest in Colluli Potash Project of \$26.0 million.

SOP Peer Group Listed Companies include:

- Potash Ridge (CND:PRK) U.S. developer has completed Preliminary Feasibility Study for surface mining at Blawn Mountain, Utah with an output of 645,000 tonnes per annum of SOP. Measured and Indicated Resources of 26.4 million tonnes of SOP for an Enterprise Value of \$0.30 per tonne of resources.
- IC Potash (CDN: ICP) U.S. developer has completed Definitive Feasibility Study for an underground mine at Ochoa, New Mexico with an output of 650,000 tonnes per annum of SOP. Measured and Indicated Resources of 22.6 million tonnes of SOP for an Enterprise Value of \$1.81 per tonne of resources with partial funding and partial off-take agreement in place.
- EPM Mining Ventures (CDN: EPK) U.S. developer has completed a Preliminary Feasibility Study at Sevier Playa, Utah for a brine based resource with an output of 300,000 tonnes per annum of SOP. Measured and Indicated Resources of 31.5 million tonnes of SOP for an Enterprise Value of \$0.51 per tonne of resources.
- Reward Minerals (ASX: RWD) Australian developer is completing a Scoping Study at Lake Disappointment Western Australia for a brine based resource with an output of 400,000 tonnes per annum of SOP. Measured and Indicated Resources of 24.0 million tonnes of SOP for an Enterprise Value of \$1.54 per tonne of resources.

South Boulder has completed a Preliminary Feasibility Study based on production of 425,000 to 850,000 tonnes per annum of SOP, for its 50% Project equity in a Measured and Indicated Resource of 260 million tonnes of SOP (estimated on a 100% recovery basis).

This equates to an Enterprise Valuation for South Boulder of just \$0.20 per tonne for 130 million tonnes of SOP resources.

This compares to an average SOP Peer Group Enterprise Valuation of \$0.88 per tonne of SOP resources. No value is



currently attributed to other by-products.

South Boulder stands out as the 50% owner of the largest and longest life resource and low operating costs within its peer group. Our valuation adopts the average Enterprise Valuation within its peer group as a base to arrive at "market based" valuation of Colluli.

Proactive Investors then applies a discount for development risk including capital expenditure risk and discounting for sovereign risk for an implied Enterprise Valuation and share price target of \$0.40 to \$0.45 per share (on an undiluted basis). We forecast that rising demand and increasing prices for SOP will drive development of Colluli.

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