Kalia – The key to unlocking and exploring Bougainville’s world class gold and copper potential
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Exploration by Other Explorers

- This presentation contains information sourced from the reports of Other Explorers. References to the original reports are provided as footnotes where the information is cited in this presentation. The Other Explorers reports cited include: the Geological Survey of Papua New Guinea. and The Federal Institute for Geosciences, Federal Republic of Germany Kalia does not vouch for the accuracy of these reports. Kalia has taken the decision to include this information as we assess it to be of relevance to shareholders and investors.

Competent Person Statement

- The information in this presentation that relates to Exploration Results is based on information reviewed by Mr Peter Batten who is a member of the Australasian Institute of Mining and Metallurgy (AusIMM) and is a consultant to Kalia Mr Batten has sufficient experience which is relevant to the style of mineralisation and type of deposits under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 edition of the ‘Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves’. Mr Batten consents to the inclusion of the information in the form and context in which it appears.
Kalia’s proposition

• Panguna is an indicator of potential
• First mover advantage
• Limited data has already identified targets
• Potential to identify more targets
• Rapid deployment onto identified targets
• Emerging country supportive of investment
• Kalia is gateway for other opportunities
Bougainville Geopolitical Overview

- Bougainville is located at the northern end of the Solomon Islands Chain:
  - Area: 9300 km².
  - 120km long and average between 65 - 95km wide.
- Under German Administration in 1898 and mandated to Australia in 1920.
- Under Japanese occupation: 1942-1944 and returned to Australian administration post World War II.
- Papua New Guinea granted independence in 1975 with Bougainville designated a Province.
- Government headquartered in Buka.
- Huge mining potential and for the development of a range of sustainable activities such as farming, fishing and tourism.
Bougainville – in the “Ring of Fire” deposit chain

- **Frieda River** 1,347 Mt @ 0.37% Cu - 0.55g/t Au
- **OK Tedi** 632 Mt @ 0.92% Cu - 0.86g/t Au
- **Mt Kare** 25.5 Mt @ 2.2g/t Au
- **Panguna** 1,838 Mt @ 0.30% Cu, 0.34g/t Au

- **Porgera** 198 Mt @ 4.8g/t Au
- **Ramu** 143 Mt @ 1.0% Ni - 0.1% Co
- **Wafi** 72 Mt @ 2.7g/t Au
- **Kainantui** 3.1 Mt @ 20.3g/t Au
- **Hidden Valley** 32.3 Mt @ 3.28g/t Au - 54.2g/t Ag
- **Tolukuma** 2 Mt @ 20.3g/t Au
- **Kodu** 203 Mt @ 0.28% Cu - 0.32g/t Au
- **Metawerei Au**
- **New Hanover Au**
- **Simberi** 45 Mt @ 1.1g/t Au
- **Lihir** 552 Mt @ 2.6g/t Au
- **Siniurt Au mining**
- **Fergusson Is Au mining**
- **Woodlark Is** 18.1 Mt @ 1.7g/t Au
- **Misima** 134 Mt @ 1.3g/t Au

*The resource estimate for Panguna is taken from the Bougainville Copper Limited website and is reported by BCL as compliant with the JORC 2012 guidelines. All other figures in this diagram are from public sources.*
Bougainville Mining History

- Bougainville is one of the last undeveloped mineralised regions in the world that retains the potential for world-class deposits.
- Mineralised areas hosted in highly prospective epithermal, porphyry and massive volcanic sulphides.
- 9,300 km² of target rich geology within the Pacific Rim of Fire, a zone already host to some of the world’s largest mines.
- History of mining with Gold & Copper mined since German colonial administration.
- Alluvial gold mined continuously for more than 100 years.
- Historically, only one large scale mine – Panguna (separate slide).
- Unrest and war against Papua New Guinea started at Panguna with issues around share of wealth generated, environmental issues and political aspirations.
- Panguna was, at its inception the largest copper mine in the world.
Panguna - indicator of potential?

• Panguna operated for 17 years from 1972 to 1989.
• Production ceased due to civil unrest (addressed next slide).
• At closure the pit was 400m deep with ~90 Mtpa of ore and waste being mined.
• Mill throughput was ~48 Mtpa with a grade 0.41 % copper ("Cu") and 0.41 grams per tonne gold ("g/t A u"), producing around 550,000 tonnes per annum ("tpa") of concentrate grading 30% Cu and 25g/t Au containing around 170,000 tonnes ("t") of copper and 450,000 ounces ("ozs") of gold.
• Annual production value in 11 October 2017 terms:
  • Copper LME Dec 3 US$6,639/t = 1,128,630,000
  • Gold US$1,286/ozs = 578,700,000
  • **Total notional final year Revenue US$** = 1,707,330,000
• Very little exploration after discovery and development of Panguna, in its time the biggest and richest mine in the world
Current Mining environment

• Unrest continued to Peace Agreement of 2001 after which it ceased.
• Peace Agreement provides, et al, for:
  • Definition of Autonomous Region of Bougainville (“AROB”)
  • Governance of AROB by the Autonomous Government of Bougainville (“ABG”)
  • Referendum on independence from PNG whereby a vote for independence would be subject to AROB disarming, establishing governance processes and having fiscal independence.
  • Referendum scheduled for June 2019.
  • Powers of ABG to manage various aspects of AROB, including Mining
• ABG promulgated new Mining Act in 2015 and lifted moratorium on mining for specific areas in 2016 with the aim of addressing the fiscal pillar required for independence.
• New Mining Act recognises indigenous landowners and adopts the core principle: ‘landowners own their traditional land and the minerals beneath them’.
• Landowners support mining with ‘appropriate partner’,
• The experience during Mining Warden’s Hearings clearly demonstrated popular support for mining in the areas where Kalia has applied for exploration licences.
Regional Geological Setting

- Bougainville and the Solomon chain rise from a submarine ridge bounded on both sides by deep sea trenches.
- Three successive cycles of volcanic activity created the Solomon Island Ridge resulting in repeated accumulations of volcanic rocks from 45 million years ago and until the present day.
- The rocks are a mixture of lavas, volcanic breccias and volcanic sediments.
- Coarser grained intrusive granodiorites and diorites within the volcanic sequences represent the magma cores. These host the copper and gold mineralization on Bougainville. (Davies, 1992)
- Copper mineralization at Panguna was identified in 1961 by Clark as porphyry in style. Additional porphyry coppers and epithermal mineralization were identified by Dr Rogerson (1989) throughout the island of Bougainville.
- Whilst in operation, Panguna was the largest porphyry copper mine in the world. The remaining resources are still amongst the world’s largest.
- Copper and gold mineralisation at Ok Tedi, Frieda River and Wafi are of similar style.
Mount Tore Region

- Approximately 1,700 km$^2$ is subject to the exploration permits in the JV with Toremana Resources Ltd.
- The geology of the Tinputz region is dominated by andesites, diorites and granodiorites, similar to the Crown Prince Range and Panguna.
- Four intrusive granodiorites have been identified in the area of the Emperor Range. With the limited data available (dark red on map).
- The Upper Ramazon is a 20+ km long zone of anomalous Au, Cu and Hg, as defined from stream sediment sampling (Rogerson, 1989).
- In the Uruai River area (Puspa in the report) sampling produced rocks with porphyry style mineralisation, the report lists anomalous copper and gold results with coordinate locations (Rogerson, 1989 and Tsiperau, 2012).
- Rogerson set further targets for Cu and Au within porphyry mineralization in the Rarie/Puspa region.
- Rogerson also sampled epithermal veining in the Rarie/Puspa area and based on simple field observations and gold analysis highlighted the potential for higher grade epithermal vein style deposits in the region this was supported by airborne geophysics but without any drilling.
On June 19, 2017 Kalia Investment Limited and Toremana Resources Limited submitted applications for two Exploration Licences to the Department of Mineral and Energy Resources, Autonomous Region of Bougainville.

The two applications, Area East and Area West, cover a combined area of 1,704 km², being 865.3 km² & 838.6 km² respectively.

Kalia/Toremana’s applications were the only applications received for the North Bougainville, Mt Tore district.

The DMER accepted the applications and processing of those applications nears completion having successfully completed all requirements under the Mining Act and Regulations 2015, including Chief Mining Warden Hearings in the region.
The targets devised by Rogerson in his 1989 report highlight the prospectivity of the Tore region.

With incomplete access and limited geophysics the Rogerson team was able to identify two major styles of mineralization in the Tore region (porphyry copper and epithermal gold).

The Rari’e (Puspa) target was estimated to have the potential to host large deposits in several styles of mineralization.

Outside of this one occurrence the Tore region exhibits numerous targets from topography and geophysical surveys completed in 1986.

The geophysical surveys only covered a portion of the Tore project area and the expectation is that additional anomalies will be produced from a more comprehensive survey.
Recently acquired magnetic data was filtered to highlight possible structural trends in the data.

Circular structures indicate potential intrusive bodies.

Strong regional features suggest mantle tapping structures.

Two coincident circular features bounded by regional structures are apparent in the limited coverage available for processing with the suggestion of other circular features on the edge of the data.
Tore - Geophysical interpretation

- Despite only partial cover the results of the 1986 geophysical survey confirms the prospectivity of the Tore region.
- Using the potassium band in the radiometrics (1) two anomalous highs stand out in the Tore data.
- Overlaying the K anomalies on the Ternary radiometrics, KThU, (2) suggests a diorite/granodiorite association.
- Looking at the magnetics (3) highlights the large circular feature, coincident with the structural and radiometric anomalies and high magnetic anomaly on the circular feature’s west rim. A desirable location similar to the Panguna magnetic features.
- Overlaying deep, mid and shallow magnetics (4) shows the magnetic anomaly is continuous to depth, again suggesting an intrusive association.
• Rogerson’s expedition in 1988/89 took only 860 stream sediment samples for the entire 9,300 km² Bougainville land mass

• The sampling was prioritised to cover targets derived from the 1986 geophysical survey results. Almost all on the east half of Tore except for the strandline magnetite sands on the west coast below the Sarime River. For the Tore region this represents less than 50% coverage

• Rogerson’s results suggest there is potential in the Tore for multiple deposits and up to seven different styles of mineralization, although these seven styles can be broadly grouped into three styles.
  • Porphyry Cu, Au
  • Epithermal quartz veining (including polymetallic veins), and
  • Volcanogenic Massive Sulphides (VMS)

• The standouts from Rogerson’s work are the Puspa (Rari’e) prospect and the Ramazon anomalous zone.
  • The Puspa (Rari’e) results were anomalous for Au, Cu, Zn and Te. The rock types described and the chemical assemblage suggest multiple sources including porphyries and epithermal veining. The zinc suggests VMS or polymetallic veining
  • The Ramazon anomaly is a 20km+ long Au Cu anomaly. The sheer size of the anomaly suggests a large source possibly a porphyry
Tore – Geochemical Modelling

- Work completed for the production of Rogerson’s 1989 report included river float, stream sediment and rock chip sampling.
- The raw data for these samples was acquired by Kalia and some preliminary modelling was undertaken to determine the usefulness of the sampling in defining targets for the Tore project area.
- Despite the sparse nature of the sampling a number of interesting areas resulted from this preliminary work.
- The gold anomalies were in keeping with the geological understanding of the area and confirmed the areas already identified by Kalia/Toremana.
- The copper modelling has highlighted some areas that lay outside the aerial survey area helicopter borne survey and not previously identified in Rogerson’s work.
- This simple, modelling of old data produced enhances the prospectivity of what is already considered a highly prospective project area.
- This work also displays the potential to increase the number of exploration projects through remote work. New geophysical surveys covering the whole of the Tore project area may be very productive.
High definition topographic data is searched for circular features.

These features may represent many situations but in volcanic terrains are indicative of intruded porphyries or collapsed volcanic vents.
Targeting Ideas

• Using algorithms the geophysical data is assessed to identify discrete anomalies for Magnetic highs (sulphide or metal), Potassium highs (alteration from mineralisation) and Topographic lows (sunken rims of volcanic vents).

• The coincident areas of anomalism are then rated for known geology to generate areas of high interest (next slide).
Target zone defined

TARGETING IDEAS using layers presented
[and checked against original RTP etc]
Next 12 Months

• Expand established operating infrastructure in Tinputz (complete January 2018).
• Digitise information and update geology (complete November 2017).
• Complete processing raw 1986 geophysical data (complete September 2017).
• Target sampling, infill stream sediment sampling, soil mapping, wide spaced soil sampling, rock chip sampling. (commence November 2017).
• Extend airborne Geophysics to unexplored but high potential West Area (weather dependent mid 2018).
• Environmental and social mapping studies (commence November 2017) – will be ongoing.
• Assay work commences December 2017 with first samples returned to Australia.
• Landholder and community engagement ongoing.
• 1st Target definition drilling on receiving positive results from samples (Q2 2018).
The Kalia Opportunity

- Bougainville is highly supportive of mining development.
- Kalia has established deep relationships with landowner and government bodies.
- Kalia has established, with its landowner partner, access to multiple high quality targets, initial project sites have been developed from limited historical work and the potential for economic mineralisation reported as early as 1989.
- Indications (geological, geochemical, geophysical and structural) are that there will be major additional discoveries made once systematic, modern exploration is undertaken.
- Significant potential to identify additional targets on the West.
- Possibility of developing higher grade resources / lower capital for early production and cash flow.
- Potential to develop large scale world class mining operations.
- Team with proven track record of exploitation and development of resources.


Report No. 3, Interpretation of Aerogeophysical data and followup Aerogeophysical anomalies on the island of Bougainville, Papua New Guinea, text volume and Appendix I. Dr. D. Bering, Prof. Dr. W. Bosum, Dr. K. Busch, F. Plattetschlager, Dr. D. Rammlmair, Dr. R. Robling, B. Stroheker, R. Sumaiang, 1990.


