

## Mining in Papua New Guinea

### Nickel & Cobalt

Highlands Pacific Limited is a Papua New Guinea (PNG) based nickel exploration company and owns the **Ramu** Nickel Project in Papua New Guinea. Ramu is a large "wet tropical" laterite nickel/cobalt project located in the Madang Province of PNG. The project is fully permitted. The resource at Ramu is estimated at 143 million tonnes at 1.01% nickel and 0.10% cobalt which gives a mine life in excess of 20 years based on forecast annual production of 33,000 tonnes of contained nickel per annum.

The Ramu project is premised on mining and beneficiating the nickel and cobalt ore at Kurumbukari which is located in the foothills of the Bismark Ranges approximately 75km south west of the provincial capital of Madang. The upgraded ore will be pumped, as a slurry, through a 134km pipeline to a refinery located at Basamuk Bay on the Rai Coast. At the refinery, the slurried ore will be processed to produce high-grade nickel and cobalt metal or alternatively a high-grade nickel intermediate product for the world market. The project is fully permitted, having received all the permits and approvals required from the different levels of government.

The current joint venture participants are Highlands Pacific 68.5% and Orogen Minerals Ramu Limited (OMR) a subsidiary of Oil Search Limited (OSH) 31.5%. OMR has entered into an Agreement with Mineral Resources Development Company (MRDC) whereby MRDC will purchase OMR's equity in Ramu. MRDC is a company owned by the government of Papua New Guinea. OSH acquired OMR and the interest in the Ramu project as a result of the merger with Orogen Minerals Limited by way of a Scheme of Arrangement during the 2002 year.

In March 2005 Master Agreement for the development of the Ramu nickel/cobalt project was signed by China Metallurgical Construction (Group) Corporation (MCC), Ramu Nickel Limited (a subsidiary of Highlands Pacific) and Mineral Resources Ramu Limited (a subsidiary of Mineral Resources Development Company).

### Copper

All the mining activity that has taken place in the country since 1970 has produced approximately 5 Mt of copper. The country produced 202,277 t of copper in 2003 compared to 211,315 in 2002. All of which was produced by the Ok Tedi Mine. The mine reported that 29.32 Mt of ore was mined (approximately 240,000 t/d material moved) and 29.26 Mt milled (77,000 t/d) with a head grade of 0.78% Cu and 0.8 g/t Au. Respective gold and copper recoveries for 2003 at Ok Tedi were 68% and 84%.

The **Ok Tedi** Mine is situated at Mount Fubilan in the Star Mountains in western PNG, close to the Indonesian border. OK Tedi Mining Ltd. (OTML) is owned by BHP Billiton (52%), Inmet Mining Corp. (18%) and the PNG government (30%). OTML has been at the focus of several tailings pollution claims and as a result, BHP Billiton has reviewed its position in OTML and is to withdraw from the project. Inmet and the PNG Government are to retain their respective interests in Ok Tedi, with BHP Billiton's interest being transferred into a trust. Of the government's 30%, 2.5% is allocated to mine landowners. OTML is one of PNG's largest export earners, contributing 20% to PNG's exports. Ore resources are estimated at 344 Mt grading at 0.88% copper and 0.92 g/t gold.

Bougainville Copper Limited (BCL) has developed the **Panguna** mine that has limited work carried out on it due to civil unrest in the province. Rio Tinto is a major shareholder of the BCL (54%) and intends disposing of its stake in the company. The deposit has a life of mine of some 20 years and has a capacity to produce 180 000t of copper and 480 000 oz gold per year. This development marked one of the first major investments in PNG, and was at one stage one of the world's largest copper - gold mines.

### Gold

PNG has ranked as the 11th gold producer in the world over the past few years with almost all of the exploration carried on within the country being for gold and copper. All the mining activity that has been undertaken since 1970 has produced approximately 1100 t of gold, producing 68.1 t of gold in 2003 compared to 63.1 t in 2002.

Papua New Guinea's largest gold producer, the **Porgera** mine, is situated in the Enga Province in the highlands of PNG. The Porgera Joint Venture comprising Placer Dome (75%), DRDGGold Ltd (20%) and the remainder is split between the Porgera landowners and the Enga provincial government. In

2003 13.94 Mt of ore was mined from underground and open-pit operations. Approximately 5.66 Mt of ore averaging 5.34 g/t Au was milled, with an average recovery of 87.5%. During 2003, the mine produced 851,920 oz of gold at an average cash operating cost of US\$256/oz and a total cost of US\$301/oz. Total proven and probable mineral reserves at the end of 2003 were 48.85 Mt, averaging 3.4 g/t Au, equating to 5.4 Moz of contained gold. This gives a projected operational life of nine years.

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The **Lihir** Mine was commissioned in 1997 and has an expected life of 37 years, with the intial 15 years based on the high grade open pit operation, with the remaining 22 on working low grade stockpiles. Gold production for 2003 was 17,131 kg compared to 18,761 kg in 2002. A 6 MW geothermal power station was commis- sioned during the year. A 30 MW geothermal power station is expected to be operational by mid-2005. At the end of 2003, measured, indicated and inferred mineral resources, inclusive of ore reserves, were 442.5 Mt, at 3.14 g/t Au, for 44.7 Moz of contained gold.

Placer Dome also a major interest (80%) in the **Misima** Mine, located on Misima Island in the Milne Bay Province, eastern PNG. Similar to that of Lihir, Misima has a high grade open pit operation, which is to be followed by the processing of low grade stockpiled material. During 2003, Misima treated 5.59 Mt of stockpiled low-grade ore averaging 0.74 g/t Au and 7.5 g/t Ag. Misima mine has closed down, and decommissioning and rehabilitation are under way.

The **Tolukuma** Mine is situated in the remote Central Province in the Owen Stanley Mountains and is owned and operated by DRDGGold Ltd of South Africa. Tolukuma is a high grade – low tonnage mine with plans to increase production to over 120 000 oz each following a resource upgrade. However, the operation has also been dogged with environmental problems, with a minor cyanide spill from one of its helicopter deliveries. In 2003 production totalled 81,074 oz (2,522 kg) of gold and 177,246 oz (5,513 kg) of silver, at a cost of S\$279/oz Au.

Highlands Pacific, also active in developing the nearby **Ramu** lateritic Ni-Co deposit are also embarking on a feasibility study over the high grade Kainantu gold project in PNG. Initial estimates have calculated a resource of 807 000t grading at 28 g/t gold. The PNG awarded Highlands Pacific a Mining Lease and construction that could start as soon as late 2002.

Although PNG has numerous copper and gold projects that are undergoing feasibility studies, future mine developments will have to take a more integrated approach in addressing the social and environmental impact of mining in PNG.

Furthermore: **Kainantu (geplant), Mount Kare (geplant), Simberi (geplant)**.

## Silver

### **Tantalum, Niobium and Rare Earth Mining**

(Quelle: Mbendi Information Services; <http://www.mbendi.com/index.htm>; 26.10.2010)