Review of Nickel-Cobalt Laterites in Papua New Guinea

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ABSTRACT

While nickel-cobalt laterites have been documented in Papua New Guinea (PNG) since the 1950s, they have only been commercially developed in the last 10 years. At least fifteen nickel-cobalt laterites have been documented dotted along the mountain spine of PNG from a prospect in the Oenake Mountains on the western border to Sewa Bay, Normanby Island in east. Currently the only deposit in production is the Ramu (Kurumbukari) deposit. In 2017, Ramu produced 34,666 tonnes of Ni and 3,308 tonnes of Co, which represents some 5% of the cobalt production outside the Democratic Republic of the Congo.

All the Ni-Co laterites in PNG appear to be oxide type deposits, with the mineralisation dominated by Ni and Co in Fe and or Mn oxides in yellow limonite and slightly nickel enriched saprolite. Deposit resources range in size from +150 million tonnes to less than 10 million tonnes for laterites developed over smaller ultramafic blocks. Grades range from 0.7 to 1.1% Ni and are independent of deposit size.

The three largest deposits are developed over ultramafics rocks of the Marum Ophiolote Complex (Kurumbukari) and the Papuan Ophiolite Complex (Wowo Gap and Mambare). Smaller deposits are reported over dismembered blocks of the April River Ophiolite.

The laterites are all developed over peridotites, dominantly dunite, with lesser amounts of harzbergite and lherzolite. The host peridotites are locally serpentinized at some prospects though this does not appear to affect the grade or thickness of the overlying laterite.

Nickeliferous laterite soils occur over most occurrences of ultramafic rocks in PNG but commercially important thicknesses are largely restricted to areas of subdued topographic relief (plateaus or benches) where erosion has been limited. Karst features such as lapiés, blind valleys and alvars are common in these plateaus.