

PAPUA NEW GUINEA – KILI TEKE

EXTRACT FROM MINERAL RESOURCES AND MINERAL RESERVES 2017



Exploration drilling at Kili Teke

KILI TEKE

Location

Kili Teke is located on EL2310, some 50km north-northwest of the Tari Township (which is the provincial capital of the Hela Province in the Highlands of Papua New Guinea) and approximately 40km west-northwest of Porgera. The nearest road access point, which connects through to the Highlands Highway at Tari is approximately 14km from the Kili Teke prospect.

History

Outcropping mineralised breccia and copper gold skarn mineralisation at Kili Teke was initially identified in historic reconnaissance work undertaken in the early 1990s. Following a review of previous exploration results in the district, an exploration licence application over the area containing the Kili Teke resource was lodged by Harmony Gold Exploration (Papua New Guinea) Limited (Harmony Gold Exploration) in October 2013. EL2310 was subsequently granted in May 2014, and field work programmes by Harmony defined a broad (kilometre scale), high-tenor copper-gold anomaly at Kili Teke, indicative of the zonal geochemical distribution and alteration footprint associated with a major mineralised porphyry copper-gold system. Initial drilling began in November 2014 with significant results first returned in hole 7 of the drill programme:

KTDD007: 422m @ 0.55% Cu, 0.43 g/t Au, from 131m

Which included: 202m @ 0.74% Cu, 0.57g/t Au, from 137m

Nature of operation

Kili Teke is at an advanced exploration stage and activities are dominated by resource definition and exploration drilling. Pre-concept scoping studies help inform drill planning.

Legal aspects and tenure

The Kili Teke deposit is located on exploration licence EL2310 which is 100% owned by Harmony Gold Exploration. The tenement spans 252km² and is current until 23 May 2018.

The Papua New Guinea government issues and administers mining tenements under the Mining Act 1992, through the offices of the Mineral Resources Authority. Exploration licences are issued for a term not exceeding two years, and are renewable for further two-year terms subject to compliance with expenditure and other conditions. Each licence contains a condition conferring on the Papua New Guinea government the right to make a single purchase up to 30% equitable interest in any mineral discovery under the licence at a price pro rata to the accumulated exploration expenditure.

As at 31/8/2017, all licence conditions and expenditure commitments for EL2310 have been fulfilled, and the tenement is in good standing.

Geology

The Kili Teke deposit comprises porphyry style copper-gold mineralization hosted in a multiphase calc-alkaline dioritic to monzonitic intrusive complex. Host rocks comprise interbedded siliciclastics and limestone of the Papuan Fold Belt. Uranium-lead zircon age dating highlights Pliocene age dates in the range of 3.5 ± 0.04 Ma (million years) to 3.59 ± 0.07 Ma for emplacement of the mineralised porphyry phases. Late-mineral porphyry phases have been identified in the drilling and impact grade continuity within the deposit, where they intrude and stope out the earlier more mineralised phases. Overall the geometry of the deposit reflects a relatively steeply plunging, pipe like body, with mineralisation decreasing away from the central high grade stockwork zones of copper-gold mineralisation. Intense marbleisation and copper-gold skarn mineralisation is developed around the peripheral contact with the host sequence, and variably developed skarn mineralisation also occurs along internal structural and contact zones within the complex.

Mining methods and mine planning

Kili Teke is at the concept study level of work. This work has confirmed technically-viable solutions exist for mining, processing, infrastructure and logistics at Kili Teke, and no fatal flaws were identified.

Mining options consider open pit and bulk underground mining options with open pit the preferred option to take to further studies. This contemplated standard open pit mining with shovels and trucks. Waste dump locations have been preliminary identified as has terrestrial tailings storage facility locations.

Mineral processing

First pass rougher kinetic test work for metallurgical recovery shows that copper recovers extremely well (90%) and gold recovers well (65%) through standard copper flotation process. An option for smelting was considered by high capital cost has precluded this process with a copper concentrate product the most likely option to consider in further studies

Further deposit concept and study work is planned for FY18 in conjunction with the drill programme.

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Mineral resource estimation

The current resource for Kili Teke has been generated from over 22,000m of drilling, along with detailed surface mapping, sampling and airborne geophysical survey data. Estimation has been constrained by a 0.125% copper shell, which represents the approximate natural break to mineralisation from the surrounding host sequence and unmineralised intrusive phases.

The modelling process used is similar to the previous (November 2015) model, with estimation by ordinary kriging of 4m composites utilising a three-pass search ellipse into a regular block model comprising 60m x 60m x 60m parent blocks and 20m x 20m x 20m sub-blocks. An inferred resource has been reported from the resulting resource model and is based on a 0.2% Cu cut-off along with sample support criteria. The resource estimate is constrained approximately 650m below surface at the 780mRL, although mineralisation remains open at depth.

Environmental impact

The projects are in exploration and feasibility study stage and as such have only minor environmental impacts. The environment aspect are regulated by CEPA (Conversational and Environmental Protection Agency) and Kili Teki reports regularly to this agency.

Exploration

The Kili Teke deposit remains open to the southeast and at depth down plunge. Study work, together with data consolidation and update modelling, is underway to inform the FY18 drill program. Key targets will include

- Zones of skarn mineralisation within and around the main intrusive complex. Skarn mineralisation has not yet been included in the model. These have potential to develop into high-grade massive sulphide lodes which could be selectively mined provided grade continuity and size (tonnage) can be established. KTDD025 for example intersected: 7.8m @ 12.98% Cu, 11.45 g/t Au from 920.5m
- The deposit remains open at depth where trends in the copper-sulphur ratios suggest higher-grade (bornite) stockwork mineralisation may be developed
- The deposit remains open to the southeast under cover of the limestone cap. Further drilling to scope out the full extent of the intrusive complex is planned
- Additional intrusive centres with mineralisation outside of the current resource area; potentially driving marbleisation intersected at the Gold Ridge Anomaly or the intense alteration and accompanying sulphides evident at the Transfer Zone Porphyry target

Competent person	
Resource	
Group Resource Geologist Harmony SE Asia, Ronald Reid <i>Australian Institute of Geoscientists (AIG)</i>	+10 years' experience

KILI TEKE

Gold – Mineral resources

	Measured resources				Indicated resources				Inferred resources				Total mineral resources			
	Tonnes		Gold		Tonnes		Gold		Tonnes		Gold		Tonnes		Gold	
	(Mt)	(g/t)	(000kg)	(000oz)	(Mt)	(g/t)	(000kg)	(000oz)	(Mt)	(g/t)	(000kg)	(000oz)	(Mt)	(g/t)	(000kg)	(000oz)
Kili Teke	–	–	–	–	–	–	–	–	237.0	0.24	56	1 810	237.0	0.24	56	1 810

Copper – Mineral resources

	Measured resources				Indicated resources				Inferred resources				Total mineral resources			
	Tonnes		Cu		Tonnes		Cu		Tonnes		Cu		Tonnes		Cu	
	(Mt)	%	(Mkg)	(Mlb)	(Mt)	%	(Mkg)	(Mlb)	(Mt)	%	(Mkg)	(Mlb)	(Mt)	%	(Mkg)	(Mlb)
Kili Teke	–	–	–	–	–	–	–	–	237.0	0.34	802	1 767	237.0	0.34	802	1 767

Molybdenum – Mineral resources

	Measured resources				Indicated resources				Inferred resources				Total mineral resources			
	Tonnes		Mo		Tonnes		Mo		Tonnes		Mo		Tonnes		Mo	
	(Mt)	(ppm)	(Mkg)	(Mlb)	(Mt)	(ppm)	(Mkg)	(Mlb)	(Mt)	(ppm)	(Mkg)	(Mlb)	(Mt)	(ppm)	(Mkg)	(Mlb)
Kili Teke	–	–	–	–	–	–	–	–	237.0	168	40	88	237.0	168	40	88

Copper – Mineral resources as gold equivalents

	Measured	Indicated	Inferred	Total
	(000oz)	(000oz)	(000oz)	(000oz)
Kili Teke	–	–	4 416	4 416

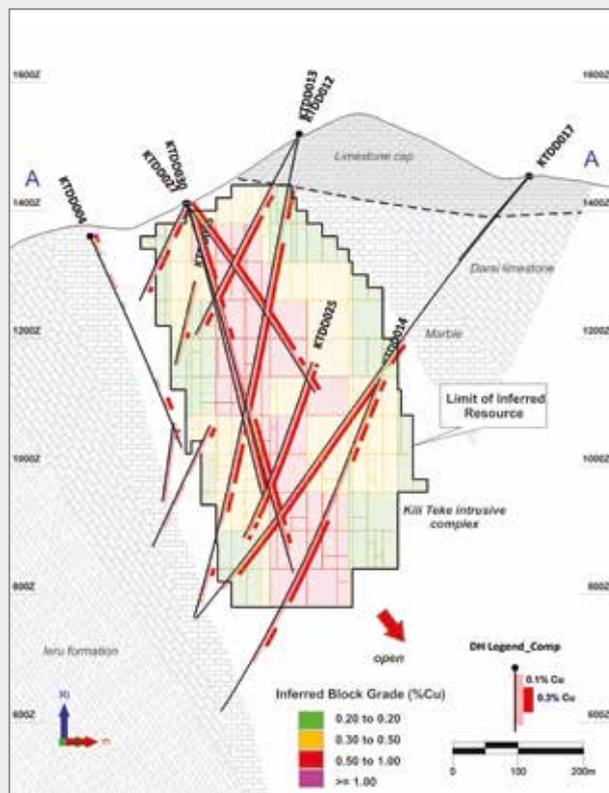
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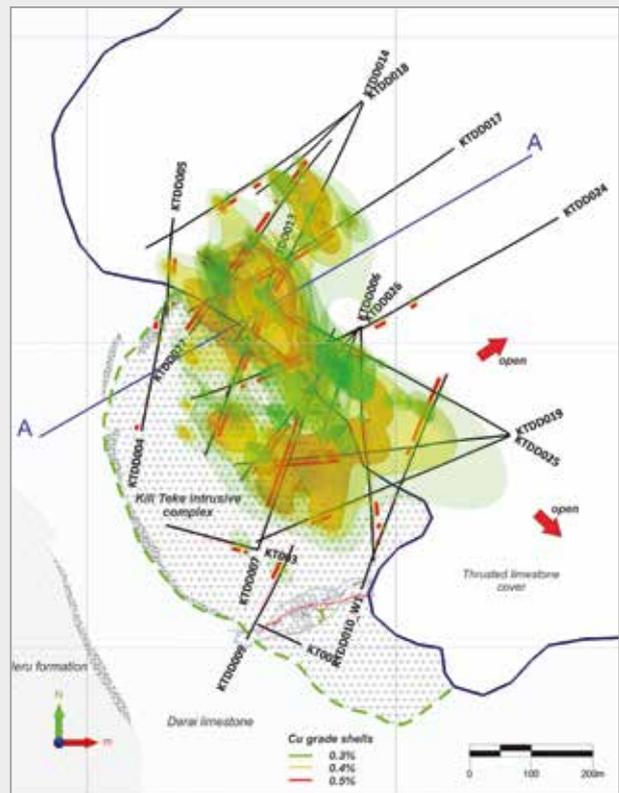
Kili Teke deposit

Overall the geometry of the deposit remains as a relatively steeply plunging, pipe-like intrusive complex, with mineralisation decreasing away from the central high-grade stockwork zones of copper gold mineralisation. Intense marbleisation and skarn mineralisation is developed around the peripheral contact with the host sequence. Variably developed skarn mineralisation also occurs along internal structural and contact zones. See diagrams below.

Block model slice with schematic geology



Geological interpretation showing drill hole locations and copper grade shells



Exploration drilling at Wau