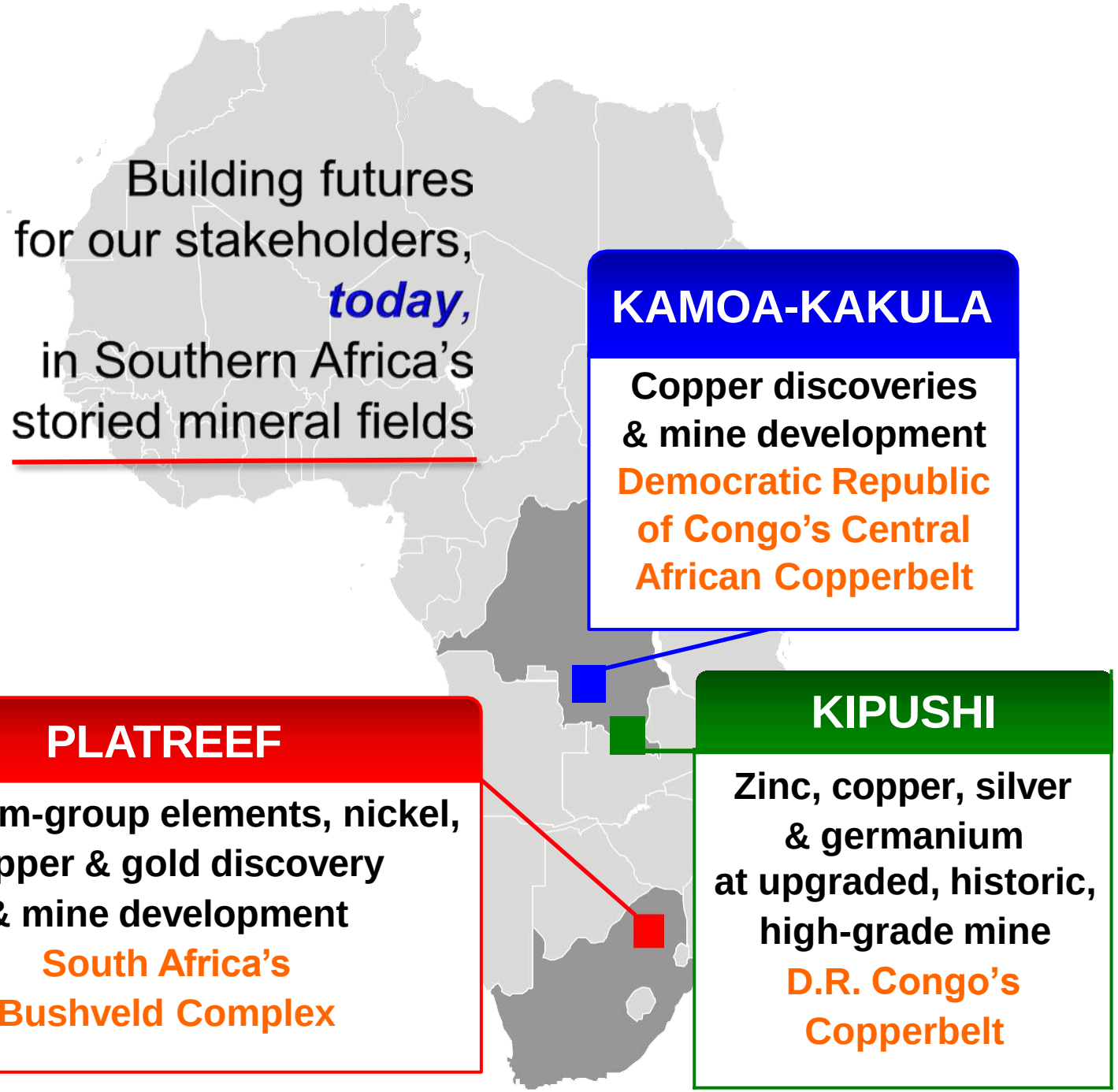
IVANHOE MINES
NEW HORIZONS

PROGRESS GALLERY

Advancing our projects

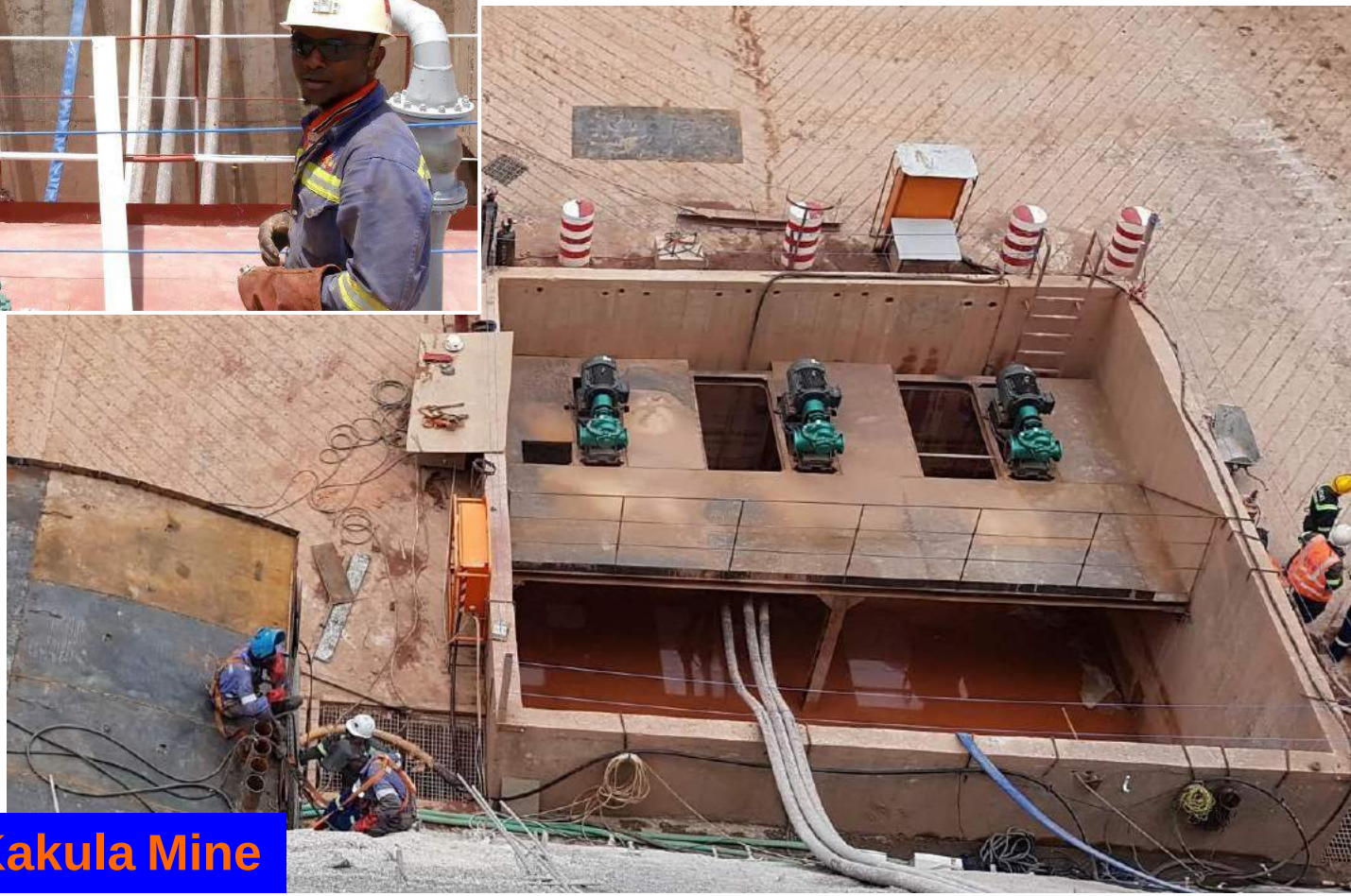
March 2018

Ayakha Mbongonya, Geotechnical Engineer, in Shaft 1 of the Platreef platinum-palladium-nickel-copper-gold project in South Africa. Shaft-sinking operations have reached 700 metres below surface, now less than 80 metres above the top of the Flatreef orebody.


Building futures
for our stakeholders,
today,
in Southern Africa's
storied mineral fields
KAMOA-KAKULA
Copper discoveries
& mine development
Democratic Republic
of Congo's Central
African Copperbelt
KIPUSHI
Zinc, copper, silver
& germanium
at upgraded, historic,
high-grade mine
D.R. Congo's
Copperbelt
PLATREEF
Platinum-group elements, nickel,
copper & gold discovery
& mine development
South Africa's
Bushveld Complex

Kamoa-Kakula, DRC – Kakula Mine

Excavated rock being hauled out of the services decline at the planned Kakula Mine. Underground development work on the twin declines is progressing ahead of plan. Both declines have been advanced more than 300 metres toward the high-grade copper deposit.



Kamoa-Kakula – Kakula Mine

Water sump being completed at the bottom of the Kakula box cut by construction team members.

Kamoa-Kakula – Kakula Mine

Members of JMMC, a DRC subsidiary of JCHX Mining Management of Beijing, China, at the Kakula box cut where decline development work is well underway to provide access to what will be a highly-mechanized, underground copper mine.

Kamoa-Kakula – Kakula Mine

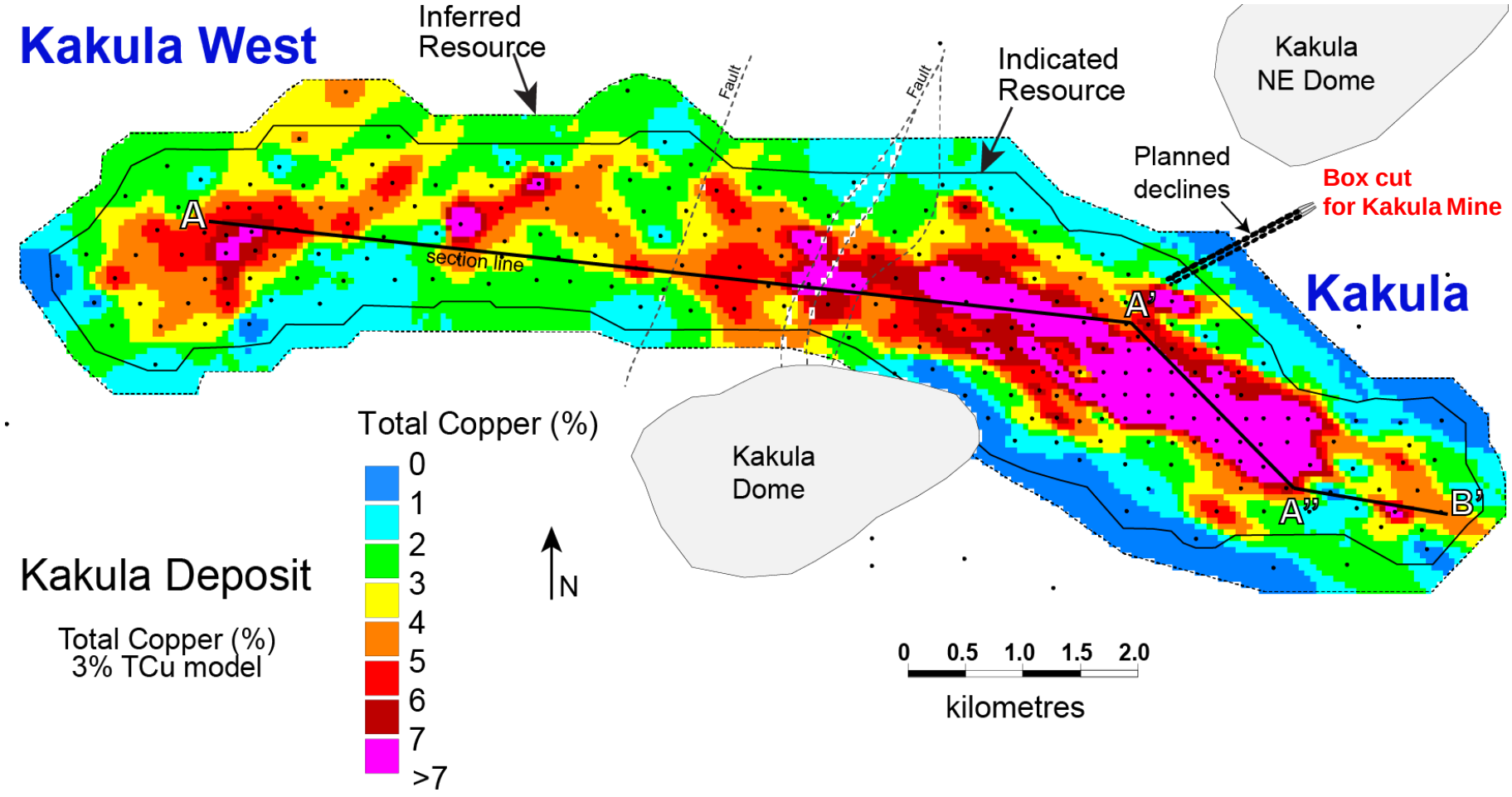
Delivery of a new jumbo drill rig to be used to expedite underground development work at the Kakula Deposit. Initial mine development is planned to begin at the deposit in a flat, near-surface zone along the deposit's axis that is between 7.1 and 11.7 metres thick, at a 3% cut-off, with copper grades of between 8.11% and 10.35%.

Kamoa-Kakula – Kakula Mine

Drilling a cover hole at Kakula to analyze underground conditions for safe mine development.

Kamoa-Kakula

Exploration by two of 13 rigs at the Kakula Discovery. More than 25,000 metres have been drilled since the beginning of this year, part of a program that has totalled more than 181,500 metres at Kakula during almost the past two years. Ivanhoe expects significant expansions and upgrades to the current resources with ongoing in-fill and step-out drilling.



Kamoa-Kakula – Kakula Mine

Kakula discovery area showing grades of the February 2018 Indicated and Inferred Mineral Resource blocks. Kakula's Indicated Mineral Resources increased by 50% and now total 174 million tonnes at 5.62% copper, at a 3% cut-off grade.

Indicated Mineral Resources, Kamoa-Kakula Project, February 2018.

Category	Cut-off Grade (Cu%)	Tonnes (millions)	Area (Sq. km)	Copper Grade	Contained Copper (kTonnes)	Contained Copper (billion lbs)
Indicated	3.0	396	33.2	4.79%	19,000	41.8
Indicated	2.5	535	44.0	4.25%	22,800	50.2
Indicated	2.0	780	53.8	3.63%	28,300	62.4
Indicated	1.5	1030	62.8	3.17%	32,500	71.7
Indicated	1.0	1340	70.1	2.72%	36,600	80.7

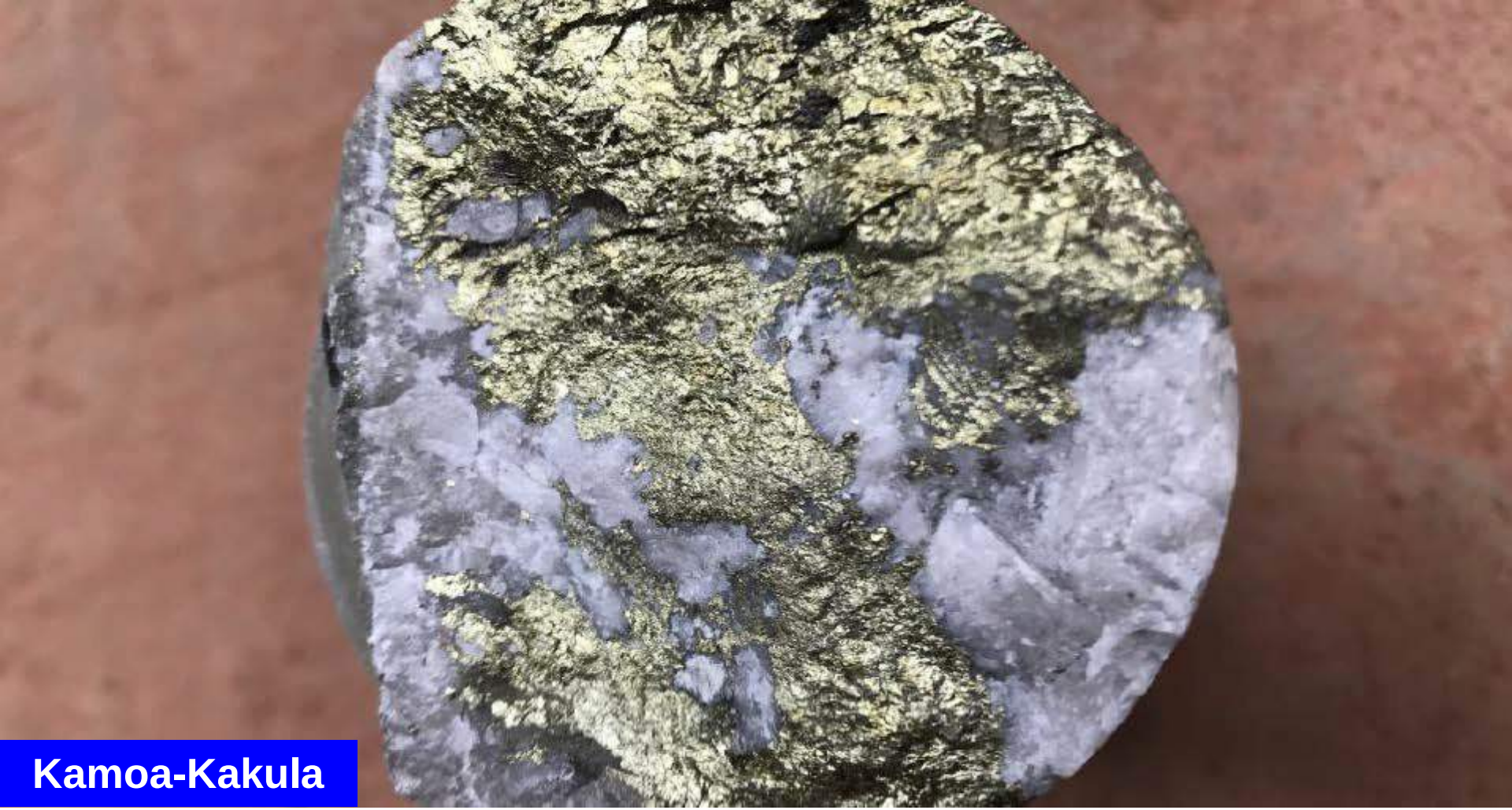
Notes:
Ivanhoe's Mineral Resources Manager, George Gilchrist, Professional Natural Scientist (Pr. Sci. Nat) with the South African Council for Natural Scientific Professions (SACNASP), estimated the Mineral Resources under the supervision of Dr. Harry Parker and Gordon Seibel, both Registered Members of the Society for Mining, Metallurgy and Exploration (SME), who are the Qualified Persons for the Mineral Resource estimate. The effective date of the estimate is February 23, 2018. Mineral Resources are estimated using the 2014 CIM Definition Standards for Mineral Resources and Mineral Reserves. Mineral Resources at Kamoa are inclusive of Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. No Mineral Reserves are currently estimated at Kakula.
Mineral Resources at Kamoa are reported using a total copper (TCu) cut-off grade of 1% TCu and a minimum vertical thickness of 3 m. There are reasonable prospects for eventual economic extraction under assumptions of a copper price of US$3.00/lb; employment of underground mechanized room-and-pillar and drift-and-fill mining methods; and that copper concentrates will be produced and sold to a smelter. Mining costs are assumed to be US$27/t, and concentrator, tailings treatment, and general and administrative costs (G&A) are assumed to be US$17/t. Metallurgical recovery for Kamoa is estimated to average 84%. At a 1% TCu cut-off grade, assumed net smelter returns for 100% of Mineral Resource blocks will cover concentrator, tailings treatment, and G&A costs.
Mineral Resources at Kakula are reported using a TCu cut-off grade of 1% TCu and an approximate minimum thickness of 3 m. There are reasonable prospects for eventual economic extraction under assumptions of a copper price of US$3.00/lb, employment of underground, mechanized, room-and-pillar and drift-and-fill mining methods, and that copper concentrates will be produced and sold to a smelter. Mining costs are assumed to be US$42/t and concentrator, tailings treatment, and G&A costs are assumed to be US$18/t. Metallurgical recovery is assumed to average 85% at the average grade of the Mineral Resource. Ivanhoe is studying reducing mining costs using a controlled convergence room-and-pillar method. At a 1% TCu cut-off grade, assumed net smelter returns for 100% of Mineral Resource blocks will cover concentrator, tailings treatment and G&A costs.
Reported Mineral Resources contain no allowances for hangingwall or footwall contact boundary loss and dilution. No mining recovery has been applied. Tonnage and contained-copper tonnes are reported in metric units, contained-copper pounds are reported in imperial units and grades are reported as percentages. Rounding as required by reporting guidelines may result in apparent summation differences between tonnes, grade and contained metal content.

Kamoa-Kakula – Kakula Mine

Victor Bridgett, Hi-Seis' Quality Control Manager, with a seismic vibrator rig being used to survey the Kamoa-Kakula licence area. The device creates seismic waves to produce reliable and quality images of hard-rock environments to help identify drilling targets to test for potential, new Kakula-like discoveries. Seismic work is being conducted by Hi-Seis, a leading international services company.

Kamoa-Kakula

University interns with members of Kakula's geology team logging high-grade core samples from hole DD1327 recently drilled in the Kakula West area.



Kamoa-Kakula

A core sample showing massive chalcopyrite in carbonate vein recently drilled from hole DD1320 in the Kakula West area.

The combined Kamoa-Kakula Indicated Mineral Resources now **total 1.34 billion tonnes grading 2.72% copper, containing 80.7 billion pounds of copper** at a 1.0% copper cut-off grade and an approximate minimum thickness of 3.0 metres.

PLATREEF: A significant new source of nickel, copper and platinum for the world's electric-car revolution.

Platreef, South Africa

Investors arriving at Shaft 1 on a recent visit to the Platreef Project. The shaft, 7.25 metres in diameter, is expected to reach the Flatreef mineralization at a depth of approximately 780 metres in the third quarter of this year.

View from the top of Shaft 1 of the excavation site for the 29-metre-deep box cut for Platreef's Shaft 2.

Platreef

Site visitors at the top of Shaft 1 viewing excavated rock from shaft-sinking operations being hoisted in a kibble bucket.

Benjamin Sekano (right), Platreef's Mine Manager, with one of the underground survey team members in Shaft 1.

Platreef

Ivano Manini, Platreef's Executive Head of Operations, conducting a pre-shift safety meeting with members of the shaft-sinking team. Platreef's rate of sinking in Shaft 1 has averaged approximately 45 to 50 metres a month.

Platreef

Young residents of Mokopane using the free wi-fi that connects to a local portal – called ***Maru a Mokopane****,* or *'Clouds of Mokopane'* – created by CanPro.

Maru a Mokopane**,** a digital communications system launched in 2017 by Ivanplats, an Ivanhoe Mines subsidiary, was designed for local people living in Mokopane, Limpopo, to learn more about the Platreef Project and provide free access to wireless internet.

Platreef

Some of Ivanhoe's stakeholders – students from the University of South Africa – using the free wi-fi to study and complete school projects at one of the hotspots in the Mokopane area near the Platreef Project. Implemented in June 2017, the digital service now has more than 10,000 users.

Platreef

Local students in a new science lab at Masodi Secondary School, an Ivanhoe-sponsored school, connecting to the ***Maru a Mokopane*** web-based application that may be accessed from all devices with a browser. A total of 300MB of data are available each day for internet access by each user.

Kipushi, DRC

Regular maintenance of one of the Grifo pumps at the pump station at the mine's 1,200-metre level.

Kipushi

Control room operators at Kipushi’s Shaft 5.

Kipushi

Tshinkobo Fwamba, Kipushi's Engineering Superintendent, inspecting electrical panels at the 1,200-metre-level pump station.

Kipushi

New fire-suppression valves being installed on the mine’s system of underground ore conveyors.

Kipushi

Installation of lightning-protection wire completed on a new 6.6-kilovolt overhead power line by contractor, PANACO. The new lines deliver power to pump stations that supply drinking water to residents of the town of Kipushi as part of Ivanhoe's community-support initiatives.

Kipushi

Repair work on Kipushi mine equipment as part of the ongoing upgrading work at the historic, high-grade zinc-copper-silver-germanium mine in the DRC's Copperbelt.

Kipushi

Kenny Mukendi, Mine Superintendent, at the surface of Shaft 5 – the Kipushi Mine's main production shaft that has been upgraded and re-commissioned.
Shaft 5 is eight metres in diameter and 1,240 metres deep.

Kipushi

Arrival at the mine site of the new ore crusher that will be installed underground at the 1,150-metre level this month.

Kipushi

Upgrading of the Shaft 5 rock winder to meet global industry standards and safety criteria.

Kipushi

A Kipushi team member with one of the underground construction vehicles on the mine’s 1,200-metre level.

Kipushi

Attendees at a recent Kipushi Future Forum meeting, where local stakeholders and members of the KICO corporate communications team gathered to discuss the forum’s sustainability and community initiatives, including scholarships, agriculture and literacy projects.