



Platreef's geotechnical engineers inspecting the 29-metre-high walls of Shaft 2's box cut.

Ivanhoe's Platreef Project achieved three significant milestones this month: (1) completion of the box-cut excavation for Shaft 2 down to a depth of 29 metres below surface; (2) reaching the 850-metre level in Shaft 1, where the second mine access level will be developed; and (3) finalization of a long-term wastewater agreement with the local municipality to supply most of the bulk water needed for the mine's first phase of production.

Building what will be
**③ of the world's
best mines**
in Southern Africa's
legendary mineral fields

KAMOA-KAKULA

Initial development
of two mining areas
on **world's 4th-largest**
copper discovery

**Democratic Republic
of Congo's Central
African Copperbelt**

PLATREEF

Mine projected to be
Africa's lowest-cost producer
of platinum-group metals,
plus nickel, copper & gold

**Northern Limb of South Africa's
Bushveld Complex**

KIPUSHI

Ultra-high-grade
historic mine being
upgraded to produce
zinc, copper, silver,
germanium & lead

**D.R. Congo's
Copperbelt**



Construction underway at Kakula's new, southern box cut and a second decline to provide access to the high-grade copper on the southern side of the Kakula Deposit.



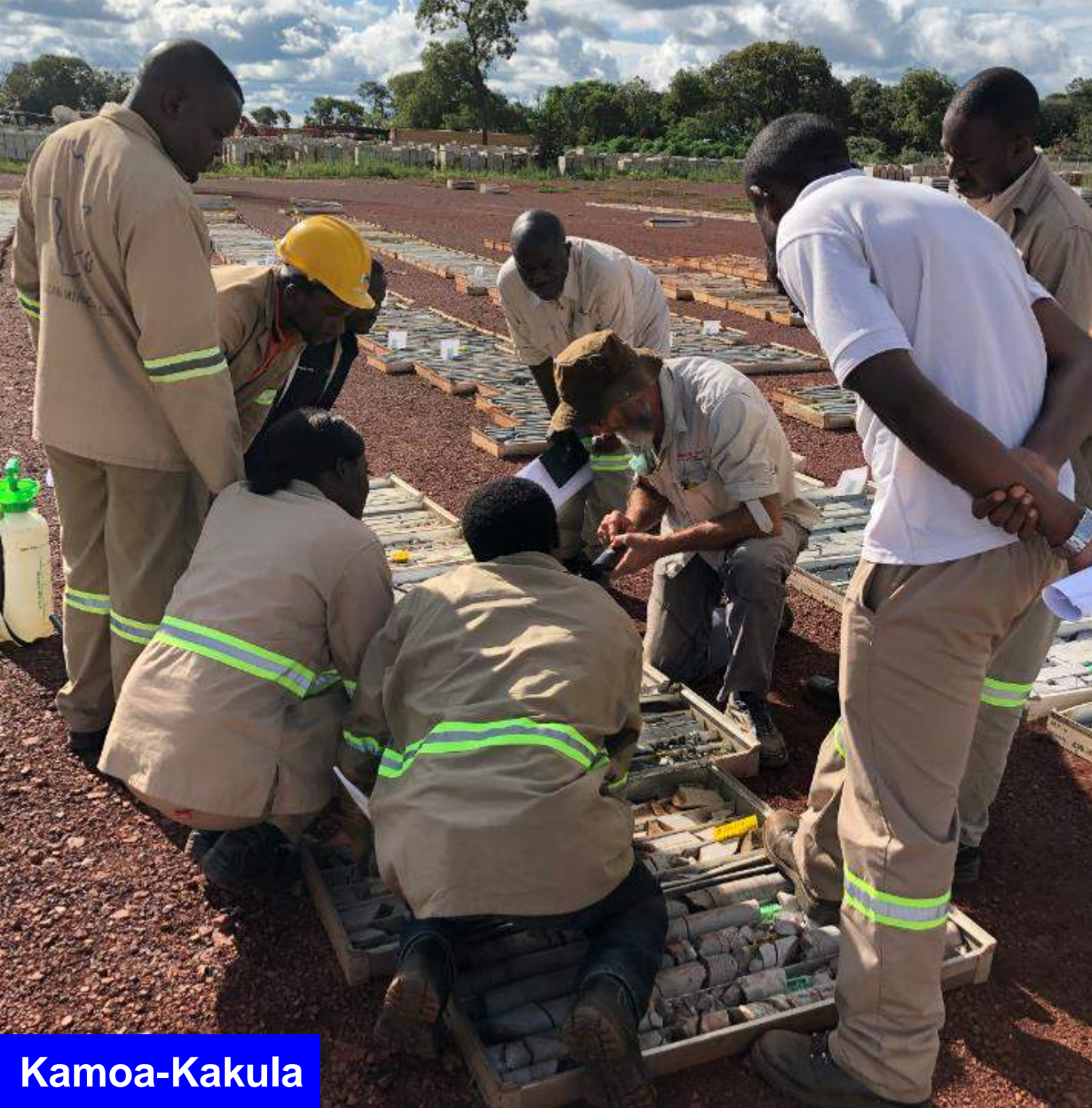
Kamoa-Kakula

Workers spraying shotcrete (a wet concrete mixture) onto wire mesh for added support of the side walls at Kakula's new, southern box cut.



Kamoa-Kakula

We congratulated our Kamoa-Kakula employees and contractors for their outstanding workplace achievement of logging a total of 12 million hours without any lost-time injuries – the equivalent of approximately seven years of project progress! Their success is testament to the safety-focused culture that is a foundation of the conduct of the project's mine development and exploration activities.



David Broughton, Ivanhoe Mines' Senior Advisor, Exploration and Geology (centre, kneeling), using samples of drill core as part of a geological workshop with members of the Kamo-Kakula exploration team and geology students from several universities in the DRC. Mr. Broughton led Ivanhoe's 2008 discovery of Kamo.



Kamoa-Kakula

Hongbing Li and Lydia Makong, Kamoa-Kakula geologists, and David Edwards, Geology Manager, Kamoa Copper Project (right), reviewing a chart of recent drill holes at the Kamoa North Discovery on the northern portion of the Kamoa-Kakula Mining Licence.



Kamoa-Kakula

A driller operating a computer-assisted jumbo drill in one of the two main declines that will provide underground access to the high-grade copper resources on the northern side of the Kakula Deposit. The main access declines soon will reach the northern edge of high-grade deposit.



Kamoa-Kakula

Kamoa-Kakula geologists analyzing core from holes drilled from the main Kakula declines.



Kamoakakula

Tresor Katoki (right) received an award from Mike Freer, Kamoakakula's Technical Services Manager, recognizing his safety initiatives that helped the project complete 12 million work hours without incurring any lost-time injuries.



Kamoa-Kakula

Eco-livelihoods staff collecting bees at the Kamoa-Kakula Project garden. Production and sale of honey is one of the new, community socio-economic projects supported by the Kamoa Copper Sustainable Livelihoods Program, and helps provide local community members with opportunities to earn additional income.



Western Foreland, DRC



Core from recent drilling at the Makoko Discovery.



Platreef, South Africa

Platreef's Shaft 2 box cut (now completed to a depth of 29 metres) alongside Shaft 1 headframe. Construction of the concrete hitch (foundation) for Shaft 2 now is underway.



Platreef

Bottom of the box cut for Shaft 2, showing the 10-metre-diameter outline for the planned shaft.



Platreef

Installing slope-stability anchors in the box cut for Shaft 2.



Platreef

Ivano Manini, Ivanplats' Executive Head, Operations (far left), escorting visiting members of Ivanhoe's board down Platreef's Shaft 1 to the 850-metre level.



Platreef

Egizio Bianchini, Ivanhoe's Executive Vice Chairman (left), holding a piece of the 3,500 tonnes of high-grade ore collected during the sinking of Shaft 1 through the 29-metre-thick Flatreef Deposit.

Goodman School hosts South African students

■ Ivanhoe Mines looks to Sudbury to develop highly educated professionals

BY NORM TOLLINSKY

Laurentian University's Goodman School of Mines is playing a key role in the development of South Africa's geological braintrust.

Eleven students with undergraduate degrees in geology from the University of Limpopo are working on their Masters and PhD degrees in Sudbury as part of Canadian-based Ivanhoe Mines' social and labour plan for the development of its Platreef Mine in South Africa.

"The idea is to increase the research and teaching capacity at the University of Limpopo," said Bruce Jago, executive director of the Goodman School of Mines.

The relationship was pitched by Ivanhoe executive chairman Robert Friedland in 2013 when he was in Sudbury for a guest lecture.

"He asked if we would help out with the Platreef project's social and labour plan," recalled Jago. "That's how it all started."

Ivanhoe Mines invested \$1.2 million in the academic co-operation and development initiative, and soon after signing the Memorandum of Understanding, Jago received a call from the International Development Research Council (IDRC), a

Canadian Crown corporation dedicated to helping developing countries.

"They asked us if we'd like some additional money, so I put together an application and we were awarded \$570,000," said Jago. The IDRC grant and additional funding in the amount of \$500,000 from the Queen Elizabeth II Diamond Jubilee Scholarship almost doubled Ivanhoe's contribution, increasing the number of South African students Laurentian could accept.

Since 2015, 15 students have participated

in the program, "but that will probably double by the time it ends in two years," said Jago.

The South African students are grateful for the opportunity to upgrade their academic credentials and enjoying their adventure in Canada.

Michael Langa came to Sudbury in 2015 to do a Masters degree and one and a half years in was upgraded to a PhD program.

"The standard of education at the University of Limpopo is good, but there were a lot of things we missed out on," said Langa. "Here at Laurentian, there are professors from all over the world who are experts in their field, which makes the experience in Sudbury especially fulfilling

and rewarding."

In addition to his studies, Langa has found time to engage in several typically Canadian winter sports, including cross-country skiing, skating and snowshoeing.

Francisca Maepa also came to Laurentian for her Masters but was upgraded to the PhD program. Currently in her second year of the four-year program, Maepa hopes to embark on a career in industry and possibly return to academia sometime in the future.

Charlotte Mkhonto, who came to Sudbury in 2017, hails from Burgersfort, 158 kilometres southeast of Polokwane, the capital of Limpopo province.

"I'm in geology," she said, "because I grew up in a small town with 10 platinum mines. My mom works in finance for an andalusite mine and dad is a haul truck operator."

Ivanhoe's social and labour plan for its Platreef project also included the purchase of equipment for the geology labs at the University of Limpopo, including instrumentation for x-ray diffraction and fluorescence.

The Platreef Mine, 280 kilometres northeast of Johannesburg on the northern rim of the Bushveld Complex, is expected to begin production in 2020. It's projected to be the lowest cost producer of platinum group metals in South Africa with a mine life of 36 years. ■



South African students pictured here will receive Masters and PhD degrees in geology from Laurentian University through an academic development and co-operation agreement with Ivanhoe Mines.

Canadian media story reporting on students, with South African undergraduate degrees in geology, now qualifying for Masters and PhD degrees at Canada's Laurentian University through a program initiated and supported by Ivanhoe Mines.



Kipushi, DRC

Workers installing a high-voltage electrical cable underground at the Kipushi Mine.



Kipushi

Members of Ivanhoe's mine design and engineering teams who conducted an inspection of Kipushi's underground workings.



Earlier this month, 'Santa' delivered gifts of appreciation to Kamo-Kakula employees for their contributions to the project's success in completing 12 million hours of work without a lost-time injury.

Kamo-Kakula

In 2009, when he announced Ivanhoe's initial copper discovery at the Kamo Project in the Democratic Republic of Congo, then Chairman Robert Friedland said: "Kamo will become an important pillar of the country's economy and help to build sustainable livelihoods and communities through social and economic programs responsive to local needs".

Now, nearly 10 years later, Kamo's potential, and promise, is being progressively delivered to stakeholders. And remember: The people of Ivanhoe dedicated to the task really are just getting started!

Best wishes for a joyful festive season and a rewarding new year.