

November 18, 2021

## **Kamoa Copper awards China Nerin Engineering contract for direct-to-blister copper smelter**

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**500-ktpa smelter to be the largest copper smelter in Africa, and one of the world's largest single-line smelters**

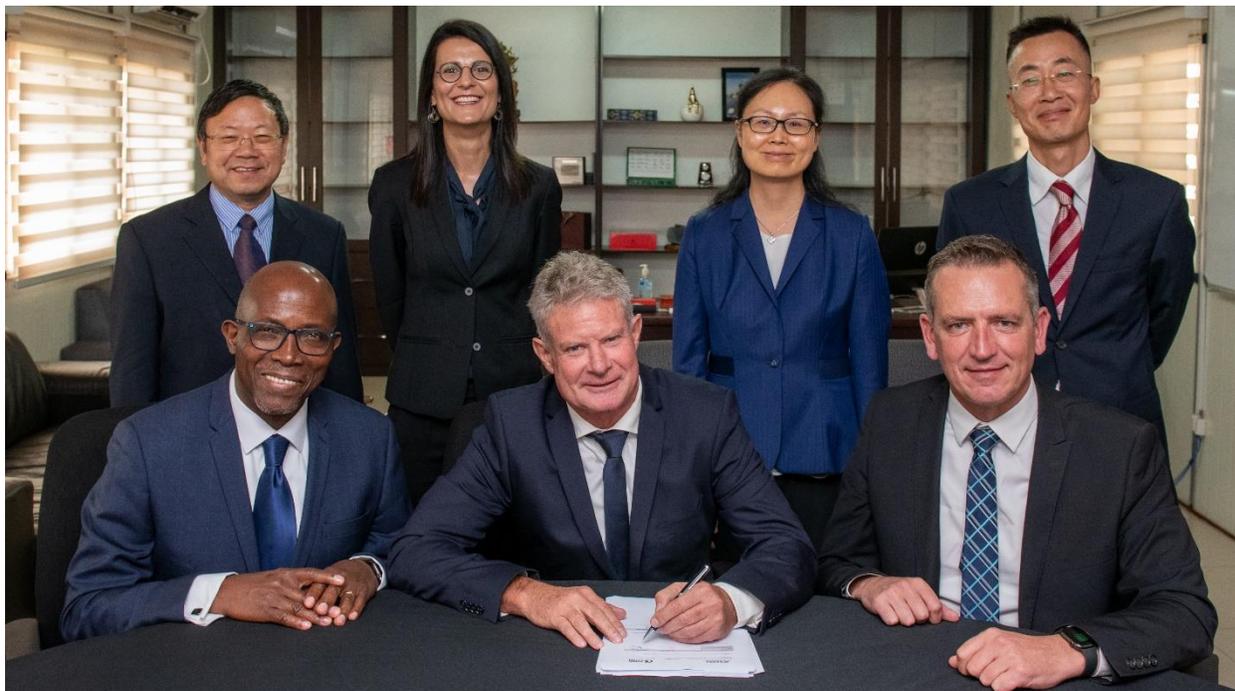
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**Metso Outotec's state-of-the-art, environmentally-friendly smelter technology aligned with Kamoa-Kakula's goal of producing the world's 'greenest copper'**

**KOLWEZI, DEMOCRATIC REPUBLIC OF CONGO & NANCHANG, CHINA – Ivanhoe Mines (TSX: IVN; OTCQX: IVPAF) Co-Chairs Robert Friedland and Yufeng “Miles” Sun are pleased to announce that Kamoa Copper has awarded China Nerin Engineering Co., Ltd. (Nerin) of Jiangxi, China, with the basic engineering contract for the planned, direct-to-blister flash smelter at the Kamoa-Kakula Copper Complex that will incorporate leading-edge technology supplied by Metso Outotec of Espoo, Finland, and have a nameplate capacity of 500,000 tonnes a year of approximately 99%-pure blister copper.**

**The contract was signed earlier today by Mark Farren, CEO of Kamoa Copper, and Wu Runhua, General Manager of Nerin, at a virtual ceremony held at the Kamoa-Kakula Mine and Nanchang City. Jinghe Chen, Chairman of Zijin Mining; Zhang Xiaobo, Chairman of Nerin; along with Mr. Friedland and Mr. Sun, joined the signing ceremony to offer their congratulations and support for this important project milestone.**

**The planned Kamoa-Kakula smelter is to be built adjacent to the Phase 1 and Phase 2 concentrator plants, and is designed to use technology supplied by Metso Outotec and to meet the International Finance Corporation's (IFC) emissions standards. The smelter has been sized to process the majority of the copper concentrate forecast to be produced by Kamoa-Kakula's Phase 1, Phase 2 and Phase 3 concentrators. With a nameplate capacity of 500,000 tonnes per annum of blister copper, it is projected to be one of the largest, single-line blister-copper flash smelters in the world, and the largest in Africa.**

**Kamoa Copper's executive team members at the virtual signing ceremony. (L-R, seated): Ben Munanga, Chairman; Mark Farren, CEO; and Rochelle De Villiers, Co-CFO. (L-R standing) Zhilin Li, Deputy General Manager; Annebel Oosthuizen, Executive, Finance; Xuelin Cai (Minty), Co-CFO; and Yong Chen, COO.**



**Nerin is an international engineering company with more than 60 years of experience in smelter engineering and construction projects globally. Nerin actively promotes the advancement of smelting technology through its own research and development, and establishing various partnerships with global industry peers, including Metso Outotec.**

**Since its inception in 1957, Nerin has undertaken more than 4,000 engineering and construction projects in 60 countries, including numerous large-scale, flash smelting projects, which comprise approximately 47% of the world's current flash-smelting capacity. Notable projects include the upgrading of Rio Tinto's Kennecott smelter in Salt Lake City, Utah, United States, and the upgrading and expansion of Glencore's PASAR smelter and refinery in Isabel, Leyte Philippines. Nerin's exceptional capabilities in flash-smelting technology, combined with its significant experience in the DRC (including the Lualaba Copper Smelter near Kolwezi that is treating approximately one-third of Kamoa-Kakula's current concentrate output, and Tenke Fungurume's copper hydrometallurgical plant) will help ensure a smooth execution of the planned smelter at Kamoa-Kakula.**

The smelter is expected to be built concurrently with the project's Phase 3 mine and concentrator expansion, and the upgrading of turbine 5 at the Inga II hydropower complex. The additional 162 megawatts of renewable electricity from the Inga II upgrading project will be needed to power the Phase 3 expansion and on-site smelter.

The next stages in the smelter project development will be the completion of basic engineering, which is expected to take approximately seven months, and the ordering of the long-lead equipment, followed by earthworks which are expected to commence in Q2 2022. The awarding of the Engineering, Procurement and Construction Management (EPCM) contract is expected to occur shortly after the commencement of the earthworks.

The overall execution timeline will be dictated by the basic engineering, but is expected to be approximately three years. The expected capital cost is in the region of US\$700 million (100%-basis) for the enlarged smelter, to be financed with cash flows from Kamoakakula.

An onsite smelting facility has compelling cost and environmental benefits, including a reduction in the volume of copper concentrate shipped from the mine by approximately one half or more, and the associated logistics costs, export taxes and concentrate treatment charges. The smelter also will produce sulphuric acid as a by-product, creating a new revenue stream for Kamoakakula.

There is a strong demand and market for sulphuric acid in the DRC to recover copper from oxide ores. Copper mines in the DRC currently import significant volumes of sulphur used in sulphur-burning acid plants to produce sulphuric acid for the treatment of oxide copper ores. The DRC also imports sulphuric acid, primarily from Zambia.

Kamoakakula currently is producing an extremely high-grade, clean copper concentrate containing approximately 55% copper and extremely low levels of arsenic by world standards – approximately 0.01%. Approximately 35% of Kamoakakula's Phase 1 concentrate is sent to the local Lualaba smelter for processing into blister copper ingots – containing approximately 99% copper – while the remainder is transported via trucks and ships to international smelters for treatment.

Mark Farren commented: "Today's signing of the smelter basic engineering contract with Nerin highlights our commitment to the people of the DRC to derive more economic benefits from Kamoakakula by maximizing in-country beneficiation. Achieving the transformative potential of Kamoakakula's unrivaled copper resources requires creative thinking that supports the DRC's priorities of economic growth and diversification through value-addition, processing and beneficiation.

“Nerin is a highly-respected engineering firm with the people and in-country expertise to deliver a first-rate, on-site smelter that will be among the largest of its kind in the world. They successfully built the local Lualaba Copper Smelter, to which we are sending about a third of our current concentrate output.

“After a great deal of due diligence, the partners at Kamo Copper collectively agree that the state-of-the-art, environmentally-friendly technology offered by the Metso Outotec direct-to-blister smelter best suits the unique low-iron, low-sulphur and ultra-high-grade concentrate produced at Kamo-Kakula, and aligns seamlessly with our goal of producing the world’s ‘greenest copper’.

“The Kamo-Kakula smelter will be powered by clean, renewable hydropower and will incorporate leading-edge sulphur capture. Shipping 99%-pure blister copper ingots produced from an on-site smelter, instead of shipping copper concentrate, will result in a significant reduction in Kamo-Kakula’s concentrate transportation costs and Scope 3 emissions.”

Wu Runhua, General Manager of Nerin (seated, centre) and Xiaobo Zhang, Chairman of Nerin (standing behind Wu Runhua), and other members of China Nerin Engineering join members of Ivanhoe Mines’ Chinese representative office at the signing ceremony in Nanchang City, China, with the Kamo Copper team on the screen in the background.

(L-R) Kexin Liu (Cathy), Ivanhoe; Tao Feng, Ivanhoe; Chao Zhou (Peter), Ivanhoe; Wu Runhua, Nerin; Xiaobo Zhang, Nerin; Feng He, Nerin; Hu Hu, Nerin; and Xiaowei Yang, Nerin.



A 3D illustration of the planned direct-to-blister flash smelter at the Kamoakakula Copper Mine that will have a nameplate capacity of 500,000 tonnes per annum of blister copper.



Aerial view of the Kamoakakula Copper Complex. The planned smelter is to be built within the area outlined in red, adjacent to the Phase 1 and 2 concentrator plants (in yellow circle). The backfill plant is circled in blue.



## Benefits of the Metso Outotec direct-to-blister smelting technology

Approximately one-half of the world's primary copper currently is produced using flash, direct-to-blister smelting technology. Metso Outotec recently signed a major engineering and technology contract for the delivery of a landmark copper smelter complex to be built in Gresik, East Java, Indonesia. The project owner is PT Freeport Indonesia and has a value of EUR 360 million (US\$424 million).

The Outotec technology produces high-quality blister copper in a single flash furnace without the need for separate converting stages or ladle transportation. The process and equipment have undergone continuous development over the last 70 years, which has led to one of the safest, most environmentally-friendly, and most reliable smelting processes for treating high-grade copper concentrates.

### Summary of direct-to-blister smelting key features:

- Often the most profitable process option for concentrates containing more than 30% copper.
- Results in high copper recovery.
- Requires no converting process.
- Low capital and maintenance costs.
- Integrated controls with continuous process.
- High sulphur recovery due to single, continuous, stable gas stream, leading to minimum emissions to the environment.
- Low capital and operational costs for sulphuric acid plant.

### A Metso Outotec direct-to-blister flash smelter furnace in operation.



**Kakula is projected to be the world's highest-grade major copper mine, with an initial mining rate of 3.8 million tonnes per annum (Mtpa) at an estimated, average feed grade of more than 6.0% copper over the first five years of operations, and 5.9% copper over the initial 10 years of operations. Phase 1 is expected to produce approximately 200,000 tonnes of copper per year, while the Phase 2 expansion is forecast to increase production to approximately 400,000 tonnes of copper annually. Kamo Copper is on track to complete the Phase 2 expansion in Q2 2022.**

**Based on independent benchmarking, the project's phased expansion scenario to 19 Mtpa would position Kamo-Kakula as the world's second-largest copper mining complex, with peak annual copper production of more than 800,000 tonnes.**

**The Kamo-Kakula Copper Project is a joint venture between Ivanhoe Mines (39.6%), Zijin Mining Group (39.6%), Crystal River Global Limited (0.8%) and the Government of the Democratic Republic of Congo (20%). A 2020 independent audit of Kamo-Kakula's greenhouse gas intensity metrics performed by Hatch Ltd. of Mississauga, Canada, confirmed that the project will be among the world's lowest greenhouse gas emitters per unit of copper produced.**

## **Qualified Persons**

**Disclosures of a scientific or technical nature regarding development scenarios at the Kamo-Kakula Project in this news release have been reviewed and approved by Steve Amos, who is considered, by virtue of his education, experience and professional association, a Qualified Person under the terms of NI 43-101. Mr. Amos is not considered independent under NI 43-101 as he is Kamo Copper's Head of Projects. Mr. Amos has verified the technical data disclosed in this news release.**

**Ivanhoe has prepared an independent, NI 43-101-compliant technical report for the Kamo-Kakula Project, which is available on the company's website and under the company's SEDAR profile at [www.sedar.com](http://www.sedar.com):**

- Kamo-Kakula Integrated Development Plan 2020 dated October 13, 2020, prepared by OreWin Pty Ltd., China Nerin Engineering Co., Ltd., DRA Global, Epoch Resources, Golder Associates Africa, KGHM Cuprum R&D Centre Ltd., Outotec Oyj, Paterson and Cooke, Stantec Consulting International LLC, SRK Consulting Inc., and Wood plc.**

**The technical report includes relevant information regarding the assumptions, parameters and methods of the mineral resource estimates on the Kamo-Kakula Project cited in this news release, as well as information regarding data**

verification, exploration procedures and other matters relevant to the scientific and technical disclosure contained in this news release.

## **About Ivanhoe Mines**

Ivanhoe Mines is a Canadian mining company focused on advancing its three principal projects in Southern Africa: the development of major new, mechanized, underground mines at the Kamoa-Kakula copper discoveries in the Democratic Republic of Congo and at the Platreef palladium-rhodium-platinum-nickel-copper-gold discovery in South Africa; and the extensive redevelopment and upgrading of the historic Kipushi zinc-copper-germanium-silver mine, also in the Democratic Republic of Congo.

Kamoa-Kakula began producing copper concentrates in May 2021 and, through phased expansions, is positioned to become one of the world's largest copper producers. Kamoa-Kakula is being powered by clean, renewable hydro-generated electricity and is projected to be among the world's lowest greenhouse gas emitters per unit of metal produced. Ivanhoe Mines has pledged to achieve net-zero operational greenhouse gas emissions (Scope 1 and 2) at the Kamoa-Kakula Copper Mine. Ivanhoe also is exploring for new copper discoveries on its Western Foreland exploration licences in the Democratic Republic of Congo, near the Kamoa-Kakula Project.

## **Information contacts**

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## **Forward-looking statements**

Certain statements in this release constitute “forward-looking statements” or “forward-looking information” within the meaning of applicable securities laws. Such statements and information involve known and unknown risks, uncertainties and other factors that may cause the actual results, performance or achievements of the company, its projects, or industry results, to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements or information. Such statements can be identified by the use of words such as “may”, “would”, “could”, “will”, “intend”, “expect”, “believe”, “plan”, “anticipate”, “estimate”, “scheduled”, “forecast”, “predict” and other similar terminology, or state that certain actions, events or results “may”, “could”, “would”, “might” or “will” be taken, occur or be achieved. These statements reflect the company’s current expectations regarding future events, performance and results and speak only as of the date of this release.

Such statements include without limitation, the timing and results of: (i) all statements regarding the planned Kamoa-Kakula smelter; (ii) statements regarding the completion of basic engineering is expected to take approximately seven months; (iii) statements regarding the ordering of the long-lead equipment, followed by earthworks which are expected to commence

in Q2 2022; (iv) statements regarding the awarding of the Engineering, Procurement and Construction Management (EPCM) contract is expected to occur shortly after the commencement of the earthworks; (v) statements regarding the overall execution timeline is expected to be approximately three years; (vi) statements regarding the expected capital cost is in the region of US\$700 million (100%-basis) for the enlarged smelter, to be jointly financed with Ivanhoe's equal partner Zijin Mining, with cash flows from Kamo-Kakula; (vii) statements regarding Kakula is projected to be the world's highest-grade major copper mine, with an initial mining rate of 3.8 Mtpa at an estimated, average feed grade of more than 6.0% copper over the first five years of operations and 5.9% copper over the initial 10 years of operations; (viii) statements regarding Kamo-Kakula's Phase 1 is expected to produce approximately 200,000 tonnes of copper per year, and Phases 1 and 2 combined are forecast to produce approximately 400,000 tonnes of copper per year; (ix) statements regarding based on independent benchmarking, the project's phased expansion scenario to 19 Mtpa would position Kamo-Kakula as the world's second largest copper mining complex, with peak annual copper production of more than 800,000 tonnes; (x) statements regarding Kamo-Kakula will be among the world's lowest greenhouse gas emitters per unit of copper produced; (xi) statements regarding Kamo Copper is on track to complete the Phase 2 expansion in Q2 2022; and (xii) statements regarding an upgraded turbine 5 at Inga II is expected to produce 162 megawatts of renewable hydropower, providing the Kamo-Kakula Copper Complex and associated smelter with abundant sustainable electricity for future expansions.

As well, all of the results of the Kakula definitive feasibility study, the Kakula-Kansoko pre-feasibility study and the Kamo-Kakula preliminary economic assessment, constitute forward-looking statements or information, and include future estimates of internal rates of return, net present value, future production, estimates of cash cost, proposed mining plans and methods, mine life estimates, cash flow forecasts, metal recoveries, estimates of capital and operating costs and the size and timing of phased development of the projects. Furthermore, with respect to this specific forward-looking information concerning the development of the Kamo-Kakula Project, the company has based its assumptions and analysis on certain factors that are inherently uncertain. Uncertainties include: (i) the adequacy of infrastructure; (ii) geological characteristics; (iii) metallurgical characteristics of the mineralization; (iv) the ability to develop adequate processing capacity; (v) the price of copper; (vi) the availability of equipment and facilities necessary to complete development; (vii) the cost of consumables and mining and processing equipment; (viii) unforeseen technological and engineering problems; (ix) accidents or acts of sabotage or terrorism; (x) currency fluctuations; (xi) changes in regulations; (xii) the compliance by joint venture partners with terms of agreements; (xiii) the availability and productivity of skilled labour; (xiv) the regulation of the mining industry by various governmental agencies; (xv) the ability to raise sufficient capital to develop such projects; (xvi) changes in project scope or design; (xvii) political factors; and (xviii) unforeseen delays or stoppages in shipping and transportation of goods and equipment.

Forward-looking statements and information involve significant risks and uncertainties, should not be read as guarantees of future performance or results and will not necessarily be accurate indicators of whether or not such results will be achieved. A number of factors could cause actual results to differ materially from the results discussed in the forward-looking statements or information, including, but not limited to, the factors discussed below and under "Risk Factors", and elsewhere in this release, as well as unexpected changes in laws, rules or regulations, or their enforcement by applicable authorities; the failure of parties to contracts with the company to perform as agreed; social or labour unrest; changes in commodity prices; and the failure of

exploration programs or studies to deliver anticipated results or results that would justify and support continued exploration, studies, development or operations.

Although the forward-looking statements contained in this release are based upon what management of the company believes are reasonable assumptions, the company cannot assure investors that actual results will be consistent with these forward-looking statements. These forward-looking statements are made as of the date of this release and are expressly qualified in their entirety by this cautionary statement. Subject to applicable securities laws, the company does not assume any obligation to update or revise the forward-looking statements contained herein to reflect events or circumstances occurring after the date of this release.

The company's actual results could differ materially from those anticipated in these forward-looking statements as a result of the factors set forth below in the "Risk Factors" section in the company's 2021 Q3 MD&A and its current annual information form.