Rio Tinto’s Nuton technology produces first copper

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Rio Tinto has successfully produced the first copper from the Johnson Camp mine in Arizona using its Nuton ® Technology, marking a pivotal step forward in the development of this innovative copper processing technology.

After more than 30 years of research and development, the first copper cathode using Rio Tinto's proprietary bioleaching technology, which relies on microorganisms grown on site, was produced at Gunnison Copper's Johnson Camp mine last month. The deployment involves the design and delivery of a technology package for a heap leach pad targeting production of approximately 30,000[1] tonnes of refined copper over a four-year demonstration period. Rio Tinto is engaging with several potential customers in the U.S. to support the domestic copper supply chain.

Rio Tinto Copper Chief Executive Katie Jackson said: "This is a breakthrough achievement for our Nuton technology, which is proving that cleaner, faster, and more efficient copper production is possible at an industrial scale. In an industry where projects typically take about 18 years to move from concept to production, Nuton has now proven its ability to do this in just 18 months.

"Nuton has designed a modular system deployed as a technology package integrating biology, chemistry, engineering, and digital tools, allowing it to be rapidly scaled and tailored to different ore bodies, unlocking resources that have historically been considered uneconomic or challenging. We are actively partnering on projects in North and South America to assess the potential for future deployment at additional sites in the coming years."

Nuton relies on naturally occurring microorganisms to extract copper from primary sulphide ores, which are traditionally difficult to process. These microbes, grown at large scale in Nuton's proprietary bioreactors, accelerate the oxidation of minerals in the crushed ore heap, generating heat and enabling copper to dissolve into a leach solution, which is then processed into 99.99% pure copper cathode.

Significantly, processing copper ore with Nuton eliminates the need for concentration, smelting and refining, shortening supply chains and delivering copper cathode at the mine gate. It achieves recovery rates of up to 85% from primary sulphides, the most abundant copper bearing ores in the world.

Nuton can also extend mine life and maximize resource use by extracting value from ores that would otherwise be classified as waste, increasing yield and revenue at both new and existing mines. Its environmental performance is expected to exceed conventional copper processing technologies, with up to 80% less water usage and up to 60% lower carbon emissions than the traditional concentrator route.

At Johnson Camp, Nuton aims to produce copper with the lowest carbon footprint in the U.S. Through the purchase of 134,000 Green-e Energy certified renewable energy certificates, Nuton ensures 100% of the site's electricity is matched by renewable sources. The copper produced is anticipated to have a mine-to-metal carbon footprint of 0.82-kilogram CO?-e per kilogram copper, the lowest in the U.S. and substantially lower than the projected 2026 global average of 3.4 kilograms CO?-e per kilogram among operating copper mines. Additionally, water intensity is anticipated to be 71 litres per kilogram copper, compared to the global average industry estimate of ~130 litres per kilogram of copper production[2].

Gunnison Copper Chief Executive Officer and President Stephen Twyerould said, "The first production of Nuton copper at Johnson Camp is the culmination of exceptional teamwork between Gunnison Copper and Rio Tinto's Nuton team. Achieving this level of performance in such a short time frame shows what is possible when innovation, operational excellence, and a shared vision come together. With Nuton copper

now entering the U.S. supply chain, this milestone underscores the critical role we can play in strengthening domestic access to cleaner, low-carbon copper."

While this milestone confirms Nuton's engineering and operational viability, the next phase will focus on validating long-term technical performance. This includes multi-year testing, independent third-party verification, and internal review by Rio Tinto to ensure consistent recovery rates and environmental performance.

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[1] Includes ~16kt from run of mine leaching pad and ~14kt from Nuton technology.

[2] Water and carbon emissions intensities for Johnson Camp and global averages have been validated by Skarn Associates, a leading provider of carbon and water intensity curves for the industry.

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