Gallium and Rubidium Are Moving Out of the Footnotes

written by Tracy Hughes | August 18, 2026

Christopher Ecclestone's latest Hallgarten + Company report offers a clear reminder that the strategic value of a critical mineral is often greatest where public understanding is weakest.

I have just finished reading Hallgarten + Company's initiation report on Quantum Critical Metals Corp. (TSXV: LEAP | OTCQB: ATOXF | FSE: 86A1), *Carving Out a Niche in Gallium & Rubidium*. I will be honest: I absolutely love Christopher Ecclestone's writing, largely because he has a rare talent for making complicated subjects easier to understand without pretending they are simple.

That matters in the critical minerals sector. CEOs live inside their companies' technical reports, geological models, metallurgical programs and strategic plans. They know the story so well that it can be difficult to explain it to someone encountering the company for the first time. This is not a criticism of Quantum CEO Marcy Kiesman. It is a challenge shared by virtually every CEO in our industry.

Before going further, I need to be clear about my own position. I recently joined the Board of Directors of Quantum Critical Metals, and the company paid for the Hallgarten report. This column is therefore not a review or endorsement of the report's investment conclusions, valuation or recommendations. Instead, I want to focus on the broader educational value of its appendices on gallium and rubidium, using publicly available sources to explain why these two little-understood elements are becoming strategically important.

Gallium is often remembered as the metal that melts in your hand. It should be remembered as the metal China has already demonstrated it can withhold from the United States.

Gallium arsenide and gallium nitride are essential compound semiconductors used in radar, satellite communications, high-speed electronics, power systems, LEDs and laser diodes. Gallium nitride is particularly valuable where equipment must operate at high voltages, high frequencies or elevated temperatures—conditions common to advanced communications, aerospace and defence systems.

The vulnerability is extraordinary. **China accounts for approximately 98% of primary refined gallium production, while the United States produces no low-purity, unrefined gallium.** Most gallium is recovered as a by-product of processing bauxite or zinc, so supply depends less on how much gallium exists in the ground than on whether a processor is willing and able to recover it.

Beijing placed gallium under export licensing in 2023. In December 2024, it went further and banned exports of gallium, germanium and antimony to the United States. General licenses issued under the 2025 U.S.–China trade truce later provided relief for American end users, but the market had already received its warning: China controls a metal essential to Western semiconductor and defense supply chains and has already shown that it is prepared to use that control.

This is why Ecclestone's criticism of just-in-time purchasing matters. Just-in-time inventory is efficient when supply chains are stable. It is dangerous when a geopolitical competitor controls almost the entire supply of a material that requires lengthy customer qualification and cannot be replaced quickly.

The West cannot solve that vulnerability simply by discovering

gallium in a drill hole. It needs recoverable feedstock, metallurgy, refining capacity, qualified customers and economics capable of surviving the next period of lower prices. China became dominant because it built that industrial system while the West allowed its own capabilities to disappear.

Rubidium is even less understood, and its commercial supply chain is thinner still. It occurs in minerals such as lepidolite, pollucite and mica, but there are no conventional primary rubidium mines supplying a large, transparent market. It is generally recovered as a by-product, leaving end users with irregular supply and little price transparency.

Its applications are specialized but strategic. Rubidium is used in atomic clocks and frequency standards, specialty glass, medical and scientific equipment, laser cooling, sensing and emerging quantum technologies. The U.S. Geological Survey now identifies rubidium as a critical mineral because of its role in GPS, data-network synchronization, atomic clocks, and research and development.

Ecclestone calls this the “Scandium Conundrum.” Manufacturers hesitate to develop applications without dependable supply, while producers hesitate to build supply without established demand. Each waits for the other, leaving a potentially important metal trapped in a small and opaque market.

His most provocative argument is that rubidium formate could challenge cesium formate in some high-pressure and high-temperature oil and gas well operations. That opportunity is not yet commercially proven; rubidium formate would have to meet demanding performance, cost and qualification requirements. But the strategic rationale is clear because the cesium formate market is exceptionally concentrated.

Cabot Corporation acquired Manitoba’s Tanco operation in 1993

and produced cesium from the mine. In 2019, Cabot sold Tanco and its Specialty Fluids business to Sinomine (Hong Kong) Rare Metals Resources Co. Limited, a wholly owned subsidiary of China-based Sinomine Resource Group Co., Ltd., transferring the mine and a strategically important cesium business into Chinese ownership. Tanco remains active and is pursuing additional cesium recovery from previously processed material, but that fact sharpens the strategic concern rather than removing it: the resource is in Canada, while corporate control and much of the commercial network are Chinese. Geography alone does not create supply security.

This is where Ecclestone's appendices connect with Quantum Critical Metals. Quantum has publicly reported that its NMX East project in Québec hosts gallium, rubidium, cesium and other critical elements in muscovite mica. It has also begun metallurgical work with the University of British Columbia to evaluate a hydrometallurgical recovery route for rubidium and associated metals.

The important word is "recovery." Finding a critical mineral is only the beginning. It must be concentrated, separated, purified and converted into a qualified product that a customer will buy.

That is why Ecclestone makes these metals easier to understand. Gallium matters because China controls approximately 98% of primary refined production and has already placed it on an export-ban list for the United States. Rubidium matters because new applications cannot grow until someone solves the supply problem.

The critical minerals economy will not be built by geology alone. It will be built by metallurgy, processing, qualification and customers prepared to support non-Chinese supply. Gallium and rubidium are moving out of the footnotes. The opportunity

now belongs to those who can turn their chemistry into qualified products.

To access the latest Hallgarten + Company report, click here

Disclosure: Tracy Hughes is a director of Quantum Critical Metals Corp. Hallgarten + Company's initiation report was commissioned and paid for by the company. This article is provided for general information only and does not constitute investment advice, an offer or solicitation, or a recommendation to buy or sell any security. Readers should review the company's continuous disclosure filings and conduct their own due diligence.