

Australia's Precarious Position: Navigating a Critical Minerals Market Meltdown

written by InvestorNews | February 26, 2024

Australia, often celebrated as the world's quarry, finds itself at a critical juncture as the prices of iron ore, nickel, and lithium, three of its most significant exports, have plummeted. This decline has not only exposed the inherent vulnerabilities of relying heavily on these commodities but has also highlighted the country's dependence on China, its largest buyer. This situation is further compounded by the realization that the wider global implications of such a downturn are largely overlooked by many in the field.

Critical Minerals in the Congo: A Strategic Treasure Trove

written by Tracy Weslosky | February 26, 2024

The Democratic Republic of Congo (DRC), known for its vibrant history and rich cultural fabric, is increasingly coming under the limelight for its vast mineral wealth. A deeper look into its mineral assets sheds light on global geopolitics, economic

tactics, and the progression of technology.

First Shots in the New Cold War

written by Christopher Ecclestone | February 26, 2024

When we were recently writing our review of the takeover battle between Teck Resources Limited (TSX: TECK.A | TSX: TECK.B | NYSE: TECK) and Glencore PLC (LSE: GLEN) a colleague said, “don’t forget to mention the Germanium” and we nearly did. It proved to be an important reminder as Germanium (Gallium) became eminently newsworthy only a few weeks later when China decided to turn off the spigots of both metals as part of the tit-for-tat over Chinese access to Western semiconductor output. The Chinese ban spurred a surge in Wikipedia and Google traffic as pundits and journalists scurried to get au fait with the metals. For us, it was lucky we had been so recently hot off the press with our thoughts. As for Gallium, we happened to be one of the few that also knew where a primary Gallium deposit was hiding in full sight... Though we were not telling.

Let the Cold War Begin

written by InvestorNews | February 26, 2024

In a recent InvestorIntel interview, Tracy Weslosky spoke with Christopher Ecclestone, Principal and mining strategist at

[Hallgarten & Company](#), regarding China's new export ban on critical minerals germanium and gallium. The ban, enacted on August 1st, is seen as a strategic retaliation against Western restrictions on key semiconductor supplies to China.

Ecclestone explained this as an extension of the modern "Cold War," where conflict is expressed through trade embargos, rather than on battlefields. The aim, seemingly, is to disrupt Western semiconductor production by limiting access to essential materials like gallium arsenide, which is critical in chip manufacturing.

Despite China's dominance in gallium and germanium production (98% and 66% respectively), the U.S. government has been reticent to admit this 'stranglehold.' Companies in the West, Ecclestone highlighted, have failed to stockpile these critical metals, leaving them exposed to the current 'rainy day' scenario.

However, this new restriction has sounded an alarm for Western companies to reevaluate their dependencies and take necessary actions. Companies like [Trafigura Beheer B.V.](#) are already looking at byproduct production of germanium in their zinc refineries. Over time, this could eventually lead to Western self-sufficiency in these metals, negating Chinese leverage.

As Ecclestone concluded, the Cold War may have indeed restarted in the realm of trade. To read Ecclestone's latest report, "[Let the Cold War \(re\)Begin](#)," visit the [Hallgarten & Company](#) website.

To access the complete interview, [click here](#)

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If you have any questions surrounding the content of this interview, please contact us at +1 416 792 8228 and/or email us direct at info@investorintel.com.

Incompetent Experts: For Critical Minerals, this is not an Oxymoron.

written by Jack Lifton | February 26, 2024

I am often asked to introduce technology metals based ventures to the sourcing/purchasing activities of the OEM automotive industry, based in Detroit, where I have lived for most of my 83 years, and for which I was a supplier of production parts and engineered materials for more than 30 years.

I find an almost complete lack of understanding of marketing and sales to the OEM automotive industry to be common among technology metals miners and refiners, who are of course the anchor companies of any and all production parts' supply chains.

In the past this has been of little interest to the OEM automotive industry due to its standard operating procedures of choosing preferred vendors, known in the industry as Tier One Vendors, who then became responsible for choosing their own vendors of parts and services, subject to the acceptance of the Tier One product by the end-use customer's internal Production Part Acceptance Protocol (PPAP), and even then, subject to on-time delivery, in the agreed quantities, to the customer's specification at the agreed pricing. Failure in any one of these required categories could, at the discretion of the OEM, result in the "desourcing" of the (approved otherwise) vendor. To ensure security and continuity of supply, the end-user normally would have a primary Tier One vendor and at least two alternates, each of which would normally get a small percentage

of the total “buy” to keep it in the game. The alternates would be required to have the capability and the capacity to supplement or even replace the primary in the event of partial, or even total, non-performance by the primary.

Such Tier One Vendors are of course operating companies with an existing output or capability to produce the parts in question. They will have positive cash flow and, typically, are public companies with a listing on a major exchange and a substantial market cap. The core competency of each and every company in the total supply for the part chain would be required and it is understood to be guaranteed to the OEM by the Tier One.

Nowhere is the decay of proven, verifiable, competence as the sine qua non “standard” more apparent than in the, most likely to be, disastrous exemption of the PPAP standard in the OEM automotive industry for lithium-ion battery manufacturing. Rare earth permanent magnet motor manufacturing may soon be compromised by the same decay of standards.

The pathetic and jejune industry “experts” who not only analyze but, even worse, advise the OEMs on the sourcing of production parts based on critical metals are unified by their almost complete lack of practical experience, education and knowledge of the origin, processing, fabricating and manufacturing engineering at commercial scale of the **total** supply chains for the critical metals enabled devices upon which the motive power, “engine” management, and supply of information for the drivers of EVs depend.

Last week we were told by this “expert” class of journalists and advisors that both [germanium and gallium](#) were “rare earths” and that they were used in batteries. Both “expert” statements were completely wrong and misleading.

Earlier this year we were told and continue to be told by an

“expert” firm that the economy needs “only 300” more lithium mines to meet the needs of a zero-carbon economy. Apparently, these fools think that there is not only a standard size lithium mine, but also a standard predictable demand for lithium. Mining engineers and mining company CFOs will be delighted to find out about this development.

I’m going to try from now on to list the Erroneous Critical Minerals Supply and Demand statement of the Week each Friday.

Attention manufacturing executives and policy makers: You need to do a due diligence review of your “experts,” before you act on their advice.

Hint: Make sure that their jobs don’t depend on always agreeing with you.

A final comment: Germanium and gallium are critical to chip manufacturing, LEDs, and military optics. The “CHIPS” act and the “IRA” pledged more than \$50 billion in subsidies for domestic chip manufacturing and battery manufacturing, but not ONE CENT for domestic gallium or germanium production.

Is this how policy experts in Washington think we can become independent of Chinese dominance in critical minerals production and processing?

Critical Minerals Export Ban

is China Tit-for-Tat with the United States

written by Jack Lifton | February 26, 2024

“The issue here is one of understanding. The Chinese didn’t stop exporting the materials. What the Chinese said, and what they are going to do is to restrict the exports, not prohibit them. This means that they have adopted a policy of tit-for-tat with the United States. We recently have restricted the export to China of very high-tech machinery to make the latest and greatest chips. Simultaneously, we have prohibited our own companies from buying Chinese-manufactured chips for use in their products without permission from our State or Commerce Department in the form of a ruling that such importation and/or use does not impact “national security.”

The Chinese are saying, OK, so if those are the rules of the game then, now, we’re playing also by those rules. We’re going to start playing by picking two materials that you don’t have available domestically in end-user form, the metalloid germanium, and the metal gallium. These two materials, are in fact, critical to the manufacturing of the chips, access to which you wish to prohibit China from getting.

Now the interesting thing is here the journalists have got this all wrong – they all call these metals, “rare earths”, and they couldn’t be more wrong, It’s frightening to think that they don’t understand what rare earths are, considering how important rare earths are to us in a different industrial context of use.

Germanium is a member of the silicon family. Gallium is chemically related to aluminum. Neither one of these are rare earths, and if I were teaching a course in general chemistry, I would fail anyone who said something like that. Alright, here’s

the point. The United States Department of Defense actually has stockpiled germanium. That should tell you something. It's really critical. It's what I call a critical-critical mineral. OK, but not, for some reason that I don't understand, gallium. Both of those, as I recall from my misspent youth, were produced in the United States and we were self-sufficient.

We have domestic American sources of both of these materials that come actually as byproducts of more common materials. Germanium is a byproduct of zinc and silver mining, and can also be obtained from coal. Gallium is a byproduct of aluminum production. Both of those were once produced and in abundance in the United States. I've talked about germanium and gallium, because we used to produce so much of the metals of which they're a byproduct, that we supplied our gallium needs and our germanium needs out of processing those materials. America stopped producing end-user forms of both germanium and gallium, because the Chinese got into the processing of these materials in a big way and pretty soon it became obvious that it was much cheaper to buy them from China.

Now keep in mind that when the Chinese were setting up to produce both of these metals, they actually had little or no use for them. They were strictly a service operation 25 years ago. I doubt that the Chinese had ever produced a computer chip 25 years ago. There is one other use they might have had back then for gallium. It, gallium, is used in making atomic bombs, so perhaps they were doing it for that, but we simply stopped producing fine gallium chemical forms here, because, we didn't have to. You could get cheaper from China.

Now, "all of a sudden," The Chinese, who are very aware of critical materials and have been organizing themselves to be self-sufficient and secure in their supplies of all of these materials that underlie our modern technological society, are

supposed to be “weaponizing” them for use against us. This is saying that we’re so stupid and lazy that we didn’t notice the dependence of our technological society on certain critical materials and take action to secure sufficient supplies of them for our domestic industries. Of course, this is exactly what happened.

I’m sure, once we started with the arguments about computer chips, that the Chinese could be using them to spy on us, and when we started saying this publicly and embarrassing the Chinese and insulting them, they decided that they had no recourse but to take aggressive action in the marketplace. They may, in fact, be doing these things. I’m not saying that they’re innocent. I’m just saying that somehow or other. Our government doesn’t seem to understand that cultures outside of the American ethos may be different from those on the American ethos. For example, you keep telling the second largest economy in the world and, perhaps, the proudest people in the world of their multi 1000 year old heritage of “civilization” that you’re liars and you’re cheats. You’re trying to screw us, blah blah, blah. Pretty soon they get annoyed.

Fast forward to today. The U.S. Secretary of the Treasury, Mrs. Yellen, is in Beijing today. OK. And all the reporters, the same ones who think germanium and gallium are rare earths, they’re saying, well, she’s going to straighten things out with the Chinese. Do you know what I think? I’ll bet that when she landed and went to see the first Chinese officials, they started telling her, Hey, what the hell does your country think they’re doing now? You want to discuss economics with us while you’re insulting us. You call us pariahs, you call our great leader a dictator.

OK. This problem with germanium and gallium is not going to go away anytime soon until American diplomats get diplomatic and

so-called American experts in Washington figure out that we should have never gotten out of the germanium and gallium “processing” business in the United States. We can go back to secure self-sufficiency.

I have been asked frequently in the last few days how long it would take for the USA to regain self-sufficiency in the production of ultra-high-purity end-user forms of germanium and gallium. Would it take decades, the youthful reporters ask breathlessly? I’ll make you a bet we could be back into producing gallium and germanium in the United States in a useful form for electronics in six months to a year. I mean, this is not, excuse the expression, rocket science. We developed these technologies. This is among the very first things I ever did in my working life, the ultra-purification of metals for electronics. I knew how to process gallium and germanium 60 years ago(!), and there’s been a lot of work to improve and commercialize processes since then. We have to stop saying “Oh my God. The sky is falling,” and just start doing what we should have been doing all this time. That is my commentary on this subject...” – *Excerpt from an interview with the Critical Minerals Institute’s Co-Chairman, Jack Lifton*

Rare Earths, “The War Metals?”

written by Jack Lifton | February 26, 2024

Sometime after 2007, I was invited to participate in a meeting called by the Office of Net Threat (Assessment) in the inner ring of the Pentagon in Washington, DC. The topic was the impact of the lack of critical materials on the security of the United States. I was asked to discuss the necessity of rare earths for

the military. Around that same time, the US Dept of Energy put out its now well-known chart of [critical materials](#). The current version of that chart is now given as a set of bullet points

- Rare earth elements, used in offshore wind turbine generators and electric vehicle motors;
- Lithium, cobalt, and high-purity nickel, used in energy storage technologies;
- Platinum group metals used in catalysts for automotive, chemical, fuel cell, and green hydrogen products; and
- Gallium and germanium used in semiconductors.

Note well that there is no mention of specific military demands for any of the critical materials in the DoE bullet points. This doesn't mean that these critical materials are not important to the Department of Defense; it means that the US cabinet departments have separate agendas.

Even though the Pentagon released a report in 2013 that stated that the demand for rare earth permanent magnets by the US military was "about" 1000 tons per year, the current demand figure is "classified,"

Returning to 2007 or thereabouts I well remember that the leading market cap player at the time, sometime around 2010, started using a picture of a US jet fighter plane in its advertising and claiming that "rare earths" were critical to its (the plane's) flying and combat operations and implying that without rare earths the US would be defenseless. This quickly became "received wisdom."

This was, as with so many pronouncements made by many companies in the bull market not true, but it became embedded in all rare earth related advertising from then on.

The purpose and value of rare earth permanent magnets in vehicles of any type is to reduce weight and the need for space. Their value is that they can be miniaturized. In planes, trains and automobiles this allows more payload (for the military) or more range due to less power necessary to carry the weight of the magnets and less volume allowing tiny, but powerful, magnets to be used in power accessories, such as power windows and seats or, as one example of a military use, weapons bay (formerly called bomb bay) doors.

Similar stories were that then began to say that an F35 fighter/bomber needed 935 pounds of rare earth permanent magnets in its construction and operation. This misinformation has also become, today, received wisdom.

In 2017 while working on a plan to recycle rare earth permanent magnets for the Defense Logistics Agency, I, of course, asked from where the scrap magnets were to come. The answer was that the DLA didn't have a firm grasp on that, since compartmentalization and "need to know" and classification of end uses made it impossible for any one agency of the Pentagon to know that.

I guessed that the DoD needed 3000 tons per annum of rare earth permanent magnets. I based my estimate on data about the uses in F35s from an unclassified report published by the Pentagon in 2013, and my own guesses as to the need for rare earth permanent magnets in main battle tanks, man-carried missiles, drones, and the Navy's adoption of electric propulsion.

Rare earth permanent magnets are important to the military for exactly the same reason they are important to the OEM automotive industry; they save weight and volume, and thus increase range and payload.

Vehicles and weapons can be made without rare earth permanent

magnets; they will just be less efficient.

The Hellfire missile, made famous by being carried and launched from drones, uses Alnico (aluminum-nickel-cobalt) magnets made in the USA by a magnet maker in business now for 120 years. It could use rare earth permanent magnets, if they were available and made from domestic raw materials processed in the United States.

The F35 could use Alnico magnets in place of its current rare earth permanent magnets, but it would require special cooling to avoid curie-point failure and the additional weight and volume would reduce range and payload. The same for automobiles and trucks except that it wouldn't be so much the payload that is sacrificed it would be convenience accessories such as power windows, seats, and doors in all cars and range in EVs.

Rare earth permanent magnet motors are the most efficient electric motors known. They are thus the best and most robust solution to engineering issues of weight and volume for both military and consumer products.

But, they are not indispensable. And, if the US requires that any such magnets be made domestically from domestic materials then we are going to need to make between 10,000 and 15,000 tons of them per year at current usage.

Even if only the military gets to use them, we would need at least 3,000 tons per year.

Today NO rare earth permanent magnets are manufactured in the USA from domestic materials.

The time to change that is NOW.

Note from the Publisher: Jack Lifton is the co-founder and the Chairman of the [Critical Minerals Institute](#), which maintains

lists of the critical minerals as identified by the US, Canada, the UK, Australia and Europe.