



March 31, 2022

Senator Joe Manchin III, chairman
Senator John Barrasso, ranking member
Senate Committee on Energy and Natural Resources
Dirksen Senate Office Building – SD-304
Washington, DC 20510

Re: Secure Supply Chains for Critical Minerals from the Seabed

Dear Chairman Manchin and Senator Barrasso:

Thank you for holding today’s hearing on domestic critical mineral supply chains. We believe that any comprehensive treatment of this topic must include a full discussion of seabed resources, particularly the collection of polymetallic nodules that lay unattached atop the seafloor relatively close to the U.S. mainland when compared to other sources of the principal battery metals the U.S. needs for the clean-energy transition.

The Administration, U.S. automakers, academics and interest groups all recognize that global demand for critical battery minerals is set to skyrocket over the next several decades.^{1,2} Acknowledging that over-reliance on foreign sources (particularly from adversarial nations) of critical minerals poses national and economic security threat to the United States, its workforce and economy, The Metals Company (Nasdaq: TMC) [offers solutions](#) to mitigate commodity price volatility, secure mineral independence, re-shore primary processing and refining capacity, support U.S. companies and jobs, and drastically reduce the environmental and social impacts that currently plague geopolitically-complex battery material supply chains. Given the known lack of domestic supply and processing of critical lithium-ion battery cathode materials including cobalt, nickel, and manganese, the U.S. should consider responsible development of polymetallic nodules found on the seafloor in international waters off the U.S. coast as a potential game-changer for U.S. critical mineral supply lines and domestic processing opportunities.

The Biden 100-Day review found that, “Significant quantities of strategic and critical materials may be found on the seabed” and their careful development afforded opportunities for “providing not only a potential supply benefit, but also dual-use technology development associated with unmanned undersea vessels and hydrographic mapping.” Somewhat disappointingly, the Administration’s review further found that, “Though seabed resources may provide a significant future source of strategic and critical materials, they are not covered by this report.”³ Unfortunately, while many in the Administration quietly recognize the importance of seabed resources, the subsequent 1-year review was silent on the topic.

Several key developments since release of the 100-Day Review are of note.

- Letters of support for the consideration of the polymetallic nodule resource in U.S. strategic planning from political and military leaders are pending reply from Energy Secretary Granholm, Defense Secretary Austin, and Transportation Secretary Buttigieg.
- Governments of some of the world’s largest economies increased their investment in this space, including President Macron of France and Prime Minister Modi of India; and

¹ <https://www.whitehouse.gov/briefing-room/statements-releases/2022/02/22/fact-sheet-securing-a-made-in-america-supply-chain-for-critical-minerals/>

² <https://www.whitehouse.gov/briefing-room/statements-releases/2021/08/05/statements-on-the-biden-administrations-steps-to-strengthen-american-leadership-on-clean-cars-and-trucks/>

³ <https://www.whitehouse.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf>

- Encouraged by Government and industry support, proximity to battery and steel growth markets, and shared innovation to utilize unconventional resources to fuel the clean energy transition, TMC has executed a non-binding memorandum of understanding with battery anode material producer Epsilon Carbon, for our first small-scale nodule processing facility in India to demonstrate the material to the market.

We continue to engage U.S. Government and businesses to support a full-scale processing facility in the United States. Support from U.S. Government for the development of the polymetallic nodules resource and TMC's first project, NORI-D, would unlock access to the resource without overcoming legislative hurdles to ratify the United Nations Convention on the Law of the Sea (UNCLOS).

Doing so would provide the following broader benefits:

Localizing supply of 4 critical EV metals, simultaneously:

It is a geological reality that there are insufficient U.S. reserves of nickel, cobalt, and manganese to support lithium-ion battery production at scale, and that recycling will not be able to meet demand in the midterm.⁴ TMC can provide access to the enough *in situ* resource to fully electrify the U.S. passenger fleet (280 million EVs).⁵ Our pilot processing program using proven processing equipment and an integrated zero-toxic waste, near-zero solid waste processing flowsheet to produce battery grade materials has been conducted at facilities across North America.⁶

Nickel: Our NORI-D project alone which is just 22% of TMC's total estimate resource is the largest nickel project on the planet⁷ and represents one, if not the only, alternative source of additive nickel in quantities that rival Indonesian rainforest nickel projects operated by Chinese companies with loose regulatory oversight and significant environmental and social impacts. Given integrated processing of nodules to battery cathode precursor chemicals, TMC's operation would also rival Russia, today's largest Class 1 (battery grade) nickel producer.

Cobalt: TMC's project offers what would comparatively be the largest source of cobalt outside of the Democratic Republic of Congo across today's producing countries,⁸ while importantly eliminating the issues of child labor from the supply chain.

Copper: While the U.S. does have domestic copper reserves, domestic mining projects have been increasingly delayed or cancelled due to environmental concerns.⁹ The Metals Company NORI-D project can serve to backfill this void, as a tier-1 copper project.

Manganese: The U.S. recognizes manganese as a critical mineral without any known substitutions for which the country is 100% import reliant. TMC's NORI-D project once in production would be the fourth largest single source of manganese globally, potentially single-handedly converting the U.S. to a net-exporter of the material.

Solution to NIMBYism: EV producers require hundreds of thousands of tons of virgin raw battery materials, but Americans do not want mines in their backyards; lack of ability to permit new mines on U.S. lands adds to the mismatch between metal demand and commercial availability. A U.S. nodule

⁴ https://irena.org/-/media/Files/IRENA/Agency/Technical-Papers/IRENA_Critical_Materials_2021.pdf; <https://www.nature.com/articles/s43017-020-0027-0?proof=t>

⁵ https://www.sec.gov/Archives/edgar/data/1798562/000121390021033645/fs42021a2ex96-1_sustainable.htm

⁶ <https://metals.co/the-metals-company-processing-pilot-campaign-converts-seafloor-nodules-into-alloy-containing-critical-battery-metals/>

⁷ <https://protect-au.mimecast.com/s/IHZbCjZ1nXTy8LGintZzC?domain=nam11.safelinks.protection.outlook.com>

⁸ USGS 2021 Commodity Summaries – Cobalt: DRC: 95ktpa, [TMC: 9 ktpa], Russia 6.3ktpa, AUS 5.7ktpa, Philippines 4.7ktpa

⁹ Pebble, AK; Resolution, AZ; PolyMet, Twin Metals & Rosemont, MN; environmental review process has not yet started for Tamarack, MN.

processing facility solves this issue on a near term timeline, with significantly reduced environmental impact versus land-based alternatives for four critical battery metals *without the need to mine U.S. lands*.

Re-shoring manufacturing, with return on EV & battery investments and support for Buy American programs: by 2030, 30 million electric vehicles could go unbuilt due to material shortages.¹⁰ A healthy return on billions of dollars of investment in battery and EV assembly plants in the U.S. depends on a secure source of raw materials. TMC can deliver the first half of the upstream lithium-ion battery supply chain for cathode metals - raw materials & integrated processing and refining capacity - to any region including the United States, supporting the localization of midstream battery chemicals, and consolidating today's battery cathode supply chain by 50x (50,000 to 1,500 miles). Access to upstream supply and processing underpins American clean energy jobs; The Metals Company Project One full scale facility is expected to support 1,170 employees directly with an indirect labor impact of approximately 10,000 jobs.^{6,11}

As noted in the 100-Day Review, engaging with nodule exploration Contractors can benefit the United States in many ways, including technology development. Nodules were collected in large volumes in the 1970s by companies like Lockheed Martin, Shell, and BP. That proven technology is now being optimized by various exploration contract holders and their partners. Our own nodule collection system is currently being piloted in the Atlantic with positive results thus far and is heading for testing in international waters this summer.¹² Collaboration with U.S. businesses such as Deep Reach Technologies whose work on nodule collector technology is funded by arpa-e and the American Bureau of Shipping illustrate the potential to support U.S. businesses and clean energy economy.^{13,14} Further, American offshore drilling company, Transocean, purchased a minority interest in Ocean Minerals Ltd. this week, exploring seabed resources in the Cook Islands economic zone.¹⁵

Drastic reduction of environmental and social impacts of extractive industries: even the most ardent supporters of clean energy must concede that today we export many of the environmental and social impacts that enable us to have the metals necessary for cell phones, electric vehicle, and other technologies to other countries and communities that are least able to manage the consequences. In truth, there are no zero-impact options to securing critical mineral supply chains - leaders must make decisions based on the best available data. However, collecting and processing polymetallic nodules would significantly reduce ESG impacts including the elimination of child and forced labor, mine-site injuries, health risks from toxic waste streams, deforestation, and destruction of precious carbon sinks TMC's use of nodules and its processing approach would also reduce carbon footprint by approximately 90%.¹⁶ Located in a remote area of the ocean considered an abyssal marine desert, there is zero plant life and limited animal life with ~70% of life being microbial as measured by biomass. An area of approx. 70,000 square miles (slightly larger than the country of Mexico and larger than the area under exploration) has already been set aside for conservation. We must compare this option with the impacts on humans and animals from land-based mining occurring today, much of which is done beneath biodiverse, carbon-

¹⁰ Benchmark Mineral Review, Westbeck Capital estimates.

¹¹ Indirect job estimate based on Economic Policy Institute durable manufacturing multiplier, Jan 23, 2019 report.

¹² <https://www.globenewswire.com/news-release/2022/03/22/2407559/0/en/The-Metals-Company-and-Allseas-Announce-Successful-Completion-of-Harbor-Wet-Test-Commissioning-of-Robotic-Polymetallic-Nodule-Collector-Vehicle.html>

¹³ <https://news.cision.com/american-bureau-of-shipping/t/abs-chosen-by-allseas-for-their-deep-sea-mineral-collection-project,c3430654>

¹⁴ <https://www.globenewswire.com/news-release/2022/03/17/2405631/0/en/The-Metals-Company-and-Allseas-Announce-Proposed-Economic-Terms-for-Developing-and-Operating-the-World-s-First-Commercial-System-to-Collect-Deep-Sea-Polymetallic-Nodules-to-Meet-Su.html>

¹⁵ <https://www.deepwater.com/news/detail?ID=26831>

¹⁶ <https://www.sciencedirect.com/science/article/pii/S0959652620338671?via%3Dihub>



storing rainforests.¹⁷ Studies from a wide variety of U.S. entities have established the environmental benefits of the polymetallic nodule resource versus land-based ores.¹⁸

Governed by an international regulatory regime:

Unlike land-based mining regulations which are nation-dependent and rely on local governments that in some cases not equipped or motivated to set, monitor, and enforce regulations, exploitation regulations from the International Seabed Authority (“ISA”) will be arrived at by consensus across 167 member states, plus the European Union, as one of the most robust international pieces of regulation ever agreed. The ISA has set a roadmap towards finalization of the mining code before July 9 of next year¹⁹. A component of these regulations is a comprehensive Environmental Impact Study (EIS) and Environmental Monitoring and Management Plan. While not a member of the ISA, U.S. delegates have been actively engaged in ISA proceedings though Observer status since the 1980s; nothing precludes the U.S. from accepting and processing this unique resource for domestic use. The United States through the State Department and other agencies can support this new industry by encouraging thorough and timely adoption of a finalized mining code. The U.S. can also take proactive steps to encourage the processing of this abundant and secure resource within U.S. borders as they have already done with rare earth metals, rather than standing on the sidelines as our rivals extend their lead in critical battery metals.

Chairman Manchin, Ranking Member Barrasso, you and other members of the Committee are frequently confronted with the problem of critical mineral supply chains, supply, and processing. But seldom are you presented with answers that can really change the strategic outcome for the United States in significant ways. We believe that sustainable and safe collection of polymetallic nodules from the relatively close Clarion Clipperton Zone can provide a clear opportunity to address the heart of the issue. As one of the most advanced participants with knowledge of this emerging technology, we look forward to working with the Committee as it continues its examination of this important issue.

Very respectfully yours,

A handwritten signature in black ink that reads "Gerard Barron".

Gerard Barron
Chairman and Chief Executive Officer
The Metals Company

¹⁷ <https://www.theguardian.com/global-development/2022/feb/19/we-are-afraid-erin-brockovich-pollutant-linked-to-global-electric-car-boom>;
<https://www.maplecroft.com/insights/analysis/mining-operations-face-growing-biodiversity-risks/>; <https://www.nbcnews.com/specials/rise-of-electric-cars-endangers-last-frontier-philippines/index.html>

¹⁸ <https://repository.library.noaa.gov/view/noaa/30033>; <https://www.nature.com/articles/s43017-020-0027-0?proof=t>; <https://www.nature.com/articles/s43247-021-00213-8#ref-CR3>

¹⁹ Page 26, <https://investors.metals.co/static-files/96d3ae97-366f-435c-935f-5c663bc2574a>