

Questions for the Record

Hearing on “Part of Your World: U.S.-China Competition Under the Sea”

Response from David Calhoun,
Director, Baron

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Question: *In your oral testimony, you said that seabed mining firms could merit Office of Strategic Capital ownership stakes to ensure they stay competitive against China’s state-owned enterprises. Could you explain further how equity stakes would help seabed mining companies compete against Chinese companies?*

Response:

China is poised to continue distorting commodity markets. Chinese state-backed rare earth companies and black-market rare-earth producers, for example, have successfully concentrated this vital industry in China’s borders. It is no secret that non-Chinese rare earth companies have long struggled to compete with China’s non-market actors. According to a 2025 report on China’s rare earth strategy published by the Atlantic Council: “China’s policies aim to further expand China’s already commanding share of global supply and production, as well as to prevent competitors from entering the market or maintaining a profitable competing operation.”¹

Beijing could emulate its rare earth model in the seabed mining sector. The significant role of SOEs and government-funded institutions, especially elite universities and agencies backed by the Ministry of Natural Resources (MNR) and Chinese Academy of Sciences (CAS), provides relative financial security to China’s seabed mining sector. Moreover, China already has defined the undersea domain – like the rare earth sector before it – as having immense strategic importance. *Qiushi* (求是) released six articles in March 2026 that mention “deep-sea mining, 深海采矿” – before, during, and after the Two Sessions – with one describing the deep sea as a “strategic frontier ... bound up with national strategic security that will influence the future direction of the global power structure.”²

An unchecked Chinese seabed mineral sector will disrupt the global competitive landscape. It is only a matter of time before China has an active seabed mining sector. When it overcomes

¹ Craig A. Hart, “Mapping China’s strategy for rare earths dominance,” Atlantic Council, June 2025, page 18, <https://www.atlanticcouncil.org/wp-content/uploads/2025/06/Mapping-Chinas-strategy-for-rare-earths-dominance.pdf>.

² “【理响中国】如何理解海洋经济发展的大思路?” *Qiushi*, March 20, 2026, <https://www.qstheory.cn/20260320/5b47854d046e4f0197c73d9142f01290/c.html>; “我国海洋经济发展面临怎样的形势和挑战,” *Qiushi*, March 20, 2026, <https://www.qstheory.cn/20260320/d7b7a049c268485d8cecb406ab70f5cb/c.html>; “走有中国特色向海图强之路,” *Qiushi*, March 15, 2026, <https://www.qstheory.cn/20260314/cb6ee3c958f848e68b53a2eb4671acf3/c.html>; “求是网评论员：如何理解海洋经济发展的大思路?” *Qiushi*, March 20, 2026, <https://www.qstheory.cn/20260320/9c718f17d16c4aa8b6370580692dc0f2/c.html>; Fu Xiaoqiang, “怎么看全球地缘格局之变,” *Qiushi*, March 1, 2026, <https://www.qstheory.cn/20260228/bf5de6dcc34441779107199d4e7879dc/c.html>; and “全球地缘格局发生重要变化,” *Qiushi*, March 11, 2026, <https://www.qstheory.cn/20260311/f515fee7e46c433090a70f72de3e69c1/c.html>.

the remaining engineering hurdles, its immense advantages in mineral processing and shipbuilding will enable it to rapidly build out a potentially dominant seabed mining industry. If this comes to pass, the United States will find itself in a deepened state of dependence on China for critical minerals, positioning it as the weaker party in what is the defining great power competition of the 21st century.

Despite a storied history in seabed minerals, the United States lacks experienced seabed mining operators. The seabed mining industry will likely involve operators acquiring licenses in promising areas and then partnering with offshore and deep-sea engineering companies to conduct integrated exploration and extraction. Before states started ratifying the UN Convention on the Law of the Sea, U.S. industry – including Lockheed Martin – led a group of Western-backed consortiums into the sector. Today, regulatory uncertainty, China’s influence on critical mineral pricing, and America’s deficient processing capabilities are discouraging private sector investment. As a result, the U.S. seabed mining sector has been dormant for decades. Only two operators – one Canadian and one Belgian – have conducted integrated tests of seabed mining systems in the past five years.³ These tests, while promising, revealed challenges that need to be resolved before full-scale commercial operations begin.

Equity stakes in the seabed mineral supply chain would ensure eventual U.S. operators set the world standard for efficiency and sustainability. While there are no experienced U.S. seabed mining operators there are numerous U.S. companies with established expertise in offshore engineering, deep-sea sensors, and underwater vehicles. Equity stakes in companies active in these and other segments of the seabed mineral supply chain (e.g., mineral processing) would provide eventual U.S. seabed mining operators with the technological breakthroughs necessary for responsible commercial extraction and processing. Conditioning these stakes on direct support for developing seabed mining capabilities (e.g., collector vehicles, riser systems, environmental monitoring) would ensure that the United States develops the technologies and systems required to outcompete China. These equity stakes would help counter China’s ambitions, incentivize larger investments from America’s dominant financial sector, and spur offtake agreements by American industry.

Existing public-private deep-sea innovation incubators are another pathway to success. The United States is home to elite oceanographic institutions. Key researchers promoting China’s seabed mining industry, for example, have long sought postings at the Woods Hole Oceanographic Institution (WHOI).⁴ There are numerous pathways for Washington to direct the latent potential of these research hubs toward seabed mining technology. NOAA already supports the Ocean Enterprise Initiative and StartBlue – two hubs for ocean technology

³ Qi Zhang, Xuguang Chen, Lubao Luan, Fei Sha, Xuelin Liu, “Technology and equipment of deep-sea mining: State of the art and perspectives,” *Earth Energy Science* Vol. 1, No. 1 (2025) <https://www.sciencedirect.com/science/article/pii/S2950154724000060>.

⁴ One example is Lin Jian, a prominent Chinese expert in marine geophysics who is leading the creation of Shenzhen Ocean University. Lin spent decades studying and researching in America between 1984 and 2015, including at WHOI and Brown University. Lin has described seabed minerals as “playing an irreplaceable role in guaranteeing the security of supply chains.” Lin Jian, “Research on Forward-looking Layout of Deep-sea Scientific and Technological Innovation,” *Academic Frontiers* 《学术前沿》 No. 23 (2025), <https://www.rmlt.com.cn/2025/1219/744562.shtml>; and “美国伍兹霍尔海洋研究所研究员林间访问沈阳自动化所,” Shenyang Institute of Automation, Chinese Academy of Sciences, May 4, 2015, https://sia.cas.cn/gjil/jldt/201602/t20160229_4538968.html.

innovation.⁵ U.S. universities also boast robust deep-sea exploration and innovation programs: Massachusetts Institute of Technology (WHOI and Lincoln Laboratory), University of Rhode Island (Ocean Exploration Cooperative Institute), University of California San Diego (Scripps Institution of Oceanography), and University of South Florida (Florida Institute of Oceanography).⁶ The U.S. government could explicitly prioritize seabed mining R&D in new competitive grants. Providing financial support for seabed mining innovation at these institutions would help spur another era of U.S. leadership.

⁵ “Program,” StartBlue Ocean Enterprise Accelerator,” <https://startblue.ucsd.edu>; and “About Ocean Enterprise Initiative,” Ocean Enterprise Initiative, <https://oceanenterprise.com/about-ocean-enterprise-initiative>.

⁶ “Parent Institutions,” Massachusetts Institute of Technology (MIT) – Woods Hole Oceanographic Institution (WHOI) Joint Program in Oceanography/Applied Ocean Science and Engineering, <https://mit.who.edu/about/institutions>; “Advanced Undersea Systems and Technology,” Lincoln Laboratory, Massachusetts Institute of Technology, <https://www.ll.mit.edu/r-d/air-missile-and-maritime-defense-technology/advanced-undersea-systems-and-technology>; “About Us,” Scripps Institution of Oceanography, University of California San Diego, <https://scripps.ucsd.edu/about>; “About Us,” NOAA Ocean Exploration Cooperative Institute, <https://web.uri.edu/oeci/about>; and “About FIO,” Florida Institute of Oceanography, University of South Florida, <https://www.fio.usf.edu>.