ASX Announcement 14 February 2022

American Rare Earths Partners with US Government Funded R&D Projects

The Board of American Rare Earths Ltd (ASX: ARR; OTCQB: ARRNF; FSE: 1BHA) is pleased to announce key partnerships with leading research organizations in the United States of America to focus on new technology for sustainable, bio-based extraction, separation, and purification of rare earths.

Lawrence Livermore National Laboratory (LLNL), Penn State (PSU) and University of Arizona (UA) researchers are partnering with industry collaborator Western Rare Earths (WRE), U.S. subsidiary of American Rare Earths Limited, to use a naturally occurring protein to extract and purify rare earth elements (REEs) from abundant, domestic ore-based feedstocks and waste materials without harming the environment. It could offer a new avenue toward a more diversified and sustainable REE sector for the United States.

Domestic sourced and processed REEs are essential for American competitiveness in the clean energy and high-tech industries. These rare earth and other critical minerals are used in many devices vital to a high-tech economy and national security, including computer components, high-power magnets, wind turbines, mobile phones, solar panels, superconductors, hybrid/electric vehicle batteries, LCD screens, night-vision goggles and solid oxide fuel cells (SOFCs). To date, the chemical processes used to extract, separate and purify REEs are harmful to the environment and not sustainable.

In the project, funded by the Department of Energy's Critical Materials Institute, the researchers turned to the protein lanmodulin, which PSU's Center for Critical Minerals team member Joseph Cotruvo discovered. This discovery enabled a one-step quantitative and selective extraction of REEs from electronic waste and pre-combustion coal — capabilities that other chemical extraction methods do not offer.

Through a collaborative effort between LLNL, PSU, UA and WRE, the team plans to develop a scalable, all-aqueous, protein-based method for high-purity recovery of the REEs scandium and yttrium from low-grade, abundant domestic allanite ore. Yttria-stabilized zirconia (YSZ) is the most widespread electrolyte material used for SOFCs, given its high ionic conductivity, electronic resistivity and stability over a wide temperature range. Scandia-stabilized zirconia (ScSZ) is an attractive alternative to the yttrium due to its higher conductivity and excellent stability, allowing lower operating temperatures and improved longevity. Scandium also is used in high-strength, lightweight aluminum–scandium alloys that offer fuel savings when used in aircraft and vehicles.

Currently, China produces the majority of REEs, including yttrium and scandium. “The absence of reliable, large-scale and long-term supply severely limits commercial applications of scandium," said LLNL scientist Dan Park, principal investigator of the project. “We need to explore and exploit new sources and technologies to establish a domestic supply chain for scandium and yttrium for next-generation clean energy technologies.”

“The researchers affiliated with CMI, LLNL, UA and Penn State’s Center for Critical Minerals are the competitive advantage for the USA in its mission to responsibly secure this supply chain,” said Marty Weems, of Western Rare Earths and president, North America of American Rare Earths Limited. “The prospect of a sustainable, reusable, high-efficiency process that could extract, separate and purify scandium, yttrium and individual, high-value, rare-earth magnet metals could revolutionize the industry. The simplicity we see in the technology could bode well for scaling to industrial production. We are honored and humbled that CMI and the research team has chosen us as

team member and will be using our Wyoming- and Arizona-sourced ultra-low thorium content feedstocks. This project is an excellent fit to our mission to resource the renewable future responsibly."

A notable advantage of the allanite feedstock from WRE is the low level of uranium and thorium. These radioactive elements commonly co-occur in many other REE feedstocks and pose environmental and economic burdens due to their radioactivity. The team's lanmodulin-based approach offers several unique advantages over the prior methods, including compatibility with low-grade leachates, elimination of harmful solvents and the ability to achieve high-purity separation of certain critical REEs.

The Critical Materials Institute is a DOE Energy Innovation Hub led by Ames Laboratory that seeks to accelerate innovative scientific and technological solutions to develop resilient and secure supply chains for rare-earth metals and other materials critical to the success of clean-energy technologies. The research team includes Park and Ziye Dong from LLNL, Cotruvo and Sarma Pisupati from Penn State, Hongyue Jin from the University of Arizona and Weems from Western Rare Earths.

American Rare Earths CEO and Managing Director Chris Gibbs said of the collaboration:

"The US team led by Marty Weems have worked diligently to establish our presence on a number of top tier rare earths innovation programs. Thanks to the team's efforts, we are well positioned to play our part and be at the forefront of new technology.

"As we develop our world class mining projects our strategy is to also focus on new and disruptive technologies while building our processing and refining capabilities. We are excited by the progress being made and I congratulate the US team on their work towards our vision of transformation into a leading vertically integrated, sustainable supplier of minerals essential for a renewable future."

This market announcement has been authorised for release to the market by the Board of American Rare Earths Limited.

Chris Gibbs

Chief Executive Officer & Managing Director

About American Rare Earths

American Rare Earths Limited (ASX: ARR, OTCQB: ARRNF, FSE: 1BHA) is the only Australian company listed on the ASX with assets in the growing rare earth metals sector of the United States of America, itself emerging as an alternative international supply chain to China's market dominance of a global rare earth market expected to balloon to US$20 billion by the mid-2020s. The Company's mission is to supply Critical Materials for Renewable Energy, Green Tech, Electric Vehicles, National Security, and a Carbon-Reduced Future. Chris Gibbs is the Managing Director and CEO of American Rare Earths Limited. Western Rare Earths (WRE) is the wholly owned US subsidiary of the Company. ARR owns 100% of the world-class La Paz rare-earth Project, located 170km northwest of Phoenix, Arizona. As a large tonnage, bulk deposit, La Paz is potentially the largest, rare-earth deposit in the USA and benefits from containing exceptionally low penalty elements such as radioactive thorium and uranium. ARR plans to deliver its first Preliminary Economic Assessment for La Paz by the end of 2022 and is working with leading USA research institutions. La Paz's mineral profile is incorporated into emerging US advanced rare earth processing technologies. In early February 2022, the company commenced further drilling at the La Paz project to explore lateral and vertical extent in new southwest area. Approximately 742 - 928 million tonnes of Rare Earths mineralised rocks are identified as an exploration target in the La Paz Rare Earths project's southwest area with an average TREO Grade of 350 - 400ppm and Scandium Oxide grade of 20 - 24.5ppm. The new exploration Target is additive to the La Paz Rare Earth project's recently upgraded 170MT Resource. ARR acquired a second USA REE asset in the Searchlight Rare Earths Project in the first half of 2021. In June 2021 ARR acquired a third USA REE asset, the Halleck Creek Project in Wyoming. With permits in hand the maiden exploration drilling program is planned for Q1 2022 or early Q2 2022. The exploration deep drilling will provide initial mineralisation, lithology and fresh rock core material for metallurgical and process testing. Approximately 308 to 385 million tonnes of rare earths mineralised rocks were identified as an exploration target for the Halleck Creek project area with an average TREO Grade of 2,330 ppm - 2,912 ppm. Initial surface sampling of the Overton Mountain area conducted in 2018 revealed average Total Rare Earth Oxide (TREO) values of 3,297 ppm, average Heavy Rare Earth Oxide (HREO) values of 244 ppm, and average Magnetic Rare Earth Oxide (MREO) values of 816 ppm.