Ucore Announces Successful Independent Expert Evaluation of RapidSX Rare Earth Separation Technology

written by Raj Shah | April 27, 2022

April 27, 2022 (Source) – **Ucore Rare Metals Inc. (TSXV: UCU) (OTCQX: UURAF) ("Ucore" or the "Company")** is pleased to report the positive conclusions of a multi-phase, independent, third-party technical review of RapidSX™ technology (the "**Independent Evaluation**" or the "**Evaluation**") prepared by Dr. Ahmad Ghahreman of AG Hydrometallurgy Services Inc. ("**AGHS**") as a noted subject-matter-expert[1]. With a focus on the technical assuredness, benefits, and scalability of the RapidSX™ technology specifically for the separation of rare earth elements ("**REEs**") for the production of commercial-grade rare earth oxides ("**REOs**"), the Independent Evaluation concludes the following:

- RapidSX™ is capable of separating both light and heavy REEs for producing high-quality REOs and uses the same chemistry as proven conventional solvent extraction ("**CSX**") processes but with faster kinetics; thus, no chemistry risk at scale-up;
- RapidSX™ process shows itself to likely be 3 times as efficient as CSX, concluding a production plant can potentially have a 2/3 smaller footprint than a CSX plant of the same capacity with an associated separation process capital cost ("**CAPEX**") reduction of 50% or better;
- RapidSX™ for the separation and purification of REEs is dependent on its chemistry (same as CSX) and, given a smaller footprint for the same throughput, should have an

expected operating cost ("**OPEX**") of 20% less than CSX for the same purpose; and

- RapidSX™ is a modular process making it scalable with minimal risk. The process can be designed to process REEs in the range of 1,000 to 10,000+ tonnes per annum.

AGHS was engaged by the Alaska Industrial Development and Export Authority ("**AIDEA**") to undertake a technical review of the RapidSX™ technology and to provide an opinion concerning the technical and economic feasibility and scalability of RapidSX™, specifically for the separation of REEs for the production of commercial-grade REOs in Ucore's planned Alaska Strategic Metals Complex ("**SMC**"). *"After completing our extensive technical review of the RapidSX™ technology, its commercialization development process and its planned installation in the Alaska SMC, it is my opinion that Ucore can credibly and effectively execute its unique business strategy*," noted **Dr. Ghahreman**.

Figure 1 – RapidSX™ Testing on the CDF's Research Apparatus

To view an enhanced version of Figure 1, please visit:

https://orders.newsfilecorp.com/files/1119/121814_1abe1c4454ba19cd_001full.jpg

"We're extremely pleased with the independent expert evaluation of the RapidSX technology, as it continues to support our commercial deployment plans that center on being very competitive for the production of REOs to be delivered to downstream EV and renewable energy manufacturers," stated Ucore Chairman and CEO **Pat Ryan**, P.Eng. *"The Evaluation's technically based alignment with our economic premise that there is a reduction in capital cost required to build a North American SMC for REE separation versus CSX, the increased throughput using the proprietary column-based technology and thus lower working capital, supports our business planning. This includes self-use to begin (i.e., the Alaska SMC), the ability to scale appropriately as the market dictates, potential JV opportunities and eventual US-allied licensing."*

As part of its confidential work, in Phase I (*Expert Opinion; Technical Review of the IMC RapidSX™ Separation Technology for Rare-Earth Separation, March 26, 2021*), AGHS conducted a literature/data/conversational review of all past and current work associated with the development and commercialization efforts of the RapidSX technology. And in Phase II (*Expert Opinion; Technical Review of the IMC RapidSX™ Separation Technology for Rare-Earth Separation – Phase II, January 17, 2022*), they observed two rounds of testing carried out at Innovation Metals Corp.'s ("**IMC**") RapidSX Commercialization and Development Facility ("**CDF**") in Q4-2021 and conducted by IMC's laboratory partner **Kingston Process Metallurgy Inc.** ("**KPM**"). The first test was performed on a synthetic REE solution (a dilute solution consisting of Pr, Nd, Sm, and Gd), and the second test was conducted on a commercial mixed heavy REO sourced from an operating rare earth mine (the source of which remains commercially confidential). All testing was performed by KPM's

personnel under the observation of Dr. Ghahreman, with AGHS receiving the test data/results directly from KPM and evaluating the RapidSX technology based on this data.

The two sets of solutions were tested utilizing both RapidSX and conventional solvent extraction processes, primarily exploring the kinetics of the two processes for separating the rare earth elements. RapidSX testing was undertaken on the CDF’s Research Apparatus with a variety of flow rates and contactor lengths, as shown in Figure 1. Phase separator sizes and contactor diameter were kept consistent for all tests. CSX testing was conducted using mixer settlers, as shown in Figure 2.

Figure 2 – Conventional Solvent Extraction Testing at the CDF

To view an enhanced version of Figure 2, please visit:

https://orders.newsfilecorp.com/files/1119/121814_1abe1c4454ba19cd_002full.jpg

From the tests on the synthetic samples, it was clear that the equilibrium time with the CSX process was reached in approximately 120 seconds or more. In contrast, the RapidSX process achieved a higher separation factor of the REEs within 40 seconds. The results of the CSX tests on the commercial mixed rare earth concentrate showed that the equilibrium time shifted to over 300 seconds. However, RapidSX test results were consistently better than the CSX results, with a higher separation factor reached within less than 100 seconds. **These results confirm that RapidSX can be 3 times as efficient as CSX, which, among other advantages, could result in a RapidSX plant having a footprint 1/3 the size of a CSX plant.** Operating costs of RapidSX could be expected to be more than 20% less than those of CSX for the same throughput.

During the last week of March and the second week of April 2022, the expanded commercialization team of management, engineers and scientist (from Ucore, IMC and KPM) held numerous meetings at the RapidSX CDF to review and update all past and planned activities and schedules. Additionally, the team took the opportunity to review and discuss the Independent Evaluation's findings which Ucore received in March 2022.

Based on vast experiences with process optimization from all involved team members, design decisions confirmed that the Company would continue to aggressively advance the construction of its RapidSX Demonstration-scale Plant ("**DEMO Plant**") within the CDF – the DEMO Plant is now scheduled for commissioning in mid-2022. The Company shared more intricate long-range planning (under an NDA) with a potential multi-national SMC partner that also visited the CDF in April 2022, wanting to see the technology development first-hand and to discuss their upstream

and downstream requirements.

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About Ucore Rare Metals Inc.

Ucore is focused on rare- and critical-metals resources, extraction, beneficiation, and separation technologies with the potential for production, growth, and scalability. Ucore has a 100% ownership stake in the Bokan-Dotson Ridge Rare Earth Element Project in Southeast Alaska, USA. Ucore's vision and plan is to become a leading advanced technology company, providing best-in-class metal separation products and services to the mining and mineral extraction industry.

Through strategic partnerships, Ucore's vision includes disrupting the People's Republic of China's control of the US REE supply chain through the development of a heavy and light rare-earth processing facility – the Alaska Strategic Metals Complex in Southeast Alaska and the long-term development of Ucore's heavy-rare-earth-element mineral-resource property located at Bokan Mountain on Prince of Wales Island, Alaska.

Ucore is listed on the TSXV under the trading symbol "UCU" and in the United States on the OTC Markets' OTCQX® Best Market under the ticker symbol "UURAF."

For further information, please visit www.ucore.com.

About the RapidSX™ Technology

The Company's wholly owned subsidiary, Innovation Metals Corp., developed the RapidSX separation technology with early-stage assistance from the United States Department of Defense ("**US DoD**"), later resulting in the production of commercial-grade, separated rare-earth oxides at the pilot scale. RapidSX combines the time-proven chemistry of conventional solvent extraction

("**SX**") with a new column-based platform, which significantly reduces time to completion and plant footprint, as well as potentially lowering capital and operating costs. SX is the international rare-earth-element ("**REE**") industry's standard commercial separation technology and is currently used by 100% of all REE producers worldwide for bulk commercial separation of both heavy and light REEs. Utilizing similar chemistry to conventional SX, RapidSX is not a "new" technology but represents a significant improvement on the well-established, well-understood, proven conventional SX separation technology preferred by REE producers.

Forward-Looking Statements

This press release includes certain statements that may be deemed "forward-looking statements" regarding, among other things, the Company's ALASKA2023 Business Plan as well as the upcoming prospective financing activities involving the Company and AIDEA. All statements in this release (other than statements of historical facts) that address future business development, technological development and/or acquisition activities (including any related required financings), timelines, events, or developments that the Company expects, are forward-looking statements. Although the Company believes the expectations expressed in such forward-looking statements are based on reasonable assumptions, such statements are not guarantees of future performance or results, and actual results or developments may differ materially from those in forward-looking statements. In regard to the disclosure in the "About Ucore Rare Metals Inc." section above, the Company has assumed that it will be able to procure or retain additional partners and/or suppliers, in addition to IMC, as suppliers for Ucore's expected future Alaska Strategic Metals Complex ("Alaska SMC"). Ucore has also assumed that sufficient external funding will be found to prepare a new National Instrument 43-101 ("NI 43-101") technical

report that demonstrates that the Bokan Mountain Rare Earth Elements project ("Bokan") is feasible and economically viable for the production of both REE and co-product metals and the then prevailing market prices based upon assumed customer offtake agreements. Ucore has also assumed that sufficient external funding will be secured to continue to develop the specific engineering plans for the Alaska SMC and its construction. Factors that could cause actual results to differ materially from those in forward-looking statements include, without limitation: Innovation Metals Corp. ("IMC") failing to protect its intellectual property rights in RapidSX™; RapidSX failing to demonstrate commercial viability in large commercial-scale applications; Ucore not being able to procure additional key partners or suppliers for the Alaska SMC; Ucore not being able to raise sufficient funds to fund the specific design and construction of the Alaska SMC and/or the continued development of RapidSX; adverse capital-market conditions; unexpected due-diligence findings; the emergence of alternative superior metallurgy and metal-separation technologies; the inability of Ucore and/or IMC to retain its key staff members; a change in the legislation in Alaska and/or in the support expressed by the Alaska Industrial Development and Export Authority ("AIDEA") regarding the development of Bokan and/or the Alaska SMC; the availability and procurement of any required interim and/or long-term financing that may be required; and general economic, market or business conditions.

Neither the TSXV nor its Regulation Services Provider (as that term is defined by the TSXV) accept responsibility for the adequacy or accuracy of this release.

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[1] Dr. Ahmad Ghahreman is the CEO and President of AGHS, whose clients include many senior and junior mining companies. He has invented / co-invented 15 patents and has co-authored more than 100 journal and conference papers on the topics of metals extraction and hydrometallurgy. Dr. Ghahreman has been a consultant to the Government of Canada to (1) review the status and likelihood of success of all the active rare earth mining projects in Canada in 2015-2016, (2) to review the hydrometallurgical processing of REE ores and concentrates in 2016-2017, and (3) review acid baking and REE solutions purification for 2 of the most prominent REE mining projects in Canada.