AMERICAN RARE EARTHS ABN 83 003 453 503

ASX RELEASE

29 May 2024

American Rare Earths Announces Zircon Co-Product Potential

Zircon has been significantly upgraded at Halleck Creek as part of low-cost REE pre-concentration

Highlights

- Zircon supply is currently limited but is essential in high-growth industries like ceramics, electronics and nuclear energy, which are experiencing increasing demand globally.
- Initial and historical exploration assay results indicate the potential for significant Zircon co-product potential alongside Rare Earths (REEs) processing at ARR's flagship Halleck Creek project.
    - Zirconium can be easily separated and upgraded, owing to its density, as part of the REEs pre-concentration steps in the Halleck Creek flowsheet; potentially providing significant economic value when produced alongside REE's" as a co-product.
    - Historical assay results for zirconium indicate an average in-situ grade is 2,077 ppm. The average crustal abundance is 300 ppm for comparison purposes.
    - Initial assay results from the gravity separation program (spiral testing) within the REEs program provided a 13.7x upgrade which equates to ~2.3%.
    - Through research collaboration with the University of Wyoming, ARR believes zircon is more prevalent at Halleck Creek than previously believed.
    - Beneficiation work currently being performed includes testing to separate and further concentrate zirconium using gravity separation and magnetic removal of paramagnetic minerals to further upgrade the material.
    - Laser ablation assay of zircon crystals show elevated levels of heavy REEs, providing additional upside.
- Future exploration and metallurgy work is focused on several opportunities:
    - Separated zirconium concentrate as a co-product, and
    - Heavy REEs extraction from metamict zircon

American Rare Earths **(ASX: ARR | OTCQX: ARRNF | ADR: AMRRY) ("ARR"** or the **"Company")** is pleased to announce the zircon co-product potential alongside REE processing at Halleck Creek as part of a research collaboration with the School of Energy Resources ("SER") at the University of Wyoming.

Donald Swartz, Chief Executive Officer of American Rare Earths, commented:

"*Zircon is typically a minor product obtained from processing heavy mineral sands and has many high value applications across multiple industries. We are thrilled to announce the discovery of a potential co-product in our Halleck Creek project. This potential was only recently identified as part of our previously announced REE processing program modifications emphasising Dense Medium Cyclones work*[1] *led by Lawrence Livermore National Laboratory. This opportunity has the potential to generate significant additional revenue and enhanced project economics. Further details will be provided as we continue our assessment and evolve our strategy to maximise value for our shareholders*."

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[1] ASX Announcement 22 January 2024. American Rare Earths Announces Breakthrough Metallurgical Results

This work is a significant step forward in understanding the potential of zircon within the Red Mountain pluton at ARR's flagship Halleck Creek REEs project. Dr. Lily Jackson, an expert in sedimentology, tectonics, and geochronology from SER, has led this research. The Company aims to understand the significance of zircon within the REEs bearing Red Mountain pluton at Halleck Creek. Zircon, like allanite contains REEs elements and, has the potential to be a significant contributor of Heavy REEs ("HREE") at Halleck Creek.

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

Technical Summary

Preliminary assessments uncovered notable anomalies in zircon within core samples collected from the Red Mountain pluton. The preliminary findings indicate that zircon may occur in greater abundance than previously observed (Figure 1). Observations also reveal that zircon in the samples have metamict cores like metamict cores observed in allanite at Halleck Creek. Furthermore, this preliminary work indicates that metamict zircon cores (centers) exhibit an exceptional enrichment in REEs Elements compared to their rims. This is well illustrated by cathodoluminescence images as observed in Figure 2.

Dr. Jackson of the University of Wyoming performed laser ablation inductively coupled plasma mass spectrometry analyses on several metamict zircon phenocrysts (crystals) which provided preliminary REE values. The pinpoint laser ablation showed that the metamict centres of the zircon contained anomalously high levels of REEs relative to the rims of the zircon. Lastly, the highly metamict zircon cores suggest that REEs contained within them may be more readily leached than unaltered zircon, potentially offering an avenue for efficient REE recovery. These observations highlight the need for further exploration into the unique properties of zircon at Halleck Creek.

ARR and the University of Wyoming are collaborating to continue investigation of zircon at Halleck Creek. The initial collaboration will consist of performing QEMSCAN analysis at the University of Wyoming, to provide quantitative mineral analysis, and benchtop-scale REE leaching to assess how metamictization of zircon affects extraction of REEs from zircon.

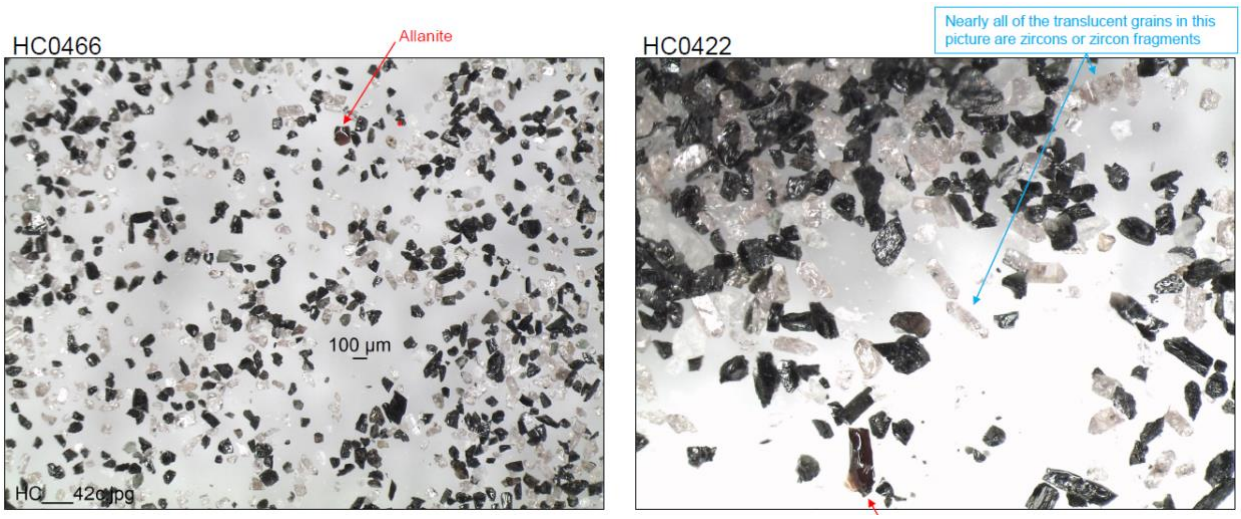

Figure 1 - Images of heavy mineral separates illustrating previously unrecognized abundance of zircon in the Red Mountain pluton ore.

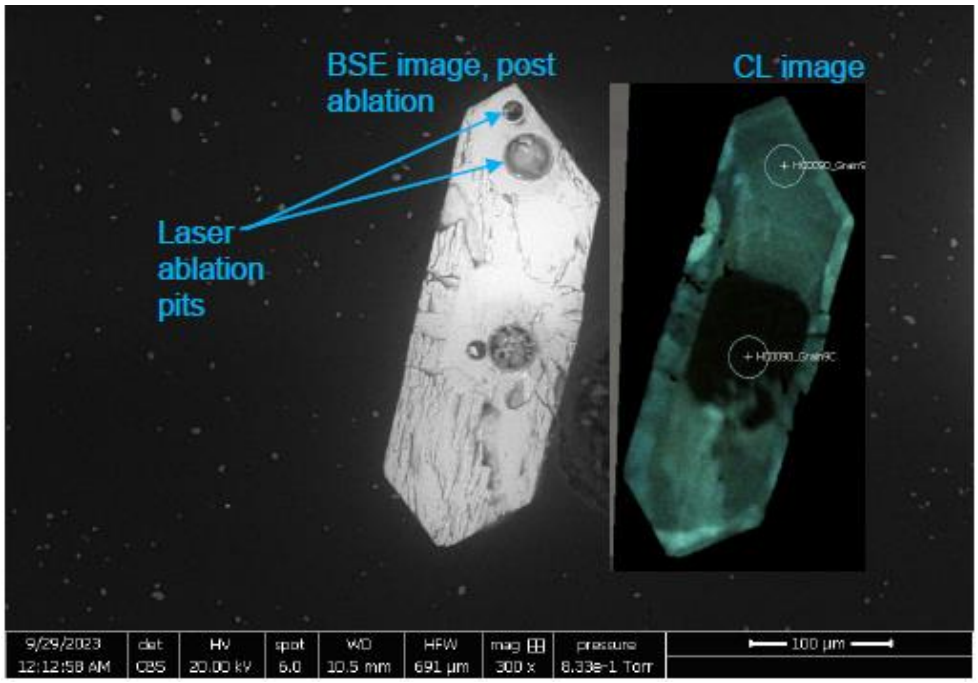

Figure 2 – Back scatter electron and cathodoluminescence image of a single zircon grain from Red Mountain pluton exhibiting metamict and REE enriched cores.

ARR reviewed ZrO2 values in drilling assay data across Halleck Creek. In 5,012 drilling assay samples with TREO greater than 1,000ppm, ZrO2 values ranged from 38ppm to 7,402ppm with an average of approximately 2,077ppm. In comparison to average crustal abundance of 300ppm, as determined by the USGS, the average ZrO2 values in Halleck Creek data are approximately 7 times average crustal abundance.

As a proof-of-concept study, Sepro Systems, in Vancouver, British Columbia, performed preliminary rougher spiral separation using 71 kg of Halleck Creek core material. Sepro ground the core samples to p80 of 250 µm. The ground sample was mixed in the pump box at a pulp density of 28% and pumped to the top of a 7-turn mineral spiral. The preliminary rougher spiral concentrate showed significant upgrade factors of TREO and Zircon of 4.9 and 13.7, respectively. The spirals tests showed TREO and Zircon recoveries of 23.5% and 66.2%, respectively for the concentrate material. Upgrades of TREO and Zircon improved when the concentrate and middlings product were combined, indicating that cleaner, scavenger spiral testing would improve overall upgrade factors and recoveries.

It should be noted, this proof-of-concept testing is not indicative of final flowsheets or process design. The results of this testing, while favourable, cannot be used to imply upgrading and recoveries moving forward.

Sepro Spiral Results										
Products	Weight	(%)	TREO (ppm)	SiO2 (ppm)	Al2O3 (ppm)	Fe2O3 (ppm)	ZrO2 (ppm)	LREO (ppm)	MREO (ppm)	HREO (ppm)
Concentrate	308.5	4.8	18,379.4	48.1	11.5	23.0	22,700.0	16,136.8	952.4	1,290.1
Upgrade Factor			***4.9***	*0.8*	*0.7*	*3.8*	***13.7***	*5.0*	*4.4*	*4.0*
Middling	770.5	12.1	6,912.6	60.1	15.2	10.2	1,335.9	5,955.9	389.1	567.6
Upgrade Factor			*1.8*	*1.0*	*0.9*	*1.7*	*0.8*	*1.8*	*1.8*	*1.8*
Concentrate + Middlings	1,079.0	**16.9**	10,191.1	56.6	14.1	13.8	7,444.2	8,866.8	550.2	774.2
Upgrade Factor			***2.7***	*0.9*	*0.8*	*2.3*	***4.5***	*2.7*	*2.5*	*2.4*
Tails	5,311.7	83.1	2,464.2	64.5	17.1	4.5	478.2	2,083.3	149.3	231.6
Calculated Head	6,390.7	100.0	3,768.8	63.2	16.6	6.0	1,654.3	3,228.6	217.0	323.2
Assayed Head			4,127.7	62.4	16.4	6.5	1,659.5	3,545.0	234.0	348.7

			Recovery Distribution (%)							
Products	Weight (g)	(%)	TREO	SiO2	Al2O3	Fe2O3	ZrO2	LREO	MREO	HREO
Concentrate	308.5	4.8	**23.5**	3.7	3.4	18.4	**66.2**	24.1	21.2	19.3
Middling	770.5	12.1	22.1	11.5	11.0	20.3	9.7	22.2	21.6	21.2
Concentrate + Middlings	1,079.0	16.9	**45.7**	15.1	14.4	38.7	**76.0**	46.4	42.8	40.4
Tails	5,311.7	83.1	54.3	84.9	85.6	61.3	24.0	53.6	57.2	59.6
Total	6,390.7	100.0	54.3	84.9	85.6	61.3	24.0	53.6	57.2	59.6

Further information

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Competent Persons Statement:

This work was reviewed and approved for release by Mr Kelton Smith (Society of Mining Engineers #4227309RM) who is employed by Tetra Tech and has sufficient experience which is relevant to the metallurgical testing and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 JORC Code. Mr Smith consents to the inclusion in the report of the matters based upon the information in the form and context in which it appears.

About American Rare Earths

American Rare Earths Limited **(ASX: ARR | OTCQX: ARRNF | ADR: AMRRY)** owns the Halleck Creek, WY and La Paz, AZ rare earth deposits which have the potential to become the largest and most sustainable rare earth projects in North America. American REEs is developing environmentally friendly and cost-effective extraction and processing methods to meet the rapidly increasing demand for resources essential to the clean energy transition and US national security. The Company continues to evaluate other exploration opportunities and is collaborating with US Government-supported R&D to develop efficient processing and separation techniques of REEs elements to help ensure a renewable future.