7 April 2022

American Rare Earths provides an update on La Paz Metallurgy

American Rare Earths (**ASX: ARR, OTCQB: ARRNF, FSE: 1BHA**) (**ARR or 'the Company')** is pleased to announce that the current metallurgical test work on ore from its flagship La Paz project has responded well to conventional processing technology. The results provide further opportunities to reduce operating and capital costs and will help underpin a Preliminary Economic Assessment (PEA) for La Paz, scheduled for the second half of 2022.

Highlights

- Metallurgical test results from the La Paz project show the ore responds well to conventional processing technology.
- Capital and operating costs will be reduced with 75% of the gangue (non-mineralised) material removed prior to the floatation circuit.
- The next testing phase will focus on flotation to further increase Total Rare Earth Oxides (TREO) recoveries.
- Further potential to significantly cut operating and capital costs for La Paz will be tested using Watts and Fisher's propriety leaching technology.

The new metallurgical testing campaign initiated by the Company has been designed to investigate how composites prepared from diamond drill core produced during 2021 respond to currently used processing technologies.

The campaign follows encouraging beneficiation work completed on surface rock chips involving magnetic separation and flotation combinations at Saskatchewan Research in Canada in 2021.

Planned work will build upon these results to produce a beneficiated concentrate that maximises rejection of acid or alkali consuming gangue minerals.

Significantly, in conjunction with ongoing extraction testwork, these results will contribute to a Preliminary Economic Assessment (PEA), planned for the second half of 2022, which aims to demonstrate the economic viability of the large La Paz resource.

Managing Director, Mr Chris Gibbs, commented: *"These recent metallurgical results are incredibly positive and continue to move the La Paz Project forward.*

“Metallurgy is key for all rare earth projects, and we are seeing the allanite hosted minerals respond well to widely used ore processing technologies. We are excited to see 75% of the gangue material removed before the flotation circuit. This will significantly help to reduce operating and capital costs for the project.

"We appreciate the work Wood Australia has been conducting on our behalf, as they project manage the metallurgical test work program conducted at Nagrom Laboratories in Perth, Western Australia.

"Significant progress has been made and we look forward to the next round of test work on the flotation and leach stages. Under the guidance of Wood, we are also pleased to be partnering with Watts and Fisher, who have proprietary technology that could be a game-changer for this project.”

Program Highlights

Key laboratory results

- Comminution test work indicates La Paz ore has moderate hardness and competency, making it well suited to semi-autogenous (SAG) milling and High Pressure Grinding Rolls (HPGR) processing.
- Low yields produced from Low Intensity Magnetic Separation (LIMS) processing indicate little contamination from magnetic minerals, simplifying the flowsheet.
- Sequential grinding and rougher-cleaner Wet High Intensity Magnetic Separator (WHIMS) effectively reject 75% of silica/silicate gangue minerals, an essential step before employing flotation.
- Concentrate produced from cleaner WHIMS and flotation processing will be tested using the proprietary Watts & Fisher leaching process, which offers a much less capital-intensive route than conventional rotary kiln acid or alkali bake processing routes.

Program Overview

Nagrom laboratory in Perth, Western Australia, was awarded the testwork program in late 2021.

The program comprises mineralogy, high-intensity magnetic separation and rare earth mineral flotation to upgrade the target rare earth mineral content before extraction testwork.

La Paz's rare earth mineralisation is primarily hosted in allanite, a sorosilicate group mineral related to epidote. As the gangue rocks hosting allanite comprise feldspars and silicates, innovative separation techniques are needed to upgrade the ore.

Four composites are currently under evaluation – three variability (Cataclastite, Gneiss and Dyke) and the main composite reflecting the typical lithologies of the orebody. Main exploratory work is being conducted on a "main" composite, with optimised conditions to be trialled on variability samples.

Mineralogy

Comprehensive QEMSCAN testing has been undertaken to map mineral deportment in selected particles and understand the conditions needed to liberate allanite from non-mineralised waste rocks. A typical image of 0.5 to 1 mm specimens from QEMSCAN is shown in Figure 1.

QEMSCAN confirms that 85% of Rare Earth Element (REE) mineralisation resides in allanite, with 2% in monazite and 7% in synchysite/parisite (fluorocarbonate REE minerals. The balance is found in other REE intergrowths, such as amorphous REE carbonates or intergrowths with manganese minerals. The minerals found in those intergrowths are difficult to differentiate as distinct REE minerals. Fortunately, the proportion of intergrowths at La Paz is very low compared to some other rare earth orebodies.

Allanite is, however, relatively fine-grained and will ultimately require fine grinding to achieve a high degree of liberation from gangue minerals. Still, its magnetic susceptibility does lend itself to initial upgrading with WHIMS.

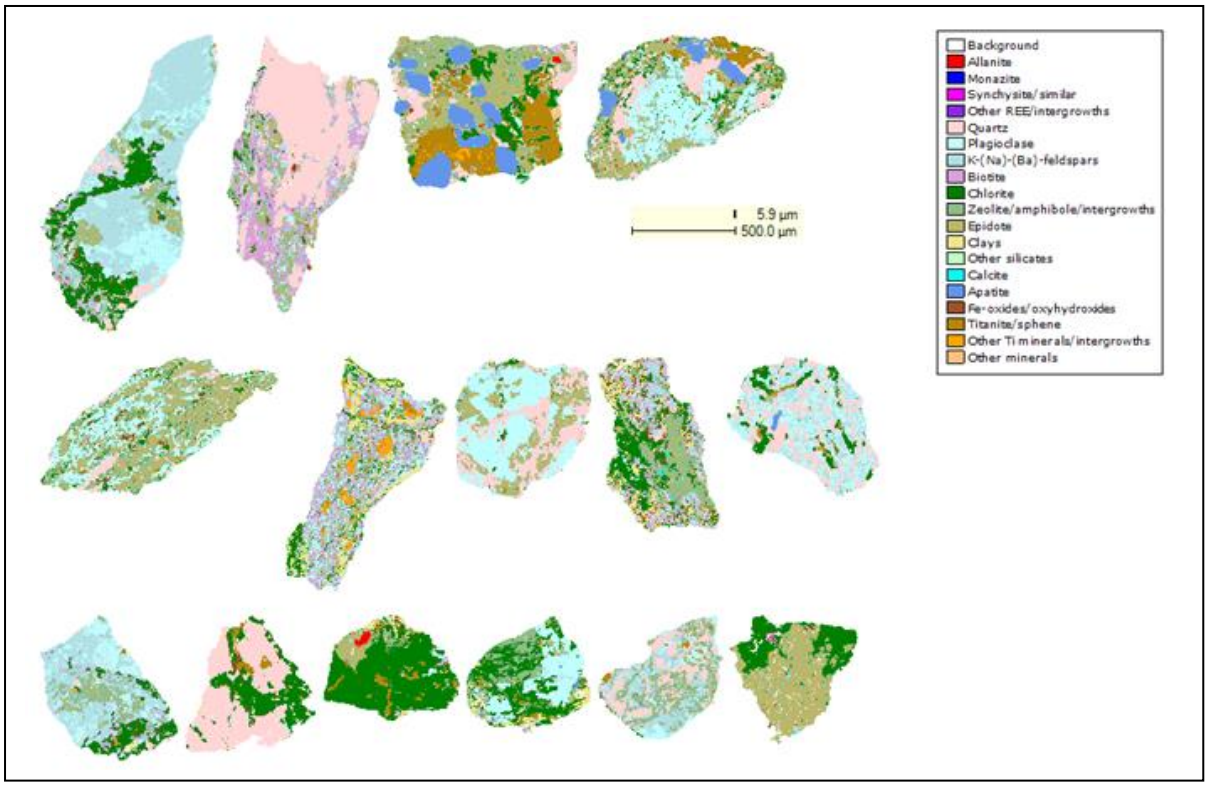

Figure 1: QEMSCAN Mapping of La Paz Mineral Assemblages

Size by assay analysis indicates enrichment of rare earth metals with increasing fineness of the grind. Figure 2 plots Total Rare Earth Oxides (TREO) assay with particle size for ore crushed to minus 3.35 mm, illustrating this enrichment.

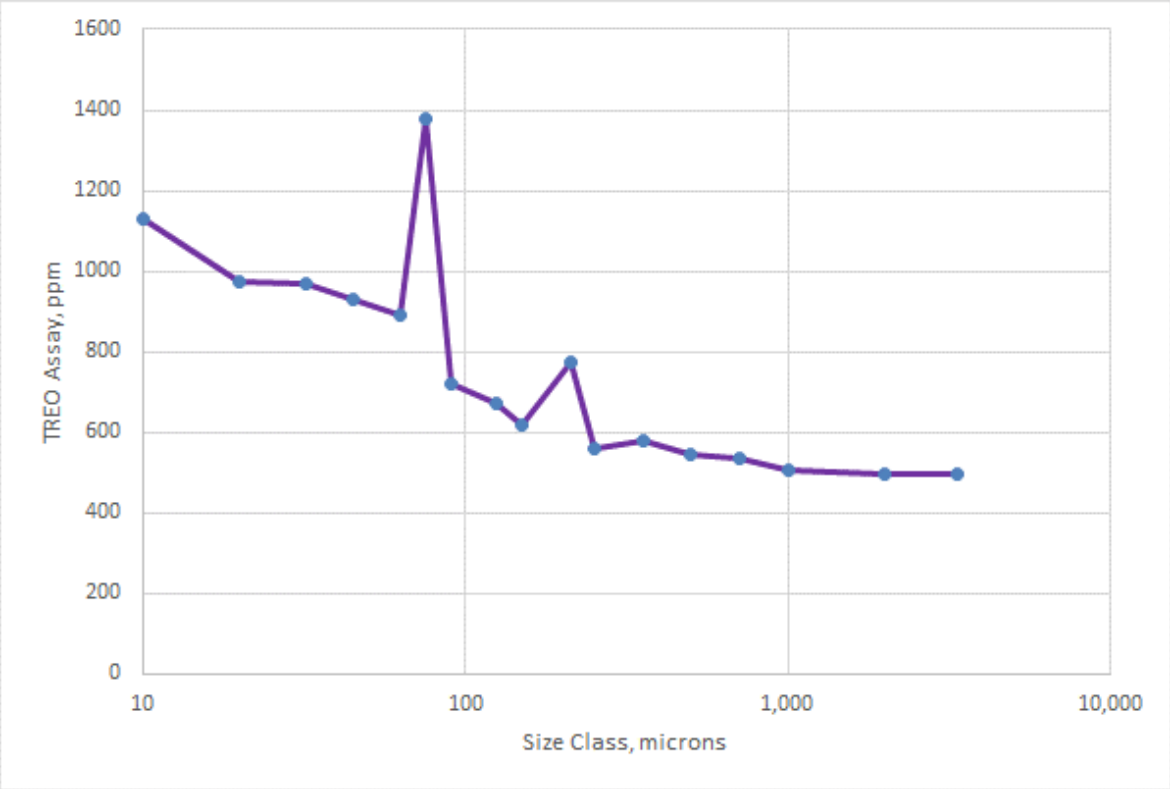

Figure 2: TREO Assay with Particle Size

Comminution Properties

The Main Composite was subjected to comminution testing to understand its suitability for semi-autogenous grinding (SAG) and other comminution methods. Key outcomes were:

- A Bond ball mill work index value of 18 kWh/t was returned, indicating moderately high ore hardness.
- A Bond abrasion index value of 0.21 was reported, suggesting below average abrasiveness towards grinding media and liners, which is positive for economics.
- SAG Power Index (SPI) testing produced a value of 68, which indicates average ore competency.
- SAG Mill Competency (SMC) testing generated an Axb product of 47.5, suggesting average ore competency. This is typical of ores that respond well to SAG milling and are also expected to be well suited to high pressure grinding rolls processing. The eventual comminution method will depend on the selected processing rate and grind size required for primary beneficiation.

Low Intensity Magnetic Susceptibility

WHIMS is the primary technology employed to concentrate weakly magnetic minerals such as allanite and monazite before being subjected to flotation. Removing strongly

magnetic minerals such as magnetite from the WHIMS feed is important to avoid blocking the magnetic matrix.

To this end, Davis Tube Recovery (DTR) testing was applied to sample milled to eight grind sizes, ranging from 80% passing 25 microns to 500 microns. Minimal mass yield (0.7 to 1.1%) was achieved, which indicates low magnetite content in the ore.

Importantly, this indicates that low intensity magnetic separation (LIMS) is not needed as a processing step before WHIMS, which reduces concentrator complexity.

The recovered little mass was high in TREOs, particularly in the coarser grind sizes, indicating some association of magnetics with rare earth minerals. The TREO grade dropped steadily with increasing fineness, indicating that rare earth minerals were liberated at the finer grind sizes. This was a useful diagnostic test to understand allanite deportment.

High Intensity Magnetic Susceptibility

Sighter Rougher WHIMS Investigations – Main Composite

Batch sighter WHIMS testing was undertaken using a pulsating Wet High Gradient Magnetic Separator (WHGMS) at the same eight grind sizes used for DTR testing. All tests were conducted at a relatively high field of 1.2 Tesla to ensure high recovery of rare earth minerals.

Figure 3 depicts % silica rejection with magnetics TREO grade and recovery. High rejection of silica is possible whilst maintaining high TREO recovery to magnetics. For the bulk rougher WHIMS run, grind size of 80% passing 150 microns was selected, corresponding to 38.5% silica rejection and 87% TREO recovery to magnetics in the batch WHGMS145 unit.

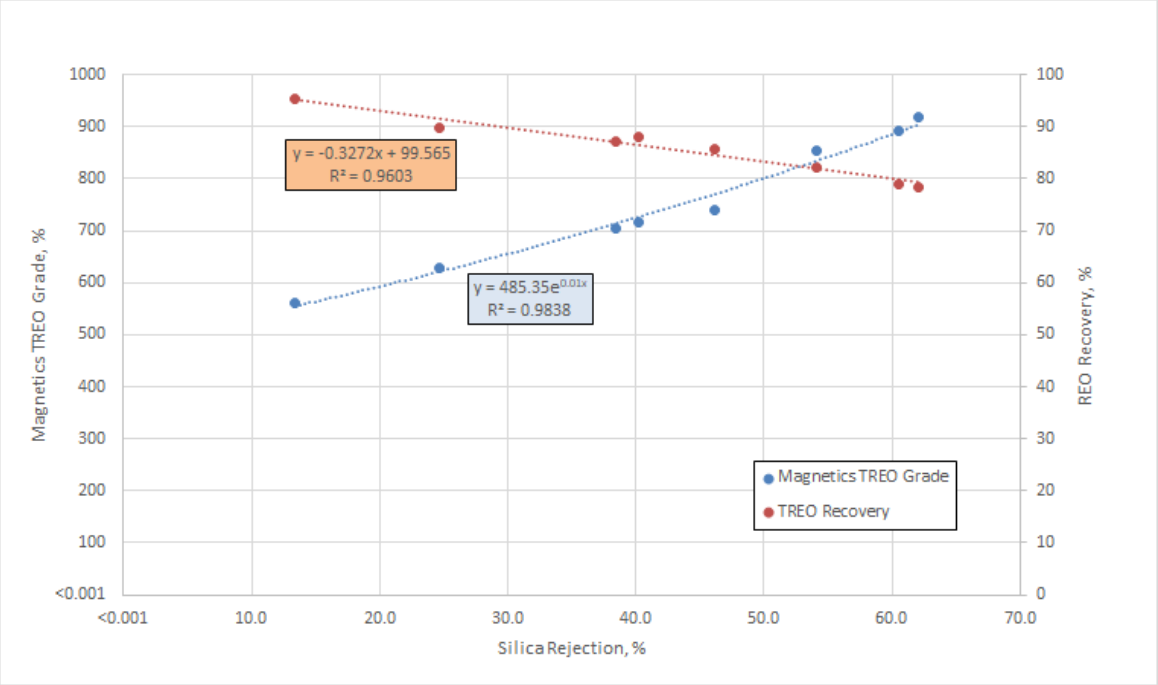

Figure 3: TREO Assay with Particle Size

Figure 4 provides contrasting views of magnetic and non-magnetic products produced by the batch WHIMS unit, illustrating the effectiveness of high intensity magnetic separation for the primary treatment of La Paz ore.

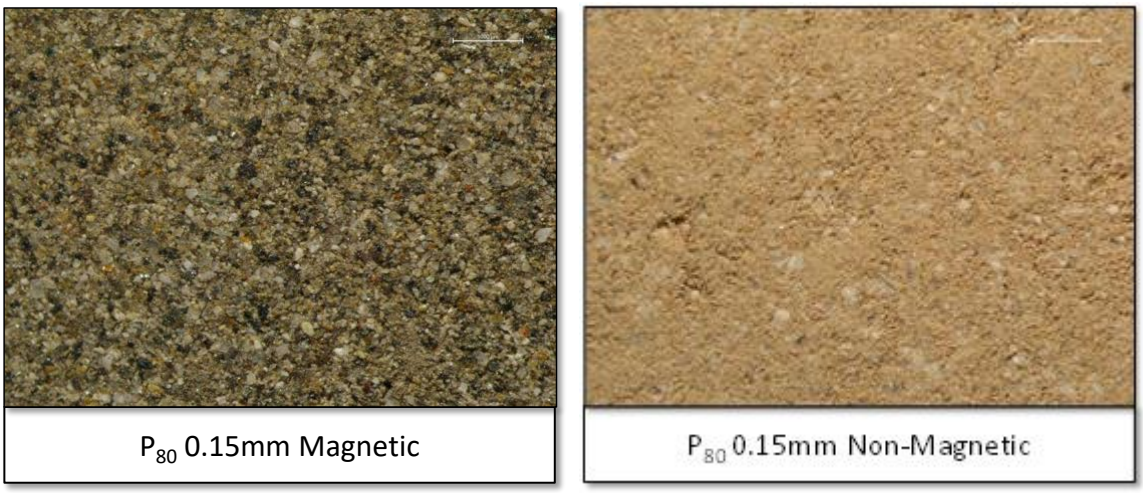

Figure 4: Sighter WHIMS Products

Bulk Rougher-Scavenger WHIMS Run – Main Composite

The bulk rougher WHIMS run was undertaken at a grind size of 80% passing 150 microns, selected as optimal in the batch work. The bulk run was conducted in a Longi 500 WHIMS unit, initially consisting of a rougher stage, but due to the continuous mode of operation with a rotating cage, fine paramagnetics are lost. This necessitated passing the rougher tails through two scavenger stages for additional recovery. The conditions for scavenging were not optimised, so it is likely that in the full scale plant, only a single stage of scavenging would be needed.

Figure 5 shows a comparative plot of TREO recovery grade for the continuous Longi 500 run with rougher and two scavenger stages against a single pass in the WHGMS145 batch unit.

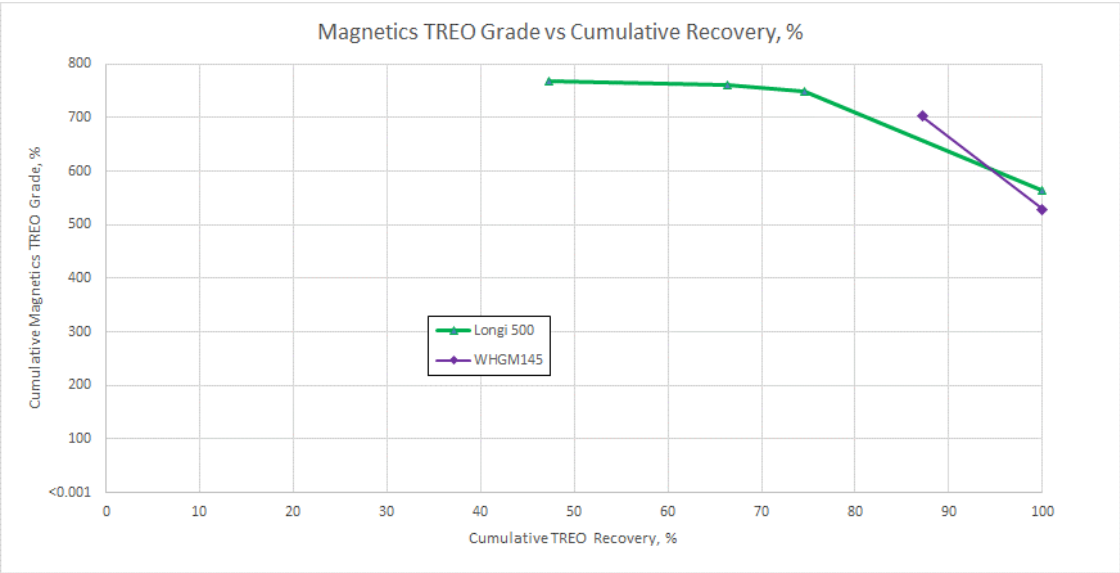

Figure 5: Rougher-Scavenger REO Recovery vs Grade

Higher TREO grades were achieved in the continuous Longi 500 unit due to the purging of fine paramagnetics from the cage matrix. This achieved 75% recovery at 749 ppm grade compared with 703 ppm grade for 87% recovery in the batch unit. 50% of feed silica was rejected in the continuous run compared with only 38% in the batch test at this grind size. This suggested that REO losses are possibly very fine allanite particles encapsulated within larger silica particles, so the overall magnetic susceptibility of the particles is lower than the liberated allanite particles.

Variability Composites Rougher WHIMS Tests

The three variability samples were milled to a P_{80} of 150 um and subjected to rougher WHGMS145 treatment. Results are summarised below with a comparison against the Main Composite batch test results at this grind size.

Sample	Mass, %	Feed TREO Ppm	TREO		SiO_2	
			Grade, ppm	Rec'y, %	Grade, %	Rec'y, %
Cataclastite	59.9	527	649	73.8	55.6	55.6
Gneiss	61.5	515	690	82.4	55.0	56.3
Dyke	54.0	531	714	72.5	59.1	49.8
Main	66.3	550	703	87.2	56.4	61.5

Gneiss compared favourably to the main composite in terms of TREO grade and recovery, which makes sense since this is the main lithology type in the deposit. Dyke and cataclastite samples performed the worst in terms of recovery to concentrate. Dyke returned the highest grade, suggesting losses to fine fractions. Cataclastite, however, did not upgrade well, suggesting locking in coarse silica/silicate particles. Silica rejection for all samples was better than the Main Composite, which also accompanied lower TREO recovery. Silica grades were comparable across the samples. There was insufficient dyke material left to do further work, so bulk rougher, regrind and cleaner work will be done only on Cataclastite and Gneiss samples, adopting optimised conditions from the main composite run.

Sighter Cleaner WHIMS Investigations – Main Composite

To determine optimal regrind size, sighter cleaner tests were undertaken on bulk rougher-scavenger WHIMS magnetics. Regrind sizes of 80% passing 90, 75, 45 and 38 microns were investigated.

Figure 6 depicts TREO recovery-grade responses for each grind size tested.

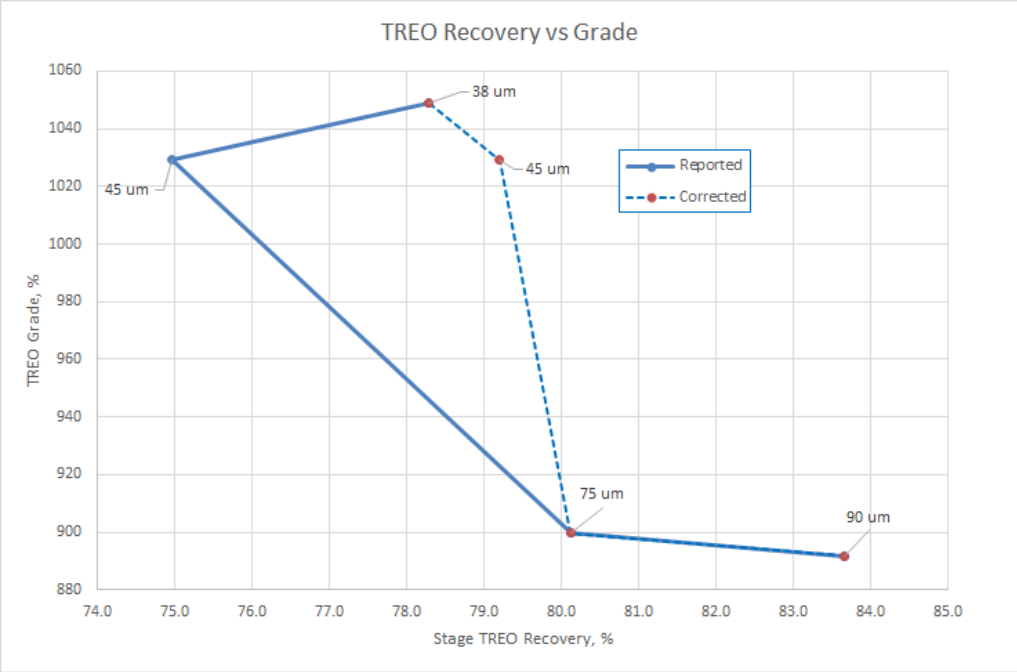

Figure 6: Sighter Cleaner WHIMS REO Recovery vs Grade by Grind Size P80

Plotting TREO recovery grade for the four grind sizes indicates that a P_{80} of 45 microns is likely to be optimal for this sample based on plateauing TREO recovery and flattening silica rejection below this size. The recovery at 45 um P_{80} is lower than at 38 and 75 um P80, due to an elevated tail grade caused by experimental uncertainty. There is no logical reason for recovery to dip at this size since silica and mass rejection steadily increase with the increasing fineness of the grind, as seen in Figure 7.

There is an inflection point at 45 um, which shows the curve flattening for silica recovery. The recovery at 45 um P80 (dashed line) has been corrected to represent the likely liberation profile for the grind series.

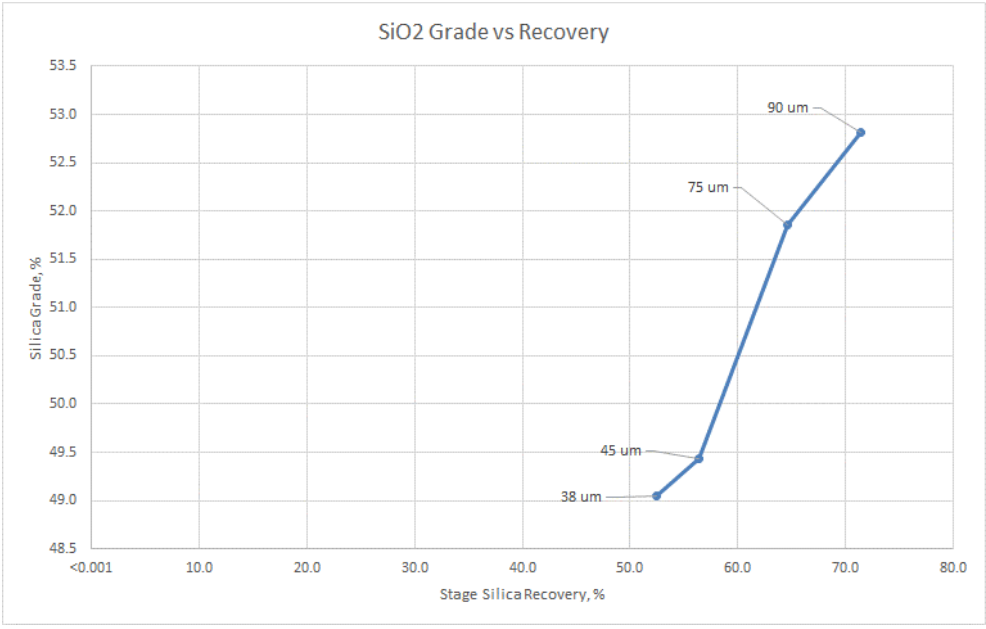

Figure 7: Sighter Cleaner WHIMS Silica Recovery vs Grade by Grind Size P80

Based on the initial grind size series evaluation, the bulk rougher-scavenger WHIMS concentrate was reground to 80% passing 45 microns and submitted to two additional series of tests evaluating pulsation rate and stroke amplitude before moving on to bulk cleaner WHIMS operation.

Results for the three pulsation rate tests are summarised in the following table using the Longi 500 unit at 10% solids feed pulp density, with a 1.5 mm matrix and field strength of 17000 gauss for maximum recovery.

	Pulsation Rate Series		
Parameter	**Cleaner Test 5**	**Cleaner Test 6**	**Cleaner Test 7**
Pulsation rate (ppm)	250	200	150
Ring speed (rpm)	2	2	2
Stroke amplitude (mm)	4.5	4.5	4.5
Stroke length (mm)	6.1	6.1	6.1
Results (concentrate)			
Mass yield (%)	44.3	42.2	44.3
TREO grade (ppm)	939	943	926
TREO recovery (%)	59.9	51.7	56.2
NdPrO grade (ppm)	219	219	213
NdPrO recovery (%)	60.1	51.4	56.1
SiO_2 grade (%)	48.9	48.8	49.3

Test 5 conditions were selected for further optimisation as they produced the equal best NdPrO grade and recovery of the three tests. Mass yield is 44.3% of test feed, so cleaning successfully rejects mass. NdPrO recovery largely follows TREO recovery, and is low as it is a single pass test.

Results for the tests evaluating stroke length are presented below.

	Stroke Length Series		
Parameter	**Cleaner Test 8**	**Cleaner Test 9**	**Cleaner Test 10**
Stroke length (mm)	4.0	11.7	15.9
Pulsation rate (ppm)	200	200	200
Ring speed (rpm)	2	2	2
Results (concentrate)			
Mass yield (%)	40.2	43.8	41.4
TREO grade (ppm)	1056	1180	1287
TREO recovery (%)	53.9	64.4	66.1
NdPrO grade (ppm)	237	261	282
NdPrO recovery (%)	54.0	64.4	66.1
SiO_2 grade (%)	48.9	45.0	43.5

The stroke length test series produced higher selectivity against gangue in Tests 9 and 10 compared to Test 5 in the preceding pulsation rate tests. TREO grades also improved markedly, lifting from 943 ppm in Test 5 to 1287 ppm in Test 10, with corresponding

increases in NdPrO grade from 219 ppm to 282 ppm. a corresponding reduction in mass yield was observed, reducing from 48.9% in Test 5 to 41.4% in Test 10.

Test 10 conditions have been selected for the bulk cleaner WHIMS run will be undertaken. The cleaner stage will operate at a lower gauss level of 12000 gauss to generate a higher grade concentrate, with scavenger steps included at 17000 gauss level to boost overall recovery. A decision will be made once the results are received as to whether or not one or both scavenger stages will be included in the cleaner concentrate for downstream testing, based on achieved NdPrO upgrade.

Forward Plan

Work planned in April includes the following:

- Bulk cleaner WHIMS run.
- Commencement of sighter flotation tests (both direct REO and reverse silica flotation).
- The initial sample of cleaner WHIMS concentrate will be sent to Watts & Fisher for sighter leaching testwork.

Work planned for May includes the following:

- Completion of sighter flotation testing.
- Optimised conditions bulk flotation test (full sequence).

Work planned for June includes the following:

- Completion of beneficiation work, including sighter dewatering testing.
- Confirmatory testing at Watts & Fisher on flotation concentrate to compare against cleaner WHIMS concentrate.
- Comparative sighter tests evaluating conventional extraction routes:
    - Acid bake
    - Alkali bake
    - Caustic digest

Summary

Testwork conducted so far on the diamond drill core from the La Paz deposit confirms previous findings regarding mineral liberation and upgrade potential.

Planned work will build upon these results to produce a beneficiated concentrate that maximises rejection of acid or alkali consuming gangue mineral.

In conjunction with extraction testwork, these results will underpin a PEA planned for the second half of 2022, which aims to demonstrate the economic viability of the large La Paz resource.

American Rare Earths Limited (ASX: ARR, OTCQB: ARRNF, FSE: 1BHA) is an Australian company listed on the ASX with assets in the growing rare earth metals sector of the United States of America, emerging as an alternative international supply chain to China's market dominance of a global rare earth market expected to expand 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.

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 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 the 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 recently upgraded 170MT Resource.

In the first half of 2021, ARR acquired the USA REE asset, the Halleck Creek Project in Wyoming. The maiden exploration drilling program commenced in March 2022 and 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 Total Rare Earth Oxide (TREO) grade of 2,330 - 2,912 ppm. Initial surface sampling of the Overton Mountain area conducted in 2018 revealed average 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.

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

Mr Chris Gibbs
CEO & Managing Director

Competent Persons Statement:
The information in this document is based on information compiled by Mr Greg Henderson. Mr Henderson is a Senior Process Consultant at Wood Australia. Mr Henderson is a Fellow of the Australian Institute of Mining and Metallurgy (AUSIMM), number 109007, and has sufficient experience which is relevant to the style of mineralisation 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 Henderson consents to the inclusion in the report of the matters based upon the information in the form and context in which it appears.