American Rare Earths Limited

(ASX:ARR)

An Australian exploration company focused on the discovery & development of Rare Earths and Critical mineral resources in North America and Australia

Commodity Exposure

Rare Earth Elements, in the USA

Heavy Mineral Sands and Cobalt in Australia

Directors & Management

Creagh O'Connor
Non-Executive Chairman
Keith Middleton
Managing Director
Geoff Hill
Non-Executive Director
Vice Chairman
Denis Geldard
Non-Executive Director
Jim Guilinger
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Wayne Kernaghan
Company Secretary

Capital Structure

Ordinary Shares on Issue 338,058,326

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7 April 2021

Metallurgical Testwork Update - La Paz Rare Earths Project

- Interim metallurgical testwork on rock chip samples taken from the Original Resource Area returned positive results, providing support for a new testwork program to be conducted on the newly drilled diamond core.
- The current round of testwork, conducted by the Saskatchewan Research Council (SRC) in Canada, has produced concentrate grades similar to what was achieved in historical work, but using wet high intensity magnetic separation (WHIMS) only.
- The rock chip material contains in excess of 50% silica (SiO_2), with minor magnetite and hematite. Rare earths are predominantly hosted in the mineral allanite, with minor monazite also being present.
- Concentrate is currently being produced from an additional composite of rock chips at the SRC using the WHIMS beneficiation flowsheet adopted for the initial work. The concentrate will be subjected to acid baking and water leaching to produce leachate that will be sent to Lawrence Livermore National Laboratories for patented biosorption technology that uses a biological ligand metal extraction of TREEs and scandium.
- Initial work focussed on a staged grind-WHIMS beneficiation approach. Work planned on a bulk composite of diamond drill core from the deposit will address optimisation of grind size to enhance TREE and scandium recoveries/grades in the separation from gangue minerals.
- Introduction of flotation to reject barren silica is expected to further enrich the TREE and Scandium concentrate grades which will have a positive impact on project economics. The intent is to apply flotation first and use WHIMS technology to provide further upgrading by rejecting barren silica after the majority of iron oxide gangue minerals have been rejected in flotation.
- Given that allanite beneficiation is not commonly practiced, with most global rare earth operations processing monazite and bastnaesite bearing ores, testing of new generation flotation collectors and gangue depressants will be a large focus in the next round of testwork, working closely with specialist reagent suppliers. This work will be undertaken by Nagrom Laboratories in Perth, Western Australia, and co-ordinated by Wood PLC.

American Rare Earths Limited (ASX: "ARR") ("the Company") is pleased to provide the following activities update from its wholly owned US subsidiary, Western Rare Earths as they develop the La Paz Rare Earths Project.

La Paz Testwork Update

Building on historical work undertaken in 2011, the Saskatchewan Research Council (SRC) was commissioned to undertake exploratory testwork of mineralised rock chips in the interim period while the diamond drilling program is conducted.

The program comprises the following components:

- Preliminary dry, high intensity magnetic separation of separate size fractions using a Frantz separator
- Sighter wet high intensity magnetic separation (WHIMS) with stage grinding
- Bulk wet separation run to generate concentrate for flotation testwork and preliminary acid bake testwork

Head Analysis

The prepared composite has the following key elemental content:

Component	Unit	Value
LREE	ppm	448
HREE	ppm	103
TREE	ppm	552
Sc	ppm	16
Fe2O3	%	7.15
SiO2	%	59.9
Th	ppm	17
U_3O_8	ppm	6

The ore is very low in thorium and uranium which is beneficial from an environmental and handling perspective. Silica is the largest component of the ore.

Dry Magnetic Separation

Minus 25 microns material was screened out of the ore sample that had been milled to minus 150 microns. The screened material was then separated into four size classes and tested separately. The following table summarises these preliminary findings.

Size	Mass	Preliminary MS Recovery		Combined Magnetics			
Microns	%	Fe2O3, %	TREE, %	LREE	HREE	TREE	Fe2O3, wt%
106-150	35.4	90.6	82.4	367	74	441	7.1
75-106	17.0	94.6	87.2	688	72	760	8.2
38-75	30.0	88.8	83.0	1020	182	1202	10.5
25-38	17.6	84.5	79.6	1065	192	1257	11.3

Key observations are:

- TREE recovery was relatively stable across the range of sizes tested, from 80 to 87%.
- REE grade increased with finer size fractions, indicating the ore benefits from finer grinding to liberate rare earth minerals, primarily allanite.
- Iron oxide grades in magnetic concentrate also increase with finer grind sizes, which is expected with the use of high intensity magnetic separation

Sighter Wet Magnetic Separation

A sub-sample of ore was milled to 80% passing 75 microns and subjected to wet LIMS processing at 1000 gauss to remove magnetite and other diamagnetic minerals, followed by WHIMS processing at 10000 gauss field strength. The concentrate was then reground to 80% passing 38 microns and subjected to cleaner WIMS processing. The following table summarises results, arranged with different combinations of magnetic products:

	Mass, %	**TREEs, ppm**	**TREEs Distn, %**	**Sc, ppm**	**Sc Distn, %**
Feed	100.0	662	100.0	16.0	100.0
LIMS mags	4.0	912	5.5	22.0	5.5
Ro WHIMS mags	19.6	1914	56.8	31.2	38.3
Cl WHIMS mags	6.3	2560	24.4	42.0	16.6
LIMS+Cl WHIMS mags	10.3	1921	30.0	34.2	22.1
LIMS+Ro WHIMS mags	**23.7**	**1744**	**62.3**	**29.6**	**43.8**

Key findings were as follows:

- LIMS processing produced a small concentrate mass with 5.5% of total REOs
- Rougher WHIMS produced a good upgrade to 1914 ppm TREEs, containing 56.8% of total feed TREEs
- Regrinding and cleaner WHIMS saw the concentrate grade increase to 2560 ppm TREEs but at the expense of recovery, reducing to 24.4% of total feed TREEs
- Scavenger tests on rougher and cleaner WHIMS tailing is underway to determine if recovery can be increased at similar grades

Sighter Scavenger Magnetic Separation

Rougher and Cleaner WHIMS tailings were subjected to three passes of scavenger WHIMS processing at a field strength of 10000 gauss.

Rougher scavenger run

	Mass, %	**TREEs, ppm**	**TREEs Distn, %**	**Sc, ppm**	**Sc Distn, %**
Stage Performance					
Ro Sc non-mags	8.0	710	16.7	26.0	22.0
Ro Sc WHIMS mags	92.0	308	83.3	8.0	78.0
Feed (Ro WHIMS non-mags)	**100.0**	**340**	**100.0**	**9.4**	**100.0**
Overall Performance					
LIMS mags + WHIMS mags (Ro + Sc)	**29.8**	**1532**	**68.8**	**25.4**	**47.2**

Recovery of REEs and Sc with the introduction of rougher scavenging increased marginally, with a reduction of weighted combined grades noted. On the basis of this result, scavenger WHIMS is not warranted.

Cleaner scavenger run

	Mass, %	TREEs, ppm	TREEs Distn, %	Sc, ppm	Sc Distn, %
Stage Performance					
Cl Sc non-mags	27.0	1789	31.2	38.0	43.8
Cl Sc WHIMS mags	73.0	1457	68.8	18.0	56.2
Feed (Cl WHIMS non-mags)	**100.0**	**1547**	**100.0**	**23.4**	**100.0**
Overall Performance					
LIMS mags + WHIMS mags (Ro + Sc + Cl Sc)	**33.4**	**1559**	**78.5**	**26.7**	**55.7**

Scavenging of cleaner WHIMS tailings increased REE recovery from 68.8 to 78.5% relative to the preceding rougher scavenging only, with grade improving to 1559 ppm.

Scandium recovery correspondingly increased from 47.2 to 55.7 for a similar weighted grade (increased from 25.4 to 26.7 ppm). Scavenging of cleaner WHIMS tailings appears to have merit and should be incorporated in further testing flowsheets.

Future Work

A bulk run will be undertaken with rougher WHIMS only to produce concentrate for flotation testing. A portion of this concentrate will also be used for acid bake testwork to generate leachate for enzyme absorption testwork at the Lawrence Livermore National Laboratory in California to assess potential REE extraction from magnetic concentrate. Future work will be undertaken on enriched concentrates as the concentrator flowsheet is progressed and optimised.

The current round of testwork has produced concentrate grades similar to what was achieved in historical work but using magnetic separation only. Introducing flotation to reject barren silica is expected to further enrich the concentrate grades which will have a positive impact on project economics.

A larger concentrator program will be undertaken when diamond drill core becomes available in May, exploring the use of new generation flotation colectors and promoters to specifically target rare earth bearing allanite.

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

Keith Middleton

Managing Director

This ASX announcement refers to information extracted from market announcements, which are available for viewing on ARR's website **https://americanrareearths.com.au**

ARR confirms it is not aware of any new information or data that materially affects the information included in the original market announcements, and, in the case of estimates of Mineral Resources, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcements continue to apply and have not materially changed. ARR confirms that the form and context in which the Competent Person's findings presented have not been materially modified from the original market announcements.

Competent Person's Statement: The information in this report is based on information compiled by Mr. Denis Geldard. Mr. Geldard is a member of the Australian Institute of Mining and Metallurgy. He has considerable experience with the style of mineralisation and types of deposit under consideration and is considered to be a competent person under the JORC code 2012.

About American Rare Earths

American Rare Earths Limited (ASX: ARR) 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 counter China's market dominance of a global rare earth market expected to balloon to US$20 billion by the mid-2020s. ARR owns 100% of the world-class La Paz rare earth project, located 170km northwest of Phoenix, Arizona. The project's highly shallow 2012 JORC resource (128.2Mt @ 373.4ppm (0.037%) Total Rare Earth Elements), is less than 30m below surface and is contained within just 525 acres of ARR's total La Paz footprint of 5,143 acres that points to potential resource upside. As a large tonnage, bulk deposit, La Paz is also potentially the largest, rare earth deposit in the USA and benefits from containing very low penalty elements such as radioactive thorium and uranium. ARR plans to deliver its first Preliminary Economic Assessment for La Paz in late 2021 and is working with leading USA research institutions to have La Paz's mineral profile incorporated into emerging US advanced rare earth processing technologies. ARR is also acquiring a second USA rare earth asset, the Laramie project in Wyoming. Transaction completion is due by mid-2021.

JORC Code – Table 1 report

Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• ***Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.*** • ***Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.*** • ***Aspects of the determination of mineralisation that are Material to the Public Report.*** • ***In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.***	Rock samples were collected by hand at the surface from in-situ outcrops. Grab samples are believed to be representative of the outcrops they came from. 1-2 kg rock samples were collected by a geologist, samples were broken using a rock hammer from outcrop. Rock samples were crushed in the laboratory and pulverized before analysis
Drilling techniques	• ***Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).***	• No drilling
Drill sample recovery	• ***Method of recording and assessing core and chip sample recoveries and results assessed.*** • ***Measures taken to maximise sample recovery and ensure representative nature of the samples.*** • ***Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.***	• No drilling
Logging	• ***Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate***	Rock samples were geologically described

Criteria	JORC Code explanation	Commentary
	Mineral Resource estimation, mining studies and metallurgical studies. • ***Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.*** • ***The total length and percentage of the relevant intersections logged.***	Qualitative logging No drilling
Sub-sampling techniques and sample preparation	• ***If core, whether cut or sawn and whether quarter, half or all core taken.*** • ***If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.*** • ***For all sample types, the nature, quality and appropriateness of the sample preparation technique.*** • ***Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.*** • ***Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.*** • ***Whether sample sizes are appropriate to the grain size of the material being sampled.***	No drilling No Drilling Reconnaissance samples were analysed at ALS Laboratories in Reno Nevada, the samples were crushed, pulverised and assayed by ICP-ME and MS61r for REE. Metallurgical samples were collected and sent to a metallurgical lab for compositing and testing ~2kg of rock was crushed and pulverised and a subsample was taken in the laboratory and sent for analysis. Sampling was selective and based on geological observations. Each sample was 1kg – 2 kg in weight which is appropriate to test for the grain size of the material.
Quality of assay data and laboratory tests	• ***The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.*** • ***For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.*** • ***Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.***	The samples were crushed and assayed for 60 elements by fusion ICP-MS. The procedure will report near total results No geophysical tools used in this sampling program Internal laboratory standards were analysed with rock samples.

Criteria	JORC Code explanation	Commentary
Verification of sampling and assaying	• ***The verification of significant intersections by either independent or alternative company personnel.*** • ***The use of twinned holes.*** • ***Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.*** • ***Discuss any adjustment to assay data.***	Consulting company personnel have observed the assayed samples No drilling Field data were all recorded in field note books and sample record books and then entered into a digital database No adjustments were made.
Location of data points	• ***Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.*** • ***Specification of the grid system used.*** • ***Quality and adequacy of topographic control.***	Sample location is based on GPS coordinates +/-5m. **NAD83 / UTM zone 12N** **Topography control is +/-10m.**
Data spacing and distribution	• ***Data spacing for reporting of Exploration Results.*** • ***Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.*** • ***Whether sample compositing has been applied.***	All sample sites are shown on Figures. The data alone will not be used to estimate mineral resource or ore reserve. No compositing applied for the reconnaissance samples. The samples collected for metallurgical testing were composited at the testing laboratory.
Orientation of data in relation to geological structure	• ***Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.*** • ***If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.***	Rock samples were taken of selected outcrops that were considered representative of varying rock types within the resource area. No drilling

Criteria	JORC Code explanation	Commentary
Sample security	• ***The measures taken to ensure sample security.***	The samples were kept in numbered bags until delivered to the laboratory
Audits or reviews	• ***The results of any audits or reviews of sampling techniques and data.***	Sampling techniques are consistent with industry standards.

Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• ***Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.*** • ***The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.***	The La Paz Rare Earth Project is located within Federal Lode mining claims that have been claim staked and on the State of Arizona Exploration Permit License Area. As above. The staked mining claims and State Mineral Exploration License have no known impediment to future granting of exploitation rights provide appropriate permitting and bonding is completed.
Exploration done by other parties	• ***Acknowledgment and appraisal of exploration by other parties.***	American Rare Earths Ltd.'s consultant undertook rock sampling within the region as a follow up to a previously uranium exploration program by a different company.
Geology	• ***Deposit type, geological setting and style of mineralisation.***	The deposit consists of REE's hosted in allanite primarily that occurs in gneisses, granodiorite and an altered cataclastite.
Drill hole Information	• ***A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:*** ○ ***easting and northing of the drill hole collar*** ○ ***elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar*** ○ ***dip and azimuth of the hole*** ○ ***down hole length and interception depth*** ○ ***hole length.*** • ***If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.***	No drilling

Criteria	JORC Code explanation	Commentary
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	No high grade cutting No aggregation used No metal equivalents used
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').*	No drilling No drilling No drilling
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	Samples collected for metallurgical testing from previous surface sample sites in the resource area. Refer to previous PR's for locations.
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	Summary of results reported in the body of the text in previous PR's
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	Summary update of ongoing metallurgical testing by Saskatchewan Research Council (SRC): • The rock chip material contains in excess of 50% silica (SiO2), with minor magnetite and hematite. Rare earths are predominantly hosted in the mineral allanite, with minor monazite also being present. • **Key observations with dry magnetic separation are**: • TREE recovery was relatively stable across the range of sizes tested, from 80 to 87%. • REE grade increased with finer size fractions, indicating the ore benefits from finer grinding to liberate rare earth minerals, primarily allanite. • Iron oxide grades in magnetic

Criteria	JORC Code explanation	Commentary
		concentrate also increase with finer grind sizes, which is expected with the use of high intensity magnetic separation • **Key findings with wet magnetic separation are**: • LIMS processing produced a small concentrate mass with 5.5% of total REOs • Rougher WHIMS produced a good upgrade to 1914 ppm TREEs, containing 56.8% of total feed TREEs • Regrinding and cleaner WHIMS saw the concentrate grade increase to 2560 ppm TREEs but at the expense of recovery, reducing to 24.4% of total feed TREEs • Scavenger tests on rougher and cleaner WHIMS tailing is underway to determine if recovery can be increased at similar grades
Further work	• *The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	A drilling program is in process.

Competent Persons Statement: The information in this report that relates to Exploration Results is based on information compiled by Mr. Jim Guilinger. Mr. Guilinger is a Member of a Recognised Overseas Professional Organisation included in a list promulgated by the ASX (SME Registered Member of the Society of Mining, Metallurgy and Exploration Inc). Mr. Guilinger is Principal of independent consultants World Industrial Minerals LLC. Mr. Guilinger has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which they are undertaking as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr. Guilinger consents to the inclusion in the report of the matters based on their information in the form and context in which it appears.