09 JULY 2025

STRONG LEACH RECOVERIES AND LOW IMPURITIES DRIVE HALLECK CREEK CLOSER TO UNLOCKING ITS RARE EARTH POTENTIAL

Highlights

- **High Light Rare Earths Leach Recoveries**
    - Praseodymium ("Pr") leach recoveries of 85% at optimal conditions
    - Neodymium ("Nd") leach recoveries of 84% at optimal conditions
- **Encouraging Heavy Rare Earths Leach Recoveries**
    - Terbium ("Tb") leach recoveries of 52% at optimal conditions
    - Dysprosium ("Dy") leach recoveries of 46% at optimal conditions
- **Significantly lower impurity elements of iron and aluminum**
    - Concentrations of iron and aluminum impurities post leach are approximately 5.0x and 2.9x, respectively, lower than the tests previously performed for the Scoping Study[1]
- **Atmospheric Tank Leach chosen as the preferred leach method**
    - Atmospheric tank leaching is typically more energy and reagent efficient and less costly than other rare earth leaching methods, such as an acid-bake (i.e. cracking)

American Rare Earths (**ASX: ARR | OTCQX: ARRNF | ADR: AMRRY) ("ARR"** or the **"Company"**) is pleased to announce the results of an extensive leach testing program undertaken on Cowboy State Mine ore, part of the Halleck Creek Rare Earths Project in Wyoming USA.

Twenty-five leach tests exploring various parameters and leach methods were completed at SGS's laboratory in Lakefield, Ontario, Canada.

Why it matters? The leach tests provide key data for the on-going metallurgical testing and mineral processing flow-sheet development for the Cowboy State Mine Pre-Feasibility Study. The tests represent a significant milestone in the technical de-risking of the project as the results have established the optimal leach conditions and preferred arrangement for the PFS flow-sheet. Test results demonstrate leach parameters which may achieve favourable processing outcomes such as lower energy consumption and front end impurity removal. This is a key step forward in producing rare earth magnet oxides from Halleck Creek ore.

Metallurgical Testing Next Step

- SGS is performing scoping impurity removal tests, the next step in the mineral processing flow-sheet design for the Pre-Feasibility Study

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[1] Refer ASX Announcement titled 'Full Updated Scoping Study' released 7 March 2025

Additional Technical Details

The completion of the extensive leach testing campaign of Cowboy State Mine ore marks a major milestone for the project. The testing was completed at the Lakefield Ontario Canada location of SGS. All testing in this current campaign was conducted using sulfuric acid as the lixiviant (leaching agent). Previous leach testing completed at Nagrom (under the direction of Wood), and Virginia Tech demonstrated that sulfuric acid was the ideal lixiviant when optimising for recovery, reagent cost, and shipping/logistics.

Building on the previous leach testwork, SGS tested the following leaching types and arrangements during the recent trials:

- Atmospheric Tank Leach
- Acid-bake and Water Leach
- Counter-Current Leach

SGS conducted 18 atmospheric tank leach tests, 5 acid-bake/water leach tests and 2 counter-current leach tests. The atmospheric tank leach was chosen as the preferred arrangement with operating conditions providing the optimal revenue minus raw material cost.

The selected atmospheric leach ("AL") conditions for AL16 are shown in Table 1. The AL16 parameters represents the recommended feed for ongoing plant engineering and piloting trials. AL16 is composed of 80% Unaltered Concentrate that was created by gravity spiral separation followed by Induced Rolled Magnetic Separator ("IRMS"), and 20% of fines created during comminution and then concentrated using Wet High Intensity Separator ("WHIMS"). The combined feed was then processed through a regrind step for 100% passing 270 mesh (53 µm). It should also be noted that altered material (i.e. weather) is a minority portion of the total ore body, as a result the main focus of the test work is on unaltered material. Two Atmospheric Leach Tests were performed on Altered Ore and leaching results were very similar to Unaltered Ore.

Table 1 - Atmospheric Tank Leach Conditions and Results:

Leach Condition	**AL16**
Feed	80% Unaltered Conc 20% WHIMS of Fines
Regrind Particle Size	-53 µm
Acid Dosage	400 kg/t
Retention Time	8 hrs
Temperature	90°C
% Solids	10%
Leach Result	
La Extraction	88%
Pr Extraction	85%
Nd Extraction	84%
Tb Extraction	52%
Dy Extraction	46%
Fe Extraction	18%
Al Extraction	23%
Mg Extraction	28%
Ca Extraction	20%
Final Acidity	20 g/L

Leachate Concentration

The Scoping Study concentrate was generated using WHIMS. The current concentrate was produced using gravity spiral followed by IRMS. The Scoping Study sulfuric acid tank leach test was performed at 250 kg/t and a 6 hr reaction time while the current spiral/IRMS concentrate was tested at 400 kg/t and a 8 hr reaction time.

Table 2 below compares the difference in leachate concentrate for the major impurity elements for the Scoping Study concentrate with the current concentrate. Concentrations of iron and aluminum impurities post leach are approximately 5.0x and 2.9x, respectively, lower than the tests previously performed for the Scoping Study.

It is theorised that the gravity spiral step removed some of the Fe and Al containing heavy minerals and the IRMS was able to separate out the highly magnetic minerals such as hematite and magnetite. These minerals were readily leached in the sulfuric acid tank leach tests for the WHIMS concentrate resulting in much higher impurity concentrations in the leachate. With greater proportions of Fe and Al removed from IRMS concentrate, downstream Impurity removal steps should use less reagent (i.e. potential for lower operating costs) and achieve lower concentrations of these elements in the leachate.

Table 2 – Leachate Concentrate for Major Impurity Elements

	Unit	SGS Spiral/IRMS Conc (AL16)	Scoping Study WHIMS Conc	% Change
Si	mg/L	1,250	3,627	-66%
Al	mg/L	1,300	3,748	-65%
Fe	mg/L	4,450	22,230	-80%
Mg	mg/L	74	210	-65%
Ca	mg/L	1,670	1,495	12%
Na	mg/L	92	292	-68%
K	mg/L	158	510	-69%
Ti	mg/L	231	562	-59%
P	mg/L	45	190	-76%
Mn	mg/L	111	541	-79%
Zn	mg/L	19	101	-81%

This release was authorised by the board of American Rare Earths.

Investors can follow the Company's progress at www.americanree.com

Competent Person(s) Statement:

Competent Persons Statement: The information in this document is based on information compiled by personnel under the direction of Mr. Dwight Kinnes. This work was reviewed and approved for release by Mr. Dwight Kinnes (Society of Mining Engineers #4063295RM) who is employed by American Rare Earths 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. Kinnes consents to the inclusion in the report of the matters based upon the information in the form and context in which it appears.

ARR confirms it is not aware of any new information or data that materially affects the information included in the original market announcement, 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 announcement.

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 processing, separation, metallurgical testing and type of deposit under consideration and to the activity which he is undertaking as a Competent Person as defined in the 2012 JORC Code. Mr. Smith is an experienced technical manager with a degree in Chemical engineering, operations management and engineering management. He has held several senior engineering management roles at rare earth companies (Molycorp and NioCorp) as well as ample rare earth experience as an industry consultant. 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 Limited:

American Rare Earths (ASX: ARR | OTCQX: ARRNF | ADR: AMRRY) is a critical minerals company at the forefront of reshaping the U.S. rare earths industry. Through its wholly owned subsidiary, Wyoming Rare (USA) Inc. (“WRI”), the company is advancing the Halleck Creek Project in Wyoming—a world-class rare earth deposit with the potential to secure America’s critical mineral independence for generations. Located on Wyoming State land, the Cowboy State Mine within Halleck Creek offers cost-efficient open-pit mining methods and benefits from streamlined permitting processes in this mining-friendly state.

With plans for onsite mineral processing and separation facilities, Halleck Creek is strategically positioned to reduce U.S. reliance on imports—predominantly from China—while meeting the growing demand for rare earth elements essential to defense, advanced technologies, and economic security. As exploration progresses, the project’s untapped potential on both State and Federal lands further reinforces its significance as a cornerstone of U.S. supply chain security. In addition to its resource potential, American Rare Earths is committed to environmentally responsible mining practices and continues to collaborate with U.S. Government-supported R&D programs to develop innovative extraction and processing technologies for rare earth elements.

Appendix A – Halleck Creek JORC Table 1

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 (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as downhole gamma sondes, handheld XRF instruments, etc.). These examples should not be taken as limiting the broad meaning of sampling.*	In 2024, WRI drilled 28 drill holes at the Cowboy State Mine area. This included 11 HQ-sized core holes (1,586 m total) and 17 reverse circulation (RC) holes (1,866 m total). RC chip samples were collected at 1.5 m intervals via rotary splitter, while core samples were collected every 3 m of at lithological contacts. ARR drilled 15 reverse circulation (RC) holes and eight HQ-sized diamond core holes between September and October 2023. All RC holes were 102 meters (334.65 feet) deep, with seven core holes at 80 meters (262.47 feet) and one deep core hole at 302 m (990.81 feet). RC chip samples were collected at a 1.5-meter (4.92 ft) continuous interval via rotary splitter. Rock core was divided into sample lengths of 1.5 m (4.92 feet) long and at key lithological breaks. ARR drilled 38 reverse circulation (RC) holes across the Halleck Creek Resource Claim area between October and December 2022. All holes were approximately 150 meters (492.13 feet) deep, with the exception of HC22-RM015 which went to a depth of 175.5 meters (576 feet). Chip samples were collected at 1.5-meter continuous intervals via rotary splitter.

Section 1 Sampling Techniques and Data

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

Criteria	***JORC Code explanation***	**Commentary**
		In March and April 2022, ARR drilled nine HQ-sized core holes across the Halleck Creek Resource claim area. All holes were approximately 350 ft with the exception of one hole which was terminated at 194 ft. Total drilled length of 3,008 ft (917 m). Rock core was divided into sample lengths of 5 ft (1.52 m) long and at key lithological breaks. A total of 734 surface rock samples exist in the Halleck Creek database. Surface rock samples collected by ARR are logged, photographed and located using handheld GPS units. As part of reverse circulation (RC) and diamond core exploration drilling at Halleck Creek, ARR collected XRF readings on RC chip and core samples. Elements included in XRF measurements include Lanthanum, Cerium, Neodymium, and Praseodymium. ARR collected three XRF readings on each sample, then averaged the readings. Readings are performed at 20-meter intervals down each drill hole. These values are qualitative in nature and provide only rough indications of grade.

Section 1 Sampling Techniques and Data		
(Criteria in this section apply to all succeeding sections.)		
Criteria	***JORC Code explanation***	**Commentary**
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	Core and RC samples were processed and logged systematically. Quality control included inserting certified reference materials (CRMs), blanks, and duplicates into the sampling stream.
	Aspects of the determination of mineralisation that are Material to the Public Report.	The Red Mountain Pluton (RMP) of the Halleck Creek Rare Earths Project is a distinctly layered monzonitic to syenitic body which exhibits significant and widespread REE enrichment. Enrichment is dependent on allanite abundance, a sorosilicate of the epidote group. Allanite occurs in all three units of the RMP, the clinopyroxene quartz monzonite, the biotite-hornblende quartz syenite, and the fayalite monzonite, in variable abundances.
	In cases where 'industry standard' work has been done, this would be relatively simple (e.g. '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 (e.g. submarine nodules) may warrant disclosure of detailed information.	Reverse circulation rock chip samples were collected at 1.5-meter continuous intervals via rotary splitter. For each interval chip samples were placed in labelled sample bags weighing between 1-2kg. A 0.5-1kg sample was collected for reserve analysis and logging. Chip samples were also placed into chip trays with 20 slots for logging and XRF analysis. Rock core samples 5 ft (1.52 m) long are fillet cut. The fillet cuts are being pulverised and sampled for 60 elements including rare earth elements using ICP-MS and industry standards. A select number of samples are additionally being assayed for whole rock geochemistry.

Section 1 Sampling Techniques and Data

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

Criteria	***JORC Code explanation***	**Commentary**
		RC chip samples were sent to ALS labs in Twin Falls, ID for preparation and forwarded on to ALS labs in Vancouver, BC for ICP-MS analysis. ALS analysis: ME-MS81. Core samples were first sent to ALS in Reno, NV, for cutting and preparation, and also sent to Vancouver, BC for the same suite of testwork. ALS Laboratories in BC, Canada has performed detailed assay analysis for the project since the fall of 2022. American Assay Labs in Sparks, NV is performed the analyses for the Spring 2022 program.
Drilling techniques	*Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc.) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or another type, whether the core is oriented and if so, by what method, etc.).*	Drilling included HQ diamond drilling for core samples using a Marcotte HTM 2500 rig and rotary split RC drilling with a Schramm T455-GT rig. Oriented core was collected where applicable to support structural analysis.
Drill sample recovery	*Method of recording and assessing core and chip sample recoveries and results assessed.*	A continuous rotary sample splitter was used to collect the RC samples at 1.5m intervals.

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Criteria	***JORC Code explanation***	**Commentary**
		All drill core was visually logged, measured, and photographed by ARR geologists. Drill core was collected in lengths (runs) of 1.5m (~5 ft). Recoveries were calculated for each core run.
	Measures are taken to maximise sample recovery and ensure the representative nature of the samples.	Reverse circulation rock chip samples were collected at 1.5-meter continuous intervals via rotary splitter. For each interval chip samples were placed in labelled sample bags weighing between 1-2kg. A 0.5-1kg sample was collected for reserve analysis and logging. Chip samples were also placed into chip trays with 20 slots for logging and XRF analysis. All core and associated samples were immediately placed in core boxes. In 2024, acoustic televiewer surveys provided supplementary data on structural continuity. Natural gamma logs were also collected for each 2024 drill hole which correlate with TREO grades.
	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.	Recoveries were very high in competent rock. No loss or gain of grade or grade bias related to recovery

Section 1 Sampling Techniques and Data

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

Criteria	*JORC Code explanation*	Commentary
Logging	*Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.*	All RC samples were visually logged by ARR geologists from chip trays using 10x binocular microscopes. Samples at 25m intervals were photos and analysed using an Olympus Vanta handheld XRF analyser in triplicate. Lanthanum, Cerium, Neodymium, and Praseodymium were analysed via XRF. All drill core was visually logged, measured, and photographed by ARR geologists. Drill core was collected in lengths (runs) of 1.5 meters (~5 ft). ARR geologists calculated recoveries for each core run. ARR geologists logged lithology, various types of alteration and mineralisation, fractures, fracture conditions, and RQD. Alpha and beta fracture angles were determined from oriented core in 2024.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	RC samples and logging is quantitative in nature. Chip samples are stored in secure sample trays. Chip samples were photographed and 25m intervals. Core logging is quantitative in nature. All core was photographed wet and dry.
	The total length and percentage of the relevant intersections logged.	All RC samples were visually logged by ARR geologists for each 1.5-meter continuous sample.

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

Criteria	JORC Code explanation	Commentary
		All drill core was visually logged, measured, and photographed by ARR geologists. Drill core was collected in lengths (runs) of 5 feet (1.52m). ARR geologists calculated recoveries for each core run. ARR geologists logged lithology, various types of alteration and mineralisation, fractures, fracture conditions, and RQD.
Sub-sampling techniques and sample preparation	*If core, whether cut or sawn and whether quarter, half or all core taken.*	RC chip samples were not cut. Drill core was fillet cut by ALS Laboratories with approximately 1/2 of the core used for assay. The remaining core material will be kept in reserve by ALS until sent for future metallurgical testwork.
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	Samples varied between wet and dry. The course crystalline nature of the deposit minimizes adverse effects of wet samples. Samples were rotary split during drilling and sample collection. ALS labs dried wet samples using their DRY-21 drying process.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	RC samples were taken from pulverize splits of up to 250 g to better than 85 % passing minus 75 microns.

Section 1 Sampling Techniques and Data

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

Criteria	***JORC Code explanation***	**Commentary**
		All core samples were dry. Sample preparation: 1kg samples split to 250g for pulverising to -75 microns. Sample analysis: 0.5g charge assayed by ICP-MS technique. Both sampling methods are considered appropriate for the type of material collected and are considered industry standard.
	Quality control procedures adopted for all sub-sampling stages to maximise the representivity of samples.	ARR submitted CRM sample blanks, CRM standard REE samples from CND Labs and duplicate samples for analysis. Each CRM blank, REE standard, and duplicate were rotated into both the RC and core sampling process every 20 samples.
	Measures are taken to ensure that the sampling is representative of the in situ material collected, including, for instance, results for field duplicate/second-half sampling.	RC samples were collected using a continuous feed rotary split sampler. Fillet cuts along the entire length of all core are representative of the in-situ material.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Allanite is generally well distributed across the core and the sample sizes are representative of the fine grain size of the Allanite.

Section 1 Sampling Techniques and Data

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

Criteria	***JORC Code explanation***	**Commentary**
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.*	ALS uses a 5-acid digestion and 32 elements by lithium borate fusion and ICP-MS (ME-MS81). For quantitative results of all elements, including those encapsulated in resistive minerals. These assays include all rare earth elements. AAL Labs uses 5-acid digestion and 48 element analysis including REE reported in ppm using method REE-5AO48 and whole-rock geochemical XRF analysis using method X-LIB15.
	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.	Samples at 25m intervals were photographed and analysed using an Olympus Vanta handheld XRF analyser in triplicate. Lanthanum, Cerium, Neodymium, and Praseodymium were analysed. Simple average values of three XRF readings were calculated. Seven of the core holes received ATV/OTV logging as well as slim hole induction which recorded natural gamma and conductivity/resistivity. Geophysical logging was completed by Century Geophysical located in Gillette, WY in 2023. DGI Geosciences, Salt Lake City, UT, performed logging in 2024. All tools were properly calibrated prior to logging.

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

Criteria	***JORC Code explanation***	**Commentary**
	Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.	For the 2024 drilling program, ARR submitted CRM sample blanks, CRM standard REE samples from CDN Labs, and duplicate samples for analysis. QA/QC samples, including CRM and blank samples, were inserted alternately at every 20th sample for both RC and core drilling. ALS Laboratories also incorporated their own QA/QC procedures to ensure analytical reliability. For the RC drilling, ARR submitted CRM sample blanks, CRM standard REE samples from CND Labs and duplicate samples for analysis. CRM and Blank samples were inserted alternately at 20 sample intervals. The same was done for the core drilling completed Fall 2023. ALS Laboratories additionally incorporated their own Qa/Qc procedure. For core drilling completed Spring 2022, ARR submitted CRM sample blanks, CRM standard REE samples from CND Labs and duplicate samples for analysis. Blank samples were added one for every 10 core samples, REE samples were added one for every 25 core samples, and Duplicate samples were added one per every 25 core samples. Internal laboratory blanks and standards will additionally be inserted during analysis.

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Criteria	***JORC Code explanation***	**Commentary**
Verification of sampling and assaying	*The verification of significant intersections by either independent or alternative company personnel.*	RC chip samples have not yet been verified by independent personnel. Consulting company personnel have observed the assayed core samples. Company personnel sampled the entire length of each hole.
	The use of twinned holes.	No twinned holes were used.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Data entry was performed by ARR personnel and checked by ARR geologists. All field logs were scanned and uploaded to company file servers. All photographs of the core were also uploaded to the file server daily. Drilling data will be imported into the DHDB drill hole database. All scanned documents are cross-referenced and directly available from the database. Assay data from the RC samples was imported into the database directly from electronic spreadsheets sent to ARR from ALS. Core assay data was received electronically from AAL labs. These raw data as elements reported ppm were imported into the database with no adjustments.

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Criteria	***JORC Code explanation***	**Commentary**
	Discuss any adjustment to assay data.	Assay data is stored in the database in elemental form. Reporting of oxide values are calculated in the database using the molar mass of the element and the oxide.
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.*	All drill hole collars were surveyed by a registered professional land surveyor. Deviation surveys were conducted post-drilling to confirm subsurface data accuracy.
	Specification of the grid system used.	The grid system used to compile data was NAD83 Zone 13N.
	Quality and adequacy of topographic control.	Topography control is +/- 10 ft (3 m).
Data spacing and distribution	*Data spacing for reporting of Exploration Results.*	Drill spacing varied between 100 and 300 m, with infill drilling conducted to refine the resource model and improve classification confidence.
	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.	Spacing supports classification into Indicated and Inferred categories based on geostatistical analysis and grade continuity confirmed through cross-sections and swath plots.
	Whether sample compositing has been applied.	Sample compositing was applied during resource estimation. Grade intervals were composited to 1.5 m (5 feet), the dominant sampling

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Criteria	***JORC Code explanation***	**Commentary**
		interval, ensuring compatibility with the data collected and supporting accurate resource estimation.
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.*	Mineralization at Halleck Creek is a function of fractional crystallization of allanite in syenitic rocks of the Red Mountain Pluton. Mineralization is not structurally controlled and exploration drilling to date does not reveal any preferential mineralization related to geologic structures. Therefore, orientation of drilling does not bias sampling.
	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.	Orientation of drilling does not bias sampling.
Sample security	*The measures are taken to ensure sample security.*	All RC chip samples were collected from the drill rigs and stored in a secured, locked facility. Sample pallets were shipped weekly, by bonded carrier, directly to ALS labs in Twin Falls, ID. Chains of custody were maintained at all times. All core was collected from the drill rig daily and stored in a secure, locked facility until the core was dispatched by bonded courier to ALS Laboratories. Chains of custody were maintained at all times.

Section 1 Sampling Techniques and Data

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

Criteria	***JORC Code explanation***	**Commentary**
		All rock samples were in the direct control of company geologists until dispatched to American Assay Labs.
Audits or reviews	*The results of any audits or reviews of sampling techniques and data.*	No external audits or reviews have been conducted to date. However, 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.*	ARR controls 364 unpatented federal lode claims and 4 Wyoming State mineral licenses covering 3,280 ha (8,108 acres).
	The security of the tenure held at the time of reporting and any known impediments to obtaining a licence to operate in the area.	No impediments to holding the claims exist. To maintain the claims an annual holding fee of $165/claim is payable to the BLM. To maintain the State leases minimum rental payments of $1/acre for 1-5 years; $2/acre for 6-10 years; and $3/acre if held for 10 years or longer.
Exploration done by other parties	*Acknowledgment and appraisal of exploration by other parties.*	Prior to sampling by WIM on behalf of Blackfire Minerals and Zenith there was no previous sampling by any other groups within the ARR claim and Wyoming State Lease blocks.
Geology	*Deposit type, geological setting and style of mineralisation.*	The REE's occur within Allanite which occurs as a variable constituent of the Red Mountain Pluton. The occurrence can be characterised as a disseminated rare earth deposit.
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:*	For the 2023 and 2024 exploration programs, FTE DRILLING USA INC. of Mount Uniacke, Nova Scotia used a Schraam T-450 track mounted rig to drill 15 reverse circulation drill holes. Drill hole depths for 37 holes was 102 m. FTE also utilized an enclosed Versa-Drilling diamond core rig to drill eight HQ-sized core holes.

Section 2 Reporting of Exploration Results

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

Criteria	JORC Code explanation	Commentary
		For the Fall 2022 program, FTE DRILLING USA INC. of Mount Uniacke, Nova Scotia used a Schraam T-450 track mounted rig to drill 37 reverse circulation drill holes. Drill hole depths for 37 holes was 150m and one hole at 175.5m Authentic Drilling from Kiowa, Colorado used both a track mounted and ATV mounted core rig to drill nine HQ diameter core holes. From March to April 2022, ARR drilled nine core holes across the Halleck Creek claim area. Drill holes ranged in depth from 194 to 352.5 ft with a total drilled length of 3,008 ft (917 m).
	easting and northing of the drill hole collar	Drilling information from the 2024 exploration program was published in the report "Technical Report of Exploration and Updated Resource Estimates at Red Mountain of the Halleck Creek Rare Earths Project", December 2024. Drilling information from the Fall 2023 campaign was published in the report "Summary of 2023 Infill Drilling at the Halleck Creek Project Area", November 2023 Drilling information from the Fall 2022 drilling campaign is presented in detail in the "Technical Report of Exploration and Maiden Resource Estimates of the Halleck Creek Rare Earths Project", March 2023.
	elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar	
	dip and azimuth of the hole	
	downhole length and interception depth	
	Hole length.	

Section 2 Reporting of Exploration Results

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

Criteria	JORC Code explanation	Commentary
	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 data has been excluded.
Data aggregation methods	*In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.*	Average Grade values were cut at minimum of TREO 1,000 ppm.
	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.	Assays are representative of each 1.50 m, (~5 ft) sample interval.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	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.*	Allanite mineralization observed at Halleck Creek occurs uniformly throughout the CQM and BHS rocks of within the Red Mountain Pluton. Therefore, the geometry of mineralisation does not vary with drill hole orientation or angle within homogeneous rock types.

Section 2 Reporting of Exploration Results

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

Criteria	JORC Code explanation	Commentary
	If it is unknown and only the downhole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').	
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.*	Location information is presented in detail in the "Technical Report of Exploration and Updated Resource Estimates at Red Mountain of the Halleck Creek Rare Earths Project", December 2024.
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 practised to avoid misleading reporting of Exploration Results.*	Reporting of the most recent exploration data is included in the "Technical Report of Exploration and Updated Resource Estimates at Red Mountain of the Halleck Creek Rare Earths Project", December 2024. Previous data is presented in the "Technical Report of Exploration and Maiden Resource Estimates of the Halleck Creek Rare Earths Project", March 2023, and in report "Summary of 2023 Infill Drilling at the Halleck Creek Project Area", November 2023.

Section 2 Reporting of Exploration Results

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

Criteria	JORC Code explanation	Commentary
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.*	In hand specimen this rock is a red colored, hard and dense granite with areas of localized fracturing. The rock shows significant iron staining and deep weathering. Microscopic description: In hand specimen the samples represent light colored, fairly coarse-grained granitic rock composed of visible secondary iron oxide, amphibole, opaques, clear quartz and pink to white colored feldspar. All of the specimens show moderate to strong weathering and fracturing. Allanite content is variable from trace to 2%. Rare Earths are found within the Allanite. Historical metallurgical testing consisted of concentrating the Allanite by both gravity and magnetic separation. The current program employs sequential gravity separation and magnetic separation to produce a concentrate suitable for downstream rare earth elements extraction.
Further work	*The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).*	Detailed geological mapping and channel sampling is planned to enhance further development drilling to increase confidence levels of resources.

Section 2 Reporting of Exploration Results

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

Criteria	*JORC Code explanation*	Commentary
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Geological mapping and channel sampling is planned for the Bluegrass and County Line project areas to potentially expand mineral resources beyond the Cowboy State Mine area.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	*JORC Code explanation*	Commentary
Database integrity	*Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* *Data validation procedures used.*	Drill hole data header, lithologic data checked by field geologists and by visual examination on maps and drill hole striplogs. Assay and Qa/Qc data were imported into the database directly from electronic spreadsheets provide by laboratories. Histograms graphical logs were also prepared and reviewed by ARR geologists.
Site visits	*Comment on any site visits undertaken by the Competent*	Mr. Dwight Kinnes visited the Halleck Creek site numerous times in 2024 and 2025. Mr. Patrick Sobecke and Mr. Erick Kennedy of Stantec visited the site on February 10, 2025.

Section 3 Estimation and Reporting of Mineral Resources		
(Criteria listed in the preceding section also apply to this section.)		
Criteria	***JORC Code explanation***	**Commentary**
	Person and the outcome of those visits. *If no site visits have been undertaken indicate why this is the case.*	Mr. Alf Gillman of Odessa Resources and Mr. Kelton Smith of Tetra Tech visited the site on March 7, 2024.
Geological interpretation	*Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* *Nature of the data used and of any assumptions made.* *The effect, if any, of alternative interpretations on Mineral Resource estimation.* *The use of geology in guiding and controlling Mineral Resource estimation.*	The Halleck Creek RE deposit is contained with rocks of the Red Mountain Pluton. These rocks consist primarily of clinopyroxene quartz monzonite (CQM), and biotite hornblende syenite (BHS). These two lithologies are difficult to visually distinguish. However, the concentration of rare earth elements is observable between lithologies. Rocks of the Elmers Rock Greenstone Belt (ERGB) and the Sybille (Syb) intrusion are easily distinguishable from rocks of the RMP. These rock units are essentially barren of rare earth elements. Therefore, the confidence in discerning rocks of the RMP from is high. The extent of the RMP relative to other units was outlined into modelling domains used for resource estimates. The distribution of allanite throughout CQM and BHS rocks of the RMP is generally uniform and is not structurally controlled. Potassic alternation observed does not appear to affect the grade of allanite throughout the deposit.

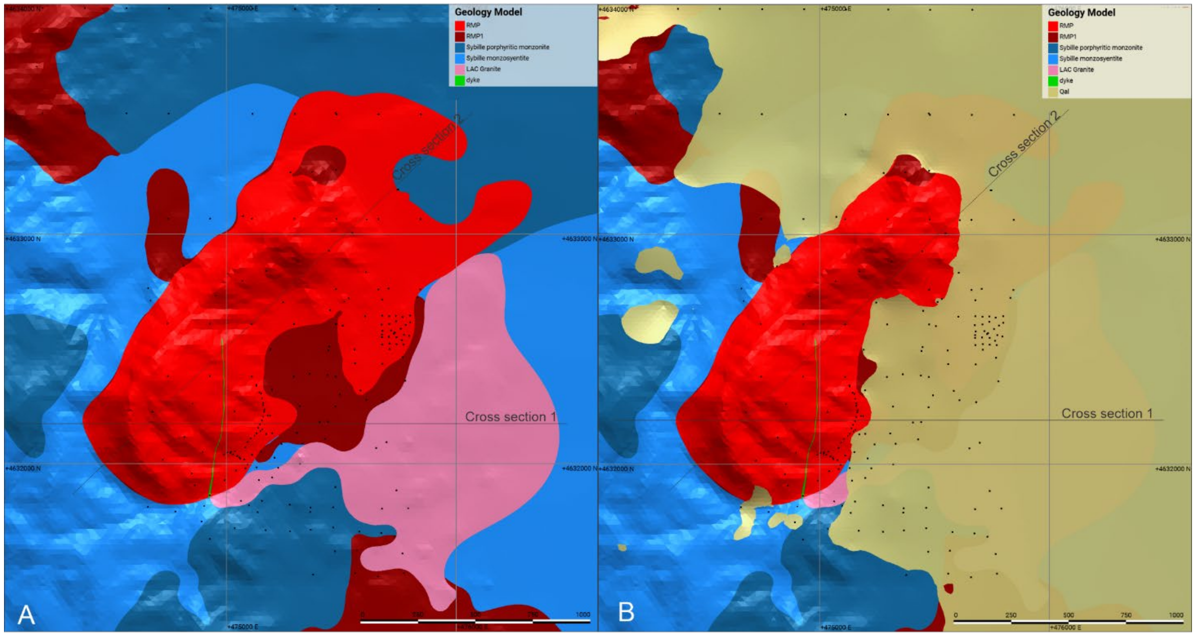
Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	***JORC Code explanation***	**Commentary**
	The factors affecting continuity both of grade and geology.	
Dimensions	*The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	The Halleck Creek REE project currently contains two primary resource areas: the Red Mountain area and the Overton Mountain area. Resources also extend into the Bluegrass resource area. The Cowboy State Mine area is a subset of Red Mountain cover land minerals owned by the state of Wyoming, and under lease by WRI. The Red Mountain resource area is bounded to the west by the ERGB, and to the south by the Syb. Archean granites bound the Red Mountain area to the east. RC samples with TREO grades exceeding 1,500 ppm occurred at the base of 37 drill holes in the Red Mountain resource area extending down to depths of 150m with one hole extending to a depth of 175.5m. Therefore, ARR considers the Red Mountain resource area to be open at depth. The Overton Mountain resource area is bounded to the west by mineral claims, and therefore, remains open to the west. Lower grade BHS rocks occur at the northern end of Overton Mountain. Drilling data to the east and south indicate that the Overton Mountain resource area remains open across Bluegrass Creek. Like the Red Mountain drilling, RC samples at Overton Mountain contained TREO assay values exceeding 3,500 ppm to depths of 150m in 18 holes. One, 302m diamond core hole additionally exhibited grades exceeding 2,000 ppm to the bottom of the hole. Therefore, ARR considers the Overton Mountain resource area to be open at depth.
Estimation and modelling techniques	*The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment*	A revised three-dimensional geological model was developed Odessa Resources Pty. Ltd., from Perth Australia, using both drillhole information and surface mapping to isolate the higher-grade RMP domain from the surrounding lithologies. The domains that are modelled comprise the primary geological units as interpreted by ARR geologists. These geological domains consist of: • QAL Quaternary alluvium

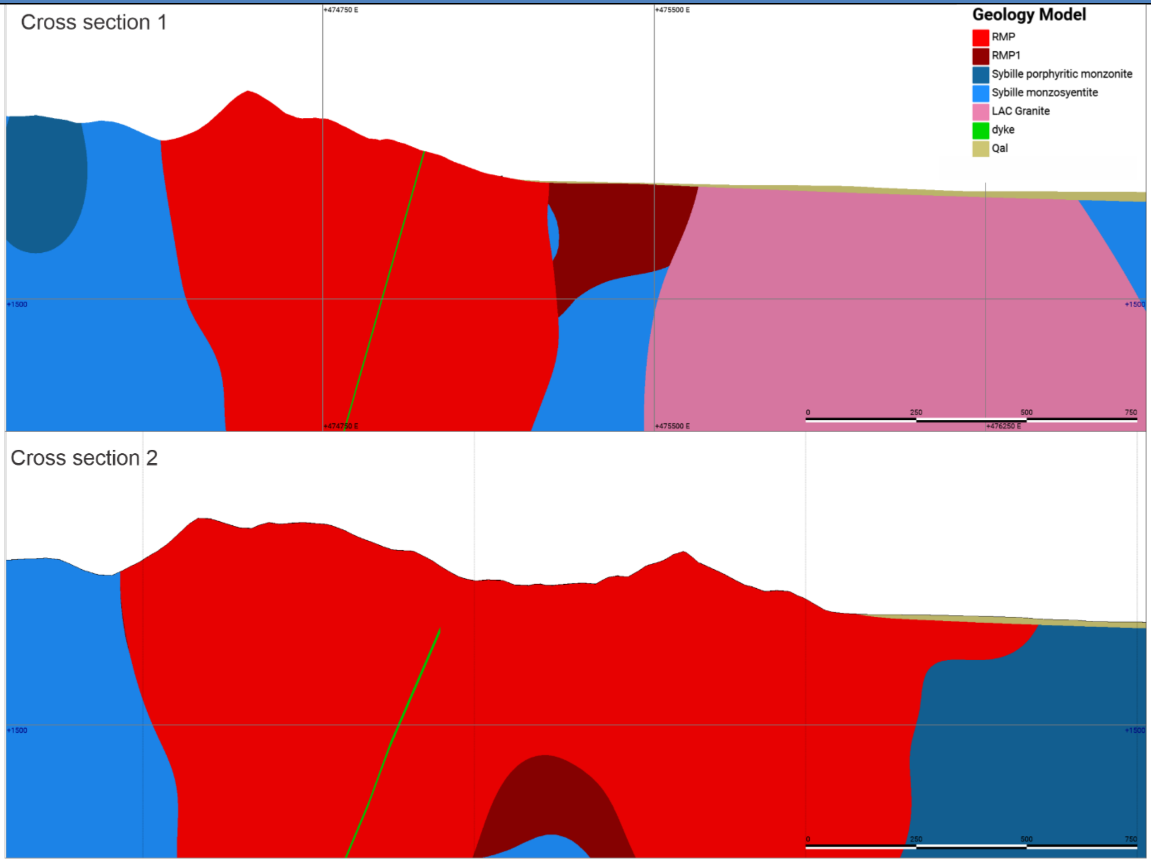
Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	***JORC Code explanation***	**Commentary**
	of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used. *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.* *The assumptions made regarding recovery of by-products.*	• RMP Red Mountain Pluton comprising mostly clinopyroxene quartz monzonite (CQM) • RMP1 comprising mostly biotite-hornblende quartz syenite and fayalite monzonite • ERGB unmineralized Elmers Rock Greenstone Belt • SYB low grade monzonite Sybille intrusions • LAC Laramie Anorthosite Complex Geochemical surface sample results were incorporated into the model but only to define the outer limits of the resource block domains. The Figures below show the general arrangement of the geological domains. 

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	*JORC Code explanation*	Commentary
	Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation). *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* *Any assumptions behind modelling of selective mining units.* *Any assumptions about correlation between variables.* *Description of how the geological interpretation was*	 Odessa updated the Red Mountain resource model using Leapfrog Edge, with all drill hole data variograms and block model parameters were updated. Grade estimation was carried using an ordinary kriged ("OK") interpolant.

Section 3 Estimation and Reporting of Mineral Resources

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

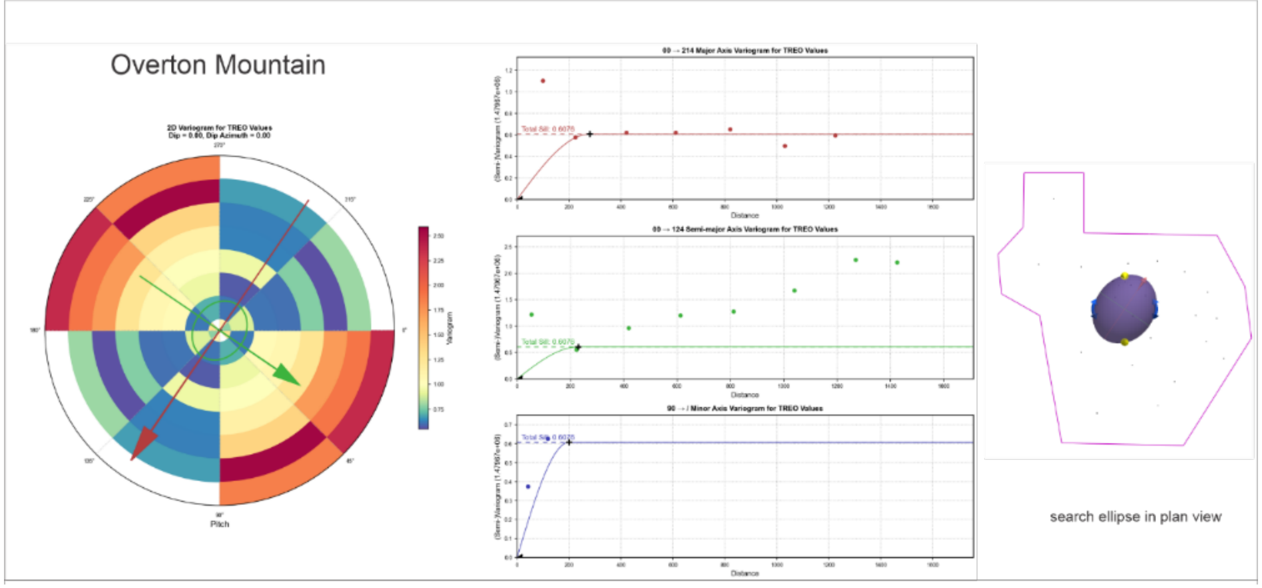
Criteria	*JORC Code explanation*	Commentary
	used to control the resource estimates. *Discussion of basis for using or not using grade cutting or capping.* *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	**Block Model Parameters** The block model contains attributes pertaining to resource block, resource category, grade class, geologic domain, and numerical attributes for TREO, rare earth oxides of all rare earth elements. Geological domains focused on higher grade RMP and RMP1 lithologies which provided control of resource block boundaries along with variography.

Block Model Parameter	Value
Parent Block Size	20m
Sub-block count (i, j, k)	4, 4, 4
Minimum block size (i, j, k)	5m ,5m, 2.5m
Base point (x, y, z)	473900.00, 4631300.00, 2000.00
Boundary size (W x L x H)	2060.00, 2040.00, 510.00
Azimuth	0
Dip	0
Pitch	0
Size in Blocks	103x102x51=535,806

General	Direction			Structure 1					
Variogram Name	Dip	Dip Azimuth	Pitch	Normalized Nugget	Normalized sill	Structure	Major	Semi-major	Minor
OM	0	0	124	0	0.6	Spherical	280	230	200
RM	0	0	90	0.1	0.8	Spherical	445	240	170

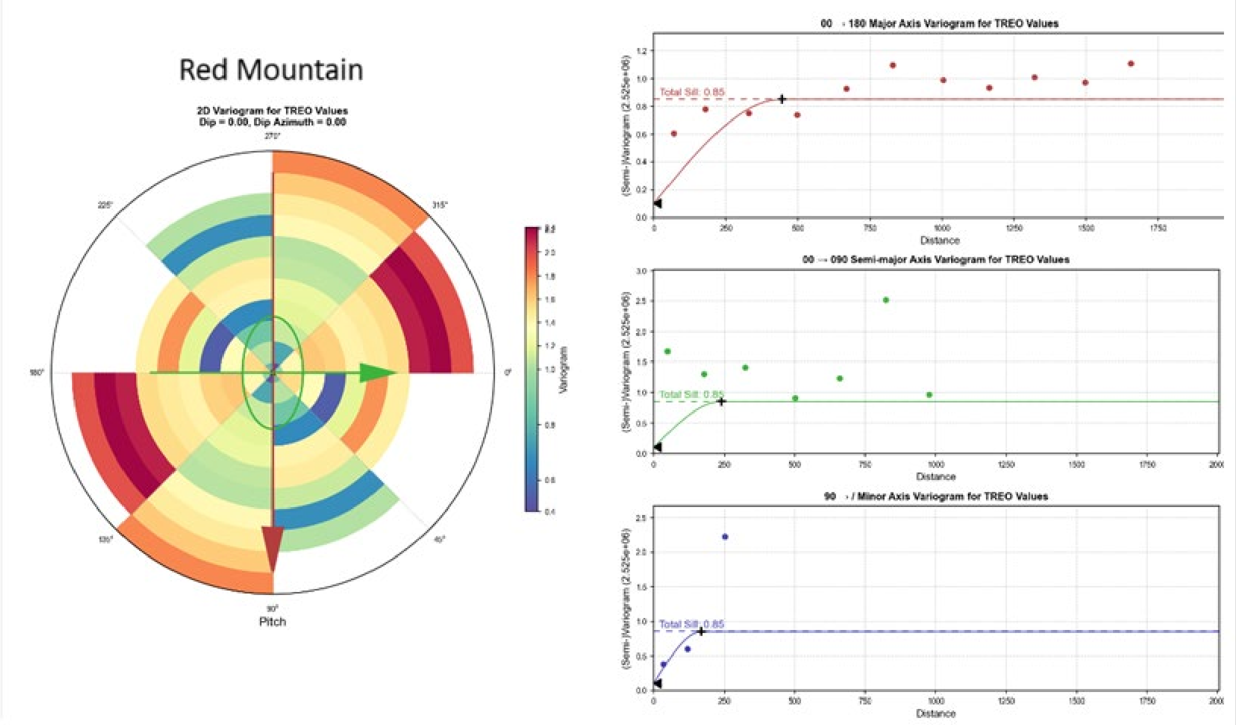
Section 3 Estimation and Reporting of Mineral Resources

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

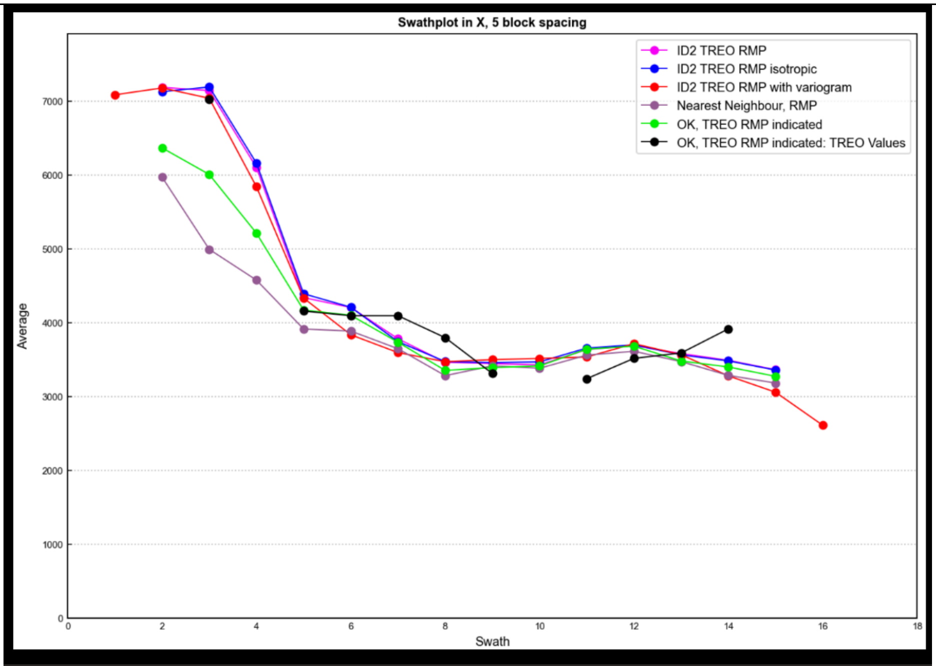
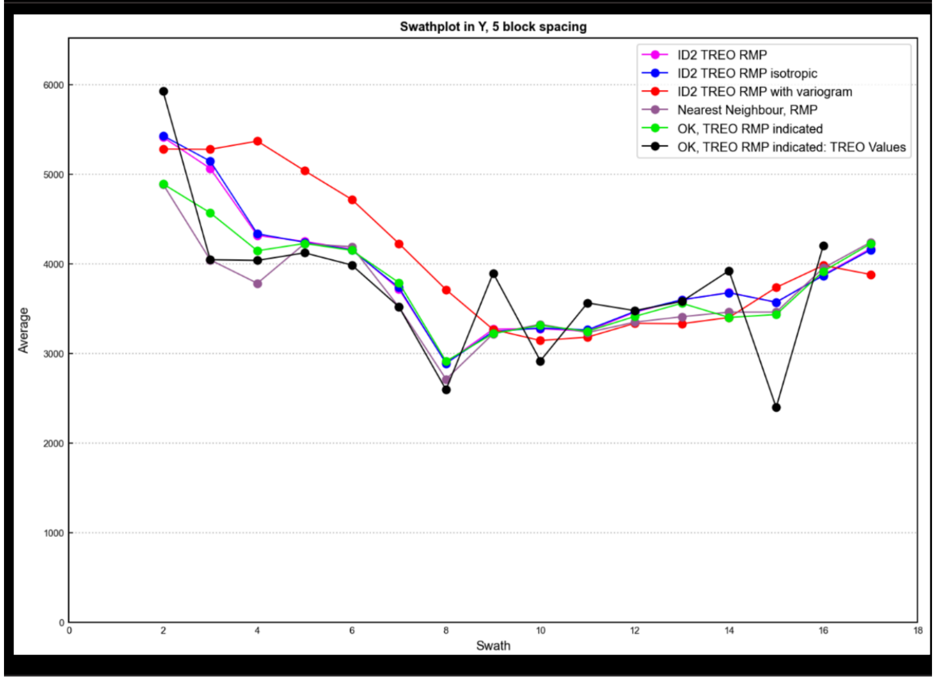
Criteria	*JORC Code explanation*	**Commentary**
		

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	*JORC Code explanation*	**Commentary**
		 Several estimation runs were carried out on the RMP Indicated resource to check for any variance between estimated grades and the input data. Modelled estimator: OK TREO RMP: Indicated ordinary kriged estimate with variogram model (150x150x120m search) The additional estimators:

Section 3 Estimation and Reporting of Mineral Resources		
(Criteria listed in the preceding section also apply to this section.)		
Criteria	***JORC Code explanation***	**Commentary**
		ID2 TREO RMP: Inverse Distance Squared (ID2) using horizontal plane (150x150x120m search) ID2 TREO RMP: isotropic Inverse Distance Squared (ID2) using an iso-tropic 150m search ellipse ID2 TREO RMP: with variogram Inverse Distance Squared (ID2) using the same estimation and variogram parameters as the kriged model (445x240x170m search) Nearest Neighbour, RMP: nearest neighbour estimate (150x150x120m search) These validation runs, together with the kriged estimator, were compared against the raw composite data in east-west (X) and north-south (Y) swath plots across the Red Mountain area (see below). The data indicate that the kriged estimator has done a reasonable job in estimating a global resource grade with no systematic bias towards overestimating the grades. The smoothing effects of the kriging interpolant is consistent with both the inherent nature of the kriging process and the large search ellipses used.

			 Swathplot in X, 5 block spacing ID2 TREO RMP ID2 TREO RMP isotropic ID2 TREO RMP with variogram Nearest Neighbour, RMP OK, TREO RMP indicated OK, TREO RMP indicated: TREO Values Average 0 1000 2000 3000 4000 5000 6000 7000 Swath 0 2 4 6 8 10 12 14 16 18  Swathplot in Y, 5 block spacing ID2 TREO RMP ID2 TREO RMP isotropic ID2 TREO RMP with variogram Nearest Neighbour, RMP OK, TREO RMP indicated OK, TREO RMP indicated: TREO Values Average 0 1000 2000 3000 4000 5000 6000 Swath 0 2 4 6 8 10 12 14 16 18	

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	***JORC Code explanation***	**Commentary**
Moisture	*Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	Tonnages are based on in-situ, dry basis.
Cut-off parameters	*The basis of the adopted cut-off grade(s) or quality parameters applied.*	A cut-off grade of 1,000 ppm TREO was applied to reported resource estimates based on preliminary net smelter calculations performed by Stantec.
Mining factors or assumptions	*Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but*	Surface mining was chosen as the method to extract the resource due to mineralization outcropping on surface and the homogeneity of the mineral grade over a large extent. In the absence of geotechnical data Stantec used reasonable bench angles, catch bench widths based on industry experience. Mining and metallurgical costs were from Stantec and Tetratech's respective cost databases for a mine and mill of this size and scale. Process recoveries were based on preliminary test work on samples of the mineralization. Mine design work was based on Geovia's Whittle mine software package, using a block model supplied by ARR and reviewed by Stantec for adequacy at a scoping level of study. The following mine design parameters were used in the pit design: Height between catch benches 6 m Bench Face Angle 70° Berm Width 2.9 m Total Road Allowance 18.5 m

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	***JORC Code explanation***	**Commentary**
	the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	Maximum Ramp Grade 10% Minimum Operating Width 30 m

Parameter	**Unit**	**Red Mountain & Overton Mountain**							
Revenue, Smelting & Refining		**La**	**Pr**	**Nd**	**Sm**	**Eu**	**Gd**	**Tb**	**Dy**
Price	USD	$2.00	$91.00	$91.00	$10.00	$10.00	$10.00	$1,500.00	$400.00
Recovery	%	68.63%	63.86%	63.86%	70.11%	70.11%	70.11%	70.22%	66.49%
Refining Price Factor	%	0%							
Treatment Charges	USD	$0.00							
Refining Costs	USD	$0.00							
Shipping Costs	USD	$0.00							
Transportation Concentrate Losses	%	0%							
Recovery and Dilution									
External Mining Dilution	%	0%							
Mining Recovery	%	100%							
Geotechnical									
Slope ISA	deg	50							
OPEX									
Milling Cost	USD	$26.43							
Surface Mining Cost	USD	$3.95							
Site G&A	USD	$0.00							
Total OPEX Cost	USD	$29.28							

*OPEX costs are from 2023

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	***JORC Code explanation***	**Commentary**
		No mining dilution was used in the mine design of this study and a mining recovery of 100 % was assumed. Based on the chosen mining equipment, a minimum mining width of 30 meters was utilized. Measured, indicated and inferred mineral resources were included in the mine design, which is appropriate at a scoping level of study. Due to the homogeneity of the mineralization, while it is not reasonable to state that all inferred resources will be converted to a more precise mineral resource category, in general it is felt that it is reasonable to assume that the majority of the inferred resource will be converted to indicated or measured with additional sampling due to the size and homogeneity of the mineralized zone. Supporting mine infrastructure is discussed in the appropriate section of this report.
Metallurgical factors or assumptions	*The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when*	Mineral Technologies in the USA performed separation tests using -300µm x +86µm feed from Halleck Creek on MG12 triple-start spirals. Mineral Technologies processed approximately 1,900 kg of feed material using the production scale MG12 spiral units. Final modelled recover curves have a 25% mass yield translates to a 79% TREO recovery. Mineral Technologies performed additional separation testing using an Induced Roll Magnetic Separator (IRMS) using the rougher spiral concentrate from the -300µm x +86µm ore feed testing. Concentrate material was collected using IRMS power settings greater than 0.6 amps and less than 2.0 amps. The final results for the IRMS treatment is 28.0% mass yield, 85% TREO recovery . The combined results of spiral separation and IRMS separation of Halleck Creek feed material sized between -300µm x+86µm results in a final 6.9% mass yield, 67% recovery. IRMS processing is also the first technology found to significantly separate iron minerals (hastingsite) from REE bearing minerals (allanite). The following table shows that discarding material using IRMS setting less than 0.6 amps and greater than 2.0 amps results in large rejection fractions of deleterious elements, with small losses in TREO. Scoping leach testing was completed at the Lakefield Ontario Canada location of SGS. All testing in this current campaign was conducted using sulfuric acid as the lixiviant (leaching agent). Previous leach testing

Criteria	JORC Code explanation	Commentary
	reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.	completed at Nagrom (under the direction of Wood), and Virginia Tech demonstrated that sulfuric acid was the ideal lixiviant when optimizing for recovery, reagent cost, and shipping/logistics. SGS tested the following leaching types and arrangements during the scoping trials: • Atmospheric Tank Leach • Acid-bake and Water Leach • Counter-Current Leach During the scoping trials, SGS conducted 18 atmospheric tank leach tests, 5 Acid-bake/Water Leach tests and 2 counter-current tests. The Atmospheric Tank Leach was chosen as the preferred arrangement with the following operating conditions providing the best revenue minus raw material cost. Capital cost was also considered, and future tradeoff studies should be undertaken to further study the case for Counter-Current Leaching. Table 1 summarizes the most favorable results of the atmospheric tank leach tests. Table 2 summarizes the elemental grade of feedstock used for the leach trials. The selected atmospheric leach conditions for AL16 are shown in Table 1. The AL16 parameters represents the recommended feed for ongoing plant engineering and piloting trials. AL16 is composed of 80% Unaltered Concentrate that was created by gravity spiral separation followed by Induced Roll Magnetic Separation (IRMS), and 20% of fines created during comminution and then concentrated using Wet High Intensity Magnetic Separation (WHIMS). The combined feed was then processed through a regrind step for 100% passing 270 mesh (53 µm). It should also be noted that altered material (i.e. weather) is a minority portion of the total ore body, as a result the main focus of the test work is on unaltered material.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	***JORC Code explanation***	**Commentary**

Table 3 - Atmospheric Tank Leach Conditions and Results:

Leach Condition	**AL16**
Feed	80% Unaltered Conc 20% WHIMS of Fines
Regrind Particle Size	-53 µm
Acid Dosage	400 kg/t
Retention Time	8 hrs
Temperature	90°C
% Solids	10%
Leach Result	
La Extraction	88%
Pr Extraction	85%
Nd Extraction	84%
Tb Extraction	52%
Dy Extraction	46%
Fe Extraction	18%
Al Extraction	23%
Mg Extraction	28%
Ca Extraction	20%
Final Acidity	20 g/L

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	***JORC Code explanation***	**Commentary**

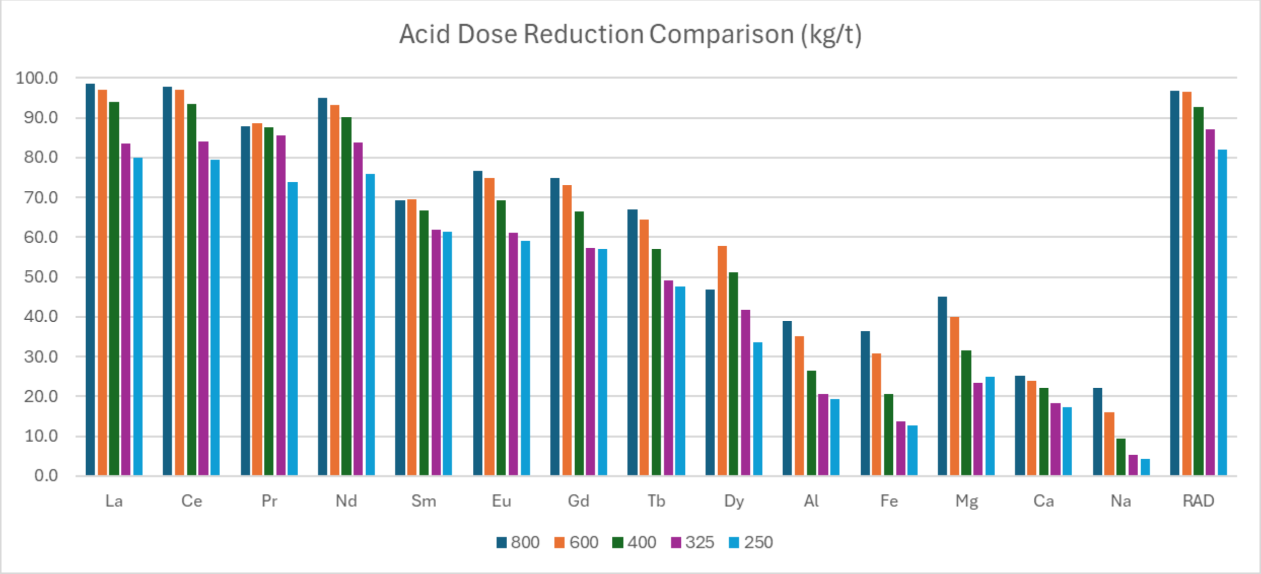
Table 2 Head Grade of Concentrates used in Leach Testing:

	Unit	**Unaltered Mag (T1303) (-270 mesh)**	**Altered Mag (T2303) (-270 mesh)**	**Comm Fines UC1-Mag WHIMS**
La	ppm	5,210	4,960	2,380
Ce	ppm	10,500	10,000	4,890
Pr	ppm	1,120	1,070	562
Nd	ppm	4,220	4,060	2,130
Sm	ppm	605	585	348
Eu	ppm	34.5	33	24.7
Gd	ppm	358	357	225
Tb	ppm	40.3	40.5	28.8
Dy	ppm	197	200	147
Ho	ppm	31.7	32.7	27.4
Y	ppm	701	759	609
Er	ppm	78.4	81.6	63
Tm	ppm	9.59	10.3	8.5
Yb	ppm	62.6	66.2	53.2
Lu	ppm	9.1	9.8	8
Sc	ppm	<30	30	-
Th	ppm	473	466	201
U	ppm	24	22	15.5
Si	%	18.9	18.6	20.0
Al	%	4.84	4.77	5.29
Fe	%	21.3	21.47	20.4
Mg	%	0.21	0.44	0.28
Ca	%	6.67	6.32	5.82
Na	%	1.19	1.13	1.38
K	%	1.26	1.17	1.84
Ti	%	1.52	1.73	1.11
P	%	0.04	0.03	0.06
Mn	%	0.56	0.6	0.5
Zn	%	0.08	0.09	-

Criteria	***JORC Code explanation***	**Commentary**
		ATMOSHPERIC TANK LEACH TESTING: The following parameters and test ranges were evaluated during the Atmospheric Tank Leach testing: - Acid Addition (kg sulfuric acid/ton of concentrate) – 250, 325, 400, 600 and 800 - Both ore types, altered and unaltered weatherization, as well as a magnetic concentrate of the fines material (<86 micron) were tested individually and as a blend. - Percent Solids – 10%, 15% and 20% - Retention Time (hrs) – 8, 12, 24 with kinetic sampling - Solids Particle Size (microns) – Concentrate from Gravity Spiral/dry magnet separation minus 300/+86 micron, as well as concentrate material ground to 100% passing 53 micron, and 100% passing 44 micron. - Temperature (°C) – 40 and 90 - Single run to test an addition of hydrogen peroxide to create an oxidizing environment The acid addition was the most tested parameter due to the initial acid addition having a direct impact on the Rare Earth Element (REE) extraction, gangue (impurity) extraction, terminal acidity (leftover acid), sales/revenue, acid and neutralizing agent usage, see below. Multiple scenarios were run through our high-level material balance to calculate a simplified “profit” (Sales Revenue – Raw Material Cost). 400 kg/ton of acid was deemed to be the optimal acid addition considering recoveries and acid neutralization costs.

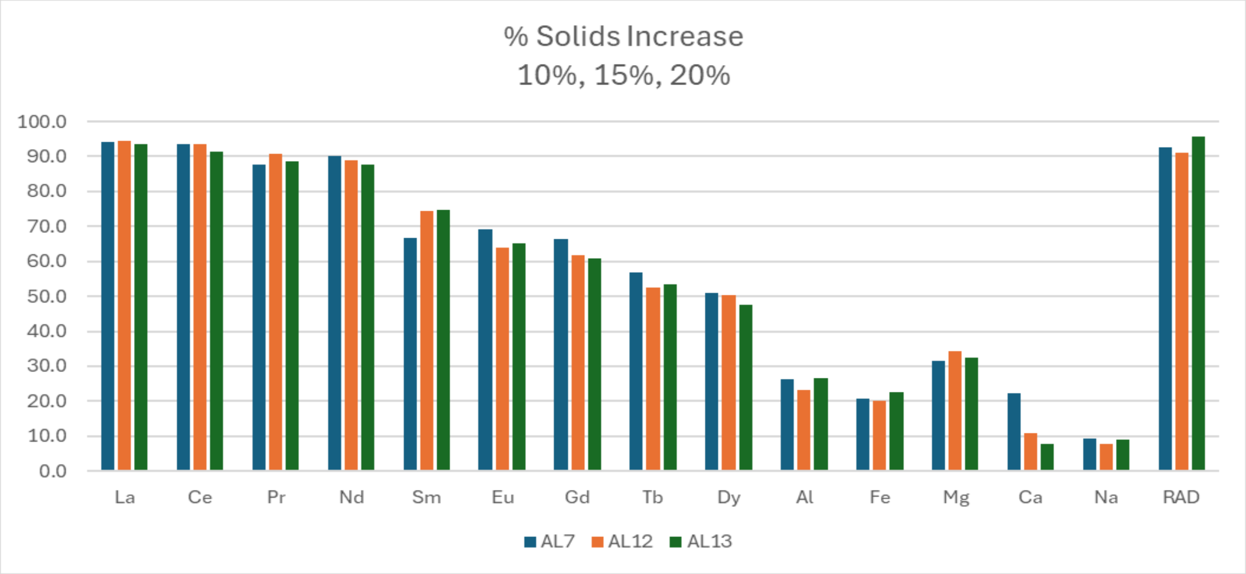
Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	***JORC Code explanation***	**Commentary**
		 Unaltered and Altered (i.e. weathered) ore were tested separately at a 600 kg/t acid dosage to check for detrimental impacts of the Altered ore which forms the top 10-12 ft of the deposit and ~10% of the mine plan material. The Altered ore shows slightly lower recovery than the Unaltered ore. The magnesium (Mg) leach extraction was ~15% higher from the Altered ore vs. the Unaltered. % Solids were increased over the initial setting of 10% to 15% and 20% to evaluate the effect upon extraction, see below. Running at a higher % solids also results in creating a liquid that is more acidic due to less water being added to the slurry. This effect did not increase the extraction nor did the higher % solids detrimentally effect the solubility of the REE or the gangue elements due to being well below the solubility limit with the exception of the Ca which did experience lower extraction at 15% and 20% solids due to being a saturated solution.

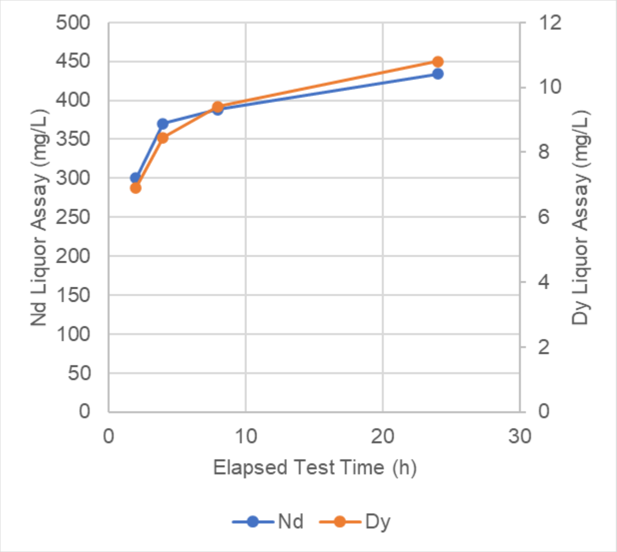
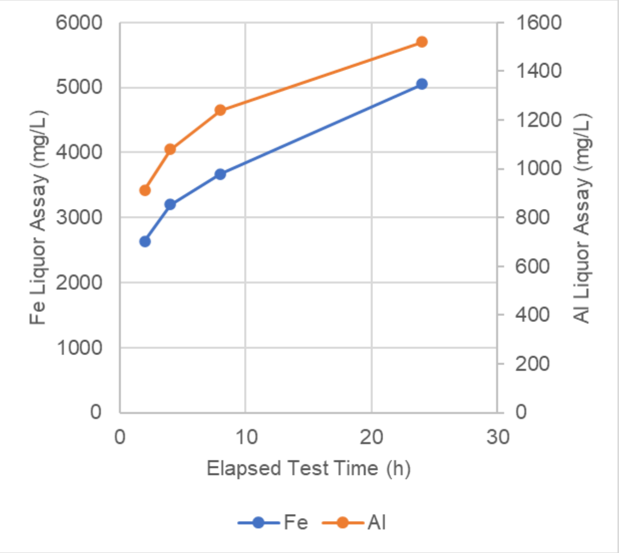
Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	*JORC Code explanation*	Commentary
		 Reaction time (residence time) was run at 24 hrs for the first two tests on unaltered and altered ore material while maintaining 50g/L acidity during the entire run, see below. Samples were taken over time to show the kinetic changes and therefore extraction levels in the reaction. Below, the graphs for AL2 show the Nd and Dy reaction rate for the REE starts to flatten at 8 hrs where the Fe and Al show no slowing or flattening of the curve, most likely due to an abundance of exposed Fe and Al grains to react with the acid whereas the number of exposed REE grains decreases.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	***JORC Code explanation***	**Commentary**
		  The filtration rate for the 24 hr reaction time tests was poor. Subsequent tests (AL4) was run for 8 hrs along with a regrind of the concentrate to 100% passing 53 micron. The filtration was much improved at these settings which concludes that it was not the particle size causing slow filtration but more likely gypsum or silica gel formation created during the long reaction time. The best filtration was experienced at shorter reaction times and lower acid dosage levels. During the filter cake washing it was observed that there were a small amount of rare earth compounds precipitated as either “co-precipitation” in the gypsum or as a rare earth double salt sulfate since the cake wash increases recovery due to re-dissolving the rare earth compounds in the filter cake. The precipitated REE compounds in the filter cake will require a very effective cake wash which will be recycled back to leach to eliminate a yield loss to the leach residue cake.

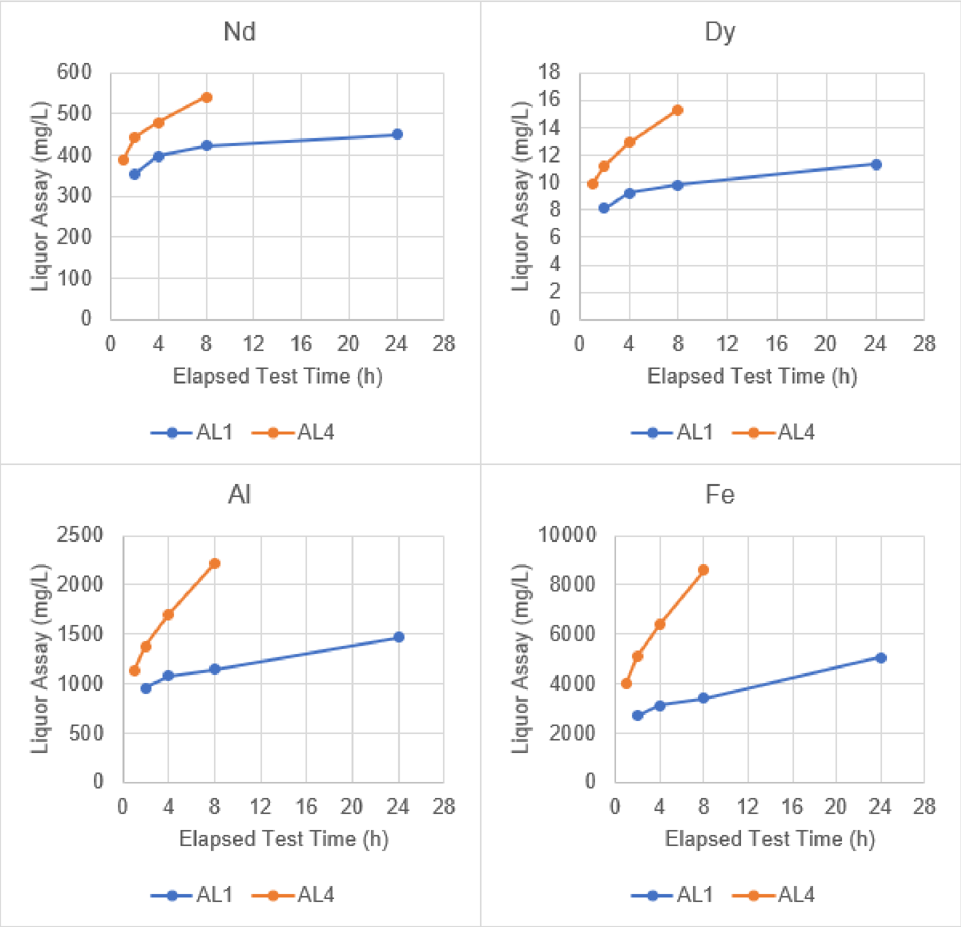
Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	*JORC Code explanation*	**Commentary**
		AL4 was a duplicate to AL1 but the ore was subjected to a regrind of 100% passing 270 mesh (53 micron) to test the effect of particle size on reaction rate. The graphs below show a marked increase in Nd and Dy concentration in the leachate, Al and Fe also increase at an even higher rate due to increased surface area.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	*JORC Code explanation*	**Commentary**
		 The table below compares the difference in leachate concentrate for the major impurity elements for the Scoping Study concentrate with the current concentrate. The Scoping Study concentrate was generated

Section 3 Estimation and Reporting of Mineral Resources

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

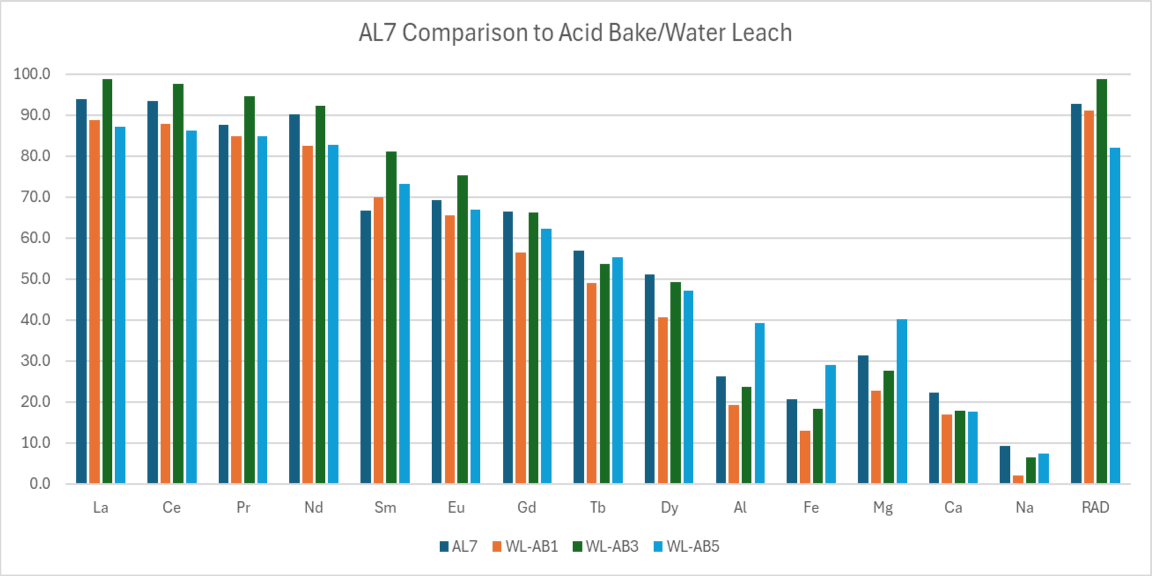
Criteria	***JORC Code explanation***	**Commentary**
		using WHIMS only, while the current concentrate was produced using gravity spiral followed by IRMS. The Scoping Study sulfuric acid tank leach test was performed at 250 kg/t and a 6 hr reaction time while the current spiral/IRMS concentrate was tested at 400 kg/t and a 8 hr reaction time. The Scoping Study WHIMS concentrate has a much higher concentration of Fe (AL16 is 80% vs. Scoping Study concentrate) and Al (AL16 is 65% lower). It is theorized that the gravity spiral step removed some of the Fe and Al containing heavy minerals and the IRMS was able to separate out the highly magnetic minerals such as hematite and magnetite. These minerals were readily leached in the sulfuric acid tank leach tests for the WHIMS concentrate resulting in much higher impurity concentrations in the leachate. Downstream Impurity removal steps should use less reagent (i.e. potential for lower operating costs) and achieve lower concentrations for the spiral IRMS concentrate.

	Unit	**SGS Spiral/IRMS Conc (AL16)**	**Scoping Study WHIMS Conc**	**% Change**
Si	mg/L	1,250	3,627	-66%
Al	mg/L	1,300	3,748	-65%
Fe	mg/L	4,450	22,230	-80%
Mg	mg/L	74	210	-65%
Ca	mg/L	1,670	1,495	12%
Na	mg/L	92	292	-68%
K	mg/L	158	510	-69%
Ti	mg/L	231	562	-59%
P	mg/L	45	190	-76%
Mn	mg/L	111	541	-79%
Zn	mg/L	19	101	-81%

Criteria	***JORC Code explanation***	**Commentary**
		ACID-BAKE ("AB") and WATER LEACH ("WL") TESTING: A sulfuric acid-bake consists of adding concentrated sulfuric acid (96+%) to the solid concentrate, mixing and then baking at high temperature. Five acid-bake/water leach tests were run. Acid-bake tests were conducted at 225°C for 4 hrs with the exception of WL-AB4 that was run at 300°C, which was based on experience and external technical reports, see below. All water leach tests were conducted at 90°C. Both the acid-bake and water leach temperatures are the maximum without losing sulfuric acid or water to boiling without going to higher than atmospheric pressures, therefore no higher temperatures were tested.

	WL-AB1	**WL-AB2**	**WL-AB3**	**WL-AB4**	**WL-AB5**
Feed	Unaltered -300/+86 µm	Altered -300/+86 µm	Unaltered -300/+86 µm	Unaltered -300/+86 µm	Unaltered -53 µm
Acid Addition (kg/t)	749	749	817	816	400
Bake Temp (°C)	225	225	225	300	225
Bake Time (hrs)	4	4	4	4	4
WL Temp (°C)	90	90	90	90	90

The figure below compares acid-bake/water leach results to atmospheric leaching run AL7. The chart shows that the acid-bake/water leach tests performed poorly compared to the atmospheric leach. AL7 compared to WL-AB5 (which were both performed at 400 kg/t acid addition) it can been seen that the acid-bake offers no benefit in acid used, REE Extraction, and shows that it extracts more Al, Fe and Mg. The equipment for acid-bake is more costly and complicated and experiences more corrosion and erosion wear than the comparable atmospheric leach equipment, so any further acid-bake testing was abandoned.

Criteria	JORC Code explanation	Commentary
		 **<u>COUNTER CURRENT LEACH TESTING:</u>** The final type of leaching that was tested is referred to as counter-current leaching. Atmospheric Leaching run #7 is shown for comparison which was run at 400 kg/t of acid, see below. The counter-current run, PL1/AL10 was run at 677 kg/t acid addition and PL2/AL11 was run at 433 kg/t of acid addition.

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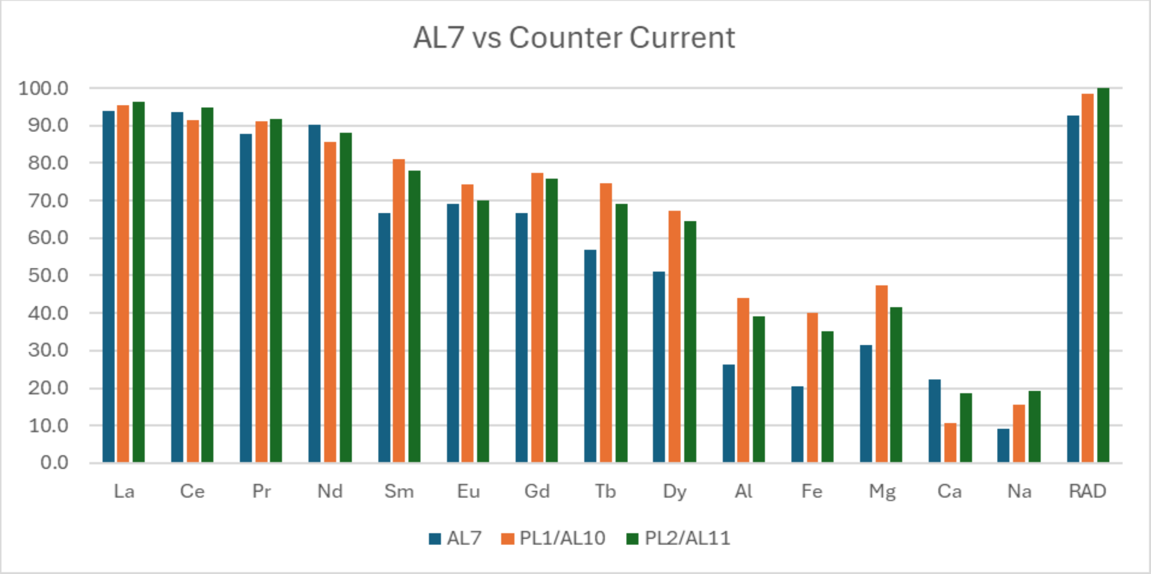
(Criteria listed in the preceding section also apply to this section.)

Criteria	*JORC Code explanation*	Commentary
		 The Nd recovery is very comparable between AL7 and PL2/AL11. Heavy rare earth recoveries show slightly higher extractions in PL2/AL11 keeping in mind that the counter-current leach had 33 kg/t higher acid dosage. PL1/AL10 show the highest heavy rare earth recovery but that is due to a much higher acid dosage of 677 kg/t. The counter-current runs show higher Al, Fe, Mg and Na which is a result of contacting spent solids with fresh acid in the acid leach step. The disadvantages of a counter-current leach are listed below which will result in essentially doubling the capital cost of the leach equipment • Filtration has to be conducted twice as compared once in a simple tank leach. The filtration step is the likely the largest in the whole flowsheet and is the highest acidity (corrosion) and will have high erosion as well.

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Criteria	***JORC Code explanation***	**Commentary**
		- The Acid Leach and Pre Leach are equivalent to two atmospheric acid leach circuits - Number of pumps, piping, valving, controls, etc will also double
Environmental factors or assumptions	*Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental*	ARR acquired exploration drilling notices from the Wyoming Department of Environmental Quality (WDEQ), Land Quality Division, for all drilling activities performed to date. ARR is developing a permitting needs assessment with local environmental consulting groups to present to each division at WDEQ to identify comprehensive environmental baseline studies needed to permit a mining operation at Halleck Creek. ARR is identifying additional regulatory stakeholders in Wyoming as part of the needs assessment. Factors for mine closure have been included in mining costs and financial modeling. At this stage of development, no mine closure plans have been developed. At this stage in project development, no social impact studies have been completed.

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

Criteria	***JORC Code explanation***	**Commentary**
	impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.	
Bulk density	*Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and*	An average specific gravity of 2.70 represents the in-place ore material at Halleck Creek based on hydrostatic testing. Bulk density testing will be included during bulk sample collection currently being designed and permitted.

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(Criteria listed in the preceding section also apply to this section.)		
Criteria	***JORC Code explanation***	**Commentary**
	representativeness of the samples. *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	
Classification	*The basis for the classification of the Mineral Resources into varying confidence categories.*	The classification at Halleck Creek is based on the following key attributes: **Geological continuity between drill holes** • Mineralization is controlled by batholith-scale fractionation. Hence, both empirical observations and statistical analysis confirm a very high degree of continuity with the respective rock masses at Overton Mountain and Red Mountain. • This is supported by variography.

Section 3 Estimation and Reporting of Mineral Resources

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

Criteria	***JORC Code explanation***	**Commentary**
	Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data). *Whether the result appropriately reflects the Competent Person's view of the deposit.*	**Drill spacing and drill density** • The drill pattern is mostly irregular with drill spacing of approximately 200m. • At Overton Mountain an area has been infilled on a systematic grid spacing of approximately 90m. This spacing is considered to be adequate to support a measured classification. • Drill hole spacing at Red Mountain is considered to be adequate to support indicated resources. The CP considers the above classification strategy and methodology to be appropriate and reasonable for this style of mineralisation.
Audits or reviews	*The results of any audits or reviews of Mineral Resource estimates.*	There have not been any audits of mineral resource estimates.
Discussion of relative accuracy/ confidence	*Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource*	Reported resources for Halleck Creek are in-place global estimates of tonnage and rare earth grade. The basis of classification of mineral resources was based on geostatistical analysis of variograms of rare earth elements.

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Criteria	***JORC Code explanation***	**Commentary**
	estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate. *The statement should specify whether it relates to global or local estimates, and, if*	The resource is classified as either measured, indicated or inferred. Subject to the application of 'modifying factors' the measured plus indicated component of the resource may allow for a formal evaluation of its economics with the potential to be converted to a Probable Ore Reserve. Therefore, a high degree of conservatism has been adopted as the underlying premise of the resource classification and, in particular, the indicated component.

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Criteria	***JORC Code explanation***	**Commentary**
	local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used. *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	

SECTION 4 ESTIMATION AND REPORTING OF ORE RESERVES – ORE RESERVES ARE NOT BEING REPORTED