High-Grade Surface Sampling from Expanded Halleck Creek Project, TREO averaging >3000 ppm

Highlights

- **Consistently high-grade surface sampling from expanded Halleck Creek project area:**
  - **3,349 ppm average Total Rare Earth Oxides (TREO) in the Overton Mountain Area**
  - **3,002 ppm average Total Rare Earth Oxides (TREO) Red Mountain Area**
- **Highest grade observed in samples collected in 2021 are:**

TREO: PPM	**5,756**
HREO: PPM	**552**
Magnet Minerals Oxide:	**1,433**

- **The surface samples also host high-value Neodymium (Nd) and Praseodymium (Pr) with average values of 742 ppm for Overton Mountain and 661 ppm for Red Mountain study areas**
- **The magnet Rare Earth Oxides, NdPr, comprises 22% of TREO at an ideal 4:1 ratio**
- **A 62% increase of area under claim control, with 63 new lode claims staked, adding 1,193 acres (483 ha)**
- **The total area under mineral claim control (tenement area) is approximately 3,109 acres (1,257 ha)**
- **Next Steps: Exploration drilling permits filed; JORC 2012 compliant Exploration Targets being determined**

American Rare Earths Limited (ASX: ARR) ("the Company") is pleased to announce the release of the "2021 Technical Report of the Wyoming Halleck Creek Rare Earths Project" (Report) prepared by World Industrial Minerals (WIM). The Report provides an overview of the Halleck Creek Project area, regional and local geology, recent claim-staking activities, general mineralogy of the host rocks and summarises assays of rock samples collected across the project area.

The impressive surface sampling results over a substantially expanded tenement control footprint support the robust prospectivity of the extensive Halleck Creek project area. The continuous trend of high-grade mineralisation of the exposed and accessible Red Mountain pluton presents a high-value opportunity for drilling 100 metres or deeper over significant acreage.

This announcement supports further development of the US domestic Rare Earths supply chain. Downstream US magnet manufacturers will benefit from using a domestic raw material source upon passing of the recently introduced H. R. 5033 ``Rare Earth Magnet Manufacturing Production Tax Credit Act of 2021''. Using a domestically sourced REE would increase the tax credit by 50% for each Kg of magnet manufactured. Details are available at https://www.govinfo.gov/app/details/BILLS-117hr5033ih/

Mr Keith Middleton, Managing Director of ARR, adds, "The release of this report unveils the latest expansion and analysis of our Halleck Creek REE project. We are extremely excited about the results of the surface sampling. The TREO grades and the grades of key elements of Neodymium (Nd) and Praseodymium (Pr) in our surface samples accelerates the timetable to perform additional exploration of the project area."

Project Overview

Acquisition and Expansion

The company announced the acquisition of the project from Zenith Minerals on 6 August 2020. Partial completion of the transaction was announced on 22 December 2020, which included five unpatented lode claims totalling approximately 85 acres and the business entity Wyoming Rare Pty Ltd, including its US subsidiary, Wyoming Rare (USA). The completion of the transaction was announced on 30 June 2021. Closing was possible after the USA based leadership team successfully earned unanimous government approvals of the four associated exploration leases totalling 1,844 acres with the State of Wyoming. The Company's US management team quickly achieved these approvals even though Zenith Minerals had more than two years without progress in their lease application. This success reinforces the Company's strategy of basing key business and technical leadership near the USA projects, activating their local relationships and knowledge of appropriate procedures.

After careful data analysis and the additional surface sampling, the Company created shareholder value by adding lode claims (tenements). ARR staked additional areas, providing a more complete claim of the control area, especially in the geologic anomaly area known as the Red Mountain Pluton. The 63 new lode claims, staked in 2021, added 1193 acres (483 ha), representing an increase of 62% compared to the acquisition from Zenith Minerals.

When staking new claims (tenements), the technical team expanded the robust trove of intellectual property by collecting and assaying approximately 200 additional surface samples collected in 2021.

Historic Metallurgy

The historic metallurgy of samples from the Red Mountain Pluton of the Halleck Creek Project area indicates an opportunity for cost-effective upgrading of ores and simple elimination of most gangue material. This is indicated in the ASX release reported by Zenith Minerals on 3 March 2020 "Further Positive Metallurgical Test work - Laramie Rare Earths (REE) Project, Wyoming USA."

Notable highlights include:

- "Mineral separation by magnetic methods recovered 87% of the REE minerals into 27% of the mass whilst rejecting 78% of the waste material…"
- "Mineral separation using gravity methods recovered 76% of the REE minerals into 22% of the mass whilst rejecting 78% of the waste material…"

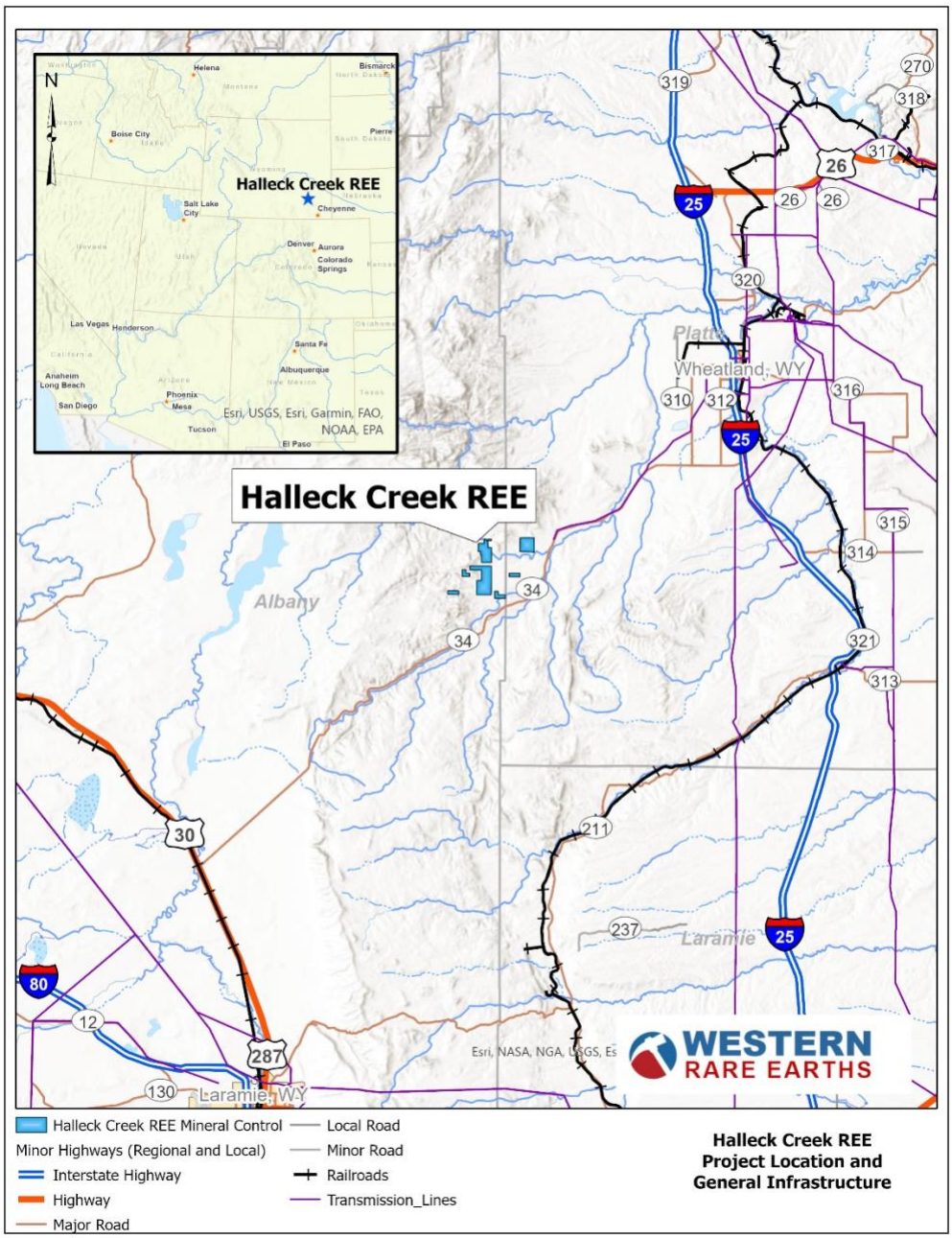
Rejecting large percentages of waste material so early in mineral processing shows the potential for reducing operating expenses. Less mass requiring chemical treatments would reduce related raw material costs. Chemical-free gangue material is returned to the open-cut during reclamation. This would reduce chemically treated tailings volumes by a similar percentage. Thus, there is potential for reduced environmental impact and reduced reclamation costs.

Summary of Halleck Creek Technical Report

Introduction and Location

ARR commissioned World Industrial Minerals LLC (WIM) of Arvada, Colorado, to assess the regional geology, conduct surface sampling, and summarise mineral claims across the Halleck Creek REE project area in Albany County, Wyoming, refer to Figure 1. WIM presented the results of their work in a report entitled "2021 technical Report on the Wyoming Halleck Creek Rare Earths Project", August 2021. The Halleck Creek project is accessible by state highways and locally maintained roads from Wheatland, Wyoming. Major rail and interstate highways are within 50 km of Halleck Creek. Electric power runs to the project area.

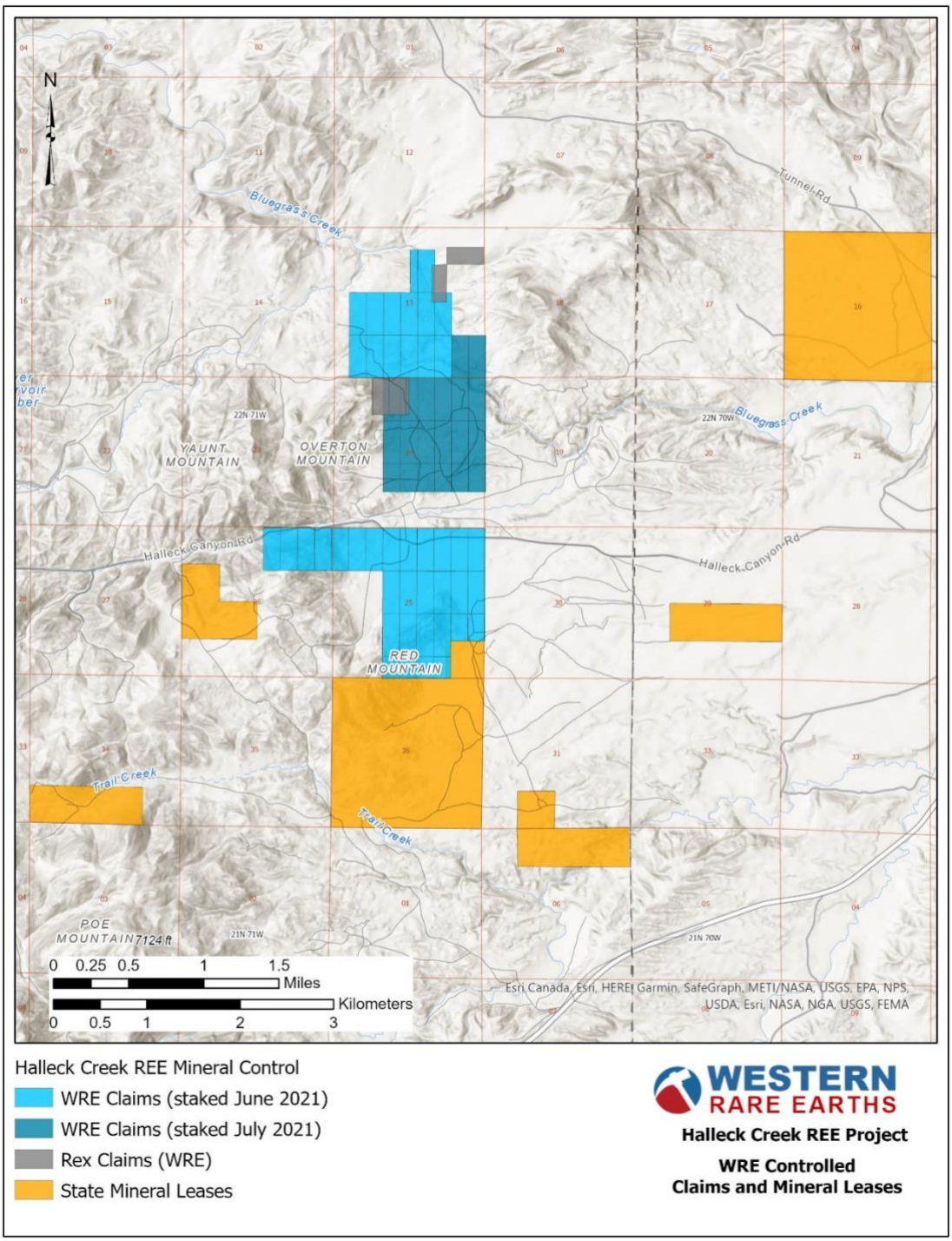
Figure 1 – Halleck Creek REE Project Location



Mineral Control

The total mineral area controlled by ARR at Halleck Creek covers 3,109 acres (1257 ha); refer to Figure 2. ARR controls 68 unpatented lode claims at Halleck Creek covering 1265 acres (512 ha) and four state mineral leases covering 1,844 acres (745 ha).

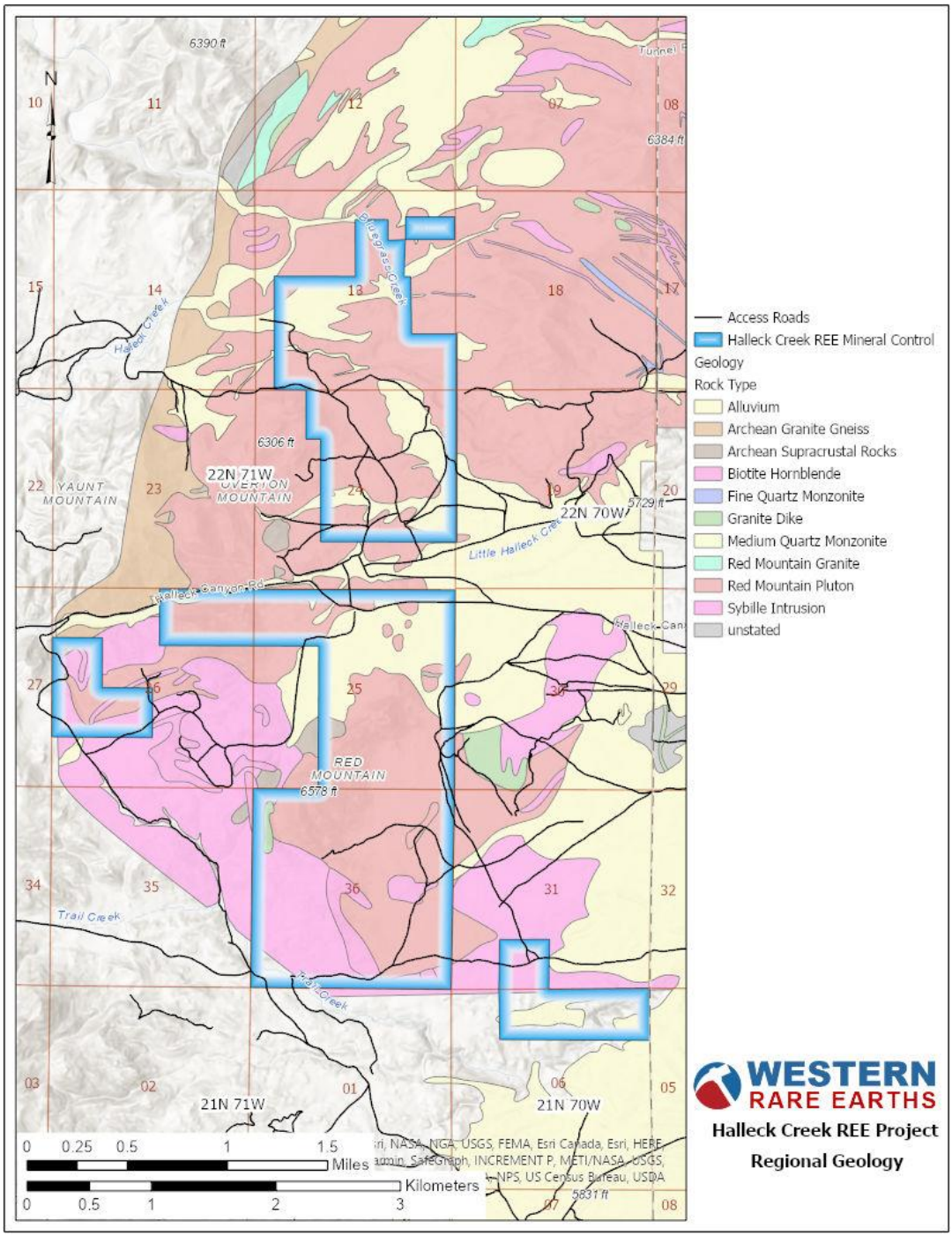
Figure 2 – Halleck Creek Claims



General Geology

Halleck Creek resides in the Laramie anorthite complex of the Precambrian age. The Red Mountain Pluton is the predominant Rare Earth Oxide bearing Formation at Halleck Creek. The Red Mountain pluton ranges in composition from fayalite monzonite, clinopyroxene quartz monzonite, and biotite–hornblende quartz syenite to granite, refer to Figure 3.

Figure 3 – Regional Geology of the Halleck Creek Project Area



Petrography

Petrographic work completed by Anderson (at the University of Wyoming) in the Red Mountain area initially identified clinopyroxene quartz monzonite (CQM) and discovered that it contains more allanite than surrounding rock types FM and BHS. Allanite hosts rare earths, and there is a positive correlation between the abundance of allanite and the abundance of rare earths. The higher grade TREO's outlined from the sampling program appears to be the best indicators of the CQM unit.

DCM Science, a petrographic laboratory located in Lakewood, Colorado, was commissioned to determine the mineralogy of the Red Mountain Pluton. Four rock samples, similar in composition, were submitted to DCM for detailed petrographic analysis. The results from sample RMP-024 are:

"Client Sample No: **RMP-024 TREO:4427ppm**

Mineralogy: Microcline 42%, Plagioclase 31%, Amphibole 14%, Quartz 10%, Iron Oxide 1%, Allanite 2%

Trace Mineralogy: Epidote, Ilmenite, Apatite, Zircon, Biotite

The thin section sample contains the highest concentration of allanite. Allanite occurs as fractured subhedral to anhedral grains and aggregates vary from 400µm to 2.5mm, with one large aggregate measuring over 5mm. Some grains show slightly isotropic interiors with a few grains rimmed with epidote and iron oxide. Although some allanite is attached and included in amphibole, the majority is seen locked between quartz/feldspar. Although this sample is the most intact specimen studied, the rock's matrix still showed moderate fracturing and is easily crushed. In general, the liberation of individual mineral phases should not be problematic." Figure 4 and Figure 5 show photographic images of rock thin sections under 100x magnification and polarised light.

Figure 4 - Client Sample No: RMP-024. Allanite with a metamict-isotropic core in feldspar

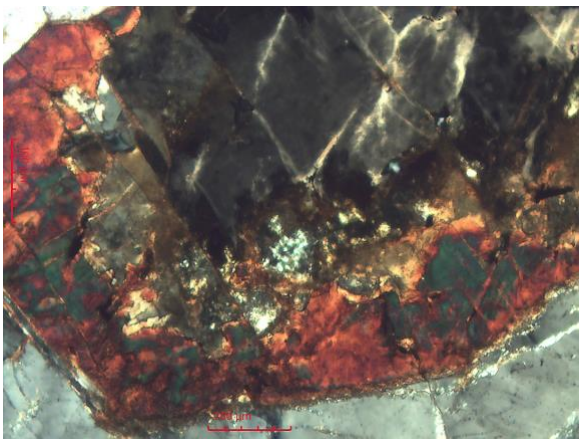
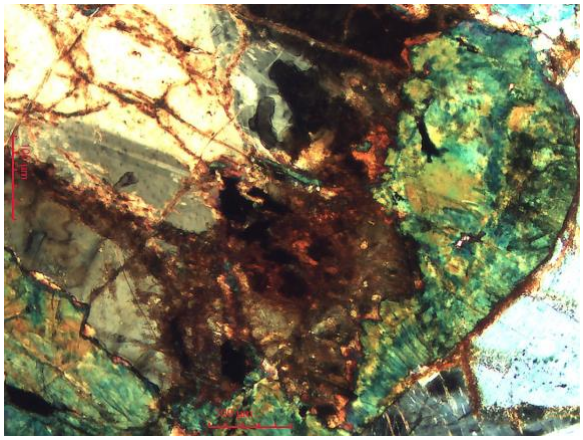


Figure 5 - Client Sample No: RMP-024. Allanite with metamict-isotropic core rimmed with epidote in quartz/feldspar



Surface Sampling

Since 2010, 259 valid samples have been collected across the Halleck Creek Project Area. Figure 6 highlights TREO surface sample values across Overton Mountain and Red Mountains study areas in the Red Mountain Pluton rocks. Approximately 200 surface samples were collected in 2021.

The highest grade observed in samples collected in 2021 are:

TREO:	**5,756**
HREO:	**552**
Magnet Minerals Oxide:	**1,433**

Table 1 lists the distribution of REO elements and the average grade in surface samples. When cerium and lanthanum are removed from the mix, neodymium averaging 488 ppm REO is the most abundant economic critical and magnetic REE present. A combined grade of 615 ppm, neodymium, and praseodymium (NdPr) account for approximately 22% of all TREO. For the heavy REE's yttrium averaging 169 ppm REO is the most abundant economic REE.

The charts in Figure 7 illustrate the distribution and comparison of REO elements from the surface samples. Magnetic REO accounts for about 26% of all TREO, while the elements defined as Critical REO account for about 30%.

In approximately 197 surface samples in the Overton Mountain and Red Mountain study areas, the average TREO is approximately 3,349 ppm TREO and 3,002 ppm TREO, respectively; refer to Table 2. The surface samples also host high-value NdPr with average values of 742 ppm for Overton Mountain and 661 ppm for Red Mountain study areas, with an average of 702 ppm. The NdPr in these same samples average 22% of TREO and are in the market ideal 4:1 ratio.

Table 1 - Average REO Grades of All Samples Collected

Element	REE Oxide	Average REO (PPM)
Lanthanum	La2O3	547
Cerium	Ce2O3	1227
Praseodymium	Pr2O3	128
Neodymium	Nd2O3	488
Samarium	Sm2O3	81
Yttrium	Y2O3	169
Europium	Eu2O3	10
Gadolinium	Gd2O3	58
Terbium	Tb2O3	7
Dysprosium	Dy2O3	39
Holmium	Ho2O3	7
Erbium	Er2O3	18
Thulium	Tm2O3	2
Ytterbium	Yb2O3	15
Lutetium	Lu2O3	2

Table 2 - Average REO Values for Rock in the Red Mountain Pluton by Study Area

			Average REO Values (ppm)				
Study Area	**Rock Unit**	**No. Samples**	**Total REO**	**Light REO**	**Heavy REO**	**Magnetic REO**	**NdPr**
Overton Mountain	Red Mountain Pluton	105	3,349	3,002	347	790	742
Red Mountain	Red Mountain Pluton	92	3,002	2,646	356	713	661
Grand Total		**197**	**3,187**	**2,836**	**351**	**754**	**702**

Figure 6 - Sample Location Map and TREO Values in PPM

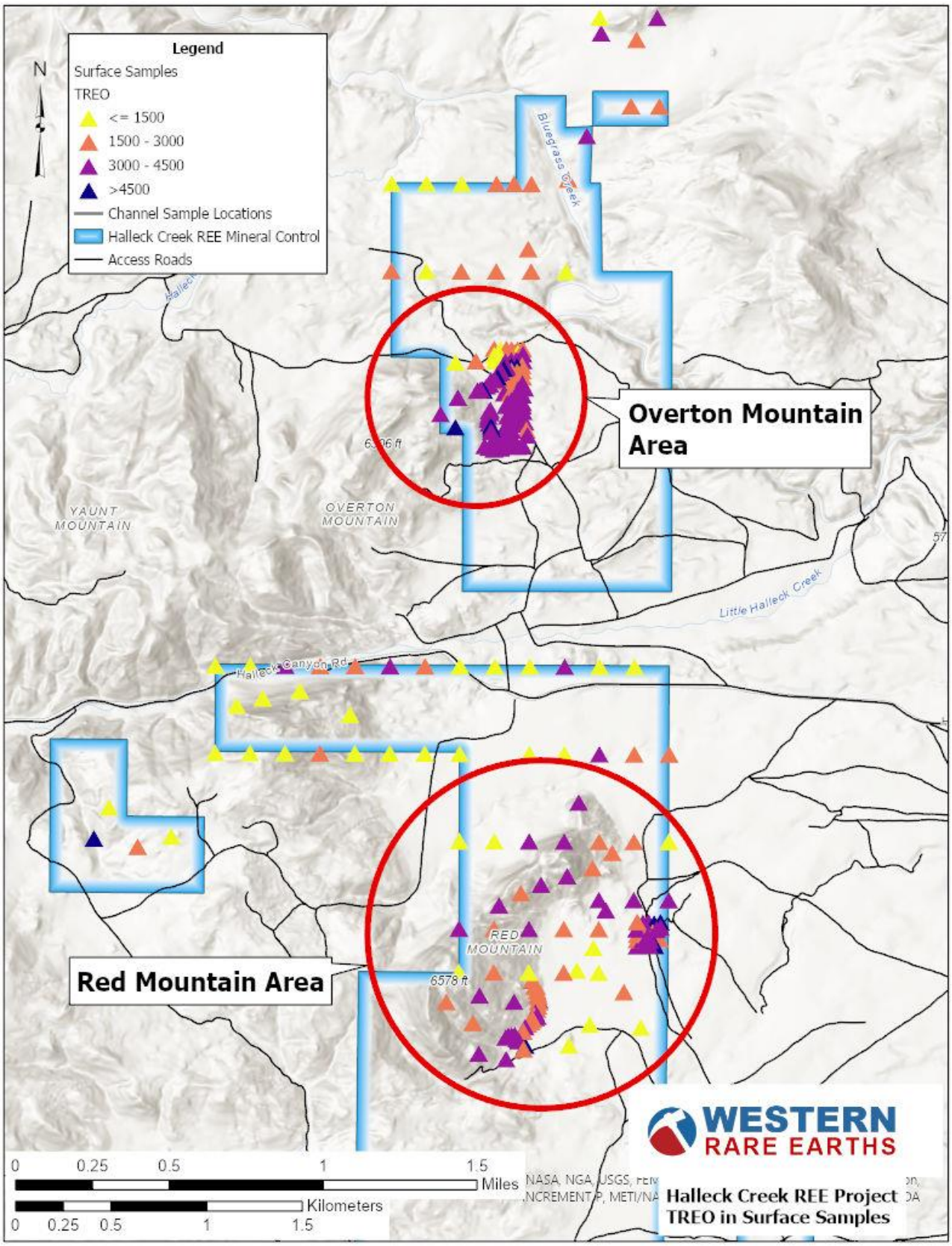
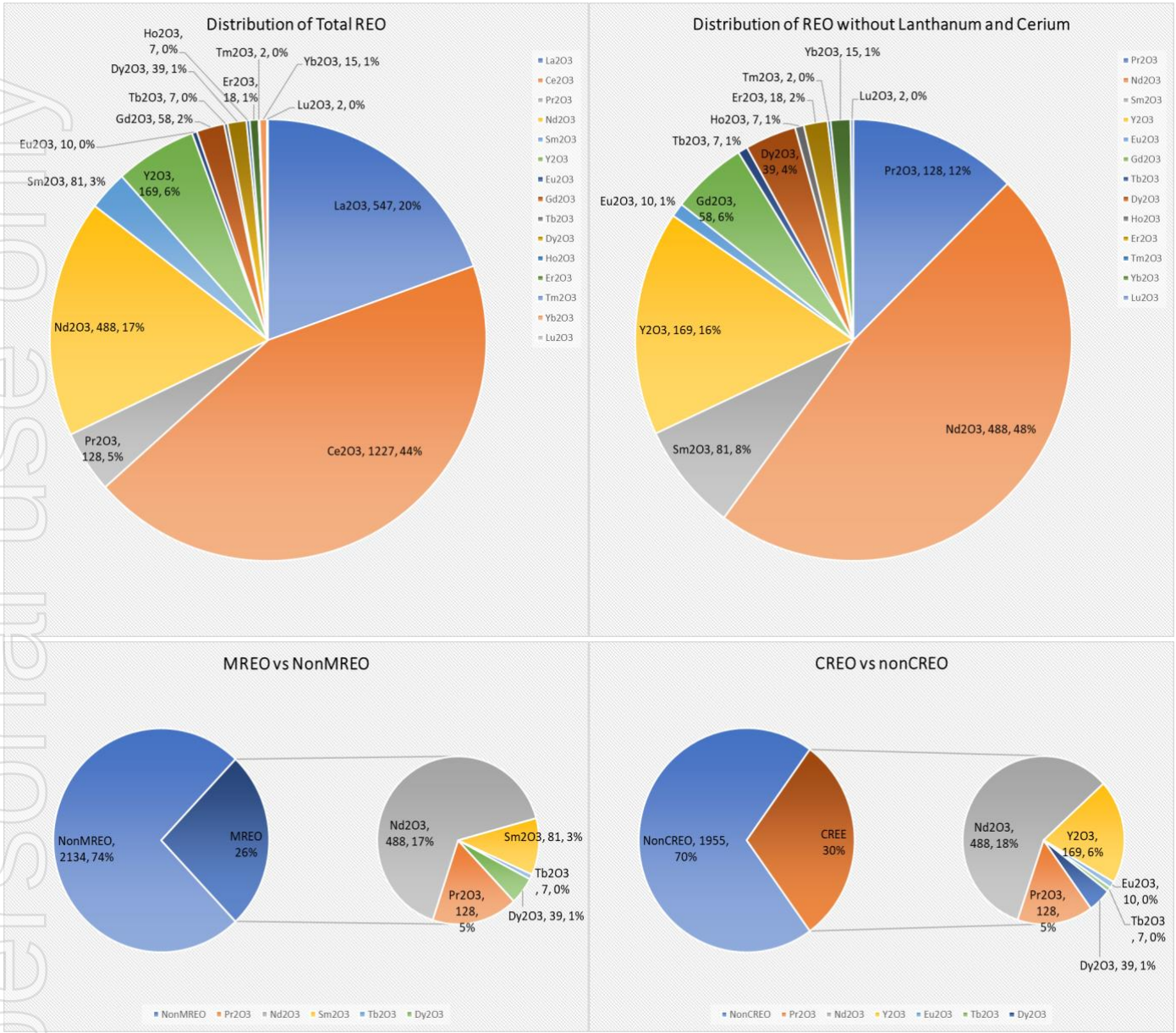


Figure 7 - Charts of REO Distributions



Exploration Drilling

ARR is proposing to drill five core holes on BLM land and claims in the northern area of Overton Mountain; refer to Figure 8. Notice of Intent documents have been filed with the regional BLM field office in Rawlins, Wyoming.

ARR plans to drill additional exploration holes on state land and leases in the southern Red Mountain area; refer to Figure 9.

Figure 8 - Proposed Overton Mountain Area Holes

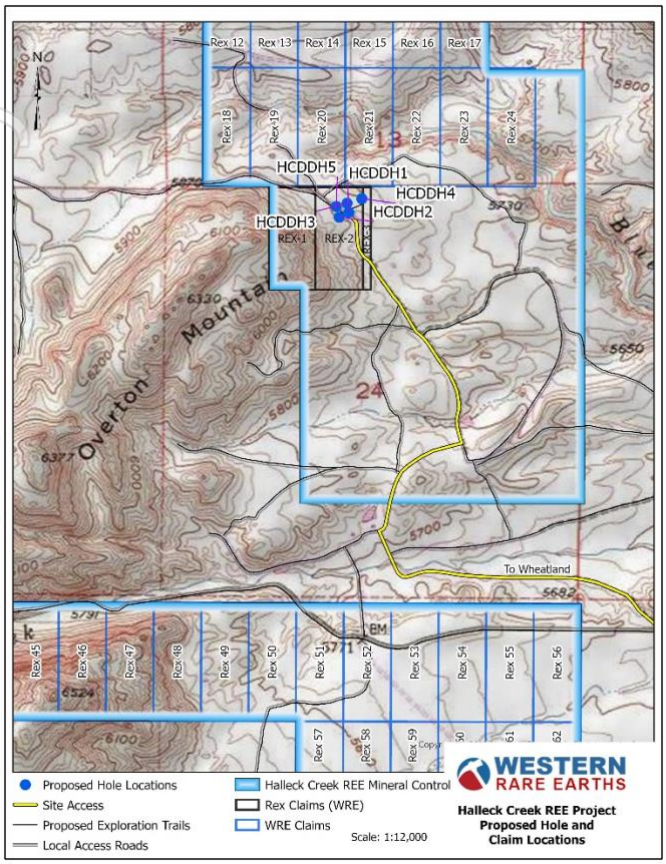
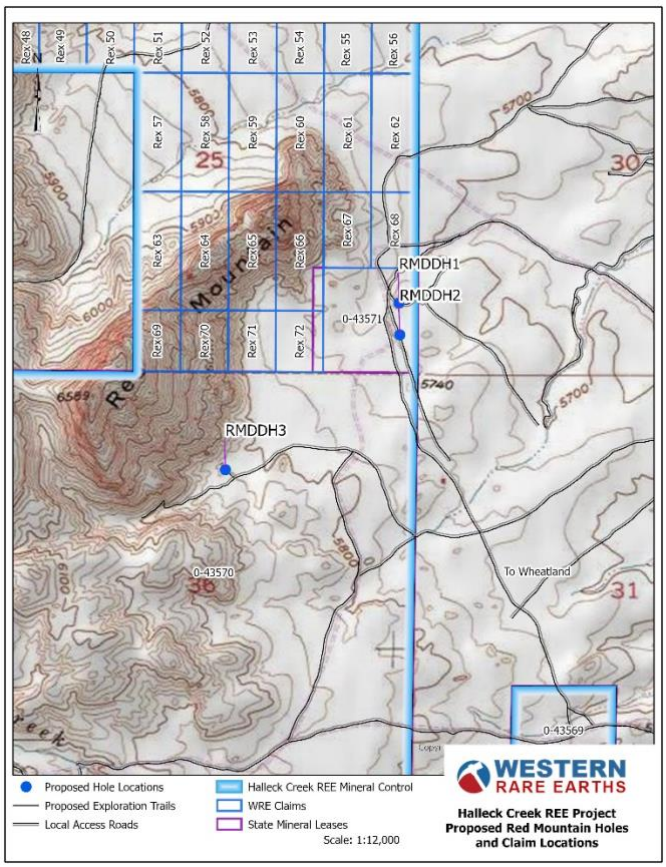


Figure 9 - Proposed Red Mountain Area Holes



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 available 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. In the case of Mineral Resources estimates, 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 Person's findings presented have not been materially modified from the original market announcements.

Competent Persons Statement: The information in this Report related to Exploration Results is based on the 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 relevant to the style of mineralisation and type of deposit under consideration. The activity 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 the matters in the Report are based on the information in the form and context in which it appears.

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 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. As a large tonnage, bulk deposit, La Paz is also potentially the largest, rare-earth deposit in the USA and benefits from containing exceptionally low penalty elements such as radioactive thorium and uranium. ARR plans to deliver its first Preliminary Economic Assessment for La Paz by 2022 and is working with leading USA research institutions La Paz's mineral profile incorporated into emerging US advanced rare earth processing technologies. ARR acquired a second USA REE asset in the Searchlight Rare Earths project in the first half of 2021. ARR has also acquired a third USA REE asset, the Halleck Creek project in Wyoming, in June 2021.

Appendix A

JORC Code, 2012 Edition – Table 1 Halleck Creek Rare Earths Project

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 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 (e.g., submarine nodules) may warrant disclosure of detailed information.*	• Individual grab rock samples and were collected by hand at the surface from in-situ outcrops. • Grab samples are believed to be representative of the outcrops they came from. • 1-2kg rock samples were collected by a geologist. The samples were broken down using a hammer from the outcrop. Rock samples were crushed in the laboratory and then pulverised 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.*	• No drilling

Criteria	JORC Code explanation	Commentary
	• *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.*	
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.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• Rock samples were geologically described and photographed. • No logging
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 • Samples were analysed at ALS Laboratories in Reno, Nevada. The samples were crushed, pulverised, and assayed by ICP-ME MS81 for REE. • ~2kg of rock was crushed and pulverised, and a subsample was taken in the laboratory and sent for analysis. • Grab sampling was selective based on geological observations. • Each sample was 1kg to 2kg in weight which is appropriate to test for a grain size of 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 34 elements by fusion ICP-MS. The procedure will report near total results. • No tools were used in the sampling program. • Internal laboratory standards were kept when analysing rock samples.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.*	• Consulting company personnel have observed the assayed samples. • No drilling

Criteria	JORC Code explanation	Commentary
	• *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• Field data was recorded in field notebooks, sample record books and 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 with +/- 5m accuracy. • The grid system used to compile data was NAD83 Zone 13N. • 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.*	• Both randomly and non-randomly spaced surface chips were sampled. • Not only the data will be used to estimate the mineral resource or ore reserve. • None.
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 from selected outcrops that were considered representative of varying rock types. • No drilling.
Sample security	• *The measures taken to ensure sample security.*	• 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.*	• Wyoming Rare Earths Project Acquisition – Five unpatented mining claims on BLM US Federal Land totalling 71.6 acres (29 has) plus six Wyoming state leases totalling 1843.72 acres (745 has) were acquired from Zenith Minerals Ltd. • Sixty-three (63) additional unpatented mining claims were staked by ARR that totalled 1193.3 acres (482 has). Overall, the ARR subsidiary controls 3108 acres (1255 has) of mining claims and Wyoming State Leases. • No impediments to holding the claims exist. An annual holding fee of $165/claim ($11,880) is payable to the BLM to maintain the claims. To keep the State leases, minimum rental payments of $1/acre to for 1-5 years; $2/acre for 6-10years; and $3/acre if held for ten years or longer.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Before sampling by WIM on behalf of Blackfire Minerals and Zenith Minerals, 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 occurs within allanite, which arises as a variable constituent of the Red Mountain Pluton. The occurrence can be characterised as a disseminated type of 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:*
	  ○ *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.*
		• No drilling

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.*	
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.*	• See map in the body of Report under "Wyoming Project Acquisition Section".
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.*	• The average grade of the TREO's calculated from the collection of 268 samples is 2604ppm. The lowest grades collected were less than ten ppm TREO, the highest 5756ppm; less than 10ppm HREO, the highest 552ppm; less than ten ppm magnet minerals oxide, 1433ppm the highest grade.

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 coloured, hard and dense granite with areas of localised fracturing. The rock shows significant iron staining and deep weathering. • Microscopic description: In hand specimen, the samples represent light coloured, relatively coarse-grained granitic rock composed of visible secondary iron oxide, amphibole, opaques, clear quartz and pink to white coloured feldspar. All the specimens show moderate to strong weathering and fracturing. Allanite content is variable from trace to 2%. Rare Earths are found within the allanite. • Metallurgical testing to date consisted of concentrating the allanite by both gravity and magnetic separation. The rare earth, rich, allanite concentrate is further evaluated for extraction.
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.*	• Further mapping and sampling are expecting to lead to drill targets.

Sections 3 and 4 are not relevant for this early-stage exploration project

Appendix B

2021 Technical Report on the Wyoming Halleck Creek Rare Earths Project Western Rare Earths

Prepared by

World Industrial Minerals, LLC
PO Box 130
Arvada, CO 80001
303-905-9820

2021 Technical Report on the Wyoming Halleck Creek Rare Earths Project Western Rare Earths

Prepared for:

American Rare Earths Ltd.
Suite 706 Level 7
89 York Street
Sydney, NSW 2000
Australia

Prepared by:

World Industrial Minerals, LLC
P.O. Box 130
Arvada, CO 80001
303-905-9820

Report Date: 5 August, 2021

CONTENTS

FIGURES

1. SUMMARY

A geological review and sampling program of the Halleck Creek Property, a REE exploration project, located in Albany and Platte Counties, Wyoming (Figure 1-1) was completed on behalf of American Rare Earths Ltd. (ARR). The Company currently trades on the Australian Stock Exchange (ASX) under the symbol ARR.

The Halleck Creek REE Project is an exploration project located in the southern Laramie Mountain range of southeastern Wyoming about 70 km northeast of Laramie Wyoming and 30 km southwest of Wheatland Wyoming (Figure 1-1, 1-2). The property consists of 68 unpatented lode mining claims totaling 1,264.9 acres (512 has) staked in June 2021 and July 2021. These claims are 100% owned by the company Western Rare Earths (WRE), a US subsidiary of ARR. Additionally the company controls Wyoming State leases totaling 1843.72 acres (745 has) The area is readily accessible by road, with climate and terrain favoring seasonal (summer/fall) exploration activities. There are no apparent environmental issues of serious concern.

No mining is known to have taken place in this portion of the Laramie range historically. During the 1950s uranium prospecting rush, a number of REO-thorium, and uranium occurrences were discovered in nearby pegmatite bodies and in throughout the southern Laramie range. None of these were seriously explored (drilling, trenching etc.), and apparently none were mined. The region has received little attention since. The Southern Laramie Mountain Region that contains the project area lies entirely within the Red Mountain Pluton. This Precambrian intrusive syenite has been dated at 1.51 billion years old and has variously been identified as a hornblende monzonite and a hornblende syenite. Highly anomalous REO values were discovered in the clinopyroxene quartz monzonite portion of the Red Mountain Pluton specifically occurring within the silicate mineral allanite. A PhD candidate (Anderson, 1995) doing sampling in his thesis area made this discovery and published his findings in an academic journal.

In 2010 literature research by WIM personnel uncovered the sampling data for the area that led to follow up field mapping and sampling that identified large areas of anomalous REO mineralization with relatively low thorium/uranium values. Wyoming state mineral leases were subsequently acquired and prospected. Due to low REE prices the project was suspended and subsequently reactivated in 2018. In 2021 the project was acquired by ARR who now controls the leases and claims. WIM has managed the project since its inception.

The best sample assay (in ppm) collected in 2021 is summarized as follows:

- **TREO : 5,756**
- **HREO : 552**
- **Magnet Minerals Oxide : 1,433**

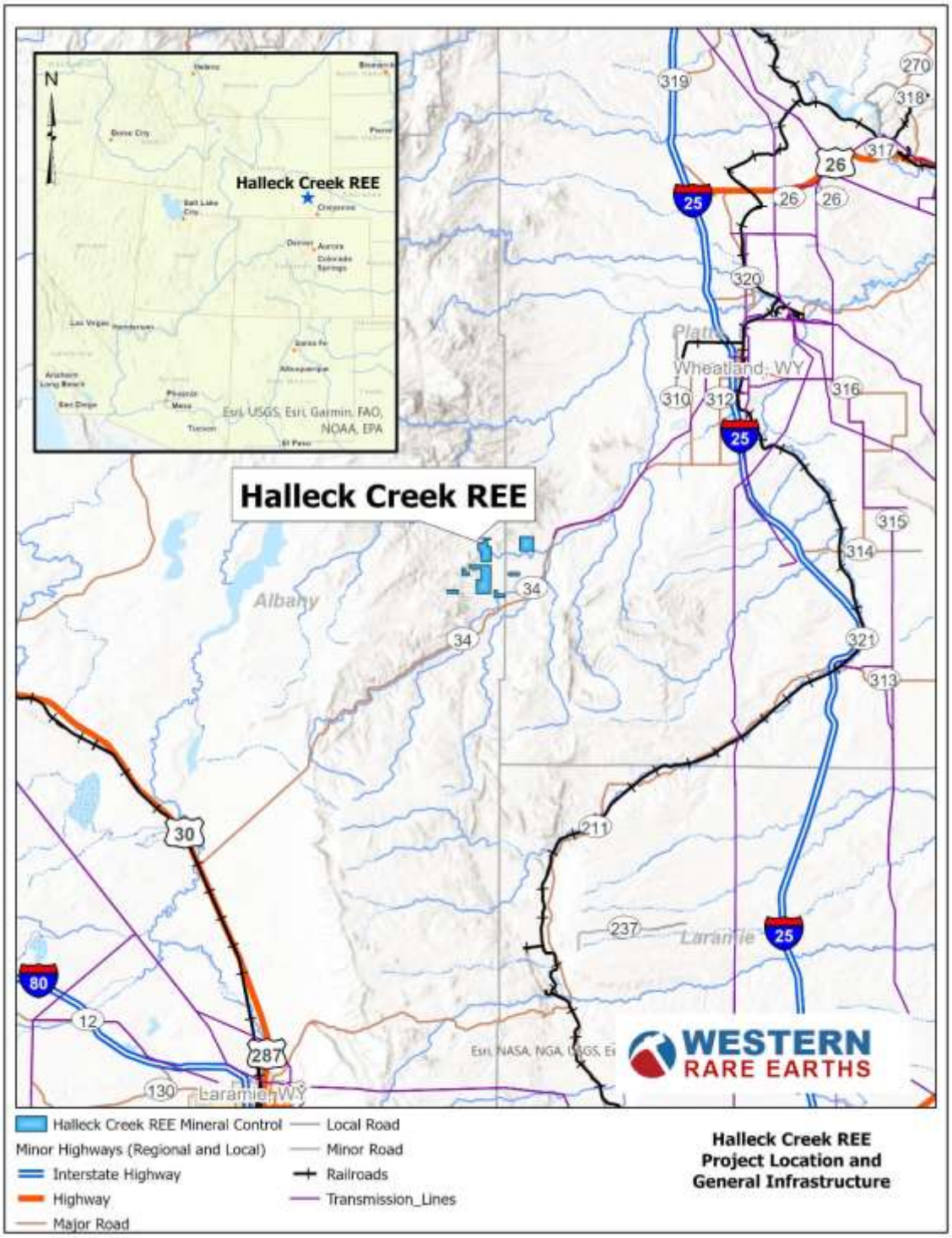
Mapping and sampling in 2019 by Zenith consulting geologists at WIM indicates that the principal REO mineralization in the Halleck Creek Project area occurs in allanite within the Red Mountain Pluton. The allanite content and associated REO content varies within the pluton due to local variant rock types within the pluton such as the clinopyroxene quartz monzonite. The mineralogical differences between these rock types are very subtle and differences can only be determined by thin section petrography. Widespread grid sampling followed up by detailed channel sampling within the Red Mountain pluton appears to be the effective way of identifying higher grade zones of REO's.

The Halleck Creek Project appears to be a unique REE property containing wide spread near surface mineralization that warrants further study and exploration. A Phase I exploration program is recommended to

better define REE targets using widespread grid sampling followed up by detailed chip channel trench sampling. A phase 2 drilling program will be designed to test for mineralization at depth over the higher grade surface anomalies. A successful drilling program will result in a maiden resource being delineated.

The completed JORC Table 1 included in this report is located in Appendix A.

Figure 1-1 General Location Map



2. INTRODUCTION

2.1 Terms of reference

The Author will be paid a consulting fee for the preparation of this Report. This will be comprised of a daily fee plus reimbursement of out-of-pocket expenses. Receipt of this payment is not contingent upon the conclusions of this Report or the success of any potential share offering.

All measurements herein will be given in Metric system units (meters, metric tons, degrees centigrade etc.) except where designated in Imperial units. All currency values are in United States Dollars except where designated otherwise. Also shown is a conversion table (Table 2.1) showing Rare Earth Elements converted to Rare Earth Oxides. Table 2.2 shows the conversion of uranium and thorium to oxides.

List of Abbreviations

Abbreviation	Description	Abbreviation	Description
^{O}C	Degree Celsius	Ltd	Limited
^{O}F	Degree Fahrenheit	m	Meter
ac	Acre	mm	Millimeter
ASX	Australian Stock Exchange	MREE	Magnet Rare Earths Elements
ATV	All-terrain vehicle	MREO	Magnet Rare Earth Oxides
BLM	Bureau of Land Management	mt	Metric ton
cm	centimeter	ppm	Part per million
CREE	Critical Rare Earth Elements	REE	Rare Earths Element
CREO	Critical Rare Earth Oxides	REO	Rare Earth Oxides
ft	Foot	st	Short ton
’	Feet	t	Metric ton
g	Gram	TREE	Total Rare Earths Elements
g/t	Gram per ton	TREO	Total Rare Earth Oxides
ha	Hectare	USGS	United States Geologic Survey
HREE	Heavy Rare Earths Elements	WGS	Wyoming Geologic Survey
HREO	Heavy Rare Earth Oxides	WY	Wyoming
kg	Kilogram	yr	Year
km	Kilometer		
LREE	Light Rare Earths Elements		
LREO	Light Rare Earth Oxides		

Table 2.1
REE to REO Conversion and Type REO

Rare Earth Element	Symbol	Heavy	Light	Critical	Magnet	Oxide	Conversion Factor*
		HREO	LREO	CREO	MREO		
Scandium	Sc					Sc_2O_3	1.5338
Lanthanum	La		X			La_2O_3	1.1728
Cerium	Ce		X			Ce_2O_3	1.2284
Praseodymium	Pr		X		X	Pr_2O_3	1.1700
Neodymium	Nd		X	X	X	Nd_2O_3	1.1664
Samarium	Sm		X		X	Sm_2O_3	1.1596
Yttrium	Y	X		X		Y_2O_3	1.2699
Europium	Eu	X		X		Eu_2O_3	1.1579
Gadolinium	Gd	X				Gd_2O_3	1.1526
Terbium	Tb	X		X	X	Tb_2O_3	1.1510
Dysprosium	Dy	X		X	X	Dy_2O_3	1.1477
Holmium	Ho	X				Ho_2O_3	1.1455
Erbium	Er	X				Er_2O_3	1.1435
Thulium	Tm	X				Tm_2O_3	1.1421
Ytterbium	Yb	X				Yb_2O_3	1.1387
Lutetium	Lu	X				Lu_2O_3	1.1372

* PPM Element X Conversion Factor = PPM Oxide
(Conversion Source: Saskatchewan Research Council 2021, American Assay Lab 2021)

[The factor is calculated by taking the formula weight divided by the atomic mass of the element within that formula.
Example Dy2O3 formula weight is 372.997, and Dy atomic weight is 162.5.
However, there are two Dy per unit (Dy2O3), so total Dy mass is 325 per unit. 372.997 / 325 = 1.1477]

Table 2.2
Uranium and Thorium Conversion to Oxides

Element	Symbol	Oxide	Conversion Factor*
Uranium	U	U_3O_8	1.1792
Thorium	Th	ThO_2	1.1379

* PPM Element X Conversion Factor = PPM Oxide
(Conversion Saskatchewan Research Council, 2021 American Assay Lab 2021)

2.2 Purpose of Report

The purpose of this report is to provide American Rare Earths LTD. (ARR) its investors and potential investors with a clear summary of the Company's Property assets. Included in this summary are recommendations for further exploration.

2.3 Sources of Data

The data in this Report comes from multiple sources. All of the data and information supplied are legal property of the Company. Chiefly, data was extracted from and relied upon from the Wyoming Geologic Survey: King and Hausel and King and Harris; and Academic Reports primarily authored by Geist et.al; Graff et.al. and Fountain et.al. References to these and other reports are given in the Reference Section (27) of this report.

The Author has reviewed, verified, interpreted and analyzed all of the data presented in this Report.

It is believed that the underlying information contained herein is reliable, based on the systematic data verification procedures (including field examination of pertinent geologic features) performed by John Keller, Senior Exploration Geologist, World Industrial Minerals, David Guilinger, Senior Exploration Geologist World Industrial Minerals and myself.

The results and opinions expressed in this Report are conditional upon the aforementioned technical and legal information being current, accurate and complete as of the date of this Report and the understanding that no information has been withheld that would affect the conclusions made herein. The Author does not assume responsibility for Company's actions in distributing this Report.

The Author therefore cannot guarantee the correctness of all of the information but, to the extent of his investigation and within the scope of the assignment, he believes that the Report is substantially correct.

2.4 Disclaimer

The herein proposed exploration is designed to identify additional rare earths mineralization within Precambrian monzonites and syenites identified from mapping. It is herein stated that by completion of the proposed exploration program success is not assured.

3. RELIANCE ON OTHER EXPERTS

This is an early stage exploration project. No outside experts were consulted for this project.

4. PROPERTY DESCRIPTION AND LOCATION

The Halleck Creek REE Project is in the Southern Laramie Mountains, approximately 70 km northeast of Laramie, a sparsely populated area of Albany and Platte Counties in Southeastern Wyoming (Figure 4-1)

The project is comprised of 68 unpatented lode mining claims (Figure 4- 1) totaling 1,264.9 acres (512 has). These claims are located as follows:

- Township 22 North, Range 70 West Section 18
- Township 22 North, Range 71 West Sections 13,24,24,26

Albany County.

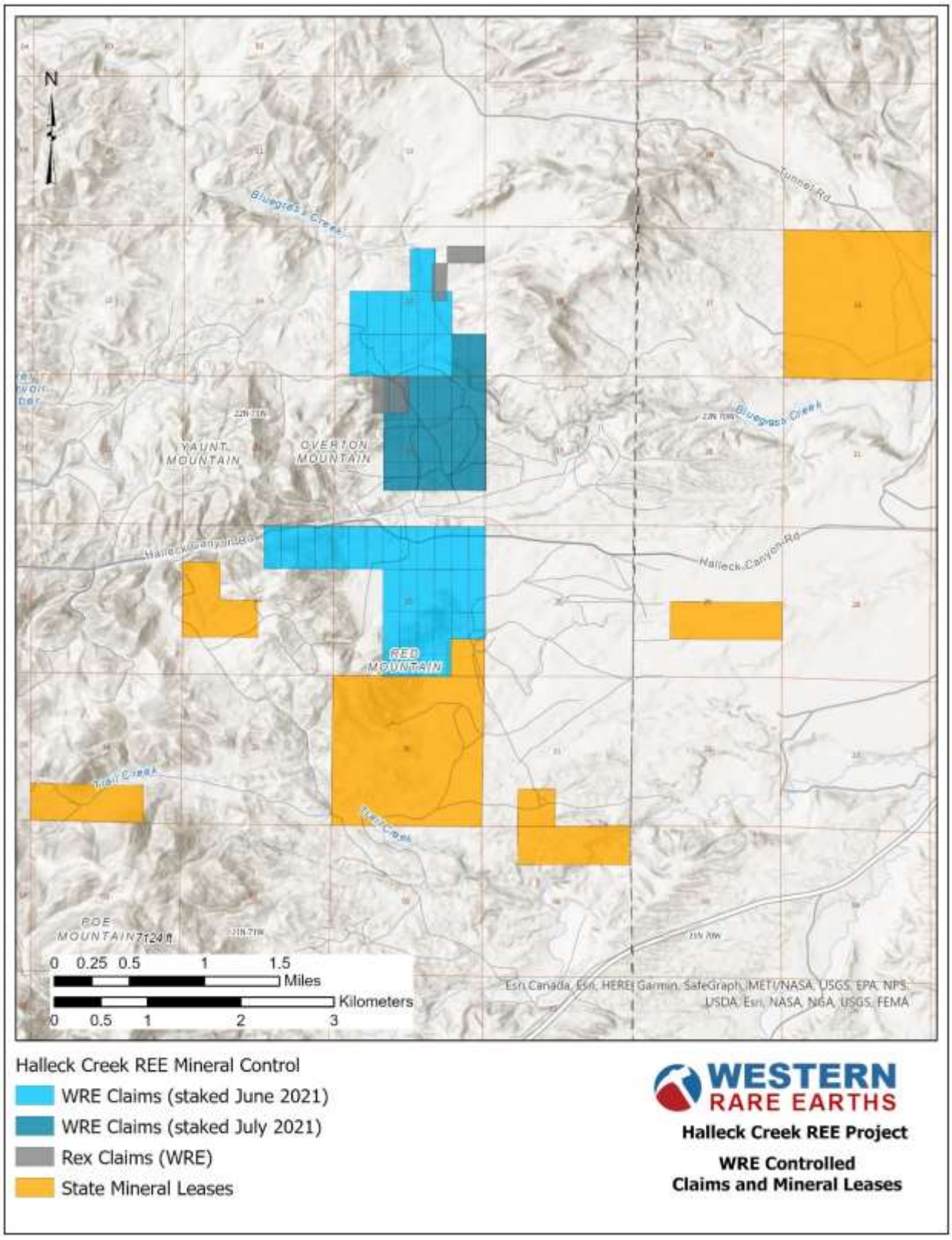
Additionally the Company controls 6 Wyoming State Mining Leases totaling 1843.72 acres (746 has) (Figures 4-1) and are located as Follows:

- Township 22 North, Range 70 West Sections 16, 28

Platte County.

- Township 22 North, Range 70 West Section 31
- Township 22 North, Range 71 West Sections 26,34,36
- Township 21 North, Range 70 West Section 6

Figure 4-1 Claim Location Map



4.1 Unpatented Claims

The Property consists of 68 unpatented lode mining claims listed in Appendix B.

The unpatented lode mining claims are located on United States Federal land and administered by the U. S. Bureau of Land Management (BLM). A lode mining claim consists of up to 20.66 acres (8.57) has) and their locations staked in the field and located on a map. Once the staking is complete, the claims are filed with the State of Wyoming BLM office and a $225 per claim filing fee is paid.

The claims can be held in perpetuity provided an annual claim holding fee of $165 per claim is paid on or before September 1 of each calendar year the claims are held. Failure to pay this annual holding cost or paying late will result in the voiding of the claim. Additionally claims must be recorded annually in the County in which they were staked. All claims are located in Albany County, Wyoming.

Once claims are staked and fees paid, the claim holder has a right of access on the claims and the right to explore once all required exploration permitting requirements is met. Other than the right to explore and develop the claims for their mining content, the claim holder has no other rights to the property.

Other than failing to pay the annual holding costs or paying late, which results in the voiding of the claims, there are no other significant factors and risks discussed in this report that may affect access, title, or the right or ability to perform work on the property.

4.2 Wyoming State Mining Leases

Wyoming Rare a wholly owned subsidiary of Western Rare Earths who is in turn a wholly owned subsidiary of ARR controls the following Wyoming State Leases:

Lease 0-43568 consisting of 640 acres located in T22N R70W Section 16 all in Platte County Wyoming

Lease 0-43569 consisting of 283.72 acres located in T22N R70W Section 29 NESW:N2SE; Section 31 SESW; T21N R70 W Section 6 Lot1:L2:L3 in Platte and Albany Counties Wyoming

Lease 0-43570 consisting of 640 acres located in T22N R71W Section 36 all in Albany County Wyoming

Lease 0-43571 consisting of 280 acres located in T22N R71W Section 25 SESE; T22N R71W; Section 26 SWNW:N2SW; T22N R71W Section 34 S2SW:SWSE Albany County Wyoming

State Lease acreage totals 1842.73 acres (744.5 has). The initial rental fee for the 4 leases is $1/year for a total of $1843. The Company is in year 1 of the lease period.

The overall fee structure is as follows: One dollar ($1) per acre for the first through the fifth years; Two dollars ($2) per acre for the sixth through tenth years of the primary lease term and for any renewal year within a second ten (10) year term; Three dollars ($3) per acre for renewal for third ten year term; Four dollars ($4) per acre for each year for renewals for a fourth ten (10) year term.

4.3 Company Interest

ARR has a 100% interest in the State Leases.

4.4 Encumbrances

There are no encumbrances associated with the mining claims.

4.5 Environmental Liabilities

There are no environmental liabilities associated with the mining claims.

4.6 Permitting

Limited areas of the claims will permitted for core drilling under the 5 acre NOI (Notice of Intent) permitting procedure in the near future.

5. ACCESSIBILITY, CLIMATE, INFRASTRUCTURE AND PHYSIOGRAPHY

The Halleck Creek Project is in the eastern part of the northwestern United States in the southern part of the Laramie Mountain Range. It is located in eastern Albany County and western Platte in southeastern Wyoming. By air the Project is approximately 70 km northeast of Laramie, Wyoming and 30km southwest of Wheatland, Wyoming the closest city to the project. Road access from Wheatland is via Wyoming State Highway 34 southwest for about 29km then an additional 10km west on a County maintained gravel road number 720.

The project is located at the edge of the high plains of Wyoming characterized by short grass and sparse sagebrush. Elevations range from over 2135 meters on mountain tops (Overton, Red Mountain) to 1900 meters on average in the rolling hills portions of the project.

The climate is semi-arid and continental. The region experiences four seasons, and is drier and windier in comparison to most of the United States with greater temperature extremes. Summers in Wyoming are warm and dry with July high temperatures averaging between 29 and 35 °C in most of the state. Winters are cold and moderately snowy averaging around 381mm of moisture with temperatures ranging from -15º C to +2º C. Spring can be variably mild to very snowy. Fall is the mildest time of year with little moisture and generally warm days. The prevailing vegetation consists of prairie grasses and sage brush.

Today, the local economy is based largely on tourism and ranching, the town of Wheatland (pop. 3560; 39km east by road) offers modest facilities including food, lodging and fuel. Cell phone coverage is available throughout most of the area, including limited portions of the claim block. The I-25 freeway north-south transportation corridor passes through the town of Wheatland. A major east-west rail and I-80 freeway route passes through the town of Laramie located to the south west of the property.

The project is located on split estate lands public lands with the minerals administered by the U.S. Bureau of Land Management (BLM). The surface is privately owned with restricted access. Mineral claim staking requires notification of surface land owners prior to staking. Mineral exploration, development and other operations that create surface disturbances require permitting by the BLM and coordination of activities with surface land owners.

6. HISTORY

6.1 Halleck Creek Project Area

The Halleck Creek Project is in the southeastern part of Albany County and the southwestern part of Platte County Wyoming.

No mining is known to have taken place in this portion of the Laramie range historically. During the 1950s uranium prospecting rush, a number of REE-thorium, and uranium occurrences were discovered in nearby pegmatite bodies and in throughout the southern Laramie range. None of these were seriously explored (drilling, trenching etc.), and apparently none were mined. The region has received little attention since.

In 2010 Blackfire Minerals, An Australian mining company acquired the current set of State Leases ARR now controls for the purpose of REE exploration activities. Based on research completed by World Industrial Minerals areas of anomalous REE values were discovered in the Red Mountain area as part of PhD thesis. Much of Red Mountain was covered by a State Mineral Lease that was subsequently acquired. Initial sampling was completed on this and other leases with results shown in Appendix C. In 2011 after initial sampling was completed the project was subsequently dropped due to low REE prices.

In 2018 the project was re-activated by Zenith Minerals, an Australian Mining Company who applied for the same State leases and also staked 5 claims on land in which the BLM owned both the surface and minerals. Additional sampling was completed both on the State Lease applications and the mining claims on the BLM Land.

Sample results from the 2019 sampling program are included in Appendix C. Sample site locations and results are shown on the detailed geology maps in section 7 of this report

6.2 Historic Production

There has been no production of REE's in the Halleck Creek Project Area.

6.3 Historic Mining

There has been no mining of REE's in the Halleck Creek Project Area.

6.4 Historic Processing

There has been no processing of REE's in the Halleck Creek Project Area.

7. GEOLOGIC SETTING

7.1 Regional Geology

The Laramie anorthosite complex is one of five monzonitic to granitic A-type plutons intruded at 1.43 Ga in the Laramie Mountains of southeastern Wyoming. Regionally in the Precambrian Laramie anorthosite complex youngest to oldest rocks are listed as follows:

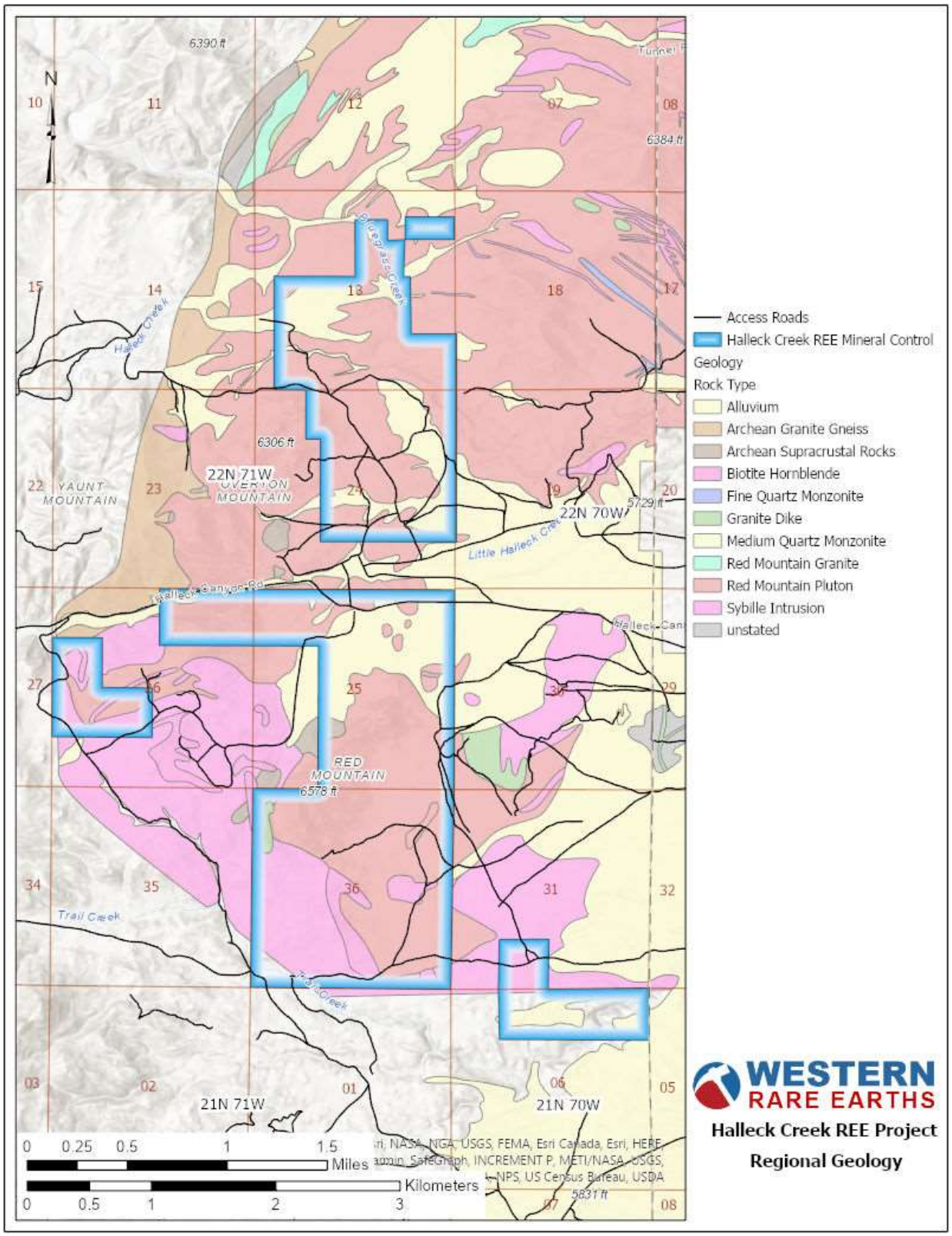
- Granite Gneiss
- Supercrustal Rocks
- Granite Dikes
- Biotite Hornblende
- Fine Quartz Monzonite
- Red Mountain Granite
- Red Mountain Pluton
    - Fayalite Monzonite (Olivine rich unit)
    - Clinopyroxene Quartz Monzonite
    - Biotite Hornblende Quartz Syenite
- Sybille Intrusion

The Precambrian granite gneiss, supercrustal rocks, granite dikes, biotite hornblende, fine quartz monzonite, rand red mountain granite are only sparsely exposed in the region. Granite dikes are exposed on both the claims and leases. The prevalent rock types exposed regionally and on the claims and leases are the Red Mountain Pluton and the Sybille intrusion which is composed of older monzonites and syenites.

The Red Mountain pluton, the next youngest intrusion in the Laramie anorthosite complex, is one of five monzonitic to granitic A-type plutons intruded at 1.43 Ga in the Laramie Mountains of southeastern Wyoming. The Red Mountain pluton ranges in composition from fayalite monzonite, clinopyroxene quartz monzonite, and biotite–hornblende quartz syenite to granite. The Red Mountain pluton is petrologically and geochemically distinct from the northern and southern Sherman batholith and the Sybille intrusion. It has higher FeOt/(FeOt + MgO) and higher K2O, is more strongly enriched in REEs, and at any given silica content it has lower abundances of TiO2, FeO, MgO, CaO, and P2O5.

The biotite–hornblende quartz syenite crystallized at oxygen fugacities near or slightly below those of Fayalite Monzonite. Most of the units in the pluton carry mantle-like Nd, Sr, and Pb isotopic compositions similar to the least contaminated anorthositic and ferrodioritic rocks of the Laramie Anorthosite Complex, indicating that the pluton evolved mainly via differentiation. Substantial crustal assimilation occurred only in the late dikes and the granite. It is suggested that all of the 1.43 Ga A-type intrusions in southeastern Wyoming are ultimately derived from tholeiites. Extreme differentiation or partial melting produced monzonitic magmas that have assimilated varying amounts of siliceous crust. The differences between the Red Mountain pluton and other A-type granitoids in southeastern Wyoming are related to the extent of differentiation prior to crustal assimilation.

Figure 7-1 Regional Geology of the Halleck Creek Project Area



7.2 Halleck Creek (North-South) Property Geology

The primary rock types exposed on the property are the Red Mountain Pluton and the Sybille intrusive monzonites and syenites. These intrusive complexes have subsequently been intruded by younger granite dikes. The Red Mountain Pluton is composed of three intrusive units:

- Fayalite Monzonite (Olivine rich unit) (FM)
- Clinopyroxene Quartz Monzonite (CQM)
- Biotite Hornblende Quartz Syenite (BHS)

These rock types also have disseminated allanite of variable quantities up to 2% (weight %) present throughout the Pluton. The younger granite dikes also contain variable quantities of allanite. Based on the petrographic work completed to date the allanite is the primary host of the REO's. In the older Sybille intrusive allanite is only sparsely present and sampling to date indicate minimal REO mineralization.

Preliminary reconnaissance mapping within the Red Mountain Pluton does not reveal any differentiation of the units identified above. Only by thin section work are the units able to be discerned. The rocks in the north part of the project area around Overton Mountain are less weathered and fractured than those of the south part of the project area around Red Mountain.

Petrographic work completed by Anderson in the Red Mountain area originally identified the clinopyroxene quartz monzonite (CQM) and also discovered that it contains more allanite than surrounding rock types (FM, BHS. Allanite hosts the rare earths and the more abundant the allanite the more abundant the rare earths. The higher grade TREO's outlined from the sampling program appears to be the best indicators of the CQM unit.

Figure 7-2 Geology Map North Area of the Halleck Creek Project

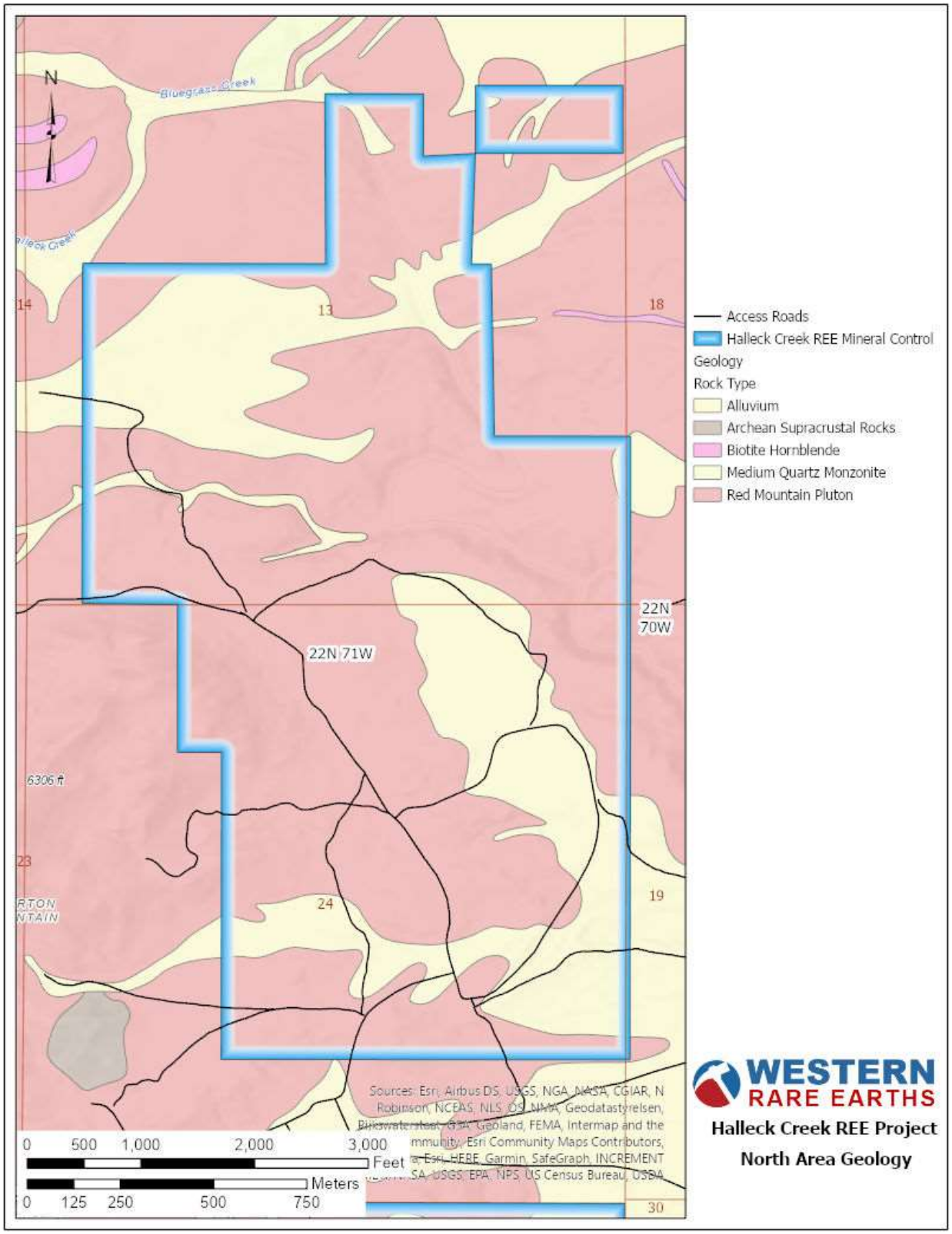
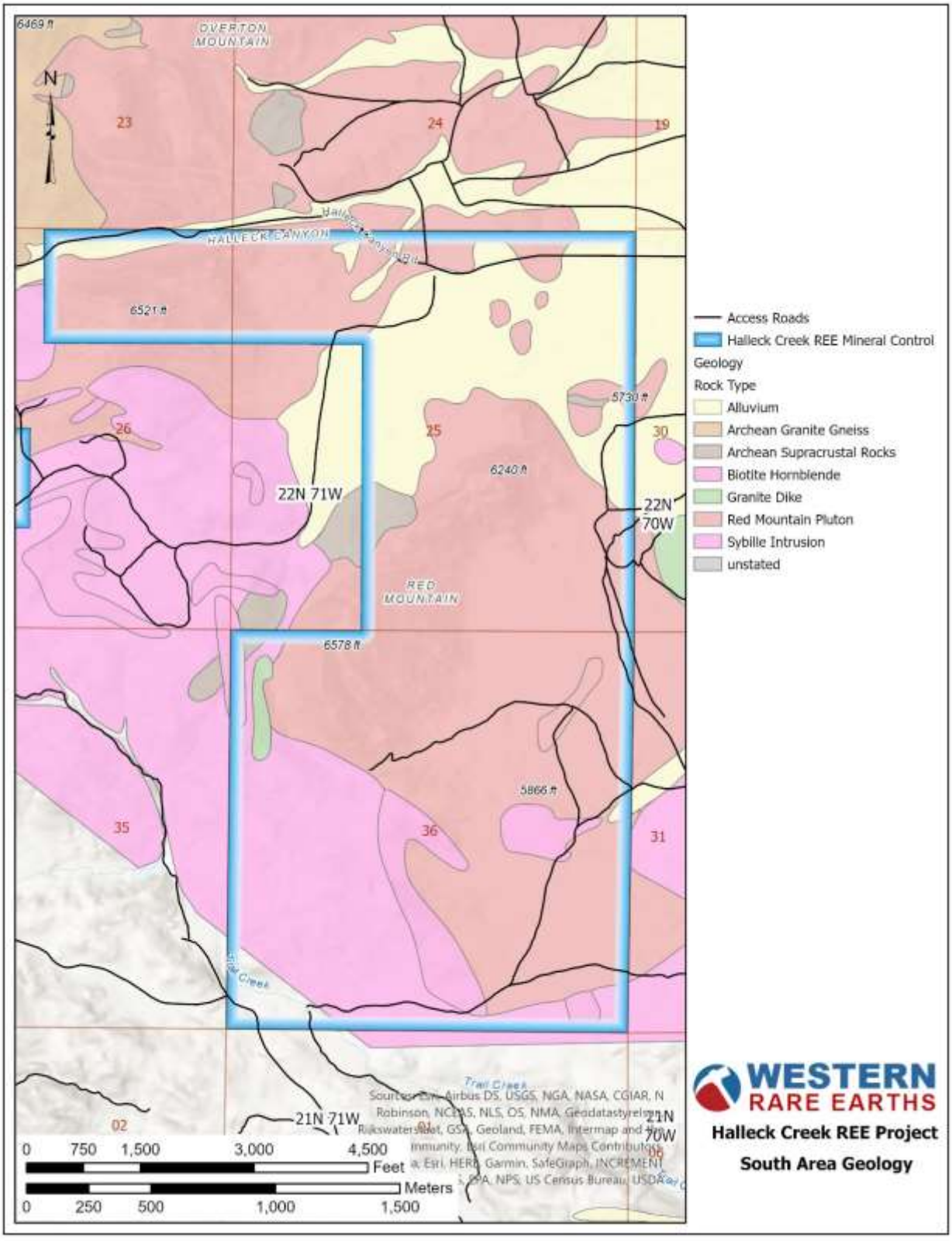


Figure 7-3 Geology Map South Area of the Halleck Creek Project



7.3 Mineralogy

DCM Science, a petrographic laboratory located in Lakewood Colorado USA was commissioned to determine the mineralogy in general of the Red Mountain Pluton; the association of the pluton with rare earths; and found the association of rare earths with allanite that is disseminated throughout the pluton. Four samples were studied for this petrographic study: **RMP-005, RMP-013, RMP-024,** and **RMP-032**). Each sample was prepared as a standard polished thin section for study by polarized reflected light microscopy (RL) and polarized transmitted light microscopy (PL).

Color photomicrographs of relevant features are included for documentation.

Mineral Assemblage

Petrographic analyses of the four samples confirm the bulk mineralogy and rock types are essentially the same. Therefore, the major/minor phases will be described under specific mineral category headings. Allanite and its association with other mineralogy will be discussed under individual sample number headings.

Hand Specimen 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.

Sample no. **RMP-013** shows the highest degree of degradation in the form of strong oxidation of mafic phases and fragmentation of the rock's matrix.

Silicate Mineralogy

Feldspars are the dominant hard silicate in all samples and show mild to moderate fracturing. Late stage grid twinned microcline is the primary feldspar and occurs as anhedral grains with size measurements that vary greatly from 500µm to 4mm. The majority of grains have a perthitic texture and are water clear. Plagioclase occurs as anhedral to subhedral grains that vary in size from 500µm to approximately 5.5mm. Optical measurements indicate the plagioclase is albite to oligoclase in composition. Most of the plagioclase exhibits mild sericitization. Dark green amphibole is present in significant and similar amounts in all samples and occurs as aggregates and prisms up to 5mm in size. The amphibole shows mild to moderate decay to iron oxide along cleavage planes and grain interiors. A trace of clinopyroxene showing strong iron oxide replacement is present in sample **RMP-024**. Quartz is low in all samples and occurs as anhedral grains squeezed between feldspar and amphibole with a grain size that varies significantly from 50µm up to 4mm. Wormlike myrmekitic quartz confined to smaller plagioclase grains is common in all the samples. Zircon is present in low amounts and occurs as fractured euhedral prisms showing strongly bound crystal faces with a grain size that varies from 75µm to 600µm. Although some of the zircon is included in feldspar, the majority is associated with amphibole as inclusions or attachments. Dark brown biotite mica is present as a trace and occurs as small aggregates

closely associated with amphibole. Epidote is present as a trace and occurs as small independent grains and thin rinds on allanite to be discussed later.

Oxide Mineralogy

All of the samples carry varying amounts of iron oxide that occurs as fracture filling and replacement of amphibole. Sample **RMP-013** contains the highest concentration. Ilmenite is present as a trace in all samples and occurs as rounded to irregularly shaped grains that vary in size from 50µm to 500µm. Although some ilmenite is seen as minute inclusions in feldspar, the majority is included in amphibole.

Phosphate Mineralogy

Apatite in trace amounts is the sole phosphate identified. Apatite occurs as rounded grains and blunt prisms included in quartz/feldspar with a grain size of 50µm to 100µm.

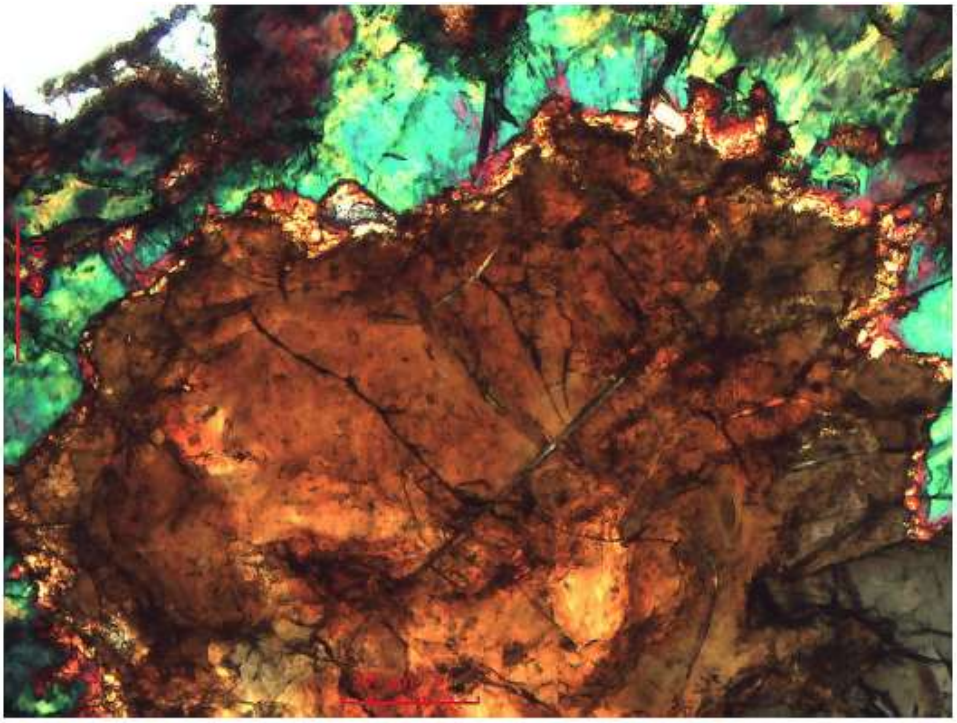
Allanite Mineralogy and Mineral Phase Estimates

Client Sample No: **RMP-005 TREO:4442ppm**

Mineralogy: Microcline 42%, Plagioclase 32%, Amphibole 14%, Quartz 10%, Allanite 1%, Iron Oxide 1%
Trace Mineralogy: Epidote, Ilmenite, Apatite, Zircon, Biotite

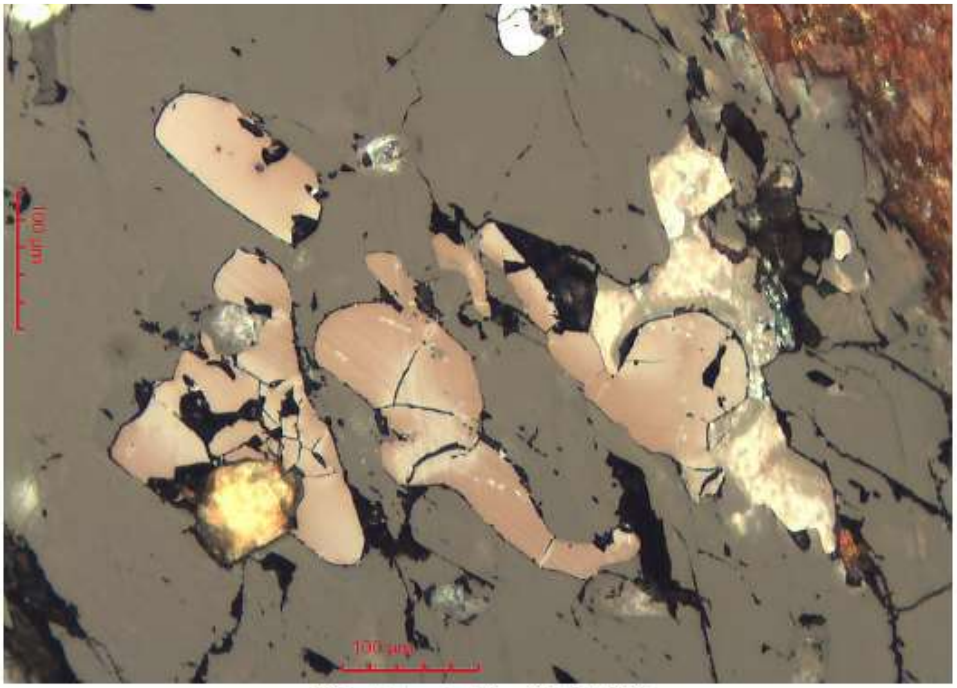
In thin section this sample carries approximately 1% allanite. The allanite occurs as subhedral to rounded anhedral grains and masses with measurements that vary from 500µm up to 2.5mm.

Some grains wear thin rinds of light green epidote or iron oxide and have interior cores that are zoned and nearly isotropic. Although a few allanite grains are bound by harder quartz/feldspar, the majority are attached to or included in large aggregates of fractured amphibole. Moderate fracturing of the rock's framework and large size of the allanite should facilitate liberation upon grinding.

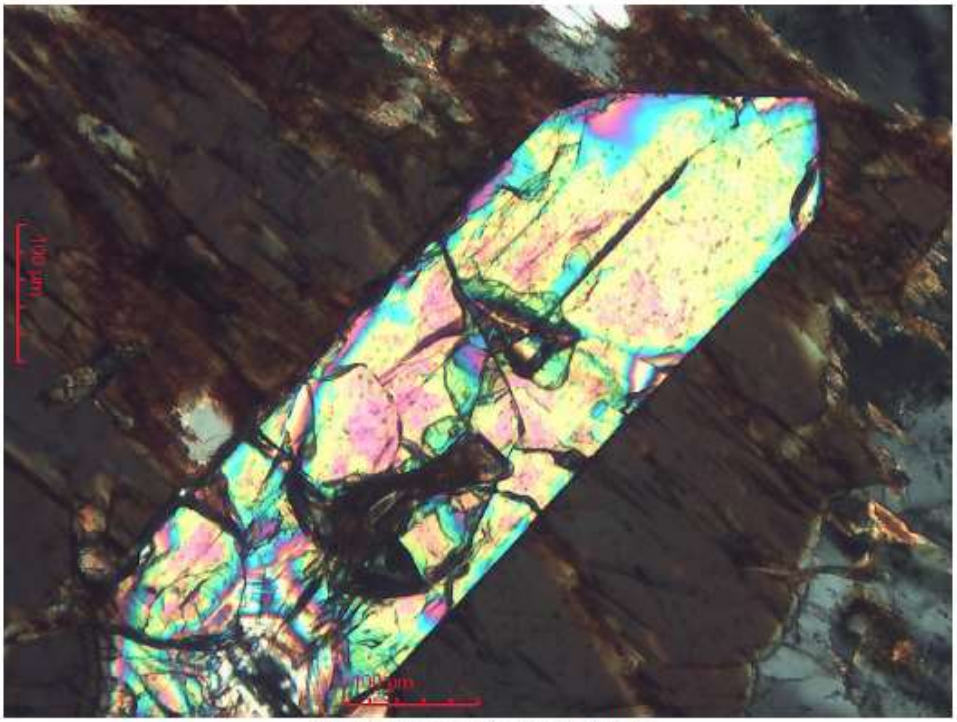


Client Sample No: **RMP-005**
Large grain of brown allanite rimmed in epidote – 100X PL

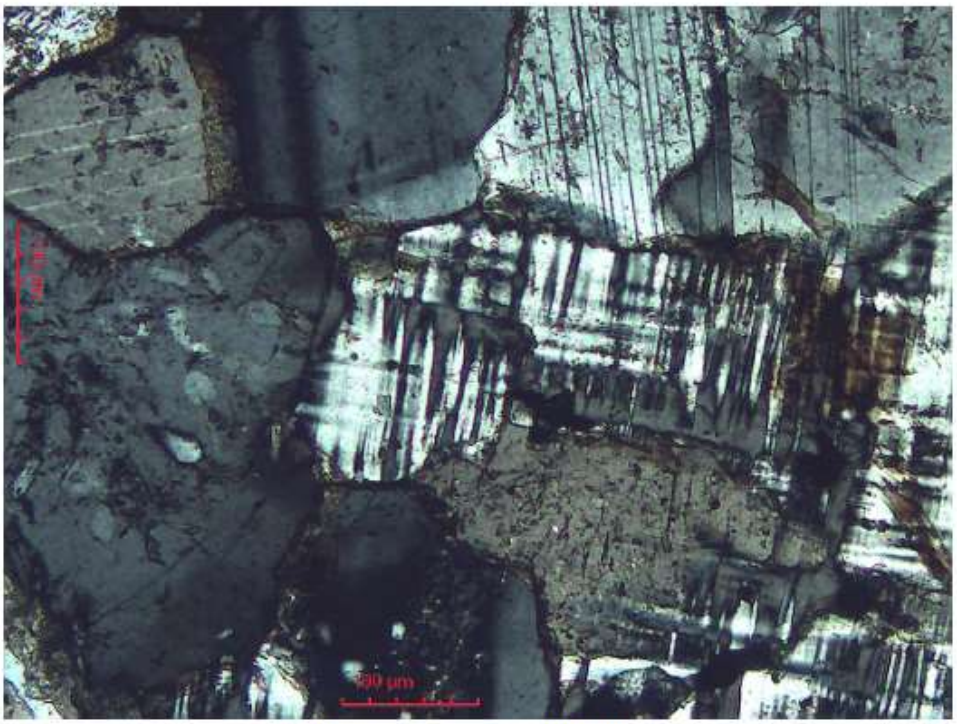
Client Sample No: **RMP-005**
Allanite grain with partially isotropic core – 100X PL



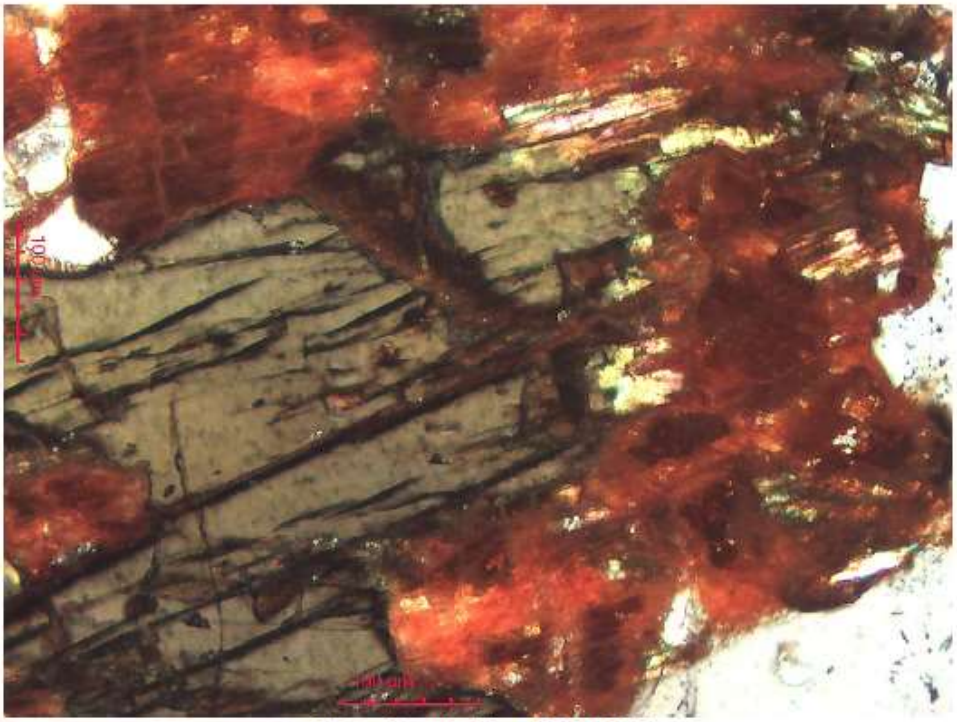
Client Sample No: **RMP-005**
Rounded grains of ilmenite with clear zircon in amphibole – 100X RL



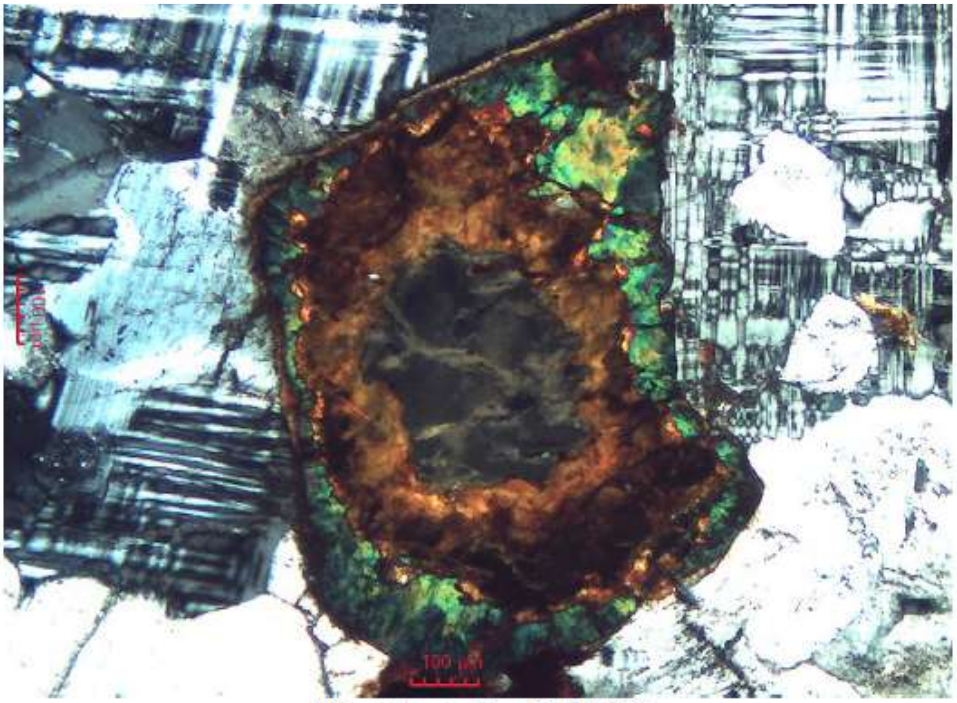
Client Sample No: **RMP-005**
Large euhedral prism of zircon included in amphibole – 100X PL



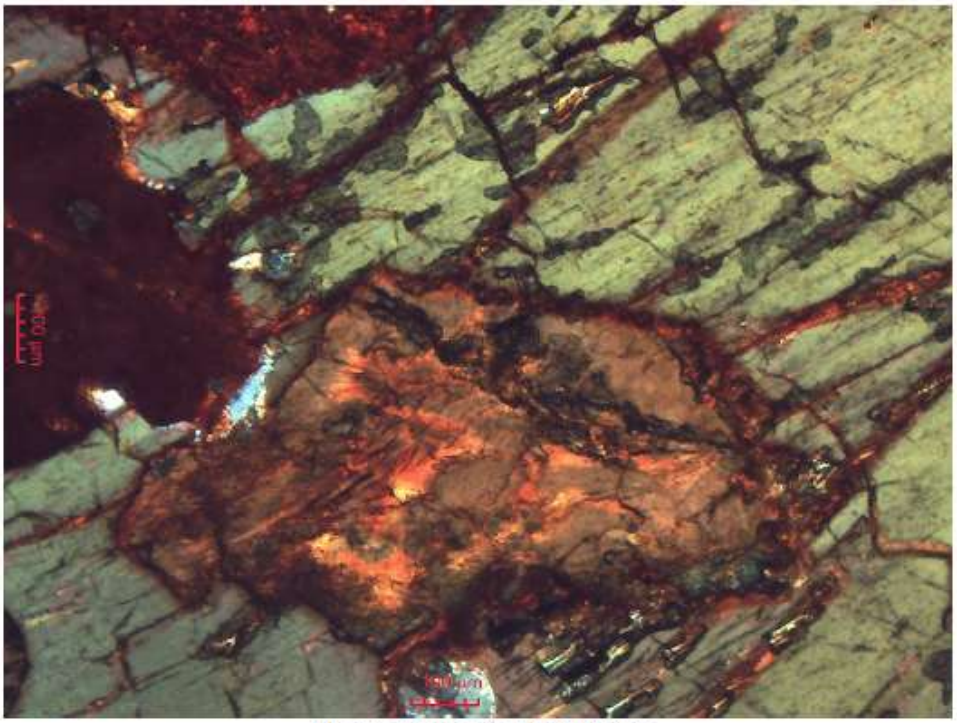
Client Sample No: **RMP-005**
Area photo of the rock's matrix showing microcline, plagioclase and quartz – 100X PL



Client Sample No: **RMP-005**
Green amphibole showing strong alteration to iron oxide – 100X PL



Client Sample No: RMP-005
Grain of allanite with isotropic core rimmed by epidote in a matrix of quartz/feldspar – 50X PL



Client Sample No: RMP-005
Brown anhedral allanite grain included in green amphibole – 50X PL

Client Sample No: **RMP-013 TREO:3783ppm**

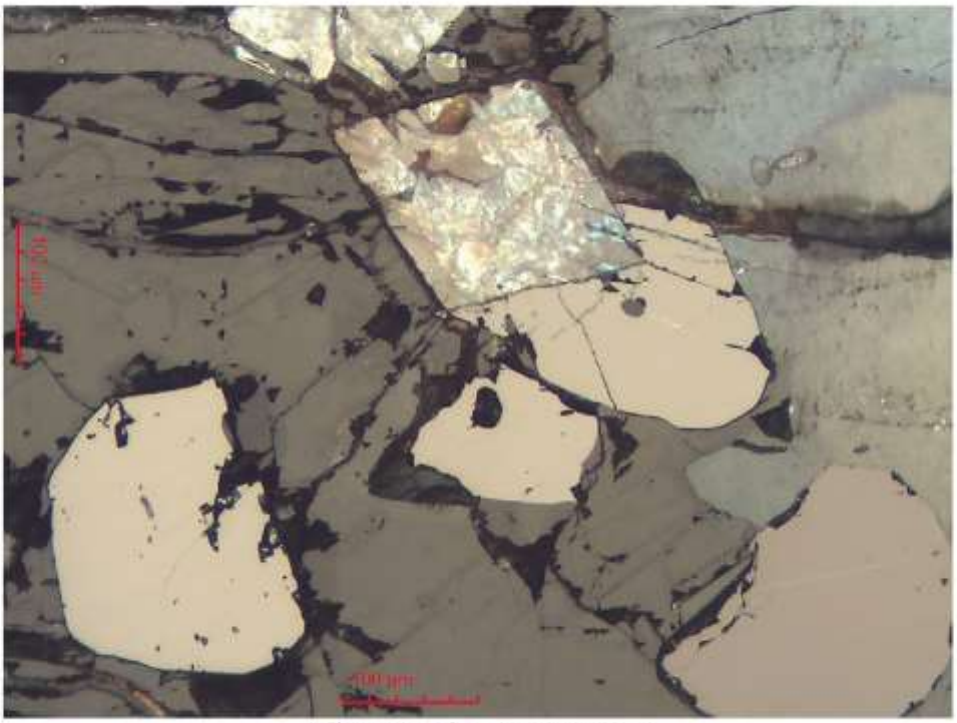
Mineralogy: Microcline 40%, Plagioclase 33%, Amphibole 15%, Quartz 9%, Iron Oxide 3%

Trace Mineralogy: Ilmenite, Apatite, Zircon, Biotite, Allanite

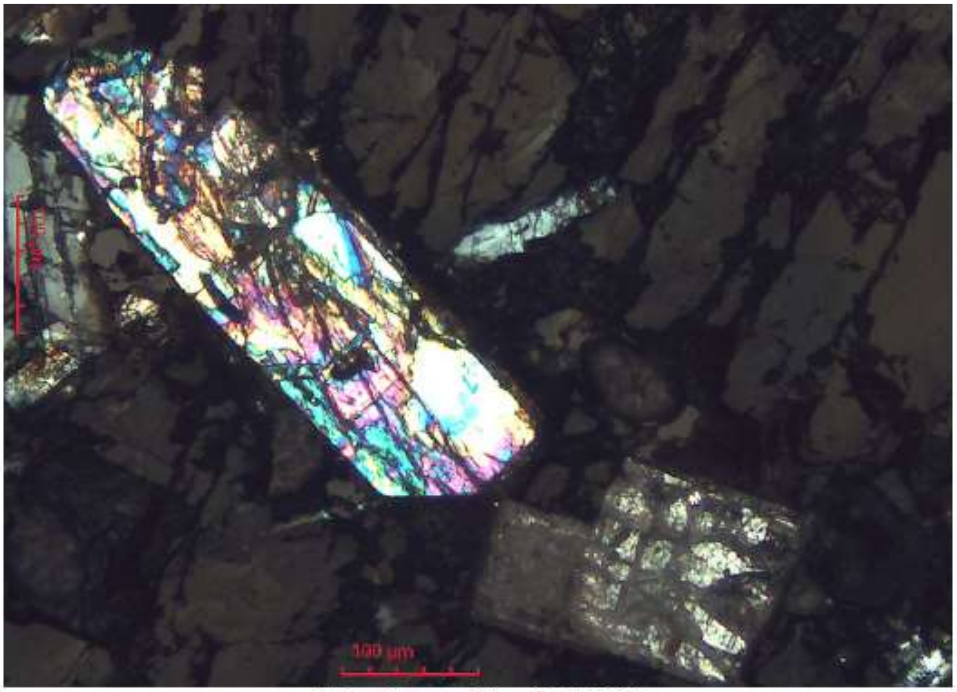
An extensive search in thin section identified one grain of allanite. The grain occurs as a brown colored, subhedral crystal just over 1mm in size. The grain is situated in a loose matrix of quartz/feldspar and attached to a mass of fractured amphibole. The allanite grain is fractured, has some iron oxide coating and is completely metamict-isotropic. Along the grain boundary are numerous radial extension fractures in the surrounding feldspar due to the emission of radioactive particles. Of the granitic rocks studied this sample shows the highest degree of fracturing/weathering and is easily disaggregated which should facilitate liberation of individual mineral phases.

Client Sample No: **RMP-013**

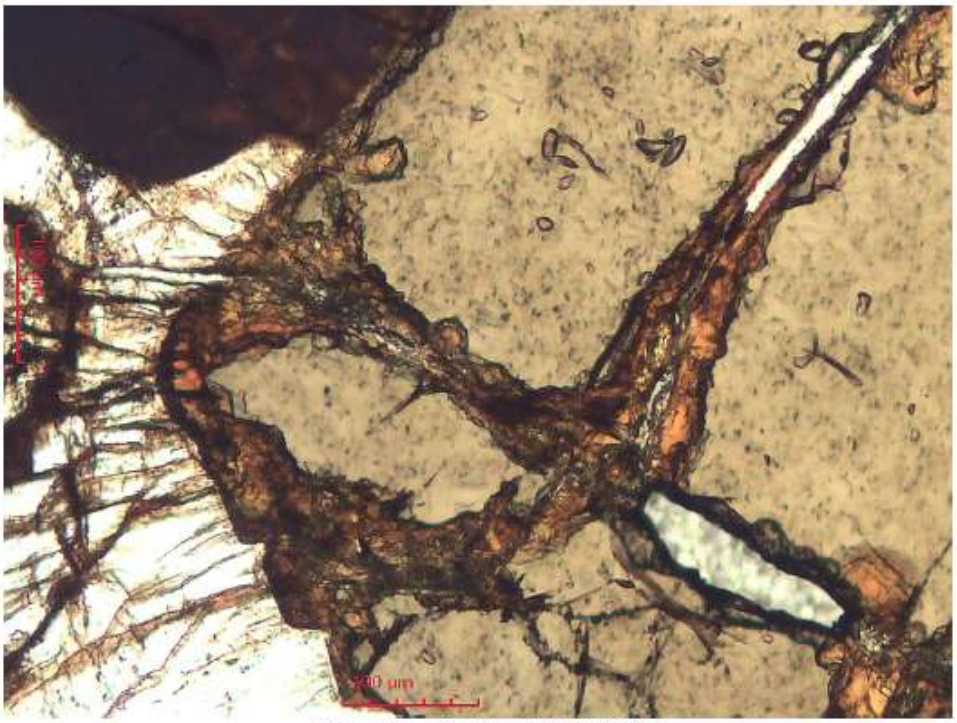
Rounded grains:



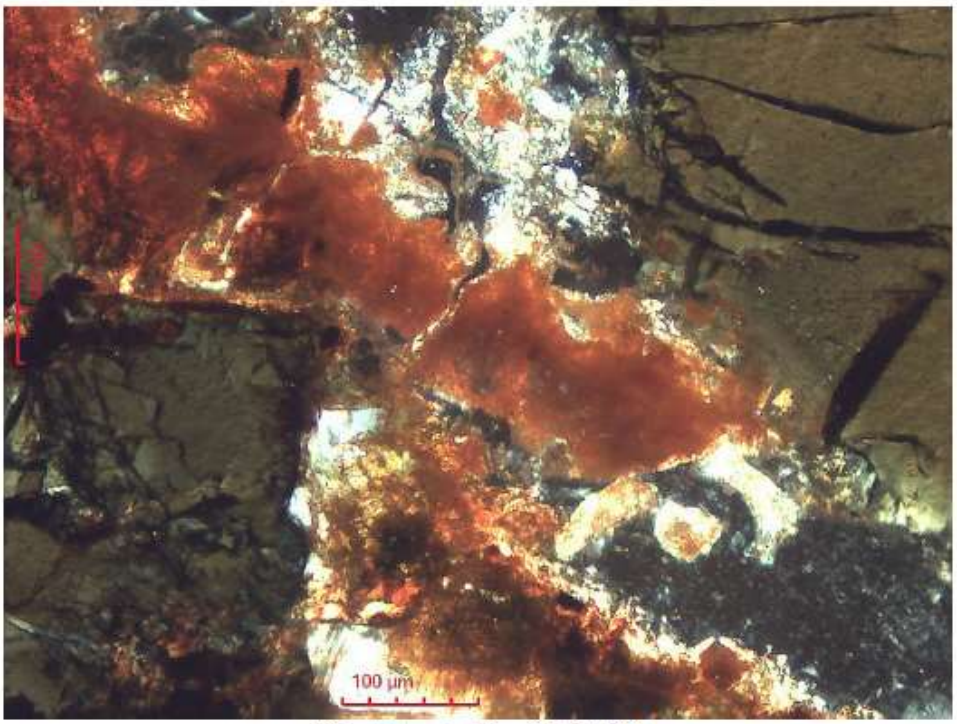
Client Sample No: **RMP-013**
Rounded grains of ilmenite with euhedral zircon included in amphibole – 100X RL



Client Sample No: RMP-013
Euhedral grains of zircon included in amphibole – 100X PL



Client Sample No: RMP-013
Brown metamict allanite with radiation fractures extending along grain boundary in feldspar – 100X PL



Client Sample No: **RMP-013**
Fractured green amphibole with iron oxide – 100X PL

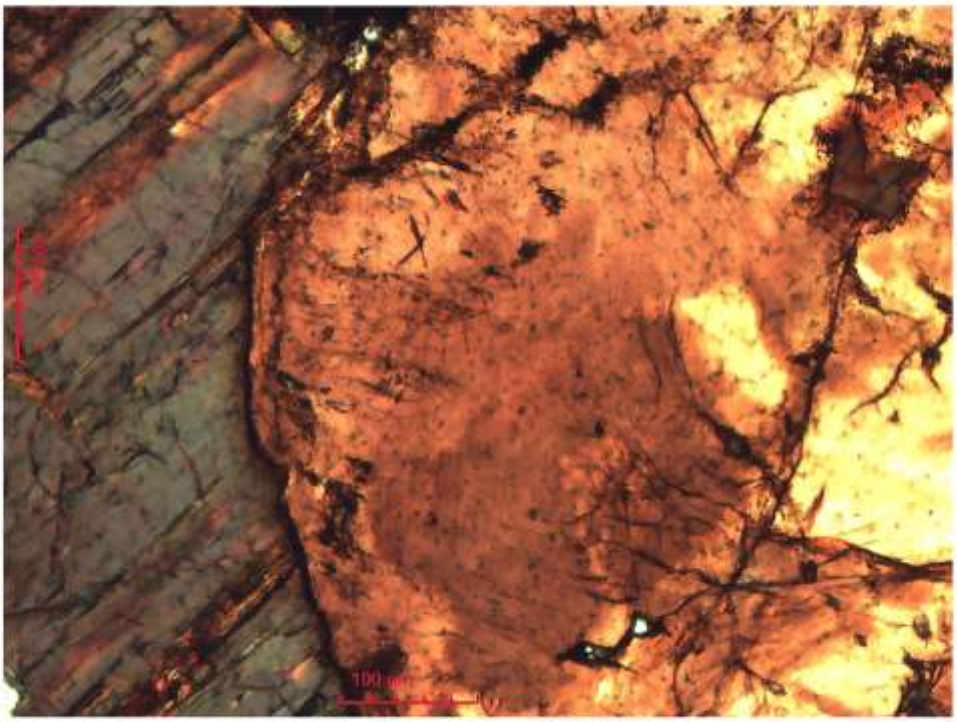
Client Sample No: **RMP-024 TREO:4427ppm**

Mineralogy: Microcline 42%, Plagioclase 31%, Amphibole 14%, Quartz 10%, Iron Oxide 1%, Allanite 2%

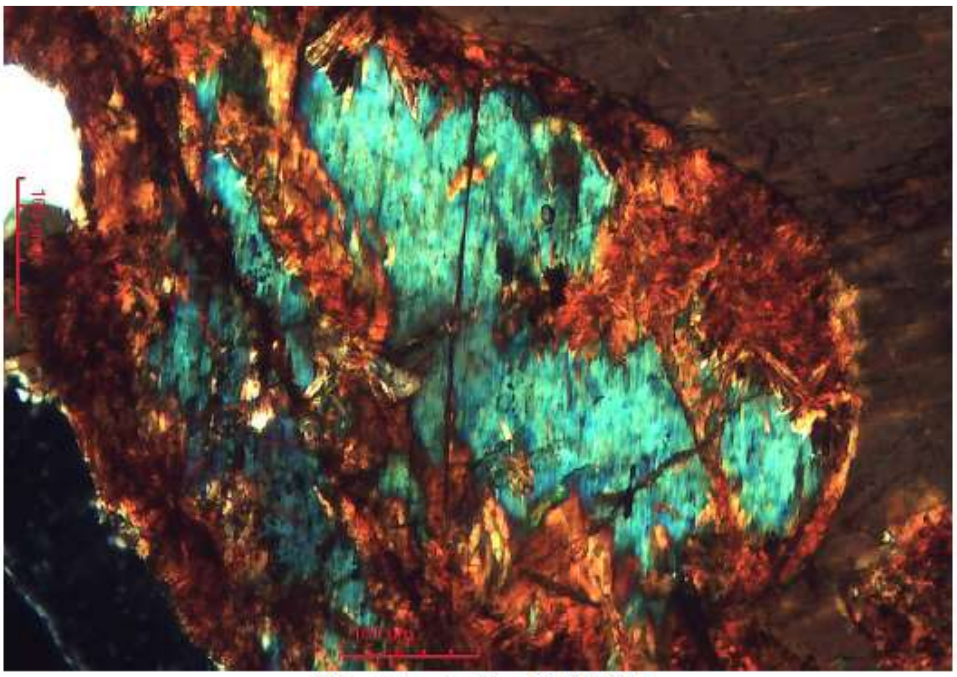
Trace Mineralogy: Epidote, Ilmenite, Apatite, Zircon, Biotite

In thin section this sample contains the highest concentration of allanite. Allanite occurs as fractured subhedral to anhedral grains and aggregates that vary in size from 400µm to 2.5mm. One large aggregate measured over 5mm. Some grains show slightly isotropic interiors and a few grains are rimmed with epidote and iron oxide. Although some allanite is attached and included in amphibole, the majority is seen locked between quartz/feldspar. Although this sample is the most intact specimen studied, the rock's matrix still shows moderate fracturing and is easily crushed. In general, liberation of individual mineral phases should not be difficult.

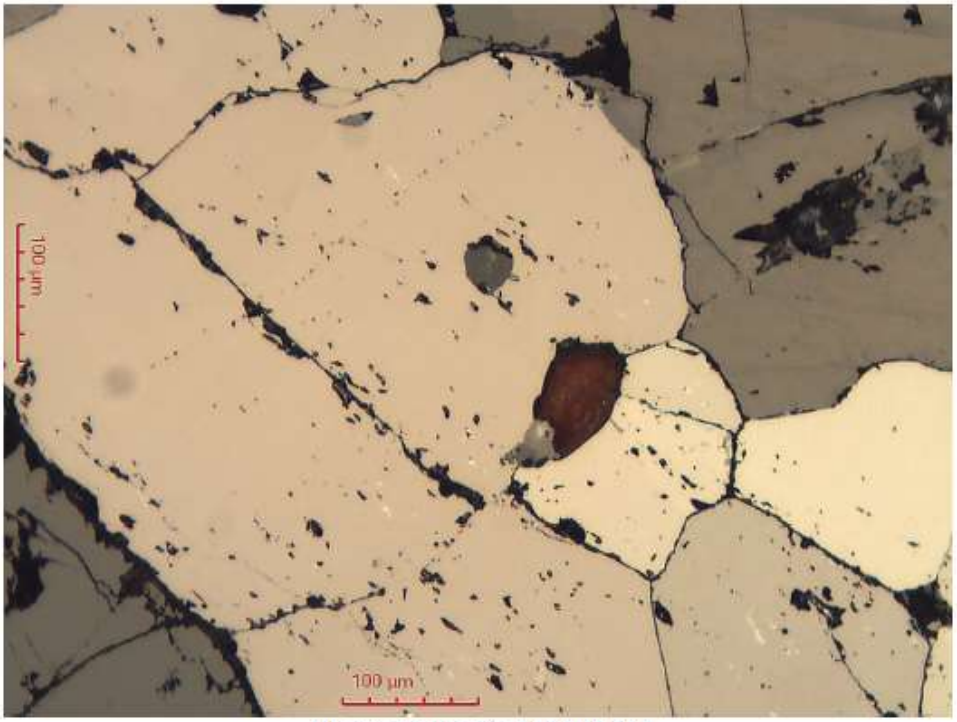
Client Sample No: **RMP-024**



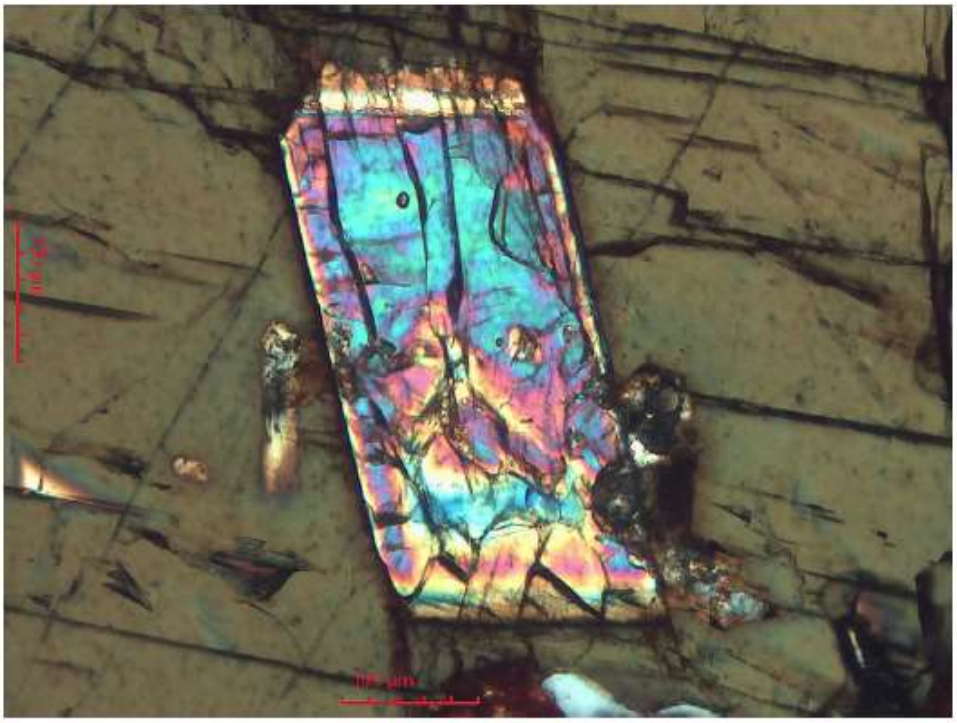
Client Sample No: **RMP-024**
Large grain of brown allanite attached to amphibole – 100X PL



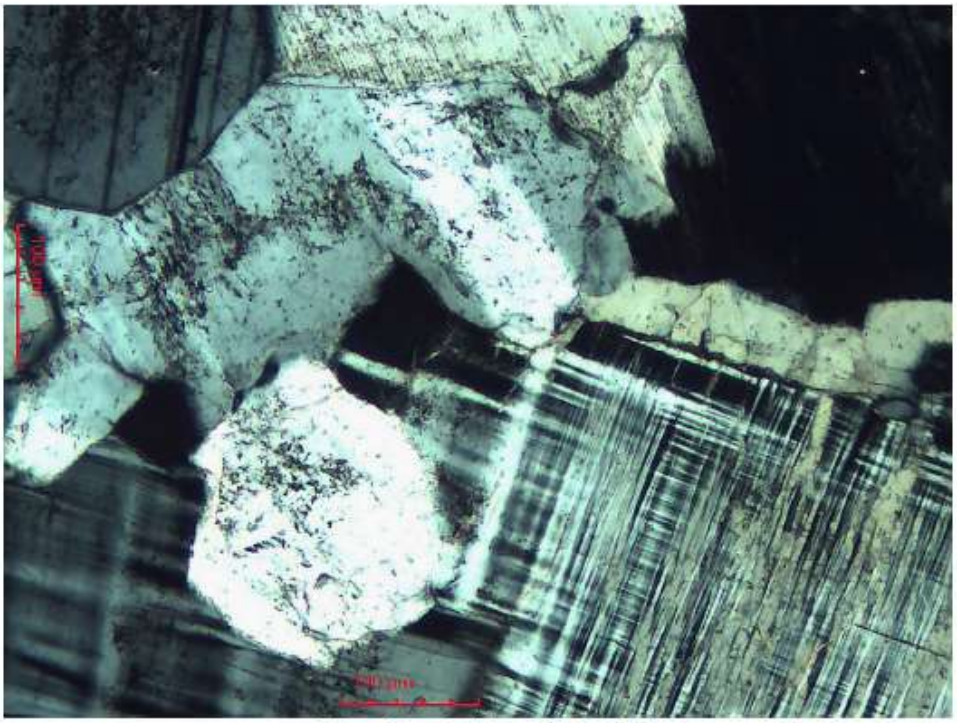
Client Sample No: **RMP-024**
Pyroxene showing strong iron oxide alteration – 100X PL



Client Sample No: **RMP-024**
Large aggregate of ilmenite in amphibole – 100X RL

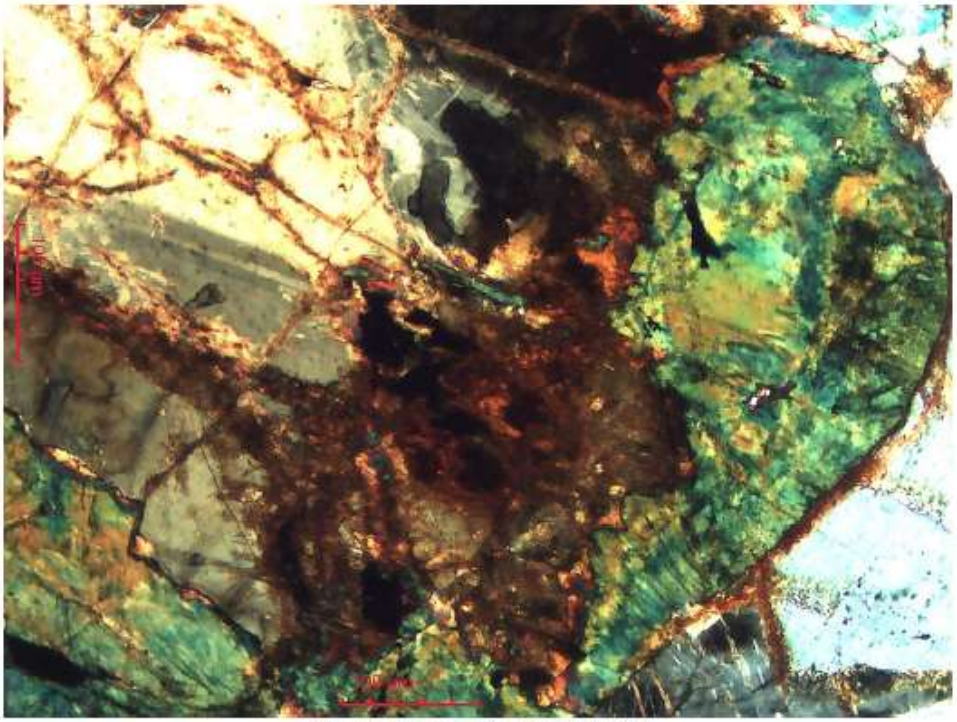


Client Sample No: **RMP-024**
Large prism of zircon included in amphibole – 100X PL

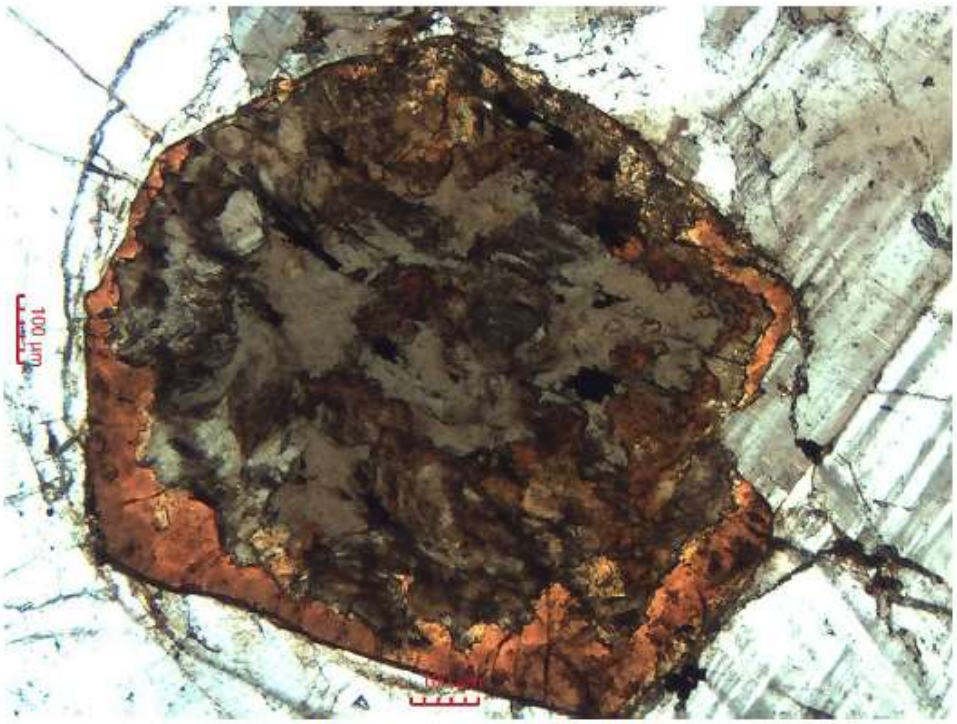


Client Sample No: **RMP-024**
Area photo of rock's matrix showing microcline, plagioclase and quartz – 100X PL

Client Sample No: **RMP-024**
Allanite with an metamict-isotropic core in feldspar – 100X PL



Client Sample No: **RMP-024**
Allanite with metamict-isotropic core rimmed with epidote in quartz/feldspar – 100X PL



Client Sample No: **RMP-024**

Subhedral mostly metamict-isotropic allanite with radiation fractures along its grain boundary in feldspar – 50X PL

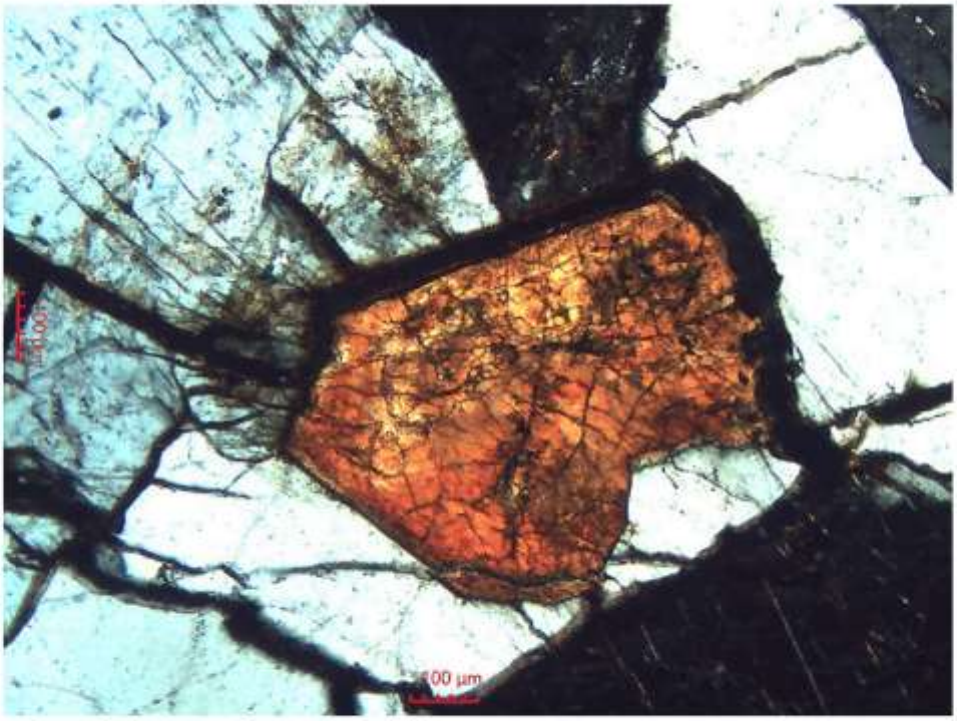
Client Sample No: **RMP-032 TREO:3468ppm**

Mineralogy: Microcline 41%, Plagioclase 33%, Amphibole 15%, Quartz 10%, Iron Oxide 1%

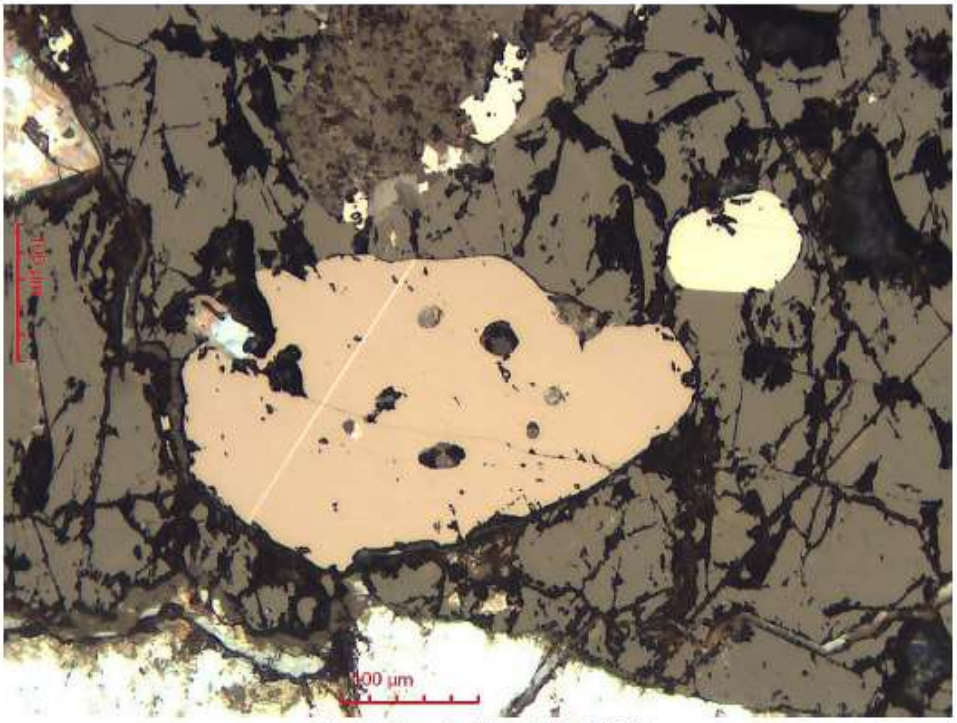
Trace Mineralogy: Ilmenite, Apatite, Zircon, Biotite, Allanite

An extensive search of this sample's thin section identified one brown colored, subhedral grain of allanite measuring 650µm. The grain is locked between loosely bound quartz/feldspar. This sample shows moderate to strong fracturing and disaggregates easily.

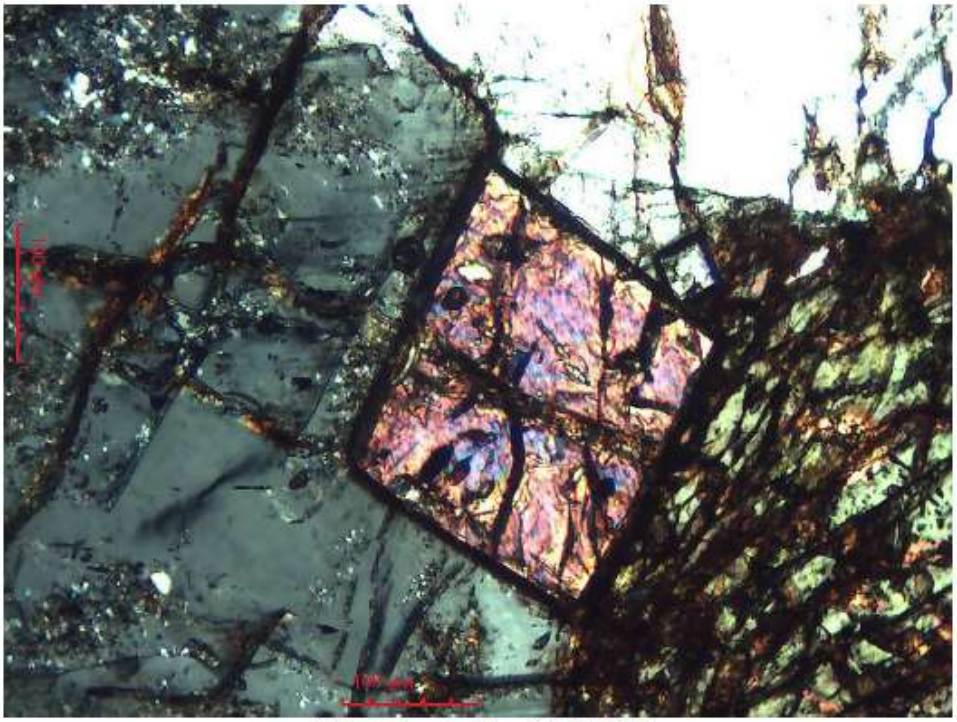
Client Sample No: **RMP-032**



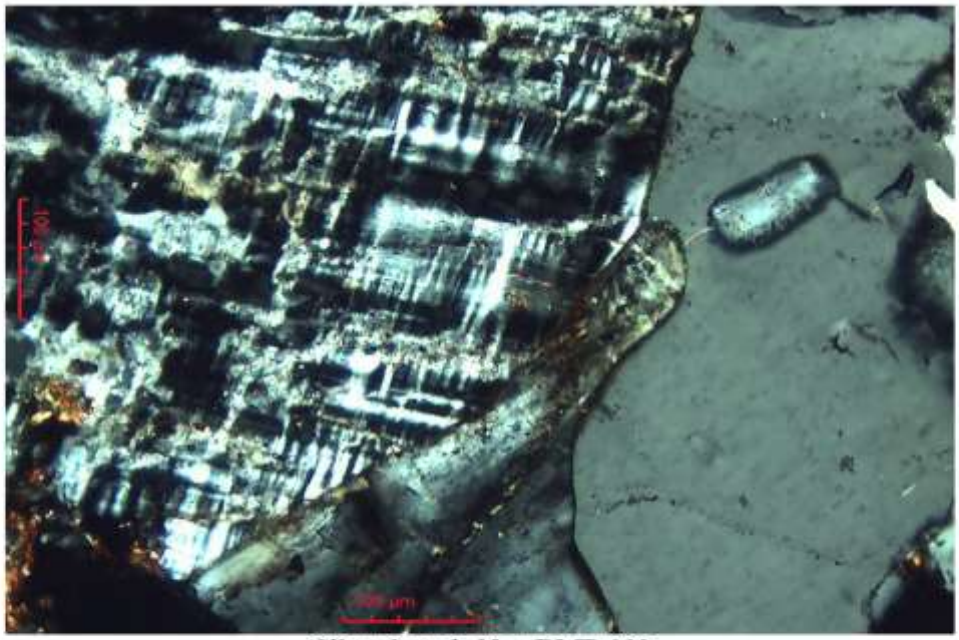
Client Sample No: **RMP-032**
Subhedral grain of brown allanite in quartz/feldspar – 50X PL



Client Sample No: **RMP-032**
Rounded grains of ilmenite in fractured amphibole – 100X RL



Client Sample No: **RMP-032**
Euhedral zircon between fractured quartz/feldspar and amphibole – 100X PL



Client Sample No: **RMP-032**
Area photo of rock's matrix of quartz, microcline and plagioclase – 100X PL

7.4 Mineralization

Based on the WRE sampling, petrographic studies and literature review of REE mineralization in the area rare earths are associated with allanite. The REE enriched allanite occurs as coarse aggregates and inclusions within the Red Mountain Pluton. The intrusive units that make up the Red Mountain Pluton are as follows:

- Fayalite Monzonite (Olivine rich unit)
- Clinopyroxene Quartz Monzonite – Zone of greatest concentration of Allanite and REE's within the Allanite.
- Biotite Hornblende Quartz Syenite

All units listed above contain allanite in variable quantities. Only the Clinopyroxene quartz monzonite consistently has higher concentrations of allanite. The clinopyroxene quartz monzonite can only be differentiated from other intrusive units in the Red Mountain Pluton by thin section analysis. Extensive surface sampling of the pluton appears to be the only effective way of identifying high grade zones of REE's within the pluton.

The pluton is extensively weathered/oxidized at the surface with no evidence of hydrothermal alteration.

8. DEPOSIT TYPE

Rare earth metals are naturally occurring components of the earth but seldom if ever found in pure form. They are chemically active and readily bond with oxygen and other metals, or substitute for other metals to form complex minerals. The principal concentrations of rare earth elements are associated with relatively uncommon varieties of igneous rocks such as alkalic rocks and carbonatites. The REE's at the Halleck Creek Project are primarily associated with coarse aggregates of allanite found in variable quantities within the Red Mountain quartz monzonite. Higher concentrations of allanite within the pluton are found in a petrographically similar rock to the Red Mountain quartz monzonite-clinopyroxene quartz monzonite. The rock type can only be differentiated from the quartz monzonite by thin section examination. It is unknown how extensive this rock type is. In general higher grades of TREE are indicative of the presence of this rock type.

This deposit type most closely resembles an intrusive hosted disseminated rare earth deposit of potentially immense size depending on what depth mineralization extends.

9. EXPLORATION

9.1 Surface Sampling Program

In 2010 Blackfire Minerals, An Australian mining company acquired the current set of State Leases ARR now controls for the purpose of REE exploration activities. Based on research completed by World Industrial Minerals, areas of anomalous REE values were discovered in the Red Mountain area as part of PhD thesis completed by Anderson (1995). Much of Red Mountain was covered by a State Mineral Lease that was subsequently acquired. Initial sampling was completed on this and other leases with results of the 18 samples collected shown in Appendix C. In 2011 after initial sampling was completed the project was subsequently dropped due to low REE process.

In 2018 the project was re-activated by Zenith Minerals, an Australian Mining Company who applied for the same State leases and also staked 5 claims on land in which the BLM owned both the surface and minerals. Additional sampling was completed both on the State Lease applications and the mining claims on the BLM Land.

Sample results from the 87 samples collected from the 2019 sampling program showed broad areas higher mineralization above 2000 ppm TREO.

Sample site locations and results are shown on the detailed sample maps (Figure 9-1 TREO values North Area, Figure 9-2 TREO values South Area).

Previously mentioned in the geology section was the difficulty in determining where the higher grade REE values might occur in the Red Mountain Pluton. The sampling procedure is as follows:

1. Widely spaced samples were collected in the 2010 program and anomalous areas of the pluton were identified.
2. In 2019 additional reconnaissance samples were collected plus grid sampling was completed around the previously identified anomalous zones.
3. Based on the success of the grid sampling in identifying zones of REE mineralization continuous to discontinuous (soil cover) chip channel samples were collected All of the channel sampling was successful in identifying extensive zones of continuous mineralization as shown on the North and South Area maps.

Listed below are the summary assay results of the three chip channels:

Location: North Channel – Overton Mountain Detail Map

Channel Length: 100m

Average Channel Grade (ppm) :TREO : 3297; HREO:244; Magnetic Oxide: 816

Location: South-most Channel on Overton Mountain Detail Map

Channel Length: 62m

Average Channel Grade(ppm): TREO: 3246; HREO: 248; Magnetic Oxide: 791

Location: Channel on South Area – Overton Mountain Detail Map

Channel Length: 200m

Average Channel Grade (ppm): TREO: 2573; HREO: 219; Magnetic Oxide: 642

In June and July in 2021 a follow up surface sampling program totaling 181 samples were collected. This sampling consisted of two types:

- Sampling at corners of newly staked claims
- Detailed 30m grid sampling designed to delineate trends around the previously completed chip channels

9.2 Summary of Surface Sample Results

Shown on the following Figures 9-1 through 9-3 are the 259 sample locations and TREO values. Shown in Appendix C are the raw assay values plus the calculated TREO, HREO and Magnet Mineral Oxide values in ppm. Shown in the following Table 1 are the average grades of all 259 samples collected since 2010. These sampling results show widespread significant REO values across broad areas in both the North and South Project Areas. The detailed channel and grid sampling highlight the continuity of the higher grade REO values and target areas for future drilling.

Table 1
Average REO Grades of All Samples Collected

Element	REE Oxide	Average REO (PPM)
Lanthanum	La2O3	547
Cerium	Ce2O3	1227
Praseodymium	Pr2O3	128
Neodymium	Nd2O3	488
Samarium	Sm2O3	81
Yttrium	Y2O3	169
Europium	Eu2O3	10
Gadolinium	Gd2O3	58
Terbium	Tb2O3	7
Dysprosium	Dy2O3	39
Holmium	Ho2O3	7
Erbium	Er2O3	18
Thulium	Tm2O3	2
Ytterbium	Yb2O3	15
Lutetium	Lu2O3	2

Figure 9-1 Sample Location Map and TREO Values in PPM

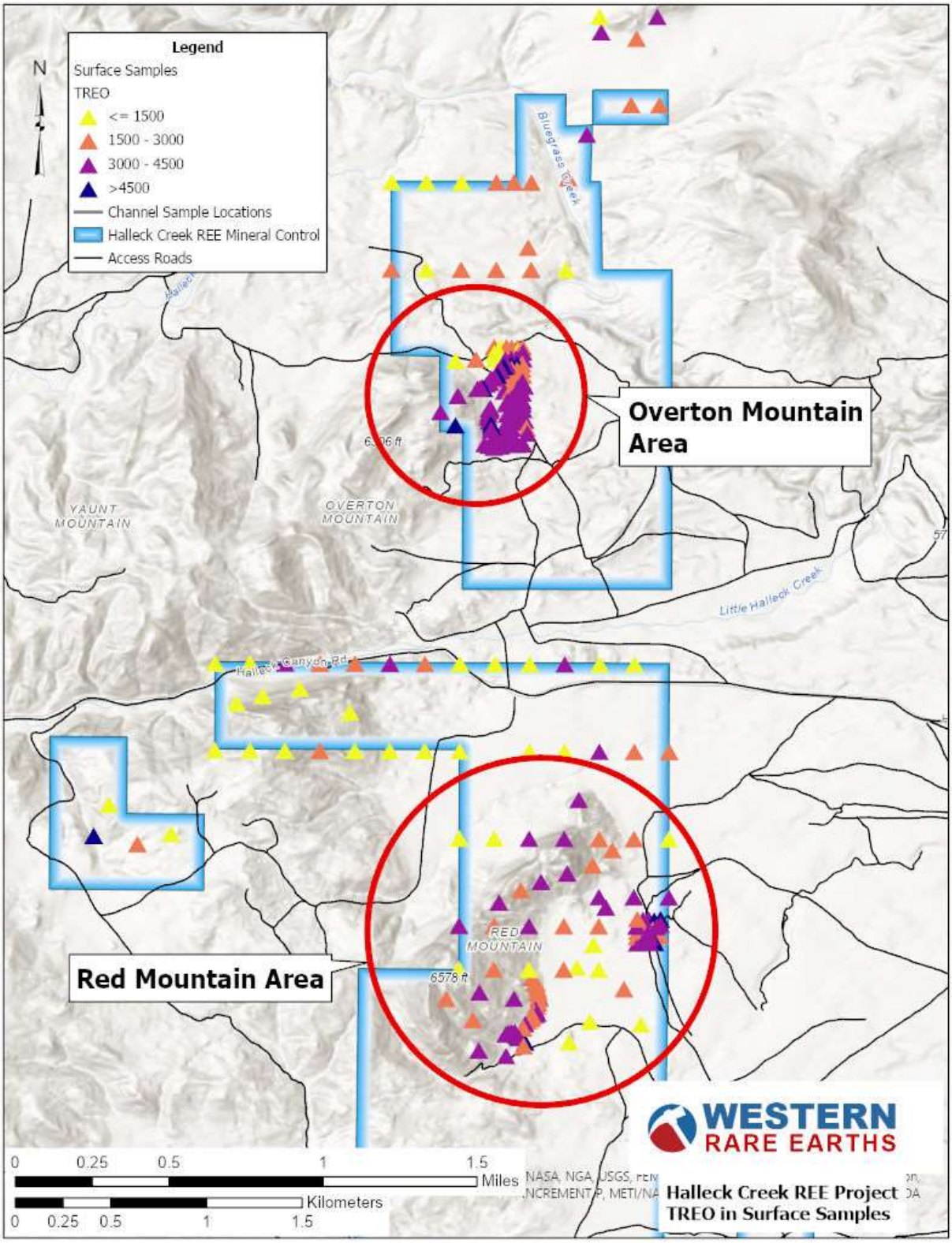


Figure 9-2 Red Mountain Samples - TREO Values in PPM

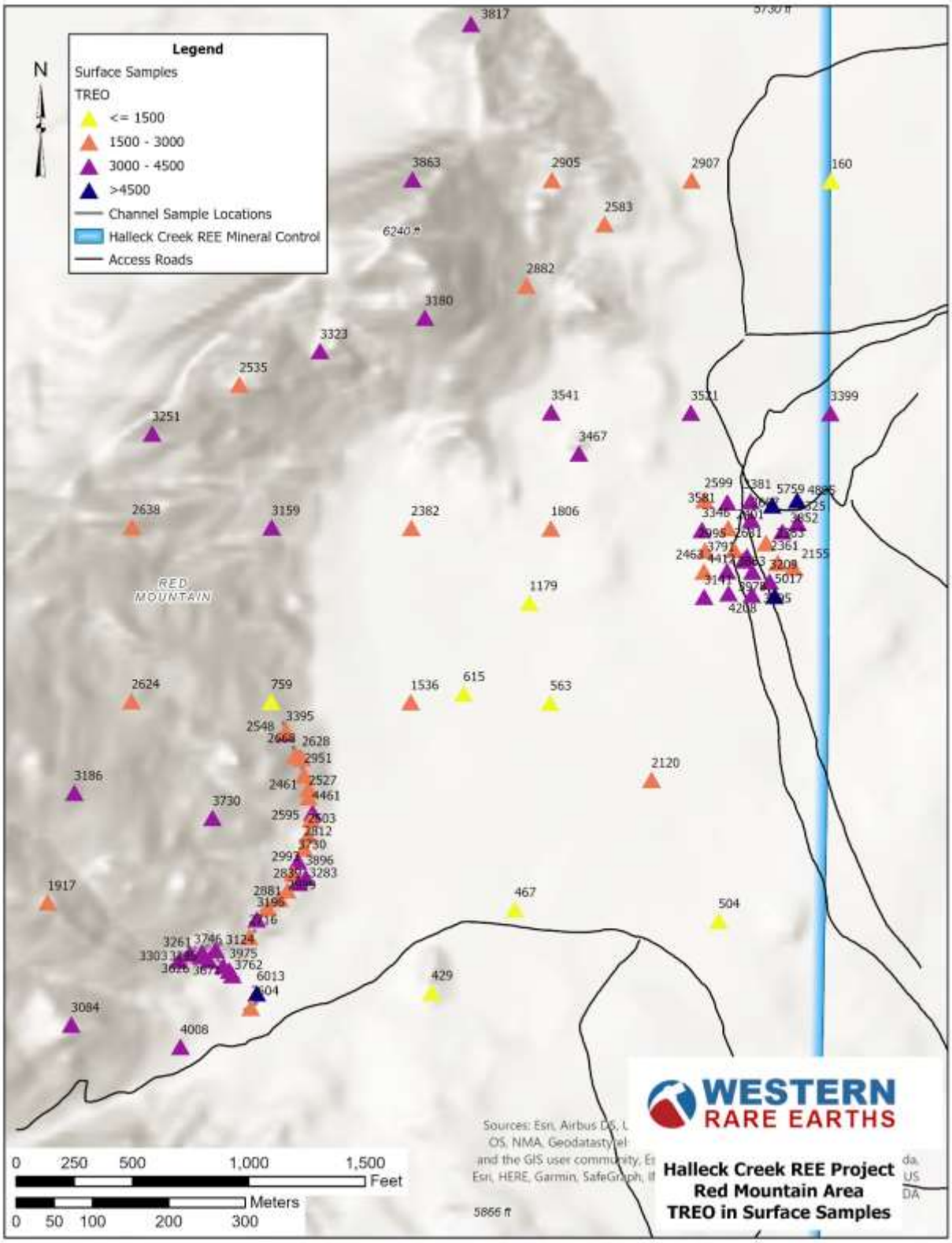
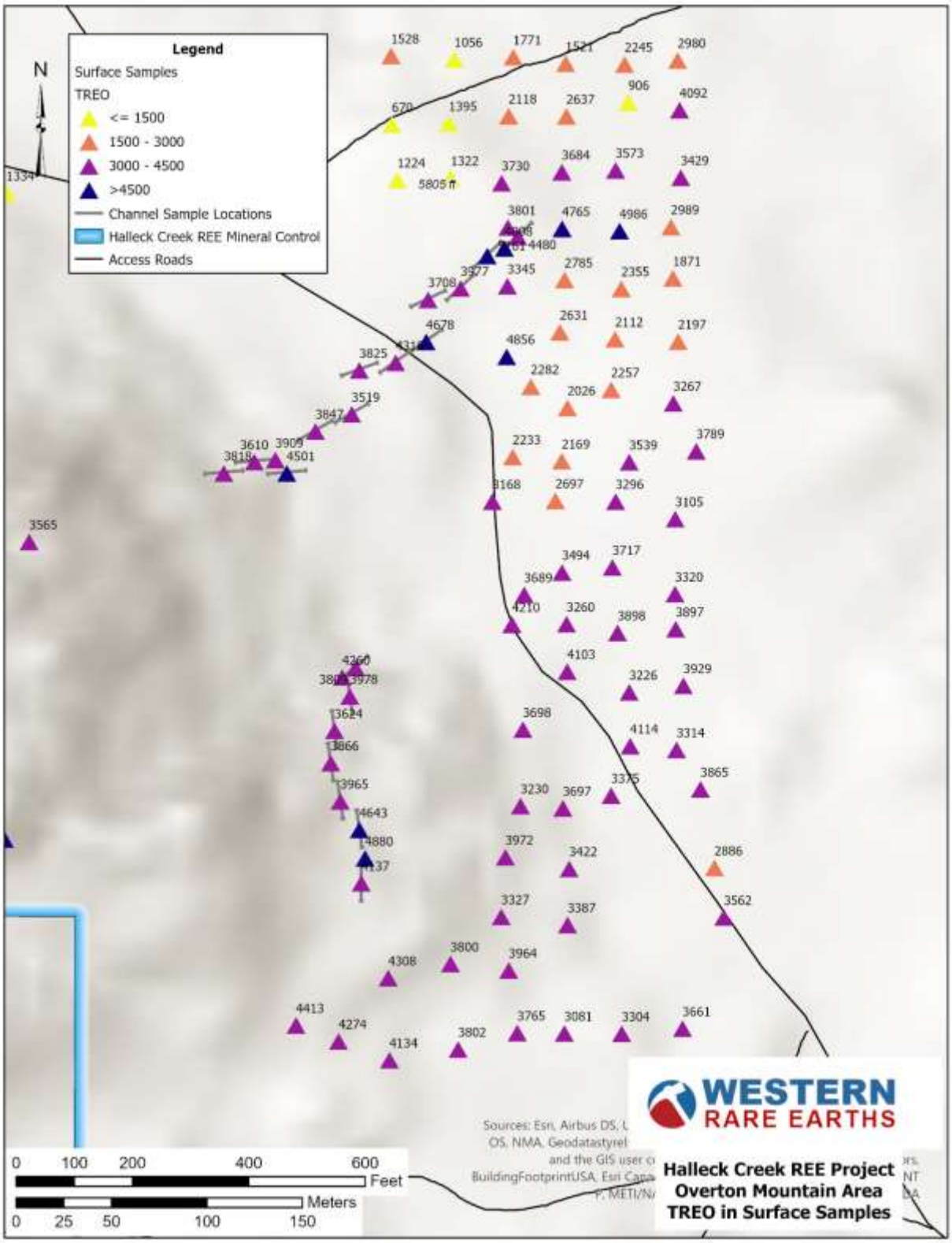


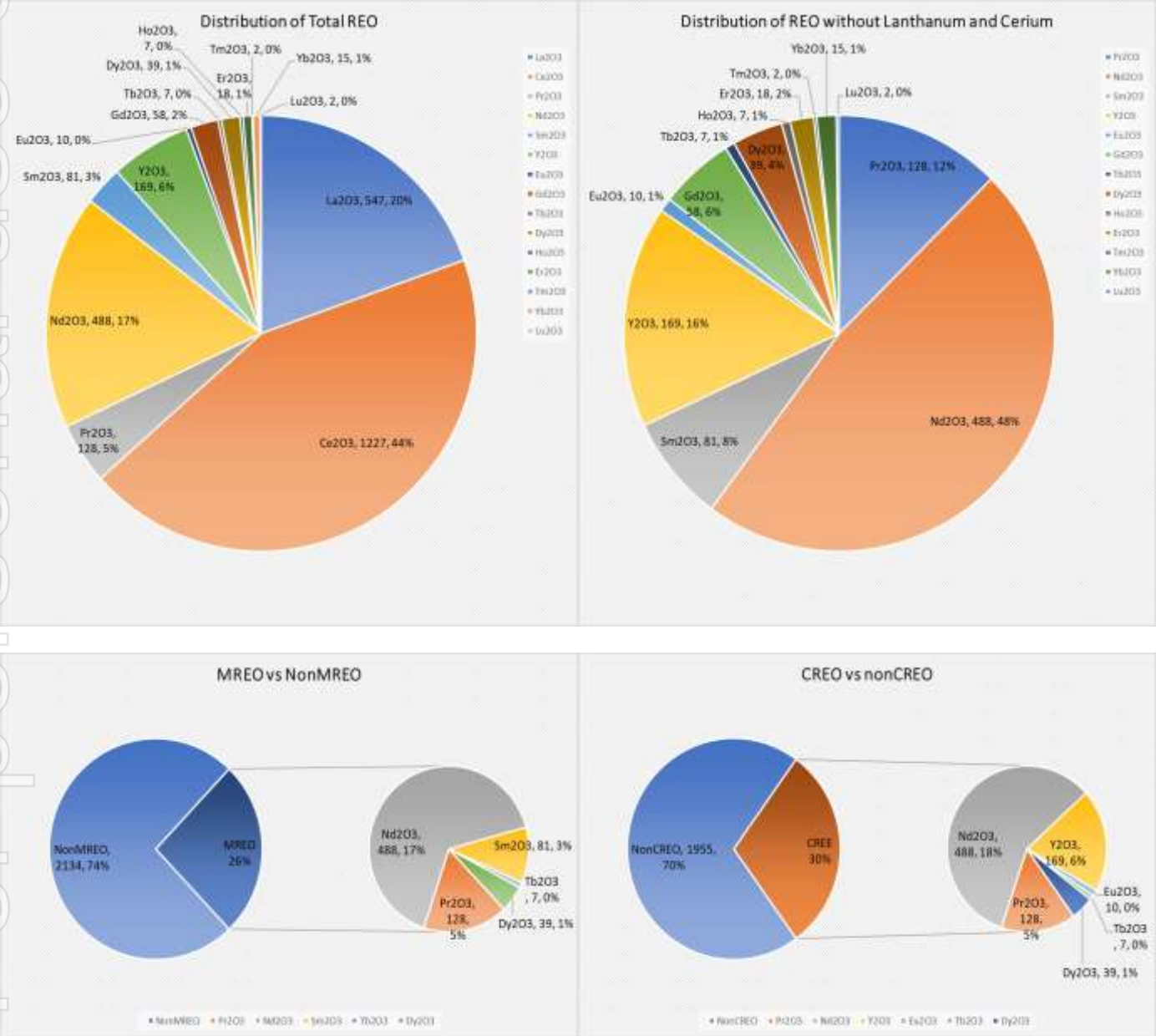
Figure 9-3 Overton Mountain Samples - TREO Values in PPM



Also shown in the following figure (Figure 9-4) are pie charts showing the relative abundance of the various rare earth elements. When cerium and lanthanum are removed the mix, neodymium averaging 488 ppm REO is the most abundant economic critical and magnetic REE present at Halleck Creek. For the heavy REE's yttrium averaging 169 ppm REO is the most abundant economic REE.

Halleck Creek contains low levels of radioactive elements, or penalty elements. The average Thorium Oxide and Uranium Oxide grades in the surface samples are 52ppm and 5ppm, respectively.

Figure 9-4 Charts of REO Distributions



Surface samples were collected in two primary study areas called Overton Mountain and Red Mountain, highlighted in Figure 9-1 through Figure 9-3. Table 2 summarizes the Halleck Creek surface samples by study area and rock type for Total REO, Light REO, Heavy REO and Magnetic REO. The table shows that the Red Mountain Pluton, and the Medium Quartz Monzonite contain the highest REO grades.

Table 2
Halleck Creek Surface Samples by Study Area and Rock Type

			Average REO Values (ppm)				
Study Area	Rock Unit	No. Samples	Total REO	Light REO	Heavy REO	Magnetic REO	NdPr
Overton Mountain	Red Mountain Pluton	105	3,349	3,002	347	790	742
Overton Mountain Total		**105**	**3,349**	**3,002**	**347**	**790**	**742**
Red Mountain	Alluvium	4	917	727	191	219	192
Red Mountain	Red Mountain Pluton	92	3,002	2,646	356	713	661
Red Mountain Total		**96**	**2,915**	**2,566**	**349**	**692**	**641**
undefined	Alluvium	16	1,503	1,274	229	356	325
undefined	Archean Granite Gneiss	2	143	111	32	32	29
undefined	Medium Quartz Monzonite	1	4,202	3,627	576	996	919
undefined	Red Mountain Pluton	38	1,677	1,409	268	391	355
undefined	Sybille Intrusion	1	841	552	291	237	201
undefined Total		**58**	**1,605**	**1,351**	**255**	**377**	**343**
Grand Total		**259**	**2,798**	**2,471**	**327**	**661**	**615**

Table 3 summarizes the surface samples by study area and the Red Mountain Pluton to correspond to Figure 9-2, and Figure 9-3.

Table 3
Surface Samples by Study Area and the Red Mountain Pluton

			Average REO Values (ppm)				
Study Area	Rock Unit	No. Samples	Total REO	Light REO	Heavy REO	Magnetic REO	NdPr
Overton Mountain	Red Mountain Pluton	105	3,349	3,002	347	790	742
Red Mountain	Red Mountain Pluton	92	3,002	2,646	356	713	661
Grand Total		**197**	**3,187**	**2,836**	**351**	**754**	**702**

10. DRILLING

No drilling has been completed for the Halleck Creek Project.

11. SAMPLE PREPARATION ANALYSIS AND SECURITY

The 2021 sampling program was completed over a three day period. All samples were secured with the geologist collecting the samples and delivered shipped by the geologist to ALS Laboratory in Reno Nevada.

ALS holds analytical certifications from state regulatory agencies and from the US Environmental Protection Agency (EPA). We participate in performance evaluation studies to demonstrate competence in these areas of certification. ALS maintains a large stock of standard reference materials from the National Institute of Standards and Technology (NIST), the Canada Centre for Mineral and Energy Technology (CANMET), the EPA and other sources.

There was no break in the chain of custody between sample collection and sample delivery. ALS analyzed the samples by ICP methods per their 34 element standard analysis procedure. Results were reported in weight percent.

For the sampling completed by World Industrial Minerals in 2010, 2018 and 2019 the same procedures listed above were followed. All samples were sent to ALS in Reno, Nevada.

12. DATA VERIFICATION

WRE for this initial sampling program relied upon internal controls maintained by ALS Labs to ensure accuracy of data. The laboratory provides worldwide services to a very wide range of companies in the mining and mineral exploration industries.

13. MINERAL PROCESSING AND METALLURGICAL TESTING

Mineral processing and testing was completed in 2019 for this early stage project. Shown in the diagram below is a summary of the initial test results. Testing was completed by Nagrom in their Perth Australia metallurgical testing facility. As previously discussed in the mineralogy section of this report the surface weathering/oxidation has facilitated the disaggregation of the allanite from the parent host rock thus significantly improving allanite concentration by either magnetic or gravity separation.

14. MINERAL RESOURCE ESTIMATES

No mineral resource estimates were completed for this early stage project.

15. MINERAL RESERVE ESTIMATES

Due to the early stage of exploration on this property, no mineral reserve estimates can be made for this property.

16. MINING METHODS

There are no mine plans yet developed for the Property.

17. RECOVERY METHODS

No definitive recovery methods can be developed for the Property currently until more detailed metallurgical test work and studies are completed.

18. PROJECT INFRASTRUCTURE

Infrastructure on the property is minimal.

19. MARKET STUDIES AND CONTRACTS

There have been no marketing studies completed or contracts made. A general overview of the REE market and uses of REEs in industry is herein presented. Parts of the following discussion of rare metals are from the 2005 publication *"Extractive Metallurgy of Rare Earths" by C.K. Gupta and N. Krishnamurhy.*

Rare Earths is a term that characterizes a complex of chemically similar but individually diverse metallic elements that includes the following elements: Lanthanum (La), Cerium (Ce), Praseodymium (Pr), Neodymium (Nd), Promethium (Pm), Samarium (Sm), Europium (Eu), Gadolinium (Gd), Terbium (Tb), Dysprosium (Dy), Holium (Ho), Erbium (Er), Thulium I, Ytterbium (Yb) and Lutetium (Lu). Scandium (Sc) and Yttrium (Y) share similar chemical properties and are often included in the rare earth family of elements. The rare earth elements are divided into two groups:

- The Light Rare Earth Elements (LREE) consisting of Ce, Pr, Nd, Pm, Sm, Eu and Gd.
- The Heavy Rare Earth Elements (HREE) consists of Tb, Dy, Ho, Er, Tm, Yb and Lu.

Despite their name, rare earths have a relatively high crustal abundance; however, economic concentrations of rare earths are scarce. With the exception of Promethium all rare earths occur in nature and commonly occur together in widely varying mixtures. Average crustal abundance ranges from 150-250ppm TREE (long et al, 2010). The separation of individual rare earths is challenging.

Rare earths production currently is overwhelmingly concentrated in western China which is the primary supplier of rare earths to the world markets. Lesser production comes from Australia and the United States.

Bastnaesite (Ce, LA, PR)(CO_3)F, monazite((Ce,La…)PO_4) and xenotime (YPO_4) are the most commercially significant rare earth minerals but not exclusively. Allanite hosted rare earths deposits are a small but potentially significant contributor to the world's supply of rare earths [Authors' Comment].The rare earth component of each mineral may vary greatly from location to location. Collectively, the rare earth elements, due to their particular properties: electrical, chemical and physical, are irreplaceable in modern high technology applications. Principal uses of rare earth elements in compounds and metallic forms include petroleum, cracking catalysts, automotive catalytic converters, polishing agents, protective glasses, high temperature, high strength ceramics, anti-corrosive coatings, permanent magnets, MRI tomographic applications and as additives in specialty metals and super alloys.

Rare earth metal pricing is market dependent, but China, by controlling or threatening to control supply, has the ability to influence prices. Users are in most cases dependent upon the particular characteristics of one or more rare earth metals to achieve manufacturing objectives and their flexibility is often limited to substituting one rare earth for another.

Purity of metal, which is difficult to achieve, is almost always a critical issue in determining the price paid by the end-user. There is no widely accepted and readily accessed marketplace; i.e. consumers and suppliers negotiate individually under confidential arrangements.

Executive Order 13817 was signed December 20, 2017 designating rare earths as “Critical Minerals” for the United States which would potentially merit special assistance and protection from adverse international market developments. In December 2019, the US Army announced that it will fund rare earth processing plants for weapons development.

20. ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL IMPACT

This is an early stage exploration project and as such no environmental studies or permitting have been undertaken. The social impact of the project is currently unknown.

21. CAPITAL AND OPERATING COSTS

No Capital and operating costs have been addressed because of the early stage of exploration on the Property.

22. ECONOMIC ANALYSIS

No economic analyses have been completed for this early stage project.

23. ADJACENT PROPERTIES

There are no adjacent REE properties.

24. OTHER RELEVANT DATA AND INFORMATION

There is no other relevant data or information that has not already been included in this report.

25. INTERPRETATION AND CONCLUSIONS

The Halleck Creek Rare Earths Project is unique in that it contains large areas of near surface moderately high grade values of critical, magnet component and heavy rare earths. These magnet components REE's are critical for the Green Energy Economy. Development of a high value REE resource on the Halleck Creek Property is possible with a carefully planned, properly executed exploration program.

The following is concluded:

- The Red Mountain Pluton, is an extensive well mapped geologic feature, containing extensive zones of clinopyroxene quartz monzonite that hosts relatively coarse allanite crystals containing REE's.
- Sampling and mapping completed to date indicates that REE mineralization is widespread presenting numerous drilling targets.
- Preliminary metallurgical testing indicates the coarseness of the REE enriched allanite crystals allows for concentration of allanite by either gravity or magnetic separation. Surface weathering/oxidation significantly aids in the disaggregation and concentration of the allanite.

26. RECOMMENDATIONS

The following near term activities are recommended:

- Conduct more detailed mapping and sampling to better delineate REO drilling targets.
- Pending above results, permit a drilling program under the 5 acre NOI permitting process.
- Once drilling is complete a maiden resource for the Halleck Creek Project can be developed.

27. REFERENCES

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28. CERTIFICATE OF QUALIFICATION

CERTIFICATION OF QUALIFICATIONS

JAMES R. GUILINGER (AUTHOR)

CONSULTING GEOLOGIST

WORLD INDUSTRIAL MINERALS LLC

I, JAMES R. GUILINGER, Qualified Professional Member (QP) #01260280RM of the Society Of Mining Engineers (SME), HEREBY CERTIFY THAT:

1. I am currently employed as a consulting geologist with World Industrial Minerals LLC, PO Box 130, Arvada, Colorado, USA 80004.

2. I am a graduate of the University of Colorado, with a B.A. degree in Geology (1973), I have been practicing my profession since 1974.

3. I am a member of the Society Of Mining Engineers (SME) RM, number 01260280 RM.

4. From 1974 to present I have been actively employed in various capacities in the mining industry in numerous locations in North America, Asia, Europe and the Middle East.

5. I am the Author of the Technical Report titled dated ____August 5 2021_____, with an effective date of _____August 5 2021_____ (the "Technical Report) and accept professional responsibility for all sections of this report except as stipulated in Item 3 "Reliance on Other Experts" in regards to environmental issues, permitting, Resource Estimation and land status.

6. I have had extensive prior involvement working in rare earths and on rare earths properties similar to Searchlight since the mid 1980's in various capacities as an employee of mining companies and as a consulting geologist.

7. As of the effective date of the Technical Report, to the best of my knowledge, information and belief, The Technical Report Contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

8. I am independent of ARR.

9. I consent to the filing of this Technical Report with any stock exchange and other regulatory authority and publication by them, including publication of this Technical Report in the public company files on their websites accessible by the public.

DATED in Arvada, Colorado, USA this __5_ day of _____August_____, 2021.

James Guilinger RM01260280

APPENDIX A: JORC TABLE 1

JORC Code, 2012 Edition – Table 1 Halleck Creek Rare Earths Project

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.*	• Individual grab rock samples and were collected by hand at the surface, from in-situ outcrops. • Grab samples are believed to be representative of the outcrops they came from • 1-2kg rock samples were collected by a geologist, samples were broken using a hammer from outcrop. Rock samples were crushed in the laboratory and then 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.*	• No Drilling

Criteria	JORC Code explanation	Commentary
	• *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.*	
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.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• Rock samples were geologically described and photographed. • No logging
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 • Samples were analysed at ALS Laboratories in Reno Nevada, the samples were crushed, pulverized and assayed by ICP-ME MS81 for REE • ~2kg of rock was crushed and pulverized and a subsample was taken in the laboratory and sent for analysis. • Grab sampling was selective based upon geological observations. • Each sample was 1kg to 2kg in weight which is appropriate to test for grain size of 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 34 elements by fusion ICP-MS. The procedure will report near total results. • No geophysical tools used in the sampling program. • Internal laboratory standards were analysed with rock samples.
Verification	• *The verification of significant intersections by either*	• Consulting company personnel have observed the assayed samples.

Criteria	JORC Code explanation	Commentary
of sampling and assaying	*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.*	• No Drilling • Field data were all recorded in field notebooks 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 accuracy. • The grid system used to compile data was NAD83 Zone 13N. • 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.*	• Both randomly spaced surface chip sampling • The data alone will not be used to estimate mineral resource or ore reserve • None
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. • No drilling
Sample security	• *The measures taken to ensure sample security.*	• 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.*	• Wyoming Rare Earths Project Acquisition –5 Unpatented mining claims on BLM US Federal Land totalling 71.6 acres (29 has) plus 6 Wyoming state leases totalling 1843.72 acres (745 has) were acquired from Zenith Minerals Ltd. • Sixty-seven (67) additional unpatented mining claims were staked by ARR that totalled 1193.3 acres (482 has). Overall the ARR subsidiary controls 310 acres (1255 has) of mining claims and Wyoming State Leases.
	• *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.*	• No impediments to holding the claims exist. To maintain the claims an annua holding fee of $165/claim ($11,880) is payable to the BLM. To maintain the State leases minimum rental payments $1/acre to for 1-5 years; $2/acre for 6-10years; 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 Minerals 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 occurs within allanite which occurs as a variable constituent of the Red Mountain Pluton. The occurrence can be characterized as a disseminated type 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:* ○ *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*	• No Drilling

Criteria	JORC Code explanation	Commentary
	○ *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.*	
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.*	• See map in body of Report under "Wyoming Project Acquisition Section"
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.*	• The average grade of the TREO's calculated from the collection of 268 samples is 2604ppm. The lowest grades collected were less than 10 ppm TREO, the highest 5553ppm; less than 10ppm HREO, the highest 518ppm; less than 10 ppm magnet minerals oxide, 1433ppm the highest grade.

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 coloured, 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. • Metallurgical testing to date consisted of concentrating the allanite by both gravity and magnetic separation. The rare earth rich allanite concentrate with be further evaluated for extraction of the rare earths.
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.*	• Further mapping and sampling is planned leading to drill targets.

Sections 3 and 4 not relevant for this early stage exploration project

APPENDIX B: CLAIM LISTING

Company Name	Claim Name	Serial Number	Status	Control	Claim Type	Area (ac)	Area (ha)
Western Rare (USA), Inc.	Rex 1	WY101766644	Filed	100%	Federal Lode	17.9	7.3
Western Rare (USA), Inc.	Rex 2	WY101766645	Filed	100%	Federal Lode	17.9	7.3
Western Rare (USA), Inc.	Rex 3	WY101766646	Filed	100%	Federal Lode	3.0	1.2
Western Rare (USA), Inc.	Rex 4	WY101766647	Filed	100%	Federal Lode	14.9	6.0
Western Rare (USA), Inc.	Rex 5	WY101766648	Filed	100%	Federal Lode	17.9	7.3
Western Rare (USA), Inc.	Rex 10	WY105250218	Under Review	100%	Federal Lode	9.1	3.7
Western Rare (USA), Inc.	Rex 11	WY105250219	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 12	WY105250220	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 13	WY105250221	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 14	WY105250222	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 15	WY105250223	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 16	WY105250224	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 17	WY105250225	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 18	WY105250226	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 19	WY105250227	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 20	WY105250228	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 21	WY105250229	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 22	WY105250230	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 23	WY105250231	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 24	Pending	Staked	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 25	Pending	Staked	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 26	Pending	Staked	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 27	Pending	Staked	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 28	Pending	Staked	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 29	Pending	Staked	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 30	Pending	Staked	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 31	Pending	Staked	100%	Federal Lode	20.6	8.4

Company Name	Claim Name	Serial Number	Status	Control	Claim Type	Area (ac)	Area (ha)
Western Rare (USA), Inc.	Rex 32	Pending	Staked	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 33	Pending	Staked	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 34	Pending	Staked	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 35	Pending	Staked	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 36	Pending	Staked	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 37	Pending	Staked	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 38	Pending	Staked	100%	Federal Lode	13.8	5.6
Western Rare (USA), Inc.	Rex 39	Pending	Staked	100%	Federal Lode	13.8	5.6
Western Rare (USA), Inc.	Rex 40	Pending	Staked	100%	Federal Lode	13.8	5.6
Western Rare (USA), Inc.	Rex 41	Pending	Staked	100%	Federal Lode	13.8	5.6
Western Rare (USA), Inc.	Rex 42	Pending	Staked	100%	Federal Lode	13.8	5.6
Western Rare (USA), Inc.	Rex 43	Pending	Staked	100%	Federal Lode	13.8	5.6
Western Rare (USA), Inc.	Rex 44	WY105250232	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 45	WY105250233	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 46	WY105250234	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 47	WY105250235	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 48	WY105250236	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 49	WY105250237	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 50	WY105250238	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 51	WY105250239	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 52	WY105250240	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 53	WY105250241	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 54	WY105250242	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 55	WY105250243	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 56	WY105250244	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 57	WY105250245	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 58	WY105250246	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 59	WY105250247	Under Review	100%	Federal Lode	20.6	8.4

Company Name	Claim Name	Serial Number	Status	Control	Claim Type	Area (ac)	Area (ha)
Western Rare (USA), Inc.	Rex 60	WY105250248	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 61	WY105250249	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 62	WY105250250	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 63	WY105250251	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 64	WY105250252	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 65	WY105250253	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 66	WY105250254	Under Review	100%	Federal Lode	20.6	8.4
Western Rare (USA), Inc.	Rex 67	WY105250255	Under Review	100%	Federal Lode	13.2	5.3
Western Rare (USA), Inc.	Rex 68	WY105250256	Under Review	100%	Federal Lode	13.2	5.3
Western Rare (USA), Inc.	Rex 69	WY105250257	Under Review	100%	Federal Lode	10.7	4.3
Western Rare (USA), Inc.	Rex 70	WY105250258	Under Review	100%	Federal Lode	10.7	4.3
Western Rare (USA), Inc.	Rex 71	WY105250259	Under Review	100%	Federal Lode	10.7	4.3
Western Rare (USA), Inc.	Rex 72	WY105250260	Under Review	100%	Federal Lode	10.7	4.3
Total Area						**1,264.9**	**512.0**

Company Name	Lease Name	State Lease No	Status	Control	Claim Type	Area (ac)	Area (ha)
Western Rare (USA), Inc.	0-43571	0-43571	Active	100%	State Mineral	120.0	48.6
Western Rare (USA), Inc.	0-43570	0-43570	Active	100%	State Mineral	640.0	259.0
Western Rare (USA), Inc.	0-43571	0-43571	Active	100%	State Mineral	120.0	48.6
Western Rare (USA), Inc.	0-43569	0-43569	Active	100%	State Mineral	123.7	50.1
Western Rare (USA), Inc.	0-43568	0-43568	Active	100%	State Mineral	640.0	259.0
Western Rare (USA), Inc.	0-43569	0-43569	Active	100%	State Mineral	120.0	48.6
Western Rare (USA), Inc.	0-43569	0-43569	Active	100%	State Mineral	40.0	16.2
Western Rare (USA), Inc.	0-43571	0-43571	Active	100%	State Mineral	40.0	16.2
Total State Lease Area						**1,843.7**	**746.1**

APPENDIX C: SURFACE SAMPLE ASSAY RESULTS

Sample_No	TREO	LREO	HREO	MREO	La2O3	Ce2O3	Pr2O3	Nd2O3	Sm2O3	Y2O3	Eu2O3	Gd2O3	Tb2O3	Dy2O3	Ho2O3	Er2O3	Tm2O3	Yb2O3	Lu2O3	ThO2	UO2
L001	1525	1242	186	359	234	635	64	259	51	159	11	38	5	31	6	18	2	16	2	27	4
L002	1054	822	152	261	157	397	44	185	38	126	11	32	5	27	5	15	2	12	2	18	3
L003	1768	1491	199	421	274	778	75	307	58	146	12	43	6	33	6	16	2	15	2	30	3
L004	1519	1254	187	352	216	673	61	254	52	140	12	40	6	31	6	16	2	14	2	25	4
L005	2242	1977	206	515	367	1070	97	381	66	134	12	47	6	32	5	15	2	13	2	38	4
L006	904	715	132	227	128	351	38	162	35	100	9	28	4	22	4	11	1	10	2	15	2
L007	2978	2706	229	666	571	1431	129	498	80	133	12	50	6	33	5	15	2	14	2	48	4
L008	4089	3748	295	928	812	1953	184	695	108	166	12	68	8	42	7	18	2	17	3	73	5
L009	2634	2287	263	639	440	1178	118	471	82	179	12	59	7	43	7	21	2	17	3	42	5
L010	2116	1825	217	502	357	941	92	370	67	151	12	49	6	34	6	17	2	14	2	32	3
L011	1393	1159	165	337	230	575	62	244	48	125	11	36	4	26	5	13	2	12	2	23	3
L012	669	490	109	170	100	216	29	117	26	103	7	22	3	20	3	11	1	10	1	10	2
L013	1222	1003	149	295	199	495	53	214	41	119	10	31	4	24	4	13	2	12	2	21	3
L014	1320	1054	186	351	223	461	60	254	53	142	11	41	5	31	6	16	2	14	2	17	3
L015	3728	3395	279	866	788	1689	170	649	100	164	12	63	8	40	7	18	2	16	2	61	5
L016	3681	3352	277	844	728	1732	166	631	98	161	12	63	8	40	7	18	2	16	2	60	5
L017	3570	3263	257	777	684	1763	153	580	91	151	11	57	7	38	6	17	2	16	2	60	4
L018	3426	3096	276	806	686	1554	156	603	98	163	12	63	8	40	7	19	2	16	2	60	4
L019	2987	2673	250	695	598	1339	133	518	86	160	9	58	7	37	6	18	2	15	2	45	4
L020	4982	4562	365	1122	961	2414	217	843	134	204	11	86	10	52	9	23	3	20	3	93	6
L021	4762	4381	332	1104	1016	2193	218	832	123	185	13	76	9	47	7	21	3	18	3	80	7
L022	3798	3472	279	877	774	1769	171	659	101	158	12	64	8	40	6	18	2	16	2	63	5
L023	3343	3040	257	779	678	1535	151	584	92	148	12	58	7	37	6	17	2	14	2	55	4
L024	2782	2495	234	641	551	1265	122	478	79	142	12	53	7	35	6	16	2	14	2	41	4
L025	2353	2063	213	511	386	1147	97	373	66	153	9	47	6	35	6	17	2	14	2	42	3
L026	1868	1564	206	447	298	806	81	324	57	166	9	45	6	37	6	19	2	15	2	33	7
L027	2195	1921	196	529	405	964	100	393	59	147	11	43	5	31	5	16	2	15	2	39	4
L028	2110	1809	211	509	354	925	94	374	63	164	10	47	6	35	6	17	2	14	2	35	3
L029	2629	2338	222	637	542	1122	122	477	74	152	11	50	6	33	6	16	2	14	2	44	5
L030	4853	4437	353	1182	1014	2168	233	892	128	204	15	83	9	49	8	23	3	20	3	82	6
L031	2280	1975	220	567	436	945	106	420	67	163	11	51	6	36	6	17	2	14	2	40	4
L032	2024	1741	198	494	365	862	92	364	58	152	11	44	6	33	6	17	2	14	2	35	5
L033	2255	1975	201	536	410	1005	102	397	61	150	11	44	6	32	6	17	2	14	2	41	4

L034	3264	2915	266	794	681	1394	153	595	89	184	13	60	7	40	7	20	2	17	2	56	4
L035	3787	3431	292	926	790	1658	178	699	102	178	13	68	8	42	7	19	2	17	2	63	5
L036	3537	3160	288	843	726	1548	162	629	94	196	13	66	8	45	8	21	3	17	2	64	5
L037	2166	1857	216	508	355	975	95	371	63	167	11	48	6	36	6	18	2	15	2	42	5
L038	2231	1904	223	536	361	989	99	392	65	180	10	47	6	38	7	20	2	17	2	45	5
L039	3166	2790	275	766	642	1345	146	568	87	201	12	62	8	45	7	22	3	17	2	63	5
L040	2695	2362	239	648	541	1144	121	482	73	179	11	54	6	39	7	19	2	17	2	45	5
L041	3294	2942	269	781	652	1468	150	583	89	185	12	61	7	41	7	20	3	16	2	59	5
L042	3102	2751	273	776	646	1284	147	581	90	180	12	64	8	41	7	19	2	17	3	49	5
L043	3318	3020	247	786	667	1523	154	590	86	147	11	57	7	36	6	16	2	14	2	60	5
L044	3714	3363	284	907	774	1628	176	684	100	180	13	65	8	41	7	19	2	16	2	66	6
L045	3491	3159	267	845	742	1523	164	635	93	169	13	62	7	39	6	18	2	14	2	58	5
L046	3685	3251	314	837	802	1572	162	616	98	233	13	70	9	52	9	25	3	21	3	54	6
L047	4207	3804	314	993	911	1843	194	744	109	212	13	70	9	47	8	22	3	18	3	67	6
L048	3258	2939	257	794	688	1406	152	600	90	163	12	59	7	36	6	17	2	15	2	56	4
L049	3896	3561	285	913	787	1806	178	688	104	165	12	65	8	40	6	19	2	16	2	65	5
L050	3895	3552	300	987	803	1695	193	745	112	166	13	69	8	42	7	19	2	16	2	65	5
L051	3927	3542	310	954	820	1714	184	715	108	196	10	73	9	47	8	21	3	18	3	68	6
L052	3223	2879	276	781	661	1388	149	583	95	175	10	65	8	41	7	19	2	16	2	58	5
L053	4100	3727	309	971	809	1892	189	729	110	186	11	73	8	46	7	20	2	17	3	77	6
L054	3696	3347	287	891	753	1652	171	671	100	173	11	68	8	42	7	19	2	16	3	61	4
L055	4112	3739	313	999	870	1806	194	752	114	186	9	75	8	45	7	20	2	17	2	72	5
L056	3312	2986	260	793	668	1480	152	595	90	167	9	61	7	39	7	18	2	16	2	62	5
L057	3862	3481	299	924	809	1695	180	692	104	199	11	68	8	45	8	22	3	17	3	73	6
L058	3373	3046	265	820	699	1480	157	616	92	165	10	62	7	40	6	19	2	15	2	58	4
L059	3694	3325	296	888	758	1628	171	665	102	188	11	69	8	45	7	21	3	18	3	66	5
L060	3228	2940	241	745	637	1517	145	559	85	141	10	57	7	35	6	16	2	14	2	60	4
L061	2883	2507	275	697	561	1215	129	514	86	201	10	62	8	46	8	22	3	18	2	48	6
L062	3420	3050	284	802	724	1480	153	597	94	193	11	66	8	44	8	21	3	17	2	57	5
L063	3969	3614	301	942	854	1757	183	709	110	176	12	70	8	42	7	19	2	16	2	65	5
L064	3324	2997	263	755	642	1560	145	565	89	164	11	62	7	39	7	18	2	16	3	58	5
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L066	3559	3159	300	824	728	1560	158	612	99	213	10	70	9	45	8	23	3	20	3	58	6
L067	3961	3583	309	945	881	1695	183	711	109	191	12	74	9	43	8	20	3	16	3	56	5
L068	3797	3430	303	902	771	1701	174	677	107	184	12	70	8	44	8	21	3	18	3	63	5
L069	4305	3919	321	990	873	1996	192	745	115	193	12	76	9	45	8	22	3	18	3	75	5

L070	4410	3994	346	1074	986	1861	209	807	124	209	12	84	10	49	8	23	3	18	3	70	5
L071	4271	3847	344	998	866	1922	191	748	120	215	12	82	10	49	9	23	3	20	3	70	5
L072	4131	3682	347	986	864	1769	188	737	121	238	12	80	10	52	9	25	3	20	3	73	6
L073	3799	3431	297	885	786	1707	170	664	104	188	11	69	8	43	7	20	3	18	3	62	5
L074	3762	3388	302	883	786	1664	169	663	106	191	11	72	8	44	7	21	3	17	3	64	5
L075	3079	2751	253	704	612	1394	133	526	86	173	9	59	7	38	6	18	2	16	2	56	4
L076	3302	2985	256	753	658	1529	144	566	90	162	10	59	7	37	6	17	2	15	2	57	4
L077	3659	3327	277	859	778	1634	167	646	101	168	10	65	8	38	7	18	2	15	2	62	5
L078	3685	3265	338	923	793	1486	172	691	117	213	12	83	10	51	9	22	3	16	3	61	6
L079	3378	3033	289	749	573	1671	140	556	99	168	11	68	8	44	8	20	2	15	2	67	8
L080	5756	5081	552	1415	1048	2530	260	1052	190	337	13	137	17	87	15	37	4	26	4	106	11
L081	4892	4346	451	1216	973	2076	229	906	157	272	13	111	14	68	12	30	4	22	3	79	7
L082	3323	2941	300	784	619	1492	147	582	102	197	11	71	9	47	8	21	3	16	2	64	6
L083	2153	1875	211	507	347	996	92	374	67	144	7	49	6	34	6	16	2	13	2	59	11
L084	2360	2103	208	554	410	1106	104	413	73	130	8	48	6	31	5	14	2	11	2	53	5
L085	2361	2071	224	559	399	1086	103	414	72	148	9	53	7	36	6	16	2	14	2	53	6
L086	3849	3396	364	926	729	1683	171	688	123	229	12	87	11	56	10	25	3	19	3	64	6
L087	3207	2851	286	755	592	1462	141	561	97	180	10	67	9	45	8	20	3	15	2	61	5
L088	5014	4507	421	1208	982	2242	228	905	150	254	13	101	12	63	11	27	3	21	3	80	7
L089	3492	3030	346	832	645	1511	151	612	111	243	12	80	11	58	10	27	3	19	3	59	7
L090	4205	3772	358	1015	844	1849	193	758	126	217	12	85	11	54	9	23	3	18	3	72	6
L091	3139	2791	279	728	610	1413	137	539	94	175	11	66	8	44	8	19	2	14	2	48	4
L092	2461	2215	202	574	447	1161	110	429	71	123	9	47	6	29	5	13	2	11	2	46	6
L093	3860	3418	353	899	704	1763	167	667	120	225	12	82	11	55	10	25	3	18	3	68	7
L094	3976	3580	335	949	800	1769	180	710	120	194	12	80	10	49	8	21	2	16	2	68	5
L095	3789	3366	343	921	722	1664	171	687	119	215	12	80	10	53	9	24	3	18	3	57	5
L096	2629	2310	252	644	469	1161	120	477	84	162	11	59	7	40	7	18	2	13	2	41	4
L097	2992	2612	292	694	459	1425	126	511	96	199	10	66	9	48	8	22	3	17	3	58	6
L098	2399	2096	229	568	443	1055	108	416	74	159	10	54	7	37	6	17	2	13	2	54	5
L099	3578	3147	340	844	681	1572	158	622	114	220	12	81	10	55	9	23	3	18	3	62	7
L100	3344	2951	313	785	654	1468	147	577	104	197	11	75	9	51	8	21	3	16	2	59	7
L101	2597	2245	268	631	462	1118	116	464	85	182	11	65	8	44	7	19	2	14	2	41	4
RMP-001	2946	2577	273	697	579	1265	134	510	88	197	9	64	9	45	8	20	3	16	2	45	7
RMP-002	3167	2705	302	703	597	1382	136	504	88	265	8	70	10	53	10	26	4	20	3	47	7
RMP-003	1638	1302	212	394	297	599	70	280	54	191	12	44	6	38	7	20	3	18	3	28	9
RMP-004	1331	1011	201	327	194	482	55	229	50	181	12	41	6	37	7	20	3	17	2	21	5

RMP-005	4805	4412	339	1113	985	2248	224	834	123	190	15	78	9	47	8	21	3	19	3	79	6
RMP-006	3906	3530	305	953	819	1701	188	714	106	190	16	69	9	44	7	20	3	18	3	61	5
RMP-007	4256	3828	321	993	898	1886	198	737	107	230	13	75	9	49	9	22	3	20	3	68	7
RMP-008	4199	3627	381	996	862	1726	195	724	116	328	12	87	12	66	12	32	4	24	4	52	5
RMP-009	1275	989	172	317	216	447	56	224	44	168	8	37	5	31	6	16	2	14	2	16	3
RMP-010	2552	2189	238	586	494	1086	113	426	71	210	7	54	8	40	8	20	3	16	3	45	5
RMP-011	6008	5304	565	1520	1214	2481	300	1113	188	353	16	140	18	91	15	38	4	29	4	99	11
RMP-012	3972	3457	398	971	766	1671	183	709	125	260	13	99	13	66	11	29	3	21	3	72	8
RMP-013	4458	4066	341	1081	945	1972	220	804	123	188	13	83	10	49	8	21	3	17	3	89	10
RMP-014	4004	3557	345	917	762	1836	179	671	111	229	10	82	11	57	10	25	3	20	3	93	9
RMP-015	3743	3310	346	882	714	1671	170	645	111	213	12	85	11	56	9	24	3	18	3	73	7
RMP-016	3894	3568	292	930	816	1763	188	694	107	150	13	71	8	41	6	17	2	13	2	79	9
RMP-017	428	370	43	101	88	176	20	73	12	30	4	9	1	7	1	3	0	3	0	16	2
RMP-018	466	357	71	112	76	167	20	79	16	58	10	13	2	11	2	6	1	5	1	14	4
RMP-019	2118	1889	181	472	412	983	93	345	58	115	8	42	5	29	5	13	2	11	2	52	5
RMP-020	504	459	37	109	97	248	23	80	13	21	3	8	1	5	1	2	0	2	0	16	2
RMP-021	3562	3217	281	841	721	1609	166	626	95	171	13	65	8	41	7	19	3	17	3	59	5
RMP-022	3514	3109	313	830	683	1554	160	612	101	207	13	71	9	50	8	23	3	20	3	54	6
RMP-023	4748	4307	365	1159	1048	2027	239	858	129	220	13	86	10	53	9	25	3	21	3	79	8
RMP-024	4876	4428	371	1158	1055	2144	239	856	131	224	14	87	11	54	9	25	3	21	3	84	7
RMP-025	1937	1638	206	466	349	805	86	338	59	163	8	45	6	35	6	18	2	16	2	33	4
RMP-026	3724	3105	402	858	710	1511	162	609	112	353	9	91	13	75	13	36	5	28	4	44	7
RMP-027	2689	2318	263	625	514	1153	121	451	79	199	8	61	8	45	8	22	3	18	3	50	5
RMP-028	3081	2623	334	730	569	1296	136	524	98	238	11	79	11	59	10	27	3	20	3	66	7
RMP-029	1915	1628	207	435	325	854	81	310	60	150	7	48	7	37	6	17	2	13	2	46	5
RMP-030	2987	2526	330	707	554	1241	131	505	95	242	12	79	11	60	10	26	3	19	3	50	11
RMP-031	3183	2763	319	747	595	1388	142	541	98	213	12	77	10	54	9	24	3	18	3	60	8
RMP-032	3727	3323	331	919	800	1548	178	680	112	199	13	82	10	51	8	21	3	16	3	67	6
RMP-033	3392	3033	294	831	691	1462	161	618	99	177	12	71	9	44	7	19	3	16	3	68	8
RMP-034	613	471	95	156	95	214	27	112	23	76	11	19	3	15	3	8	1	8	1	11	4
RMP-035	1176	916	171	302	177	427	51	216	44	142	10	38	5	30	5	16	2	14	2	18	6
RMP-036	3464	3022	339	864	721	1388	165	635	108	227	12	82	10	54	9	25	3	20	3	57	7
RMP-037	4409	3945	381	1029	828	2033	204	755	129	227	14	92	12	59	10	26	3	19	3	81	7
RMP-038	695	546	94	165	118	258	29	117	22	84	11	18	3	16	3	8	1	7	1	12	2
RMP-039	116	31	36	18	5	13	2	7	4	56	0	5	1	8	2	5	1	8	1	22	6
RMP-040	497	372	66	107	88	176	20	74	15	78	5	12	2	12	2	7	1	7	1	13	2

RMP-041	758	667	57	140	135	389	29	100	16	53	3	11	2	9	2	6	1	6	1	37	6
RMP-042	2452	1966	285	553	441	958	103	387	76	296	8	59	9	53	10	27	4	24	3	37	7
RMP-043	6724	5774	647	1589	1314	2801	316	1138	202	541	15	149	21	114	20	51	6	38	5	81	11
RMP-044	4477	4089	317	1024	907	2101	209	762	114	199	14	71	9	45	8	20	3	19	3	71	6
RMP-045	5157	4724	361	1222	1094	2334	257	905	132	220	15	83	10	50	9	22	3	19	3	85	7
RMP-046	3974	3599	300	924	800	1824	185	687	105	192	14	68	8	44	8	20	3	17	3	69	6
RMP-047	3705	3348	284	856	748	1695	170	637	99	184	14	64	8	42	7	19	2	17	3	61	5
RMP-048	4675	4274	334	1103	978	2125	232	816	123	203	15	75	9	47	8	20	3	18	3	76	6
RMP-049	4315	3929	315	1019	919	1929	208	759	113	197	15	72	9	44	8	20	3	17	3	70	6
RMP-050	3822	3467	285	884	769	1763	178	658	101	183	14	64	8	41	7	18	2	16	3	63	6
RMP-051	3516	3163	281	824	705	1585	164	612	98	182	14	63	8	41	7	19	3	16	3	58	5
RMP-052	3844	3478	296	922	816	1683	187	685	105	187	15	67	8	43	7	19	2	17	3	63	5
RMP-053	4498	4117	318	1047	937	2070	214	781	117	192	15	71	9	44	8	20	3	18	3	75	6
RMP-054	3608	3275	269	829	718	1683	167	616	94	168	13	61	8	39	7	17	2	16	3	60	6
RMP-055	3815	3470	285	900	795	1720	182	671	102	175	14	64	8	40	7	18	2	16	3	65	6
RMP-056	3975	3589	301	908	807	1824	182	673	105	204	12	67	8	45	8	20	3	18	3	73	6
RMP-057	3621	3268	279	851	762	1603	173	631	98	185	13	62	8	40	7	19	2	17	3	64	5
RMP-058	3863	3507	285	890	820	1744	180	661	102	185	12	65	8	42	7	18	2	16	3	67	6
RMP-059	3962	3579	305	922	828	1775	186	682	107	199	12	69	9	45	8	20	3	17	3	66	5
RMP-060	4640	4213	346	1093	996	2058	230	804	125	220	13	80	10	50	9	22	3	20	3	78	6
RMP-061	3806	3426	291	871	787	1720	175	645	100	203	12	65	8	43	8	20	3	18	3	70	6
RMP-062	4134	3732	319	943	827	1910	188	698	111	209	12	73	9	49	8	21	3	18	3	73	6
RMP-063	2525	2254	220	607	516	1093	118	450	74	135	11	52	7	32	6	14	2	12	2	50	6
RMP-064	2460	2215	201	579	507	1092	115	430	70	123	11	46	6	29	5	13	2	11	2	54	5
RMP-065	2949	2666	234	701	618	1302	139	523	83	142	12	55	7	33	6	14	2	12	2	59	8
RMP-066	2626	2342	228	628	534	1142	122	465	77	143	12	54	7	34	6	14	2	13	2	49	7
RMP-067	2666	2382	228	634	529	1182	125	469	77	144	12	53	7	34	6	15	2	13	2	52	6
RMP-068	2546	2289	209	602	523	1126	119	447	72	130	11	47	6	31	5	13	2	12	2	49	5
RMP-069	2593	2286	231	632	538	1075	123	468	78	166	11	54	7	34	6	15	2	13	2	56	6
RMP-070	2501	2234	218	602	502	1093	117	447	74	133	12	51	6	32	5	14	2	12	2	48	5
RMP-071	2810	2519	242	684	582	1206	135	509	85	144	12	57	7	35	6	15	2	13	2	55	6
RMP-072	3727	3379	295	880	771	1671	176	654	107	173	12	70	9	42	7	17	2	14	2	75	7
RMP-073	2991	2703	242	705	619	1333	141	523	87	143	11	56	7	35	6	15	2	12	2	63	9
RMP-074	3281	2972	263	777	683	1462	154	577	95	152	11	62	8	38	6	16	2	13	2	67	7
RMP-075	2836	2529	253	680	570	1241	132	503	83	148	12	64	8	38	6	16	2	13	2	54	5
RMP-076	2997	2670	266	729	622	1278	141	540	87	159	11	67	8	40	7	17	2	13	2	58	6

RMP-077	2878	2558	260	692	568	1259	134	511	86	157	11	65	8	39	7	17	2	13	2	55	6
RMP-078	3194	2836	289	784	644	1364	149	582	95	176	11	73	9	44	7	19	2	15	2	63	7
RMP-079	2713	2397	252	646	507	1211	123	476	81	156	11	63	8	39	7	17	2	14	2	54	6
RMP-080	3121	2704	319	753	577	1339	142	548	97	211	12	78	11	52	9	23	3	18	3	55	6
RMP-081	3258	2831	328	790	609	1394	149	577	101	215	12	82	11	54	9	23	3	18	3	58	6
RMP-082	3623	3159	356	864	663	1591	163	631	112	236	12	89	12	59	10	25	3	19	3	62	6
RMP-083	3300	2857	337	799	597	1425	149	582	104	226	12	82	11	57	10	24	3	18	3	65	6
RMP-084	3292	2858	333	806	626	1382	152	590	105	222	12	82	11	54	9	24	3	18	3	58	7
RMP-085	3760	3326	346	907	719	1652	173	668	113	216	13	85	11	54	9	24	3	17	3	69	7
RMP-086	3668	3247	339	904	711	1578	174	668	114	211	12	85	11	52	9	22	3	17	2	68	7
RMP-087	2603	2333	223	623	509	1165	121	462	76	133	9	54	7	33	6	15	2	11	2	63	7
WR-01-021	2988	2558	300	736	537	1253	135	540	92	237	8	68	9	53	9	24	3	20	3	53	5
WR-01-022	2148	1836	212	514	433	861	98	374	67	179	6	47	6	35	6	17	2	15	2	32	3
WR-01-023	2397	2051	236	557	434	1034	106	405	73	196	7	52	7	39	7	20	3	17	3	43	4
WR-01-024	1480	1177	193	358	244	561	64	254	52	175	8	41	6	34	6	18	2	16	2	25	3
WR-01-025	1127	878	155	266	174	429	47	187	41	144	9	31	5	27	5	15	2	13	2	21	3
WR-01-026	875	637	144	220	118	294	37	152	36	138	9	28	4	26	5	14	2	13	2	14	3
WR-01-027	1853	1537	196	403	326	797	76	286	54	185	8	41	6	35	6	18	2	17	2	31	2
WR-01-028	99	75	13	19	14	42	4	13	3	15	0	2	0	3	0	1	0	2	0	16	3
WR-01-029	1921	1583	208	425	340	802	80	301	60	203	6	43	6	38	7	20	3	17	2	34	7
WR-01-030	2242	1873	247	533	405	911	99	383	74	210	7	55	8	43	8	22	3	18	3	38	4
WR-01-031	1694	1230	266	408	250	568	68	278	64	281	10	55	9	53	10	28	3	22	3	38	7
WR-01-032	1937	1653	204	468	331	829	87	344	62	153	12	45	6	32	5	16	2	14	2	32	4
WR-01-033	1171	1034	110	281	236	497	56	208	36	68	13	22	3	15	2	7	1	6	1	21	2
WR-01-080	231	191	26	54	42	91	10	39	8	23	2	5	1	4	1	2	0	2	0	12	4
WR-01-081	133	82	27	30	17	37	5	19	4	31	1	4	1	5	1	4	1	4	1	27	12
WR-01-082	53	31	11	10	7	14	2	7	1	13	0	1	0	2	0	2	0	2	0	18	4
WR-01-083	1404	1130	188	360	222	529	63	261	53	150	12	41	5	31	5	16	2	14	2	24	3
WR-01-084	3619	3279	279	844	746	1634	167	631	101	175	11	63	7	39	7	18	2	16	2	62	6
WR-01-085	142	28	46	22	4	9	2	8	4	77	0	7	2	10	2	7	1	9	1	22	7
WR-01-086	1521	1266	180	380	257	608	69	278	53	138	13	38	5	29	5	14	2	13	2	28	4
WR-01-087	504	350	73	97	83	175	18	61	14	101	0	12	2	16	3	10	2	10	1	32	8
WR-01-088	2580	2302	221	607	497	1158	118	451	77	145	10	51	6	32	5	15	2	12	2	48	5
WR-01-089	3023	2721	251	708	650	1314	139	526	90	152	11	58	7	36	6	16	2	13	2	54	4
WR-01-090	2078	1812	199	490	382	914	93	359	64	140	11	45	6	32	5	14	2	11	2	39	3
WR-01-091	634	521	66	133	123	262	27	93	17	68	2	12	2	11	2	8	1	8	1	93	18

WR-01-092	120	91	17	26	20	45	5	18	3	16	2	3	0	3	1	2	0	3	0	49	6
WR-01-093	275	221	30	57	49	114	11	39	7	34	1	6	1	6	1	3	1	3	0	72	6
WR-01-094	3313	2866	336	799	680	1345	154	577	104	232	13	79	10	57	9	25	3	18	3	56	5
WR-01-095	479	332	73	99	66	172	18	63	14	94	2	13	2	16	3	9	1	8	1	19	4
WR-01-096	120	76	20	26	18	31	5	18	4	30	0	4	1	4	1	2	0	3	1	31	5
WR-01-097	45	38	4	9	11	17	2	6	1	4	0	1	0	1	0	0	0	0	0	7	0
WR-01-098	2706	2302	299	668	489	1112	129	479	91	211	12	70	9	51	9	23	3	18	3	57	6
WR-01-099	1976	1647	238	499	335	787	91	362	70	173	13	56	7	40	7	19	2	14	2	28	4
WR-01-100	4293	3931	311	964	880	2033	199	714	110	173	15	74	9	43	7	20	2	16	3	68	5
WR-01-101	105	66	21	23	14	30	4	14	4	23	1	4	1	4	1	3	0	3	0	36	5
WR-01-102	239	186	30	51	41	94	10	34	7	32	1	6	1	6	1	3	0	3	0	59	8
WR-01-104	404	310	64	95	68	144	18	66	14	47	12	12	2	10	2	5	1	4	1	3	1
WR-01-105	501	333	84	96	80	163	17	58	15	105	1	14	3	18	4	13	2	12	1	36	12
WR-01-106	744	608	95	182	130	287	34	131	25	71	11	19	3	15	3	8	1	7	1	16	3
WR-01-107	223	173	28	45	42	86	9	30	6	30	2	6	1	5	1	3	0	3	0	19	4
WR-01-108	2788	2474	244	661	536	1241	132	486	80	159	11	57	7	36	6	18	2	16	2	47	5
WR-01-109	903	698	139	237	133	318	41	169	35	108	11	31	4	23	4	12	2	11	2	14	3
WR-01-110	1343	1095	170	328	208	545	61	234	46	133	13	36	5	28	5	15	2	13	2	22	4
WR-01-111	838	552	180	237	87	219	36	165	42	159	12	40	5	31	6	17	2	16	2	6	2
WR-01-112	187	129	29	38	28	62	7	25	6	37	1	5	1	5	1	4	1	4	1	35	7
WR-01-113	410	327	45	79	81	167	17	53	10	51	1	9	1	8	2	5	1	5	1	60	6
WR-01-114	3698	3273	326	847	758	1628	171	614	103	217	14	78	10	52	9	23	3	18	3	68	8
WR-01-115	3860	3385	368	884	713	1750	173	638	114	237	15	89	11	62	11	27	3	19	3	65	6
WR-01-116	3814	3317	370	886	773	1615	175	638	114	259	14	88	11	62	11	29	3	21	3	55	7
WR-01-117	2902	2457	327	688	482	1259	130	491	96	230	12	79	10	57	10	26	3	18	3	41	5
WR-01-118	2903	2351	391	722	491	1110	130	507	108	290	12	97	13	71	13	32	4	24	3	38	4
WR-01-119	160	101	31	35	23	45	6	22	5	35	1	6	1	6	1	4	1	4	0	11	2
WR-01-120	3396	2945	337	702	452	1775	135	499	99	229	12	81	11	58	10	27	3	20	3	71	6
WR-01-121	3519	3075	341	830	710	1492	163	602	106	224	13	85	10	55	9	25	3	19	3	58	6
WR-01-122	2580	2204	279	640	487	1048	126	458	83	194	12	66	9	47	8	22	3	17	3	37	5
WR-01-123	3538	3106	322	827	767	1468	167	600	102	227	13	78	10	51	9	23	3	18	3	49	6
WR-01-124	2880	2503	288	661	509	1302	130	476	88	191	12	69	9	47	8	22	3	17	2	54	6
WR-01-125	3178	2811	292	740	640	1388	148	539	95	182	11	72	9	45	8	20	2	16	2	59	6
WR-01-126	3321	2956	285	734	658	1529	150	531	91	184	12	68	9	46	8	20	2	16	2	61	6
WR-01-127	2533	2218	244	577	452	1162	115	416	76	157	10	59	7	39	7	19	2	14	2	46	5
WR-01-128	3249	2905	275	752	687	1425	153	549	90	170	12	67	8	42	7	19	2	15	2	61	8

WR-01-129	3053	2646	305	703	552	1364	136	505	91	207	11	73	9	52	9	24	3	19	2	58	6
WR-01-130	2636	2335	237	596	476	1235	119	433	76	150	12	55	7	37	7	17	2	13	2	50	5
WR-01-131	3157	2848	259	721	671	1413	147	528	88	149	12	64	7	38	6	17	2	13	2	60	6
WR-01-132	2380	2092	218	566	461	1036	114	413	68	149	12	51	6	33	6	17	2	13	2	46	5
WR-01-133	1805	1600	169	438	340	796	89	320	55	98	11	38	5	25	4	12	1	9	1	40	5
WR-01-134	563	487	45	106	122	258	24	73	12	45	1	9	1	8	2	5	1	5	1	89	8
WR-01-135	1535	1317	152	333	297	677	66	237	42	116	10	34	5	26	5	12	2	10	1	30	3
WR-01-136	757	539	154	219	82	224	34	155	42	114	10	36	5	26	5	12	2	10	2	10	5
WR-01-137	2622	2266	269	625	442	1176	114	456	81	180	11	64	8	47	8	21	2	15	2	45	5
WR-01-138	123	46	37	25	9	16	3	13	5	48	1	7	1	8	2	5	1	6	1	25	8