

17th October 2019

New Rare Earths (REE) Project Secured in Wyoming USA

New 100% owned Laramie Rare Earths (REE) Project secured via leasing and staking in Wyoming USA:

◆ Zenith surface rock sampling has returned widespread TREO (Total Rare Earth Oxide) grades up to 0.54% in two initial sampling areas 3km apart with strong values of high-value neodymium, praseodymium and dysprosium;

◆ Applications lodged first in time for State and Federal lands covering the most promising areas from recent Zenith sampling;

◆ REE's are reported to occur predominantly as the mineral allanite hosted by clinopyroxene and hornblende syenites within a late stage 30 sqkm monzonitic pluton that is the youngest and most highly differentiated part of a very large anorthosite complex, providing Zenith with the opportunity to define a very large-scale exploration target once initial follow-up work is completed;

◆ REE's listed as critical minerals in USA report *"A Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals 1"*. Strong Federal Government support to secure USA domestic REE supply.

◆ Wyoming is home to multiple existing major mining operations and the project area has excellent existing road and rail infrastructure; and

◆ Assays are awaited for the balance of first pass samples and more detailed and systematic traverse chip sampling and mapping to assess size potential, leading to drill testing.

Zenith Minerals Limited ("Zenith" or "the Company") is pleased to announce that it has secured the new 100% owned Laramie REE Project in Wyoming USA (Figure 1). Wyoming is home to multiple existing major mining operations (coal and uranium) and has local engineering and construction companies capable of supporting mine project development.

The project area has excellent existing infrastructure being located 3km from the national road network, 30km to interstate and 35km to rail, in addition Wyoming has abundant low-cost commercial electricity. Rare Element Resources (TSX:RES) are currently assessing the advanced Bear Lodge REE project in north east Wyoming.

Corporate Details

ASX: ZNC

Issued Shares (ZNC)	212.8M
Unlisted options	4.15M
Mkt. Cap. (\$0.06)	A\$13M
Cash (30 th Jun 19)	A\$1.1 M
Debt	Nil

Directors

Michael Clifford:
Managing Director

Mike Joyce:
Non-Exec Chairman

Stan Macdonald:
Non-Exec Director

Julian Goldsworthy:
Non-Exec Director

Graham Riley:
Non-Exec Director

Major Shareholders

HSBC Custody. Nom.	12.2%
Nada Granich	5.4%
J P Morgan	4.8%
Miquilini	4.3%
Abingdon	4.1%

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Initial sampling and mapping by Zenith in two key areas 3km apart has returned up to 0.54% TREO, with the 23 highest results from 29 samples taken from the two key areas held under application by Zenith averaging 0.34% TREO (Figure 2 & Table 1).

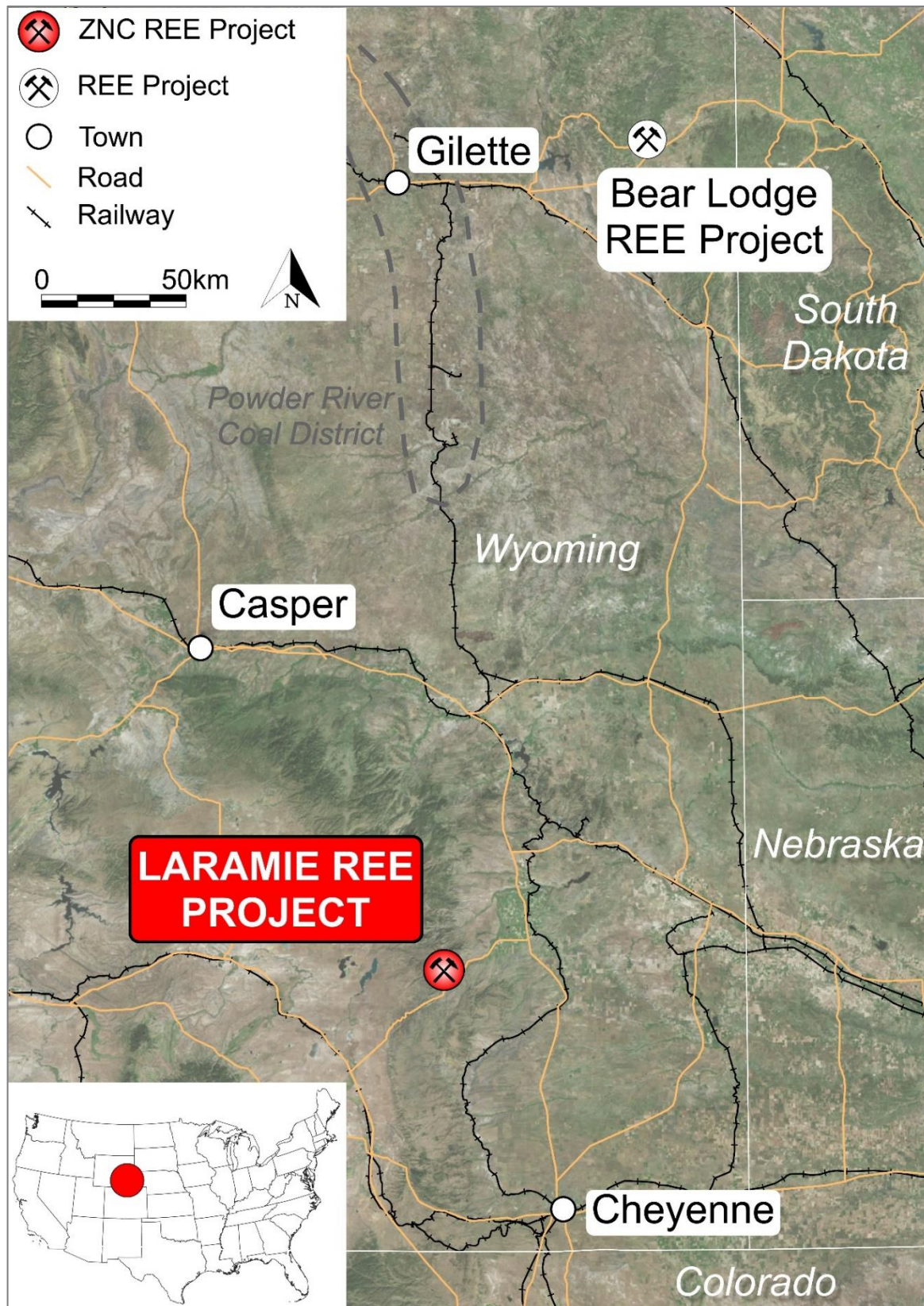


Figure 1: Laramie REE Project – Location Map

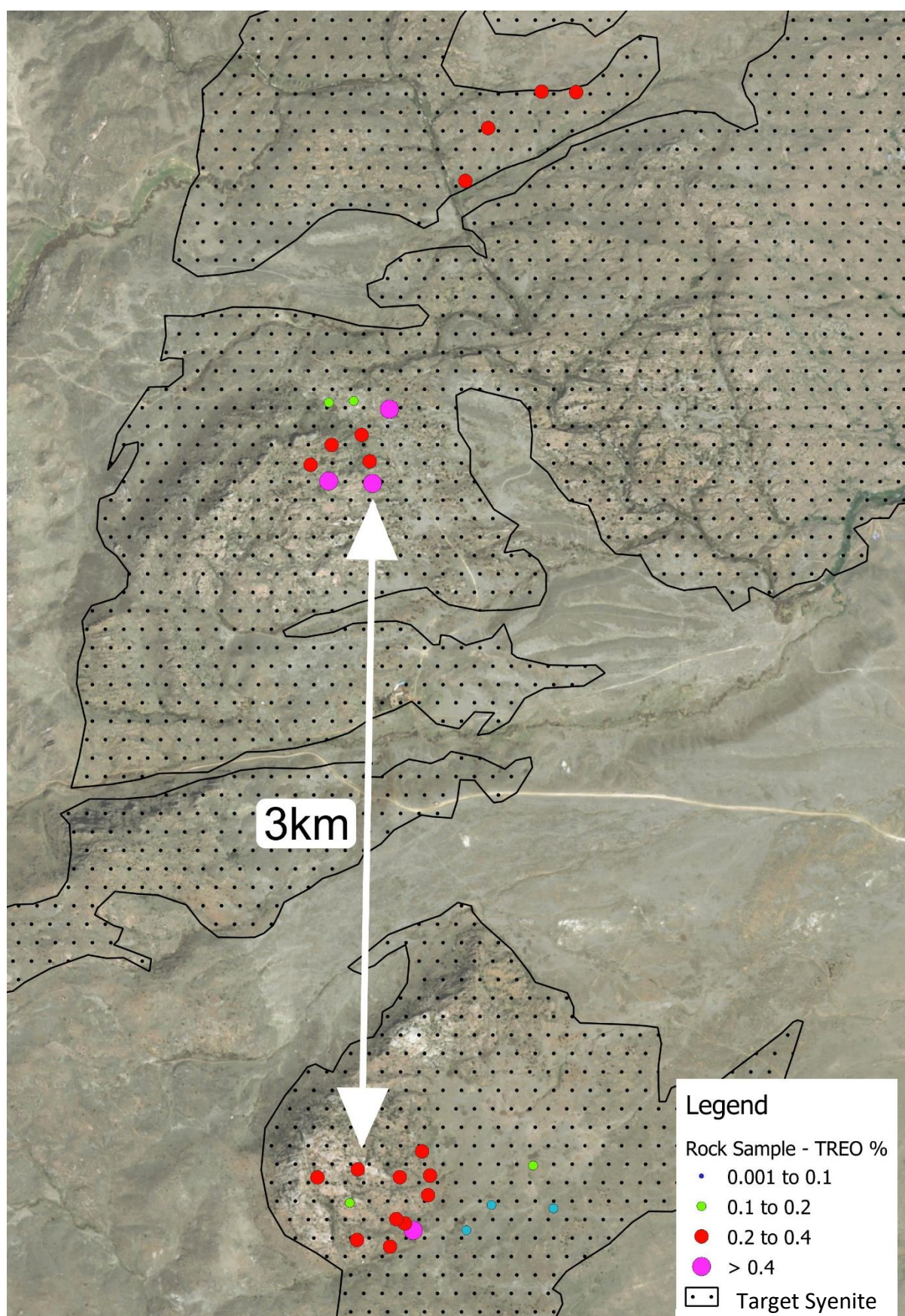


Figure 2: Laramie REE Project – Geochemical Results – Summary Map



Assays have now been received for 29 of 38 first pass rock chip samples, results for the remaining 9 samples are anticipated shortly, whilst more detailed and systematic traverse chip sampling and mapping is in progress to assess size potential, leading to drill testing (Figure 3).



Figure 3: Systematic Traverse Chip Sampling in Progress

Background on Rare Earth's (REE)

A renewed interest in REE projects has come about as a result of the recent US – China trade dispute. The USA has listed REE's as critical minerals in the federal report "A Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals 1". There is strong Federal US Government support to secure a stable domestic REE supply.

REE projects in production, development and exploration stages span a wide range of size and grade (Figure 4). Deposit size, grade, mineability and metallurgical performance are key factors in the economic viability of all mining projects but in the case of REE projects the type of REE minerals present are critically important.

The 17 chemical elements that occur together in the periodic table are referred to as rare earth elements (REE's). The group consists of yttrium and the 15 lanthanide elements (lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, and lutetium)². A project may have a very high content of total rare earth oxides (TREO) but what



is more important is the proportion of highly valuable REE's such as neodymium, praseodymium and dysprosium. Notably it is those elements that are strongly anomalous in the regional reconnaissance sampling results from the Laramie REE project area.

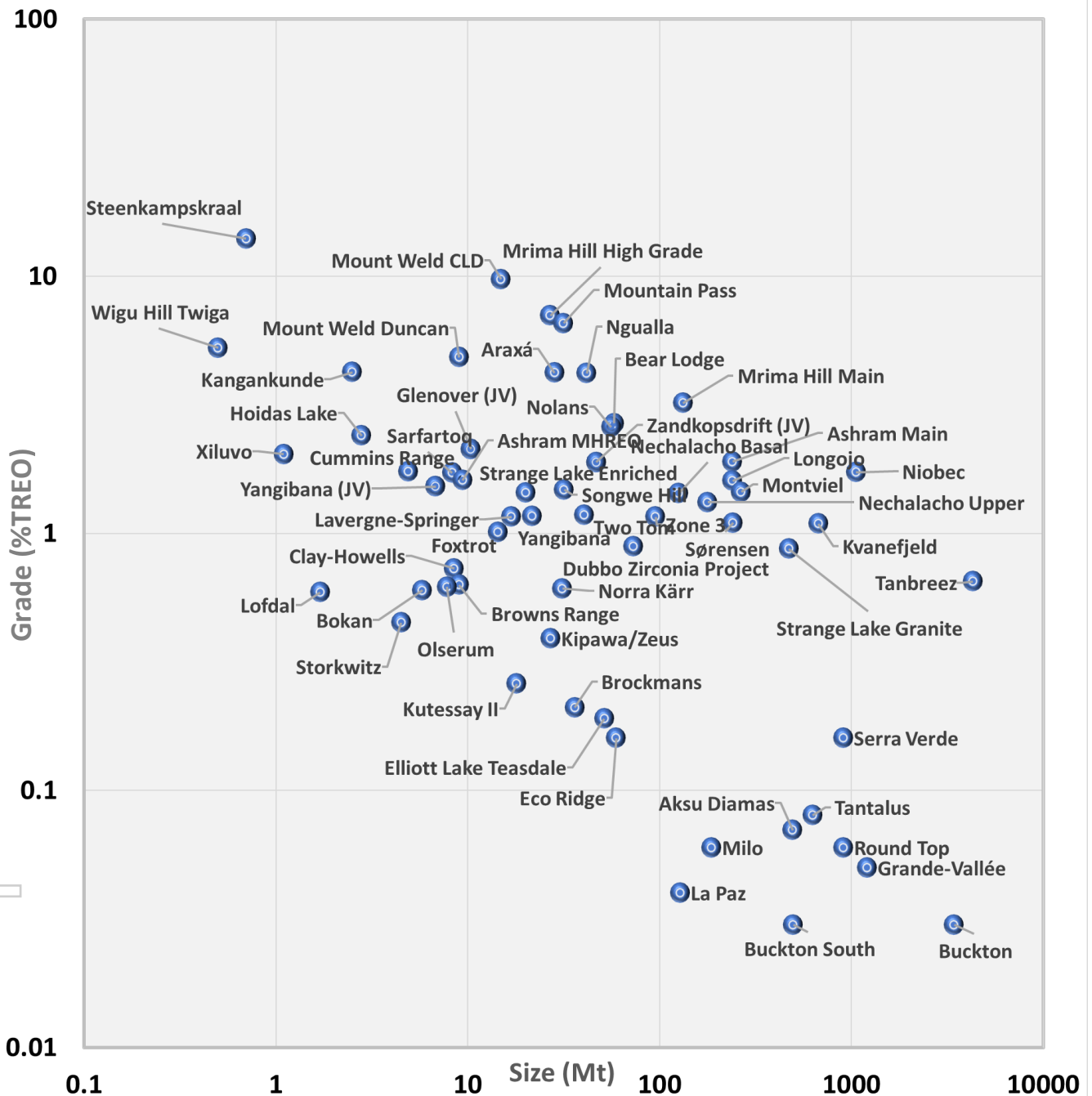


Figure 3: World REE Projects Size and Grade³



Laramie Project - Geology

The Laramie REE Project occurs within the Laramie Anorthosite Complex a Proterozoic massif consisting of three anorthositic intrusions, three syenitic to monzonitic intrusions and several smaller intrusions of leucogabbro and ferrodiorite^{4 5}.

REE's are reported to occur at the Laramie REE project predominantly as the mineral allanite hosted by clinopyroxene and hornblende syenites that are part of a very large differentiated Laramie anorthosite complex, providing Zenith with the opportunity to define a very large-scale exploration target once initial follow-up work is completed.

Table 1: Significant REE Surface Sample Results – Laramie Project Area

La ₂ O ₃ (ppm)	CeO ₂ (ppm)	Pr ₆ O ₁₁ (ppm)	Nd ₂ O ₃ (ppm)	Sm ₂ O ₃ (ppm)	Eu ₂ O ₃ (ppm)	Gd ₂ O ₃ (ppm)	Tb ₄ O ₇ (ppm)	Dy ₂ O ₃ (ppm)	Ho ₂ O ₃ (ppm)	Er ₂ O ₃ (ppm)	Tm ₂ O ₃ (ppm)	Yb ₂ O ₃ (ppm)	Lu ₂ O ₃ (ppm)	Y ₂ O ₃ (ppm)	TREO (ppm)	TREO (%)
556	1240	138	507	86.6	9.8	61.7	8.79	45.7	8.03	21.7	2.41	16.1	2.42	198	2902	0.29
525	1245	133	486	84.8	7.7	65.4	9.91	53.4	9.2	26.2	3.17	18.9	3.07	243	2914	0.29
261	554	69.4	268	52.4	12.7	43.6	6.45	35.7	6.98	19.3	2.33	15	2.63	185	1534	0.15
175	439	54.5	221	45.3	12	38	5.93	34.5	6.37	19.5	2.49	15	2.83	171	1242	0.12
873	2080	219	794	110.5	14.9	73.5	8.7	44.9	6.94	20.8	2.27	17.5	2.95	182	4451	0.45
723	1545	180.5	660	93.5	14.4	64.3	8.18	40.6	6.61	18.9	2.23	16.4	2.92	180	3557	0.36
799	1705	194	689	101.5	12.5	69.5	8.84	47.6	8.01	23	2.87	19.7	3.67	216	3900	0.39
456	1025	114.5	402	66.7	6.9	54.3	7.2	39.9	7.32	19.6	2.52	17.2	3.04	200	2422	0.24
1085	2310	284	1060	172.5	15	129	16.55	82.4	13.5	37	3.83	25.2	3.53	320	5558	0.56
698	1570	183	689	118	11.6	90.7	12.45	60.7	10.4	26.6	3.09	19.5	3.08	244	3740	0.37
685	1735	177	652	111	9.8	76.5	10.55	52.9	8.83	24.1	2.62	18.4	2.64	225	3791	0.38
801	1740	198.5	706	111	11.9	69.8	8.17	42.2	6.38	19.6	2.24	14.3	2.92	168	3902	0.39
659	1590	173	631	106	12.3	77	10.55	52.4	8.59	23.3	2.44	15.8	2.87	200	3564	0.36
733	1650	184	665	96.2	11.2	64.4	7.54	37.2	6.12	14.1	1.88	12.2	2.04	140	3625	0.36
80	171	19.9	72.2	11.5	3.7	8.1	1.16	5.7	1.15	2.9	0.4	2.5	0.56	29	410	0.04
68	158	19.6	74	14.2	8.6	12.8	1.96	9.8	1.76	5.8	0.59	5	0.89	55	436	0.04
376	944	95.3	342	58.9	7.5	38.4	5.01	25.9	4.42	13.1	1.42	9.4	1.63	109	2032	0.20
87	241	21.7	72.6	11.8	2.3	6.9	0.85	4.8	0.74	2.4	0.34	2.2	0.41	20	475	0.05
663	1545	167.5	615	91.7	12.8	60.5	7.26	37.3	6.33	16.6	2.17	15.5	3	170	3414	0.34
578	1370	149.5	550	84.7	10.6	59.6	8.39	41.2	7.5	20.1	2.59	17.3	3.27	193	3096	0.31
963	1925	232	839	120.5	12.6	76.3	9.46	49	8.18	21.4	2.67	18.5	2.69	212	4492	0.45
925	1950	222	802	123	12.8	78	9.98	47.5	8.47	22.3	2.66	19	2.9	205	4431	0.44
451	1060	117	427	73.8	7.9	53.4	7.45	40.4	7.11	19.9	2.46	16.6	2.46	189	2475	0.25
509	1235	135	508	95.1	10.3	70.4	10.2	55	8.92	24.4	2.89	17.9	2.88	234	2919	0.29
286	789	78.9	302	53	6.4	43	6.36	33.5	5.75	17.3	1.95	11.2	2.01	138	1774	0.18
511	1205	134.5	500	92.9	10.8	72.3	10.35	54.4	9.54	24	2.69	16.6	2.22	225	2871	0.29
560	1360	148	546	95.1	11	70.5	9.63	50.8	8.71	22.3	2.77	15.4	2.96	203	3106	0.31
713	1445	176	652	103	13.2	74.7	9.57	46.6	7.45	20.5	2.23	13.5	2.38	188	3467	0.35
653	1410	163.5	595	97.8	11.9	64.7	8.77	42	6.95	17.9	2.36	14.3	2.92	166	3257	0.33

(All sample location shown on Figure 2)



Competent Persons Statement

The information in this report that relates to Exploration Results is based on information compiled by Mr Michael Clifford, who is a Member of the Australian Institute of Geoscientists and an employee of Zenith Minerals Limited. Mr Clifford has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Clifford consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

References:

- ¹ As defined in Executive Order 13817, a critical mineral is “a mineral identified by the Secretary of the Interior [pursuant to the Executive Order] to be (i) a non-fuel mineral or mineral material essential to the economic and national security of the United States, (ii) the supply chain of which is vulnerable to disruption, and (iii) that serves an essential function in the manufacturing of a product, the absence of which would have significant consequences for our economy or our national security.” 82 Fed. Reg. 60835; 2017; <https://www.federalregister.gov/documents/2017/12/26/2017-27899/a-federal-strategy-to-ensure-secure-and-reliable-supplies-of-critical-minerals>
- ¹ Department of the Interior, “Final List of Critical Minerals 2018,” 83 Fed. Reg. 23295; 2018, <https://www.federalregister.gov/documents/2018/05/18/2018-10667/final-list-of-critical-minerals-2018>
- ¹ U.S. Geological Survey, “Mineral Commodity Summaries 2018,” 2018, <https://doi.org/10.3133/70194932>
- ² <https://geology.com/articles/rare-earth-elements/>
- ³ Source: <http://www.techmetalsresearch.com/metrics-indices/tmr-advanced-rare-earth-projects-index/> updated where new information available by Zenith 29-05-2019 from Company ASX reports and from SEDAR for TSX listed entities .
- ⁴ Frost, B.R., and Frost, C.D., 2014, Essentials of Igneous and Metamorphic Petrology, Cambridge University Press, published in November 2013, ISBN 978-1-107-02754-1.
- ⁵ Frost, C.D., Frost, B.R., Lindsley, D.H., Chamberlain, K.R., Swapp, S.M., Scoates, J.S., 2010, Geochemical and isotopic evolution of the anorthositic plutons of the Laramie anorthosite complex: explanations for variations in silica activity and oxygen fugacity of massif anorthosites. Canadian Mineralogist, v. 48, 925-946.

17th October 2019

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Section 1 Sampling Techniques and Data

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

Criteria	JORC Code explanation	Commentary
Sampling techniques	<i>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.</i>	Rock samples were collected by hand, at the surface, from in-situ outcrops.
	<i>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</i>	Grab samples are believed to be representative of the outcrops they come from.
	<i>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 (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.</i>	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 pulverised before analysis.
Drilling techniques	<i>Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc.) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc.).</i>	No Drilling
Drill sample recovery	<i>Method of recording and assessing core and chip sample recoveries and results assessed.</i>	No Drilling
	<i>Measures taken to maximise sample recovery and ensure representative nature of the samples.</i>	No Drilling
	<i>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.</i>	No Drilling



Logging	<i>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.</i>	Rock samples were geologically described
	<i>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.</i>	Qualitative logging
	<i>The total length and percentage of the relevant intersections logged.</i>	No Drilling
Sub-sampling techniques and sample preparation	<i>If core, whether cut or sawn and whether quarter, half or all core taken.</i>	No Drilling
	<i>If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.</i>	No Drilling
	<i>For all sample types, the nature, quality and appropriateness of the sample preparation technique.</i>	Samples were analysed at ALS Laboratories in Reno Nevada, the samples were crushed, pulverised and assayed by ICP-ME MS81 for REE
	<i>Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.</i>	~2kg of rock was crushed and pulverised and a sub-sample was taken in the laboratory and sent for analysis.
Sub-sampling techniques and sample preparation - continued	<i>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.</i>	Sampling was selective and based on geological observations.
	<i>Whether sample sizes are appropriate to the grain size of the material being sampled.</i>	Each sample was 1kg to 2kg in weight which is appropriate to test for the grain size of material.
Quality of assay data and laboratory tests	<i>The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.</i>	The samples were crushed and assayed for 38 elements by fusion ICP-MS. The procedure will report near total results.
	<i>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.</i>	No geophysical tools used this sampling program
	<i>Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.</i>	Internal laboratory standards were analysed with rock samples
Verification of sampling and assaying	<i>The verification of significant intersections by either independent or alternative company personnel.</i>	Two consulting company personnel have observed the assayed samples
	<i>The use of twinned holes.</i>	No drilling



	<i>Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</i>	Field data were all recorded in field note books and sample record books and then entered into a digital database
	<i>Discuss any adjustment to assay data.</i>	No adjustments were made.
Location of data points	<i>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.</i>	Sample location is based on GPS coordinates +/-5m accuracy
	<i>Specification of the grid system used.</i>	The grid system used to compile data was NAD27 Zone 13 N.
Location of data points - continued	<i>Quality and adequacy of topographic control.</i>	Topography control is +/- 10m.
Data spacing and distribution	<i>Data spacing for reporting of Exploration Results.</i>	All samples are shown on Figure 2.
	<i>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.</i>	The data alone will not be used to estimate mineral resource or ore reserve
	<i>Whether sample compositing has been applied.</i>	No compositing applied
Orientation of data in relation to geological structure	<i>Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.</i>	Rock samples were taken of selected outcrops that were considered representative of varying rock types
	<i>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.</i>	No drilling
Sample security	<i>The measures taken to ensure sample security.</i>	Samples were kept in numbered bags until delivered to the laboratory
Audits or reviews	<i>The results of any audits or reviews of sampling techniques and data.</i>	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	<i>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.</i>	The Laramie REE Project is located within applications for State of Wyoming Mineral Leases. The leases will either be held via Zenith's consultant on bare trust for Zenith or via Zenith's wholly owned USA subsidiary. Federal lode mining claims have been claim staked. Sampling has been carried out under an exploration permit issued by the State of Wyoming.
	<i>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.</i>	As above. The leases are applications with no known impediment to future granting of exploitation rights.
Exploration done by other parties	<i>Acknowledgment and appraisal of exploration by other parties.</i>	Zenith's consultant undertook rock sampling within the region as part of a uranium exploration program to follow-up on information provided by a retired geologist.
Geology	<i>Deposit type, geological setting and style of mineralisation.</i>	Based on the initial site visit and academic papers referenced in this ASX release the geological setting and geochemical association at the Laramie REE project is that of a large scale anorthosite complex. REE elements are hosted within syenite that is part of that complex.
Drill hole Information	<i>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:</i>	No drilling
	<i>o easting and northing of the drill hole collar</i>	
	<i>o elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar</i>	
	<i>o dip and azimuth of the hole</i>	
	<i>o down hole length and interception depth</i>	
	<i>o hole length.</i>	
	<i>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.</i>	
Data aggregation methods	<i>In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.</i>	No high-grade cutting
	<i>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.</i>	No aggregation used



Data aggregation methods - continued	<i>The assumptions used for any reporting of metal equivalent values should be clearly stated.</i>	No metal equivalents used.
Relationship between mineralisation widths and intercept lengths	<i>These relationships are particularly important in the reporting of Exploration Results.</i>	No drilling
	<i>If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.</i>	No drilling
	<i>If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').</i>	No drilling
Diagrams	<i>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.</i>	Refer to descriptions and diagrams in body of text
Balanced reporting	<i>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.</i>	All results reported on Figure 2.
Other substantive exploration data	<i>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.</i>	No other meaningful or material exploration data to be reported at this stage
Further work	<i>The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).</i>	Detailed geological mapping and sampling is planned.
	<i>Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.</i>	Refer to figures in body of report.