PENSANA
RARE
EARTHS

21 December 2020

High grade rare earths confirmed at Coola

Pensana Rare Earths Plc (LSE: PRE, ASX: PM8) is pleased to report high grade rare earths in soils from the first sampling programmes completed at its 7,500 square kilometre Coola Project located 16 kilometres north of its flagship Longonjo project in Angola. Also reported is the appointment of accomplished economic geologist Grant Haywood as Exploration Manager together with an update on recent site activities at the Longonjo.

- Assay results received from soil sampling over the Coola carbonatite identify a high tenor soil anomaly up to 4.69% REO extending over a 1.3 x 1.4 kilometre area.

- The highest REO values lie over the 3.2 kilometre perimeter of the carbonatite ring structure and are coincident with an outcropping circular carbonatite dyke.

- The centre of the 1.2 kilometre diameter ring structure is anomalous in REO in soils despite lying beneath thick soil cover, which could partially mask a soil response.

- An area of outcropping fluorspar mineralisation located 300 metres south of the ring structure is also associated with anomalous soils to 2% REO.

- The Company plans to drill test these defined targets in 2021.

Further assay results are expected shortly from soil sampling completed over the Monte Verde alkaline complex.

Meanwhile, on site at the Company's flag ship Longonjo NdPr Project just to the south, a large diameter drilling programme has been successfully completed. 100 tonnes of mineralisation from the areas of proposed first mining will provide feed

for the further optimisation and pilot plant programmes of the expanded processing operations in Angola and the UK.

The drilling, using a large diameter drill rig, was successful in quickly and efficiently obtaining over 170 tonnes of mineralisation from surface to 24 metres depth.

REO = rare earth oxides

NdPr= the magnet metal rare earths neodymium and praseodymium

Chief Operating Officer Dave Hammond commented:

"These high grade rare earth assays are a great start, from what is only the first of several exploration targets for critical technology metals identified within the new Coola Project. Results confirm a rare earth mineralised carbonatite at Coola that is now sufficiently well-defined for drill testing. Drilling will also determine if rare earth mineralised carbonatite lies beneath the soil cover in the central part of the one kilometre diameter volcanic pipe.

It is great to have Grant join us and lead the team going forward with his extensive experience in the evaluation of rare earth deposits and a whole range of other commodities.

Assay results from soil sampling at the Monte Verde carbonatite – alkali complex are expected shortly and sampling of the Sulima Complex target will commence early next year.

The drilling programme at Longonjo was efficiently and successfully executed under Grant's supervision and 100 tonnes of the mineralisation is now on its way to Perth."

Authorised by the Board of Pensana Rare Earths Plc

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Technical Report

The Coola Project

The Coola Project lies just 16 kilometres north of the Company's Longonjo rare earth development project. Pensana has identified several carbonatite and alkaline complexes within Coola with geological prospectivity for critical technology metal commodities that could complement future NdPr rare earth production from Longonjo.

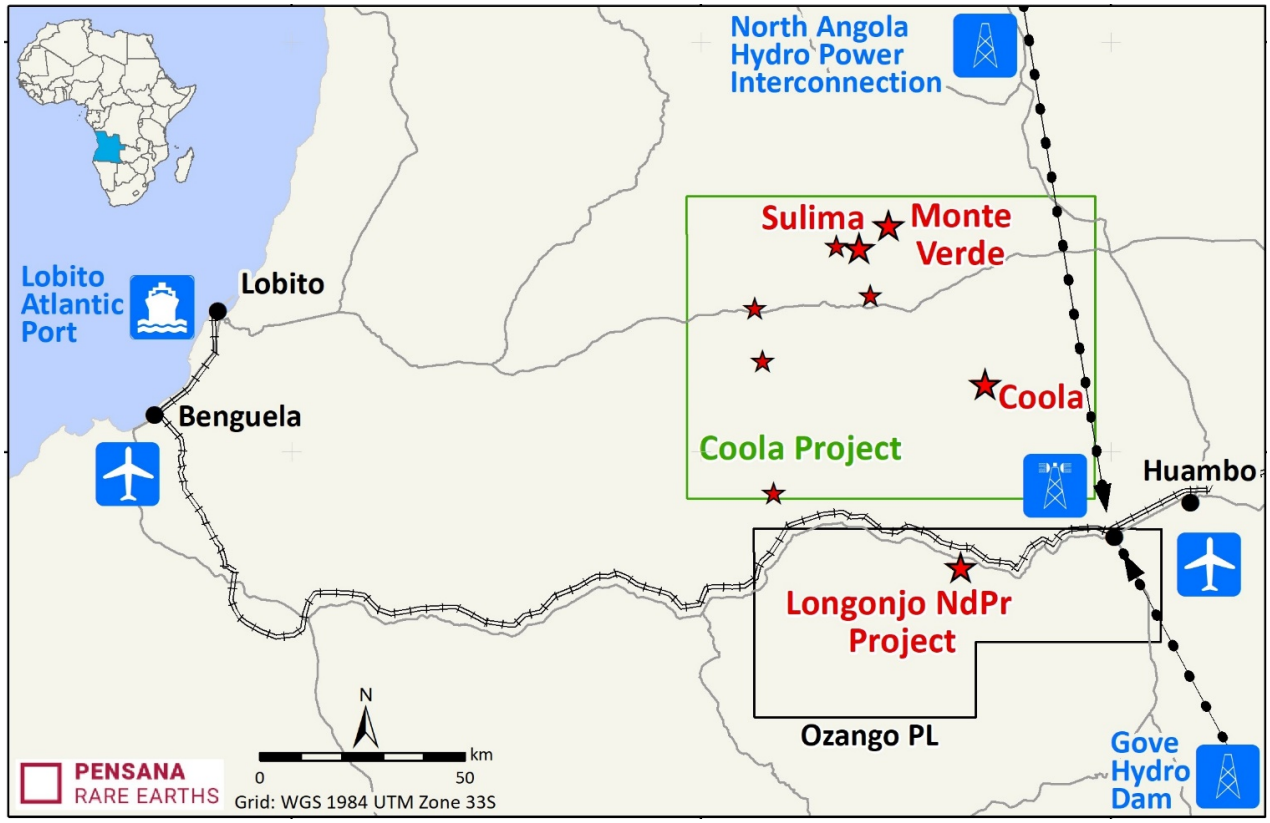

Figure 1: Location of the new Coola Licence and known mineralised carbonatites and other alkaline complexes prospective for critical technology metals. Coola lies adjacent to Pensana's Longonjo Project and established modern infrastructure

Systematic soil sampling and geological mapping programmes were completed over two geological targets in October and assay results from the first, the Coola Carbonatite itself, have now been received.

The Coola Carbonatite forms part of a larger 6 kilometre x 2.5 kilometre multi-centre volcanic system and associated fenite alteration. Previous academic work identified rare earth enrichment to 3.64% REO from limited rock sampling (Alberti et al., 1999)[2].

[2] *Alberti A. et al., 1999: Geochemical characteristics of Cretaceous carbonatites from Angola, Journal of Earth Sciences.*

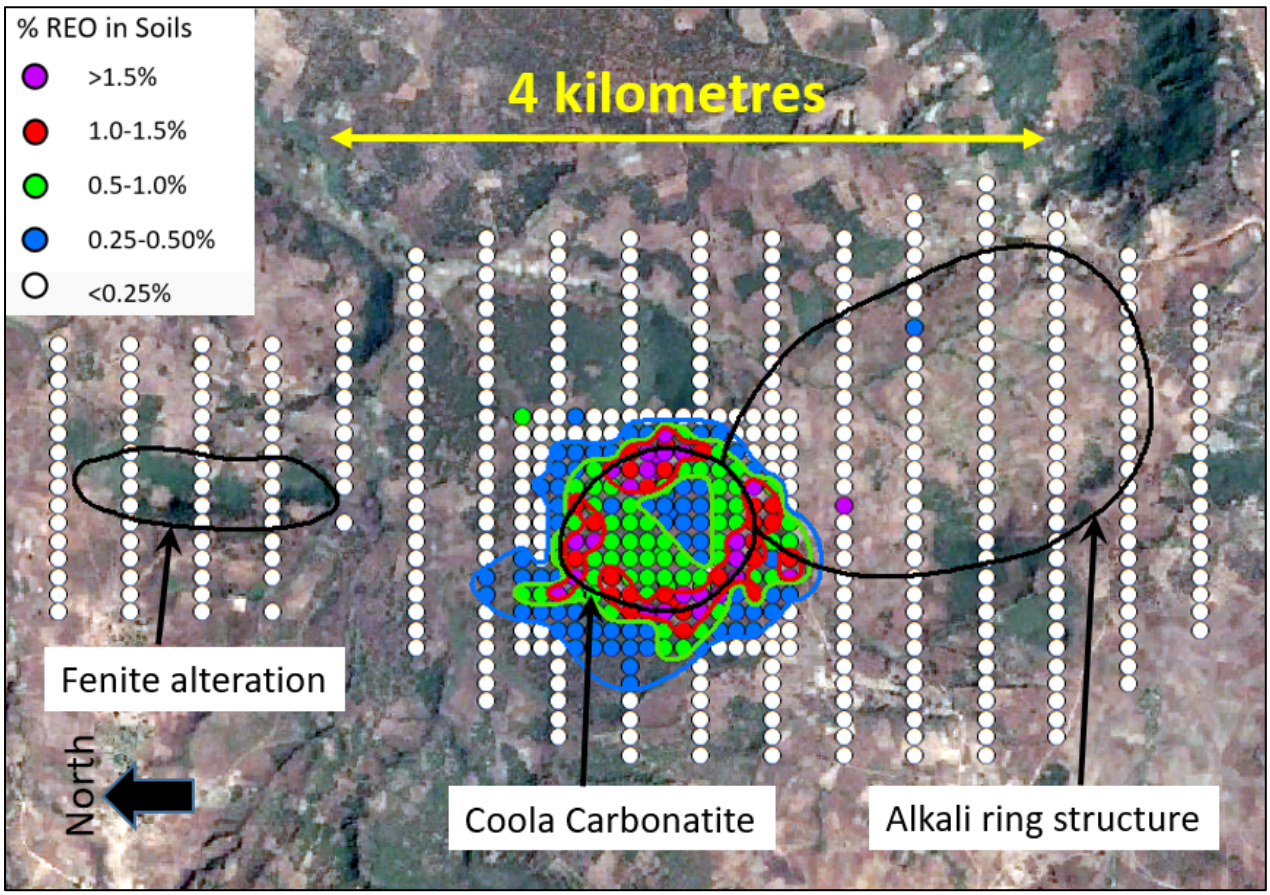

Figure 2: Plan view of Coola carbonatite – alkali complex. High tenor rare earth in soils anomalism extends over the circular carbonatite part of the multi – centre volcanic complex

Assay results received from the soil sampling programme show a high tenor rare earth in soils anomaly extends over a wide area.

Soils contain up to 4.69% REO over an outcropping carbonatite ring dyke system that forms part of the 1.2 kilometre diameter Coola Carbonatite (Figure 2). The central part of this circular volcanic structure lies entirely beneath thick soil cover. Several 3 metre deep pits were excavated in the central area but failed to reach bedrock, so the potential for additional prospective carbonatite and the mineralisation potential remains unknown. Assay results from vertical channel samples of the pits are awaited.

Outcropping fluorspar mineralisation has been located within the Coola complex during the geological mapping (Figure 3). As well as being listed as a critical commodity and having direct economic potential in its own right, fluorspar is also a positive indicator of the potential for additional technology metals in this

geological setting. Assay results from rock samples of fluorspar mineralisation are also awaited.

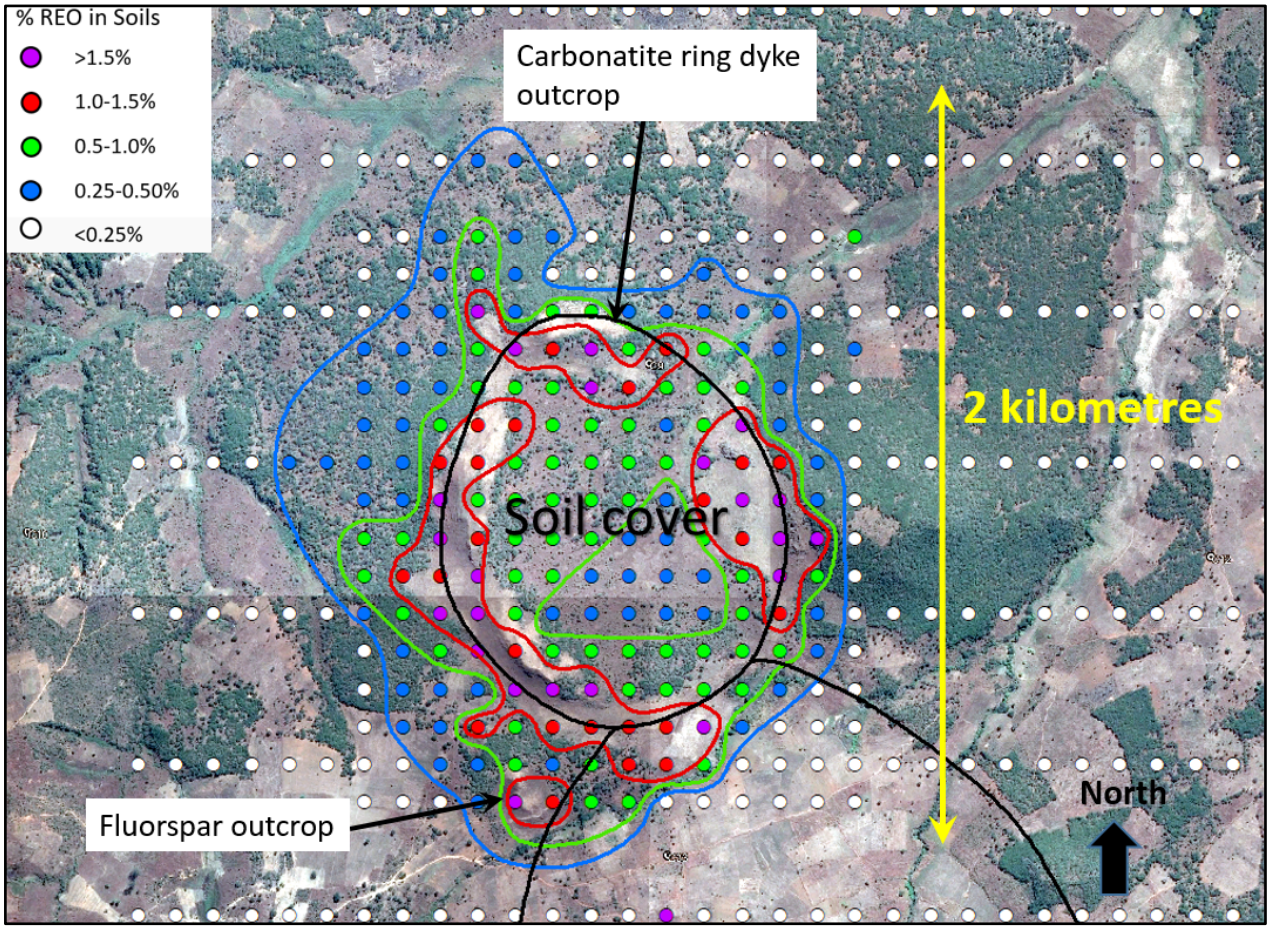

Figure 3: High tenor rare earth in soils anomalism over the outcropping carbonatite ring dyke and the soil covered interior to the circular mineralised volcanic feature at Coola

As at Longonjo, the carbonatite associated rare earth anomalism at Coola is also accompanied by highly elevated levels of phosphorous, barium, iron, manganese, niobium, strontium and zinc.

An additional soil sampling programme has been completed over the Monte Verde alkali – carbonatite complex and assay results are expected shortly. Geological mapping and sampling of the large, twin centre Sulima alkali complex is planned for early 2021. A stream sediment sampling programme and geological reconnaissance of a series of geophysical anomalies has commenced and will continue

The company looks forward to providing further updates on these exploration programmes, as well as plans to drill test the Coola rare earth anomalies and the outstanding assay results from the Monte Verde soil sampling as they are received.

Grant Hayward appointed Exploration Manager

The Company is pleased to welcome Mr Grant Hayward as Exploration Manager.

Grant is an accomplished economic geologist and manager with extensive experience in the exploration for and evaluation of rare earth and associated commodities including phosphate, fluorspar and niobium. He has been involved with the evaluation of carbonatites in South Africa, Malawi, Namibia, Mozambique, Uganda, Zimbabwe and Tanzania as well as in a range of other commodities and geological styles including platinum, gold, base metals, graphite and industrial minerals. He has lead several resource definition programmes to NI43-101 compliant resources including the Zandskopdrift rare earth carbonatite project in South Africa.

Grant was on site at Longonjo recently to supervise the bulk sample drilling programme and is exceptionally well qualified to lead the geological team in Longonjo development works and Coola exploration going forward.

Longonjo bulk sample drilling programme

Technical programmes to support the feasibility and detailed engineering studies for the development of Longonjo and a UK based rare earth refinery have continued on site with a large diameter drilling programme concluded in early December.

The drilling was completed to provide feed for the further optimisation and pilot plant programmes for the Company's expanded strategy of mining and processing operations in Angola and a UK refinery.

A total of 15 drill holes were completed using a specialised large diameter drill rig to provide representative bulk samples of weathered zone mineralisation from surface to 24 metres depth.

Figure 4: large diameter drill rig in operation, December 2020

100 tonnes of mineralisation from the areas of proposed first mining is being shipped from site through the port of Lobito to the Company's test facilities in Perth, Australia.

Figure 5: Some of the bulk drill samples of mineralisation at Longonjo camp ready for loading and shipment to Perth, Australia

The Company expects to report the Wood Group study of the Angolan based mine and processing plant and establishment of a UK rare earth refinery in January 2021.

Competent Persons Statement

The information in this report that relates to geology, exploration results and prospectivity is based on information compiled and/or reviewed by David Hammond, who is a Member of The Australasian Institute of Mining and Metallurgy. David Hammond is the Chief Operating Officer of the Company. He has sufficient

experience which is relevant to the style of mineralisation and type of deposit under consideration and the activity which he is undertaking to qualify as a Competent Person in terms of the 2012 Edition of the Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves. David Hammond consents to the inclusion in the report of the matters based on his information in the form and contest in which it appears.

APPENDIX

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.*	• Soil samples are -180# sieved soils collected from below 30 centimetres depth.
	• *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.*	• Soils: surface soil is removed before sampling at 30 centimetre depth to minimise contamination from recently transported material. • A larger soil sampling of approximately 5 kilogrammes is sieved to -180# to remove coarse rock fragments and give a consistent sample
	• *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.*	• No drilling has been completed • Sieved soil samples are split to produce a 25g charge for assay • Samples are assayed at for Ag, Al, As, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Fe, Ga, Gd, Hf, Ho, In, K, La, Li, Lu, Mg, Mn, Mo, Na, Nb, Nd, Ni, P, Pb, Pr, Rb, S, Sb, Sc, Se, Sm, Sn, Sr, Ta, Tb, Te, Th, Ti, Tl, Tm, U, V, W, Y, Yb, Zn, Zr, by mixed acid digest followed by ICP analysis at Nagrom laboratories, Perth, Western Australia. • All commercial laboratories used use industry best practise procedures and QAQC checks.
Drilling techniques	• *Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• No drilling is reported

Criteria	JORC Code explanation	Commentary
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• No drilling is reported
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 chip samples are geologically logged • Samples are not used for Mineral Resource estimation • Logging is qualitative

Criteria	JORC Code explanation	Commentary
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 core drilling is reported • The preparation of samples follows industry practice. This involves oven drying of the full 150g soil sample, pulverising to 95% passing 75 micron and splitting to a 100g sample pulp. • Field duplicates, certified reference standards and blanks were inserted at random but on average every 27 samples for each as part of Pensana QAQC protocols as per industry best practise. Laboratories also have and report internal QAQC checks including assay and preparation duplicates • The sample sizes are considered more than adequate for this disseminated style and grainsize of material sampled. Repeatability of assays is good.

Criteria	JORC Code explanation	Commentary
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.*	• The analysis was carried out by an accredited independent assay laboratory. • Samples are assayed at for Ag, Al, As, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cs, Cu, Dy, Er, Eu, Fe, Ga, Gd, Hf, Ho, In, K, La, Li, Lu, Mg, Mn, Mo, Na, Nb, Nd, Ni, P, Pb, Pr, Rb, S, Sb, Sc, Se, Sm, Sn, Sr, Ta, Tb, Te, Th, Ti, Tl, Tm, U, V, W, Y, Yb, Zn, Zr, by mixed acid digest followed by ICP analysis at Nagrom laboratories, Perth, Western Australia.
	• *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.*	• The assay technique is total. • Laboratory data only. No geophysical or portable analysis tools were used to determine assay values stored in the database.
	• *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	• Certified reference materials (CRM's) – standards and blanks - were submitted at random with the field samples on an average of 1 of each type every in 27 field samples basis, as well as the laboratory's standard QAQC procedures. • Analysis of QAQC data results indicates acceptable levels of accuracy and precision

Criteria	JORC Code explanation	Commentary
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.*	• All samples are point samples, no intersections
	• *The use of twinned holes.*	• No drilling is reported.
	• *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.*	• Field data was logged onto field data collection sheets and entered into Excel before being uploaded to the main, secure, database in Perth once complete. The data collection package has built in validation settings and look-up codes. All field data and assay data was verified and validated upon receipt. The database is managed by an independent and professional database manager offsite • Data collection and entry procedures are documented and training given to all staff • Scans of original field data sheets are stored digitally and never altered
	• *Discuss any adjustment to assay data.*	• Digital data entry is checked and validated against original field sheets if not entered directly • Laboratory assay data for rare earths is received in element form and converted to oxides for the reporting of rare earth results using molecular weight conversion and the oxide states factors: La to La_2O_3 – 1.1728 Ce to CeO_2 – 1.2284 Pr to Pr_6O_{11} – 1.2082 Nd to Nd_2O_3 – 1.1664 Sm to Sm_2O_3 – 1.1596 Eu to Eu_2O_3 – 1.1579 Gd to Gd_2O_3 – 1.1526 Tb to Tb_4O_7 – 1.1762 Dy to Dy_2O_3 – 1.1477 Ho to Ho_2O_3 – 1.1455 Er to Er_2O_3 - 1.1435 Tm to Tm_2O_3 – 1.1421 Yb to Yb_2O_3 – 1.1387 Lu to Lu_2O_3 - 1.1371 Y to Y_2O_3 – 1.2699

Criteria	JORC Code explanation	Commentary
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.*	• No drilling is reported • Rock and soil samples are located using a hand held GPS with an observed accuracy of +/-5 metres • The grid system used is WGS84 UTM Zone 33S. All reported coordinates are referenced to this grid.
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.*	• Soil samples are collected along a single east west traverse at approximately 100 metre intervals. Soil sample traverses range from 100m spacing over the Coola Carbonatite to 400m spacing north – south elsewhere. • The data is not designed to support a Mineral Resource estimate • No sample compositing is applied
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.*	• The soil sampling traverses are orientated optimally and cross the longitudinal axis of the Coola north – south alkali system at 90 degrees and is a square grid over the circular carbonatite to give an unbiased sample pattern. • No drilling is reported

Criteria	JORC Code explanation	Commentary
Sample security	• *The measures taken to ensure sample security.*	• Sample security is managed by the Company. After collection in the field the samples are stored at camp in locked sea containers. • A customs officer checks and seals the samples before transportation by the Company directly to the preparation laboratory. The preparation laboratory submits the samples to the assay laboratory by international air freight – the samples again being inspected by customs and sealed prior to despatch. • The laboratories audit the samples on arrival and reports any discrepancies back to the Company. No such discrepancies occurred.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• No external audit has been completed. The database is compiled by an independent consultant and is considered by the Company to be of sufficient quality to support the results reported. In addition, from time to time, the Company carries out its own internal data audits.

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.*	• Prospecting License 059/02/01/T.P/ANG – MIREMPET/2020 covers an area of 7,456 square kilometres. Pensana holds a 90% beneficial interest in the licence with two Angolan partners each holding 5%. The licence was granted for a period of two years, renewable to 7 years. • The concession is in good standing and no known impediments exist.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Academic research workers named in the text have completed limited rock sampling and geological mapping at Coola.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• The targets tested consist of alkaline-carbonatite volcanic and / or intrusive centres and associated fenite alteration forming ring structures several kilometres in diameter. • These geological features are prospective for disseminated heavy rare earth (HREE); light rare earth (LREE); niobium; fluorspar; phosphate / phosphorus, hafnium, tantalum and scandium mineralisation.

Criteria	JORC Code explanation	Commentary
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* ○ *easting and northing of the drill hole collar* ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* ○ *dip and azimuth of the hole* ○ *down hole length and interception depth* ○ *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	• No drilling is reported

Criteria	JORC Code explanation	Commentary
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.* • *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 grade cuts are applied • No intersections are reported and no data aggregation is applied • No metal equivalent values have been used for the reporting of these exploration results.
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 (e.g. 'down hole length, true width not known').*	• No drilling or intersections are reported. Results are point samples

Criteria	JORC Code explanation	Commentary
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.*	• Appropriate plans are included in this release.
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.*	• All new exploration results are reported.
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.*	• Geological descriptions are included in the text of the alkaline – carbonatite systems investigated • No exploration data is excluded

Criteria	JORC Code explanation	Commentary
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).*	• Systematic gridded soil sampling programmes have been completed at the Coola and Monte Verde carbonatite – alkali complexes and assay results are awaited from Monte Verde. • Wide spaced soil sampling is planned at Sulima. • Regional stream sediment sampling and geological reconnaissance has just commenced over the wider region of the licence area • Geological mapping and rock sampling will accompany the regional sampling. • Trenching and drilling programmes will be implemented to test priority targets once assay data from the above programmes is received • Drilling is planned at Coola to test the high tenor soil anomalies, outcropping fluorspar mineralisation and soil covered c entre of the Coola Carbonatite
	• *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• Appropriate diagrams accompany this release.