ASX Announcement **23 March 2023**

Amended Announcement

As requested by the ASX, Southern Hemisphere Mining Limited ("Southern Hemisphere" or "the Company") (ASX: SUH) attaches an amended version of its announcement of 22 March 2023, titled, "Leach Amenability Test-Work Completed – Los Pumas Project" which now includes a JORC Table 1 as per Listing Rule 5.7 and the JORC Code.

Authorised for release by the Board.

On Behalf of the Board

Keith Bowker
Company Secretary

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ASX Announcement **22 March 2023**

First Stage Leach Amenability Test-Work Completed - Los Pumas Manganese Project

Highlights:

- **Los Pumas ore suitable for HPMSM for the battery metals market.**
- **Los Pumas ore achieved ~99% extraction of manganese under "standard" leach conditions, producing a leach solution containing 80 g/L manganese.**

Southern Hemisphere Mining Limited ("Southern Hemisphere" or "the Company") (ASX: SUH) reports that Mn Energy Ltd ("Mn Energy"), a specialist manganese processing company, has completed the first stage leach amenability test-work on ore provided from the Company's wholly owned Los Pumas Manganese Project, with excellent results.

Natalie Dawson, The lead director on the Los Pumas Manganese Project said, "*it is a great opportunity to combine Mn Energy's patented technology with the Company's wholly owned Los Pumas Project to extract more manganese more efficiently. Given the projects location and surrounding infrastructure, the Los Pumas Manganese Project should start attracting interest from those within the electric vehicle industry".*

The leach amenability test-work determined that the Los Pumas manganese ore was suitable for High Purity Manganese Sulphate Monohydrate ("HPMSM") for the battery metals market.

The Los Pumas ore achieved ~99% extraction of manganese under "standard" leach conditions, producing a leach solution containing 80 g/L manganese.

Of interest, as well as manganese extraction were no deleterious elements that would be cause for concern in future stages.

The Mn Energy HPMSM production process is a significant improvement on current HPMSM operations, as it has six fewer processes in the stream, as well as other efficiencies.

Compared to the flowsheet for Los Pumas as published to ASX on 6 October 2021, the Mn Energy approach, illustrated below, incorporates significant changes including the removal of the roasting step, reduction in the number of PLS purification processes and removal of the electrowinning step. The potential benefits of this approach include reduced energy and reagent requirements.

This has a significant positive outlook on the project economics as:

1. Lower grade ore is potentially viable; noting that Los Pumas also has a large low grade indicated and inferred resource of 264mt @ 2.4% Mn (resource published ASX 10 May 2010 – Coffey Mining).
2. End product HPMSM is transported (minimal waste and associated costs vs a 38% Mn concentrate per a conventional manganese mine).
3. Lower Capex as 6 fewer processes to build in the plant and related Opex reduction.

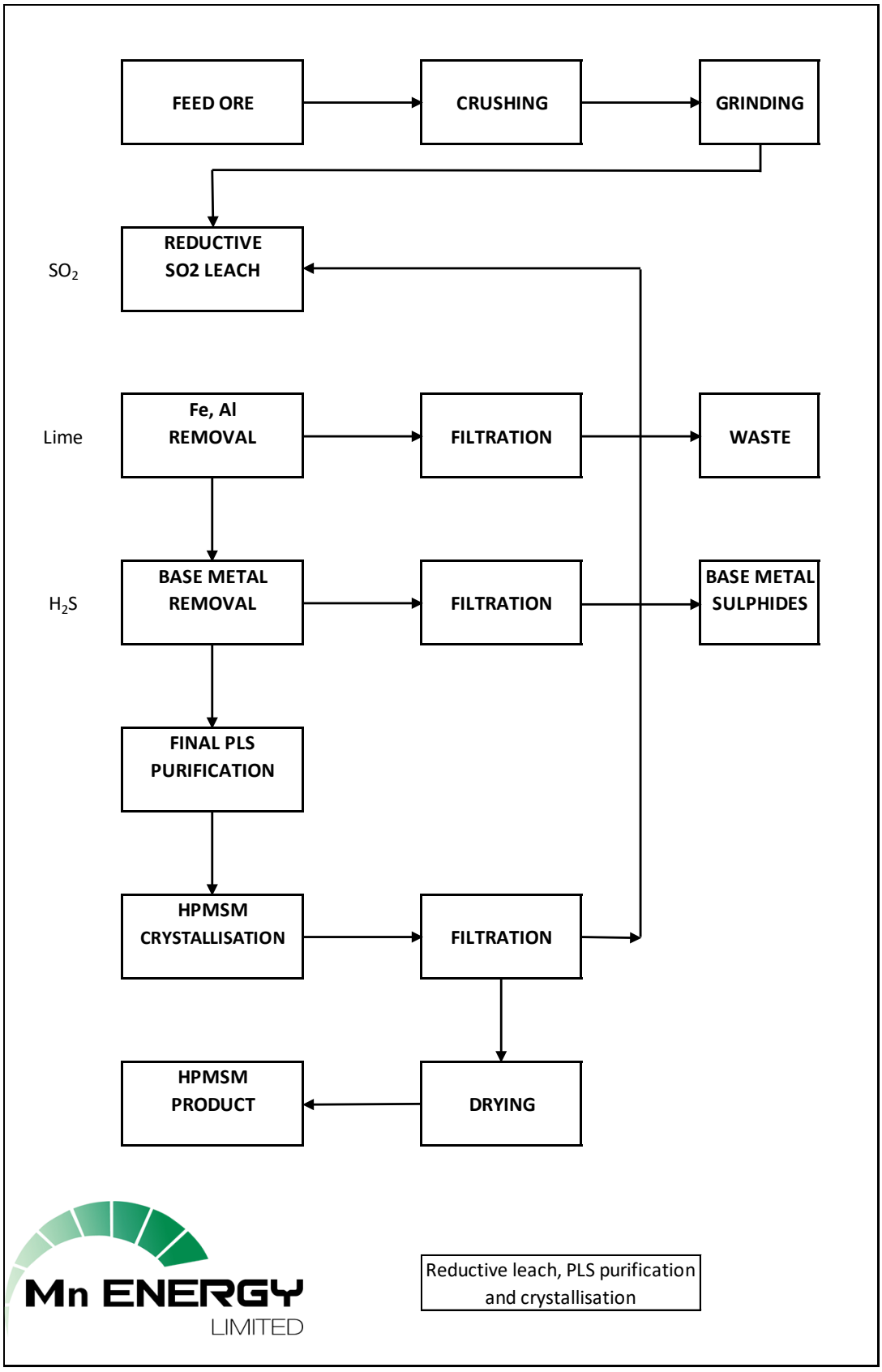

Figure 1: Los Pumas HPMSM Manufacture Indicative Flowsheet using Mn Energy Process

The location of the Los Pumas Manganese Project is also highly advantageous from a carbon footprint perspective:

1. Close to the Chapiquina Hydroelectric Power Plant ~55km via the town of Putre.
2. 175km from the port city of Arica – La Paz railway line passes next to the project.
3. Elevation is advantageous for added solar power options.
4. The town of Putre is 35km away for workers, logistics and equipment support.

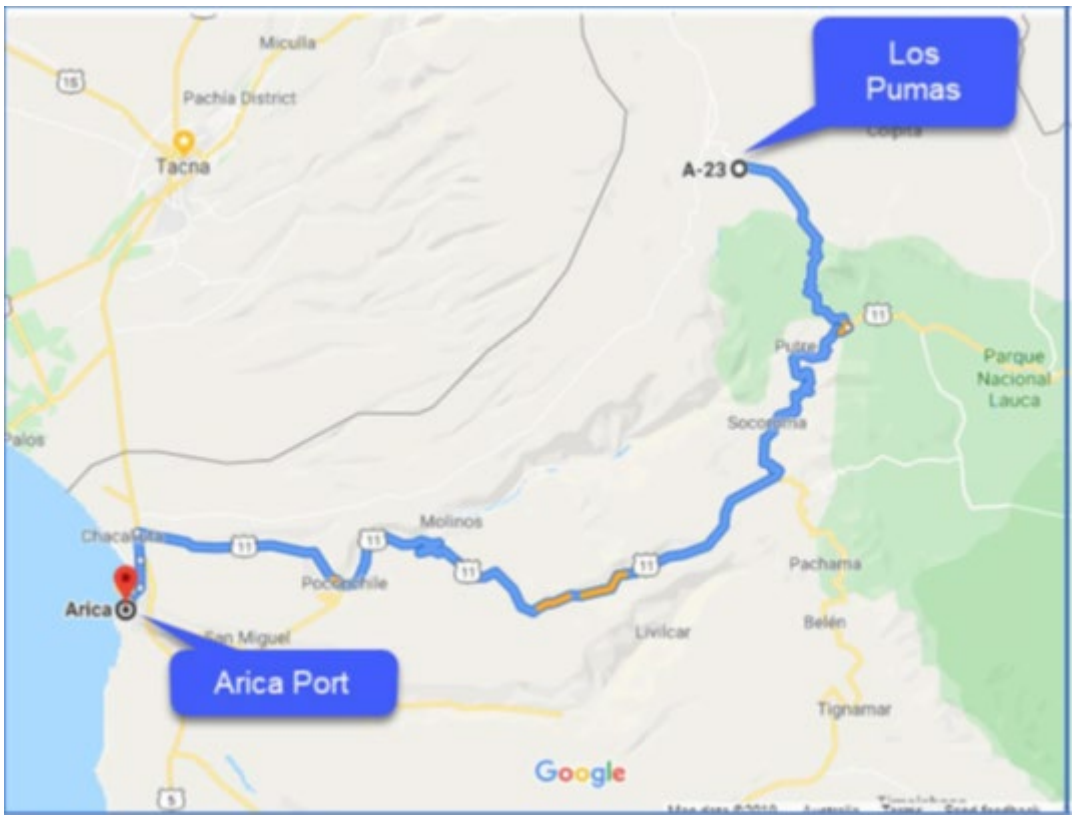

Figure 2: Los Pumas Manganese Project location

Figure 3: Train on the Arica – La Paz Railway

The next stage of work on the Los Pumas Project is processing with the focus on marketing to downstream partner(s)/ offtake/ JV in the battery metals industry. The Chilean government has recently announced its intention to promote the development of related mining and downstream industries.

Approved by the Board for release.

Natalie Dawson
Lead Director on Los Pumas Manganese Project

CONTACTS:
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BACKGROUND INFORMATION ON SOUTHERN HEMISPHERE MINING:

Southern Hemisphere Mining Limited is an experienced minerals explorer in Chile, South America. Chile is the world's leading copper-producing country and one of the most prospective regions of the world for major new copper discoveries. The Company's projects include the Llahuin Porphyry Copper-Gold Project, the Colina 2 Gold/Copper prospect near Llahuin, and the Los Pumas Manganese Project, all of which were discovered by the Company.

Los Pumas Manganese Project: Total Measured and Indicated Resources - JORC (2004) Compliant. As announced to the market on 25 March 2011.

Resource (at 4% Mn cut-off)	Tonnes Millions	Mn %	SiO_2 %	Fe_2O_3 %	Al %	K %	P %
Measured	5.27	7.39	57.85	2.78	5.62	2.88	0.05
Indicated	13.06	7.65	55	2.96	5.64	2.92	0.05
Measured plus Indicated	**18.34**	**7.58**	**55.82**	**2.91**	**5.62**	**2.91**	**0.05**
Inferred	5.39	8.59	51.44	2.72	5.49	2.69	0.06
Total	**23.73**	**7.81**					

Metallurgical studies have demonstrated greater than 38% Mn concentrates are achievable by DMS with low impurities and high silica product.

In relation to the above resources, the Company confirms that it is not aware of any new information or data that materially affects the information in the announcements, and all material assumptions and technical parameters in the announcements underpinning the estimates in the relevant market announcement continue to apply and have not materially changed.

COMPETENT PERSON / QUALIFIED PERSON STATEMENT:

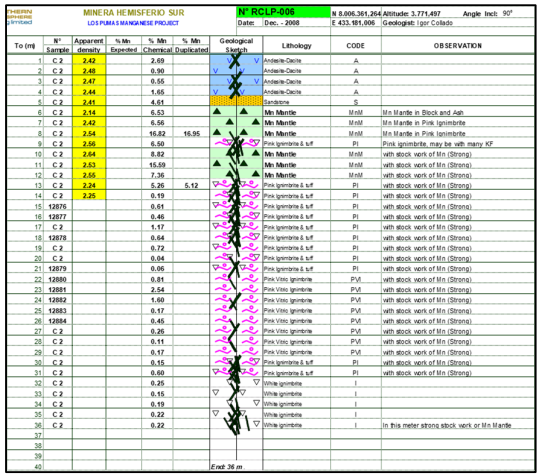
The information reported herein that relates to testing manganese ore is based on information compiled by or under the supervision of Mr Mike Kitney of Mn Energy Limited, WA. Mr Kitney is registered as a Fellow of The Australasian Institute of Mining and has sufficient experience which is relevant to the mineral processing procedures under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the JORC Code 2012 Edition. Mr Kitney consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

JORC Code, 2012 Edition – Table 1 Los Pumas Project

Section 1 Sampling Techniques and Data

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

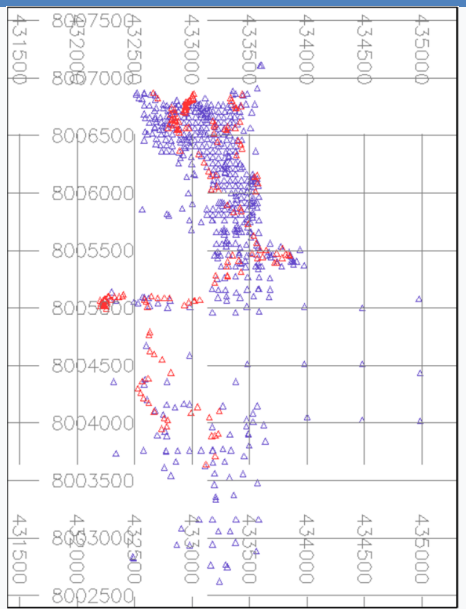
Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). 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.*	*4 techniques have been carried out, depending on the type of sampling* ***Diamond Drill Holes*** *Drill core was marked up on geological intervals, but with intervals not exceeding 1m in length. The core was then cut in half using a diamond core saw. Half the core sample was taken and broken up and submitted to the laboratory for analysis, whilst the remaining ½ core has been stored for future reference. The core were photographed.* ***Reverse Circulation Drill Holes =*** *RCH samples were taken on 1m downhole intervals and split to 5kg using a riffle splitter. The 5kg samples were then sieved with the residual coarse RC chips stored in a chip tray for later reference. The chip trays were photographed. The chips were then logged by SHM taking note of the manganese mineralisation and lithology. The bulk reject samples have been retained at the Los Pumas Project.* ***Bulk Surface sampling,*** *chip and chip channel samples of variable weight between 0.5 and 5 kg extracted by hammer and chisel, for different objectives (density, metallurgy, grades, mineralogy).* ***Exploratión Shafts****, Equiprobabilistic extraction samples weighing approximately 5 kg extracted from 'marinas' of vertical work.*
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).*	*The Los Pumas project was drilled in early 2009 with the first hole commencing on the 16th December 2008. A total of 487 holes of RC were completed for 14,204m by July 2010. The company contracted to undertake the drilling was AC Perforations, utilising an Ingersoll Rand reverse circulation drill rig with a 5½" face sampling hammer.* *Additional drilling was undertaken by SHM using diamond core (DC) to allow for metallurgical samples along with bulk density and where applicable infill resource drilling to be completed. 32 diamond drilling (DD) holes were completed for a total of 652.2m. Core was drilled to HQ and NQ size using standard wireline drilling.*

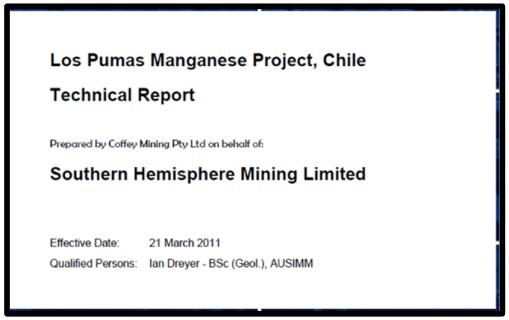
Criteria	JORC Code explanation	Commentary
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	*The RC samples (cutting), coming from the cyclone, are weighed to ensure that the recovery is acceptable. Theoretical Weight = π r2 (perforation radius x rock density x length (1 m).* *The DDH samples (core), are measured for their length and compared with the data from the drilling report* *The average recovery in diamond drilling (cores) is over 90%, there are no major structures (faults) that could reduce recovery. On the other hand, the recoveries from reverse circulation drilling (cutting) average over 80%, due to the loss of fine material and less than 80% when the drilling intersects water tables.*
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.*	*The RC and DDH drill samples are preliminary mapped in the field (quick log), using a simple format that includes estimated grade, lithology and main geological features. All RC and diamond were logged in entirety* *The previous samples are subsequently logged according to the following format*  *Surface samples are also described and include the following geological features = mineral body typology (ignimbrite mantle, conglomerate mantle, feeder); Lithology, occurrence Ore (matrix/cement, impregnation, massive); texture/structure.*

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.*	*Some core has been used for metallurgical and bulk density testwork. In these cases, ¼ core remains. The core is stored in a warehouse at Hotel Vicuñas in Putre, near the Los Pumas Project, and a few boxes, are stored in Andes Analytical Assay Limitada (AAA) Lab at Arica City.* *Drill core was marked up on geological intervals, but with intervals not exceeding 1m in length. The core was then cut in half using a diamond core saw. Half the core sample was taken and broken up and submitted to the laboratory for analysis. RC samples were taken on 1m downhole intervals and split to 5kg using a riffle splitter.*
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.*	*After sample preparation, 50g pulps were sent by air to the AAA laboratory in Santiago. This laboratory has an ISO 9001:2008 certification for quality management systems. The samples were then analysed by four acid digest (a total digest technique) and ICP AES (analysing for 33 elements). The laboratory certificates for all samples have been obtained from SHM and random checks have been completed on 10 holes to ensure the veracity of the data upload procedures.* Ag PPM, Fe %, S % Al %, Ga PPM, Sb PPM As PPM, K %, Sc PPM Ba PPM, La PPM, Sr PPM Be PPM, Mn PPM, Th PPM Bi PPM, Mn %, Ti % Ca %, Mo PPM, Tl PPM Cd PPM, Na %, U PPM Co PPM, Ni PPM, V PPM Cr PPM, P PPM, W PPM Cu PPM, Pb PPM, Zn PPM ***QAQC*** ***Standard Data*** *No independent or client generated certified standards have been included in the assay methodology by SHM. Coffey Mining recommends*

Criteria	JORC Code explanation	Commentary
		that in future SHM submit certified manganese standards at a rate of 5% of the total samples to ensure laboratory accuracy. ***Field Duplicate Data*** *Field duplicates were prepared in the field (1 in 20 or 5%) by passing the bulk RC 1m sample through the splitter to produce a second 5kg sample. This was then sent to the laboratory to be prepared and analysed in the same manner described. The results were analysed by Coffey Mining and are presented in Figure 14.2.2_1 below and show excellent precision which suggests that the current sample reduction methodology is adequate.* ***Laboratory Duplicate Data*** *No laboratory pulp duplicate data are available from AAA laboratory.* ***Blanks*** *A total of 22 blank samples were sent to AAA laboratory. The results were reviewed by Coffey Mining and are presented in Figure 14.2.4_1 below. Coffey Mining recommends that in future an increased number of blanks are submitted to assess laboratory processes at a submission rate of 1 in 20 samples.* ***Umpire Assays*** *A total of 58 pulp samples were sent to ALS Chemex in La Serena for analysis by four acid ICP-AES (and by AAS for Mn >10%). These are pulps that have been processed by AAA laboratory and then forwarded to ALS Chemex.* *ALS submitted 1 standard, one blank and one pulp duplicate as part of the ALS internal QAQC program. Coffey Mining reviewed the ALS QAQC report and noted no issues with the internal QAQC.* *The umpire assay results were analysed by Coffey Mining and are presented in Figure 14.2.5_1 below. The results are that AAA show a low relative bias to the ALS results. Coffey recommends that client standards are submitted to both ALS and AAA in sufficient quantities that a comparison can be completed between the results of each laboratory. Coffey recommends that the insertion rate of standards to the umpire laboratory be significantly increased from the rate recommended in Section 14.2.1 so that a statistically robust dataset is gathered (ideally, more than 100 standards through the umpire laboratory).*

Criteria	JORC Code explanation	Commentary
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	*12 twin holes were drilled to verify grades and geological features.* *Ian Dreyer of Coffey Mining has reviewed the protocols and procedures for unit operations for sampling, chemical analysis, geological logging, QA/QC and DB data management.* *There have been no adjustments to the assay data.*
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.*	*The drilling data were established with geodetic topography in Datum PSDat56 Huso 19 S. As the drillholes are vertical and short (25m) no downhole surveys were completed.* *The surface sampling data, in all cases, were established with a GPS explorer on Datum WGS84.* *The project has a surface topography in Datum PSDat56*
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.*	*Holes were mostly drilled to an average 25m depth. Holes were drilled on a spacing of approximately 50m by 50m in north area varying to 200m by 200m in south area. Recent drilling has infilled some pockets of the northern area to 25m x 25m. The data spacing is considered good enough for mineral resource calculation.* *The project has a surface topography in Datum PSDat56*

Criteria	JORC Code explanation	Commentary
		 *Drill Holes and Surface sampling*
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 manganese mineralisation is predominantly horizontal so the mineralised intercepts represent close to the true thickness of mineralisation (vertical drillholes).*
Sample security	• *The measures taken to ensure sample security.*	*The samples were collected and sent to the AAA and ALS laboratories by qualified geologists, Igor Collado and Marco Carrasco, QP CMCH Reg No 0336 and 0400, respectively.*
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	*Coffey Mining de Australia completed an external review and a NI43-101 compliant report.*

Criteria	JORC Code explanation	Commentary
		

Section 2 Reporting of Exploration Results

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

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• The licences which make up the Los Pumas Project are 100% owned by Southern Hemisphere Mining and are in good standing.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• All exploration work on the project has been completed by Southern Hemisphere Mining Ltd. Small scale mining was done by a German company during WW2 who did some trenches and small underground adits. No other exploration work has been done on the project by other parties.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• The primary exploration model associated with the Los Pumas Project is "manto" style mineralisation comprising sub-horizontal, stratabound deposits (or mantos) and their postulated sub-vertical feeder zones. • The manto model involves the introduction of mineralised hydrothermal solutions via steeply dipping feeder zones usually expressed as faults or breccia zones. These solutions then selectively invade and mineralize relatively porous and permeable horizons within the adjacent stratigraphic profile. Where a feeder zone

Criteria	JORC Code explanation	Commentary
		successively intersects a series of permeable horizons within the stratigraphy, stacked mineralised mantos may be developed. These stacked mantos are often characterized by a vertical metal zonation.

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.*
		•

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 data aggregation methods were 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').*	• The Manganese mineralisation at Los Pumas is horizontal or flat lying therefore vertical drillholes would approximate true widths of the mineralisation. In addition the Mn mineralisation is black and the surrounding rocks are either pink or white so it is very easy to visually identify the Manganese.
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 maps and sections have been included in the report
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades*	•

Criteria	JORC Code explanation	Commentary
	and/or widths should be practiced to avoid misleading reporting of Exploration Results.	
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.*	•
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 drilling is planned to test the outcropping mineralisation for grade and thickness.

Section 3 Estimation and Reporting of Mineral Resources

(Criteria listed in section 1, and where relevant in section 2, also apply to this section.)

Criteria	JORC Code explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* • *Data validation procedures used.*	• The database was supplied by Coffey Mining who validated the database previously.
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	•
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	•
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	•

Criteria	JORC Code explanation	Commentary
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.* • *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.* • *The assumptions made regarding recovery of by-products.* • *Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).* • *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* • *Any assumptions behind modelling of selective mining units.* • *Any assumptions about correlation between variables.* • *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	•
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	•
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	•
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.*	•

Criteria	JORC Code explanation	Commentary
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	• Several phases of metallurgical testwork have been completed by Transmin and Mintek for Southern Hemisphere Mining Ltd. Transmin completed Heavy Liquid Separation work on the samples which provided enough data for Mintek to complete pilot plant scale Dense Media Separation testwork which demonstrated a 95% Mn recovery to a 38% Mn concentrate. • Preliminary testing of RC drill hole material was carried out by Mn Energy Ltd to assess amenability of the material to manganese extraction by leaching. Results of this work indicated extraction of up to 99% of contained manganese into a solution containing 80 g/L Mn appears possible.
Environmental factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	• SNC Lavalin produced a PEA report which covered the tailings design and location and an environmental report was prepared by Cedrem Consultores, Macroforest Gestion Ambiental and Minería & Medio Ambiente Ltda to conduct initial and follow up Environment Impact Assessment Reports respectively
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* • *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	• A total of 157 samples were measured for Bulk Density for the previous resource estimate which is considered low so an additional 345 samples were sent for bulk density testing at ASL La Serena using the displacement method which is the dry weight of the sample (grams) divided by the volume of water displaced (cm^3).
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).* • *Whether the result appropriately reflects the Competent Person's*	•

Criteria	JORC Code explanation	Commentary
	view of the deposit.	
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	•
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	•

Section 4 Estimation and Reporting of Ore Reserves

(Criteria listed in section 1, and where relevant in sections 2 and 3, also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	• *Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.* • *Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.*	• Insert your commentary here…
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	•
Study status	• *The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.* • *The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.*	•

Criteria	JORC Code explanation	Commentary
Cut-off parameters	• *The basis of the cut-off grade(s) or quality parameters applied.*	•
Mining factors or assumptions	• *The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design).* • *The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.* • *The assumptions made regarding geotechnical parameters (eg pit slopes, stope sizes, etc), grade control and pre-production drilling.* • *The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).* • *The mining dilution factors used.* • *The mining recovery factors used.* • *Any minimum mining widths used.* • *The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.* • *The infrastructure requirements of the selected mining methods.*	•
Metallurgical factors or assumptions	• *The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.* • *Whether the metallurgical process is well-tested technology or novel in nature.* • *The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.* • *Any assumptions or allowances made for deleterious elements.* • *The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.* • *For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?*	•
Environmen-tal	• *The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.*	•

Criteria	JORC Code explanation	Commentary
Infrastructure	• *The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.*	•
Costs	• *The derivation of, or assumptions made, regarding projected capital costs in the study.* • *The methodology used to estimate operating costs.* • *Allowances made for the content of deleterious elements.* • *The source of exchange rates used in the study.* • *Derivation of transportation charges.* • *The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.* • *The allowances made for royalties payable, both Government and private.*	•
Revenue factors	• *The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.* • *The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.*	•
Market assessment	• *The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.* • *A customer and competitor analysis along with the identification of likely market windows for the product.* • *Price and volume forecasts and the basis for these forecasts.* • *For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.*	•
Economic	• *The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.* • *NPV ranges and sensitivity to variations in the significant assumptions and inputs.*	•
Social	• *The status of agreements with key stakeholders and matters leading to social licence to operate.*	•
Other	• *To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:* • *Any identified material naturally occurring risks.*	•

Criteria	JORC Code explanation	Commentary
	• *The status of material legal agreements and marketing arrangements.* • *The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.*	
Classification	• *The basis for the classification of the Ore Reserves into varying confidence categories.* • *Whether the result appropriately reflects the Competent Person's view of the deposit.* • *The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).*	•
Audits or reviews	• *The results of any audits or reviews of Ore Reserve estimates.*	•
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.* • *It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	•

Section 5 Estimation and Reporting of Diamonds and Other Gemstones

(Criteria listed in other relevant sections also apply to this section. Additional guidelines are available in the 'Guidelines for the Reporting of Diamond Exploration Results' issued by the Diamond Exploration Best Practices Committee established by the Canadian Institute of Mining, Metallurgy and Petroleum.)

Criteria	JORC Code explanation	Commentary
Indicator minerals	• *Reports of indicator minerals, such as chemically/physically distinctive garnet, ilmenite, chrome spinel and chrome diopside, should be prepared by a suitably qualified laboratory.*	• Insert your commentary here…
Source of diamonds	• *Details of the form, shape, size and colour of the diamonds and the nature of the source of diamonds (primary or secondary) including the rock type and geological environment.*	•
Sample collection	• *Type of sample, whether outcrop, boulders, drill core, reverse circulation drill cuttings, gravel, stream sediment or soil, and purpose (eg large diameter drilling to establish stones per unit of volume or bulk samples to establish stone size distribution).* • *Sample size, distribution and representivity.*	•
Sample treatment	• *Type of facility, treatment rate, and accreditation.* • *Sample size reduction. Bottom screen size, top screen size and re-crush.* • *Processes (dense media separation, grease, X-ray, hand-sorting, etc).* • *Process efficiency, tailings auditing and granulometry.* • *Laboratory used, type of process for micro diamonds and accreditation.*	•
Carat	• *One fifth (0.2) of a gram (often defined as a metric carat or MC).*	•
Sample grade	• *Sample grade in this section of Table 1 is used in the context of carats per units of mass, area or volume.* • *The sample grade above the specified lower cut-off sieve size should be reported as carats per dry metric tonne and/or carats per 100 dry metric tonnes. For alluvial deposits, sample grades quoted in carats per square metre or carats per cubic metre are acceptable if accompanied by a volume to weight basis for calculation.* • *In addition to general requirements to assess volume and density there is a need to relate stone frequency (stones per cubic metre or tonne) to stone size (carats per stone) to derive sample grade (carats per tonne).*	•

Criteria	JORC Code explanation	Commentary
Reporting of Exploration Results	• *Complete set of sieve data using a standard progression of sieve sizes per facies. Bulk sampling results, global sample grade per facies. Spatial structure analysis and grade distribution. Stone size and number distribution. Sample head feed and tailings particle granulometry.* • *Sample density determination.* • *Per cent concentrate and undersize per sample.* • *Sample grade with change in bottom cut-off screen size.* • *Adjustments made to size distribution for sample plant performance and performance on a commercial scale.* • *If appropriate or employed, geostatistical techniques applied to model stone size, distribution or frequency from size distribution of exploration diamond samples.* • *The weight of diamonds may only be omitted from the report when the diamonds are considered too small to be of commercial significance. This lower cut-off size should be stated.*	•
Grade estimation for reporting Mineral Resources and Ore Reserves	• *Description of the sample type and the spatial arrangement of drilling or sampling designed for grade estimation.* • *The sample crush size and its relationship to that achievable in a commercial treatment plant.* • *Total number of diamonds greater than the specified and reported lower cut-off sieve size.* • *Total weight of diamonds greater than the specified and reported lower cut-off sieve size.* • *The sample grade above the specified lower cut-off sieve size.*	•

Value estimation	• *Valuations should not be reported for samples of diamonds processed using total liberation method, which is commonly used for processing exploration samples.*
	• *To the extent that such information is not deemed commercially sensitive, Public Reports should include:*
	  ○ *diamonds quantities by appropriate screen size per facies or depth.*
	  ○ *details of parcel valued.*
	  ○ *number of stones, carats, lower size cut-off per facies or depth.*
	• *The average $/carat and $/tonne value at the selected bottom cut-off should be reported in US Dollars. The value per carat is of critical importance in demonstrating project value.*
	• *The basis for the price (eg dealer buying price, dealer selling price, etc).*
		•

Criteria	JORC Code explanation	Commentary
	• *An assessment of diamond breakage.*	
Security and integrity	• *Accredited process audit.* • *Whether samples were sealed after excavation.* • *Valuer location, escort, delivery, cleaning losses, reconciliation with recorded sample carats and number of stones.* • *Core samples washed prior to treatment for micro diamonds.* • *Audit samples treated at alternative facility.* • *Results of tailings checks.* • *Recovery of tracer monitors used in sampling and treatment.* • *Geophysical (logged) density and particle density.* • *Cross validation of sample weights, wet and dry, with hole volume and density, moisture factor.*	•
Classification	• *In addition to general requirements to assess volume and density there is a need to relate stone frequency (stones per cubic metre or tonne) to stone size (carats per stone) to derive grade (carats per tonne). The elements of uncertainty in these estimates should be considered, and classification developed accordingly.*	•