ASX Announcement

Exploration Results and Mineral Resource Estimates

Enclosed is information that is material to understanding the Exploration Results and Mineral Resource estimates following the form laid out in JORC Table 1 for both the Hematite Mineral Resource and the Itabirite Mineral Resource as disclosed in the Prospectus.

Ends-

Authorised for release by the board

Abby Macnish Niven

Company Secretary
Tombador Iron Limited (ASX:TI1)

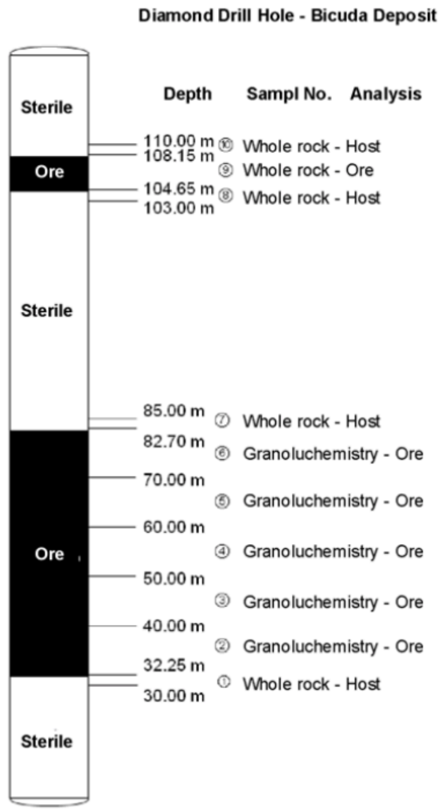
JORC Code, 2012 Edition – Table 1

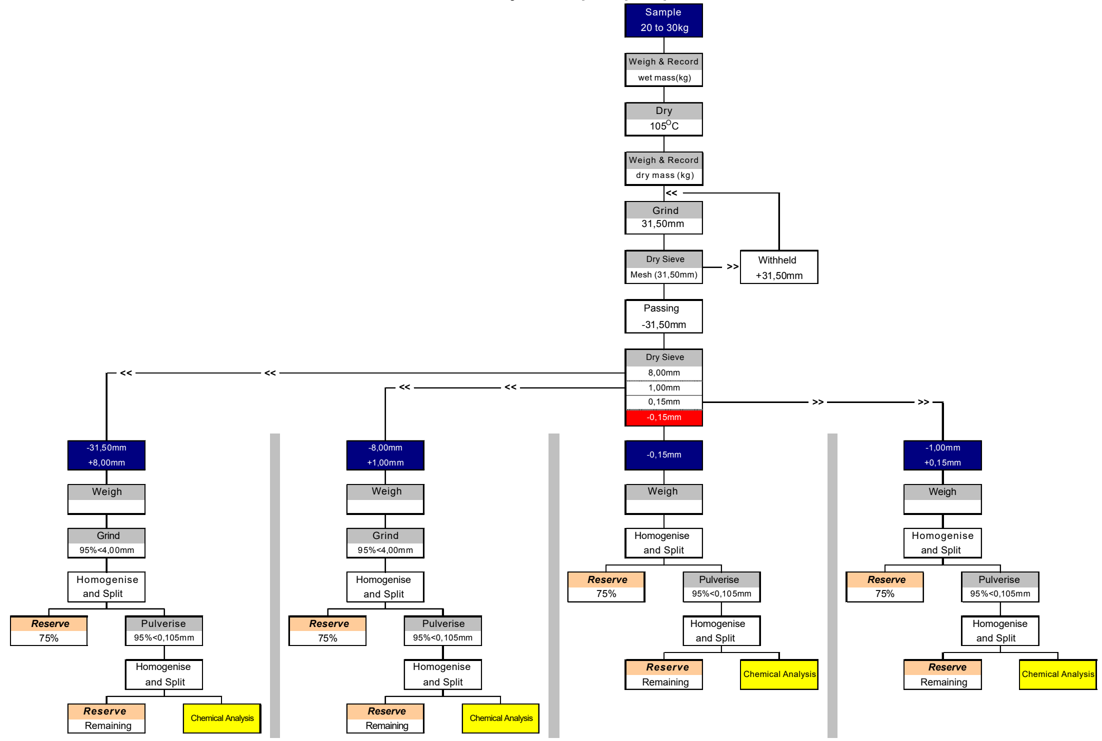
TOMBADOR IRON ORE PROJECT – COMPACT HEMATITE UPDATE

Section 1 Sampling Techniques and Data

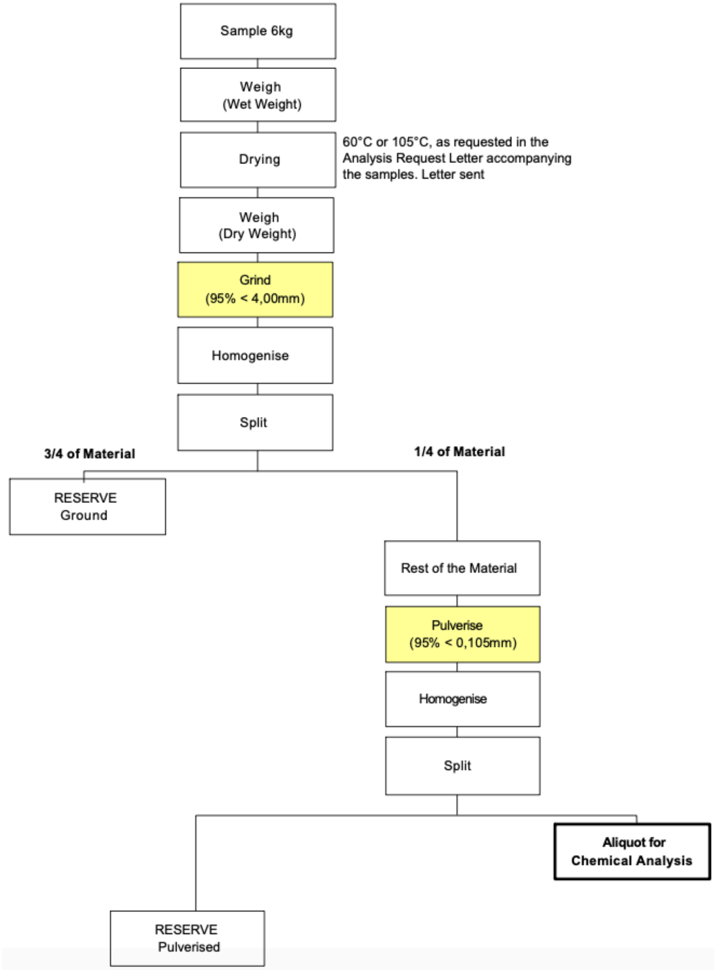
(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code explanation	Commentary
Sampling techniques	• Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc.). These examples should not be taken as limiting the broad meaning of sampling. • Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	• Samples were taken from diamond drillhole HQ core, all drilled material was sampled, nothing being discarded. The holes were all vertical. All drillhole collars were topographically surveyed by total station and drillhole landmarks properly identified. This drill program was undertaken by VALE. Mineralization intervals chosen for splitting of the diamond drilling core was based on geological core description during drill core logging. • A chip sampling plan was prepared to test surficial samples to improve confidence on the hematite resource. During this stage, only the sampling of the HCO (compact hematite) was performed; sampling of the talus was left for a later date. The chips were collected from compact hematite outcroppings. The sampling was planned by the geologists and care was taken to avoid any contamination between neighbouring samples. The chip sampling points that were selected were correlated with the drillholes. Each chip sampling point was characterized according to its geodesic position and the geological description of the area where it was located. Photographs were also taken, and the area was cleared off. In cases where the mass of the samples was greater than that which was chosen to send for granulometric classification, these samples were split in the Jones splitter.
	• Aspects of the determination of mineralization 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 mineralization types (e.g. submarine nodules) may warrant disclosure of	• Industry standard work has been done. All drilling was diamond core drilling, drill core was logged for lithology, structure and magnetism. Core samples (HQ) were sawn in half using a diamond saw. HCO samples were prepared for granulo-chemical analysis due to the existence of hematite with potential to form direct shipping lump ore. Ore samples from half diamond core were collected using a 10 m intervals, (with minimum >5 m and maximum <15 m) obeying lithological and weathering contacts. To ensure a clear definition of the boundaries of mineralised zones, 2m samples of core were collected of the host rock above and below the mineralised intervals (as shown in the diagram below). One half of the material was sent for granulo-chemical analysis to the assay laboratory SGS Geosol - Vespasiano and the remaining half were filed in the purpose built core shed.

Criteria	JORC Code explanation	Commentary
	detailed information.	 Each entire 10m composite sample (20-30kg) was metallurgically tested using granulo-chemical analysis which employs the following method. Coarse crushing and separation of size fractions as follows: ○ 8mm to 31.5mm ○ 1mm to 8mm ○ 0.15mm to 1 mm ○ < 0.15mm Once weighed, each interval was crushed, pulverized, mixed, split and assayed by:

Criteria	JORC Code explanation	Commentary
		• X-Ray fluorescence for the following elements and oxides: Fe, SiO2, P, Al2O3, Mn, TiO2, MgO, CaO, BaO, K2O, Na2O3 & Cr2O3 • Volumetric analysis using potassium dichromate for FeO • Loss on Ignition (LOI) at 1000°C The assays and weights of each size fraction were used to calculate a weighted average assay for the global sample. Granulo-chemical assay sample preparation flow chart  For samples less than five meters a simple total or whole rock analysis was used.

Criteria	JORC Code explanation	Commentary
		Whole Rock sample preparation for flowchart



Criteria	JORC Code explanation	Commentary
Drilling techniques	• Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka,	• All of the Tombador deposit drill holes were HQ sized diamond drill holes. There were 17 diamond drill holes, totalling 2133m near the deposit and 28 holes totalling 3542.7m within the

Criteria	JORC Code explanation	Commentary
	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.).	tenement. The drilling is a subset of the much larger drill program from Colomi (previous owner of the tenement). Diamond holes were undertaken in HQ size (6.35 cm) diameter triple tube.
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 diamond drilling recovery conference (conference is the logging and sampling procedure set up by the Senior geologists) consisted of verifying advance and recoveries recorded in the core boxes and drilling bulletins. For Diamond Drilling, verification was undertaken by measuring with tapeline the core present in the boxes. • Applied recovery control procedure and the recovery values was inside acceptable limits. The hematite was in most cases massive, providing excellent sample recoveries. • Not applied because the core recoveries were inside acceptance limit and the mineralization is massive Hematite grading from 60 to 70% Fe.
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.	• Geotechnical description was performed on all diamond holes where they were classified by geotechnical parameters W (degree of change weathering), R (degree of resistance), spacing of fractures and RQD with degree of detail to one meter. The data was also collected directly onto PDA's using LogMate software. • The author considers that the level of detail is sufficient for the reporting of Exploration Results and for future Mineral Resource Estimation. • Lithological logging is qualitative in nature. Post assaying the lithology was re-classified into a new category called litho assay, prominent within the MS access database. Core is photographed prior to logging when geological codes were applied. Geological Description consisted of defining weathering levels, mineralogical lithological and structural data, in all holes with detail of one meter. • All drillholes were fully logged.
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	• VALE conducted the drilling and collected core samples which were sawn in half before being collected to allow half of the material to be sent for chemical analysis and the remaining half were filed in the core shed. The sampling was planned by the geologists and care was taken to avoid any contamination between neighbouring samples. • Chip samples, from the surface sampling, were split in the Jones splitter. • GAMIK / VALE, Physical Preparation Laboratory located in the CDM in Santa Luzia – MG

Criteria	JORC Code explanation	Commentary
	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.	was responsible for sample preparation. The procedures for sample preparations are defined above in Criteria: Sampling Techniques and the respective flowcharts. • To ensure the accuracy of physical process duplicates were made of the crushed material DP2 on frequency of 1/30, after primary crushing (P 95%< 4 mm) and pulverized material DP3 on frequency of 1/20 after pulverization. • Drill hole sample sizes were considered as appropriate by GE21, and chip sampling procedures has recommendations to future works to review chip sample sizes. • GE21 considers the Vale duplicate sampling to be appropriate for resource estimation JORC 2012. • GE21 deems the sample sizes appropriate to the grain size of the material being sampled.
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 assaying regime is considered to be the standard for the determination of lump Iron. Chemical analyses were conducted in the laboratory of SGS Geosol, Vespasiano-MG, while checking of 5% of the results were made in the laboratory of ALS Chemex. Sample pulps were assayed by X-Ray fluorescence for the following elements and oxides: Fe, SiO2, P, Al2O3, Mn, TiO2, CaO, MgO, BaO, K2O, Na2O and Cr2O3. FeO was also determined by Volumetric analysis using potassium dichromate, and Calcination (LOI) was at 1000 degrees C. The assay preparation technique used: granulo-chemical analysis, performs geochemical analysis by size fraction and the total rock chemical assay is calculated by weighted average of the size fractions. This is a standard technique within the Iron Ore industry for lump ore. • Chemical analysis performed in total rock (samples with insufficient mass for granulo-chemical assay) were the same applied in granulo-chemical samples of Bicuda (Tombador) deposit, that is XRF, Volumetric, and LOI.
	• 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.	• Handheld geophysical tools were not used, sample preparation & assaying was completed within external laboratories • The Loss on Ignition Determination (LOI) at 1000°C was also completed by SGS Geosol and Chemex.
	• 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.	• Quality control tools (standard samples and duplicates) were applied and monitored in chemical analysis performed on SGS Geosol and ALS Chemex laboratories. The quality control was restricted to the elements Al2O3, Fe, MgO, P, Mn, SiO2 and to LOI (lost on Ignition). The monitored parameters were evaluated in each of the following QAQC tools: Field duplicates; crushing duplicates; pulverized duplicates (internal and independent

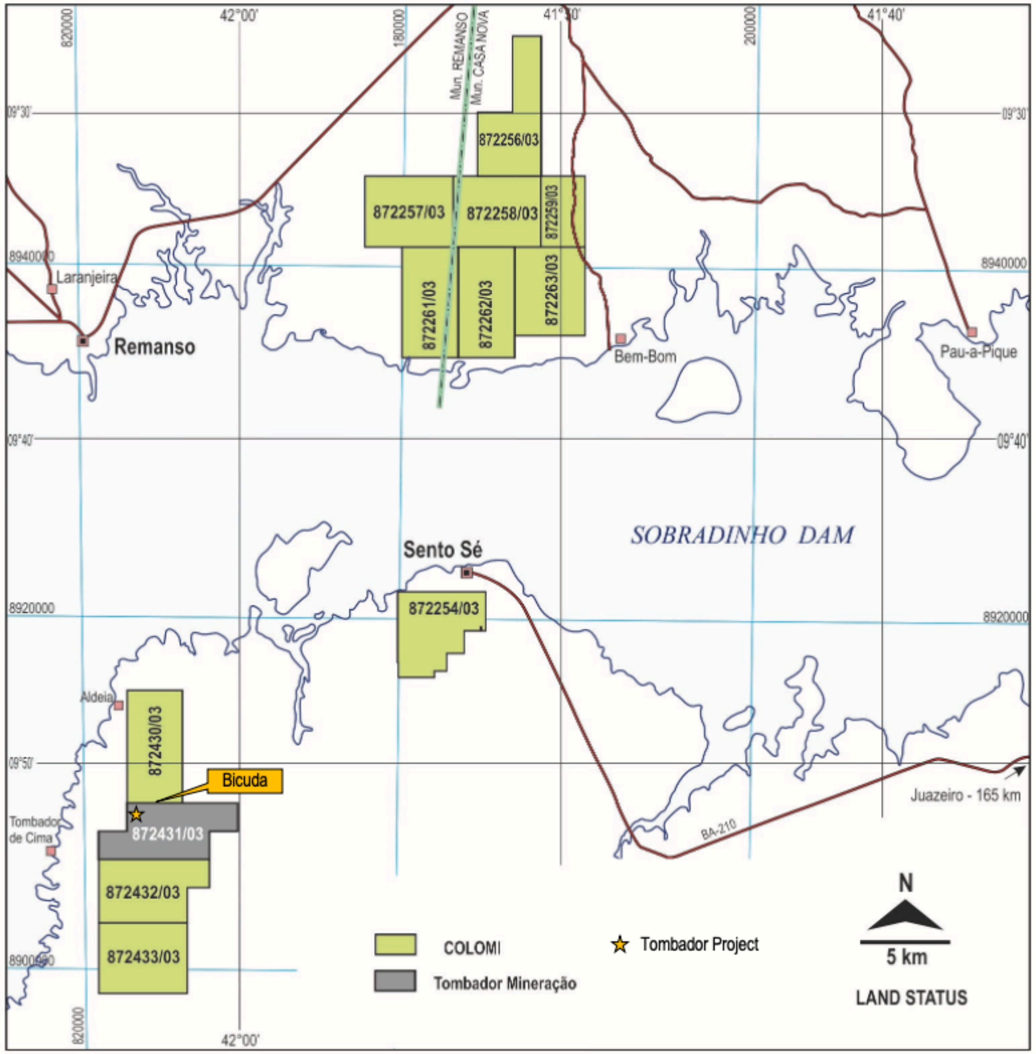
Criteria	JORC Code explanation	Commentary
		laboratory); project standard samples; stoichiometry checks; and blank samples. • Duplicates quality control results presented by VALE are, in general terms, inside acceptable limits. • The evaluation of the chip sample duplicates shows results within acceptance limit and did not indicate that samples were swapped.
Verification of sampling and assaying	• The verification of significant intersections by either independent or alternative company personnel.	• GE21 approves the methodology applied by Vale in the preparation and execution of the Tombador Project QAQC Program, including the Tombador Project. GE21 does not judge the values presented in the report for not having access to QAQC data sheet, but has accompanied the VALE QAQC programs in other projects that used the same methodology and tends to agree with the recommendations of VALE, which concludes it's necessary to improve the QAQC program and some tools, as appropriate standard sample implementation.
	• The use of twinned holes.	• Not applied within the Tombador Hematite deposit.
	• Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	• GE21 approves the methodology applied by Vale in the preparation and execution of the Tombador Project QAQC Program. According to GE21, results are inside acceptance limits of mineral industry. • Data collection and verification and storage protocols are fully documented.
	• Discuss any adjustment to assay data.	• Adjustment to assay data was neither required nor applied.
Location of data points	• Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.	• All drillhole collars were topographically surveyed by total station surveying campaign and drillhole landmarks have been properly identified.
	• Specification of the grid system used.	• SAD69 Datum for coordinate system.
	• Quality and adequacy of topographic control.	• No issue was identified by GE21 in the field or in drilling data physical archive.
Data spacing and distribution	• Data spacing for reporting of Exploration Results.	• The holes were arranged in 50 x 50m grid. • Diamond drillhole samples were produced at average length of 10 m length. Compositing was produced using these nominal lengths.

Criteria	JORC Code explanation	Commentary
	• 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.	• GE21 judges that appropriate grid spacings and applied sampling and composition lengths were provided to establish the degree of geological continuity and classification reported by GE21.
	• Whether sample compositing has been applied.	• GE21 judges appropriate applied sampling and composition lengths to establish the degree of geological continuity and classification.
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.	• The geological layers are dipping approximately 30° and the holes are vertical. Sampling was performed almost perpendicular to the layers, which is the best condition.
	• If the relationship between the drilling orientation and the orientation of key mineralized structures is considered to have introduced a sampling bias, this should be assessed and reported if material.	• No bias was introduced when using vertical drillholes.
Sample security	• The measures taken to ensure sample security.	• GE21 approves the methodology applied by Vale in the preparation and execution of the Tombador Project QAQC Program. GE21 didn't have access to QAQC data sheet, but has accompanied the VALE QAQC programs in other projects that used the same technique. • The hematite chip sampling plan was prepared by Coffey, and Colomi was responsible for collecting and preparing the samples. • The core and chips were transported by the company's personnel from the drill site to the core storage facility in Sento Sé. Drill boxes are labelled with hole number and depth interval and the core is photographed prior to logging. • Note: GE21's evaluation of the chip sample duplicates were within acceptable limit and did not indicate that samples were swapped.
Audits or reviews	• The results of any audits or reviews of sampling techniques and data.	• In 2011 Coffey prepared the "Colomi Iron Project, Brazil Independent Technical Report on Exploration and Mineral Resources Estimation" which audited the entire Tombador Project database, including the Tombador Hematite data, the results being in that report. • There has been no specific audit on sampling techniques.

Section 2 Reporting of Exploration Results

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

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td>Mineral tenement and land tenure status</td><td>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.</td><td>Tombador Iron Mineracao Ltda. (TIM or the “Company”) is the titleholder of exploration lease 872.431/2003, which was transferred to TIM from Colomi Iron Mineracao Ltda. (CIM or “Colomi). The Final Exploration Report was approved and published at Brazilian Federal Gazette on February 17, 2020 and the tenement 872.431/2003 was transferred from Colomi Iron Mineração Ltda to Tombador Iron Mineração Ltda and published at Federal Gazette on 14th April 2020.
Main exploration works was carried on by VALE a major iron ore mining company. The exploration program for the Tombador project was completed as part of a larger program covering all of CIM’s tenements shown in figure below with Concession Area Map. The Principal Source of information was the Final Exploration Report (FER) to DNPM/ANM (Brazilian National Department of Mineral Production/National Agency of Mining) with description and evaluation of results obtained in the exploration work carried out by VALE in the areas related to TIM and Colomi Exploration Permits.
<table>
<tr><th colspan="4">Tombador Project
Summary of Concession Status in the Tombador Project</th></tr>
<tr><th>Process No.</th><th>Area (Hectares)</th><th>Exploration Permit N°</th><th>Status</th></tr>
<tr><td>872.431/03</td><td>2000</td><td>1315</td><td>FER approved on 17/02/2020</td></tr>
</table></td></tr>
</table>

Criteria	JORC Code explanation	Commentary
		Concession Area Map 

Criteria	JORC Code explanation	Commentary
	• 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.	NA
Exploration done by other parties	• Acknowledgment and appraisal of exploration by other parties.	• Main exploration works were carried on by VALE a major iron ore mining company. Principal source of information was the Final Exploration Report (FER) to DNPM/ANM (Brazilian National Department of Mineral Production/National Agency of Mining) with description and evaluation of results obtained in the exploration work carried out by VALE in the areas related to TIM's and Colomi's Exploration Permits.
Geology	• Deposit type, geological setting and style of mineralization.	• The talus deposits are represented by layers with thickness average of 3.50 m, formed mainly by itabirite blocks and, secondary blocks of quartzites, dolomites and shales, immersed in siltose mass. Hematite talus blocks are only found in the adjacencies of hematite deposit of Bicuda. • Hematites represent the high grade granulated iron ore resources, restricted to the Bicuda. The hematite orebody occurs in the drag fold hinge in siliceous itabirite, showing an azimuth direction of 30°. This fold has been interpreted as being generated by a transfer fault, approximately N10E direction.

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
		• The assay program included the sampling of chips from the compact hematite outcroppings which coordinates and assays are set out below.

Criteria	JORC Code explanation	Commentary
	understanding of the report, the Competent Person should clearly explain why this is the case.	

SAMPLE ID	NEAR Drill Hole	Coffey Section Code	SAD 69 Coordinates N	E	Fe %	SiO2 %	Al2O3 %	P %	Mn %	LOI %	Moisture %
193,411	DH-01	COL BICU CS 01	8,908,808	823,477	69.7	0.24	<0,1	0.051	0.02	0.01	<0,01
193,412					69.7	0.26	<0,1	0.020	0.01	0.05	<0,01
193,413					70.3	0.15	<0,1	0.029	0.01	0.06	<0,01
193,414					69.3	0.35	0.16	0.094	0.02	0.13	<0,01
193,415					69.4	0.38	0.17	0.031	0.02	0.35	<0,01
193,416			8,908,810	823,472	69.5	0.34	0.13	0.016	0.02	0.14	<0,01
193,417	DH-05	COL BICU CS 02	8,909,873	823,457	67.7	1.19	0.51	0.189	0.02	0.16	<0,01
193,418					67.9	1.51	0.53	0.148	0.02	0.22	<0,01
193,419					64.6	5.67	0.49	0.168	0.02	0.43	<0,01
193,420			8,908,870	823,456	66.5	1.78	0.93	0.102	0.04	0.27	<0,01
193,401	FD-06	COL BICU CS 03	8,908,834	823,480	68.1	0.90	0.25	0.078	0.03	0.62	<0,01
193,402					68.1	1.04	0.41	0.029	0.14	0.15	<0,01
193,403					68.7	0.79	0.36	0.017	0.03	0.13	<0,01
193,404			8,908,835	823,476	68.1	2.13	0.43	0.020	0.05	0.10	<0,01
193,405	DH-17	COL BICU CS 04	8,908,790	823,448	68.6	0.94	0.52	0.020	0.02	0.25	<0,01
193,406					68.6	0.94	0.43	0.050	0.02	0.04	<0,01
193,407					69.0	0.53	0.21	0.059	0.02	0.06	<0,01
193,408					69.1	0.64	0.26	0.025	0.02	0.07	<0,01
193,409					68.8	1.11	0.52	0.053	0.03	0.16	<0,01
193,410			8,908,791	823,442	69.3	0.53	0.23	0.018	0.02	0.04	<0,01

- The sampling points that were selected were correlated with the drillholes or test trenches that had already been excavated, as shown in Table below:

Criteria	JORC Code explanation	Commentary

hole_id	x	y	z	TENEMENTID	max_depth	dip
COL-BICU-DH00001	823487.97	8908771.18	548.11	872.431/2003	96	-90
COL-BICU-DH00002	823484.4	8908818.26	534.73	872.431/2003	118.1	-90
COL-BICU-DH00003	823581.44	8908967.98	540.29	872.431/2003	58.5	-90
COL-BICU-DH00004	823431.26	8908818.2	527.05	872.431/2003	79.5	-90
COL-BICU-DH00005	823428.51	8908868.08	505.64	872.431/2003	72.3	-90
COL-BICU-DH00007	823631.73	8908867.61	584.81	872.431/2003	127.45	-90
COL-BICU-DH00008	823728.22	8908966.04	556.57	872.431/2003	160.2	-90
COL-BICU-DH00009	823630.55	8908814.88	602.75	872.431/2003	207.2	-90
COL-BICU-DH00012	823731.81	8908868.03	591.57	872.431/2003	132.3	-90
COL-BICU-DH00016	823478.39	8908668.24	606.2	872.431/2003	156.3	-90
COL-BICU-DH00017	823439.97	8908754.44	573.33	872.431/2003	79.6	-90
COL-BICU-DH00021	823536.16	8908868.62	557.35	872.431/2003	173.95	-90
COL-BICU-DH00022	823484.08	8908868.08	529.39	872.431/2003	145.5	-90
COL-BICU-DH00024	823581.9	8909060.02	491.12	872.431/2003	250	-90
COL-BICU-FD0004	823481.36	8908687.5	599.35	872.431/2003	104	-90
COL-BICU-FD0005	823507.88	8908781.59	547.56	872.431/2003	119.85	-90
COL-BICU-FD0006	823466.74	8908800.91	536.14	872.431/2003	52.8	-90

* There were a total of 28 diamond holes in the tenement. Drill holes not in the vicinity Tombador deposit have been excluded from this table

Summary of significant mineralized intercepts:

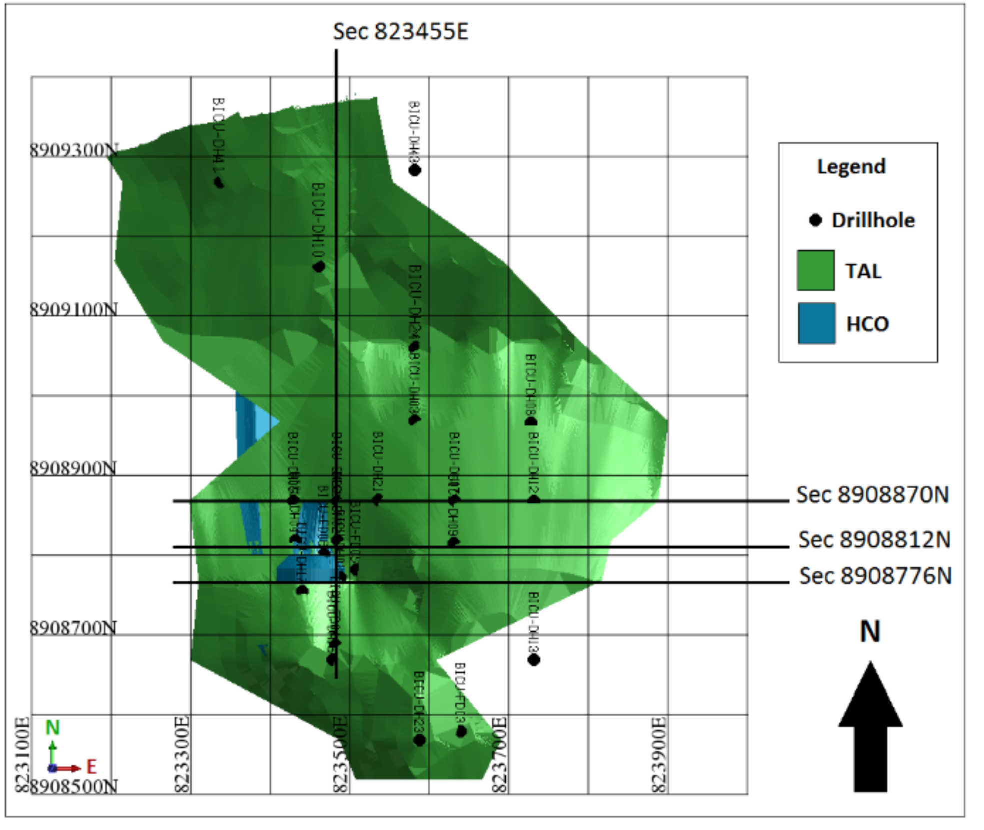
Criteria	JORC Code explanation	Commentary

hole_id	depth_from	depth_to	sample_id	SIO2%	P%	AL2O3%	MN%	FE%	PF%	LITHOASSAY
COL-BICU-DH00001	2.95	10	COL-BICU-DH00001-0002	0.72	0.066	0.28	0.034	68.64	0.05	HCO
COL-BICU-DH00001	10	20	COL-BICU-DH00001-0003	0.76	0.123	0.47	0.036	67.77	0.17	HCO
COL-BICU-DH00001	20	30	COL-BICU-DH00001-0004	1.70	0.111	0.95	0.024	66.81	0.27	HCO
COL-BICU-DH00001	30	40	COL-BICU-DH00001-0005	0.43	0.123	0.18	0.023	68.75	0.05	HCO
COL-BICU-DH00001	40	54.7	COL-BICU-DH00001-0006	0.37	0.092	0.18	0.021	68.43	0.05	HCO
COL-BICU-DH00002	20	30	COL-BICU-DH00002-0005	4.68	0.077	0.30	0.031	65.29	0.11	HCO
COL-BICU-DH00002	30	40	COL-BICU-DH00002-0006	1.11	0.078	0.58	0.018	67.67	0.24	HCO
COL-BICU-DH00002	40	50	COL-BICU-DH00002-0007	0.87	0.086	0.54	0.019	68.75	0.28	HCO
COL-BICU-DH00002	50	60	COL-BICU-DH00002-0008	0.31	0.070	0.24	0.022	69.20	0.06	HCO
COL-BICU-DH00005	23	36.7	COL-BICU-DH00005-0006	4.49	0.063	1.72	0.029	63.37	0.86	HCO
COL-BICU-DH00017	3	10	COL-BICU-DH00017-0002	0.83	0.017	0.23	0.049	68.38	0.05	HCO
COL-BICU-DH00017	10	20	COL-BICU-DH00017-0003	0.47	0.035	0.21	0.026	68.53	0.02	HCO
COL-BICU-DH00017	20	30	COL-BICU-DH00017-0004	0.86	0.060	0.39	0.023	68.56	0.20	HCO
COL-BICU-DH00017	30	40.5	COL-BICU-DH00017-0005	0.74	0.063	0.24	0.016	67.87	0.22	HCO
COL-BICU-DH00021	101	110	COL-BICU-DH00021-0009	0.58	0.083	0.36	0.017	68.12	0.22	HCO
COL-BICU-DH00021	110	117.2	COL-BICU-DH00021-0010	0.14	0.033	0.12	0.018	69.56	0.01	HCO
COL-BICU-DH00022	18	27	COL-BICU-DH00022-0004	6.50	0.034	2.54	0.151	62.10	0.84	HCO
COL-BICU-DH00022	34.5	40	COL-BICU-DH00022-0007	13.31	0.110	0.33	0.091	60.22	0.17	HCO
COL-BICU-DH00022	40	52	COL-BICU-DH00022-0008	6.89	0.079	0.19	0.024	64.37	0.03	HCO
COL-BICU-DH00022	59.9	70	COL-BICU-DH00022-0011	0.83	0.082	0.43	0.023	67.87	0.18	HCO
COL-BICU-DH00022	70	80	COL-BICU-DH00022-0012	0.32	0.116	0.18	0.035	68.56	0.05	HCO
COL-BICU-DH00022	80	85	COL-BICU-DH00022-0013	3.40	0.074	0.51	0.064	65.59	0.46	HCO
COL-BICU-FD0005	15.75	30	COL-BICU-FD0005-0005	2.07	0.620	0.76	0.141	65.63	0.56	HCO
COL-BICU-FD0005	30	40	COL-BICU-FD0005-0006	1.14	0.102	0.52	0.031	67.58	0.44	HCO
COL-BICU-FD0005	40	50.7	COL-BICU-FD0005-0007	1.28	0.084	0.39	0.021	67.99	0.36	HCO
COL-BICU-FD0006	3.6	11.35	COL-BICU-FD0006-0002	0.75	0.090	0.31	0.037	69.00	0.42	HCO
COL-BICU-FD0006	33.7	46.2	COL-BICU-FD0006-0005	1.18	0.083	0.23	0.015	68.66	0.44	HCO

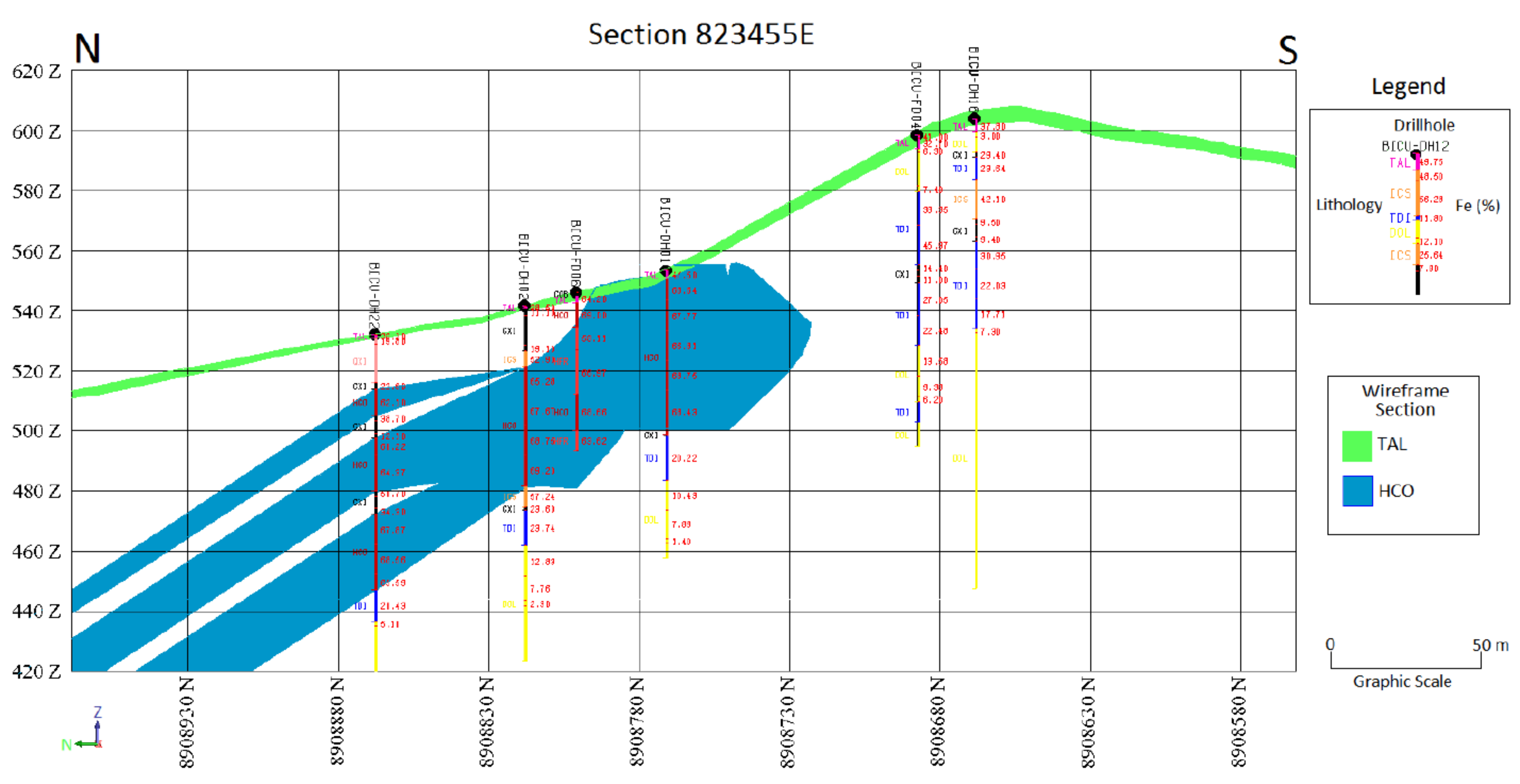
Criteria	JORC Code explanation	Commentary
Data aggregation methods	• In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high	• Global sample grades of interval samples were aggregated by weighted average mass of each size fraction. There were 4 size fractions assayed for each granulo-chemical sample for all significant mineralized intervals. • Mineralization intervals intersected by drilling was aggregated by weighted average length. There was

Criteria	JORC Code explanation	Commentary
	grades) and cut-off grades are usually Material and should be stated.	no cuts or applied caps on grade estimate. • A cut-off grade of 60% Fe was applied for Compact Hematite and 20% Fe for Talus.
	• 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.	• Samples from diamond drillings were collected using 10 m intervals, obeying the lithologic contacts. To ensure a clear definition of the boundaries of mineral zones, 2 m samples were also collected of the host rock above and below the mineralized intervals. Drill hole samples were composited to regular downhole lengths of 10m. Compositing was applied to the mineralized intervals inside the geological model. Channel samples has been submitted on variance volume adjustment to validate this samples to be used on grade estimate together with diamond drillhole samples.
	• The assumptions used for any reporting of metal equivalent values should be clearly stated.	• No metal equivalent was reported
Relationship between mineralization widths and intercept lengths	• These relationships are particularly important in the reporting of Exploration Results.	• The resource modelling was carried out in 3D software and effect of apparent widths was accounted for estimation method.
	• If the geometry of the mineralization with respect to the drill hole angle is known, its nature should be reported.	• All holes were vertical and mineralization zone dipping at 30°. The Fe mineralization sits within foliation dipping at approximately 30 degrees to the east and plunging at approximately 30 degrees to the north. All diamond drillholes into the Tombador project were drilled vertically.
	• 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').	• NA
Diagrams	• Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported	• Further diagrams necessary to describe the Project are included in "Independent Technical Report on Exploration and Mineral Resources Estimation – Update HCO Resources"- Prepared by GE21.

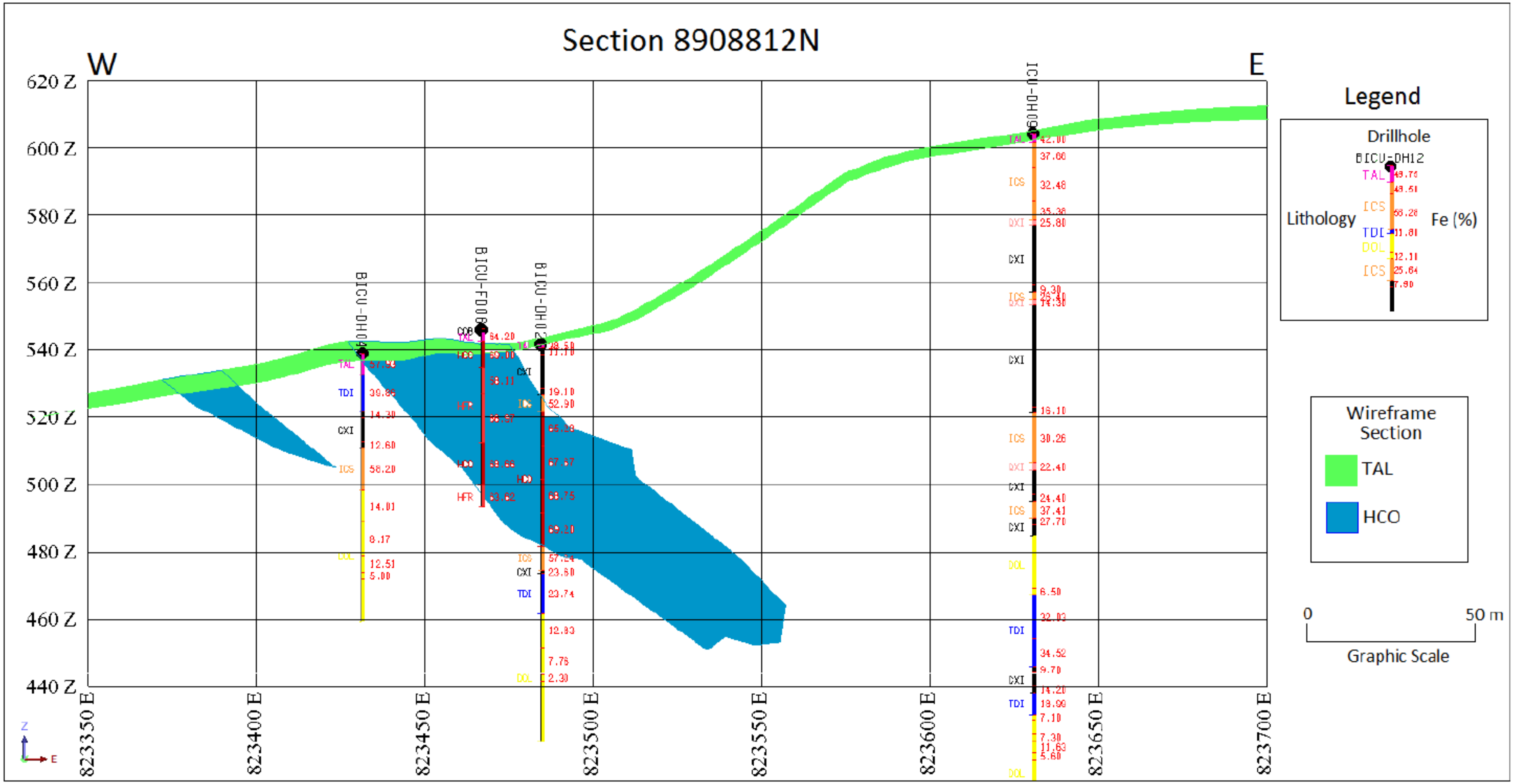
Criteria	JORC Code explanation	Commentary
	These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	



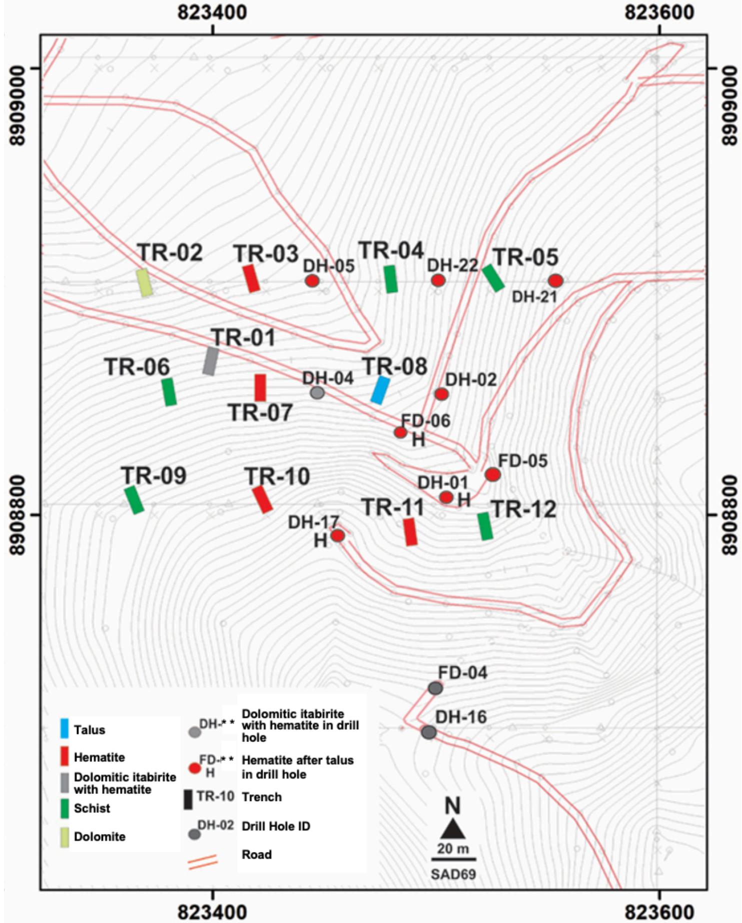
Criteria	JORC Code explanation	Commentary



Criteria	JORC Code explanation	Commentary

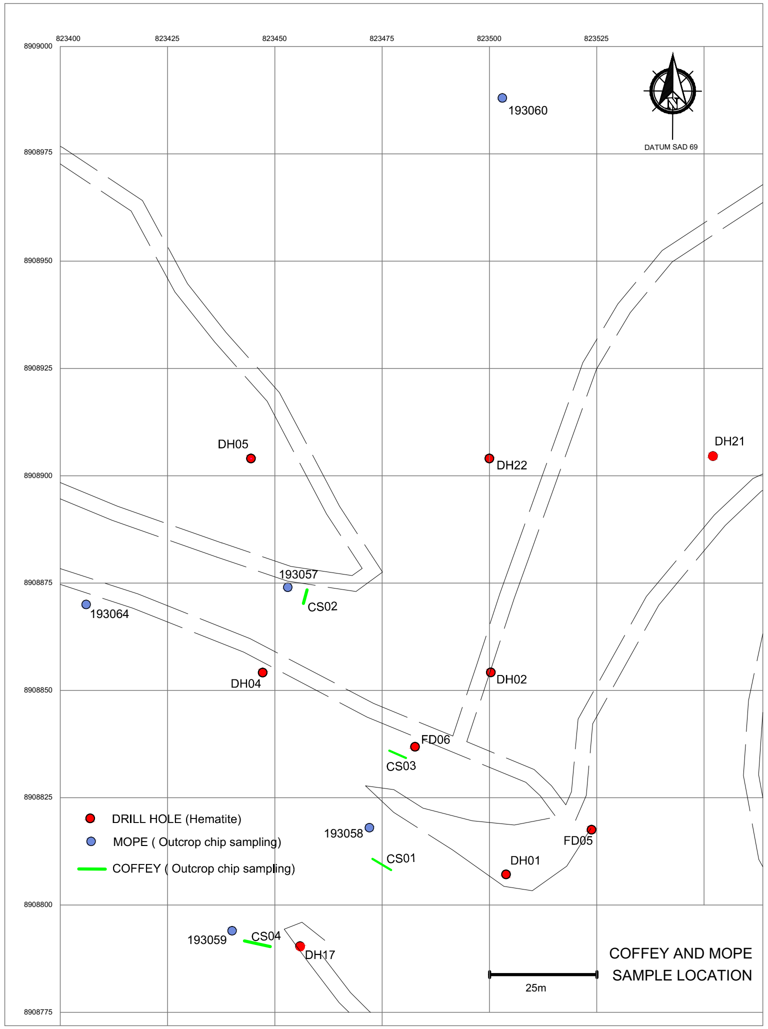


Criteria	JORC Code explanation	Commentary
Balanced reporting	• Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.	• The drilling databases are highly organized with drilling Intercepts and grade x length reports properly stored and readily available within the drilhole database.
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.	• The Tombador exploration was part of a larger VALE exploration and drilling program as mentioned in the report prepared by Coffey in 2011: "Colomi Project, Brazil Independent Technical Report on Exploration and Mineral Resources Estimation". • Other exploration data includes: ○ Geological observations of additional Talus areas outside of Tombador; ○ Geological Surface mapping by independent Professor Miguel Tupinamba; ○ Trench excavation to identify bedrock by Colomi shown in the image below;

Criteria	JORC Code explanation	Commentary
		

- Metallurgical tests were completed in 2013 by an external group Modelo Operational Ltda. (MOPE) on 10 samples consisting of 3 drill core, 5 outcrop, and 2 composite samples. Results confirmed the prospect of producing lump product. No deleterious or contaminating substances were encountered. Sulphur results were less than 0.01%. Further detail on the MOPE testwork program is provided below; and
- An additional 4 surficial channel lines were sampled atop hematite outcrops by Coffey in

Criteria	JORC Code explanation	Commentary
		2013. The 5kg samples were taken at 1 meter intervals to total 20 lineal meters assayed. These have been considered by GE21 in their estimation. • **<u>MOPE Testwork Program</u>** - In 2012-2013 MOPE coordinated testwork, metallurgical characterization and preliminary development of a processing route for hematite at the Tombador Project. The program included the following. ○ **Sampling** MOPE reported samples were collected by Colomi in 2012 and sent to MOPE for metallurgical testing. The samples were characterized into three types of hematite present in the deposit: Massive or Compact, Laminated, and Friable. The location of sample, type hematite and type of sample (outcrop or drill core) are shown the in figure and table below.

Criteria	JORC Code explanation	Commentary
		

Criteria	JORC Code explanation	Commentary

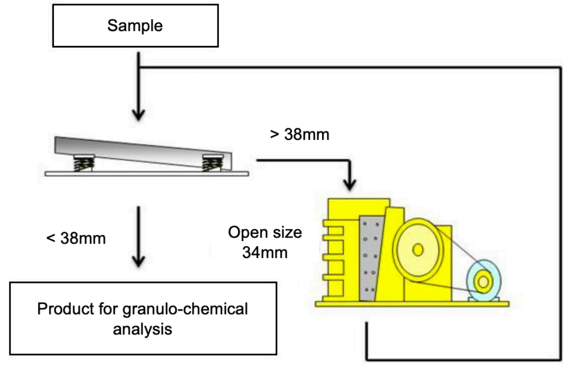
No.	Sample	UTM (SAD69) Easting	UTM (SAD69) Northing	Sample Type	Hematite Type	Mass (kg)	Comment
1	193057	823,453	8,908,874	Outcrop	Massive	100	
2	193058	823,472	8,908,818	Outcrop	Massive	100	
3	193059	823,440	8,908,794	Outcrop	Laminate	100	
4	193060	823,503	8,908,988	Outcrop	Laminate	100	
5	193064	823,406	8,908,870	Outcrop	Friable	100	
6	193065	823,440	8,908,754	Drill core	Laminate	49	BICU DH17
7	193066	823,484	8,908,868	Drill core	Laminate	50	BICU DH22
8	193067	823,467	8,908,801	Drill core	Laminate	31	BICU FD06
9	193068			Outcrop composite	Massive + Laminate + Friable	125	25kg each from 193057; 58; 59; 60; 64
10	193069			Drill core composite	Laminate	53	193065; 66; 67 Composite. i.e. DH17, 22 and FD06

In additional mineralogical studies were completed for the samples in the table below.

No.	Sample	Sample Type	Hematite Type	Mass (kg)	Comment
1	193057	Outcrop	Massive	1.1	
2	193059	Outcrop	Massive	1.9	
3	193064	Outcrop	Laminate	1.1	
4	193070	Outcrop	Laminate	1.2	BICU DH17, 22, FD06

- **Tests**
  Samples were delivered to Fundacao Gorceix, in Ouro Preto for the following tests.
  Sample material was pre-classified by hand with a 38mm screen. The oversize (>38mm) was set aside, it was not fed through the crusher. The undersize was crushed as follows.
  A lab scale jaw crusher with a opening of 34mm was used and the same 38mm screen to recirculate any retained product to the crusher.

Criteria	JORC Code explanation	Commentary



The crushed material was homogenized, and quartered producing subsamples for granulochemical analysis (screening and chemical assay)

- **Granulo-Chemical Analysis**
  The samples had different levels of compactness and produced varying levels of coarse material after crushing. Friable hematite samples produced the greatest amount of fines and massive or compact hematite produced the most lump. A summary of the results of lump yield and Fe grade are shown below.

Sample Number	Feed		Lump (+6.35 -38mm)			Coarse Sinter Feed (+1 -6.35mm)			Fines (-1mm)		
	Mass (g)	Grade %Fe	Mass (g)	% Lump	Grade %Fe	Mass (g)	% Lump	Grade %Fe	Mass (g)	% Lump	Grade %Fe
CO-HR-57	12032.77	67.48	11320.00	94.08	67.56	408.45	3.39	66.60	304.32	2.53	66.00
CO-HR-58	10546.25	66.91	9140.00	86.67	67.06	726.63	6.89	66.22	679.62	6.44	65.68
CO-HR-59	13179.08	68.92	10305.00	79.19	69.08	1220.03	9.26	68.64	1654.05	12.55	68.11
CO-HR-60	13801.45	68.90	11495.00	83.29	69.17	1169.92	8.48	68.86	1136.53	8.23	66.30
CO-HR-64	12401.02	67.28	3760.00	30.32	68.20	3874.58	31.24	68.58	4766.44	38.44	65.49
CO-HR-65	12131.50	68.46	10020.00	82.59	69.13	853.75	7.04	67.33	1257.75	10.37	63.96
CO-HR-66	11344.03	64.39	9580.00	84.45	64.65	884.91	7.80	63.99	879.12	7.75	61.92
CO-HR-67	11854.31	65.64	7840.00	66.14	65.48	1559.11	13.15	66.75	2455.20	20.71	65.43
CO-HR-68	14213.96	67.46	10950.00	77.04	67.77	1561.78	10.99	67.34	1702.18	11.98	65.60
CO-HR-69	14957.34	65.95	12685.00	84.81	66.16	1033.04	6.91	65.62	1239.30	8.29	64.06
Weighted Ave.	12646.17	67.18	9709.50	76.78	67.44	1329.22	10.51	67.44	1607.45	12.71	65.41

Note sample CO-HR-57 is the same as 193057 etc.

A summary of the chemical quality of the lump is shown in the table below

Lump quality for each sample								
Sample number	**Type of hematite**	**%Fe**	**%P**	**%SiO_2**	**%Al_2O_3**	**%Mn**	**%S**	**%LOI**
CO-HR-57	M	66.88	0.07	2.74	0.17	0.02	<0.01	-0.24
CO-HR-58	M	67.06	0.06	1.42	0.82	0.01	<0.01	0.39
CO-HR-59	L	69.08	0.05	0.57	0.27	0.02	<0.01	-0.22
CO-HR-60	L	69.17	0.02	0.47	0.19	0.03	<0.01	-0.21
CO-HR-64	F	68.20	0.02	1.24	0.54	0.10	<0.01	0.06
CO-HR-65	L	69.13	0.03	0.55	0.18	0.01	<0.01	0.27
CO-HR-66	L	64.65	0.07	4.46	0.51	0.02	<0.01	0.29
CO-HR-67	L	65.48	0.06	0.91	0.25	0.01	<0.01	2.05
CO-HR-68	L+M+F	67.77	0.07	0.83	0.31	0.03	<0.01	0.4
CO-HR-69	L	66.16	0.06	1.32	0.27	0.01	<0.01	1.83

Where M is Massive, L is Laminated and F is Friable hematite.

The samples were separated into size fractions using the following screen sizes:
38mm, 32mm, 25.4mm, 19mm, 16mm, 12.7mm, 9.52mm, 8mm, 6.35mm, (Lump)
4750µm, 2800µm, 1700µm, 1180µm, 850µm, 425µm, 300µm, 212µm, 150µm, 100µm (Fines)

SGS Geosol laboratory completed the chemical analyse of each size fraction. The elements and oxides and the analytical techniques used in their respective determination in each size fraction is as follows:

- Fe, P, SiO2, Al2O3, CaO, TiO2, MgO, K2O, Na2O, Mn, Fe2O3, BaO, Ni by X-ray flurecence;
- FeO by potassium dichromate titration;
- Loss on Ignition (LOI) – calcination at 405°C / 1000°C;
- As by digestion in Agua Regia and ICP OES / MS;
- S by LECO sulfur analyser;
- Ag, Al, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, K, La, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Sc, Se, Sn, Sr, Th, Ti, Tl, U, V, W, Y, Zn, Zr by digestion in acid and ICP; and
- Cl by Chlorine Ion Selective electrode.

MOPE states the granulo-chemical testwork results show the Tombador project Fe content is quite high and typical contaminatnt SiO_2 and Al_2O_3 are low. The phosphrorus is a little high for samples 68 and 69. The alkali content (CaO + MgO) can be matintain at low levels through careful mining and a suitably blended crushing plant feed. Sample 68 sample

Criteria	JORC Code explanation	Commentary
		represents a composite sample of outcrops of the three types of hematite (massive, laminated and friable). The product obtained with this sample is of good quality and confirms the fact that it would be prudent to blend the material before feeding the crushing facilities.

A summary of the mineralogy identified by Fundacao Gorceix is in the table below

Minerals	Specific Gravity	Massive Hematite % Mass	Laminated Hematite Outcrop % Mass	Friable Hematite % Mass	Laminated Hematite Drill Core % Mass
Monocrystalline lamellar hematite	5.20	3.60	5.10	0.25	5.57
Monocrystalline granular hematite	5.20	93.40	93.56	76.86	92.07
Polycrystalline lamellar hematite	4.26	0.00	0.00	0.00	0.00
Polycrystalline granular hematite	4.26	0.00	0.05	0.08	0.45
lobular martist Hematite	4.89	1.68	0.26	22.28	1.23
Martite	3.90	0.02	0.12	0.09	0.04
Magnetite	5.00	0.07	0.00	0.00	0.00
Goethite	3.90	0.19	0.00	0.02	0.00
Aggregate	3.00	0.05	0.00	0.00	0.00
Quartz	2.65	0.11	0.33	0.02	0.09
Ilminite	5.02	0.09	0.12	0.00	0.00
Other	3.00	0.79	0.46	0.39	0.54

The Pyrometallurgical tests were completed by Aqua Ambiental and the types of tests samples and their results shown in the table below.

Sample No. Test	193058 (massive)	193059 (laminated)	193064 (friable)	193068 (L+M+F)
Reducibility (%Reduced)	38.86	38.74	52.67	45.85
RDI (%<2.80mm)	3.28	29.52	38.67	16.69
Decrepitation Index (%<6.3mm)	0.82	1.4	8.37	1.2
Tumble Index (%>6.3mm)	90.27	74.76	50.2	82.46
Abrasion Index (%<0.5mm)	6.97	19.66	24.78	10.93

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	• Additional topographic survey. • Sampling for additional metallurgical and processing tests

Criteria	JORC Code explanation	Commentary
	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.	• Extensions of HCO were not considered in the geological modelling. The geological modeling (GE21) was confined to the large central body of hematite mineralization. Additional narrow, <10m hematite foot wall and hanging wall occurrences of Hematite mineralization are known from geological mapping and drill hole logging. These were not included as additional drilling data to establish continuity was not available. Follow up drilling is planned for these areas.

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 Tombador deposit drilling data base was received excel format and GE21 produced the Access datasets. • GE21 carried out an electronic validation of the databases with Gemcom Surpac software. No errors, as gaps or overlapping data, or other material inconsistencies were found.
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.	• A site visit was undertaken by Mr Porfirio Rodriguez to the Tombador Project between 12th to 14th November 2013. • Not Applied
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.	• There is high confidence in the geological interpretation as there is a semi-detail geological map to guide the modelling of the mineralization zone. The defined horizons are considered to be reasonably robust. The HCO model was built from as an extension of the original model presented in the previous Independent Resource Estimate, as prepared by Coffey on September 2013. The extended model was based on more detail field mapping and a new interpretation on downdip and down plunge considering a half distance between HCO mineralized and non-HCO mineralized holes. • There are a total of 17 drill holes with 8 mineralized (with >60%Fe) holes used for the HCO mineral resource estimate. • 8 mineralised drill holes have broad and consistent mineralized intersections (up to 50m) and are drilled at a reasonably close (irregular 50x50m grid) spacing refuting alternate mineral interpretations. • Geology provided a guide to the ore shapes produced. The hematite orebody occurs in the drag fold hinge in siliceous itabirite, showing an azimuth direction of 30°. This fold has been interpreted as being generated by a transfer fault, approximately N10E direction.

Criteria	JORC Code explanation	Commentary
	• The factors affecting continuity both of grade and geology.	• The fold hinge is the primary geological determining factor. Continuity of hematite mineralization is projected within the fold hinge.
Dimensions	• The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.	• The mineralization outcrops. Within the drilled portion the mineralization is 30 to 50m in thickness and occurs at a length of approximately 150m down dip and is both wide and open 200m down plunge. The down plunge projection in the non-drilled “Inferred” portion of the resource is interpreted to thin to a thickness of 20m.
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.	• Resource modelling was done with Geovia Surpac software. • Three 3D block model were constructed for resource estimation purposes for the HCO orebody. The block dimensions were defined as 25m x 25m x 5m and sub-blocks of 12.5m x 12.5m x 2.5m, based on a quarter of the drilling grid dimensions. Sub-blocking was applied to assure a good adherence between the geological model and the lithological unit attitude. • After examining the raw sample lengths of sampled intervals (Figure 3.4_1), and in consideration of the local geology, composites were generated using a nominal length of 10 meters (with 75% of range at end of intervals). Compositing was applied to the mineralized intervals inside the geological model. • The Tombador HCO chip sampling produced 20 samples, 1m each, because of the nature of the samples, they were considered as puncntual, (i.e. with only one dimension) characterized by their X,Y and Z coordinates. • Aiming to be able and combine chip samples and drilling data, a Variance Volume, based on NScore GSLIB tool was done in order to transform all chip sample data as they were in the same support as drilling data, • The downhole experimental variograms were calculated to establish the structures for composite grades. The omni-directional horizontal variograms were calculated for the purpose of determination of major axis variability for target HCO Orebody

Criteria	JORC Code explanation	Commentary

Tombador Project
HCO Orebody Variogram Model Summary

Variable	Unit	C0	C1	A1	C2	A2	Horizontal/ Vertical Ratio
Fe	HCO	0.70	2.35	30	2.35	60	2
SiO2		0.43	0.4	30	1.04	60	2
Al2O3		0.02	0.134	60	0	0	2
Mn		0.00	1.5E-04	30	6.18E-04	60	2
P		0.00	0.002	60	0	0	2
LOI		0.02	0.032	60	0	0	2

- The established Kriging plan, for all attributes, considered three estimation steps, as presented in the Table below:

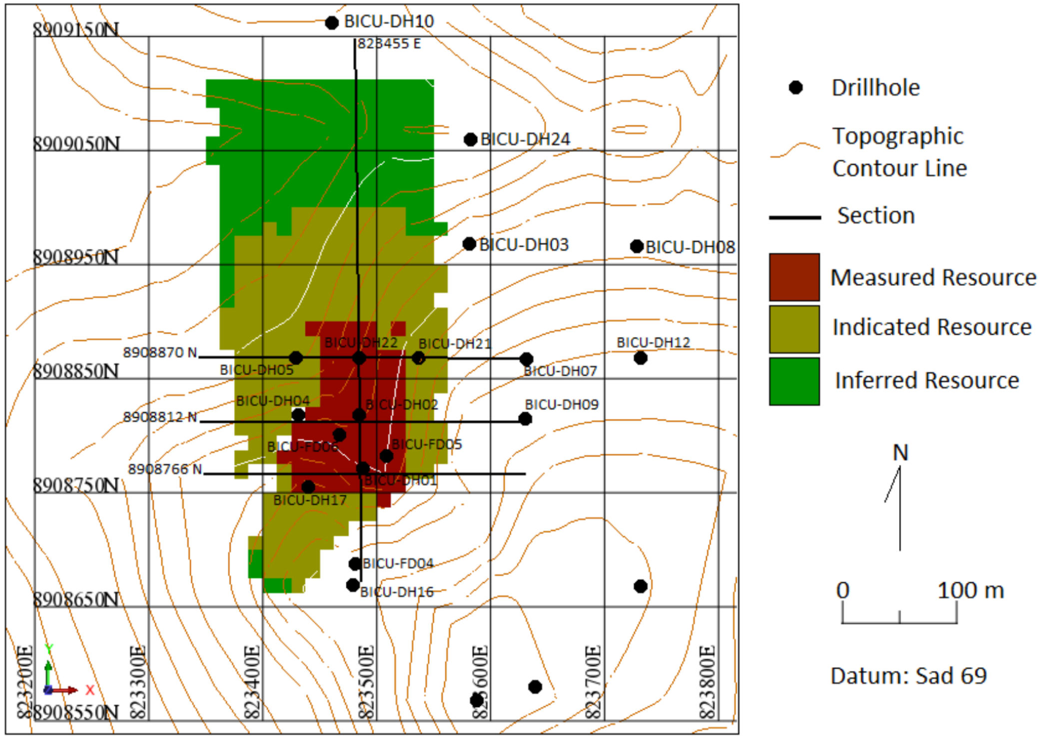
Tombador Project
Ordinary Kriging Strategy

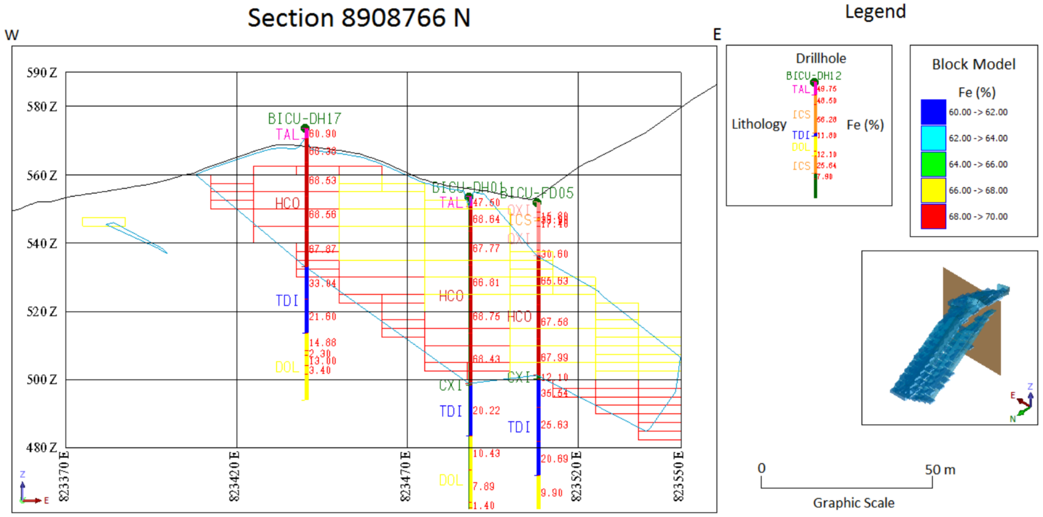
Step	Search Radius	Minimum Number of Samples	Maximum Number of Samples	Maximum Number of samples per Drillhole
HCO Unit				
Searching Parameters: Bearing=358; Plunge=-33; Dip=-35; Major/Semi-Major Ratio= 1; Major/Minor Ratio=2				
1	50	3	10	2
2	150	3	10	2
3	500	1	10	2

Criteria	JORC Code explanation	Commentary
	• The availability of check estimates, previous estimates and/or mine production records and	• Visual Validation for estimated grade was carried out with vertical sections. Visual validation by GE21 confirms the smoothing effect of the grade. Visual validation shows a

Criteria	JORC Code explanation	Commentary
	whether the Mineral Resource estimate takes appropriate account of such data.	good correlation between the blocks estimated and the original samples. • Validation for estimated grade was carried out with a comparative Nearest Neighbouring estimation (NN). This validation consists in a comparative statistical analysis over global results for Fe%, SiO2%, Al2O3%, Mn%, P% and LOI% variables to the mineralized intervals. • The comparative analysis of estimation variable with the Nearest Neighbouring results showed different grade distributions. The relative smoothing in the kriging results are compatible with the kriging technique and is acceptable based on the resources classification and the data density and distribution. • Local validation by the Swath Plot method was carried out with the verification of local bias from comparative graphs for resource estimation variable (Ordinary Kriging) and NN-Check, considering X, Y, or Z coordinates • The comparative analysis of estimative variables with the Nearest Neighbouring results show the relative smoothing in the kriging results that are compatible with the kriging technique and is acceptable based on the resources classification and the data density and distribution. Considerable biases on depth end or in corners of block model are originated on the effect of small volume of blocks in boundary portions of mineralization zones and differences in estimation techniques
	• The assumptions made regarding recovery of by-products.	• Recovery of by-products were not considered.
	• Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	• No deleterious or contaminating substances were encountered. Sulphur results were less than 0.01%.
	• In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	• The block size was smaller than the average sample spacing, less than half.
	• Any assumptions behind modelling of selective mining units.	• No assumptions were made regarding SMU (selective mining units).
	• Any assumptions about correlation between variables.	• No assumptions were made by GE21 regarding the correlation between variables.
	• Description of how the geological interpretation was used to control the resource estimates.	• The main controls to the hematite are lithological and structural. The hematite orebody occurs in the drag fold hinge in siliceous itabirite, showing an azimuth direction of 30°. This fold has been interpreted as being generated by a transfer fault, approximately N10E direction.

Criteria	JORC Code explanation	Commentary
	• Discussion of basis for using or not using grade cutting or capping.	• The mineralization is thick and continuous hematite contained within 8 drill holes each exhibiting thick and continuous hematite mineralization from 30 to 50 m in thickness with consistent grade. Grade cutting or capping procedures are not common to be applied on this style of mineralization (iron hematite). GE21 didn't apply any of this methods on Tombador grade estimate.
	• The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	• GE21 used internal peer review and created grade plans and sections to review the results. No erroneous zones were found. • Example of Block Model plan and section for visual validation.



Criteria	JORC Code explanation	Commentary
		
Moisture	• Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	• The resource was estimated in a dry basis.
Cut-off parameters	• The basis of the adopted cut-off grade(s) or quality parameters applied.	• A 60%Fe COG was applied representing a DSO (direct shipping ore) hematite product. This cut off grade defined a consistent and broad thick mineralized zone. Additional zones of mineralization were not included. Areas where the mineralization was pinching to widths of >5m, on the periphery (down dip) away from the bulk mineralized zone were included.
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	• A conventional open pit mining operation was assumed for the Tombador project. • The mineralization is known, from close spaced drilling, to be from 20 to 50m in thickness, and the external contacts are sharp and visually distinct to the lower grade peripheral transitional and waste rock. For this reason both internal and external dilution are predicted by GE21 to be modest.

Criteria	JORC Code explanation	Commentary
	case, this should be reported with an explanation of the basis of the mining assumptions made.	
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.	• No metallurgical tests were considered in the estimation of resources. • Modest metallurgical tests were completed in 2013 by an external group "MOPE" on 10 samples consisting of 3 drill core 5 outcrop and 2 composite samples. No deleterious or contaminating substances were encountered. Sulphur results were less than 0.01%. • This testwork, along with the 5 X 100kg surface samples collected by MOPE in 2013 do provide additional confidence in the resource estimation completed by GE21, because results evidence the ore produces a high-grade lump product.
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.	• The Company will be required to obtain the necessary environmental permits and comply with environmental laws.

Criteria	JORC Code explanation	Commentary
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.	• The density applied in the block model was defined by the average of values obtained by the experimental specific gravity test with litho types by Vale. There were density determinations in three types of materials: drill core samples; weathered rocks; in field tests. • Altogether, 1973 density determinations tests were carried out on all rotative drill holes made every 3 m depth in ore zones and every 10 m in waste zones by VALE in the Colomi project areas. The intervals were selected respecting geological contacts and weathering zone limits. • The density determination was carried out in drill cores by the Jolly method. The weathered rock samples were oven dried and sealed with paraffin material. • VALE applied to mineralized unit types an average density value individually in each target data. Vale didn't perform any spatial variability study on density data. • The table below summarizes the density value applied on the Tombador resource block model. **Tombador Project Density Data** **Unit** – **Density (g/cm3)** HCO – 4.62 TAL – 1.80
	• Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	• Waste density was determined in previous works. Current work performed review on density values only in HCO lithotype.
Classification	• The basis for the classification of the Mineral Resources into varying confidence categories.	• The resource was classified by the Competent Person as Measure, Indicated and Inferred based depending on the drilling grid spacing as explained below.

Criteria	JORC Code explanation	Commentary

Tombador Project Resource Table – 26th Feb 2014

Mineral Resources - Tombador Mineração Ltda - Tombador Project – HCO Resource

Block Model: 25m X 25m X 5m (12.5m X 12.5m X 2.5m)

Resource Class	Cut-off Grade (Fe%)	Tonnes (Mt)	Fe (%)	SiO2 (%)	Al2O3 (%)	Mn (%)	P (%)	LOI (%)
HCO – Compact Hematite								
Measured	60	1.94	67.04	1.95	0.47	0.037	0.101	0.44
Indicated	60	3.47	67.30	1.65	0.56	0.029	0.092	0.31
Demonstrated	**60**	**5.41**	**67.21**	**1.76**	**0.53**	**0.032**	**0.095**	**0.36**
Inferred	60	2.58	67.48	1.54	0.62	0.027	0.086	0.28

1. Mineral resource effective date is 26 February 2014
2. Presented mineral resources are not exclusive of mineral reserves. All figures have been rounded to the relative accuracy of the estimates. Summed amounts may not add due to rounding. Mineral resources which are not mineral reserves do not have demonstrated economic viability.
3. Mineral resources have been modeled with cut-off of 60% Fe Mineral resources have been estimated using ordinary kriging inside 25m by 25m by 5m block sizes. The mineral resource estimates were prepared in accordance with Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012) incorporating drilling data acquired until 2014.

Criteria	JORC Code explanation	Commentary
		Tombador Project Resource Table – 26th February 2014 **Mineral Resources – Tombador Mineração Ltda - Tombador Project – TAL Resource** **Block Model: 100m X100m X 5m (25m X 25m X 5m)**

Resource Class	Cut-off Grade (Fe%)	Tonnes (Mt)	Fe (%)	SiO2 (%)	Al2O3 (%)	Mn (%)	P (%)	LOI (%)
TAL_HCO – Compact Hematite Talus								
Inferred	20	2.06	43.17	31.88	2.04	0.276	0.022	2.49

1. Mineral resource effective date is 26th February 2014
2. Presented mineral resources are not exclusive of mineral reserves. All figures have been rounded to the relative accuracy of the estimates. Summed amounts may not add due to rounding. Mineral resources which are not mineral reserves do not have demonstrated economic viability.
3. Mineral resources have been modeled with cut-off of 20% Fe Mineral resources have been estimated using ordinary kriging inside 100m by 100m by 5m block sizes. The mineral resource estimates were prepared in accordance with Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012) incorporating drilling data acquired until 2014.

Criteria	JORC Code explanation	Commentary
	• Whether appropriate account has been taken of all relevant factors (i.e. 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).	• The anisotropic average distance to samples from ordinary kriging estimation was adopted as criteria to distinguish Indicated and Inferred resource classes. Blocks with anisotropic average distance to samples lower than 50m were classified as Measured Resource; blocks with anisotropic average distance to samples higher than 50m and lower than 150m were classified as Indicated Resource; blocks with anisotropic average distance to samples higher than 150m and lower than 500m were classified as Inferred Resource • A pit scenario study was carried out in order to guide the future mining project implying that a reasonable prospect for an eventual economical extraction was tested for mineral resource classification. GE21 generated a schematic pit using physical and economic parameters of projects according to values practiced in the market, however with a reasonable sell price. The optimization was performed using the Geovia Whittle software

Criteria	JORC Code explanation	Commentary
	• Whether the result appropriately reflects the Competent Person's view of the deposit.	including Itabirates of the Bicuda North deposit and the full extension of talus deposit. All the compact hematite (HCO) end the talus deposit associated with HCO outcropping (TAL_HCO) are located inside resultant pit shell, then it is able to be classified as mineral resource. • The Competent Person believes the classification to be appropriate as mineral resource.
Audits or reviews	• The results of any audits or reviews of Mineral Resource estimates.	• In 2013 Coffey developed the "Tombador Project, Brazil Independent Technical Report on Exploration and Mineral Resources Estimation" which audited the entire Tombador Project database, including the Tombador Hematite data. Porfírio Rodriguez and Leonardo Soares who are the Competent persons for this report, were associated of Coffey (consultancy company), who provided consultancy on mineral resource estimate for Colomi during the period from 2011 to 2015, including site visits. Both are members of the Australian Institute of Geoscientists ("MAIG") and are independent of Colomi and Tombador mining companies.
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.	• GE21 has estimated Measured, Indicated and Inferred Mineral Resources for the Tombador Project, a high-grade portion of the Tombador Project, in accordance with the guidelines as set out in the JORC Code (2012). The in-situ resources are wholly contained within the current license boundary and do not take into account any elements which may sterilize areas of the deposit for mining operations. • The Tombador Iron Ore Project contains a representative prospective tonnage of iron mineralization. The Measured plus Indicated Mineral Resources for the project area has been estimated at 5.41 Mt at 67.21% Fe, 1.76% SiO2, 0.53% Al2O3, 0.032% Mn, 0.095% P and 0.36% LOI, (with 60%Fe lower cutoff grade applied). The cut off value applied was based on economic criteria from study of other similar deposits. • The drilling grid spacing, (from 50m x 50m to punctual chip samples) was robust enough for Measured and Indicated Resource classification. However additional sampling is required for reclassification of Talus lithology to a higher category. GE21 concludes that additional exploration of talus is the main target to be investigated with further work. • Based on these positive geological indications, GE21 considers the Tombador Iron Ore Project to be prospective for hosting economic high-grade iron ore deposits. It is for this reason that Coffey recommends the continuation of the current follow up exploration program and an additional exploration budget to: ○ Perform an additional topographic survey of the adjacent areas to improve surface information for mining studies. ○ Conduct additional metallurgical and processing tests to confirm existing results on the feasibility of economically processing the Talus material existing within the

Criteria	JORC Code explanation	Commentary
		deposit. ○ To continue and improve the current QAQC program ○ Pre-feasibility study to complete a comprehensive report for project development of small scale high grade production.
	• 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.	• Tombador Iron Ore Project's grade estimate relates global estimates.
	• These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	• Tombador Iron Ore Project haven't any production history. • Historically, a Brazilian company, called Ferbasa, was known to have mined Hematite from Tombador in the early 1980's when the price was significantly lower. Production records are not known however a surface pit is remnant on the hill with visible outcrop of hematite.

Competent Persons Statement

The information in this announcement that relates to Mineral Resources, Exploration Results/Exploration Targets is based on information compiled by Leonardo de Moraes Soares, a Competent Person who is a Member of The Australian Institute of Geoscientists registered with number AIG #5180. Mr. de Moraes Soares is a Geologist with fifteen years of continuous experience in the mining industry. Mr de Moraes Soares 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 de Moraes Soares consents to the inclusion in this announcement of the matters based on his information in the form and context in which it appears.

JORC Code, 2012 Edition – Table 1

TOMBADOR PROJECT – BICUDA TARGET – ITABIRITES RESOURCE UPDATE

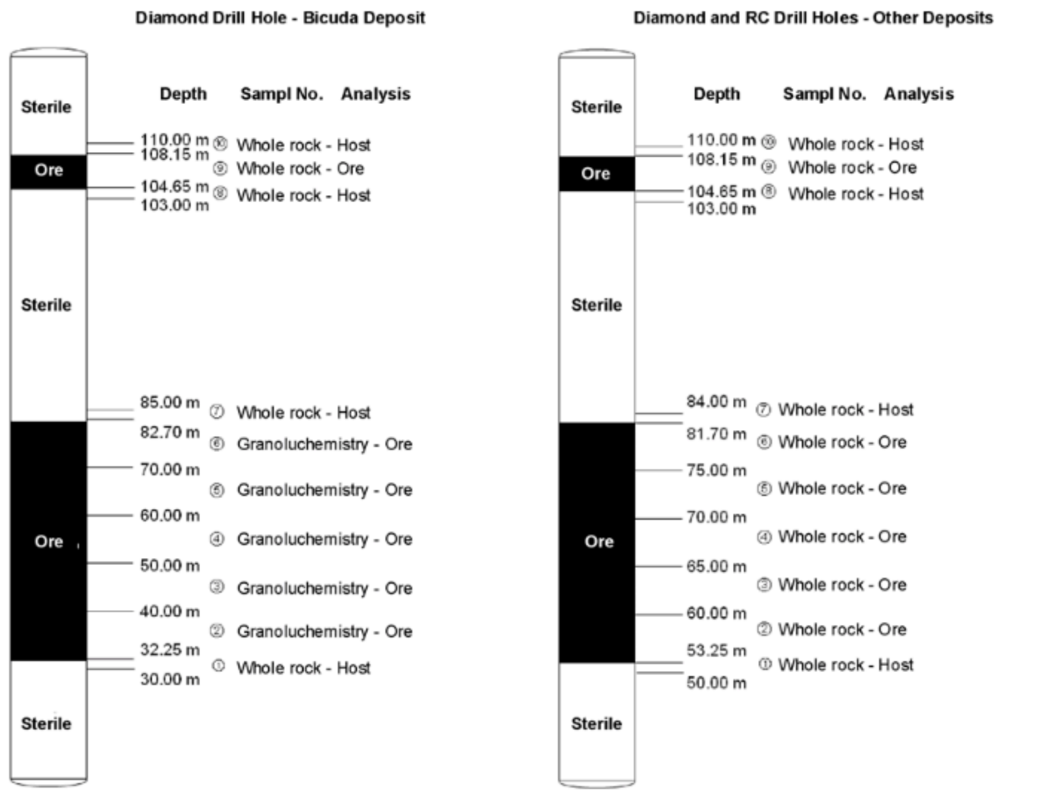
ANM Tenement No.: 872.431/2003

Section 1 Sampling Techniques and Data

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

Criteria	JORC Code explanation	Commentary
Sampling techniques	• Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc.). These examples should not be taken as limiting the broad meaning of sampling. • Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	• Samples were taken from diamond drillhole core, all drilled material was sampled, nothing being discarded. The assay program included the sampling of chips from the compact hematite outcroppings. This drill program was undertaken by VALE. Mineralization intervals chosen for splitting of the diamond drilling core was based on geological core description during drill core logging. Reverse circulation (RC) drilling samples were also produced according to industry standard procedures. • Measures to ensure sample representativity include occasional twinning of RC drill holes with diamond drillholes, setting up of a specific sampling procedure for and by geologist, having a dedicated on site full time survey team to pick up mapping sample sites and drilling locations, Assay QAQC at a second external laboratory Best practices as drillcore recovery and depth marks audits were performed during drilling campaign and sampling. The diamond drilling recovery conference consisted of verifying advance and recoveries recorded in the core boxes and drilling bulletins. For Diamond Drilling verification was undertaken by measuring with tapeline the core present in the boxes. For reverse circulation, the verification was undertaken by weighing of chip bags.
	• Aspects of the determination of mineralization 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	• Industry standard work has been done. All drilling was diamond core drilling. Core samples (HQ) were sawn in half before being collected to allow half of the material to be sent for chemical analysis and the remaining half were stored in the core shed. The sampling was planned by the geologists and care was taken to avoid any contamination between neighbouring samples. • RC samples were also collected by following sampling plans specified by the geologists. The samples were prepared by splitting using a Jones splitter. Initially each one-meter interval was split into 2 samples of approximately 40kg each. One of them was temporary archived and used to make chip rulers and chip boxes. The other half was used for final archiving and

Criteria	JORC Code explanation	Commentary
	commodities or mineralization types (e.g. submarine nodules) may warrant disclosure of detailed information.	creation of the sample intended for the chemical analysis. The sample intended for the final archiving and chemical analyses were split, generating two samples with approximately 10 kg each. One of these was duly registered with labels inside and outside the bag and filed in the core sheds in Sento Sé– BA. The second sample of 10 Kg was used in the composition of the sample sent for chemical analysis. • Sample collection for Granulo-chemical analysis Samples obtained from Bicuda diamond drilling were used for granulochemical analysis due to the existence of hematite in the southern area with potential to form direct shipping lump ore. Ore samples from diamond drilling were collected using a 10 m intervals, (with minimum >5 m and maximum <15 m) obeying lithological and weathering contacts. To ensure a clear definition of the boundaries of mineralised zones, 2m samples of core were collected of the host rock above and below the mineralised intervals. • **Sample Collection for Total Rock Analysis** For samples from Bicuda of less than five meters a simple total or whole rock analysis was used. Samples from 5 diamond holes and 8 RC holes performed in North of Bicuda North were collected using a 5 m support with a minimum >3 m and a maximum <7 m, obeying lithological and weathering contacts. For a clear definition of the limits of the mineralized zones, 2m samples of core were collected of the host rock above and below the mineralised intervals.

Criteria	JORC Code explanation	Commentary
		
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.).	• All of the Bicuda deposit drill holes were HQ sized (6.35 cm) diamond drill holes. Diamond holes were undertaken in HQ size diameter triple tube. • All the holes in Bicuda were vertical, some holes in Bicuda North were inclined. In inclined holes trajectory measures using a Maxibor were made with readings every three metres downhole. • The drill program for the Bicuda deposit on tenement 872.431 was a subset of a much larger drill program from Colomi (the previous owner). The Bicuda deposit in tenement 872.431 crosses the boundary and joins with the Bicuda North deposit.

Criteria	JORC Code explanation	Commentary
		• There are 6 diamond drill holes and 8 RC drill holes in the Bicuda North deposit area and there are 50 diamond drill holes in the Bicuda deposit area. There are 27 holes within tenement 872.431 with 27 of the holes relating to the Bicuda deposit area.
Drill sample recovery	• Method of recording and assessing core and chip sample recoveries and results assessed.	• The diamond drilling recovery conference (conference is the logging and sampling procedure set up by the Senior geologists) consisted of verifying advance and recoveries recorded in the core boxes and drilling bulletins. For Diamond Drilling, verification was undertaken by measuring with tapeline the core present in the boxes.
	• Measures taken to maximise sample recovery and ensure representative nature of the samples.	• Applied recovery control procedure and the recovery values was inside acceptable limits. The hematite was in most cases massive, providing excellent sample recoveries.
	• 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.	• Not applied because the core recovery problems were not detected. • For reverse circulation, the verification was undertaken by weighing of chip bags. • Twin hole analysis showed good correlation between recoveries and analysis of sample recovery to diamond core and RC sample weights showed no relationship to grade
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.	• Geotechnical description was performed on all diamond holes where they were classified by geotechnical parameters W (degree of change weathering), R (degree of resistance), spacing of fractures and RQD with degree of detail to one meter. The data was also collected directly onto PDA's using LogMate software. • The author considers that the level of detail is sufficient for the reporting of Exploration Results and for future Mineral Resource Estimation.
	• Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	• Lithological logging is qualitative in nature. Post assaying the lithology was re-classified into a new category called litho assay, prominent within the MS access database. Core is photographed prior to logging when geological codes were applied. Geological Description consisted of defining weathering levels, mineralogical lithological and structural data, in all holes with detail of one meter.
	• The total length and percentage of the relevant intersections logged.	• All drillholes were fully logged.
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	• VALE conducted the drilling and collected core samples which were sawn in half before being collected to allow half of the material to be sent for chemical analysis and the remaining half were filed in the core shed. The sampling was planned by the geologists and care was taken to avoid any contamination between neighbouring samples. • RC samples were also collected by following sampling plans specified by the geologists. The samples were prepared by splitting using a Jones splitter. Initially each one-meter interval was split into 2 samples of approximately 40kg each. One of them was temporary archived

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td></td><td>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.</td><td>and used to make chip rulers and chip boxes.
Samples from Bicuda were subjected to granulo-chemical analysis and samples from Bicuda North were subjected to Total Rock chemical analysis.
• Granulo-chemical Analysis
Each entire 10m composite sample (20-30kg) was metallurgically tested using granulo-chemical analysis which employs the following method. Coarse crushing and separation of size fractions as follows:
• 8mm to 31.5mm
• 1mm to 8mm
• 0.15mm to 1 mm
• < 0.15mm
Once weighed, each interval was crushed, pulverized, mixed, split and assayed by:
• X-Ray fluorescence for the following elements and oxides: Fe, SiO2, P, Al2O3, Mn, TiO2, MgO, CaO, BaO, K2O, Na2O3 & Cr2O3
• Volumetric analysis using potassium dichromate for FeO
• Loss on Ignition (LOI) at 1000°C
The assays and weights of each size fraction were used to calculate a weighted average assay for the global sample.
• Total Rock Analysis
The physical preparation of the drilling samples was performed at the ALS Chemex Laboratory of Vespasiano – MG. The procedure included drying, primary crushing P95%<4 mm, collection of (1/8 for diamond holes and 1/4 for RC holes) of the sample, grinding P95 % < 0.105mm and final division with collection of one sample for whole chemical assay.
• In RC holes, to ensure the accuracy of physical process duplicates were made of the crushed material DP2 on frequency of 1/30, after primary crushing (P 95%< 4 mm) and pulverized material DP3 on frequency of 1/20 after pulverization.
• Drill hole sample sizes were considered as appropriate by GE21, and chip sampling procedures has recommendations to future works to review chip sample sizes.
• GE21 considers the Vale duplicate sampling procedure to be appropriate for resource estimation JORC 2012.
• GE21 deems the sample sizes appropriate to the grain size of the material being sampled.</td></tr>
<tr><td>Quality of assay data and</td><td>• The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.</td><td>• The assaying regime is considered to be the standard for the determination of Iron. Chemical analyses were conducted in the laboratory of SGS Geosol, Vespasiano-MG, while checking of 5% of the results were made in the laboratory of ALS Chemex. Sample pulps were assayed by X-Ray fluorescence for the following elements and oxides: Fe, SiO2, P, Al2O3, Mn, TiO2, CaO, MgO, BaO, K2O, Na2O and Cr2O3. The assay technique is considered to</td></tr>
</table>

Criteria	JORC Code explanation	Commentary
laboratory tests		be a global sample geochemical analysis method and a standard technique within the Iron Ore industry
	• 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.	• Handheld geophysical tools were not used, sample preparation & assaying was completed within external laboratories • Chemical analysis performed in total rock samples were the same applied in granulochemical samples of Bicuda North deposits. • The Loss on Ignition Determination (LOI) at 1000°C was also completed by SGS Geosol and Chemex.
	• 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.	• Quality control tools (standard samples and duplicates) were applied and monitored in chemical analysis performed on SGS Geosol and ALS Chemex laboratories. The quality control was restricted to the elements Al2O3, Fe, MgO, P, Mn, SiO2 and to LOI (lost on Ignition). The monitored parameters were evaluated in each of the following QAQC tools: Field duplicates; crushing duplicates; pulverized duplicates (internal and independent laboratory); project standard samples; stoichiometry checks; and blank samples. • Duplicates quality control results presented by VALE are, in general terms, inside acceptable limits. • The evaluation of the chip sample duplicates shows results within acceptance limit and did not indicate that samples were swapped.
Verification of sampling and assaying	• The verification of significant intersections by either independent or alternative company personnel.	• GE21 approves the methodology applied by Vale in the preparation and execution of the Tombador Project QAQC Program. GE21 does not judge the values presented in the report for not having access to QAQC data sheet, but has accompanied the VALE QAQC programs in other projects that used the same methodology and tends to agree with the recommendations of VALE, which concludes it's necessary to improve the QAQC program and some tools, as appropriate standard sample implementation.
	• The use of twinned holes.	• No Twin holes were performed in Tombador Area
	• Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	• GE21 approves the methodology applied by Vale in the preparation and execution of the Colomi Project QAQC Program. According to GE21, results are inside acceptance limits of mineral industry. • Data collection and verification and storage protocols are fully documented.
	• Discuss any adjustment to assay data.	• Adjustment to assay data was neither required nor applied.
Location of data points	• Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other	• All drillhole collars were topographically surveyed by total station surveying campaign and drillhole landmarks have been properly identified.

Criteria	JORC Code explanation	Commentary
	locations used in Mineral Resource estimation. • Specification of the grid system used. • Quality and adequacy of topographic control.	• SAD69 Datum for coordinate system. • No issue was identified by GE21 in the field or in drilling data physical archive.
Data spacing and distribution	• Data spacing for reporting of Exploration Results.	• The holes were arranged in grid sizes varying from 50 x 50m to 200m x 200m in Tombador deposit. • Diamond drillhole samples were produced at average length of 10 m length. Compositing was produced using these nominal lengths for itabirites. For talus samples, the compositing size was 5m.
	• 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.	• GE21 judges that appropriate grid spacings and applied sampling and composition lengths were provided to establish the degree of geological continuity and classification reported by GE21.
	• Whether sample compositing has been applied.	• GE21 judges appropriate applied sampling and composition lengths to establish the degree of geological continuity and classification.
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.	• The geological layers are dipping approximately 30° and the holes are vertical. Sampling was performed almost perpendicular to the layers, which is the best condition.
	• If the relationship between the drilling orientation and the orientation of key mineralized structures is considered to have introduced a sampling bias, this should be assessed and reported if material.	• No bias was introduced when using vertical drillholes.
Sample security	• The measures taken to ensure sample security.	• GE21 approves the methodology applied by Vale in the preparation and execution of the Colomi Project QAQC Program. GE21 didn't have access to QAQC data sheet, but has accompanied the VALE QAQC programs in other projects that used the same technique. • The core boxes were transported by the company's personnel from the drill site to the core storage facility in Sento Sé. Drill boxes and RC sample bags were labelled with hole number

Criteria	JORC Code explanation	Commentary
		and depth interval and the core is photographed prior to logging.
Audits or reviews	• The results of any audits or reviews of sampling techniques and data.	• In 2011 Coffey prepared the “Colomi Project, Brazil Independent Technical Report on Exploration and Mineral Resources Estimation” which audited the entire Colomi Project database, including the Tombador itabirite data, the results being in that report.

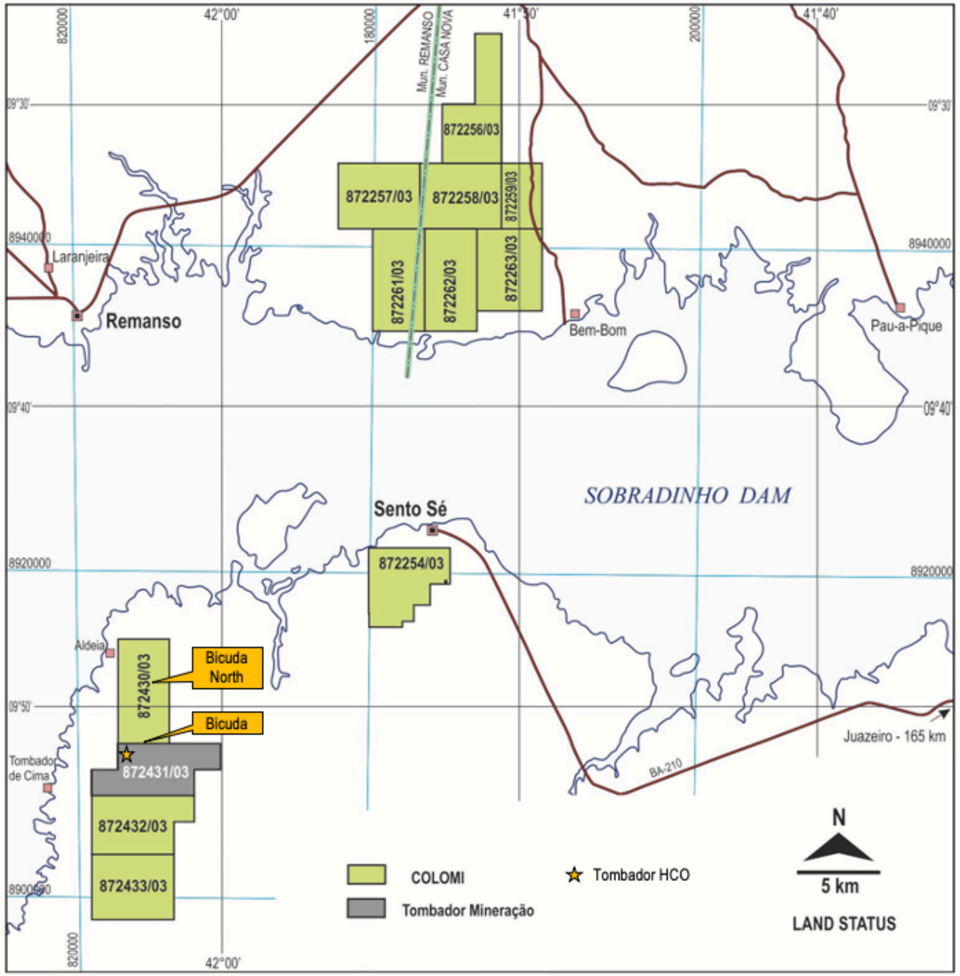
Section 2 Reporting of Exploration Results

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

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr>
<td>Mineral tenement and land tenure status</td>
<td>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.</td>
<td>
<table>
<tr><th colspan="7">Tombador Project
Summary of Concession Status in TIM’s Tombador Project</th></tr>
<tr><th>Company</th><th>Municipality</th><th>Process No.</th><th>Area (Hectares)</th><th>Application Date</th><th>Exploration Permit N°</th><th>Status</th></tr>
<tr><td>Tombador Iron Mineração Ltda</td><td>Sento Sé</td><td>872.431/03</td><td>2000</td><td>16/12/2003</td><td>1315</td><td>FER approved on 17/02/2020</td></tr>
</table>

Tombador Iron Mineracao Ltda. (TIM or the “Company”) is the titleholder of exploration lease 872.431/2003, which was transferred to TIM from Colomi Iron Mineracao Ltda. (CIM or “Colomi). The Final Exploration Report was approved and published at Brazilian Federal Gazette on February 17, 2020 and the tenement 872.431/2003 was transferred from Colomi Iron Mineração Ltda to Tombador Iron Mineração Ltda and published at Federal Gazette on 14th April 2020.
Main exploration works was carried on by VALE a major iron ore mining company. The exploration program for the Tombador project was completed as part of a larger program covering all of CIM’s tenements shown in figure below with Concession Area Map. The Principal Source of information was the Final Exploration Report (FER) to DNPM/ANM (Brazilian National Department of Mineral Production/National Agency of Mining) with description and evaluation of results obtained in the exploration work carried out by VALE in the areas related to TIM and Colomi Exploration Permits.

</td>
</tr>
</table>

Criteria	JORC Code explanation	Commentary
		Concession Area Map 
	• The security of the tenure held at the time of reporting along with any	• GE21 had consult the DNPM/ANM' GIS system (http://sigmine.dnpm.gov.br/webmap/) to perform a preliminary check of the status of tenement areas at the time of report and the information shows the

Criteria	JORC Code explanation	Commentary
	known impediments to obtaining a license to operate in the area.	areas as regular for exploration works by Tombador Iron Mineração.
Exploration done by other parties	• Acknowledgment and appraisal of exploration by other parties.	• Main exploration works was carried on by VALE a major iron ore mining company. Principal source of information was the Final Exploration Report (FER) to DNPM/ANM (Brazilian National Department of Mineral Production/ Mining National Agency) with description and evaluation of results obtained in the exploration work carried out by VALE in the area related to TIM's and Colomi's Exploration Permits.
Geology	• Deposit type, geological setting and style of mineralization.	• Mineralization: The geological, chemical, physical and technological characteristics divide the discovered iron mineralizarion into five different types: Dolomitic Itabirite, Siliceous Itabirite, Amphibolitic Itabirite, Talus Deposit and Hematitite. • The talus deposits are represented by layers with thickness average of 3.50 m, formed mainly by itabirite blocks and, secondary blocks of quartzites, dolomites and shales, immersed in siltose mass. Hematite talus blocks are only found in the adjacencies of hematite deposit of Bicuda. • Hematites represent the high grade granulated iron ore resources, restricted to the southern deposit Bicuda. The hematite orebody occurs in the drag fold hinge in siliceous itabirite, showing an azimuth direction of 30°. This fold has been interpreted as being generated by a transfer fault, approximately N10E direction. • Itabirites: siliceous and dolomitic itabirites, lesser metamorphic grade, and influence of folds, faults and shear zones.

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.	• Drill hole collars for all holes in Tenement 872.431/2003

Drill Hole ID	Coord. UTM - Córrego Alegre			Depth (m)	Dip	Tenement ID
	X	Y	Z			
COL-BICU-DH00001	823487.97	8908771.18	548.11	96.00	-90.000	872.431/2003
COL-BICU-DH00002	823484.40	8908818.26	534.73	118.10	-90.000	872.431/2003
COL-BICU-DH00003	823581.44	8908967.98	540.29	58.50	-90.000	872.431/2003
COL-BICU-DH00004	823431.26	8908818.20	527.05	79.50	-90.000	872.431/2003
COL-BICU-DH00005	823428.51	8908868.08	505.64	72.30	-90.000	872.431/2003
COL-BICU-DH00006	823786.64	8908366.99	531.82	110.90	-90.000	872.431/2003
COL-BICU-DH00007	823631.73	8908867.61	584.81	127.45	-90.000	872.431/2003
COL-BICU-DH00008	823728.22	8908966.04	556.57	160.20	-90.000	872.431/2003
COL-BICU-DH00009	823630.55	8908814.88	602.75	207.20	-90.000	872.431/2003
COL-BICU-DH00010	823460.77	8909162.72	507.30	178.40	-90.000	872.431/2003
COL-BICU-DH00012	823731.81	8908868.03	591.57	132.30	-90.000	872.431/2003
COL-BICU-DH00013	823731.53	8908667.99	632.66	159.20	-90.000	872.431/2003
COL-BICU-DH00016	823478.39	8908668.24	606.20	156.30	-90.000	872.431/2003
COL-BICU-DH00017	823439.97	8908754.44	573.33	79.60	-90.000	872.431/2003
COL-BICU-DH00019	823931.40	8908368.07	559.16	150.20	-90.000	872.431/2003
COL-BICU-DH00021	823536.16	8908868.62	557.35	173.95	-90.000	872.431/2003
COL-BICU-DH00022	823484.08	8908868.08	529.39	145.50	-90.000	872.431/2003
COL-BICU-DH00023	823587.85	8908567.53	651.29	210.10	-90.000	872.431/2003
COL-BICU-DH00024	823581.90	8909060.02	491.12	250.00	-90.000	872.431/2003
COL-BICU-DH00038	824080.14	8908267.09	497.40	116.50	-90.000	872.431/2003
COL-BICU-DH00041	823336.12	8909268.14	536.83	111.30	-90.000	872.431/2003
COL-BICU-DH00043	823581.43	8909283.48	547.55	163.60	-90.000	872.431/2003
COL-BICU-FD0001	824213.02	8908467.25	507.23	106.80	-90.000	872.431/2003
COL-BICU-FD0003	823638.77	8908579.10	646.00	56.65	-90.000	872.431/2003
COL-BICU-FD0004	823481.36	8908687.50	599.35	104.00	-90.000	872.431/2003
COL-BICU-FD0005	823507.88	8908781.59	547.56	119.85	-90.000	872.431/2003
COL-BICU-FD0006	823466.74	8908800.91	536.14	52.80	-90.000	872.431/2003

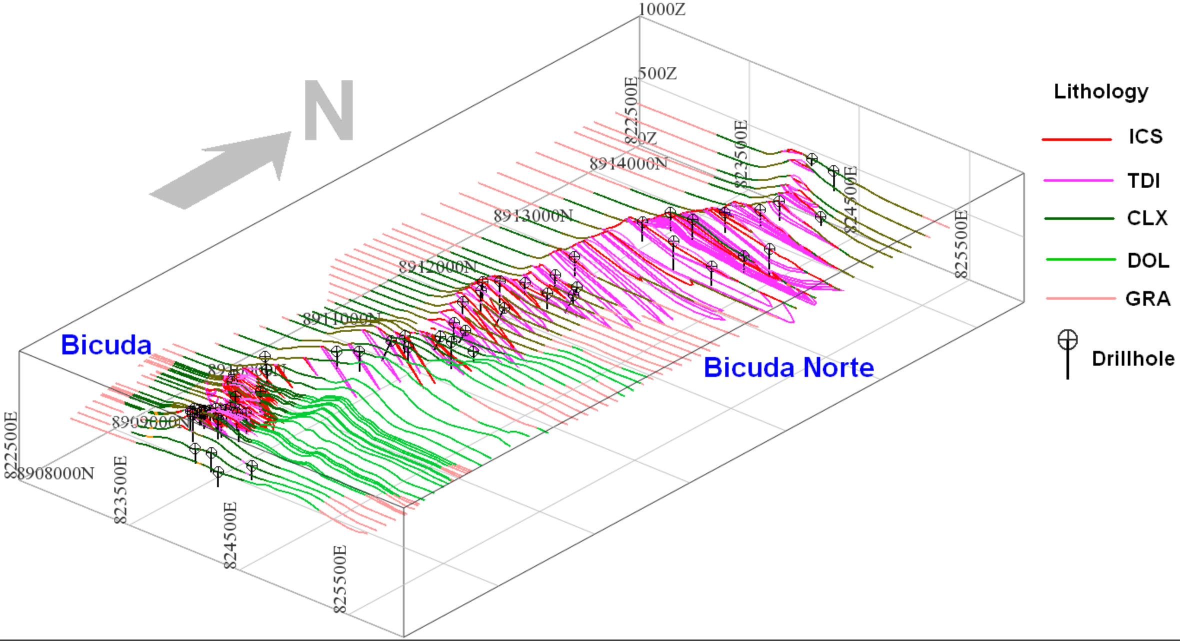
- Itabirite intercepts for Bicuda deposit only

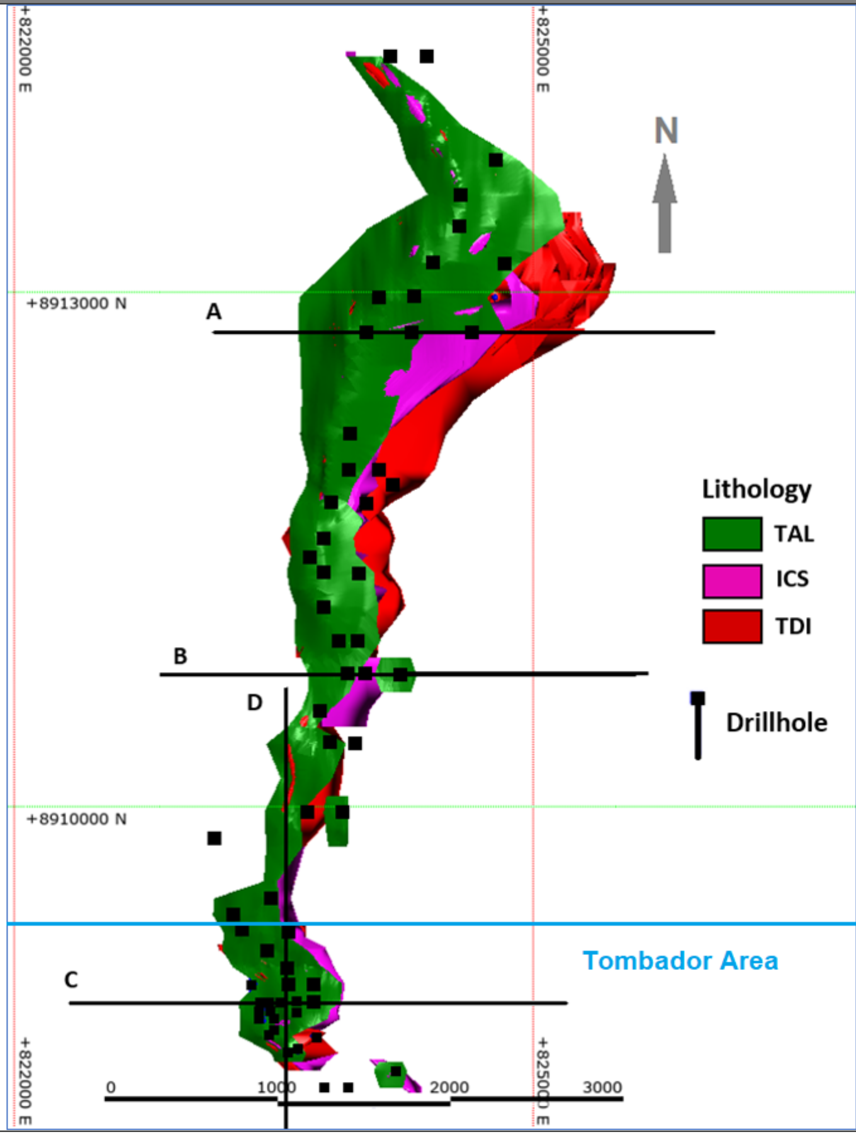
Hole ID	Type	Depth From	Depth to	Average Fe Grade	Length (m)
COL-BICU-DH00002	ICS	60.36	67.14	57.24	7.1
COL-BICU-DH00002		15.67	19.33	52.90	5.0
COL-BICU-DH00003		1.20	8.66	41.83	7.5
COL-BICU-DH00004		28.00	40.29	58.20	12.4
COL-BICU-DH00005		10.29	13.19	58.40	2.9
COL-BICU-DH00007		3.10	42.41	34.99	38.9
COL-BICU-DH00008		5.00	20.05	39.66	15.0
COL-BICU-DH00009		2.80	25.56	34.83	22.7
COL-BICU-DH00009		109.30	114.34	37.41	5.0
COL-BICU-DH00009		83.01	97.75	30.26	14.7
COL-BICU-DH00010		20.50	33.55	22.15	13.5
COL-BICU-DH00012		30.06	37.10	25.64	7.0
COL-BICU-DH00012		5.20	20.60	54.26	15.4
COL-BICU-DH00016		20.16	33.37	42.10	13.2
COL-BICU-DH00021		34.95	40.34	59.00	5.3
COL-BICU-DH00021		4.20	25.14	43.79	20.8
COL-BICU-DH00021		86.65	100.83	50.62	14.3
COL-BICU-DH00023		1.20	29.97	39.67	29.0
COL-BICU-DH00024		3.00	13.08	34.33	10.0
COL-BICU-DH00041		2.00	16.14	41.97	14.1
COL-BICU-DH00043		26.71	94.63	32.46	68.0
COL-BICU-FD0001		25.01	30.56	50.43	5.6
COL-BICU-FD0003		40.11	56.65	37.16	16.7
COL-BICU-FD0004		19.25	43.39	42.51	24.1
COL-BICU-DH00001	TAL	0.00	2.95	47.50	3.0
COL-BICU-DH00002		0.00	1.00	38.50	1.0
COL-BICU-DH00003		0.00	1.20	39.60	1.2
COL-BICU-DH00004		0.66	3.19	57.93	6.0
COL-BICU-DH00005		0.00	3.30	39.30	3.3
COL-BICU-DH00007		0.00	3.10	31.30	3.1
COL-BICU-DH00008		0.00	5.00	44.43	5.0
COL-BICU-DH00009		0.00	2.80	42.00	2.8
COL-BICU-DH00010		0.00	5.80	37.57	5.8
COL-BICU-DH00012		0.00	5.20	49.75	5.2
COL-BICU-DH00016		0.00	4.60	37.80	4.6
COL-BICU-DH00017		0.00	3.00	60.90	3.0
COL-BICU-DH00021		0.00	4.20	41.50	4.2

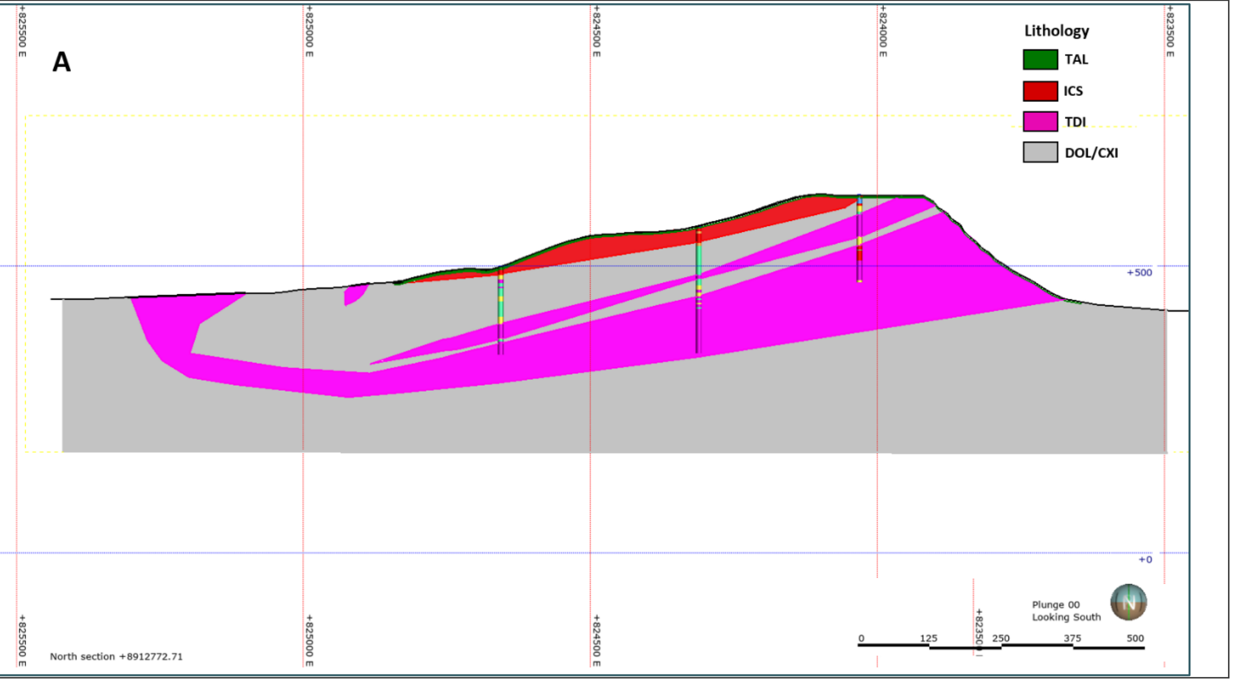
Hole ID	Type	Depth From	Depth to	Average Fe Grade	Length (m)
COL-BICU-DH00013	TDI	56.71	60.48	31.80	3.7
COL-BICU-DH00003		36.71	40.26	27.50	3.5
COL-BICU-DH00002		68.55	80.37	23.74	11.9
COL-BICU-DH00007		74.09	84.69	23.61	10.7
COL-BICU-DH00008		41.97	50.12	16.67	8.1
COL-BICU-DH00008		60.11	69.85	25.00	9.6
COL-BICU-DH00003		8.70	14.23	21.46	5.5
COL-BICU-DH00001		54.69	70.00	20.22	14.8
COL-BICU-DH00004		6.28	17.34	39.86	11.0
COL-BICU-DH00021		117.31	128.68	36.72	11.5
COL-BICU-FD0005		51.04	79.98	26.29	29.3
COL-BICU-FD0004		49.24	70.00	24.85	20.8
COL-BICU-FD0003		30.30	39.81	34.29	9.8
COL-BICU-DH00043		111.39	143.33	23.15	32.2
COL-BICU-DH00041		62.45	72.02	22.32	9.4
COL-BICU-DH00041		39.59	45.97	37.64	6.7
COL-BICU-DH00024		133.32	140.73	19.11	7.5
COL-BICU-DH00024		112.93	123.77	29.69	10.7
COL-BICU-DH00024		33.51	44.93	21.82	11.4
COL-BICU-DH00013		22.44	28.31	23.50	5.9
COL-BICU-DH00022		84.89	95.47	20.43	10.4
COL-BICU-DH00008		109.02	119.57	23.78	10.5
COL-BICU-DH00017		40.68	60.19	27.17	19.5
COL-BICU-DH00016		40.60	69.77	23.49	29.0
COL-BICU-DH00016		12.64	19.97	23.64	7.3
COL-BICU-DH00013		90.85	97.76	33.03	6.8
COL-BICU-DH00013		44.49	52.94	25.77	8.5
COL-BICU-DH00012		96.11	109.15	20.62	13.1
COL-BICU-DH00010		107.92	113.65	18.37	5.7
COL-BICU-DH00010		82.39	104.36	31.85	22.0
COL-BICU-DH00009		136.86	158.35	32.98	21.3
COL-BICU-DH00023		43.43	49.98	18.78	6.3
COL-BICU-DH00022	TAL	0.00	1.00	38.20	1.0
COL-BICU-DH00023		0.00	1.20	35.70	1.2
COL-BICU-DH00024		0.10	3.00	41.40	3.0
COL-BICU-DH00041		0.00	1.91	39.20	2.0
COL-BICU-FD0004		0.00	4.60	34.50	4.6
COL-BICU-FD0006		0.00	3.60	64.20	3.6

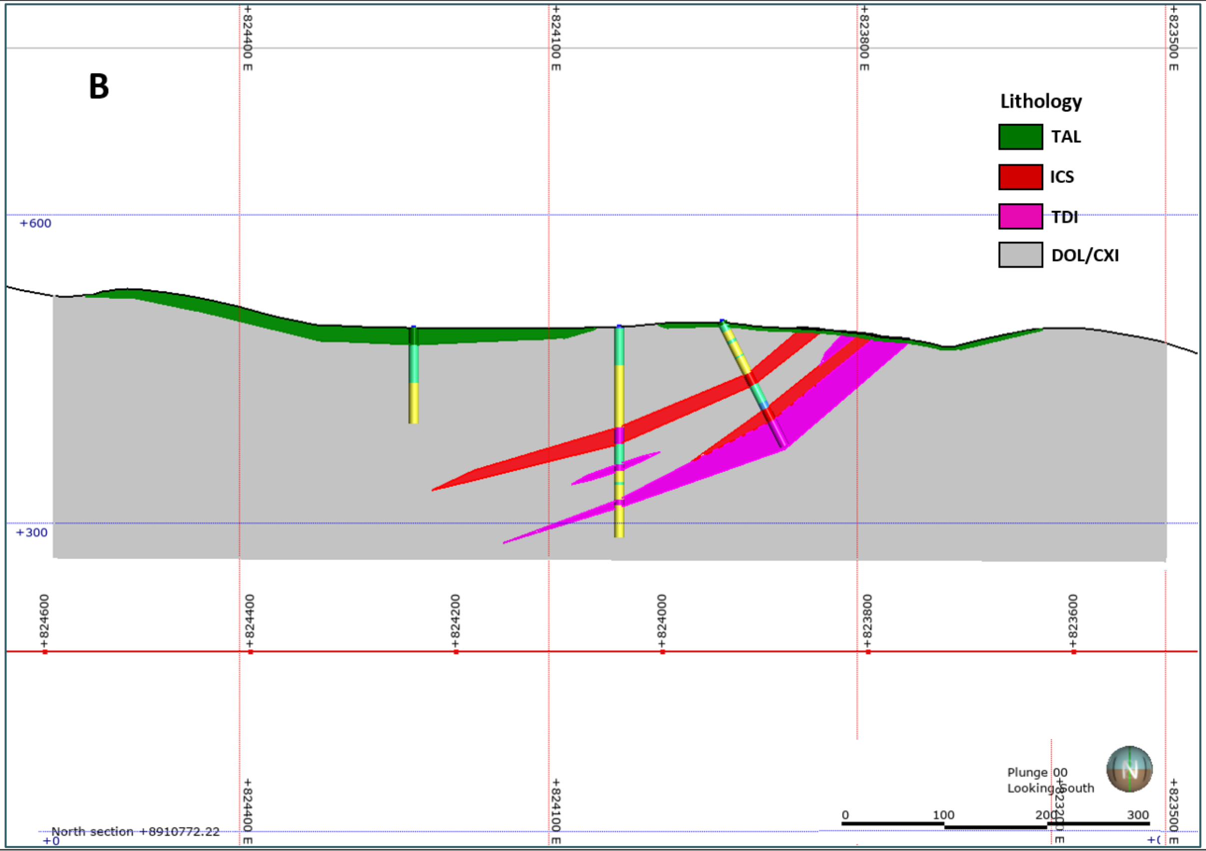
- Mineralization intervals intersected by drilling was aggregated by weighted average length.

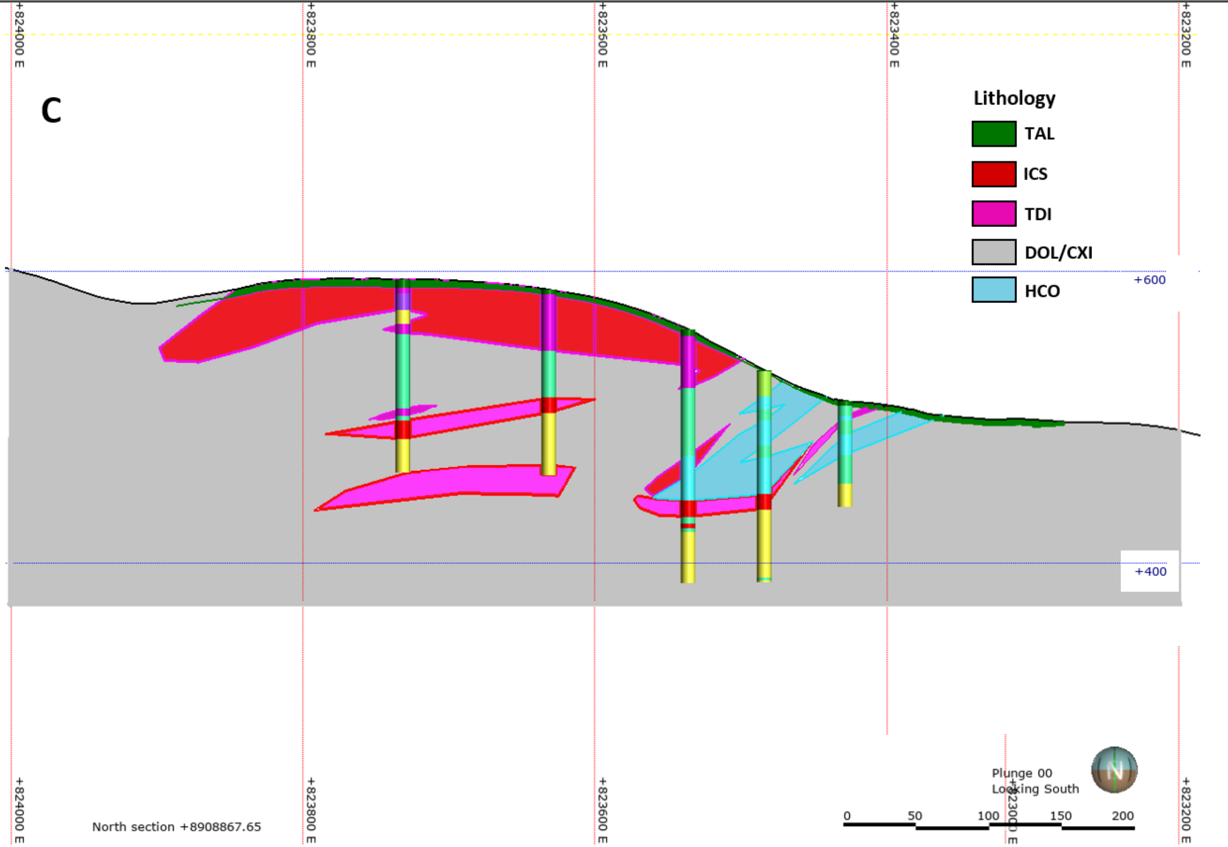
Criteria	JORC Code explanation	Commentary
Data aggregation methods	• In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated. • Where aggregate intercepts incorporate 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.	• For samples assayed by granulo-chemical analysis Global grades of interval samples were aggregated by weighted average mass of each size fraction. There were 4 size fractions assayed for each granulo-chemical sample for all significant mineralized intervals. • Drill hole samples and were composited to regular downhole lengths of 10m. Compositing was applied to the mineralized intervals inside the geological model. Talus samples were composited at 5m length. • A cut-off grade of 20% Fe was applied on Itabirites and talus mineralization models. • Samples were collected in intervals obeying lithological contacts. To ensure a clear definition of the boundaries of mineral zones, 2 m samples were also collected of the host rock above and below the mineralized intervals. See Sampling Techniques. • No metal equivalent was reported. It's not a mining industry practice the report of metal equivalent for iron ore mineralization type.
Relationship between mineralization widths and intercept lengths	• These relationships are particularly important in the reporting of Exploration Results. • If the geometry of the mineralization 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').	• All holes were vertical and mineralization zone dipping at 30°. • NA • Further diagrams necessary to describe the Project are included in "Independent Technical Report on Exploration and Mineral Resources Estimation – Itabirite Resources Update"- Prepared by GE21.
Diagrams	• Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant	• Further diagrams necessary to describe the Project are included in "Technical Memorandum related to Itabirite Resources Update"- Prepared by GE21.

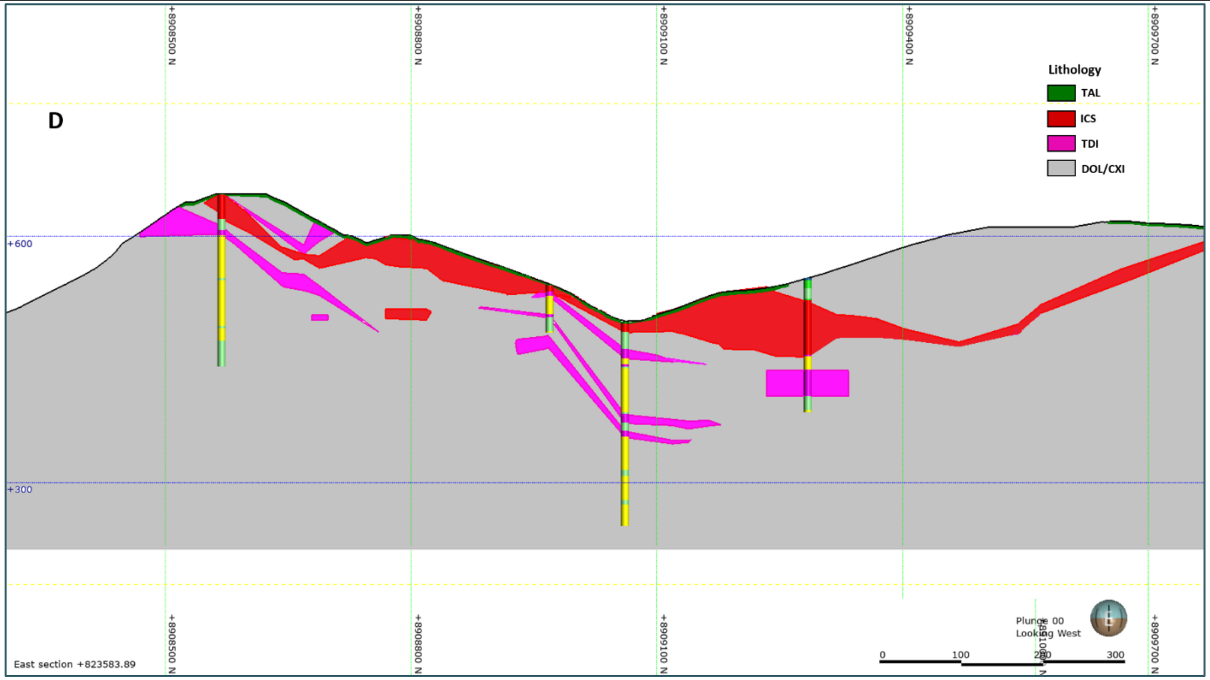
Criteria	JORC Code explanation	Commentary
	discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	

Criteria	JORC Code explanation	Commentary
		

Criteria	JORC Code explanation	Commentary
		

Criteria	JORC Code explanation	Commentary
		

Criteria	JORC Code explanation	Commentary
		

Criteria	JORC Code explanation	Commentary
		

Criteria	JORC Code explanation	Commentary
Balanced reporting	• Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.	• The Tombador exploration was part of a larger VALE exploration and drilling program as mentioned in the report prepared by Coffey in 2011: "Colomi Project, Brazil Independent Technical Report on Exploration and Mineral Resources Estimation". Modest metallurgical tests were completed in 2013 by an external group "Mope" on 10 samples consisting of 3 drill core 5 outcrop and 2 composite samples. No deleterious or contaminating substances were encountered. Sulphur results were less than 0.01%.
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.	• Additional topographic survey. • Sampling for additional metallurgical and processing tests
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).	• Extensions of HCO were not considered in the geological modelling. Talus deposit extends over the deposit on influence area of Itabirites mineralization.
	• Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	

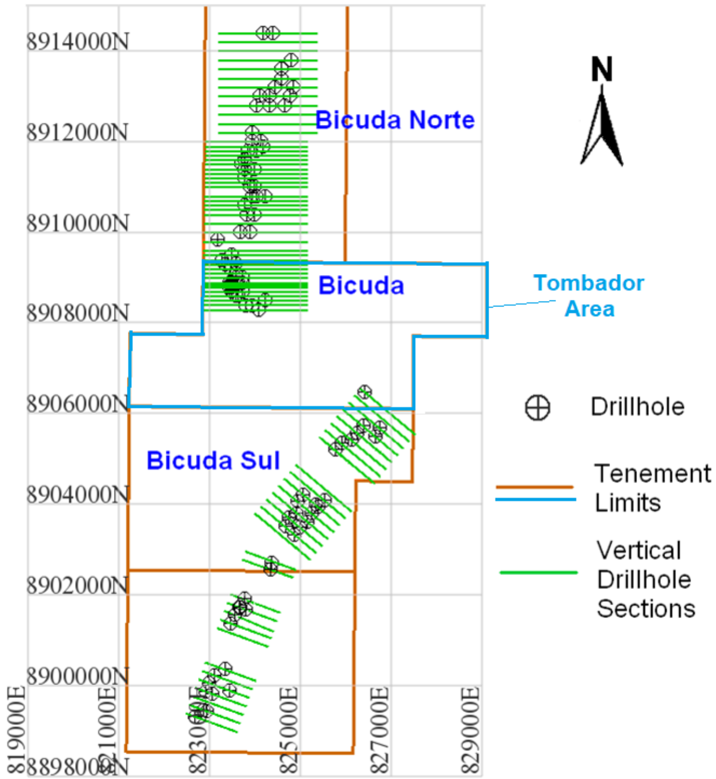
Section 3 Estimation and Reporting of Mineral Resources

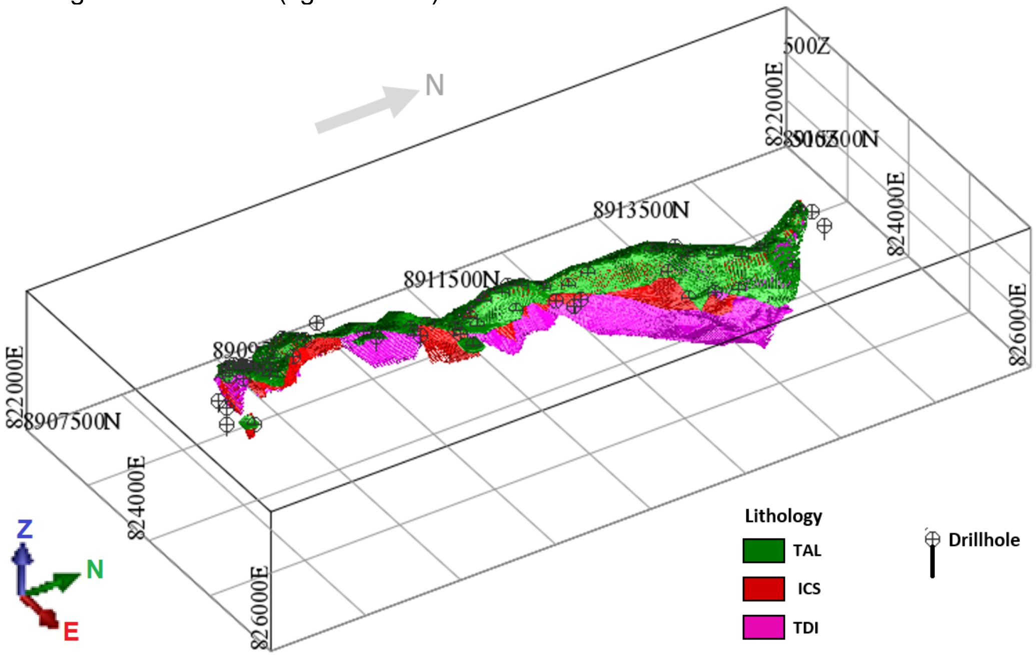
(Criteria listed in section 1, and where relevant in section 2, also apply to this section.)

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 Tombador deposit drilling data base was received excel format and GE21 produced the Access datasets. • GE21 carried out an electronic validation of the databases with Geovia Surpac software. No errors, as gaps or overlapping data, or other material inconsistencies were found.
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.	• A site visit was undertaken by Mr Porfirio Rodriguez to the Colomi Project between 12th to 14th November 2013. • Not Applied
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.	• There is high confidence in the geological interpretation as there is a semi-detail geological map to guide the modelling of the mineralization zone. The defined horizons are considered to be reasonably robust. The Itabirites model was updated as an extension of the original model presented in the previous Independent Resource Estimate, as prepared by Coffey on September 2013. The updated model on March 2020 was based on updates performed in HCO model. • There is a total of 27 drill holes included in Tombador area. The drilling database contained 2 drilling campaigns Bicuda and Bicuda North (in Colomi's tenement) which crossed tenement boundaries. These were combined to create a single geological model (see figure below). The update of Itabirite in Tombador area was performed together with Bicuda North (Colomi's Tenement area) drillhole database information and geological model.

Tombador Itabirite Project
TIM Drill Hole Databases Summary

Target	Drilling Method	Total of Drill Holes	Total length (m)	Samples with Chemical results
Bicuda & Bicuda North	Diamond and RC	64	8668.2	778
Bicuda (Within Tenement 872.431)	Diamond Drilling	27	3497.2	293

Criteria	JORC Code explanation	Commentary
		
	• 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.	• Consistent mineralized intersections and are drilled at a reasonably close spacing refuting alternate mineral interpretations. • Vertical geological section provided a guide to the interpreted ore wireframes. • The continuity of grade and geology were verified in all the extension of drilling area. Depth continuity was, also, interpreted based on drilling data.

Criteria	JORC Code explanation	Commentary
Dimensions	• The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.	• The mineralization outcrops. The mineralization in drilling area is 30 to 50m in thickness and occurs at a length of approximately 150m down dip. The mineralized layers were interpreted from 10 meters a maximum thickness of 20m.
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.	• Resource modelling was performed with Geovia Surpac software. The drilling database contained 2 drilling campaigns Bicuda and Bicuda North (in Colomi's tenement) which crossed tenement boundaries. These were combined to create a single geological model. (See figure in Geological Interpretation). • Three 3D block model were constructed for resource estimation purposes for the Itabirite orebodies. The block dimensions were defined as 50m x 50m x 5m and sub-blocks of 12.5m x 12.5m x 2.5m, based on a quarter of the drilling grid dimensions. Sub-blocking was applied to assure a good adherence between the geological model and the lithological unit attitude (figure below).  • • Variables Fe were statistically analyzed in Units ICS and TDI for samples from diamond drilling and reverse circulation drilling method, separately, to check the validation on the

Criteria	JORC Code explanation	Commentary
		use of datasets of these two sampling methods together. The comparative statistical results for this validation show that the average grade and variability of variable grades for total datasets and datasets from individual drilling types are on the same magnitude and can be applied together in variographic analysis and grade estimate.
		• The downhole experimental variograms were calculated to establish the structures for composite grades.

Variogram Models Summary

Variable	Unit	C0	C1	A1	C2	A2	Azimuth	Plunge	Dip	Major/Semi-Major Ratio	Major/Minor Ratio
Fe	ICS	1	6.4	35	25	250	216	2	12	1.6	4.2
SiO2		1	33.18	35	11.85	250	216	2	12	1.4	3.7
Al2O3		0.01	0.15	35	0.22	250	222	3	12	1.3	4.1
Mn		0.001	0.011	35	0.015	250	216	2	12	1.3	4.4
P		9.80E-05	1.20E-04	35	3.60E-04	250	216	2	12	1.5	7.7
LOI		1.00E-01	3.10E-01	35	7.40E-01	250	216	2	12	1.4	6.2
Fe	TDI	0.9	4	35	24	250	139	-14	18	1.6	4.2
SiO2		1	17	35	49	250	139	-14	18	1.5	3
Al2O3		0.005	0.12	35	0.02	250	139	-14	18	1.3	6.4
Mn		2.50E-04	2.00E-03	35	3.70E-03	250	139	-14	18	1.4	5
P		1.00E-05	2.10E-05	35	1.20E-04	250	263	12	0	1.2	3.6
LOI		1	3	35	39	285	139	-14	18	1.4	6.6

•

• The established Kriging plan, for all attributes, considered three estimation steps, as presented in the Table below:

Criteria	JORC Code explanation	Commentary

Ordinary Kriging Strategy				
Step	**Search Distance**	**Minimum Number of Samples**	**Maximum Number of Samples**	**Maximum Number of Drillholes per Drillhole**
ICS Unit - Variables: Fe, SiO2, Al2O3, Mn P, LOI				
Searching Parameters: Bearing=216; Plunge=2; Dip=12; Major/Semi-Major Ratio= 1.4; Major/Minor Ratio=4				
1	170	6	30	2
2	380	6	30	2
3	1000	4	30	2
4	>1000	1	30	2
TDI Unit - Variables: Fe, SiO2, Al2O3, Mn P, LOI				
Searching Parameters: Bearing=139; Plunge=-14; Dip=18; Major/Semi-Major Ratio= 1.5; Major/Minor Ratio=				
1	170	6	30	2
2	380	6	30	2
3	1000	4	30	2
4	>1000	1	30	2

- Tal unit was estimated by Inverse distance weighting

Inverse Distance Weighting Strategy				
Step	**Search Distance**	**Minimum Number of Samples**	**Maximum Number of Samples**	**Maximum Number of Drillholes per Drillhole**
TAL Unit - Variables: Fe, SiO2, Al2O3, Mn P, LOI				
Searching Parameters: Bearing=0; Plunge=0; Dip=0; Major/Semi-Major Ratio= 1.0; Major/Minor Ratio=1.4				
1	170	6	30	2
2	380	6	30	2
3	1000	4	30	2
4	>1000	1	30	2

Criteria	JORC Code explanation	Commentary
	• The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	• Visual Validation for estimated grade was carried out with vertical sections. Visual validation by GE21 confirms the smoothing effect of the grade. Visual validation shows a good correlation between the blocks estimated and the original samples. • Validation for estimated grade was carried out with a comparative Nearest Neighbouring estimation (NN). This validation consists in a comparative statistical analysis over global results for Fe%, SiO2%, Al2O3%, Mn%, P% and LOI% variables to the mineralized intervals. • The comparative analysis of estimation variable with the Nearest Neighbouring results show a relative smoothing in the kriging results which are compatible with the kriging technique and is inside acceptance limits. • Local validation by the Swath Plot method was carried out with the verification of local bias from comparative graphs for resource estimation variable (Ordinary Kriging) and NN-Check, considering X, Y, or Z coordinates • The comparative analysis of estimative variables with the Nearest Neighbouring results show the relative smoothing in the kriging results that are compatible with the kriging technique and is inside acceptance limits.
	• The assumptions made regarding recovery of by-products.	• GE21 recommends in future works a study about the recovery of by-products.
	• Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).	• Preliminary metallurgical tests were completed in 2013 by an external group "Mope" on 10 samples consisting of 3 drill core 5 outcrop and 2 composite samples. No deleterious or contaminating substances were encountered. Sulphur results were less than 0.01%.
	• In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	• The block dimensions were defined as 50m x 50m x 5m and sub-blocks of 12.5m x 12.5m x 2.5m, based on a quarter of the drilling grid dimensions.
	• Any assumptions behind modelling of selective mining units.	• No assumptions were made regarding SMU (selective mining units).
	• Any assumptions about correlation between variables.	• No assumptions were made by GE21 regarding the correlation between variables.
	• Description of how the geological interpretation was used to control the resource estimates.	• The main controls of Itabirites mineralization is geological layers dipping at approximately 30° to southeast.
	• Discussion of basis for using or not using grade cutting or capping.	• The style of iron ore mineralization generally doesn't uses grade cutting or capping in the estimation methodology.
	• The process of validation, the checking process used, the comparison of model data to drill hole	• Validation for estimated grade was carried out with a comparative Nearest Neighbouring estimation (NN). This validation consists in a comparative statistical analysis over global

Criteria	JORC Code explanation	Commentary
	data, and use of reconciliation data if available.	results for Fe%, SiO2%, Al2O3%, Mn%, P% and LOI% variables to the mineralized intervals. • The comparative analysis of estimation variable with the Nearest Neighbouring results show a relative smoothing in the kriging results which are compatible with the kriging technique and is inside acceptance limits. • Local validation by the Swath Plot method was carried out with the verification of local bias from comparative graphs for resource estimation variable (Ordinary Kriging) and NN-Check, considering X, Y, or Z coordinates • The comparative analysis of estimative variables with the Nearest Neighbouring results show the relative smoothing in the kriging results that are compatible with the kriging technique and is inside acceptance limits.
Moisture	• Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	• The resource was estimated in a dry basis
Cut-off parameters	• The basis of the adopted cut-off grade(s) or quality parameters applied.	• A 20%Fe COG was applied on geological modeling.
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.	• A pit scenario study was carried out in order to guide the future mining project implying that a reasonable prospect for an eventual economical extraction was tested for mineral resource classification. GE21 generated a schematic pit using physical and economic parameters of projects according to values practiced in the market, however with a reasonable sell price. The optimization was performed using the Geovia Whittle software including Itabirites, compact hematite on the Bicuda deposit (Tombador and Colomi tenements) and Bicuda North (Colomi tenement) and the full extension of talus deposit.
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	• Preliminary metallurgical tests were completed in 2013 by an external group “Mope” on 10 samples consisting of 3 drill core 5 outcrop and 2 composite samples. No deleterious or contaminating substances were encountered. Sulphur results were less than 0.01%.

Criteria	JORC Code explanation	Commentary
	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.	
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.	• The Company will be required to obtain the necessary environmental permits and comply with environmental laws. GE21 did not have information about any factors that can affect the acquisition of environmental licenses.
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.	• The density applied in the block model was defined by the average of values obtained by the experimental specific gravity test with litho types by Vale. There were density determinations in three types of materials: drill core samples; weathered rocks; in field tests. • Altogether, 1973 density determinations tests were carried out on all rotative drill holes made every 3 m depth in ore zones and every 10 m in waste zones. The intervals were selected respecting geological contacts and weathering zone limits. • The density determination was carried out by VALE in drillcores by the Archimedes/Jolly method. The weathered rock samples were oven dried and sealed with paraffin material. • VALE applied to mineralized unit types an average density value individually in each target data. Vale didn't perform any spatial variability study on density data. • The table below summarizes the density value applied on the resource block model.

Criteria	JORC Code explanation	Commentary
		(Density Data table below)
	• Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	• Waste density was determined in previous works.
Classification	• The basis for the classification of the Mineral Resources into varying confidence categories.	(Resource table below)

Density Data

Target	Unit	Density (g/cm3)
Bicuda North.	ICS	3.19
	TDI	3.32
	HCO	4.62
	TAL	1.80

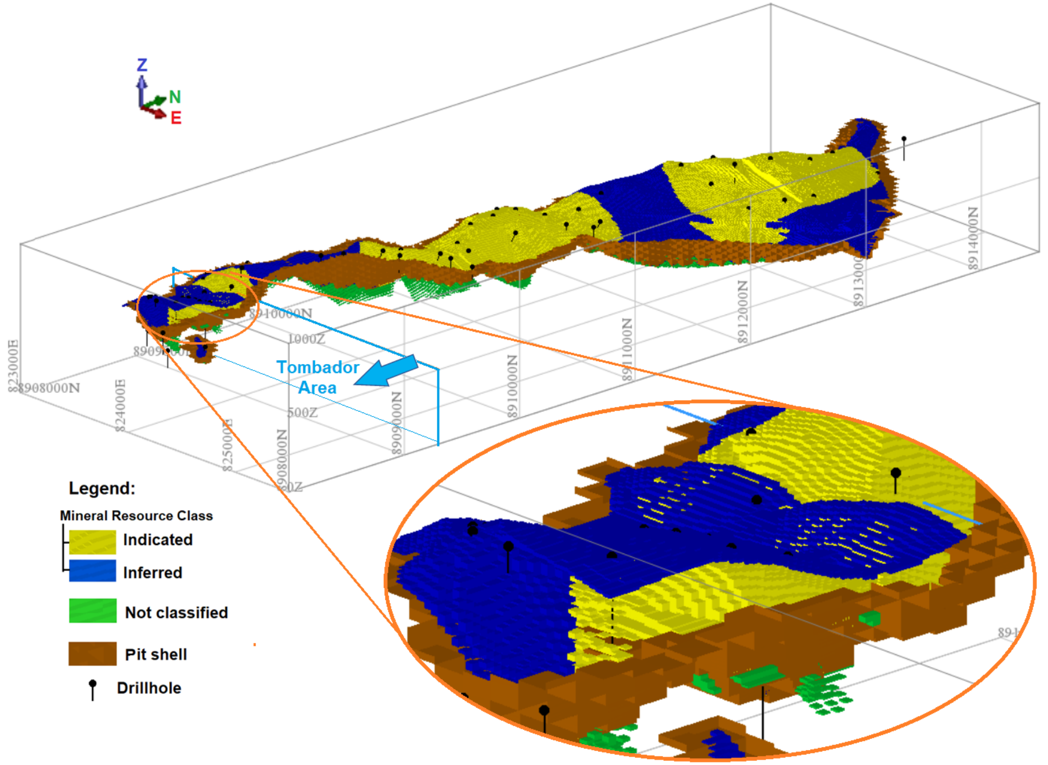
Tombador Itabirite Project Resource Table – 29th September 2011

Mineral Resource – Tombador Iron Mineração Ltda

Block Model: 50m X 50m X 5m (12.5m X 12.5m X 2.5m) - Grade cut-off applied: 20%Fe

Resource Class	Tonnes (Mt)	Fe (%)	SiO2 (%)	Al2O3 (%)	Mn (%)	P (%)	LOI (%)
Bicuda - TAL							
Inferred	0.73	42.39	33.04	2.02	0.259	0.019	2.54
Bicuda - ICS							
Indicated	27.52	37.65	41.9	1.09	0.327	0.051	1.43
Inferred	3.77	39.9	37.59	0.66	0.311	0.032	2.25
Bicuda - TDI							
Indicated	12.03	26.58	28.82	0.69	0.174	0.038	15.48
Inferred	6.29	26.61	24.33	0.49	0.185	0.032	17.47

Criteria	JORC Code explanation	Commentary
		1. Mineral resource effective date is 29 September 2011 2. Presented mineral resources are not exclusive of mineral reserves. All figures have been rounded to the relative accuracy of the estimates. Summed amounts may not add due to rounding. Mineral resources which are not mineral reserves do not have demonstrated economic viability. 3. Mineral resources have been modeled with cut-off of 20% Fe Mineral resources have been estimated using ordinary kriging inside 50m by 50m by 5m block sizes. The mineral resource estimates were prepared in accordance with Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012) incorporating drilling data acquired until 2011. 4. Resources were estimate in conjunction with other itabirites deposits owned by Colomi, and resources reported above are resources contained in tenement 872.431/2003.
	• Whether appropriate account has been taken of all relevant factors (i.e. relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data). • Whether the result appropriately reflects the Competent Person's view of the deposit.	• The anisotropic average distance to samples from ordinary kriging estimation was adopted as criteria to distinguish Indicated and Inferred resource classes. Blocks with anisotropic average distance to samples lower than 150m were classified as Indicated Resource; blocks with anisotropic average distance to samples higher than 150m were classified as Inferred Resource • A pit scenario study was carried out in order to guide the future mining project implying that a reasonable prospect for an eventual economical extraction was tested for mineral resource classification. GE21 generated a schematic pit using physical and economic parameters of projects according to values practiced in the market, however with a reasonable sell price. The optimization was performed using the Geovia Whittle software including Itabirites of Bicuda (Tombador and Colomi tenements, see image below) and the Bicuda North deposit (Colomi) and the full extension of talus deposit. All the mineralization zone located inside resultant pit shell was classified as mineral resource. • The Competent Person believes the classification to be appropriate as mineral resource.

Criteria	JORC Code explanation	Commentary
		
Audits or reviews	• The results of any audits or reviews of Mineral Resource estimates.	• In 2013 Coffey developed the "Colomi Project, Brazil Independent Technical Report on Exploration and Mineral Resources Estimation" which audited the entire Colomi Project database, including the Tombador Hematite data. Porfírio Rodriguez and Leonardo Soares who are the Competent persons for this report, were associated of Coffey (consultancy company), who provided consultancy on mineral resource estimate for Colomi during the period from 2011 to 2015, including site visits. Both are members of the Australian Institute of Geoscientists ("MAIG") and are independent of Colomi.
Discussion of relative	• 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	• GE21 has estimated Indicated and Inferred Mineral Resources for the Tombador Itabirite Project in accordance with the guidelines as set out in the JORC Code (2012). The in-situ resources are wholly contained within the current license boundary. • The Tombador Itabirite Project contains a representative prospective tonnage of iron

Criteria	JORC Code explanation	Commentary
accuracy/ confidence	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.	mineralization. The cut off value applied was based on economic criteria from study of other similar deposits. • Based on these positive geological indications, GE21 considers the Tombador Itabirite Project to be prospective for hosting economic iron ore deposits. GE21 recommends the continuation of the current follow up exploration program and an additional exploration budget to: • Perform an additional topographic survey of the adjacent areas to improve surface information for mining studies. • Conduct additional metallurgical and processing tests to confirm existing results on the feasibility of economically processing the Talus material existing within the deposit. • To continue and improve the current QAQC program • Pre-feasibility study to complete a comprehensive report for project development of small scale high grade production.
	• 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.	• Tombador Itabirite Project's grade estimate relates global estimates.
	• These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	• Tombador Itabirite Project does not have any production history.

Competent Persons Statement

The information in this announcement that relates to Mineral Resources, Exploration Results/Exploration Targets is based on information compiled by Leonardo de Moraes Soares, a Competent Person who is a Member of The Australian Institute of Geoscientists registered with number AIG #5180. Mr. de Moraes Soares is a Geologist with fifteen years of continuous experience in the mining industry. Mr de Moraes Soares 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 de Moraes Soares consents to the inclusion in this announcement of the matters based on his information in the form and context in which it appears.