Electronic Supplementary Material ESM4: Geostatistical parameters, block modelling, and resource estimation data for SIOD.

S.Tab. 1 Fe Variogram parameters

Variogram	Azimuth	Dip	Nugget Effect	Sill (normalized)	Range (m)	Lag (m)
First	110	0	0.08	1	80	20
Second	200	-50			40	25
Third	20	-40			20	5

S.Tab. 2 The prediction parameters for the SIOD were determined based on the block discretization point selection ("−" sign in dip values indicates downward direction).

Parameter	First Pass	Second Pass	Third Pass
Search Type	Ellipsoid	Ellipsoid	Ellipsoid
Strike	Azm: 110° Dip: 0°	Azm: 110° Dip: 0°	Azm: 110° Dip: 0°
Dip	Azm: 200° Dip: -50°	Azm: 200° Dip: -50°	Azm: 200° Dip: -50°
Plunge	Azm: 20° Dip: -40°	Azm: 20° Dip: -40°	Azm: 20° Dip: -40°
Search Radius (m)	80 x 40 x 20	160 x 80 x 40	240 x 120 x 60
Number of Minimum Samples	5	5	5
Number of Maximum Samples	15	15	15
Number of Samples per Hole	4	4	4
Block Discretization (X, Y, Z)	3x3x3	3x3x3	3x3x3

S.Tab. 3 Block model parameters and volumetric comparison between the solid model and the block model

Parameters	X	Y	Z
Number of parent blocks	158	320	52
Parent block size (m)	10	5	5
Minimum block size (m)	1	1	1
Rotation angles	0°	0°	0°
Volumetric comparison between the solid model and the block model			
Volume (m^3)	**Block model volume (m^3)**		**%Variation**
818,756	818,776		-0.002

S.Tab. 4 Statistics of mineralization and waste density

	Ore	Waste
Number of Samples	294	3.265
Mean (t/m^3)	4.15	2.87
Minimum (t/m^3)	2.61	1.3
Maximum (t/m^3)	4.97	4.91

S.Tab. 5 The comparison of composite and block model grades based on their zones

Mineralization Zone	**101**		**102**		**201**		**202**	
	Composite Samples	**Block Model**	**Composite Samples**	**Block Model**	**Composite Samples**	**Block Model**	**Composite Samples**	**Block Model**
Number of samples	148	65,835	47	36,046	237	106,791	23	13,275
Minimum (%Fe)	13.71	29.01	16.44	21.81	0.05	12.96	35.03	39.55
Q1 (%Fe)	51.62	50.62	33.54	34.28	43.71	44.91	40.98	45.87
Median (%Fe)	58.82	55.23	38.9	38.39	52.14	48.53	51	49.01
Q3 (%Fe)	62.39	59.81	45.27	40.98	57.78	52	54.02	51.62
Maximum (%Fe)	66.16	63.48	59.45	51.27	65.9	63.65	60.94	57.86
Average (%Fe)	55.72	53.94	39.36	38.05	48.51	48.04	48.73	49.05
Average grade difference between the sample & model	1.78		1.31		0.47		-0.32	
Average grade difference between the sample & model wrt %	3.2		3.32		0.98		-0.66	
Standard deviation	9.61	5.71	10.36	5.34	13.39	6.31	7.14	3.58
Variance	92.28	32.59	107.31	28.5	179.3	39.88	50.99	12.81
%Variation coefficient	17.24	10.58	26.32	14.03	27.6	13.14	14.65	7.3

Remarks: "Average Grade Difference between the Sample and Model" directly represents the average value of the absolute differences between the analytical grade values of the samples and the grade values predicted by the block model. "Average Grade Difference between the Sample and Model with respect to %" is a measure that shows the relative deviation of the model in terms of percentage, obtained by dividing this absolute difference by the grade of the sample used as a reference value.

S.Tab. 6 The parameters used for calculating the cut-off grade of the SIOD (open-pit)

Fe cut-off grade	%	28
Concentrate Fe grade	%	62
Price for the delivery to the Chinese port	USD / Tones	120
Cost for the transportation from the field to the port	USD / Tones	10
Cost for freight to China	USD / Tones	30
Cost per quarry	USD / Tones	80
Paste excavation cost	USD / BCM	2
Ore production cost	USD / Tones	2
Cover excavation rate	BCM / Tones	10
Process cost	USD / Tones	5
Ore recovery	%	75

S.Tab. 7 Cumulative Resource Tonnage and Grade for the SIOD (based on 5% increments in Fe cut-off grade)

Cut-off grade	**Fe%**	**Volume (m^3)**	**Tonnage**	**Density (t/m^3)**
0	47.77	486,025	2,050,366	4.22
5	47.77	486,025	2,050,366	4.22
10	47.77	486,025	2,050,366	4.22
15	47.77	486,025	2,050,366	4.22
20	47.77	486,025	2,050,366	4.22
25	47.83	484,654	2,045,502	4.22
30	48.13	476,696	2,015,387	4.23
35	49.01	448,344	1,906,021	4.25
40	50.43	392,751	1,688,665	4.3
45	52.00	323,747	1,408,126	4.35
50	54.62	199,919	883,911	4.42
55	58.43	76,120	338,567	4.45
60	61.02	19,086	85,211	4.46