

AMIS0383

Certified Reference Material

**Multi element Au 18.42g/t Cu 46.47% Fe 16.32% IOCG
AU**

Certificate of Analysis

Recommended Concentrations and Limits¹ (at two Standard Deviations)

Certified Concentrations²

Cu M/ICP	46.47	±	1.62	%
Cu Titration	46.16	±	0.50	%
Au Pb Collection	18.42	±	1.24	g/t
Ag M/ICP	92	±	10	g/t
Co M/ICP	1361	±	162	ppm
Fe M/ICP per	16.32	±	1.96	%
Specific Gravity	4.74	±	0.12	

Provisional Concentrations

F ISE	534	±	120	ppm
U M/ICP	70	±	16	ppm

Indicated Mean

Ba M/ICP	267	ppm
S M/ICP	19.22	%

1. Manufacturers recommended limits for use of the material as control samples, based on two standard deviations, calculated using "Between Laboratory" statistics for treatment of the data for trivial, non-trivial and technically invalid results. See sections 1, 9 and 12.
2. There is additional certified major element data presented on p2 and uncertified trace element data presented as an appendix.

AMIS

(A Division of Torre Analytical Services (Pty) Limited)
(Reg. No. 1989/000201/07)

A: 11 Avalon Road, West Lake View Ext 11, Modderfontein, South Africa

P: PO Box 856, Isando, 1600, Gauteng, South Africa

T: +27 (0) 11 923-0800

W: www.amis.co.za

Directors: C E Pettit (British), R Naidoo, N N Robinson, K V Gerber, M Padayachee

Major Element Recommended Concentrations and Limits (at two Standard Deviations)

(see appendix for other uncertified major element results)

Certified Concentrations

CaO	0.19	±	0.02	%
S Comb / LECO	23.28	±	0.92	%

Provisional Concentration

MgO	0.14	±	0.02	%
-----	------	---	------	---

1. Intended Use: AMIS0383 is a certified reference material which may be used to demonstrate the validity of measurement results of a single analysis of iron oxide copper gold concentrate with a similar grade and matrix.

It is a matrix matched Certified Reference Material, fit for use as control samples in routine assay laboratory quality control when inserted within runs of samples and measured in parallel to the unknown. Its purpose is to monitor inter-laboratory or instrument bias and within lab precision. It can be used, indirectly, to establish the traceability of results to an SI system of units.

The recommended concentrations and limits for this material are property values based on a measurement campaign (round robin) and reflect consensus results from the laboratories that participated in the round robin.

Slight variations in analytical procedures between laboratories will reflect as slight biases to the recommended concentrations (see 19). Good laboratories will report results within the two standard deviation levels with a failure rate of <10 %.

The material can also be used for method development and for the calibration of equipment.

2. Origin of Material: This standard was made using concentrate provided by SGS Mineral Services sourced from the Prominent Hill mine which is owned and operated by Oz Minerals Limited. The mine is located 650 kilometres North West of Adelaide, 130 kilometres North West of BHP Billiton's Olympic Dam and 130 kilometres south east of the town of Coober Pedy in the Gawler Craton of South Australia. Prominent Hill, together with Carrapateena, Olympic Dam, Moonta-Wallaroo and Hillside, are all iron oxide copper gold (IOCG) mineralised systems hosted within Palaeo- to Mesoproterozoic rocks and distributed along the eastern edge of the currently preserved Gawler Craton. Mineralization was synchronous with volcanism and sedimentation within a narrow east-west-trending graben that developed at approximately 1600 Ma. The copper and gold bearing hematite rich breccia's were formed by repetitive hydrothermal brecciation, milling and explosive venting within a volcanic setting.

AMIS

(A Division of Torre Analytical Services (Pty) Limited)
(Reg. No. 1989/000201/07)

A: 11 Avalon Road, West Lake View Ext 11, Modderfontein, South Africa

P: PO Box 856, Isando, 1600, Gauteng, South Africa

T: +27 (0) 11 923-0800

W: www.amis.co.za

Directors: C E Pettit (British), R Naidoo, N N Robinson, K V Gerber, M Padayachee

3. Mineral and Chemical Composition: The host sequence rocks are intensely altered by hematite-sericite-chlorite-carbonate (\pm quartz \pm barite \pm fluorite \pm REE phosphates). Copper mineralisation occurs as fine grained disseminations of chalcocite, bornite and chalcopyrite in the breccia matrices and (to a lesser extent) within clasts of hematite-rich breccia's. The copper sulphides display a variety of intergrowth, replacement and infill textures including chalcocite-bornite and replacement of early formed pyrite.

4. Appearance: The material is a very fine Brownish Black powder (Corstor 5YR 2.5/1).

5. Handling instructions: The material is packaged in Laboratory Packs and Explorer Packs that must be shaken or otherwise agitated before use. Normal safety precautions for handling fine particulate matter are suggested, such as the use of safety glasses, breathing protection, gloves and a laboratory coat.

6. Method of Preparation: The material was crushed, dry-milled and air-classified to $<54\mu\text{m}$. Wet sieve particle size analysis of random samples confirmed the material was 98.5% $<54\mu\text{m}$. It was then homogenized in a double cone blender, systematically divided and then sealed into 1kg Laboratory Packs. Samples were randomly selected for homogeneity testing and third party analysis. Statistical analysis of both homogeneity and the consensus test results were carried out by independent statisticians. Explorer Packs are subdivided from the Laboratory packs as required.

7. Methods of Analysis requested:

1. Au – Pb collection ICP-OES or ICP-MS.
2. Multi acid digest, ICP-OES multi element scan to include; Cu, Fe, Ba, Co, U, S and Ag.
3. 3 acid digest (HCl, HNO₃ and HClO₄) ICP-MS for U and Ag.
4. S combustion IR.
5. Cl by sodium carbonate leach and then titration with AgNO₃.
6. F by ISE.
7. U by pressed powder method.
8. Majors, to include: Cu, Fe, Ba, Co, U, S, SiO₂, Al₂O₃, CaO, MgO, K₂O, Na₂O, TiO₂, and Mn by borate fusion XRF.
9. SG. Gas pycnometer.

8. Information requested:

1. Aliquots used for all determinations.
2. Results for individual PGM's reported in ppb.
3. Results for base metals reported in ppm.
4. QC data, to include replicates, blanks and certified reference materials used.
5. Analytical techniques used.

9. Method of Certification: Twenty six laboratories were each given eight randomly selected packages of sample. Twenty one of the laboratories submitted results.

Final limits were calculated after first determining if all data was compatible within a spread normally expected for similar analytical methods done by reputable laboratories. Data from any one laboratory was then removed from further calculations when the mean of all analyses from that laboratory failed a "t test" of the global

AMIS

(A Division of Torre Analytical Services (Pty) Limited)
(Reg. No. 1989/000201/07)

A: 11 Avalon Road, West Lake View Ext 11, Modderfontein, South Africa

P: PO Box 856, Isando, 1600, Gauteng, South Africa

T: +27 (0) 11 923-0800

W: www.amis.co.za

Directors: C E Pettit (British), R Naidoo, N N Robinson, K V Gerber, M Padayachee

means of the other laboratories. The means and standard deviations were then re-calculated using all remaining data. Any analysis that fell outside of the new two standard deviations was removed from the ensuing data base. The mean and standard deviations were again calculated using the remaining data.

The “between-laboratory” standard deviation is used in the calculation to eliminate technically and statistically invalid data. Upper and lower limits are based on the standard deviation of the remaining data, which reflect individual analyses and can be used to monitor accuracy in routine laboratory quality control. This is different to limits based on standard deviations derived from grouped set of analyses (see 12), which provide important measures for precision and trueness, but which are less useful for routine QC.

Standards with an RSD of near or less than 5 % are termed “Certified”, RSD’s of between near 5 % and 15 % are termed “Provisional”, and RSD’s over 15 % are termed “Informational”.

10. Participating Laboratories: The 21 out of 26 laboratories that provided results timeously were (not in same order as in the table of assays):

1. Acme Analytical Laboratories Chile
2. ACME Analytical Laboratories Ltd CA
3. Activation Laboratories Pty Ltd (ActLabs) CA
4. Activation Laboratorios Ltda (Chile)
5. ALS Ammtec (Australia)
6. ALS Chemex Laboratory Group Johannesburg SA
7. ALS Chemex Laboratory Group Perth WA
8. ALS Chemex Laboratory Zambia
9. ALS OMAC (Ireland)
10. Genalysis Laboratory Services (W Australia P)
11. Namibia Custom Smelters
12. Set Point Laboratories (Isando) SA
13. SGS Australia Pty Ltd (Newburn) WA
14. SGS Geosol Laboratories Ltda (Brazil)
15. SGS Mineral Services Callao (Peru)
16. SGS Mineral Services Lakefield (Canada)
17. SGS Prominent Hill Australia (AU)
18. SGS South Africa (Pty) Ltd - Booysens JHB
19. SGS Townsville (Australia)
20. SGS Vancouver (Canada)
21. Ultra Trace (Pty) Ltd WA

11. Assay Data: Data as received from the laboratories for the important certified elements listed on p1 are set out below.

AMIS

(A Division of Torre Analytical Services (Pty) Limited)
(Reg. No. 1989/000201/07)

A: 11 Avalon Road, West Lake View Ext 11, Modderfontein, South Africa

P: PO Box 856, Isando, 1600, Gauteng, South Africa

T: +27 (0) 11 923-0800

W: www.amis.co.za

Directors: C E Pettit (British), R Naidoo, N N Robinson, K V Gerber, M Padayachee

Assay data

Lab Code	Au Pb Coll g/l	Ag M/ICP ppm	Ba M/ICP ppm	Co M/ICP ppm	Cu M/ICP %	Cu Titration %	F ISE ppm	Fe M/ICP %	S M/ICP %	U M/ICP ppm	CaO XRF %	MgO XRF %	S Comb/LECO %	SG pyc
A	19.1	100		1510	47.3	45.9	200	17.5	17.0	82.5	0.18	0.15	23.3	4.64
A	18.6	101		1510	47.5	46.3	243	17.6	17.0	84.6	0.18	0.15	23.4	4.65
A	18.7	101		1540	48.2	46.0	300	17.9	17.7	82.8	0.18	0.15	23.1	4.62
A	18.5	101		1520	47.7	46.1	320	17.9	17.4	81.3	0.18	0.15	22.8	4.62
A	18.7	101		1520	47.9	45.9	252	17.9	17.3	77.9	0.18	0.15	22.7	4.65
A	18.7	101		1510	47.3	46.1	230	17.7	17.1	80.1	0.18	0.15	23.2	4.63
A	18.6	98.0		1470	45.9	46.1	225	17.3	16.3	75.2	0.18	0.15	22.7	4.61
A	18.9	100		1490	46.3	46.1	225	17.7	16.4	79.1	0.18	0.15	22.2	4.61
B	19.3	86.3	146	1050	46.2	46.3	600	15.0	19.2	57.5			22.8	4.82
B	19.1	87.0	160	1050	46.5	46.5	600	15.0	19.3	61.1			22.7	4.82
B	19.2	86.0	188	1060	46.5	46.5	600	14.9	19.0	62.1			22.6	4.84
B	19.5	86.8	136	1060	46.2	46.4	600	15.1	19.1	63.6			23.0	4.83
B	19.2	85.1	167	1050	45.7	46.6	500	14.7	19.0	61.6			23.0	4.82
B	19.6	78.4	149	978	45.1	46.3	600	13.5	17.7	59.0			22.7	4.81
B	18.9	86.0	137	1060	46.6	46.5	600	14.8	19.0	63.8			23.0	4.81
B	19.5	85.7	149	1050	45.6	46.6	500	14.7	19.0	64.9			23.1	4.79
C	18.0	90.0	700	1300	46.3	46.4		17.0			0.18	0.15	23.5	4.77
C	17.8	90.0	700	1400	46.2	46.1		17.2			0.19	0.13	23.4	4.81
C	17.9	90.0	700	1400	46.4	46.3		17.1			0.18	0.14	23.8	4.67
C	18.2	90.0	700	1400	46.1	46.4		17.2			0.19	0.15	23.6	4.82
C	17.9	88.0	700	1400	46.1	46.4		17.4			0.18	0.15	23.5	4.69
C	18.5	90.0	700	1300	46.2	45.9		17.3			0.19	0.14	23.8	4.83
C	17.7	90.0	700	1300	46.1	46.3		17.1			0.19	0.13	23.8	4.71
C	17.2	92.0	700	1400	46.2	46.3		17.4			0.18	0.13	23.6	4.81
D					47.1									
D					46.3									
D					48.1									
D					46.1									
D					46.8									
D					47.9									
D					43.3									
D					46.0									
E	19.3	87.0	259	1208		46.0	593	15.3		68.8	0.20	0.13	24.8	
E	19.1	89.1	245	1233		46.0	593	15.9		70.1	0.21	0.13	24.8	
E	19.1	88.3	296	1215		45.9	642	15.8		70.1	0.21	0.14	24.9	
E	19.0	86.7	252	1203		45.9	695	15.8		69.5	0.20	0.13	24.3	
E	19.4	86.8	268	1194		45.8	642	15.8		70.5	0.20	0.13	24.4	
E	18.9	87.4	292	1220		45.8	746	15.4		70.3	0.21	0.13	24.3	
E	18.9	87.1	302	1218		45.7	595	16.1		69.6	0.21	0.14	24.7	
E	19.1	86.6	240	1204		46.0	642	15.8		70.3	0.21	0.14	24.6	
F	18.2	97.0				45.9		17.2					23.4	
F	18.1	94.0				45.9		17.5					23.1	
F	19.0	95.0				46.0		17.3					23.6	
F	17.9	90.0				46.0		17.4					23.1	
F	18.3	96.0				46.0		17.3					23.2	
F	18.5	95.0				46.0		17.4					22.8	
F	18.5	95.0				46.0		17.0					23.1	
F	18.4	94.0				45.9		17.6					23.2	
G	17.4						485						24.5	4.52
G	17.7						528						24.9	4.56
G	17.6						502						24.9	4.58
G	17.5						478						25.0	4.53
G	17.5						516						24.9	4.58
G	17.7						516						25.1	4.51
G	17.6						541						25.1	4.53
G	17.6						517						25.1	4.55
H	21.2	91.0	138	1210		47.0	455	14.9		70.0			23.4	
H	20.3	94.0	297	1250		46.2	480	14.7		75.0			23.9	
H	20.5	93.0	320	1260		46.7	540	14.9		80.0			23.9	
H	19.9	91.0	316	1290		46.4	450	15.3		75.0			24.0	
H	19.5	91.0	299	1250		46.7	465	14.8		85.0			24.1	
H	18.1	93.0	274	1190		46.3	515	14.6		75.0			23.9	
H	19.7	92.0	276	1230		46.9	465	15.0		65.0			24.0	
H	20.1	94.0	265	1220		46.3	510	14.9		70.0			23.9	
I	17.9	91.7	238	1350		46.0	480	13.5		60.0			22.7	
I	18.3	91.2	299	1370		45.8	500	14.1		70.0			22.7	
I	18.2	93.4	297	1350		46.0	510	13.8		60.0			22.7	
I	17.7	91.8	332	1320		45.8	490	13.0		70.0			23.0	
I	18.3	90.4	320	1330		45.8	540	13.8		60.0			22.9	
I	17.8	92.1	339	1350		45.8	510	14.7		70.0			22.6	
I	18.2	88.4	298	1330		45.6	490	12.9		60.0			22.8	
I	18.0	86.5	337	1330			530	13.4		60.0			22.7	
K	18.5	85.5	242	1420	45.3		500	17.6			0.20	0.14	23.5	4.79
K	18.4	86.0	267	1390	45.9		600	17.2			0.20	0.14	23.6	4.78
K	17.8	85.0	238	1420	45.2		500	17.3			0.20	0.15	23.6	4.77
K	17.9	85.5	254	1430	45.0		500	17.4			0.20	0.15	23.6	4.76
K	17.8	85.5	260	1410	45.2		600	17.2			0.20	0.16	23.6	4.78
K	18.0	85.0	257	1420	44.9		500	17.3			0.20	0.14	23.6	4.80
K	18.2	85.0	264	1410	45.4		500	17.5			0.20	0.14	23.6	4.80
K	17.7	85.0	265	1430	45.7		600	17.5			0.20	0.15	23.6	4.78
M	16.3	93.0		1360				15.7			0.18	0.12		
M	16.8	94.0		1380				15.9			0.18	0.10		
M	17.3	92.0		1380				15.9			0.18	0.12		
M	17.3	93.0		1360				16.1			0.18	0.12		
M	17.2	93.0		1370				15.2			0.18	0.10		
M	17.8	93.0		1370				16.0			0.18	0.12		
M	16.9	92.0		1370				15.7			0.18	0.10		
M	16.4	94.0		1380				16.1			0.18	0.12		

AMIS

(A Division of Torre Analytical Services (Pty) Limited)
(Reg. No. 1989/000201/07)

A: 11 Avalon Road, West Lake View Ext 11, Modderfontein, South Africa

P: PO Box 856, Isando, 1600, Gauteng, South Africa

T: +27 (0) 11 923-0800

W: www.amis.co.za

Directors: C E Pettit (British), R Naidoo, N N Robinson, K V Gerber, M Padayachee

Assay data

Lab Code	Au Pb Coll g/t	Ag M/ICP ppm	Ba M/ICP ppm	Co M/ICP ppm	Cu M/ICP %	Cu Titration %	F ISE ppm	Fe M/ICP %	S M/ICP %	U M/ICP ppm	CaO XRF %	MgO XRF %	S Comb/LECO %	SG pyc
O	18.7													4.26
O	18.6													4.41
O	18.7													4.13
O	16.1													4.17
O	14.3													4.38
O	18.1													4.34
O	18.2													4.17
O	18.3													4.30
P	18.6				46.4			17.6	23.6					
P	18.6				46.5			17.1	23.8					
P	18.4				46.5			17.2	23.9					
P	18.4				46.5			17.1	23.5					
P	18.5				46.4			17.0	23.6					
P	18.5				46.6			17.1	23.8					
P	18.6				46.5			17.1	23.7					
P	18.2				46.4			17.0	23.8					
S	17.9					46.4							23.8	4.74
S	18.3					46.4							23.8	4.75
S	17.9					46.3							23.9	4.70
S	18.1					46.3							23.7	4.74
S	18.4					46.3							23.7	4.76
S	18.1					46.4							23.6	4.72
S	18.1					46.4							23.8	4.75
S	18.0					46.3							23.8	4.73
T	19.4	96.1	30.0	1390				15.9		83.5				23.0
T	19.4	96.2	20.0	1390				16.0		82.9				22.8
T	18.9	95.8	20.0	1440				16.2		84.7				23.0
T	19.5	100	20.0	1470				16.0		75.9				22.8
T	19.1	99.1	50.0	1430				15.9		77.1				23.3
T	18.7	96.3	20.0	1390				16.1		73.4				23.0
T	17.8	96.7	20.0	1330				16.6		76.5				23.0
T	19.2	96.4	30.0	1390				16.0		70.6				23.1
U	19.1	87.2				46.3	600							23.2
U	18.7	95.0				46.3	600							23.0
U	19.3	94.4				46.1	580							22.7
U	19.0	95.5				46.2	610							23.2
U	19.4	95.2				46.2	590							23.5
U	19.5	95.0				46.2	590							22.8
U	19.2	92.8				46.3	590							23.3
U	19.6	93.7				46.2	590							23.2
V	19.4	99.2	210	1390	46.6	46.5	540	15.7	16.4					23.0
V	19.8	100	270	1420	46.4	45.8	520	15.6	18.2					23.1
V	19.8	100	240	1420	46.9	46.3	600	16.0	18.2					23.6
V	19.6	100	210	1430	47.9	46.0	550	16.3	18.5					23.1
V	18.8	100	350	1480	47.5	45.9	550	16.5	17.8					23.4
V	19.3	99	340	1290	47.3	46.3	570	16.4	20.7					23.5
V	19.0	97.2	260	1390	47.4	46.0	510	16.2	18.8					23.2
V	20.1	98.1	280	1360	47.2	46.4	580	16.1	18.4					23.2
W		79.8	14.7	1294		44.3		11.9	13.0	56.7				20.5
W		76.7	12.8	1359		44.2		12.2	13.1	56.9				22.5
W		51.0	13.2	1422		44.7		13.1	14.0					22.0
W		82.8	15.9	1431		44.5		12.8	13.9	62.3				21.9
W		78.6	19.8	1396		44.1		12.7	13.7	63.0				22.1
W		83.1	13.2	1294		43.9		11.8	12.8	69.6				22.1
W		80.3	14.4	1414		45.0		12.9	14.0	61.3				21.7
W		79.9	11.0	1357		44.3		11.7	13.1	61.6				21.9
X	17.3	84.2	400	1325		45.1		15.2	24.1	72.2	0.20	0.12		24.3
X	18.3	87.2	440	1365		44.7		15.8	23.9	71.4	0.20	0.12		24.4
X	17.8	86.1	360	1345		45.3		15.4	23.6	75.8	0.20	0.12		24.5
X	17.1	86.0	300	1355		44.7		15.5	23.7	69.8	0.20	0.12		24.3
X	18.6	87.6	400	1370		45.6		15.7	23.9	71.8	0.20	0.13		23.9
X	17.5	84.6	430	1330		45.5		15.2	24.1	73.5	0.20	0.12		24.6
X	18.5	85.4	380	1340		45.7		15.4	23.6	70.4	0.20	0.12		24.3
X	16.3	86.8	330	1365		45.7		15.7	24.2	71.9	0.20	0.12		24.1
Y	18.3						440							22.6
Y	17.5						370							22.7
Y	18.4						410							22.6
Y	17.6						420							22.7
Y	17.8						420							22.7
Y	18.4						410							22.3
Y	17.1						490							22.5
Y	18.2						470							22.6
Z	17.3													23.4
Z	17.5													23.6
Z	18.3													23.0
Z	17.7						1000							23.1
Z	17.5						1000							23.6
Z	17.2						1000							23.2
Z	18.6						1000							23.6
Z	17.8						1000							23.2

AMIS

(A Division of Torre Analytical Services (Pty) Limited)
(Reg. No. 1989/000201/07)

A: 11 Avalon Road, West Lake View Ext 11, Modderfontein, South Africa

P: PO Box 856, Isando, 1600, Gauteng, South Africa

T: +27 (0) 11 923-0800

W: www.amis.co.za

Directors: C E Pettit (British), R Naidoo, N N Robinson, K V Gerber, M Padayachee

12. Measurement of Uncertainty: (ref Dr Hugh Bartlett, Hugh Bartlett Consulting CC.)

The samples used in this certification process have been selected in such a way as to represent the entire batch of material and were taken from the final packaged units; therefore all possible sources of uncertainty (sample uncertainty and measurement uncertainty) are included in the final combined standard uncertainty determination.

The uncertainty measurement takes into consideration the between lab and the within lab variances and is calculated from the square roots of the variances of these components using the formula:

$$\text{Combined standard uncertainty} = \sqrt{(\text{between lab. var}/\text{no of labs}) + (\text{mean square within lab. var}/\text{no of assays})}$$

These uncertainty measurements may be used, by laboratories, as a component for calculating the total uncertainty for method validation according to the relevant ISO guidelines.

Analyte	Method	Unit	S ¹	σ_L ²	S _w ³	CSU ⁴
Au	Pb Coll	g/t	0.66	0.393	0.342	0.100
Ag	M/ICP	ppm	4.99	3.90	1.29	1.09
Ba	M/ICP	ppm	66.80	62.11	37.49	24.02
Co	M/ICP	ppm	81.2	64.7	34.1	19.9
Cu	M/ICP	%	0.81	0.70	0.53	0.28
Cu	Titration	%	0.25	0.19	0.15	0.06
F	ISE	ppm	60.2	49.2	32.6	16.85
Fe	M/ICP	%	0.98	0.81	0.22	0.23
S	M/ICP	%	3.75	4.64	0.60	1.89
U	M/ICP	ppm	7.85	7.09	4.02	2.56
CaO	XRF	%	0.010	0.011	0.002	0.005
MgO	XRF	%	0.014	0.015	0.006	0.006
Scomb	LECO	%	0.461	0.322	0.190	0.088
SG	pyc		0.059	0.050	0.029	0.017

1 S - Std Dev for use on control charts.

2 σ_L - Betw Lab Std Dev, for use to calculate a measure of accuracy.

3 S_w - Within Lab Stc Dev, for use to calculate a measure of precision.

4 CSU - Combined Standard Uncertainty, a component for use to calculate the total uncertainty in method validation.

13. Certified values: The Certified, Provisional and Indicated values listed on p1 and p2 of this certificate fulfill the AMIS statistical criteria regarding agreement for certification and have been independently validated by Dr Barry Smee.

14. Metrological Traceability: The values quoted herein are based on the consensus values derived from statistical analysis of the data from an inter laboratory measurement program. Traceability to SI units is via the standards used by the individual laboratories the majority of which are accredited and who have maintained measurement traceability during the analytical process.

AMIS

(A Division of Torre Analytical Services (Pty) Limited)
(Reg. No. 1989/000201/07)

A: 11 Avalon Road, West Lake View Ext 11, Modderfontein, South Africa

P: PO Box 856, Isando, 1600, Gauteng, South Africa

T: +27 (0) 11 923-0800

W: www.amis.co.za

Directors: C E Pettit (British), R Naidoo, N N Robinson, K V Gerber, M Padayachee

15. **Certification:** AMIS0383 is a new material.

16. **Period of validity:** The certified values are valid for this product, while still sealed in its original packaging, until notification to the contrary. The stability of the material will be subject to continuous testing for the duration of the inventory. Should product stability become an issue, all customers will be notified and notification to that effect will be placed on the www.amis.co.za website.

17. **Minimum sample size:** The majority of laboratories reporting used a 0.5g sample size for the ICP and a 30g sample size for the fire assay. These are the recommended minimum sample sizes for the use of this material.

18. **Availability:** This product is available in Laboratory Packs containing 1kg of material and Explorer Packs containing custom weights (from 50 to 250g) of material. The Laboratory Packs are sealed bottles delivered in sealed foil pouches. The Explorer Packs contain material in standard geochem envelopes, nitrogen flushed and vacuum sealed in foil pouches.

19. **Recommended use:** The data used to characterize this CRM has been scrutinized using outlier treatment techniques. This, together with the number of participating laboratories, should overcome any "inter-laboratory issues" and should lead to a very accurate measure for the given methods, notwithstanding the underlying assumption that what the good inter-laboratory labs reported was accurate. However an amount of bad data might have had an effect, resulting in limits which in some situations might be too broad for the effective monitoring of a single analytical method, laboratory or production process. Users should set their own limits based on their own data quality objectives and control measurements, after determining the performance characteristics of their own particular method, using a minimum of 20 analyses using this CRM. User set limits should normally be within the limits recommended on p1 and 2 of this certificate.

20. **Legal Notice:** This certificate and the reference material described in it have been prepared with due care and attention. However AMIS, Set Point Technology (Pty) Ltd, Mike McWha, Dr Barry Smee and Smee and Associates Ltd; accept no liability for any decisions or actions taken following the use of the reference material.

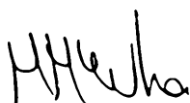
8 August 2013

Revision: 002

Date of revision: 27 January 2020

Reason for new report: Amendment of COA name

Certifying Officers:



African Mineral Standards: _____

Mike McWha
BSc (Hons), FGSSA, FSAIMM, Pr.Sci.Nat



Geochemist: _____

Barry W. Smee
BSc, PhD, P.Geo, (B.C.)

AMIS

(A Division of Torre Analytical Services (Pty) Limited)
(Reg. No. 1989/000201/07)

A: 11 Avalon Road, West Lake View Ext 11, Modderfontein, South Africa

P: PO Box 856, Isando, 1600, Gauteng, South Africa

T: +27 (0) 11 923-0800

W: www.amis.co.za

Appendix – uncertified trace element statistics

Analyte	Method	Unit	Mean	2SD	RSD%	n
Al	M/ICP	%	0.44	0.07	7.6	48
Al ₂ O ₃	XRF	%	0.85	0.06	3.7	37
As	M/ICP	ppm	175	11.4	3.2	38
Ba	XRF	ppm	840	101	6.0	15
Be	M/ICP	ppm	0.19	0.05	12.5	21
Bi	M/ICP	ppm	59.8	17.2	14.4	35
Ca	M/ICP	%	0.14	0.02	5.8	55
Cd	M/ICP	ppm	0.64	0.33	26.2	30
Ce	M/ICP	ppm	361	100	13.8	24
Cl	Leach	ppm	632	1230	97.3	16
Co	XRF	ppm	1397	121	4.3	32
Cr	M/ICP	ppm	195	59.1	15.1	56
Cs	M/ICP	ppm	0.25	0.09	18.3	24
Cu	XRF	%	46.2	1.1	1.2	24
Dy	M/ICP	ppm	3.3	0.54	8.2	16
Er	M/ICP	ppm	1.5	0.28	9.1	16
Eu	M/ICP	ppm	3.1	0.40	6.6	16
Fe	XRF	%	17.4	0.28	0.8	22
Ga	M/ICP	ppm	5.0	10.8	108.2	32
Gd	M/ICP	ppm	4.8	0.59	6.2	16
Ge	M/ICP	ppm	0.83	0.07	4.1	8
Hf	M/ICP	ppm	0.85	0.38	22.5	24
Ho	M/ICP	ppm	0.62	0.14	11.1	16
In	M/ICP	ppm	0.07	0.02	13.7	24
K	M/ICP	%	0.19	0.05	11.9	53
K ₂ O	XRF	%	0.25	0.01	2.9	39
La	M/ICP	ppm	214	69.3	16.2	24
Li	M/ICP	ppm	1.9	0.7	17.8	32
Lu	M/ICP	ppm	0.18	0.05	13.4	16
Mg	M/ICP	%	0.08	0.02	10.1	53
Mn	M/ICP	ppm	102	11.2	5.5	53
Mn	XRF	ppm	101	8.5	4.2	22
Mo	M/ICP	ppm	207	27.0	6.5	55
Na	M/ICP	%	0.01	0.00	16.9	37
Na ₂ O	XRF	%	0.02	0.02	54.0	32
Nb	M/ICP	ppm	2.6	1.2	22.9	24
Nd	M/ICP	ppm	84.8	9.6	5.7	16
Ni	M/ICP	ppm	182	28.4	7.8	56
P	M/ICP	ppm	624	887	71.1	40
Pb	M/ICP	ppm	218	38.7	8.9	44
Pr	M/ICP	ppm	31.0	5.8	9.4	16
Rb	M/ICP	ppm	7.7	3.2	21.1	24
Re	M/ICP	ppm	0.71	0.03	2.0	23
S	XRF	%	23.9	0.00	0.00	8
Sb	M/ICP	ppm	9.5	13.4	70.2	29
Sc	M/ICP	ppm	1.2	0.70	28.3	28
Se	M/ICP	ppm	256	58.7	11.5	24
SiO ₂	XRF	%	3.99	0.06	0.77	16
Sm	M/ICP	ppm	8.8	0.48	2.7	15
Sn	M/ICP	ppm	1.9	0.17	4.3	24
Sr	M/ICP	ppm	66.8	38.7	29.0	48
Ta	M/ICP	ppm	0.10	0.18	92.4	16
Tb	M/ICP	ppm	0.60	0.04	3.2	15
Te	M/ICP	ppm	32.3	5.2	8.0	30
Th	M/ICP	ppm	4.2	0.49	5.7	24
Ti	M/ICP	%	0.03	0.02	28.3	40
TiO ₂	XRF	%	0.07	0.06	45.7	32
Tl	M/ICP	ppm	2.5	0.22	4.4	24
U	XRF	ppm	75.4	16.0	10.6	39
Tm	M/ICP	ppm	0.24	0.08	16.1	16
V	M/ICP	ppm	10.6	2.8	13.1	32
W	M/ICP	ppm	3.6	1.0	13.7	24
Y	M/ICP	ppm	14.5	1.9	6.6	31
Yb	M/ICP	ppm	1.3	0.33	12.7	16
Zn	M/ICP	ppm	66.6	31.9	24.0	37
Zr	M/ICP	ppm	38.9	17.2	22.1	32

AMIS

(A Division of Torre Analytical Services (Pty) Limited)
(Reg. No. 1989/000201/07)

A: 11 Avalon Road, West Lake View Ext 11, Modderfontein, South Africa

P: PO Box 856, Isando, 1600, Gauteng, South Africa

T: +27 (0) 11 923-0800

W: www.amis.co.za

Directors: C E Pettit (British), R Naidoo, N N Robinson, K V Gerber, M Padayachee