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A Division of Set Point Industrial Technology (Pty) Ltd. Reg.No. 1989/000201/07.

African Mineral Standards

Certificate of Analysis

Copper Sulphide Ore
Reference Material from Kansanshi, Zambia

AMIS0120

Recommended Concentration and two “Between Laboratory” Standard Deviations

Certified Concentrations

Au Pb Coll	1.42	±	0.16	ppm
Co M/ICP	557	±	43	ppm
Cu F	15.14	±	0.993	%
Cu M/ICP	15.32	±	0.958	%
Cu P	15.14	±	1.13	%
Ni M/ICP	1355	±	95	ppm
SG	3.35	±	0.18	g/cc
U M/ICP	80	±	6.3	ppm

Provisional Concentrations

Pb M/ICP	9.1	±	2.4	ppm
Zn M/ICP	141	±	18.4	ppm

Indicated Mean

Ag M/ICP	2.3	ppm
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Recommended Concentration and two “Between Laboratory” Standard Deviations

Certified Concentrations (Major Elements)

Al ₂ O ₃	5.18	±	0.22	%
CaO	3.54	±	0.36	%
K ₂ O	0.34	±	0.04	%
MgO	0.68	±	0.06	%
MnO	0.039	±	0.004	%
S	18.01	±	1.32	%
SiO ₂	27.83	±	1.6	%
TiO ₂	0.49	±	0.04	%

Provisional Concentrations (Major Elements)

Fe ₂ O ₃	26.80	±	3.04	%
LOI	9.54	±	1.78	%
Na ₂ O	2.34	±	0.28	%

Indicated Mean

P ₂ O ₅	0.11	%
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Intended Use: AMIS0120 is suitable to monitor the accuracy of a single analysis of copper ore. The material can be used for routine quality control by inserting within a batch of samples, method development and for the calibration of equipment.

The recommended mean and "Between Lab" standard deviations for this standard reflect the average 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 and this is acceptable. Good laboratories however will report results within the two standard deviation levels with a failure of <10 %.

Origin of Material: This standard was made using sulphide ore sourced from the Kansanshi project, located in the North Western Province of Zambia, approximately 15 kilometres north of the town of Solwezi and 16 kilometres south of the Democratic Republic of Congo border. The Kansanshi project is majority owned by Cyprus Amax Kansanshi Holdings Limited, which is 100% owned by First Quantum Minerals Ltd (FQM).

The Kansanshi deposit occurs within the Lufilian arc, a major tectonic province characterized by broadly north directed fold and thrust structures, which hosts the world class Central African Copperbelt. The property geology is dominated by the northwest-trending Kansanshi Antiform, which exposes rocks of the Late Proterozoic Kansanshi Mine Formation in the core of a major refolded fold. Copper mineralization occurs both in and between steeply dipping, generally north-south trending quartz-carbonate veins and vein swarms, and as foliation parallel stratabound mineralization, within albite and carbonate altered phyllitic rocks of the Mine Formation.

Deep tropical weathering has resulted in ²supergene enrichment and subsequent partial

oxidation of the deposit. Mineralization comprises copper oxide and mixed copper oxide/chalcocite mineralization hosted by saprolitized phyllites, decalcified marbles and schists. This secondary mineralization is underlain by a large tonnage of primary sulphide mineralization, with chalcopyrite and subordinate bornite as the dominant minerals. Oxide and mixed oxide/sulphide copper mineralization grading plus 0.5% copper occurs principally within two essentially flat lying orebodies, separated by a mostly barren marble unit. In some areas, the marble unit has been completely decalcified during weathering and in these cases the two ore bodies are combined. Deeper primary sulphide mineralization occurs in other discrete flat lying phyllite units.

(for more information, refer to the First Quantum Minerals Ltd Kansanshi Fact Sheet, Sept 2006, www.first-quantum.com.)

Appearance: The material is a very fine Dark Grey powder (Corstor Colour Gauge).

Method of Preparation: The material was crushed, dry-milled and air-classified to 100% <54µm. Wet sieve particle size analysis of random samples confirmed the material was 100% <54µm. It was then blended in a bi-conical mixer, systematically divided and then sealed into 1kg Laboratory Packs. Explorer Packs are subdivided from the Laboratory packs as required. 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 an independent statistician.

Methods of Analysis Requested:

1. Cu, Fusion AAS or ICP-OES.
2. Multi-acid digest multi-element scan - (to include Cu, Co, Ni, Pb, As, Zn, Ag, U.). ICP-OES or ICP-MS.
3. Aqua regia digest - Cu, Co. ICP-OES or ICP-MS.
4. Pressed pellet multi-element scan - (to include Cu, Co, Ni, Pb, As, Zn, Ag, U.). XRF.
5. Fusion (Majors). XRF.
6. Au. Pb collection ICP-OES or ICP-MS.
7. Cu QBM/AAS Acid Soluble Copper – as per Bwana Mkubwa method supplied.
8. SG. Gas pycnometer.

Method of Certification: Twenty laboratories were each given eight randomly selected packages of sample. Results from the sixteen laboratories that reported back timeously were used for the determinations below:

The mean and standard deviation for all data was calculated. Outliers were defined as samples beyond the mean ± 2 Standard Deviations from all data. These outliers were removed from the data and a new mean and standard deviation was determined. Total results from some laboratories that reported significant failures were also removed. This method is different from that used to calculate the Confidence Interval shown on many Government-produced standards in that the actual “between-laboratory” standard deviation is used in the calculations. This produces upper and lower limits that reflect actual individual analyses rather than a grouped set of analyses. The limits can therefore be used to monitor accuracy from individual analyses, unlike the Certified Limits published on other standards which quote a Confidence Interval.

Participating Laboratories: (Not in the same order as in the table of assays)

1. ACME Analytical Laboratories Ltd CA
2. Activation Laboratories Pty Ltd (ActLabs) CA
3. ALS Chemex Laboratory Group Johannesburg SA
4. ALS Chemex Laboratory Group Perth WA
5. ALS Chemex Laboratory Group Vancouver CA
6. Ammttec Limited WA
7. Assayers Canada

8. Genalysis Laboratory Services WA
9. Intertek Testing Services Ltd Shanghai (ITS Beijing)
10. Intertek Utama Services (Indonesia)
11. Labtium Inc Finland
12. OMAC Laboratories Limited (Ireland)
13. SGS Australia Pty Ltd (Newburn) WA
14. SGS Lakfield Research Africa Pty Ltd (Booyens) SA
15. SGS Mineral Services Lakefield (Canada)
16. Ultra Trace (Pty) Ltd WA

Assay Data: Data as received from the laboratories for the important certified elements listed on p1 and 2 is set out below. A proficiency report has been sent to the managers of the participating laboratories. Additional data from this round robin on the other elements is available in the appendix.

Lab Code	Ag MICP ppm	Al2O3 XRF %	Au Pb coll ppm	CaO XRF %	Co MICP ppm	Cu F ppm	Cu MICP ppm	Cu P ppm	Fe2O3 XRF %	K2O XRF %	LOI %	MgO XRF %	MnO XRF %	Na2O XRF %	Ni MICP ppm	P2O5 XRF %	Pb MICP ppm	S XRF %	SG g/cc	SO2 XRF %	TiO2 XRF %	U MICP ppm	Zn MICP ppm	
A	2.00	5.28	1.37	3.57	565	155000	154000	151000	27.90	0.35	9.35	0.68	0.05		1350	0.12	10.00	18.90		27.60	0.49	82.50	145	
A	2.00	5.27	1.38	3.53	570	149000	155000	150000	27.90	0.35	9.35	0.69	0.04		1360	0.12	10.00	19.10		27.50	0.50	88.00	145	
A	2.00	5.26	1.42	3.53	550	152000	152000	155000	28.00	0.35	9.37	0.69	0.04		1300	0.12	10.00	18.20		27.50	0.50	86.50	140	
A	2.00	5.29	1.37	3.56	565	153000	152000	155000	28.10	0.35	9.31	0.69	0.04		1340	0.12	10.00	18.70		27.70	0.51	84.00	140	
A	2.00	5.29	1.40	3.54	570	149000	154000	158000	27.80	0.35	9.34	0.69	0.04		1380	0.12	9.00	19.10		27.70	0.51	81.50	150	
A	2.00	5.29	1.37	3.53	560	149000	155000	155000	27.90	0.34	9.37	0.69	0.04		1370	0.12	10.00	18.80		27.50	0.51	79.50	150	
A	2.50	5.31	1.38	3.55	560	155000	157000	153000	27.80	0.35	9.36	0.69	0.04		1380	0.12	9.00	18.80		27.80	0.50	80.00	150	
A	3.00	5.28	1.39	3.53	555	157000	157000	157000	28.00	0.34	9.32	0.69	0.04		1370	0.12	10.00	18.70		27.50	0.53	81.00	145	
B	2.60		1.45		570	145000	141000								1400				3.37				93.00	140
B	2.40		1.33		590	143000	142000								1400				3.37				95.00	130
B	2.60		1.47		570	144000	142000								1400				3.36				90.00	130
B	2.80		1.32		570	149000	141000								1400				3.35				91.00	130
B	2.50		1.36		570	151000	142000								1400				3.36				94.00	130
B	2.50		1.41		560	149000	141000								1400				3.37				97.00	140
B	2.60		1.43		570	143000	147000								1400				3.37				93.00	140
B	2.50		1.40		560	147000	141000								1400				3.37				95.00	140
C			1.41		630	157000	160000	160000							1200				3.36				91.00	
C			1.44		640	160000	160000	162000							1200				3.33				87.00	
C			1.41		650	157000	150000	160000							1200				3.33				91.00	
C			1.34		640	157000	160000	159000							1200				3.33				85.00	
C			1.42		630	160000	160000	156000							1200				3.33				91.00	
C			1.61		680	157000	160000	157000							1200				3.31				87.00	
C			1.47		640	159000	160000	154000							1200				3.31				91.00	
C			1.40		670	156000	150000	162000							1200				3.33				93.00	
D	2.30				481	157000									1220		101.00	17.70					76.60	241
D	2.30				497	157000									1260		104.00	18.70					79.30	248
D	2.20				492	155000									1240		104.00	17.70					78.10	244
D	2.30				489	160000									1240		105.00	18.20					77.00	246
D	2.30				491	158000									1250		104.00	17.90					78.50	250
D	2.20				503	161000									1270		105.00	18.00					78.00	250
D	2.20				498	163000									1260		104.00	18.20					78.00	251
D	2.30					155000									1280		105.00	18.10					78.30	255
E																								
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F		5.21	1.39	3.50			149500		26.24	0.35	10.68	0.71	0.05	2.23		0.13				27.08	0.48			
F		5.21	1.40	3.49			152900		26.54	0.34	10.99	0.71	0.05	2.26		0.13				27.64	0.49			
F		5.21	1.32	3.47			150300		26.48	0.36	11.02	0.70	0.05	2.24		0.14				27.29	0.48			
F		5.16	1.34	3.47			152300		26.03	0.35	11.16	0.70	0.05	2.24		0.12				27.70	0.48			
F		5.21	1.38	3.52			150000		26.72	0.36	10.91	0.71	0.05	2.27		0.13				27.85	0.49			
F		5.21	1.39	3.47			152900		26.91	0.35	10.89	0.70	0.05	2.24		0.13				27.23	0.48			
F		5.22	1.38	3.52			151600		26.62	0.35	10.87	0.72	0.06	2.34		0.13				27.49	0.49			
F		5.22	1.39	3.58			150800		26.94	0.36	10.82	0.72	0.06	2.33		0.13				27.80	0.49			
G																								
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G																								
G																								
G																								
G																								
H	2.71	5.31	1.48	3.27	553	157000	149000	157000	26.02	0.32		0.66	0.04	2.57	1390	0.09	2.58	17.10	3.46	28.50	0.47	79.80	137	
H	2.72	5.31	1.50	3.27	555	154000	147000	157000	25.91	0.32		0.65	0.04	2.56	1400	0.09	2.40	17.20	3.45	28.30	0.48	75.60	129	
H	2.67	5.32	1.42	3.27	555	154000	151000	159000	25.84	0.32		0.65	0.04	2.56	1400	0.09	2.32	17.10	3.44	28.40	0.47	77.70	129	
H	2.56	5.33	1.50	3.27	547	154000	146000	159000	25.97	0.32		0.65	0.04	2.56	1380	0.09	2.24	16.90	3.45	28.40	0.47	77.20	132	
H	2.67	5.30	1.50	3.26	555	151000	149000	160000	26.69	0.32		0.65	0.04	2.54	1400	0.09	2.32	17.00	3.47	28.30	0.47	77.50	133	
H	2.58	5.37	1.54	3.27	544	154000	150000	160000	25.91	0.32		0.65	0.04	2.55	1390	0.09	2.48	16.90	3.46	28.30	0.48	80.30	135	
H	2.70	5.34	1.45	3.27	550	155000	149000	159000	26.02	0.32		0.66	0.04	2.59	1390	0.09	2.48	17.00	3.48	28.50	0.48	80.50	133	
H	2.51	5.27	1.44	3.24	555	155000	149000	160000	25.78	0.32		0.65	0.04	2.56	1390	0.09	2.55	17.00	3.48	28.30	0.47	79.30	131	
I	1.90		1.36		588		161000	150569							1350				23.00				151	
I	1.80		1.44		560		160000	148393							1350				29.00				148	
I	1.70		1.46		576		155000	148838							1310				28.00				158	
I	1.80		1.34		572		156000	150244							1310				23.00				158	
I	1.70		1.43		560		159000	144612							1320				26.00				140	
I	1.80		1.43		570		158000	147706							1290				31.00				150	
I	1.80		1.36		568		159000	145746							1290				27.00				145	
I	1.80		1.46		562		160000	147739							1290				23.00				143	
J	2.30		1.24		529		145500	149700	150500						1352				23.00		14.67		288	
J	2.70		1.34		530		148000	147510	151500						1346				17.00		14.56		286	
J	2.70		1.34		542		147000	153200	154000						1373				17.00		14.86		293	
J	3.10		1.28		529		148900	146400	152500						1341				20.00		14.35		287	
J	3.10		1.40		539		144000	151200	156000						1360				22.00		14.16		291	
J	2.90		1.26		530		148000																	

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.

28 August 2008

Certifying Officers:



African Mineral Standards: _____

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



Geochemist: _____

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

APPENDIX

15 laboratories supplied additional trace element data. The iterated but uncertified statistics are presented below.

	Unit	Mean	2SD	RSD %	n
Al	%	2.74	0.30	5.4	95
As	ppm	10.4	6.7	32.2	62
Ba	ppm	39.9	3.9	4.8	71
Be	ppm	0.66	0.46	34.5	56
Bi	ppm	3.28	0.47	7.2	61
Ca	%	2.53	0.15	3.0	98
Ce	ppm	640	85.6	6.7	46
Cr	ppm	153	37.8	12.4	95
Cs	ppm	0.27	0.15	27.4	56
Dy	ppm	10.3	2.4	11.5	32
Er	ppm	4.75	1.27	13.4	32
Eu	ppm	4.83	1.03	10.6	32
Fe	%	19.2	1.4	3.7	91
Ga	ppm	13.1	14.5	55.5	61
Gd	ppm	22.4	7.2	16.2	32
Hf	ppm	2.22	0.47	10.7	55
Ho	ppm	1.73	0.55	15.8	32
K	ppm	0.28	0.02	3.8	84
La	ppm	370	44.3	6.0	75
Li	ppm	3.21	0.97	15.1	55
Lu	ppm	0.80	0.26	16.0	32
Mg	%	0.38	0.04	4.8	85
Mn	ppm	299	32.7	5.5	110
Mo	ppm	170	20.4	6.0	94
Na	%	1.68	0.22	6.4	85
Nb	ppm	5.27	2.51	23.9	47
Nd	ppm	230	41.4	9.0	32
P	ppm	516	102	9.9	61
Pr	ppm	70.8	14.6	10.3	32
Rb	ppm	13.1	5.1	19.4	64
Sb	ppm	17.7	4.5	12.8	64
Sc	ppm	7.78	3.00	19.3	80
Sm	ppm	32.5	6.2	9.6	32
Sn	ppm	49.0	14.9	15.2	78
Sr	ppm	46.0	9.5	10.3	87
Ta	ppm	0.51	0.29	29.0	55
Tb	ppm	2.64	0.44	8.4	32
Te	ppm	61.2	13.1	10.7	62
Th	ppm	4.94	0.44	4.5	53
Ti	%	0.16	0.15	46.7	103
Tl	ppm	0.07	0.04	25.5	40
Tm	ppm	0.65	0.20	15.4	31
V	ppm	43.2	11.0	12.7	77
W	ppm	2.17	1.71	39.4	54
Y	ppm	30.3	8.1	13.3	78
Yb	ppm	4.80	1.51	15.8	32
Zr	ppm	75.4	19.1	12.7	69