

African Mineral Standards

Certificate of Analysis

Copper Sulphide Ore
Reference Material from Kansanshi, Zambia

AMIS0040

Recommended Concentration and two "Between Laboratory" Standard Deviations

Certified Concentrations

Cu (P)	4842	±	320	ppm
Cu (T/ICP)	4881	±	418	ppm

Provisional Concentrations

Co (P)	15	±	2	ppm
--------	----	---	---	-----

Indicated Mean

Co (T/ICP)	17	ppm
------------	----	-----

Intended Use: AMIS0040 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 supergene 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 light grey powder (Corstor Colour Gauge – 5Y 7/1).

Method of Preparation: The material was crushed, dry-milled and air-classified to 100% <54um. Wet sieve particle size analysis of random samples confirmed the material was 100% <54um. 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: Co, Cu by multi-acid digestion, including HF, with ICP-OES or ICP-MS (T). Also aqua regia digestion with ICP-OES or ICP-MS (P).

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

Lab Code	Cu (T) ppm	Cu (P) ppm	Co (T) ppm	Co (P) ppm
A	4390	4520	10	10
A	4370	4820	20	20
A	4620	4750	20	10
A	4640	4740	10	10
A	4550	4440	10	10
A	4550	4690	20	10
A	4580	4750	10	10
A	4740	4850	20	20
B				
B				
B				
B				
B				
B				
B				
B				
C	4370	4150	20	10
C	4550	4390	20	10
C	4360	4110	20	10
C	4420	4710	10	10
C	4320	4260	20	10
C	4520	4240	20	10
C	4390	4190	20	10
C	4760	4470	10	10
D	4720	4670	15	14
D	4560	4980	13	15
D	4810	4850	16	14
D	4690	4950	13	14
D	4730	5170	12	13
D	4760	4930	15	14
D	4670	4670	13	15
D	4670	4670	16	13
E	4900	4690	20	13
E	5260	4650	20	13
E	4810	4830	20	14
E	4850	4790	20	15
E	4990	4470	20	13
E	4850	4840	20	14
E	5160	4760	20	13
E	4860	4570	20	13
F	4700		15	
F	4510		14	
F	4500		14	
F	4670		14	
F	4680		14	
F	4650		14	
F	5040		15	
F	4850		15	
G				
G				
G				
G				
G				
G				
G				
G				
H	5020	4710	17	16
H	5220	4770	19	15
H	4950	4580	18	15
H	4800	4730	17	16
H	5040	4460	18	15
H	5040	4570	17	14
H	5010	4680	17	14
H	5260	4680	19	15
I	4871	4745	16	16
I	4695	4687	16	16
I	4976	4828	16	16
I	4864	4779	16	16
I	4954	4948	16	16
I	5109	4751	18	15
I	5180	4814	17	15
I	4993	4801	17	16

Lab Code	Cu (T) ppm	Cu (P) ppm	Co (T) ppm	Co (P) ppm
J	4890	5000	15	15
J	4660	4800	14	15
J	4620	5010	16	15
J	5150	5040	16	15
J	4960	5290	14	16
J	4700	5130	14	16
J	4520	4980	14	15
J	4770	5170	14	16
K	5140	4980	17	16
K	4900	4820	16	16
K	5270	4840	19	16
K	5240	4910	17	16
K	4980	4870	16	16
K	5070	4840	18	16
K	5130	4940	17	16
K	4990	4980	16	16
L				
L				
L				
L				
L				
L				
L				
L				
M	4891	4963	18	15
M	4884	4981	17	15
M	4685	4719	15	15
M	4874	5058	17	16
M	4975	5039	15	15
M	4857	4879	16	15
M	4781	4587	14	15
M	5064	5330	16	16
N	4760	4710	16	15
N	4670	4800	14	16
N	4670	4660	16	15
N	4790	4640	16	15
N	4620	4710	15	15
N	4730	4710	15	15
N	4620	4870	17	15
N	4910	4820	17	17
O	5130	5200	15	17
O	5680	5070	16	17
O	5170	5390	14	17
O	5430	5010	19	17
O	5260	5330	32	18
O	5190	4950	14	16
O	5310	4990	14	16
O	5160	5080	23	16
P				
P				
P				
P				
P				
P				
P				
P				
P				
Q	4890	5010	20	22
Q	5120	4990	18	16
Q	4920	4930	20	16
Q	4850	4960	18	16
Q	4910	5020	18	17
Q	5020	4800	20	16
Q	4890	4960	20	17
Q	4950	4910	18	16

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., (Canada).
2. Alex Stewart International Corporation (Zambia)
3. ALS Chemex South Africa (Pty) Ltd.
4. ALS Chemex, (Vancouver, Canada).
5. Amdel Limited, (Perth, Australia).
6. Assayers Canada, (Vancouver).
7. Genalysis Laboratory Services (Pty) Ltd., (Australia).
8. Geoservice Centre, Geolaboratory, (GTK. Finland).
9. Pt Intertek Utama Services (Intertek, Indonesia)
10. Set Point Laboratories (Pty) Ltd (South Africa)
11. SGS Lakefield Research (Canada)
12. SGS Welshpool (Australia).
13. Ultra Trace (Pty) Ltd. (Australia).

Availability: This product is available in Laboratory Packs containing 1kg of material or in Explorer Packs containing client specified weights of material (from 50g up to 250g). Laboratory Packs are sealed bottles delivered in sealed foil pouches. Explorer Packs contain material in standard geochem envelopes placed into foil pouches that are nitrogen flushed and vacuum sealed.

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 May 2007

Certifying Officers:



African Mineral Standards: _____

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



Geochemist: _____

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