

African Mineral Standards

Certificate of Analysis

Copper Oxide Ore
Reference Material from Lonshi
Democratic Republic of the Congo

AMIS0051

Recommended Concentration and two "Between Laboratory" Standard Deviations

Certified Concentrations

Cu (P)	8.994%	+ -	0.608%
Cu (T/ICP)	8.929%	+ -	0.446%
Co (T/ICP)	62	+ -	6 ppm

Provisional Concentration

Co (P)	57	+ -	10 ppm
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Intended Use: AMIS0051 is suitable to monitor the accuracy of a single analysis of oxide 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 oxide ore sourced from the Lonshi Copper Mine which is owned and operated by Compagnie Miniere du Sakania sprl (Comisa), a wholly owned Congolese subsidiary of First Quantum Minerals Ltd (FQM). The mine is situated in the Congo Pedicle region of the Province of Katanga, Democratic Republic of the Congo.

Lonshi is a sediment hosted, structurally controlled deposit of Copperbelt type. In contrast to other Copperbelt deposits, Lonshi is interpreted to occur at or near the upper contact of the Upper Roan Group where a sheared and tectonised clastic unit, the Lonshi Conglomerate, is in thrust contact with overlying carbonaceous, silty, dolomitic marbles. This folded and thrust contact is the locus for mineralization which occurs in both the conglomerate and the intensely weathered dolomite.

Primary sulphide mineralization, mainly chalcopyrite, occurs as carbonate clast replacement in the conglomerate, and as disseminations and rare veinlets in both conglomerate and dolomite. Supergene enrichment and subsequent deep oxidation, has resulted in complete carbonate destruction in the dolomite, within the weathering zone, and formation of chalcocite now largely oxidized to malachite and black Cu oxide minerals.

(for more information, refer to Form 43-101F1 Technical Report, The Lonshi Copper Mine, Katanga Province, Democratic Republic of the Congo, March 26th 2003, Alan J. Stephens Vice President, Exploration, and G. Clive Newall, President, First Quantum Minerals Ltd.)

Approximate chemical composition: The major element chemistry for other materials from this particular oxide orebody is set out below. The major element chemistry for this particular product has not been determined.

Al ₂ O ₃ %	CaO %	Fe ₂ O ₃ %	K ₂ O %	LOI %	MgO %
11	1	9	2	11	2
MnO %	Na ₂ O %	P ₂ O ₅ %	SiO ₂ %	S %	TiO ₂ %
4	0.2	0.2	50	0.2	0.7

Appearance: The material is a very fine brownish grey powder (Corstor Colour Gauge - 5YR 4/1).

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:

1. Co, Cu. Multi-acid total digestion, including HF, ICP-OES or MS.
2. Cu, Co. Aqua regia digestion, ICP-OES or MS.

Method of Certification: Sixteen laboratories were each given eight randomly selected packages of sample. Results from the fourteen laboratories that reported back were used for the determinations in the tables below

The 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 removed from further calculations when the mean of all analyses from that laboratory failed a t test of the global means of the other laboratories. The means and standard deviations were calculated using all remaining data. Any analysis that fell outside of the mean ± 2 standard deviations was removed from the ensuing data base. The mean and standard deviations were again calculated using the remaining data. This method is different from that used by Government agencies 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 Confidence Limits published on other standards. Standards with an RSD of near or less than 5 % are certified, RSD's of between near 5 % and 15 % are Provisional, and RSD's over 15 % are Indicated.

Lab Code	P Cu, ppm	T-ICP Cu, ppm	P Co, ppm	T-ICP Co ppm
A	91800	92800	61	65
A	90800	93000	59	65
A	91200	93000	61	65
A	90800	91400	63	65
A	89600	90000	63	65
A	91900	92400	61	65
A	90300	90000	62	60
A	89300	92900	63	65
B	87200	100000	54	60
B	88800	108000	55	70
B	87100	100000	59	60
B	86900	99000	62	60
B	86600	104000	59	60
B	87600	105000	56	60
B	86900	114000	56	70
B	85300	117000	62	60
C	96000	87300	62	64
C	94300	88000	56	63
C	96700	90100	55	61
C	91000	91000	57	62
C	96500	90500	56	63
C	95400	90800	57	63
C	99300	87600	59	64
C	96300	92200	58	63
D	89600	88800	54	61
D	89500	89400	57	61
D	88200	88700	58	60
D	89000	90100	57	60
D	89200	88900	56	60
D	91100	90300	62	58
D	89000	90900	55	60
D	89300	89400	55	61
E		90600		48
E		90300		46
E		90100		44
E		90400		44
E		90400		47
E		90500		46
E		90200		44
E		90200		46
F		130565		37
F		133142		34
F		129943		30
F		136915		38
F		134433		20
F		134032		20
F		135563		32
F		130874		29
G	81900	95900	52	64
G	82000	94300	51	64
G	82900	92000	50	62
G	82700	94900	50	61
G	82000	97900	50	63
G	82500	96100	50	62
G	83400	96200	49	65
G	83300	97800	49	64
H	91640	91983	47	63
H	93747	90769	46	64
H	93382	90881	47	65
H	93774	90143	46	71
H	93288	89603	46	62
H	95335	90391	46	69
H	93387	89697	46	69
H	92425	91166	46	68

Lab Code	P Cu, ppm	T-ICP Cu, ppm	P Co, ppm	T-ICP Co ppm
I				
I				
I				
I				
I				
I				
I				
I				
J	91690	85710	70	70
J	92480	85910	70	60
J	92760	85690	70	60
J	90460	85460	70	60
J	89390	83090	60	60
J	91630	84570	60	60
J	91520	84930	70	60
J	90460	89350	70	70
K	88300	89400		80
K	89300	89500		80
K	88700	86900		100
K	88500	85600		100
K	89000	87400		96
K	89000	87600		92
K	89400	88500		92
K	88100	86900		96
L	90300	88100	63	70
L	89000	90100	62	60
L	89400	89300	63	60
L	89100	90300	66	60
L	89500	90900	65	60
L	89300	90300	66	60
L	89800	88800	51	60
L	88200	90200	56	60
M				
M				
M				
M				
M				
M				
M				
M				
M				
N	84400	87200	60	60
N	90000	86800	53	60
N	88900	87400	61	60
N	88400	86400	56	60
N	89100	88200	58	60
N	87000	87400	58	60
N	89900	87800	57	60
N	89700	89200	55	60
O	65400	88900	50	52
O	64600	86000	49	56
O	63300	86500	50	51
O	66100	85100	50	53
O	65100	79400	48	52
O	66500	90100	48	51
O	65200	86100	49	53
O	66700	90200	50	53
P	78300	76700	58	63
P	78700	79200	57	62
P	77900	80000	57	64
P	77900	79400	57	63
P	78100	81200	57	64
P	77000	80700	57	64
P	77300	80000	57	62
P	77900	79600	58	63

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

3. ACME Analytical Laboratories Ltd., (Canada).
4. Alex Stewart International Corporation (Zambia)
5. ALS Chemex South Africa (Pty) Ltd.
6. ALS Chemex, (Vancouver, Canada).
7. Amdel Limited, (Perth, Australia).
8. Assayers Canada, (Vancouver).
9. Genalysis Laboratory Services (Pty) Ltd., (Australia).
10. Nkomati JV Laboratory
11. Pt Intertek Utama Services (Intertek, Indonesia)
12. Set Point Laboratories (Pty) Ltd (South Africa)
13. SGS Lakefield Research (Canada)
14. SGS Lakefield Research Africa (Pty) Ltd. (Joburg, South Africa)
15. SGS Welshpool (Australia).
16. 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.

16 October 2007

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