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#### Form 43-101F1 Technical Report

The Lonshi Copper Mine Katanga Province

Democratic Republic of the Congo

 $\begin{array}{c} \mbox{March 26}^{th} \mbox{ 2003} \\ \mbox{(Amending the January 30, 2003 Report )} \end{array}$ 

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# Summary

The Lonshi Copper Mine is located in the Democratic Republic of the Congo, and is owned and operated by Compagnie Miniere du Sakania sprl. (Comisa), a wholly owned Congolese subsidiary of First Quantum Minerals Ltd (FQM).

The deposit was discovered by FQM in late 2000. Three drilling campaigns in the period November 2000 to September 2002 resulted in the definition of an economically mineable mineral resource.

Mining operations commenced in August 2001 with ore from the mine transported by road, and sold to, a pre-existing processing plant, located near Ndola, Zambia. This plant is owned and operated by Bwana Mkubwa Mining Ltd (BMML), a wholly owned Zambian subsidiary of FQM.

On the basis of the discovery of Lonshi, and after completion of an independent engineering study, the Bwana plant was first modified to accept Lonshi ore, and then expanded to triple its previous capacity. Commissioning of the plant is currently underway, and when completed, average annual production of 30,000 tonnes of cathode copper is expected for the remainder of the mine life.

An independently estimated resource model and mineable reserves statement was produced to JORC (\*) standards, and reconciled to the standards specified in National Instrument 43-101 "Standards of Disclosure for Mineral Projects" issued by the Canadian Securities Administrators. As of January  $1^{st}$  2003, these are as follows;

Mineral Resources and Mineral Reserves

Area	Classification	Tonnage Ore	% AsCu	Tonnes AsCu	Data Source
MINERAL RESOURCE (Measured & Indicated)	Block Model HG + LG	6,099,786	4.13	252,179	DMS

The proven and probable reserves set out below were derived from, and are included in the mineral resources stated above, and are not additional to them.

Area	rea Classification Tonnage % Ore		% AsCu	Tonnes AsCu	Data Source
MINEABLE RESERVES (Proven & Probable)	HG	2,880,767	5.81	167,238	AMC
BORDER STOCKPILE	HG + LG	799,527	4.26	34,060	AMC
LONSHI STOCKPILE (Stockpiles:Proven)	HG + LG	261,938	5.23	13,699	FQM
TOTAL RESERVES	HG + LG	3,942,232	5.45	214,997	

The Lonshi mine is operated under an independently defined Environmental Management Plan, that meets all local regulations and complies with internationally accepted standards.

\* Joint Ore Reserve Committee of the Australasian Code for Reporting of Mineral Resources and Reserves, September 1999.

## **Introduction & Terms of Reference**

Introduction

This report describes the geology, ore reserves and resources, and operations of the Lonshi Mine, located in Katanga Province, Democratic Republic of the Congo (DRC). The mine is owned and operated by Compagnie Miniere du Sakania sprl (Comisa), a wholly owned Congolese subsidiary of First Quantum Minerals Ltd (FQM). Ore from the mine is transported by road and sold to a pre existing processing plant, located near Ndola, Zambia, which is owned and operated by Bwana Mkubwa Mining Ltd (BMML), a wholly owned Zambian subsidiary of FQM.

This technical report has been prepared by the authors, with G. Clive Newall as a Qualified Person, to the standards specified in National Instrument 43-101 "Standards of Disclosure for Mineral Projects" issued by the Canadian Securities Administrators.

#### Terms of Reference

The report is submitted as part of the distribution requirements to file a technical report consistent with National Policy 43-101F1.

The information and data contained in this report were derived from both independent studies and internal FQM studies as described and cited as applicable.

The authors of the report are full time employees of FQM or its subsidiaries and have been involved in the discovery, development and operation of the Lonshi Mine since inception in 2000.

The authors describe the Geology, Ore Resources and Reserves, and Operations of the Lonshi Mine and associated Bwana Mkubwa treatment plant.

#### Disclaimer

The authors have relied on information provided by various independent consultants in the preparation of this report.

Independent resource estimates were provided by Digital Mine Services (DMS) of Harare, Zimbabwe, while African Mining Consultants (AMC) of Kitwe, Zambia completed an independent mineable reserve estimate. AMC also completed a geotechnical study of the Lonshi open pit that was used in mine design, as well as conducting a check assay program and stockpile verification.

D.C. Blandford & Associates of Perth, Australia produced an independent Environmental Management Plan for Lonshi.

The Bwana Mkubwa Expansion was based on an independent Definitive Engineering Study and Capital Estimate produced by Signet Engineering of Perth, Australia.

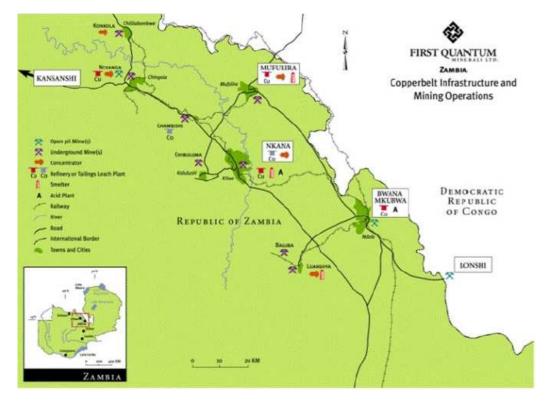
### **Property Description and Location**

The Lonshi Open Pit Mine is located in the Congo Pedicle region of the Province of Katanga, Democratic Republic of the Congo.

It is sited within 3 km of the international border with Zambia at the following UTM coordinates:

N 8542775.766; E 710278.2 and Elevation 1289.472m.

The property location and access is shown on Figure 1 below;

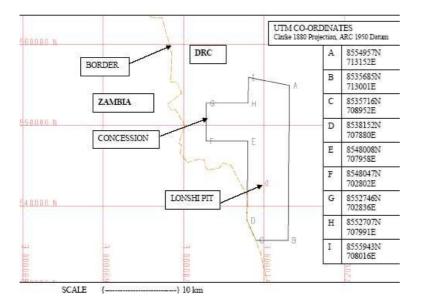


## Figure 1; Location and Access Claim Status

Lonshi lies within the Kipilunga Exploitation Concession, which measures 124 square kilometres in area, is owned 100% by Comisa, has the following characteristics, and is shown on Figure 2 below;

NAME OF THE CONCESSIO N	CONCESSI ON NUMBER	MINISTERIAL ORDER Nº	DERIVED FROM THE FOLLOWING MINING TITLES	MINERAL S	VALIDITY
KIPULUN GU	235	019/CAB.MIN ES/ 01/2001 du 25/06/2001	2210, 2211, 2212, 2213 et 2214 accordés par les arrêtés 415, 416, 417, 418 et 419/CAB MINES/01/ 2000 du 18/12/2000	COPPER , cobalt, manganè se and nickel	25/06/2001 to 25/06/20 21.

Comisa sprl – Claim Map, Concession de Kipilungu



### Figure 2; Claim Map

Comisa has obtained all operating permits required under Democratic Republic of the Congo laws and regulations currently in force, and the mine has been in continuous operation since September 2001.

Lonshi was a virgin discovery made in late 2000 in an unpopulated area, and as such there are no pre existing environmental liabilities.

Comisa and BMML operate under the following agreements governing mine operation, and export and sale of ore;

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Ore Sales Agreement between Comisa and Bwana Mkubwa Mining Ltd, dated  $9^{\mbox{th}}$  May 2002.

A new Democratic Republic of the Congo Mining Act and Regulations is currently being implemented and some changes to these operating agreements may result.

# Accessibility, Climate, Local Resources, Infrastructure and Physiography

The Lonshi mine is located in flat terrain, with an average elevation of 1300m, and the area is vegetated with a mixture of open savannah grassland, tropical forest and marsh. Access is by means of a dedicated BMML owned and operated 30km long haul road from the Bwana Mkubwa plant site. The nearest town is Ndola in Zambia, as shown on the location map above; there are no settlements of any size in the vicinity of the mine in the DRC.

The mine operates year round, although mining of ore is restricted during the wettest months of the rainy season, during which only waste stripping is carried out. As all ore processing is conducted at Bwana Mkubwa, there is no requirement for power, tailings ponds, or other installations at Lonshi.

# History

Old files both in the DRC and in The Royal Museum of Central Africa, Tervuren, Belgium described several 1930's vintage drill holes that reportedly intersected high grade copper mineralization in the Lonshi area. Site inspection revealed the presence of some old trenching and the sites of some of these drillholes. Aside from this, there is no reported mining or exploration activity at Lonshi.

FQM completed its first drilling in November 2000, and discovered the deposit.

During 2002, 4,155,839 tonnes of waste, 951,086 tonnes of high grade ore (5.42% AsCu) and 244,229 tonnes of low grade ore (0.88% AsCu), containing 53,737 tonnes acid soluble copper were mined at Lonshi. Of this, 210,418 tonnes at 4.59% AsCu containing 6,182 tonnes of copper cathode were processed at the Bwana Mkubwa plant site.

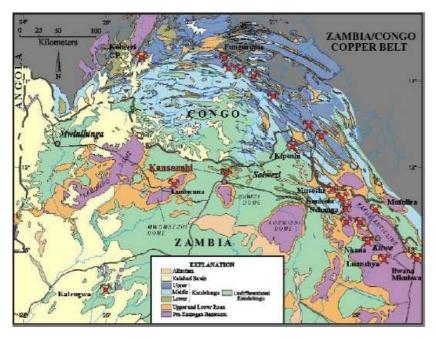
#### **Geological Setting**

The Central African Copperbelt is an arcuate belt of Late Proterozoic sediment-hosted copper deposits, many of which are world-class. The belt is coincident with the Lufilian arc, a major tectonic province characterized by broadly north-directed fold and thrust structures.

The Copperbelt deposits occur within the lowermost Mines Series of the Katangan Supergroup, and can be grouped into two broad types that geographically fall on either side of the Zambian – Congo border. The Zambian deposits are hosted in the lowermost portion of the Mines Series, the Lower Roan Group "ore shales", quartzites and other predominantly clastic sediments. The Lower Roan sediments rest upon Middle Proterozoic (~1200 to 1300 m.a.) basement gneisses, schists and granites,

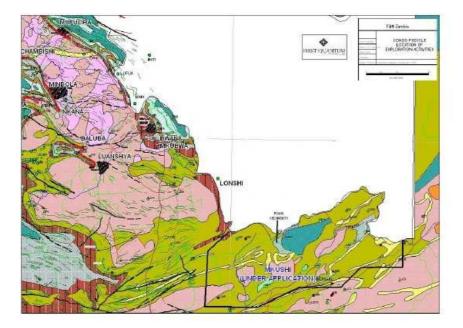
which are locally mineralized adjacent to the contact. In contrast, the Congolese deposits are hosted in Upper Roan Group dolomitic rocks within thrustbounded blocks and megabreccias. Argillaceous sediments, marbles and schists of the Mwashia Group overlie the Upper Roan sediments and form the uppermost portion of the Mines Series. The Kundelungu Series overlies the Mines Series and has been subdivided into three groups. The base of the Lower Kundelungu is marked by the Grand Conglomerate, a major submarine conglomeratic or tillite horizon. This is overlain by a thick limestone sequence (Kakontwe Fm.) and pelites.

The regional geology of the Copperbelt is shown below on Figure 3;



## Figure 3 Copperbelt Geology

There is no published geology for the Congolese Pedicle, but Figure 4 below shows the general geology for the adjacent area of Zambia and location of mineral deposits and mines.



# **Figure 4 District Geology**

The Lonshi mine area geology, derived from unpublished work and internal FQM studies is shown on Figure 5 below.

Outcrop is very poor in the area with deep tropical weathering and laterization being ubiquitous, and hence the local geology is largely interpreted from satellite imagery and drilling. The stratigraphic succession in the mine area comprises eastward dipping Lower Roan clastic rocks, overlain by Upper Roan pelitic rocks, carbonates and minor clastics, which in turn are overlain by Mwashia Group shales.

In contrast to other known Copperbelt deposits, Lonshi is interpreted to occur at or near the upper contact of the Upper Roan Group, see figure 6 below, where a sheared and tectonised clastic unit, the Lonshi Conglomerate is in thrust contact with overlying carbonaceous (?), silty, dolomitic marbles. This folded and thrusted contact is the locus for mineralization which occurs in both the conglomerate and the intensely weathered dolomite, as more fully described in the section on mineralization.

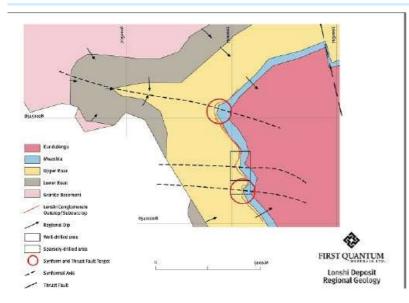
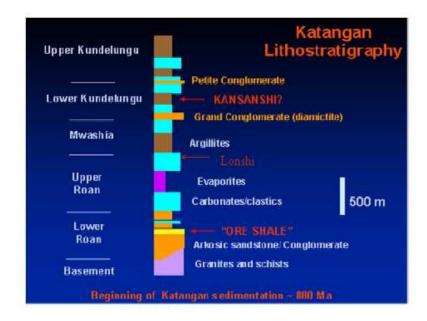


Figure 5; Lonshi Geology



# Figure 6; Lonshi Stratigraphic Column

#### **Deposit Type**

Lonshi is a sediment hosted, structurally controlled deposit of Copperbelt type.

As stated above, Copperbelt type deposits occur within the Lufilian arc, a late PreCambrian fold thrust belt. Early decollement at ductility contrasts, seems to be the primary control on ore localization. Mineralization is focused into high strain zones, particularly sheared carbonaceous phyllites and their immediately underlying altered clastic rocks. Dilation zones within fold limbs, in and adjacent to fold closures, formed the final trap at major orebodies. Mineralization is commonly accompanied by carbonate and potassic alteration and occurs as both foliation parallel disseminations and injections, and in cross cutting veinlets. Supergene enrichment of high primary grades and subsequent oxidation is an important feature in producing major orebodies.

#### Mineralization

The Lonshi orebody is sited at the thrusted contact of altered and sheared Lonshi conglomerate with overlying dolomitic marble, denominated the Lonshi Horizon. 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. The weathered dolomite is now a residual black silty rock, named Terre Noir, that is host to major secondary oxide mineralization. At depth, carbonate destruction of the dolomite is incomplete, and the Terre Noir then forms along the upper and lower dolomite contacts only.

As currently defined, the favourable Lonshi horizon has been traced over a strike length of 2500m, and has been drilled to a maximum vertical depth of 150m. Oxide mineralization varies from 2 to 50m in true thickness, with ore grades and thicknesses being confined to a synclinal fold flexure. Similar, as yet untested, synclines have been mapped to the north and south of Lonshi.

## Exploration

As stated above, Lonshi was discovered by FQM in November 2000, as part of program to find new ore sources for the Bwana Mkubwa plant. Initial site inspection resulted in the location of the reported DDH collars as well as some old trenches, located in a classic copper clearing, or vegetation kill zone, and a small RC drill program was completed, which located the orebody. A second round of drilling in May 2001 resulted in the delineation of a significant orebody.

Based on the success of this, and the completion of metallurgical testwork that showed that the Lonshi ore could be treated through the Bwana plant, open pit mining operations were initiated in September 2001. A decision was made to expand the Bwana plant from its original 10,000tpy Cu to 30,000tpy Cu, and a final campaign of ore reserve definition drilling was completed in mid 2002.

Figure 7 shows the locations of all drill holes, while figure 8 is long section through the orebody, and figure 9 is a typical cross section through it.

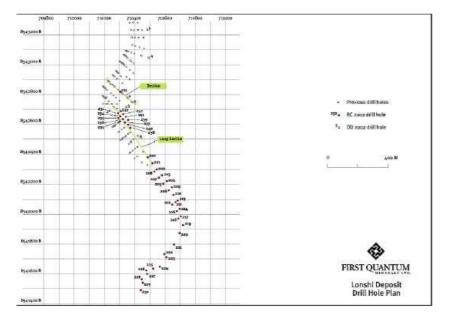


Figure 7; Drill Plan

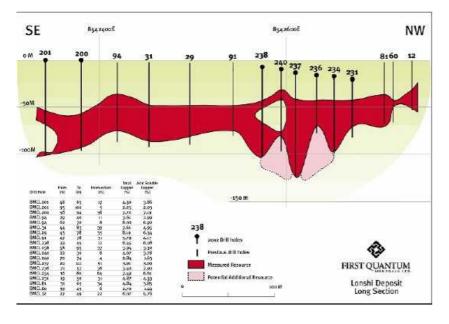
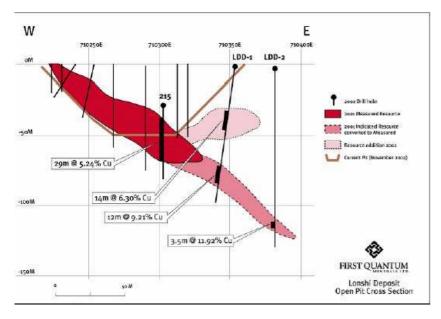


Figure 8; Long Section



# Figure 9; Cross Section

# Drilling

All drilling at Lonshi was carried out by Stanley Mining Services Ltd, a subsidiary of Layne Christensen Company., and comprised a total of 171 Reverse Circulation (RC) for 8,838m and 6 Diamond Drill Holes (DDH) for 991m. FQM personnel supervised all drilling and sampling exercises, except for 673m

of diamond drilling carried out mainly for geotechnical purposes by African Mining Consultants who collected the core samples from a Stanley Mining Services drill rig.

All drillhole collars were surveyed by an independent surveyor, Mr. Ian Robinson, of Survey and Technical Services (STS), Masvingo, Zimbabwe. STS have confirmed that the sitings used in the database are a true reflection of their surveys carried out on the site. Three separate drilling programs were completed in 2000, 2001 and 2002.

Downhole surveys were conducted on the diamond drilling program of 2002, by African Mining Consultants (AMC) of Kitwe, Zambia. No significant deflections were reported. Traces of the shallow RC drilling have been exposed as the pit deepened. To a depth of 45m below natural ground level, no significant deviation in the hole trace has been observed by correlation back to the collar on surface.

A short program of twinning of DDHs with RCs was completed. All holes were oriented to intersect the mineralization at appropriate angles to dip and strike

It can therefore be concluded that adequate checks have been undertaken by FQM using independent consultants to verify both the holes positions and deflections.

### Sampling methods and security

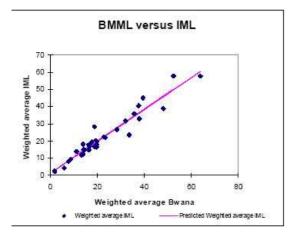
All RC samples were collected in single composite metre intervals, with no splitting done in the field. RC recoveries were generally acceptable except in those few areas of excessive moisture content, where recoveries were low. Diamond holes were drilled at PQ size, and assayed in their entirety, with individual sample intervals reflecting geology and respecting core loss, and a minimum sample interval of 0.5metres. Core recovery was generally better than 90%. All sampling was conducted by FQM personnel, who also supervised the chain of custody from the drill site to the laboratory

### Sample preparation and analyses

The RC samples, of roughly 7 to 10kgs each, were dried and crushed to approximately 10mm size before being split into 1kg sub samples using riffle splitters at a dedicated FQM Prep Lab in Ndola. The 1kg sub sample was pulverised to analytical fineness and a 100g pulp taken for assay.

All samples were prepared to normal industry standards and assayed by flame atomic absorption spectrophotometry for total copper and ambient temperature acid soluble copper. Appropriate standards, blanks and duplicates were employed.

Year 2000 program; As part of a metallurgical testwork program, 230 of the total of 890 RC samples collected were sent to Independent Metallurgical Laboratories in Perth, Australia. The 230 samples were composited into 32 samples representing 16 mineralised intersections of Terre Noire and Lonshi Conglomerate. As figure 10 below shows, the correlation coefficient between the IML and Bwana labs was excellent at 0.96



#### Figure 10; Check assaying, 2000 drill program

Year 2001 drill program; Some 4,203 samples were collected by FQM and assayed at the BMML lab using similar methods to the Year 2000 drill program.

Check and repeat samples were undertaken by FQM in 2001 to verify the consistency and accuracy of the primary Bwana Mkubwa Laboratory (BMML). A program of checking the copper assays in 2 external laboratories, Alfred Knight Laboratory (AHK) in Kalalushi, Zambia and Genalaysis [accredited], Perth, Australia was carried out.

Results, as indicated in figure 11 below, showed that the BMML lab was excellent for precision and accuracy when compared with Genalaysis and Alfred Knight.

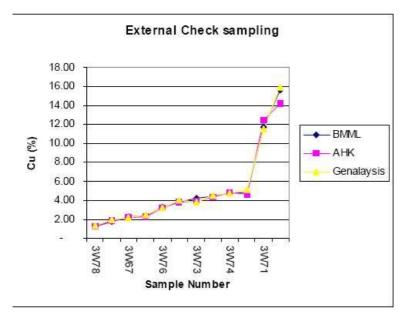


Figure 11; Check assaying, 2001

During the year external checks at the same two external labs, were also carried out on Lonshi stockpiled ore as part of an accreditation program by AMC for the BMML lab. Again results were excellent as shown in figure 12 below;

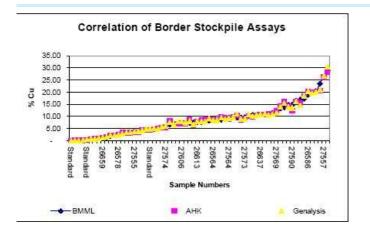


Figure 12; Stockpile check assaying

Year 2002 drill program; Some 175 RC samples were sent to the BMML laboratory for assay, and 1,470 samples were sent to Antech Laboratories, Zimbabwe (accredited laboratory). Assays from the geotechnical diamond drilling were carried out at AHK.

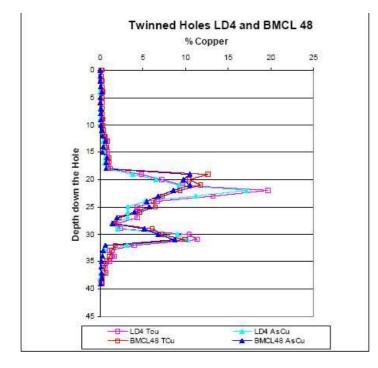
# **Data Verification**

A diamond drill hole was drilled to twin one of the RC holes in the 2001 drilling program. Whole core from the diamond drill hole was assayed by an independent laboratory (AHK) to compare with the BMML assay for the RC hole.

It was observed that the grade of the whole core sample from LD 4 is slightly higher than the RC assay, as follows;

BMCL48 (RC)	13.0m	@	6.96%	TCu	6.13%	AsCu (BMML Assay)
LD4 (PQ diamond)	13.0m	@	7.44%	TCu	6.34%	AsCu (AHK Assay)

The comparison between individual total and acid soluble assays from the two holes is shown graphically in figure 13 below;



# Figure 13; Drillhole Twinning

# **Adjacent Properties**

Not applicable

## Mineral Processing & Metallurgical Testing

Initial metallurgical testwork, on Reverse Circulation drillhole samples, was conducted in 2001 and indicated that the Lonshi ore would leach satisfactorily, under conditions in place at the existing Bwana Mkubwa plant. However, significant issues associated with the vacuum filtration portion of the Bwana circuit were identified.

Accordingly, as part of a Definitive Engineering study completed by Signet Engineering of Perth, W.A. Australia in December 2001, additional testwork was conducted on diamond drill core samples from Lonshi, at Independent Metallurgical Laboratories (IML), of Perth W.A., Australia.

This testwork comprised;

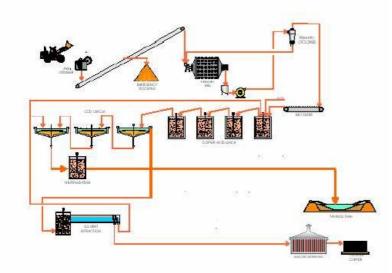
- full head analysis
- acid leachability tests
- · a variety of physical tests to determine crushing and milling characteristics
- ore filtration tests
- thickening and clarification tests

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As a result of the difficulties encountered in the original testwork with the filtration of the Lonshi leach residue, a variety of testwork was conducted to examine the concept of blending other materials with Lonshi ore to produce a filterable residue blend. This included blending low grade dump material from Bwana Mkubwa, but while much better filtration rates were achieved, results were inadequate in terms of grade and production.

Counter current decantation (CCD) was then examined as an alternative for the residue solid/liquid separation step. Incorporation of a clarification step following CCD, and the relaxation of the need to produce a clear CCD overflow, resulted in adequate specific settling rates being achieved. By using high wash flow rates in line with the revised overall circuit design, adequate recoveries of copper were achieved. The use of CCD followed by clarification of the pregnant liquor solution was therefore adopted as the preferred process for the expansion at Bwana Mkubwa, as illustrated in the flowsheet shown on figure 14 below.

Bwana Mkubwa Process Flow Diagram



# Figure 14; Bwana Mkubwa Process Flow Diagram

# **Mineral Resource Estimates**

An independent mineral resource estimate was prepared to JORC standards in September 2002 by Gail Hanssen of Digital Mining Services (DMS) of Harare, Zimbabwe. FQM requested DMS to update the Lonshi resource after their initial estimate in April 2002, subsequent to commencement of mining and the drilling of 49

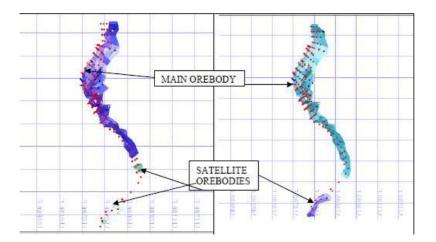
additional holes. This both increased the confidence in the resource evaluation and resulted in an increase in resources.

The Table below demonstrates the resources of the orebody defined as:

- Highgrade (HG) orebody, based on a model with a lower cut off of 2% TCu (total copper).
- Lowgrade (HG+LG) orebody, based on a model with a lower cut off of 0.8% AsCu (acid soluble copper).

The highgrade orebody is considered to be the highgrade "core" nested within the lowgrade orebody; refer to figure 15 below.

Orebody	Category	Tonnes Ore	% TCu	% AsCu	Tonnes TCu	Tonnes AsCu
HG	MEASURED	5,064,702	6.42	5.31	325,154	268,936
	INDICATED	217,734	7.82	5.97	17,027	12,999
	INFERRED	185,435	6.66	5.49	12,350	10,180
TOTAL	M & I	5,282,436	6.48	5.34	342,181	281,934
HG+LG	MEASURED	6,952,310	5.01	4.22	348,311	293,387
	INDICATED	310,088	5.07	4.28	15,721	13,272
	INFERRED	152,241	5.07	4.28	7,719	6,516
TOTAL	M & I	7,262,398	5.01	4.22	364,032	306,659



# Figure 15: Solid Models of the Lonshi Orebody.

There has been no application of an upper cut to the data in this estimate as the mining has proved the validity of the high grades estimated in the previous resource.

# Mineral Reserve Estimate

Gayle Hanssen of DMS, Zimbabwe was also responsible for the Mineral Resource Modelling. Michael Brennan of AMC, Kitwe was responsible for the Mineable Reserve Calculation. The reserves and resources were estimated according to JORC standards, and reconciled to the standards specified in National Instrument 43-101 "Standards of Disclosure for Mineral Projects" issued by the Canadian Securities Administrators.

FQM commissioned AMC to undertake a pit optimisation on the existing resource block model, generate a pit design and provide an estimate of the inpit reserves. AMC used Surpac Vision modelling software and the Whittle 4X Multi-element optimisation package to undertake this work.

All relevant technical, costing and financial information was provided by FQM.

The final pit design is based on the optimum Whittle pit shell. A copper price of US\$1600/t was used. All pit design parameters were provided by FQM. The final pit extends to a depth of 1195m a.m.s.l. which is approximately 105m below the surface.

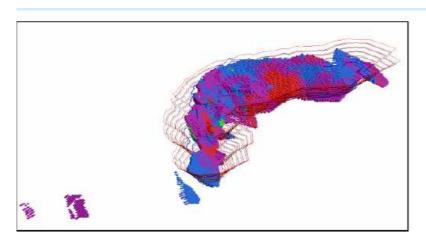
Based on the resource block model provided to AMC by DMS, the pre mining In Pit Reserves at Lonshi are as follows:

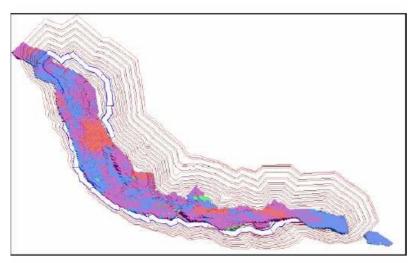
RESERVES	TONNES	%TCu	%AsCu	tonnes TCu	tonnes AsCu
PROVEN	3,977,744	6.56	5.44	260,940	216,389
PROBABLE	106,431	8.25	7.40	8,781	7,876
TOTALS	4,084,175	6.48	5.34	269,721	224,265

The reserves are based on a 2% TCu cut-off.

The total volume of waste within the final pit amounts to 16,223,281 m3 indicating a waste: ore stripping ratio of 8.16:1.

The final pit shapes and % TCu block grades are shown in figure 16;







# Figure16; 3D views of Total Copper Block Estimates and Pit Design

# **Reserves and Production Reconciliation**

In January 2003, DMS was requested to carry out a reconciliation of the material mined versus the material removed from the Block Model. Mining at Lonshi Open

Pit commenced on  $4^{\text{th}}$  August 2001 and this reconciliation is as of  $31^{\text{st}}$  December 2002.

The current status of the material mined from Lonshi Open Pit is:

Border Stockpile - drilled, sampled and measured independently by AMC

Lonshi Stockpile - surveyed and truck sampled by FQM

Consumed - Processed at the Bwana Mkubwa Plant and sampled by FQM

The Resource Block Model calculated by DMS was interrogated to define the material that had been removed at certain dates. The pit surfaces were surveyed and generated by an independent surveyor, Survey and Technical Services. AMC drilled, assayed and estimated the Border Stockpile at certain dates as part of a bankable document.

# Ore Movements $4^{\mbox{th}}$ August 2001 to $31^{\mbox{st}}$ December 2002:

Area	Classification	Tonnage Ore	% AsCu	Tonnes AsCu	Data Source
BORDER STOCKPILE	HG + LG	799,527	4.26	34,060	AMC
LONSHI STOCKPILE	HG + LG	261,938	5.23	13,699	FQM
CONSUMED	HG + LG	263,597	4.97	13,092	FQM
TOTA L A CTUA L ORE MOV EMENT	HG + LG	1,325,062	4.59	60,851	
PREDICTED ORE MOVEMENT	HG + LG	1,162,612	4.67	54,294	
(Block Model)					
VARIANCE ACTUAL VS. MODEL	HG + LG	162,450	4.04	6,557	
VARIANCE ACTUAL VS. MODEL (%)	HG + LG	12.26%		10.78%	

Some 6,557 tonnes of AsCu has been extracted in excess of the predicted tonnage from the DMS Block Model. This suggests a degree of conservatism in the orebody resource modelling.

# Mineral Resource and Mineable Reserve Statement as of 1 <sup>st</sup> January 2003

STATEMENT: Gayle Hanssen of Digital Mining Services has hereby seen, investigated and verified the evaluation of the copper resources and reserves of the Lonshi Deposit. Subsequent to 17 months of mining, the following mineral resource and mineable reserves are available.

# **Mineral Resources**

Area	Classification	Tonnage Ore	% AsCu	Tonnes AsCu	Data Source
MINERAL RESOURCE (Measured & Indicated)	Block Model HG + LG	6,099,786	4.13	252,179	DMS

The proven and probable reserves set out below were derived from, and are included in the mineral resources stated above, and are not additional to them.

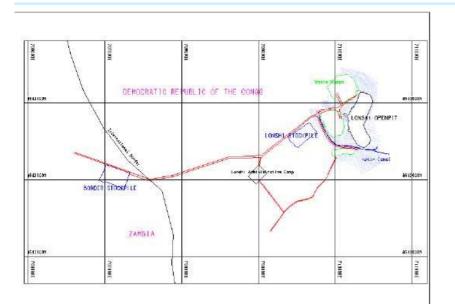
Area	Classification	Tonnage Ore	% AsCu	Tonnes AsCu	Data Source
MINEABLE RESERVES (Proven & Probable)	HG	2,880,767	5.81	167,238	AMC
BORDER STOCKPILE	HG + LG	799,527	4.26	34,060	AMC
LONSHI STOCKPILE (Stockpiles:Proven)	HG + LG	261,938	5.23	13,699	FQM
TOTAL RESERVES	HG + LG	3,942,232	5.45	214,997	

#### Additional Requirements for Technical Reports on Producing Properties

#### **Mining Operations**

Comisa uses independent contractors to mine and haul Lonshi ore. The mining contractor is South Africa's Mutual Civils and Construction, operating through its DRC subsidiary, Congolese Construction & Mining (CCM), while the haulage contractor is Kasembo Transport of Ndola. CCM mines the ore and takes it via a 3.5 km long haul road to a stockpile at the Zambian border while Kasembo transports it from there to Bwana Mkubwa over about 35 km of a newly constructed dedicated haul road. See figure 17 below.

CCM's plant fleet on site consists of 17 articulated dump trucks, all of 40-t capacity, and four 90-t excavators. The ADTs are mainly Bell B40s with three Cat D400Es in the fleet. The excavators are O&K RH30-Fs. Subsidiary equipment includes two Cat 14G graders, a Bell water cart, and Cat 962 and 966 loaders. Operating personnel are largely Congolese.



#### **Figure 17; Mine Site Layout**

An average annual mining rate of 700,000 tonnes of ore is anticipated over the life of the mine.

Mine operating costs in 2003 are projected to be as follows;

Mining; US\$2.35 per bank cubic meter (BCM) Haulage; US\$4.50 per tonne

# **Processing Operations**

As stated previously, Comisa sells ore to the Bwana Mkubwa processing plant owned by a Zambian subsidiary of FQM.

Since start up in early 1998, the Bwana Mkubwa operation has consisted of the manufacture of sulphuric acid and the re-processing of copper-bearing mine tailings contained in the existing Bwana Mkubwa tailings dam to recover residual copper as copper cathode via Solvent Extraction – Electrowinning (SX-EW). Annual production capacity of this operation was 10,000 tonnes per year of LME grade copper cathode.

Early in 2002, First Quantum completed Phase One construction of an expansion of the Bwana Mkubwa SX-EW facility, which consisted of the installation of crushing, milling and pre-leach filtration facilities necessary to process ore from Lonshi.

Following receipt of a Definitive Engineering and Capital Cost Estimate by Signet Engineering Pty, of Perth, W.A., Australia in December 2001, a decision was made to expand the Bwana Mkubwa plant to a minimum production capacity of 30,000 tonnes of LME grade copper cathode per year. Phase Two Construction which expanded the leach, filtration, solvent extraction and electrowinning facilities, was completed in December 2002. The expanded plant is currently undergoing commissioning.

In 2001 construction of a second sulphuric acid plant was completed at Bwana Mkubwa. On an annual basis, total acid production at Bwana Mkubwa has been increased from 105,000 tonnes to 145,000 tonnes. The second acid plant was built in response to the continuing shortage of sulphuric acid in Zambia and the DRC.

Over the last four years, Bwana Mkubwa has produced 34,574 tonnes of copper cathode at an average cash cost of \$0.13 per pound, net of credits from the sale of 223,556 tonnes of surplus sulphuric acid.

For 2002, Bwana Mkubwa produced 11878 tonnes of copper cathode and 88198 tonnes of surplus sulphuric acid. In 2003, once the Bwana Mkubwa facility is fully expanded to treat Lonshi ore, copper production is forecast to be approximately 28,700 tonnes.

Recovery of acid soluble copper through the Bwana Mkubwa plant was 80% during 2002 and this is forecast to improve to 85% in 2003 as the reprocessing of tailings is completed.

# **Markets and Contracts**

Copper cathodes are transported to Durban or Dar es Salaam by road or rail. The Company entered into an off-take agreement with Republic House AG of Switzerland dated April 24, 2001 pursuant to which Bwana Mkubwa agreed to sell 800 tonnes per month from the Bwana Mkubwa SX/EW facility to Republic House from May 1, 2001 through to June 30, 2003.

The majority of the acid is transported to Chingola by contract road tankers. Surplus sulphuric acid is currently sold to Konkola Copper Mines, Zambia and occasionally to various third parties in Zambia and the DRC.

# **Environmental Summary**

Comisa operates an Environmental Management Plan (EMP) at Lonshi mine. This was prepared by D. C. Blandford & Associates Pty Ltd, of Perth, W.A., Australia in January 2003. The same consultants are currently preparing an Environmental Impact Assessment.

The Congolese Environmental Regulations are undergoing modification and are expected to come into force later this year.

The essential provisions of the EMP are as follows;

### Waste Rock Dumps;

The Lonshi waste rock dumps will be designed, operated, and decommissioned using "systems approach" so that not only is the performance of individual components understood and controlled, but also the links between the components is defined and included as an integral part of design. The underlying principal of waste dump management at Lonshi is the protection of the beneficial uses of the receiving environment. Implicit in the systems approach to waste dump design and management is the attainment of long term stability. The issues driving dump design at Lonshi are cost, final outslope material characteristics, waste characteristics, climatic parameters, stakeholder requirements, and final land use.

A waste characterisation program has been initiated to examine the five main parameters associated with achieving long term stability. These are;

- particle size distribution
- clay mineralogy
- aggregate stability and dispersion
- cohesiveness, and
- permeability

The philosophy of dump design will be determined following completion of the full characterisation program. The length of slope, slope angle, need for berms, specific requirements for drainage control, and stability will all be addressed in dump design Design is centred on a basic strategy of 10m lifts with 12m berms at each lift. The rill angle between berms will be set at 18 degrees but this may change once more data becomes available.

During the early stages of dump construction, all surface runoff will be directed to sediment traps designed and located according to specific location requirements. All sediment retained in these traps will be returned to the dump. Once final dump footprints are established, permanent sediment retention ponds will be constructed as required.

Rehabilitation will be ongoing and progressive throughout the mine life. Evidence to date indicates that the revegetation of disturbed areas will be rapid and natural. Practices that address this issue will be implemented as part of long term dump management, and may include the use of top soil and surface soil as available.

### Surface Drainage;

Surface water resources within the Lonshi area are an important component of both ecological and human land use. The aim of the surface water management program is to minimise sediment loads in water flows from the active mine areas to natural undisturbed drainage lines. The soils in the area are prone to erosion in a disturbed state. Accordingly, and where appropriate, all surface runoff from areas of disturbance, hardstand areas, plant areas, and areas with elevated runoff coefficients, will be directed, by correctly designed drainage systems, to sediment traps with sufficient volume and detention time to maximise settlement of suspended sediment prior to release.

### Ground Water Monitoring;

Environmental management of groundwater resources will centre on protection of groundwater quality. The EMP requires that all discharges to the natural environment satisfy the appropriate Zambia water quality Guidelines, which have been adopted for this program. A program has been implemented to design and monitor changes in groundwater quality.

# Dust Control, Atmospheric Emissions and Noise;

Dust will be generated by trucks along some sections of the haul road and in the mine area, and water carts will be used for dust suppression. There is no data available on general air quality parameters in the Lonshi area of operations. The atmospheric conditions prevailing at any given time of year are a function of local and regional climate and contributions to air pollution from local subsistence agriculture. Sources of noise include mining operations and vehicles.

### Industrial Waste;

There will be very limited volumes of industrial waste generated at Lonshi. Non toxic waste will be buried in the waste dumps, while waste oil is collected and stored pending removal from site.

## Fuel and Oils;

Fuel will be delivered to site in bulk road tankers and stored in above ground tanks within a fully bunded area able to hold 110% of the capacity of the tank. Oils, lubricants and hydraulic fluids will be stored in their delivery containers and within a bunded area.

### Management of Biological Resources;

A number of management initiatives will be implemented to reduce potential impacts and disturbance to flora and vegetation, including;

- raising awareness in the workforce about conservation issues
- designing the mine layout to reduce the area of clearing required
- clearly marking and restricting access to high conservation value areas
- providing adequate drainage control systems
- establishing an efficient dust suppression program
- retaining topsoil, rootstock, and vegetation wherever possible
- progressively rehabilitating disturbed areas

Most of the larger animal species have moved from the area or have been hunted out by the local inhabitants prior to commencement of operations. It is likely that the remaining more mobile species will tend to move away from the areas of greatest activity during construction, but will return during the operating life of the mine and following closure. Potential impacts on fauna will be reduced by;

- restricting disturbance and clearing of habitats to the minimum required for safe and efficient operations
- progressively rehabilitating disturbed areas to re- establish habitats.

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### Taxes

The currently applicable corporate tax rates are 25% in Zambia and 35% in the DRC. The currently applicable royalties are 0.5%NSR in Zambia and 2%NSR in the DRC.

# **Capital and Operating Cost Estimates**

The Bwana Mkubwa plant was expanded from 10,000 to 30,000 tonnes per year of copper in the period 2001-2002 for a total capital cost of approximately \$24,000,000.

Operating costs for 2003 are projected to be \$2.35 per bank cubic meter ("BCM") \$4.50 per tonne for ore haulage, and \$14.50 per tonne for processing.

### **Economic Analysis**

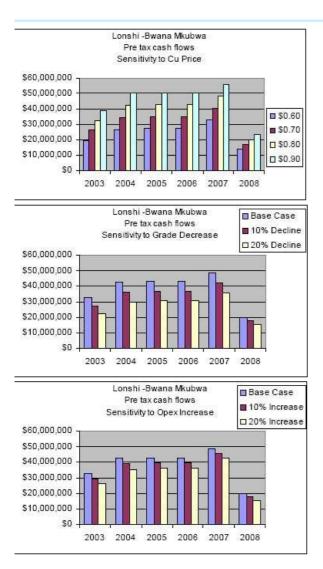
The attached table shows the base case production and pre tax cash flow forecast on an annual basis using the proven and probable reserves for the combined Lonshi / Bwana Mkubwa operation. All figures in United States Dollars.

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	2003	2004	2005	2006	2007	2008	TOTAL
MINING							
Total BCM Mined	2,519,061	2,701,061	2,680,061	2,680,061	309,229	1,310,290	12,199,765
Waste tonnes	4,256,000	4,620,000	4,578,000	4,578,000	528,216	2,238,197	20,798,413
Ore Processed tonnes	600,000	750,000	750,000	750,000	750,000	342,232	3,942,232
Head Grade %AsCu	5.63%	5.49%	5.49%	5.49%	5.49%	4.83%	5.45%
Contained tonnes Cu	33,780	41,177	41,177	41,177	41,177	16,513	214,999
Recovery % (AS Cu)	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
Copper Produced (tonnes)	28,713	35,000	35,000	35,000	35,000	14,036	182,749
A CID PRODUCTION							
Acid Produced tonnes	150,000	150,000	150,000	150,000	150,000	150,000	900,000
Acid Available for Sale	111,500	108,750	108,750	108,750	108,750	136,677	683,177
REVENUE							
Copper Price	80.0	80.0	80.0	80.0	80.0	80.0	80.0

							*222 222 042
Copper Revenue	\$50,626,762	\$61,712,044	\$61,712,044	\$61,712,044	\$61,712,044	\$24,747,905	\$322,222,843
Acid Revenue	\$16,167,500	\$15,768,750	\$15,768,750	\$15,768,750	\$15,768,750	\$19,818,200	\$99,060,700
Total Revenue	\$66,794,262	\$77,480,794	\$77,480,794	\$77,480,794	\$77,480,794	\$44,566,105	\$421,283,542
OPERATING COSTS							
Mining Costs	\$8,619,794	\$9,587,441	\$9,405,138	\$9,405,138	\$4,070,766	\$4,488,196	\$45,576,474
Processing Costs	\$8,700,000	\$9,600,000	\$9,600,000	\$9,600,000	\$9,600,000	\$4,380,570	\$51,480,570
Acid Production costs	\$10,350,000	\$10,350,000	\$10,350,000	\$10,350,000	\$10,350,000	\$10,350,000	\$62,100,000
Exploration	\$750,000	\$750,000	\$750,000	\$750,000	\$750,000	\$750,000	\$4,500,000
Administration/Overheads	\$3,250,000	\$3,250,000	\$3,250,000	\$3,250,000	\$3,250,000	\$3,250,000	\$19,500,000
TOTAL OPEX	\$31,669,794	\$33,537,441	\$33,355,138	\$33,355,138	\$28,020,766	\$23,218,765	\$183,157,044
OPERATING CASH FLOW	\$35,124,467	\$43,943,353	\$44,125,656	\$44,125,656	\$49,460,028	\$21,347,339	\$238,126,499
CAPITAL EXPENDITURE							
Copper Plant	\$2,500,000	\$1,500,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$8,000,000
Acid Plant	\$250,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$1,250,000
TOTAL CAPEX	\$2,750,000	\$1,700,000	\$1,200,000	\$1,200,000	\$1,200,000	\$1,200,000	\$9,250,000
TOTAL CASH FLOW	\$32,374,467	\$42,243,353	\$42,925,656	\$42,925,656	\$48,260,028	\$20,147,339	\$228,876,499

A discounted cash flow analysis is not deemed necessary as the operation is in production and capital was invested in prior years.

The sensitivity of the operation's total pre tax cash flow to changes in copper prices, grade, and operating costs is illustrated below:



# **Mine Life**

At the current proven and probable reserve base, the mine will operate until 2008. Exploration potential both along strike and at depth is considered to be good and thus the mine life may be expanded.

#### None

#### References

Bwana Mkubwa Expansion Phase 2A Definitive Engineering and Capital Cost Estimate; Signet Engineering Pty Ltd. December 2001

Comisa sprl Environmental Management Programme; D.C. Blandford & Associates Pty Ltd. January 2003

Lonshi Mine: On Site Due Diligence; Digital Mining Services. January 2003

Lonshi Pit Design and Reserves; African Mining Consultants. January 2003

Lonshi Copper Deposit Resource Evaluation; Digital Mining Services. September 2002

#### Date

The effective date of the report is January 30th 2003, as revised on March 26, 2003

Alan J. Stephens Vice President Exploration First Quantum Minerals Ltd.

G. Clive Newall President First Quantum Minerals Ltd.

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## **CERTIFICATE OF CO AUTHOR**

I, Alan Jarvis Stephens do hereby certify that:

- 1. I am Vice President of Exploration for First Quantum Minerals Ltd, of 450-800 W. Pender St. Vancouver, BC, V6C 2V6, Canada
- 2. I graduated with a BSc. (Hons.) ARSM in Mining Geology from the Royal School of Mines, University of London, UK in 1975.
- 3. I am a registered fellow in good standing of the Society of Economic Geologists.
- 4. I have worked continuously as an economic geologist for a total of 27 years since my graduation from university.
- 5. I am co responsible for the preparation of the technical report titled "The Lonshi Copper Mine, Katanga Province, Democratic Republic of the Congo" dated January 30<sup>th</sup> 2003 (the "Technical Report") relating to the Lonshi copper mine. The mineral resource and ore reserve estimates were carried out by independent consultants. I have visited the mine on numerous occasions since its discovery in November 2000.
- 6. I have had prior involvement with the property that is the subject of the Technical Report. The nature of my prior involvement includes supervision of all exploration and ore reserve estimation.
- 7. I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading.
- 8. As Vice President of Exploration of the Company I am not independent of the issuer applying all of the tests in section 1.5 of National Instrument 43-101.
- 9. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

Dated at Horsham, UK, this 26<sup>th</sup> day of March, 2003.

Alan Jarvis Stephens, BSc (Hons.) ARSM Vice President, Exploration First Quantum Minerals Ltd

**CONSENT OF CO-AUTHOR** 

#### Re: First Quantum Minerals Ltd. (the "Company")

I am the co author of the report entitled "The Lonshi Copper Mine, Katanga Province, Democratic Republic of the Congo" which is referred to in the news release of the Company dated January 13th, 2003 (the "News Release").

I consent to the filing of the Report with the British Columbia Securities Commission, the Alberta Securities Commission, the Ontario Securities Commission and the Quebec Securities Commission and to the extracts from the Report, which are included in the News Release.

I confirm that I have read the News Release and I have no reason to believe that there are any misrepresentations in the information contained in the News Release derived from the Report or that the News Release contains any misrepresentation of the information contained in the Report.

Dated at Horsham, UK, this 26<sup>th</sup> day of March, 2003.

Yours truly,

Alan Jarvis Stephens Vice President of Exploration First Quantum Minerals Ltd.

#### **CERTIFICATE OF CO AUTHOR**

I, Geoffrey Clive Newall do hereby certify that:

- 1. I am President of First Quantum Minerals Ltd, of 450-800 W. Pender St. Vancouver, BC, V6C 2V6, Canada
- 2. I graduated with a BSc. (Hons.) ARSM in Mining Geology from the Royal School of Mines, University of London, UK in 1971, and have a Masters of Business Administration from the Scottish Business School of Strathclyde University.
- 3. I am a registered member in good standing of the Institute of Materials Minerals and Mining (IMMM).
- 4. I have worked continuously as an economic geologist for a total of 32 years since my graduation from university.
- 5. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
- 6. I am co responsible for the preparation of the technical report titled "The Lonshi Copper Mine, Katanga Province, Democratic Republic of the Congo" dated January 30<sup>th</sup> 2003 (the "Technical Report") relating to the Lonshi copper mine. The mineral resource and ore reserve estimates were carried out by independent consultants. I have visited the mine on numerous occasions since its discovery in November 2000.
- 7. I have had prior involvement with the property that is the subject of the Technical Report. The nature of my prior involvement includes supervision of all exploration and ore reserve estimation.
- 8. I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading.
- 9. As President of the Company I am not independent of the issuer applying all of the tests in section 1.5 of National Instrument 43-101.
- 10. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

Dated at Horsham, UK, this 26<sup>th</sup> day of March, 2003.

"G. Clive Newall" G. Clive Newall, BSc (Hons.) ARSM President First Quantum Minerals Ltd

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British Columbia Securities Commission Alberta Securities Commission Ontario Securities Commission Quebec Securities Commission

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Commission and the Quebec Securities Commission and to the extracts from the Report, which are included in the News Release.

I confirm that I have read the News Release and I have no reason to believe that there are any misrepresentations in the information contained in the News Release derived from the Report or that the News Release contains any misrepresentation of the information contained in the Report.

Dated at Horsham, UK, this  $26^{th}$  day of March, 2003.

Yours truly, "G. Clive Newall"

G. Clive Newall President First Quantum Minerals Ltd.