March 31, 2011

KATANGA MINING LIMITED

An Independent Technical Report on the Material Assets of Katanga Mining Limited, Katanga Province, Democratic Republic of Congo

Submitted to:
Katanga Mining Limited
Canons Court
2 Victoria Street
Hamilton, HMEX
Bermuda

Qualified Person	Company Name	Qualification
Willem van der Schyff	Golder Associates Africa	Pri Sci Nat, BSc Hons (Geo), GDE (Mining Eng), GSSA

REPORT

Distribution:

x1 Katanga Mining Limited
x1 GAA Library
x1 GAA Project File

Golder Associates

To:

Ontario Securities Commission, as Principal Regulator

British Columbia Securities Commission
Alberta Securities Commission
Saskatchewan Financial Services Commission – Securities Division
The Manitoba Securities Commission
Autorité des Marchés Financiers
Nova Scotia Securities Commission
Prince Edward Island, Office of the Attorney General Securities Division
New Brunswick, Securities Administration Branch
Securities Commission of Newfoundland and Labrador
Yukon, Registrar of Securities
Northwest Territories, Registrar of Securities
Nunavut, Registrar of Securities

The Toronto Stock Exchange

Katanga Mining Limited

Dear Sirs/ Mesdames:

Re: Katanga Mining Limited - Technical Report

I, Willem van der Schyff, PriSciNat, (Registration Number 400176/05), am a qualified person (as such term is defined under National Instrument 43-101 – *Standards of Disclosure for Mineral Projects* ("**NI 43-101**")) responsible for preparing or supervising the preparation of the entire technical report entitled "An Independent Technical Report on the Material Assets of Katanga Mining Limited, Katanga Province, Democratic Republic of Congo" dated March 31, 2011 (the "**Technical Report**") prepared for Katanga Mining Limited (the "**Corporation**").

Pursuant to section 8.3 of NI 43-101, I hereby consent to the Corporation's public filing of the Technical Report and extracts from or summaries of the Technical Report, including extracts from or summaries of the Technical Report contained in the Corporation's Annual Information Form dated March 31, 2011 (the "**Annual Information Form**").

I confirm that I have read the Annual Information Form and that it fairly and accurately represents the information contained in the Technical Report that supports the disclosure.

Dated this 31st day of March, 2011.

/s/ Willem van der Schyff

Willem van der Schyff

Golder Associates Africa (Pty) Ltd (Reg. No. 2002/007104/07).

Tel: +27 11 254 4800 Fax: +27 11 315 0327 www.golder.com

Golder Associates: Operations in Africa, Asia, Australasia, Europe, North America and South America

Directors: FR Sutherland, AM van Niekerk, SAP Brown, L Greyling

Table of Contents

TABLES

FIGURES

APPENDICES

3.0 SUMMARY

3.1 Introduction

Golder Associates Africa (Pty) Ltd ("**GAA**") was commissioned by Katanga Mining Limited ("**KML**") to compile this Independent Technical Report ("**ITR**") which complies with the Canadian Securities Administrators' National Instrument 43-101 - *Standards of Disclosure for Mineral Projects* ("**NI 43-101**"), in respect of the Material Assets (as defined below) owned and operated by KML.

3.2 Property Description and Location

This ITR covers the following operations, projects and infrastructure of KML and its subsidiaries located in the Kolwezi District in the Katanga Province of the Democratic Republic of Congo ("**DRC**"), which are collectively referred to herein as the "**Material Assets**":

- "**Mining Assets**", namely:
  - Kamoto Underground Mine ("**KTO**");
  - T-17 Open Pit and underground extension;
  - KOV Open Pit and underground extension (Kamoto East Underground Mine) ("**KTE**");
  - Mashamba East Open Pit;
  - Tilwezembe Open Pit;
  - Kananga Mine; and
  - Extension of Kananga Mine.
- "**Processing Assets**", namely:
  - the Kamoto Concentrator ("**KTC**"); and
  - the Luilu Metallurgical Plant ("**Luilu Refinery**").
- Infrastructure necessary for the production of saleable metals.

3.3 Ownership

Kamoto Copper Company SARL ("**KCC**") owns the Material Assets, including the mining and exploitation rights related to the Mining Assets. KML holds a 75% stake in KCC. La Generale des Carrieres et des Mines ("**GCM**") and La Société Immobilière du Congo ("**SIMCO**"), state-owned mining companies in the DRC, own the other 25% of KCC.

3.4 Geology and Mineralization

3.4.1 Geology

The mineralized zones are at the western end of the Katangan Copperbelt, one of the great metallogenic provinces of the world, containing some of the world's richest copper and cobalt deposits.

These deposits are hosted mainly by metasedimentary rocks of the late proterozoic Katangan system, a seven km thick succession of sediments with minor Volcanics, Volcanoclastics and intrusive rocks. Geochronological data indicates an age of deposition of the Katangan sediments of about 880 million years and deformation during the Katangan orogeny at less than 650 million years. This deformation resulted in the NS-SE trending Lufilian Arc, which extends from Namibia on the west coast of Africa through to Zambia, lying to the south of the DRC. Within the DRC, the zone of deformation extends for more than 300 km from Kolwezi in the north-west to Lubumbashi in the south-east.

Stratigraphically, the rich copper and cobalt deposits found in Zambia and the DRC are localized in the Roan Supergroup (the "**Roan**"). The Roan occurs at the base of the Katanga succession, unconformably overlying the basement rock of Kibaran age (mid-proterozic). The Roan is separated from the overlying rocks of the Kundelungu and Nguba Supergroups by a conglomerate, the Grand Conglomerate. The Nguba (previously known as the Lower Kundelungu) is composed of sandstones and shales with a basal conglomerate, while the Kundelungu consists essentially of sediments and is separated from the Nguba by a conglomerate, the (French) 'petit conglomerat'.

Within the Lufilian Arc are large-scale E-W to NW-SE trending folds with wavelengths extending for kilometres. The folds are faulted along the crests of the anticlines through which rocks of the Roan have been diapirically injected into the fault zones, squeezed up fault planes and over-thrust to lie above rocks of the younger Kundelungu. The over-thrust Roan lithologies occur as segments or "fragments" on surface. The fragments are intact units that preserve the original geological succession within each. A fragment could be hundreds of metres and aligned across the fault plane.

In the Katangan Copperbelt, mining for copper and cobalt occurs in these outcropping to sub-outcropping fragments.

3.4.2 Mineralisation

Primary mineralisation, in the form of sulphides, within the Lower Roan is associated with the D Strat and RSF for the OBI and the SDB and SDS for the OBS and is thought to be syn-sedimentary in origin. Typical primary copper sulphide minerals are bornite, chalcopyrite, chalcosite and occasional native copper while cobalt is in the form of carrolite. The mineralization occurs as disseminations or in association with hydrothermal carbonate alteration and silicification.

Supergene mineralization is generally associated with the levels of oxidation in the sub-surface sometimes deeper than 100m below the surface. The most common secondary supergene minerals for copper and cobalt are malachite and heterogenite. Malachite is the main mineral mined within the confines of the current KOV Open Pit.

The RSC, a lithological unit stratigraphically intermediate between the upper and lower ore body host rocks, contains relatively less copper mineralization. The RSC contains appreciable copper mineralization near the contacts with the overlying SDB formation and the underlying RSF formations. The middle portion of the RSC, considered to be "sterile" by GCM, normally contains relatively less copper mineralization and is sometimes not sampled. The mineral potential of the RSC is less well known than that of other formations.

The RSC has been observed to be well mineralized in supergene cobalt hydroxide, heterogenite, which occurs as vug infillings, especially near the surface.

The mineralization at Tilwezembe Open Pit is atypical, being hosted by the Mwashya or R4 formation. The mineralization generally occurs as infilling of fissures and open fractures associated with the brecciation. The typical mineralization consists mainly of copper minerals (chalcopyrite, malachite and pseudomalachite), cobalt minerals (heterogenite, carrolite and spherocobaltite) and manganese ("**Mn**") minerals (psilomelane and manganite).

3.5 Status of Material Assets

Table 1 and Table 2 below provide certain details on the status of the Material Assets.

Table 1: Mining Assets

Property	Type	Status	Licence		Comments
			Expiry Date	Area	
KTO and Mashamba East Open Pit	UG OP	Operating Development	April 3, 2024	11,04 km^2	KTO Operational Mashamba East in development, dewatering to commence in 2013
T-17 Open Pit	OP	Operating	April 3, 2024	1,698 km^2	Mine Operational
KOV Open Pit	OP	Operating	April 3, 2024	8,49 km^2	Mine Operational
Tilwezembe Open Pit	OP	Dormant	April 3, 2024	7,64 km^2	Operations ceased in November 2008 due to lower copper/cobalt prices
Kananga Mine	OP	Dormant	April 3, 2024	11,04 km^2	Operations ceased due to pending relocation of rail line
Extension of Kananga	OP	Dormant	May 7, 2022	0,849 km^2	Operations ceased due to pending relocation of rail line

1) UG – Underground Mine
2) OP – Open Pit

Table 2: Mineral Processing Assets

Property	Status
KTC	Operating
Luilu Refinery	Operating

3.6 Mineral Resources and Mineral Reserves

At December 31, 2010, KCC has measured and indicated mineral resources of 287.4Mt with a grade of 4.02% Cu and 0.46% Co, which is described in Table 3.

Table 3: KCC Consolidated Mineral Resources as at December 31, 2010

Resource Classification	Mt	%TCu	%TCo
Measured	30.7	4.54	0.54
Indicated	256.7	3.95	0.45
Measured and Indicated	287.4	4.02	0.46
Inferred	180.2	2.32	0.32

1) Mineral resources have been reported in accordance with the classification criteria of the Australian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, 2004 Edition (the "**JORC Code**"). If the classification criteria adopted in NI 43-101 were to be used in this ITR instead of the JORC Code, the mineral resource estimates would be substantially similar.

2) Mineral resources are inclusive of mineral reserves.

3) Mineral resources are not mineral reserves and do not have demonstrated economic viability.

At December 31, 2010, KCC has proved mineral reserves and probable mineral reserves of 97.0Mt with a grade of 4.2% Cu and 0.47% Co, which is described in Table 4.

Table 4: KCC Consolidated Mineral Reserves as at December 31, 2010

Reserve Classification	Mt	%TCu	%TCo
Proved	14.6	3.47	0.51
Probable	82.4	4.33	0.46
Proved and Probable	97.0	4.20	0.47

1) Mineral reserves have been reported in accordance with the JORC Code. If the classification criteria adopted in NI 43-101 were to be used in this ITR instead of the JORC Code, the mineral reserve estimates would be substantially similar.

3.7 Development and Operations

The primary developments within the Material Assets during 2010 have been the following:

- exploration drilling continued in KTO, T-17 Open Pit and KOV Open Pit;
- production from KOV Open Pit started in July of 2010;
- milling capacity at KTC was increased to 5.6 million tonnes of ore per year; and
- Luilu Refinery production capacity was increased to 130,000 tonnes of copper per annum due to the plant upgrade programme. Phase 3 will be completed by the end of the second quarter of 2011 and the New Phase 4 (inclusive of Phase 5) has commenced with Front End Engineering and Early Works due to be completed in the second quarter of 2011.

Table 5: Plant and Processing Developments

Old Phase	Completion	Increase in Cu Capacity '000 tonnes per annum	Increase in Co Capacity '000 tonnes per annum	New Phase	Completion	Increase in Cu Capacity '000 tonnes per annum	Increase in Co Capacity '000 tonnes per annum
Refurbishment of existing facilities							
1	2007	35	2	1	2007	35	2
2	2009	35	2	2	2009	35	2
3	2011	80	4	3	2011	80	4
Subtotal		150	8			150	8
New SX plant and Luilu Copper Electro-Refinery Plant Conversion							
				4	2013	200	22

Note: The capacity of the Luilu Refinery, after the completion of the New Phase 4, will exceed the milling capacity of KTC. As a result, upon completion of the New Phase 4, the capacity at the Luilu Refinery will be utilised first to produce LME Grade A copper and then the capacity at the Luilu Refinery will be used to a maximum of 110ktpa.

3.8 Interpretations and Conclusions

The results of interpretations of developments of Material Assets are reported elsewhere in this report and have been relied upon to compile the mineral resource estimates included in section 19.0.

3.9 Recommendations

The Qualified Person recommends the following actions be taken in respect of the Material Assets:

- further exploration of the operations which have underground mine potential such as the T-17 underground and KTE should be continued;
- the Front End Engineering and Early Works Report for the New Phase 4 should be completed; and
- new deposition sites should be investigated since the existing tailings and waste facilities will require expansion in the future.

3.10 Economic Analysis

The net present value ("NPV") of KML's investment in KCC is $6,008 million. The valuation was done at a discount rate of 10%, as of January 1, 2011. This is a significant increase to the NPV of the amount of $4,045 million reported in the 2010 Technical Report. This increase is a result of a reduction in the processing capital expenditure for the New Phase 4, increase in copper and cobalt prices, reduction in mining costs for the new mine plan offset by an increase in processing costs and additional capital expenditure required for T-17 underground and KTE.

4.0 INTRODUCTION

This ITR has been compiled for KML by GAA staff and other sub-consultants.

This ITR has been prepared to support material changes in the scientific and technical information concerning the Material Assets.

This ITR was prepared in compliance with the standards set out in the Canadian Securities Administrators' NI 43-101, Companion Policy 43-101 CP and Form 43-101F1 and in conformity with the JORC Code of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and the Minerals Council of Australia.

4.1 Qualified Person

This ITR was compiled by Willem van der Schyff, PriSciNat, (Registration Number 400176/05), a registered Professional Geologist with the South African Council for Natural Scientific Professions and a member of the Geological Society of South Africa. Each aspect of this ITR was prepared by or under the supervision of Mr. van der Schyff who is a Qualified Person as defined by NI 43-101. Mr. van der Schyff retains responsibility for his contribution described above.

Mr. van der Schyff, has been a consultant with GAA for six years, prior to which he worked at a major mining house as a resource geologist.

4.2 Site Visits

Mr. van der Schyff visited the Material Assets in October and November of 2010. During the site visits, Mr. van der Schyff inspected the Material Assets. Mr. van der Schyff verified the working protocols regarding the development of geological, mineral resource and mineral reserve estimates, mine plans and processing plant development.

4.3 Basis of Technical Report

This ITR was prepared as an update of the 2010 Technical Report. Many items presented in the 2010 Technical Report have served as a basis for this ITR specifically in regard to geology, mineralisation, plant and processing, legal tenure and financial estimates (such as operating expenditures, capital expenditures, and future cashflow).

This ITR is intended to update the 2010 Technical Report to reflect the following changes:

- Phases 4 and 5 of the WOL/SX/EW refinery modular project are to be replaced by a New Phase 4 consisting of the conversion of the existing Luilu Copper Electro- Refinery to an electrowinning ("**EW**") plant fed by a new SX plant. This has resulted in $229 million of capital expenditure savings;
- update of the Life of Mine ("**LOM**") plan, including confirmation of the intention to mine KTE from underground and to exploit additional T-17 mineral resources through underground mining techniques; and
- a restatement of mineral reserves to reflect the change in mining strategy with the exclusion of the KTE mineral resources from mineral reserves pending finalization of the mine plan.

4.4 Terms of Reference

Unless otherwise stated, all units of measurements in this ITR are metric; all costs are expressed in United States dollars ($); and the payable metals, copper and cobalt, are priced in $ per pound ($/lb). A detailed glossary of terms used in this ITR is attached as APPENDIX A.

The rehabilitation and expansion of the plant and facilities have been broken down into phases (each a "**Phase**"). Where these Phases have changed from the previous Technical Report, they are referred to as a new phase ("**New Phase**"). Phases 1, 2 and 3 and New Phase 4 are detailed in Table 5: Plant and Processing Developments.

5.0 RELIANCE ON OTHER EXPERTS

Mr. van der Schyff, the Qualified Person for this ITR retains responsibility for this ITR as outlined in section 4.1 and as indicated on his certificate in section 24.0.

In the preparation of this ITR, the Qualified Person has relied on the technical contributions by GAA sub-consultants, SNC Lavalin (Spencer Anderson) in respect of sections 3.7 and 25.3, as well as the Ukwazi Group (Jaco Lotheringen) in respect of sections 3.6 and 25.1.

This ITR is an update of the 2010 Technical Report as discussed in Section 4.3. The Qualified Person has also relied on the 2009 Technical Report prepared by SRK Consulting (South Africa) (Pty) Ltd ("**SRK**"). Table 6 provides details of the reports and information that have been relied upon by the Qualified Person in preparing this ITR:

Table 6: Reliance on Other Experts

Organisation	Report	NI 43-101 Section
SRK	An Independent Technical Report on the Material Assets of Katanga Mining Limited, Katanga Province, Democratic Republic of Congo ("DRC"), dated March 17, 2009	■ Property Description and Location ■ Exploration and Drilling ■ Mineral Processing ■ Environmental Considerations ■ Economic Analysis ■ Risk Assessment
KML	A Technical Report on the Material Assets of Katanga Mining Limited, Katanga Province, DRC, dated March 31, 2010	■ Ownership ■ Material Assets ■ Mineral Resources and Reserves ■ Drilling and Exploration ■ Mineral Processing

6.0 PROPERTY DESCRIPTION AND LOCATION

6.1 KCC Rights

In April of 2007, a Commission of Enquiry (the "**Commission**") was formed by the DRC government to review approximately 60 mining agreements entered into by para-statal companies of the DRC government. The joint venture agreements that resulted in the establishment of both KCC and DCP were included in the mining agreements to be reviewed.

Following the release of the Commission's report in November of 2007, KCC and DCP were notified on February 11, 2008 by the DRC Ministry of Mines ("**CAMI**") of the objections and requirements regarding their partnerships with GCM.

In July of 2008, GCM and Katanga Finance Limited ("**KFL**"), a 100% subsidiary of KML, entered into a memorandum of understanding under which certain amendments were agreed to be reflected in an amended joint venture agreement and the parties agreed to the merger of KCC and DCP.

In August of 2008, the CAMI issued terms of reference for the renegotiation and/or termination of the mining contracts entered into by KCC and DCP.

Following a number of meetings during the course of the last quarter of 2008 and the first quarter of 2009, GCM, KFL and Global Enterprises Corporate Ltd. ("**GEC**"), in the presence of KCC, DCP, SIMCO, Katanga Mining Holdings Limited, Katanga Mining Finance Limited and KML (BVI) Holdco Ltd., entered into an amended joint venture agreement ("**AJVA**") on July 25, 2009 (which is also its date of entry into force) which resulted in the termination of the original KCC joint venture agreement and the DCP joint venture agreement. The merger of KCC and DCP was ratified by Presidential Decree on April 27, 2010.

As a result of the AJVA:

- certain "Permit d'Exploitations" (each a "**PE**") were transferred from DCP to KCC. The whole of PE525 (comprising 13 carrés) and part of PE4958 (i.e. the new PE11602 described below and comprising two carrés containing the T-17 deposit) were transferred to KCC. The Kamoto, Mashamba East and T-17 deposits and any extensions of these deposits which are within the perimeter of PE525 and the two carrés of PE4958 that have been transferred to KCC, shall be for the sole benefit of KCC. Such transfer was completed pursuant to a transfer deed dated July 27, 2009 and evidenced by the CAMI in its exploitation certificate No. CAMI/CE/5621/2009 dated November 27, 2009;

- DCP PEs were transferred to KCC following completion of the merger with DCP. In addition, one carré of PE 7044 (i.e. new PE11601 being an extension of the Kananga deposit) shall be transferred by GCM to KCC once the holder of PE652 has released the carre to be transferred from its tailings area, or earlier if KCC has agreed to grant an easement to the holder of PE652. Such transfer was completed pursuant to a transfer deed dated July 27, 2009 and evidenced by CAMI in its exploitation certificate no. CAMI/CE/5622/2009 dated November 27, 2009; and
- the perimeter of the merged KCC/DCP concession area will contain the Necessary Surfaces (as defined in the AJVA and indicated in Figure 1.

Pursuant to the AJVA, the Necessary Surfaces will be sourced from PE8841 held by GCM and from one carré close to the T-17 deposit. Easements have been granted to enable KCC to establish and maintain operating facilities for the KOV Open Pit waste removal conveyor belt system. KCC shall fund an independent contractor to determine whether the surfaces identified as potential Necessary Surfaces contain any mineral reserves. Provided no mineral reserves are discovered, the relevant surfaces shall be converted into multiple PEs (where required) and shall be leased to KCC. Should any mineral reserves be discovered in the identified surfaces, the mineral reserves shall be transferred to KCC and shall count as Replacement Reserves (as defined in 6.2 below) under the terms of the AJVA.

In addition, under the AJVA, KCC was granted an option for a period of three years following its merger with DCP to increase the Necessary Surfaces by the five carrés (to be leased) contained in PE8841 if such extension is required for the project. Beyond this three-year period, KCC shall have a pre-emptive right on these five carrés in case GCM is willing to transfer or make any part of them available to third parties.

The rent for the Necessary Surfaces (including the five additional carrés if the option is exercised within the three year period) amounts to $600,000/year. However, KCC, as the merged entity, will remain liable for the payment of the rental tax (22%) which will be in addition to the royalties owed by KCC to GCM.

As part of the AJVA, it has also been agreed that upon the winding up or liquidation of KCC, the mining rights and titles of KCC shall revert to GCM without further consideration.

Pursuant to the AJVA, GCM and KCC have signed an agreement relating to the lease by GCM to KCC of certain equipment and installations as described in an annex to the AJVA (the "**Equipment and Installations**"). The rent for the Equipment and Installations payable by KCC to GCM is $1,200,000/year to be deducted from the royalties owed by KCC to GCM. However, KCC will remain liable for the payment of the rental tax (22%) which will be in addition to these royalties.

KCC shall retrocede the Equipment and Installations free of charge to GCM upon lawful termination or final expiry of the AJVA.

As part of the AJVA, it has also been agreed that GCM grants and/or makes available to KCC, subject to payment of the reasonable maintenance costs, the following rights: (i) the right to use roads, railways, rail routes, waterways, etc; (ii) the right to avail itself of rights of way, easements, rights to water, etc; and (iii) all the supplementary rights that can facilitate access to or use of the lands involved and the facilities located thereon, which GCM enjoys outside the perimeter of the KCC project in so far as the same are necessary or desirable to carry out the project in the most cost effective manner.

Table 7 contains a list of the Material Assets and describes the: (i) area of each property; (ii) the location of each property; (iii) the PE corresponding to each property; (iv) the type of mineral tenure of each property; (v) granted on or to each property; and (vi) the expiration date of each PE.

PEs under the DRC Mining Code are renewable in accordance with the terms of the DRC Mining Code for periods of 15 years.

A PE grants to its holder the exclusive right to carry out exploration and exploitation works for the minerals for which it has been granted. This right covers the construction of necessary facilities for mining exploration, the use of water and wood resources, and the free commercialisation of products for sale, in compliance with corresponding legislation.

Table 7: Legal Tenure of KCC

Property	Exploitation Permit Number	Rights Granted	Location	Area of Title	Valid Until
KTO and Mashamba East Open Pit	PE525	Cu, Co and associated minerals	10°43'S 25°24'E	13 blocks, 11,04km^2	03/04/2024 Renewable
T-17 Open Pit	PE11602	Cu, Co, nickel and gold		2 blocks, 1,698km^2	03/04/2024 Renewable
Extension of Kananga	PE11601	Cu, Co, nickel and gold		1 block, 0,849km^2	07/05/2022 Renewable
KOV Open Pit	PE4961	Cu, Co and associated minerals + Use of Surface	10°42'S 25°25'E	10 blocks, 8,49km^2	03/04/2024 Renewable
Tilwezembe Open Pit	PE4963	Cu, Co and associated minerals + Use of Surface	10°47'S 25°42'E	9 blocks, 7,64km^2	03/04/2024 Renewable
Kananga Mine	PE4960	Cu, Co and associated minerals + Use of Surface	10°40'S 25°28'E	13 blocks, 11,04km^2	03/04/2024 Renewable

6.2 Replacement Reserves

Pursuant to the AJVA, the mineral reserves to be replaced in exchange for the Dikuluwe and Mashamba West deposits surrendered to GCM pursuant to the release agreement (the "**Released Deposits**") amount to 3,992,185 tonnes of copper and 205,629 tonnes of cobalt.

No "pas de porte" ("entry premium") shall be paid to GCM in relation to the transfer of the mineral reserves to be transferred to KCC as compensation for the Released Deposits (the "**Replacement Reserves**").

Pursuant to the AJVA, GCM and KCC are also required to jointly scope, implement and manage an exploration programme (the "**Exploration Programme**") with the object of identifying sufficient Replacement Reserves and transferring them to KCC by no later than July 1, 2015. The Exploration Programme can take place within the perimeters of: (i) the KCC PEs (excluding the KTO, Mashamba East Open Pit, Tilwezembe Open Pit, Kananga Mine, T-17 Open Pit and KOV Open Pit deposits and any extensions of these deposits); (ii) the Necessary Surfaces; or (iii) other perimeters belonging to GCM.

The Exploration Programme is to be financed by way of a loan from KCC to GCM and refunded, without interest, by GCM through the set-off against the royalties and dividends payable by KCC.

If any Replacement Reserves are identified by GCM as a result of the Exploration Programme or otherwise, they shall be evaluated and certified in accordance with the JORC Code of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Mineral Council of Australia, as amended.

Once GCM has satisfied KCC that it has good legal title to such Replacement Reserves and they are covered by valid PEs, KCC shall enter into a transfer deed or a lease, pursuant to which the Replacement Reserves shall be transferred or leased (amodié) to KCC.

If GCM does not replace these Released Deposits by July 1, 2015 it must pay $285,000,000 as financial compensation. KFL, GEC and GCM agreed that the financial compensation would be due from July 1, 2015 and that interest would be charged if the financial compensation is not paid within the two months following 1 July 2015. During the first 12 months following the two month grace period the interest rate applicable to the unpaid financial compensation amount would be limited to the London Interbank Offering Rate ("**Libor**") (6 month) as opposed to Libor (6 month) + 300 basis points which will become applicable as of the end of the 12 month period.

GCM accepts that KCC may withhold any future revenues owed to GCM (i.e. royalties and dividends, with the exception of the pas de porte) until the financial compensation is fully paid.

6.3 Property Boundaries

The property boundaries of the PEs of KCC are described in Figure 1. Figure 1 also shows the Necessary Surfaces.

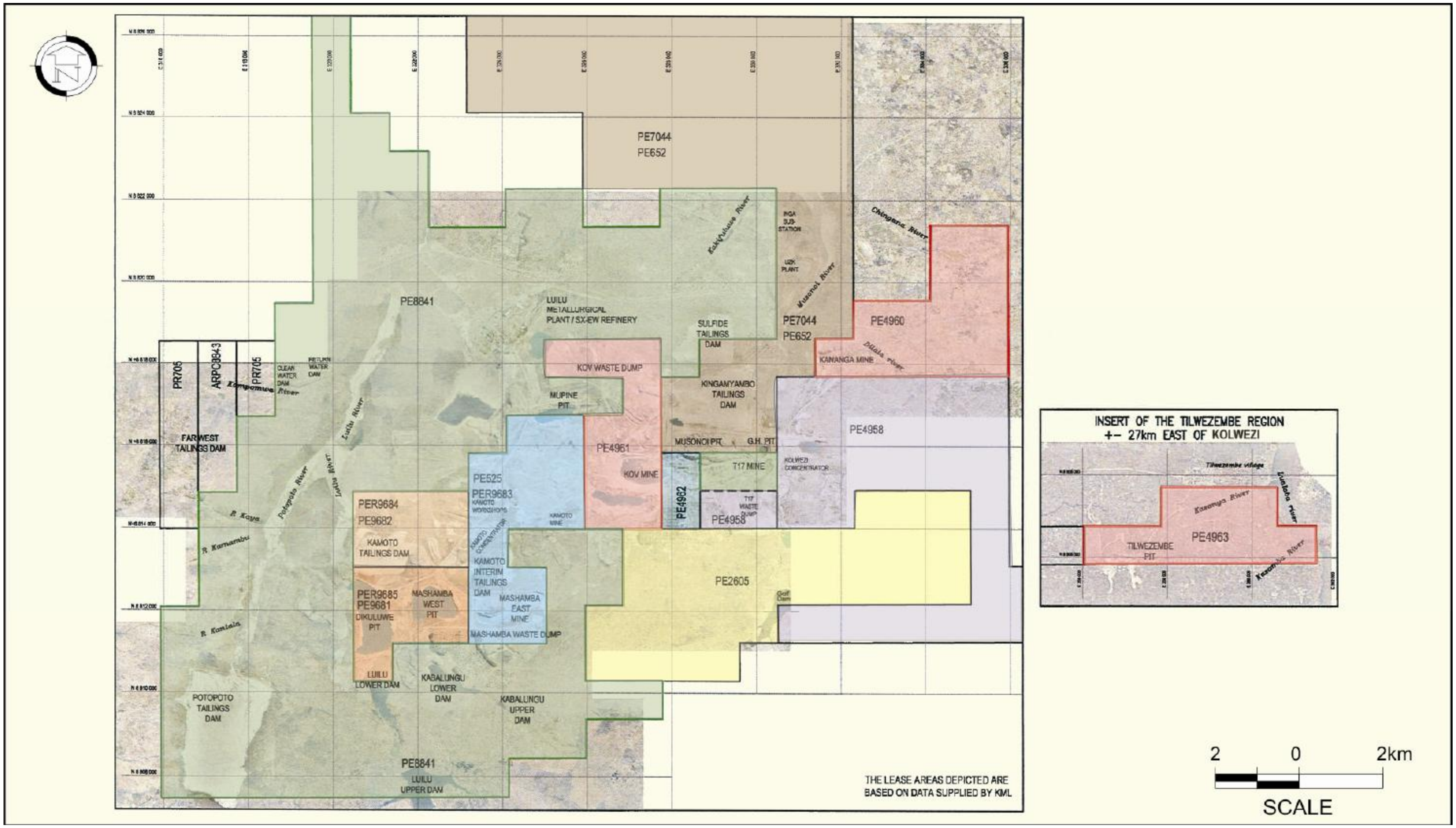

Figure 1: Property Boundaries of KCC's Exploitation Permits

The boundaries have been taken from the maps at the CAMI relating to the boundaries of KCC's PEs. KML has not separately surveyed the area. There are certain limited areas outside land currently held by GCM where KCC will need to make application for licences to operate infrastructure and tailings.

Based on the environmental assessment conducted in November and December 2010 by GAA, KCC has all relevant environmental authorisations to operate lawfully. The only environmental liabilities, which are applicable relate to the current Environmental Management Plan ("**EMP**") as approved by the local regulators for 2010. The only future environmental liability at this stage relates to closure liabilities (see section 25.7).

6.4 Royalties, Duties and Other Fees

6.4.1 Royalties payable to the State

The holder of a mining exploitation title is subject to mining royalties which are calculated on the basis of the amount of sales minus the costs of transport, the costs of analysis concerning the quality control of the commercial product for sale, the cost of insurance and costs relating to the sale transaction. The royalties are due upon the sale of the product. The mining royalties are 2% for non ferrous metals.

6.4.2 Surface rights fees payable to the State

Under Article 198 of the DRC Mining Code, KCC is required to pay surface rights fees of $5 per hectare per year or $424.78 per carré for exploitation permits.

Additional surface rights fees are payable by KCC as the merged entity holder of exploitation mining rights to the central government of the DRC pursuant to Article 238 of the DRC Mining Code at the rate of $0,08 per hectare.

6.4.3 Royalties payable to Gécamines

Under the AJVA, it was agreed that the royalty rate for equipment and facilities provided by Gécamines as well as for ore reserve depletion was 2,5% of net revenues. "Net revenues" are to be determined on the same basis royalties are calculated under Article 240 of the DRC Mining Code, namely sales less transportation costs, quality control costs, insurance costs and marketing costs.

6.4.4 Pas de porte payable to Gécamines

A pas de porte payment is payable by KFL/GEC to Gécamines for access to the project. The total amount shall be $140 million, the payment of which will be completed as follows:

- $5 million previously paid by GEC to Gécamines as a loan, was converted into a pas de porte payment.
- $135 million to be paid by KFL. This will comprise:
  - $24,5 million which was paid by way of set-off against the amount of the advance granted by KFL to Gécamines for payment of the subscription price.
  - $5 million was paid upon the transfer of PE525, PE11601 and PE11602 to KCC, described in Section 6.1 above;
  - $10 million on an annual basis between 2009 and 2011 and $15 million on an annual basis between 2012 and 2015, with a final payment in 2016 of $15.5 million. The parties have agreed that these amounts shall be paid without any deductions or set off.

No further pas de porte will be payable in respect of the Replacement Reserves; however, any additional tonnage brought by Gécamines to KCC as the merged joint venture after the Released Deposits have been fully compensated will incur a new pas de porte payment of $35/t copper.

6.4.5 Customs duties and taxes payable

There is a requirement to pay customs duties and taxes in accordance with the law.

7.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

There has been no material change to the information contained in the "Accessibility, Climate, Local Resources, Infrastructure and Physiography" section of the 2009 Technical Report.

8.0 HISTORY

Other than as disclosed under section “Property Description and Location” or in the chart below, there has been no material change to the information contained in the “History” section of the 2009 Technical Report. The chronological developments in regards to the Material Assets are tabulated below.

Table 8: Chronological developments for Material Assets

		2008	2009	2010
KTO	Unit			
Mined ore	t	551,333	1,094,088	1,309,735
Cu grade	%	3.93	3.85	3.82
Co grade	%	0.43	0.49	0.56
KOV				
Mined ore	t	-	-	722,324
Cu grade	%	-	-	4.43
Co grade	%	-	-	0.30
T-17 Open Pit				
Mined ore	t	479,543	1,687,978	1,944,742
Cu grade	%	1.72	1.30	2.35
Co grade	%	0.89	0.85	0.93
Tilwezembe Open Pit				
Mined ore	t	609,792	-	-
Cu grade	%	1.39	-	-
Co grade	%	1.17	-	-

9.0 GEOLOGICAL SETTING

9.1 General Geology

The mineralized zones are at the western end of the Katangan Copperbelt, one of the great metallogenic provinces of the world, and which contains some of the world’s richest copper and cobalt deposits.

These deposits are hosted mainly by metasedimentary rocks of the late proterozoic Katangan system, a seven km thick succession of sediments with minor Volcanics, Volcanoclastics and intrusives. Geochronological data indicate an age of deposition of the Katangan sediments of about 880 million years and deformation during the Katangan orogeny at less than 650 million years. This deformation resulted in the NS-SE trending Lufilian Arc, which extends from Namibia on the west coast of Africa through to Zambia, lying to the south of the DRC. Within the DRC, the zone of deformation extends for more than 300 km from Kolwezi in the north-west to Lubumbashi in the south-east.

Stratigraphically, the rich copper and cobalt deposits found in Zambia and the DRC are localized in the Roan. The Roan occurs at the base of the Katanga succession, unconformably overlying the basement rock of Kibaran age (mid-proterozic). The Roan is separated from the overlying rocks of the Kundelungu and Nguba Supergroups by a conglomerate, the Grand Conglomerate. The Nguba (previously known as the Lower Kundelungu) is composed of sandstones and shales with a basal conglomerate, while the Kundelungu consists essentially of sediments and is separated from the Nguba by a conglomerate, the (French) 'petit conglomerat'.

Within the Lufilian Arc is large-scale E-W to NW-SE trending folds with wavelengths extending for kilometres. The folds are faulted along the crests of the anticlines through which rocks of the Roan have been diapirically injected into the fault zones, squeezed up fault planes and over-thrust to lie above rocks of the younger Kundelungu. The over-thrust Roan lithologies occur as segments or "fragments" on surface. The fragments are intact units that preserve the original geological succession within each. A fragment could be of hundreds of metres aligned across the fault plane.

In the Katangan Copperbelt, mining for copper and cobalt occurs in these outcropping to sub-outcropping fragments.

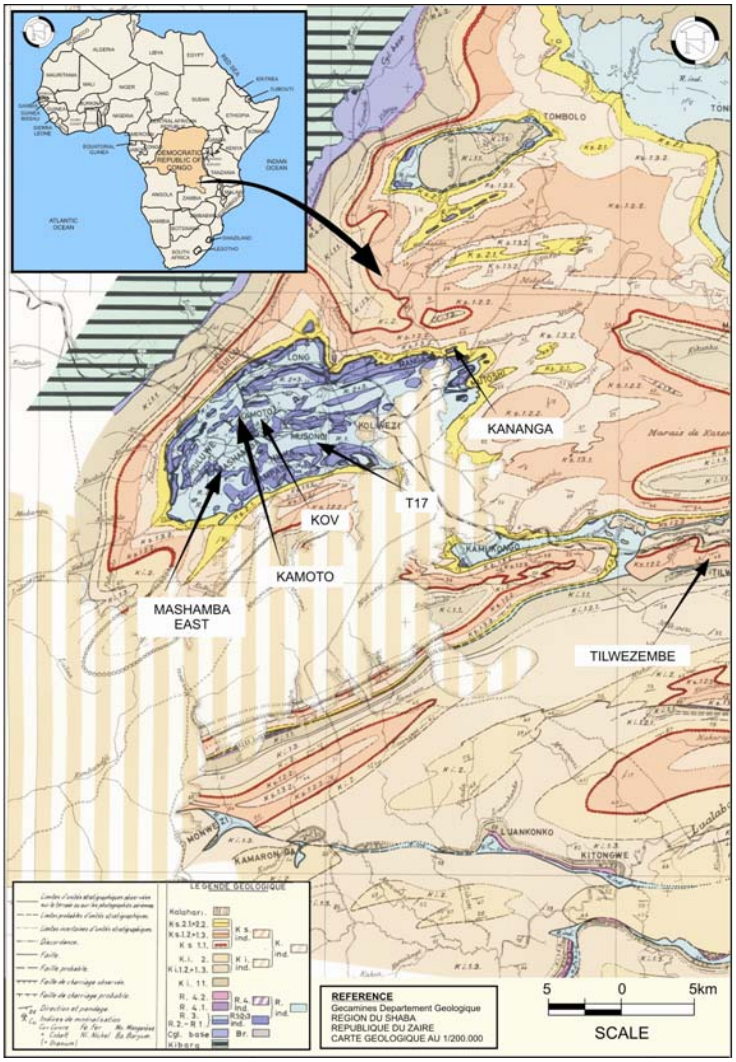

Figure 2: Regional Geology

9.2 General Stratigraphy

There has been no material change in the information contained in the "General Stratigraphy" section of the 2009 Technical Report.

9.3 Local Geology and Geological Models

With the exception of Tilwezembe Open Pit all of the mineralized properties of KCC are localized within the Kolwezi Nappe, a Northeast striking synclinal basin with major and minor axes of approximately 20 km and 10 km respectively. Tilwezembe Open Pit is located about 12 km to the east of Kolwezi.

Within the Kolwezi Nappe, each of the project areas, T-17 Open Pit, KTO, KOV Open Pit, Kananga Mine and Mashamba East Open Pit contain fragments with intact successions of Series Des Mines lithologies, which host the copper and cobalt mineralization. The fragments are often structurally complex, being tightly folded and exhibiting variable strikes and dips both within individual rafts and between neighbouring rafts.

9.3.1 KTO

KTO operations extract mineralized copper ores from the Kamoto Principal fragment, which is differentiated from Kamoto East, mined in the KOV Open Pit, but contains the same lithologies. The morphology of the ore body is described as flat to gently dipping in the central parts, becoming steeper towards the flanks. Dips in the central parts vary between 0° and 20° increasing to about 45° towards the flanks. Dips in the flank regions are between 45° to 85°. The ore body is subdivided into three regions as follows and shown in the geological model, Figure 3:

- the main central region, commonly referred to as the “Principal”;
- Etang South; and
- Etang North.

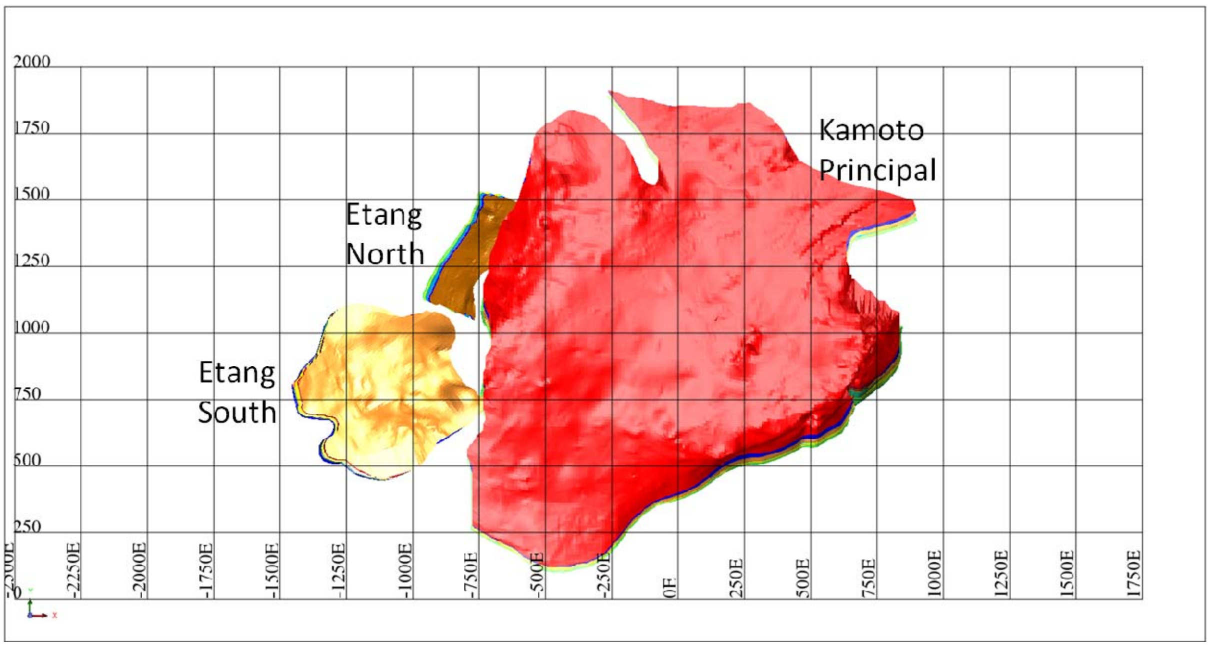

Figure 3: Plan view of KTO Mineral Resource Model

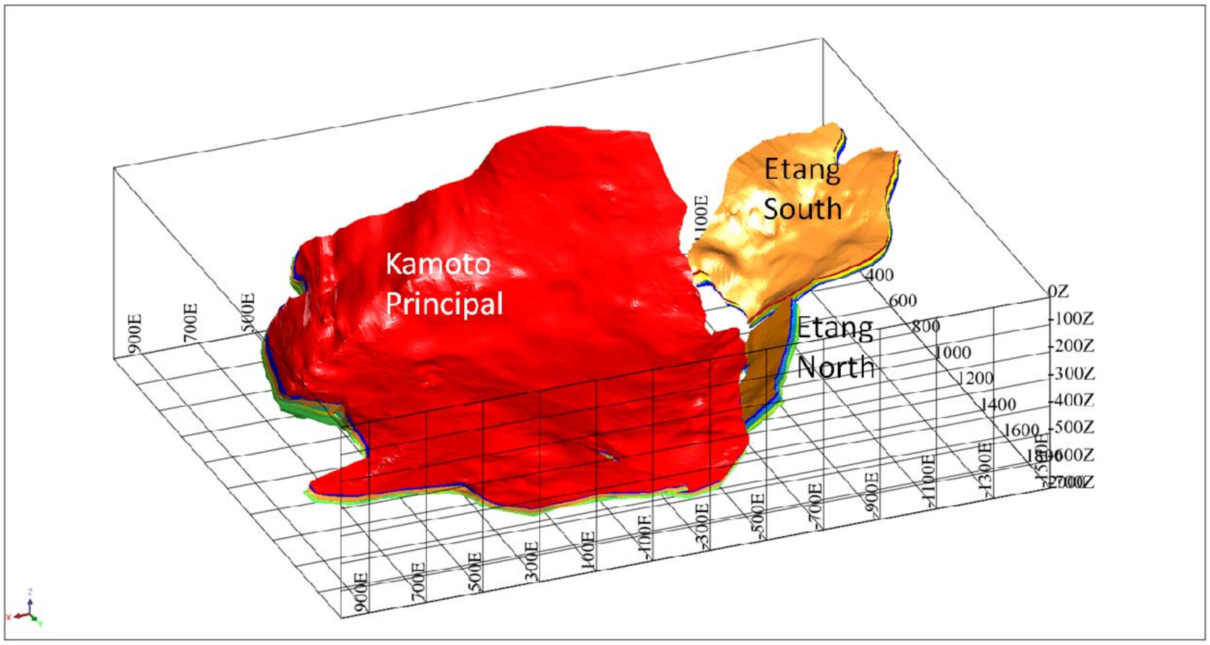

Figure 4: Oblique view of KTO with Mineral Resource Model

9.3.2 T-17 Open Pit

The T-17 Open Pit can be described as dismembered structurally complex packages, which belong to the southern flank of a synclinal fold that extends 2.6 km and is overturned towards the north. Faulting is assumed to be the predominant process in the deformation and dismemberment of the deposit. The geological model is shown in Figure 5.

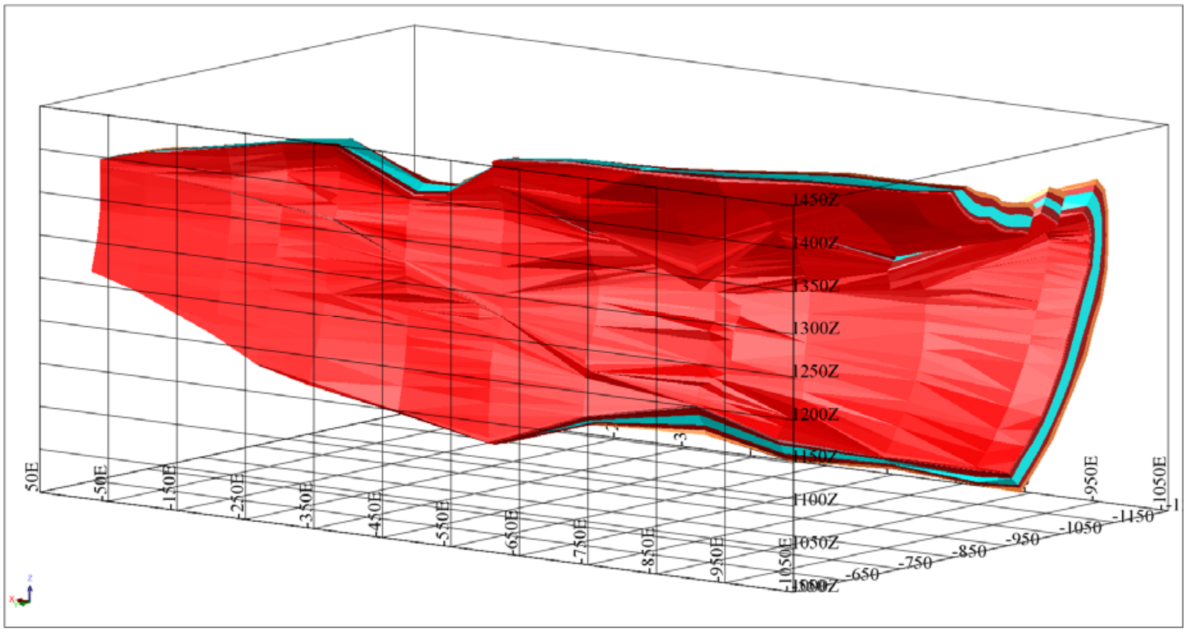

Figure 5: Oblique view of T-17 Open Pit Mineral Resource Model

9.3.3 KOV Open Pit

There are three main individual “fragments” hosting mineralized Lower Roan lithologies within the KOV Open Pit area. These are Kamoto East, Oliveira and Virgule, from which the name KOV is derived. A fourth and smaller fragment, the FNSR, is a remnant of the Musonoi West fragment mined to the east of KOV Open Pit. The FNSR lies below and is sub-parallel to the Virgule ore body.

Other fragments within the area are OEUF and Variante. The OEUF consists mostly of hanging-wall lithologies occurring above the Virgule fragment, and the Variante lies below the Virgule and Oliveira fragments but outcrops towards the east in the Musonoi West area. Lower Roan lithologies have been identified in the Variante, but investigations indicate poor copper and cobalt mineralization within these lithologies. Within each of the mineralized fragments, the succession of lithologies is intact, although in the FNSR fragment the Lower Roan lithologies occur overturned.

The fragments that make up the KOV Open Pit ore body occur in an east-west-striking synclinal structure consisting of a steeply dipping southern limb and a shallow dipping northern limb, respectively named the Kamoto East and Virgule orebodies, while the Oliveira fragment is a shallower-dipping ore body in faulted contact with and below the Virgule ore body.

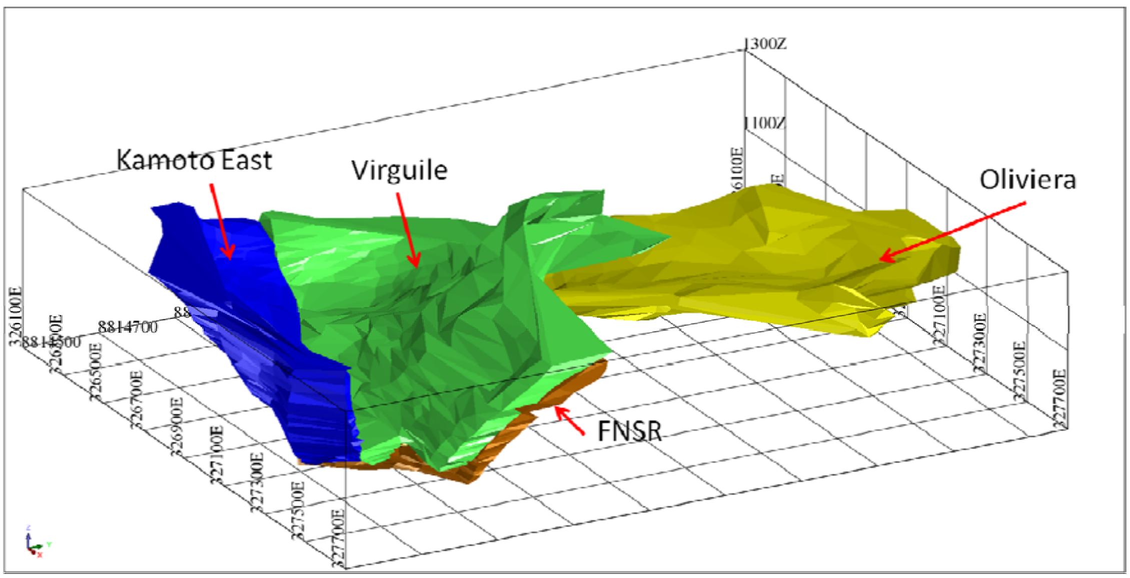

Figure 6: Oblique view of KOV Open Pit Mineral Resource Model

9.3.4 Mashamba East Open Pit

Structurally, the lithologies of the Mashamba East ore body strike to the north-east and dip gently to the north in the west and wraps around to strike almost north-south and dip to the east in the eastern portion of the property. The ore body consist of four units: RSF, SDB, BOMZ and RSC.

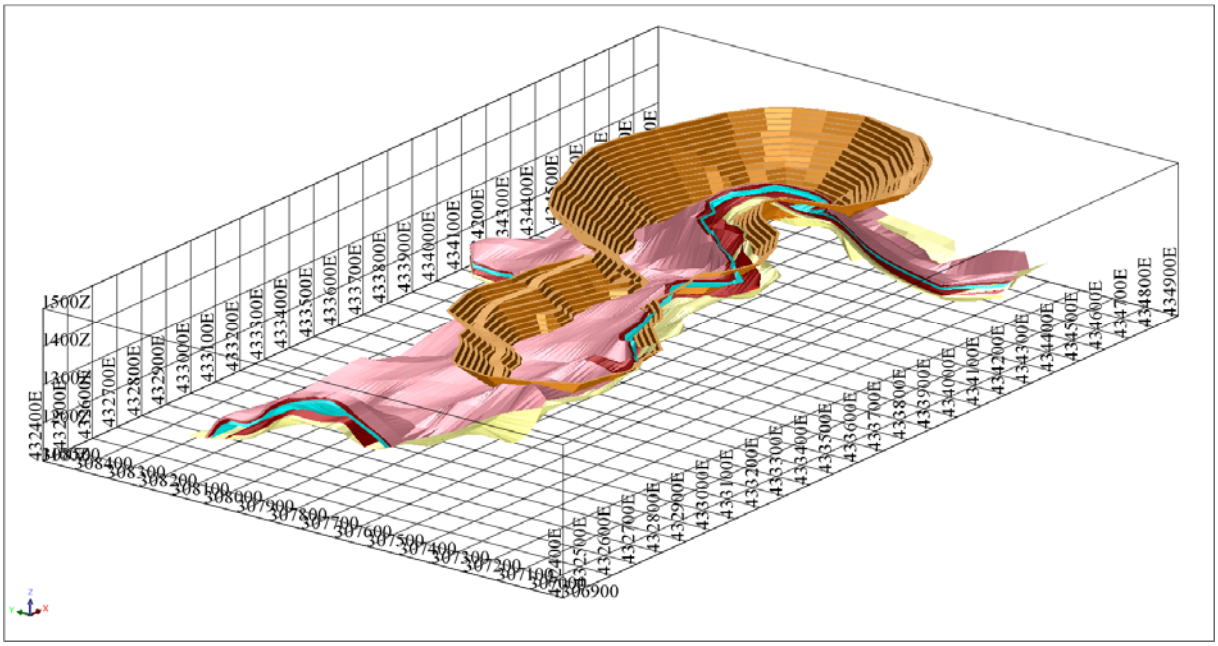

Figure 7: Oblique view of Mashamba East Mineral Resource Model and Planned Pit Layout

9.3.5 Kananga Mine and Extension of Kananga Mine

The Kananga ore body outcrops and forms a ridge with a N-NE strike. The ridge falls quite rapidly towards the south and has been cut to form part of the embankment for the main railway line, which runs parallel to the ridge and 10m to 20m away from it for most of the strike length of the ore body. GCM's interpretations indicate that Kananga is the northern limb of the Kananga-Dilala syncline, which plunges to the south. The geological model is shown in Figure 8.

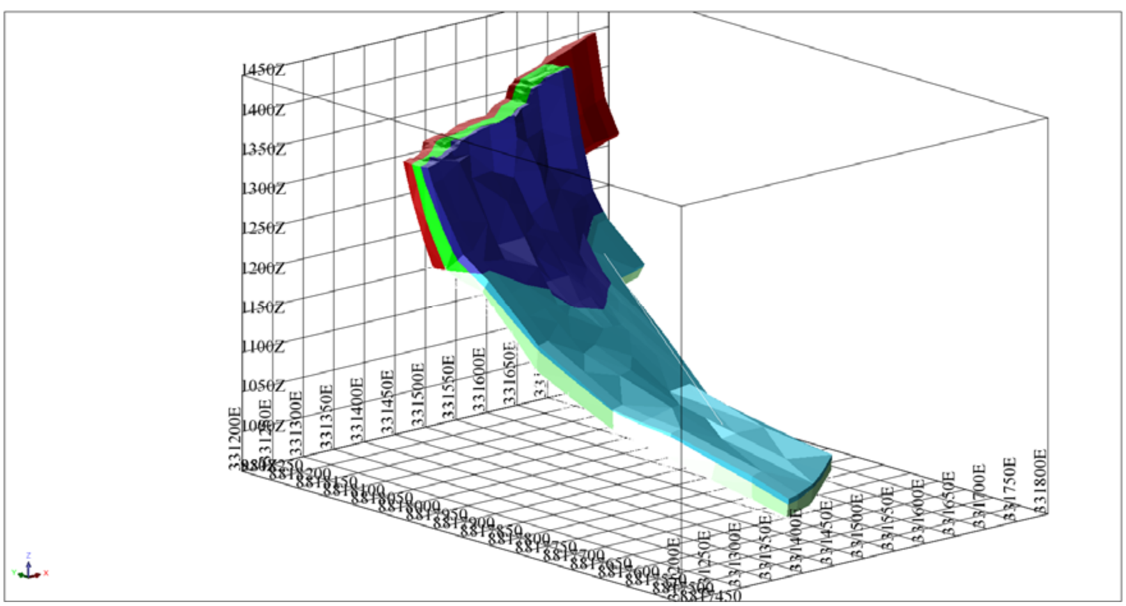

Figure 8: Oblique view of the Kananga Mineral Resource Model

9.3.6 Tilwezembe Open Pit

The mineralized zone of Tilwezembe is located in an NE-SW anticlinal structural lineament, which extends further to the east where there are known copper and cobalt deposits (Kisanfu, Myunga, Kalumbwe and Deziwa). Strongly brecciated siliceous dolomites and shales of the Mwashya Formation (or R4) dominate with interstitial bands of hematite and oolites. The strata strike almost east-west and dips at about 45° to the south. The geological model is shown in Figure 9.

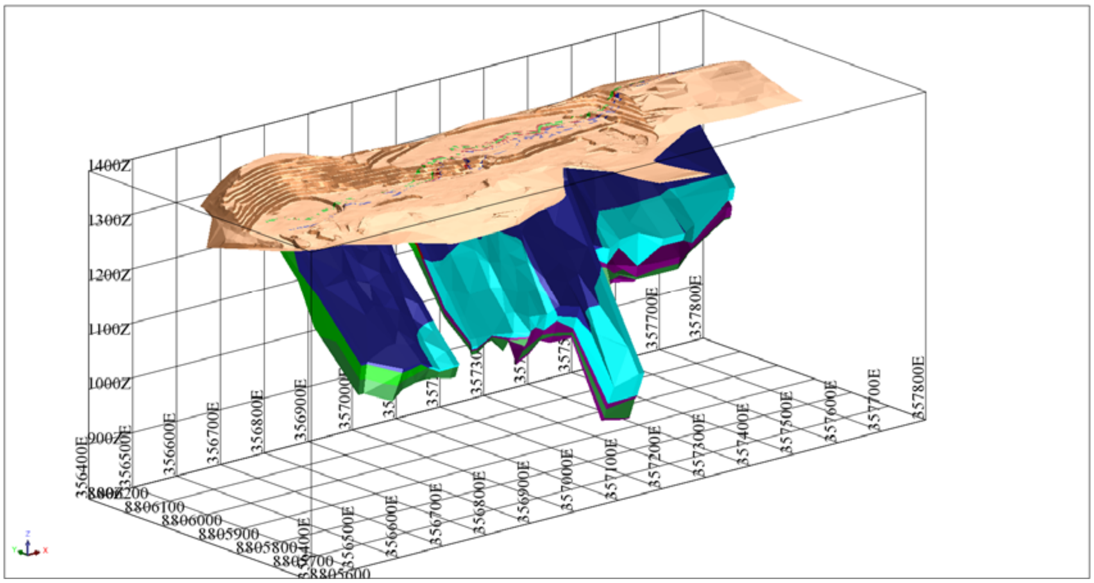

Figure 9: Oblique view of Tilwezembe Open Pit with Mineral Resource Model and Pit Layout

10.0 DEPOSIT TYPES

The deposits are stratiform with supergene enrichment within the upper surface layers.

Stratiform deposits are hydrothermal deposits but the ore minerals are always confined within specific strata and are distributed in a manner that resembles particles in a sedimentary rock. Because stratiform deposits so closely resemble sedimentary rocks, controversy surrounds their origin. In certain cases, such as the White Pine copper deposits of Michigan, the historic Kupferschiefer deposits of Germany and Poland, and the copper deposits of Zambia and the DRC, research has demonstrated that the origin is similar to that of Mississippi Valley Type ("**MVT**") deposits—that is, a hydrothermal solution moves through a porous aquifer at the base of a pile of sedimentary strata and, at certain places, deposits ore minerals in the overlying shales. The major difference between stratiform deposits and MVT deposits is that, in the case of stratiform deposits, the host rocks are generally shales (fine-grained, clastic sedimentary rocks) containing significant amounts of organic matter and fine-grained pyrite.

In ore deposit geology, supergene processes or enrichment occur relatively near the surface. Supergene processes include the predominance of meteoric water circulation with concomitant oxidation and chemical weathering. The descending meteoric waters oxidize the primary (hypogene) sulphide ore minerals and redistribute the metallic ore elements. Supergene enrichment occurs at the base of the oxidized portion of an ore deposit. Metals that have been leached from the oxidized ore are carried downward by percolating groundwater, and react with hypogene sulphides at the supergene-hypogene boundary. The reaction produces secondary sulphides with metal contents higher than those of the primary ore. This is particularly noted in copper ore deposits where the copper sulphide minerals chalcocite, covellite, digenite, and djurleite are deposited by the descending surface waters.

The copper deposits in the DRC are well known world class deposits.

11.0 MINERALIZATION

There has been no material change in the information contained in the "Mineralization" section of the 2009 Technical Report.

12.0 EXPLORATION

The project area contains mostly historical information from diamond drilling by the previous owners, GCM. Since 2009, KCC has conducted infill drilling in the three main production areas (KOV Open Pit, KTO and T-17 Open Pit) and the results of these drillings campaigns are referenced below but are not yet included in the mineral resource or the mineral reserve estimates although the mineral resource models are being updated continually by personnel from KCC.

The drilling campaign objective was to confirm contacts, geometry and grades of the ore bodies.

13.0 DRILLING

13.1 KTO

As part of an underground mineral resource verification exercise and to confirm development requirements and production schedules, KCC drilled 10,106 metres during 2009 and 2010 in the Kamoto Principal and Etang North orebodies. The drilled data confirmed the previously drilled data prepared by GCM which was used by CCIC and reported by SRK in the 2009 Technical Report.

13.2 T-17 Open Pit

KCC has drilled 20 holes in 2009 and 2010 within the current T-17 Open Pit perimeter to confirm the continuation of the mineral resource at depth. A total of 4,286m has been drilled, and the result from this drilling indicates that mineralization continues down-dip to a depth of more than 180m below the current pit design floor. Grades in these intersections have been encouraging, with the majority of intersect samples returning assay values of greater than 2% TCu. Further evaluation of this drilling data is currently being conducted to categorise this mineral resource and allow for the conceptual mine plan to be developed to a level of confidence.

In addition to the drilling referenced above, KCC have also recently drilled a total of 10 holes to the east of the current T-17 Open Pit perimeter to confirm an extension of the ore body along strike. The analysis of cores from this drilling campaign indicated significant intersections as shown in Table 9. This is leading to the delineation of additional mineral resources and a subsequent increase in the life of the current pit.

Table 9: Summary of 2010 drill data for T-17

	Hole_id	Depth	OBS	RSC	OBI	%Cu	%Co
T-17 EAST	T17001	113.4	34.9-53.5	91-108.6	53.5-91.0	3.25	0.31
	T17002	136.8	45.7-70.7	110.2-129.55	70.7-110.2	3.1	0.11
	T17003	94.8	16.1-32	71.3-93	32.0-71.3	2.09	0.25
	T17004	88.9	1.2-14.3	56.1-77.4	14.3-56.1	2.27	0.57
	T17005	116	34.3-50	50-116	No Int	3.08	0.31
	T17006	200.7	4.8-108	172.6-194.7	108-172.6	3.79	0.38
	T17007	125.3	No Int	No Int	No Int	-	-
	T17008	68.7	No Int	44.7-64.5	12-44.7	2.43	0.48
	T17009	89.5	3-32.6	32.6-71.2	71.2-78.5	2.55	0.29
	T17010	151.7	23.1-38.1	38.1-56.6	56.6-83.5	3.2	0.54

13.3 KOV Open Pit

During 2010, a total of 10 holes (3461 metres) were drilled in the Kamoto East ore body by KCC. The majority of these holes intercepted the ore body either at or below the originally GCM drilled areas which were reported by SRK in the 2009 Technical Report and the data from this drilling campaign is within +/- 5% of the GCM mineral resource model with regards to location and grade.

Table 10: Summary of 2010 drill data for Kamoto East

	Hole_id	Depth	OBS	RSC	OBI	%Cu	%Co
KAMOTO EAST	KOV0601	319.9	208.4-225.80	225.8-243.60	243.6-247.6	4.49	0.32
	KOV0602	250.5	No Int.	No Int.	No Int.	-	-
	KOV0603	317.1	221.9-236.8	236.8-252.8	252.8-263.1	6.61	0.31
	KOV0604	325	216.13-236.48	236.48-252	252-274.14	4.22	0.22
	KOV0617	430.9	353-429.1	No Int.	No Int.	2.29	1.77
	KOV0618	442.8	394.2-422	422-440.25	440.25-441.8	5.23	0.78
	KOV0619	500	413.6-455	455-472.5	472.5-478.1	3.87	0.71
	KOV0620	241	No Int.	No Int.	No Int.	-	-
	KOV0621	402.3	No Int.	No Int.	No Int.	-	-
	KOV0622	231.9	389.9-419.4	419.4-431.9	No Int	4.42	0.32
		3461.4			AVERAGE	4.47	0.63

KCC has recently drilled 11 holes (1 577m) in the Virgule ore body (Cut1a and Cut 2 of the scheduled mine plan) on the north west section of KOV Open Pit which confirmed the location and grade of the mineral resource model which was based on GCM data. Following this drilling, the mine plan was implemented and to date there has been good reconciliation between grade control assays and the mineral resource model.

Table 11: Summary of 2010 drill data for Virgule

	Hole_id	Depth	OBS	RSC	OBI	%Cu	%Co
Virgule	KOV0605	140	92.8-101.2	101.2-117.85	117.85-135.1	5.17	0.22
	KOV0606	312.6	No Int.	No Int.	No Int.	-	-
	KOV0607	65	No Int.	No Int.	No Int.	-	-
	KOV0608	100.5	Leached	Leached	55.1-82.4	1.45	0.07
	KOV0609	99	leached	Leached	80.9-91.4	3.55	0.06
	KOV0610	80.7	leached	Leached	55.2-71	3.91	0.23
	KOV0611	122.5	leached	82.4-101.9	101.9-119.8	3.42	0.34
	KOV0612	160.5	106.5-125.8	125.8-144.8	144.8-158.7	5.97	0.14
	KOV0614	90.2	34.6-40.1	40.1-58.9	58.9-84.9	2.62	0.07
	KOV0615	100.5	Leached	46.8-64.9	76.5-100.2	5.86	0.12
	KOV0616	306	273.3-248.4	248.4-264.6	264.6-281.7	3.38	0.48
		1577.5			AVERAGE	3.727	0.161

13.4 Mashamba East Open Pit

There has been no recent drilling in Mashamba East Open Pit.

13.5 Kananga Mine

There has been no recent drilling in the Kananga Mine.

13.6 Tilwezembe Open Pit

There has been no recent drilling in the Tilwezembe Open Pit.

14.0 SAMPLE METHOD AND APPROACH

14.1 Historical Sampling

Details of the historical sampling undertaken within each of the project areas are scant and based on personal communications with the respective consultant in each of the project areas. Inferences have been drawn from the observations from the sample database.

Cores from the ore body intersections were sampled for chemical analysis. The lengths of core sampled varied, and it is understood that this was a consequence of the sample recovered within each run. In the GCM logging sheet, there is a column for percentage recovery where values ranging from 1% to 100% are entered to describe the amount of core recovered in the sample length. Core recoveries are recorded only for cores that were sampled.

The lithologies sampled were the upper ore-body host rocks (lower SDS and SDB) and the lower ore-body rocks (RSF, DSTRAT and the RATGR) and portions of the RSC deemed to be mineralized. SRK understands that the visibility of copper mineralization in the core was used as the criterion for sampling the core. Core lengths deemed to be barren of copper were not sampled, and an entry was made in the sample log for that interval with the comment "steriles" or barren. It is possible, in SRK's view, that the unsampled cores could contain finely disseminated copper mineralization not visible to the naked eye. There is a further possibility, especially in the RSC, that the "sterile" zones contain cobalt mineralization. In drill holes KOV 426 and KOV 427, the entire RSC is mineralized and returned good copper mineralization (2-3%) within the mid-RSC. In drill hole KOV 428, the mid-portion of the RSC was sampled. Partial or selective sampling, although common in the RSC, was also evident in the other Roan lithologies.

The assay database describes the sample in terms of the length, depths (from and to) of intersection and the amount of core recovered in that sample length. The sample database contains assay data for the following:

- %TCu: the percentage total copper content of the sample;
- %CuO: the percentage of the copper present as oxide. In the modelling, this is reported as %ASCu. Fewer than half of the samples were analyzed for %ASCu;
- %Cu mal: the percentage of the copper as malachite. Only a few samples contain values on this column;
- %TCo: the percentage total cobalt content of the sample; and
- %CaO soluble: the relative proportion of soluble calcium oxide in the sample. Less than 30% of the total database was assayed for calcium oxide.

14.2 Current Sampling

Sampled zones are selected based on the visual observation of the lithological contacts. The geologist also marks on the core the direction along which the core should be split, after considering the attitude of the bedding or foliation relative to the core axes. The drill lengths and the recoveries are recorded in the sampling notebooks.

Sampling is carried out at a maximum of one metre drill length intervals and different stratigraphic units are sampled separately. The core samples are sawed into two halves. One half is broken up and bagged for assay while the other half is stored for future reference.

Core bags for a particular batch are pre-labelled and arranged in order from the first to the last sample. A tag with an identification or sample number is added to the bag containing the sample before the bag mouth is tied.

Split core sampling is done from the drill core. Prior to taking samples, the geologist examines the core and marks off the intervals to be sampled by drawing a line along the core with a marker pen. When the intervals have been selected, the core is split in half using a diamond saw or core splitter. Once the core is split; individual sample lengths are selected taking care to note stratigraphical and lithological boundaries. The whole width of mineralization and at least one metre of apparently barren or low grade hanging wall and foot wall material are covered.

The data is recorded as preliminary in the log sheets and is then transferred into the geological database ("**GDMS**") logged in Lakefield's sample-tracking system and stored on a shelf. The splits and resubmitted pulps are currently stored at SGS Consulting (Pty) Ltd ("**SGS**") Lakefield and the check sample pulps at Set Point Laboratories.

The analytical method used for the determination of total copper and total cobalt was X-ray fractionation. Acid-soluble copper and cobalt were determined by acid digestion (sulphuric acid) and analysis of the solution by atomic absorption spectrometry ("**AAS**").

The methods are described as:

- For analysis of copper oxides each sample was weighed and mixed with an aliquot of dilute sulphuric acid enriched with sulphur dioxide. This mixture was agitated at room temperature for a set period and the sample residue filtered out of the solution. The solution was made up to volume and analysed for copper and cobalt by AAS. This yielded acid-soluble results.

- For analysis of copper sulphides the residue of the copper oxide preparation was placed in a beaker and mixed with multiple acids, with the residue being digested in the acid mixture. The solution was made up to volume and analyzed for copper and cobalt by AAS. This yielded an assay of acid-insoluble copper("**AICu**") and acid-insoluble cobalt ("**AICo**") present as sulphides.

15.0 SAMPLING PREPARATION, ANALYSES AND SECURITY

15.1 Historical Sample Preparation and Analyses

All historical sampling, sample preparation, analysis and security were undertaken by GCM over more than 50 years. As can be expected, it is difficult to comment on the quality of such work.

The historical core samples were cut along the longitudinal axis with one half of the core sent for laboratory analysis and the remaining half retained in the boxes. There was no systematic approach to sample lengths as indicated by the variations in the sample lengths in the database. The minimum sample taken was 0.5m and the maximum sample was 2.5m. The sample lengths were also a consequence of the sample recovered within the run.

The historical core samples were delivered to the laboratory for further sample preparation and analysis which was undertaken in-house by GCM.

15.2 Current Sample Preparation and Analyses

All the current sampling is done by KCC personnel. KCC carries out the sample preparation at Luilu Laboratory (accreditation and certification of the Laboratory to ISO standards is planned.)

Each of the half core samples are crushed to ± 20 mm and then again crushed to ± 5 mm. The crushed sample is split where necessary to produce a portion about 250 g. The split is then pulverized to 50µ, bagged and labelled. It is then submitted to the Laboratory for its respective analysis.

The analytical method used for the determination of total copper, total cobalt and copper oxide is AAS.

Acid soluble copper and cobalt is determined by acid digestion in a blend of nitric acid and hydrochloric acid. Analysis of the solution is by AAS.

For total copper and total cobalt, each sample is weighed and mixed with an aliquot of blended nitric acid and hydrochloric acid in a volumetric flask. The sample residue is filtered out of solution, made up to volume and analysed for copper and cobalt by AAS.

For copper oxide, each sample is weighed and mixed in a blend of ethanol, hydrated tin chloride and hydrofluoric acid. This mixture is agitated at the room temperature for a set period and the sample residue filtered out of the solution. The solution is made up to volume and analysed for copper oxide by AAS.

16.0 DATA VERIFICATION

Data validation, which is a routine exercise for KCC, involves checking of hardcopies of printed data, 3D computer validation, and on screen checks in Datamine and Surpac. In addition, physical checks of collar and survey are done by plotting the processed data in section and on plan.

The database system employed at KCC is GDMS which has a built-in data security system. This prevents issues such as data overlaps, duplicates and gaps.

16.1 Quality Control and Quality Assurance

Quality assurance and quality control ("**QA/QC**") is the methodology by which confidence levels are measured and maintained for assaying.

The main objectives of QA/QC programs are to:

- minimize bias from sampling and assaying;
- ensure the accuracy and precision of assaying; and
- measure and demonstrate data integrity and validity for mineral resource estimates and grade control.

16.2 QA/QC Procedure

The QA/QC procedure involves insertion of blanks, duplicates and standard reference material at pre-determined and sequential intervals. Every tenth sample is a blank, every twentieth is a duplicate and every thirtieth sample is a standard reference material with known mean and standard deviations. This cycle is repeated untill the end of the hole.

KCC use three types of standard reference material; low, medium and high grade material. This ensures the full range of grade categories of both copper and cobalt are covered.

The reference material assays provide a method by which analytical accuracy is monitored and quantified. There are two parameters of interest when reporting analytical accuracy:

- the relative assay deviation from the expected value of the reference material; and

- the average bias over time.

The deviation of a reference material's assay is measured and expressed as a relative standard deviation, thus making it possible to directly compare reference materials with different standard deviations. Acceptable limits are considered to be 95% of samples submitted to be within ± two standard deviations.

When acceptable limits for reference materials are not achieved the following course of actions are taken:

- cross-check KCC reference material assays with laboratory submitted reference material assays for the same period and/or batch;
- in the case of bias, determine if it is one reference material type or all reference material types; and
- after discussions with the Laboratory, an experiment may be undertaken to determine the reason for the variance.

The Qualified Person for this ITR verified the results from the QA/QC procedure.

17.0 ADJACENT PROPERTIES

The Qualified Person for this ITR is not aware of any public disclosure by an owner or operator of a property adjacent to the Material Assets regarding such adjacent properties which is material to this ITR.

18.0 MINERAL PROCESSING AND METALLURGICAL TESTING

The primary body of text in this section remains substantially unchanged from the equivalent section in the 2009 Technical Report. For the purpose of this Technical Report, the Qualified Person responsible believes that the sections referred to are a fair and reasonable reflection of the current status of mineral processing and metallurgical testing as set out below.

18.1 Previous KOV Testwork

18.1.1 Samples Tested

The process design criteria primarily assumes that the ore mined from the KOV Open Pit will be the same as the sample used for the testwork at Mintek Laboratory ("**Mintek**") in 2006, in terms of its milling, flotation, leach and other metallurgical characteristics but different in terms of sulphide copper content. The testwork utilized bulk ore samples of the following five lithological units identified at KOV Open Pit and taken from stockpiles of ore mined just before the mine closed in 1999:

- SDB surface material consisting mainly of oxidised material referred to as SDB Ox but also a sulphide fraction called SDB Sulph;
- RSC;
- RSF;
- D Strat; and
- RAT Grise, the deepest material.

Such samples would presumably have been representative of the material being mined at the time but, in the light of the anticipated change in the proportion of sulphides, such samples are unlikely to be fully representative of future ore to be mined. In addition, it is uncertain to what extent the metallurgical characteristics of the stockpiled ore had changed since being mined. In SRK's view it would have been preferable to have conducted testwork on fresh samples of ore to be mined over the life of project. At the time the difficulty of obtaining such representative samples, due to the pit being flooded, precluded this.

18.1.2 Milling Testwork

JKTech (Pty) Ltd. ("**JKTech**") was commissioned to conduct drop weight testing of the five ore types and to simulate single-stage SAG milling versus primary SAG mill and secondary Ball milling. Generally, all material types were characterised as being "soft to very soft" in terms of resistance to impact breakage and abrasion breakage. However, RAT Grise showed evidence of bimodality in its relative density distribution, which strongly suggests that a dense component could concentrate in the mill load and compromise mill performance. It will therefore be important to ensure a good blend of feed materials to minimise such effects.

JKTech simulation results concluded that a two-stage SAG and ball mill circuit was more efficient than a single stage SAG circuit. The two-stage circuit was accordingly incorporated.

18.1.3 Hydrometallurgical Testwork

Mintek undertook a programme of testwork including mineralogy and copper and cobalt hydrometallurgical processing. The test programme was conducted on a composite sample of the five identified lithologies blended pro rata to the depth of the lithological units. Copper and cobalt leaching, SX and copper EW were conducted at bench and pilot scale whilst cobalt purification and precipitation investigations were conducted at bench scale on pilot-generated and synthetic solutions.

The leach was conducted in two steps, with pH being maintained with sulphuric acid addition in the first part and the redox potential being controlled in the second part by introducing sulphur dioxide gas. The pilot plant achieved fairly consistent copper and cobalt leaching efficiencies up to 92% and 91% respectively. During pilot testing, the SX circuit was simplified to comprise 2 extraction, 1 wash and 1 strip stages. Cathode produced in the pilot plant achieved the desired LME Grad 'A' quality of >99.95% copper, although attention will have to be given to certain impurities during full-scale operation.

Investigations into the purification and precipitation of cobalt bleed solution included the following steps:

- Fe/Mn removal with air/SO2;
- removal of aluminium and copper via precipitation with lime;
- calcination testwork on the final Co(OH)2 product with lime; and
- precipitation of Co(OH)2 salt using MgO.

The testwork identified optimum conditions for the removal of iron, Mn, aluminium and copper. Properly controlled, cobalt losses should not exceed 1% of Fe/Mn precipitation and 2% in Al/Cu precipitation.

Initial tests were conducted with an industry recognised MgO, whilst optimisation tests were conducted with an alternate MgO that was preferred for the project. Complete cobalt precipitation was achieved with MgO. Unfortunately MgO as a precipitant provided no selectivity for cobalt over nickel, zinc and copper present in the feed, underlining the need to remove these effectively during the purification steps. Furthermore it was not possible to prepare solids with the desired composition of approximately 40% cobalt with <2% co-precipitated magnesium. It is suspected that this was due to very slow kinetics displayed by the alternate MgO and further tests using the industry recognised MgO were recommended. Such tests have since been successfully completed.

18.2 Recent KOV Open Pit Testwork

18.2.1 Milling Testwork

Mintek was commissioned to further investigate the amenability of the KOV Open Pit ore to autogenous milling, with a view to using the two existing DIMA AG mills at KTC rather than the new SAG and ball mills ordered by DCP. Testwork was carried out on drill core samples from 4 ore zones, namely RSC, OBI, OBS-SDB and OBS-SDS in the KOV Open Pit. Based on the ratio of Bond Rod Mill Work Index to Bond Ball Mill

Work Index , it was again concluded that the ore is not amenable to fully autogenous milling. This was in line with the earlier JKTech investigations. However, it was also concluded that the DIMA mills could achieve the required KOV ore throughput if converted to SAG milling in series with the existing ball mills as discussed below.

18.2.2 KTC

Mintek undertook an evaluation of mill throughput of a grinding circuit for KOV copper cobalt ore by laboratory tests.

These tests indicated that the optimal circuit configuration would be an open circuit SAG mill followed by a closed circuit ball mill.

The tests determined that three existing ball mills were under powered for the target throughput and grind size. It was also determined that two new mills, of a defined size and installed power that could become available, could process the target throughput and grind size.

Mintek undertook a computer simulation study to establish the maximum throughput capacity of the KTC grinding circuit treating copper cobalt ore. The model indicated that the major bottleneck limiting throughput capacity was the ball mills.

Other computer simulations on alternative circuit configurations indicated that the circulating loads could cause process instabilities.

Further simulations indicated the preferred option would involve operating the primary mills (DIMA mills) as SAG mills. Although the power draw of the primary mill motors would remain below the installed power, changes to the mill liners would be required and tests undertaken, with respect to the increased charge mass and impact forces. Recommendations were made regarding pilot AG/SAG milling tests on bulk samples of ore and these tests are in progress with initial findings positive.

18.2.3 Luilu Refinery

Mintek undertook test work on four process streams from the Luilu Refinery. An oxide copper concentrate sample and a cobalt hydroxide sample were leached in the laboratory and compared to a concentrate leach residue sample and cobalt hydroxide leach residue sample obtained for the metallurgical plant.

In this manner, the laboratory leaching efficiencies were compared with the metallurgical plant efficiencies. Recommendations were made to improve the leaching efficiencies and hence, the recoveries.

18.2.4 SX Isotherms Test Work

In order to design the New Phase 4 SX circuit, it was necessary to know how well the process performs. The only reliable way to establish the efficiency of the SX circuit and the design parameters was to perform test work.

In order to get useable data for the design of the SX plant, it was decided that the test work should be conducted on electrolyte from the existing Luilu Refinery circuit and adjust this to the composition of the PLS that was calculated by the METSIM® model.

The two leading companies in the solvent extractant manufacturing industry were approached to do the test work using their specific extractants. The two companies were Cognis and Cytec. Cognis tested two extractants, namely LIX 984N and LIX 979N and Cytec tested ACORGA M5640.

The results were fairly similar for all three of the extractants that were tested. From the test work it was possible to produce extraction and stripping isotherms and using these isotherms it was possible to design the New Phase 4 SX circuit.

19.0 MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES

As stated in sections 14.0 to 16.0, the sampling methodology, QA/QC and analysis methodology meets best practice requirements. The statistical analyses and the variography, based on the data for the various deposits, are attached in APPENDIX B. The mineral resource and mineral reserve estimates, based on this data, are set out below.

19.1 Estimation Parameters

19.1.1 Estimation Plan

There are a number of methods used in grade estimation. These methods may be based on the presence or absence of a variogram. For data that is spaced too far apart, or where a variogram cannot be generated, the inverse distance method of interpolation may be appropriate.

Kriging is another method that may be used. Kriging allocates weights based on the distance of the sample from the point or block being estimated, to the sample points surrounding the point or block for which grade is to be estimated. By allocating these weights to the samples, it ensures that the estimation error is minimised, ensuring the best estimation possible for that block. The error associated with estimation is called the kriging variance.

Ordinary Kriging ("**OK**") was used for the purpose of this project, which is a specific algorithm that satisfies unbiasedness by ensuring that the kriging weights in the local estimation are summed to 1. The results from the variography analysis were used during the estimation of each project area.

19.1.2 Density Assignment and Determinations

Historically, GCM assigned density values based on the categorization of the ore type into dolomitic or non-dolomitic (siliceous) and its copper grade and based on an exhaustive dataset available from all GCM operations within the Katangan Copperbelt. A sample was considered dolomitic when the %TCu divided by the %CaO in the sample was less than or equal to 15 and non-dolomitic (siliceous) when it was greater than 15. GCM generalized empirical criterion defined these main categories of densities as shown in the table below.

Table 12: GCM criteria for assigning density values

Definition and Criterion	Density, t/m^3
Siliceous= (%TCu/%CaO) >=15	
TCu>1<2%	2.0
TCu>2.0%. with <0.5% Cu Sulphite content	2.2
TCu>1<2%, with >1% TCo content	2.2
TCu >2.0%, with >0.5% Cu Sulphite content	2.4
Dolomitic = (%TCu/%CaO) <15	
TCu >1<2%	2.4
TCu >2.0%, with <0.5% Cu Sulphite content	2.4
TCu >2.0%, with >0.5% Cu Sulphite content, >=0.5%Cu Oxide	2.4
TCu >2.0%, with >0.5% Cu Sulphite content, <=0.5%Cu Oxide	2.6

According to the GCM criterion, waste rock was generally assigned a density of 2.0 t/m^3 if it was siliceous and 2.4 t/ m^3 if the rock was considered dolomitic.

During the 2008 Feasibility Study, SRK reviewed the historical assayed dataset for all the projects in the application of these criteria and found that there were proportionately fewer assays for %CaO than the

%TCu assays available for these criteria to be applied. However, SRK consider these values as guidelines for the possible ranges of density within the respective mineralized zones.

KTO

CCIC undertook limited density determinations of the various stratigraphic units to verify GCM empirical density values. The determinations were undertaken on selected lithological cores using Archimedes' Principle, by which a sample is weighed in air and then in water using a Clover Scale. The measured masses then are entered into a simple formula to calculate the density. CCIC limited density determinations for KTO are presented in the table below by stratigraphic unit.

Table 13: KTO: Density Determinations on Various Lithologies

Stratigraphic Unit	Number of samples	Minimum t/m^3	Maximum t/m^3	Average t/m^3	Stratigraphic Unit
SD1a	9	2.69	2.90	2.80	SD1a
BOMZ	8	2.74	2.92	2.86	BOMZ
RSC	8	2.51	2.96	2.69	RSC
RSF	6	2.57	3.03	2.81	RSF
D STRAT	5	2.66	3.02	2.81	DSTRAT
Grey RAT	3	2.64	2.77	2.70	Grey RAT
Red RAT	3	2.63	2.75	2.67	Red RAT

On the basis of the limited density determinations, CCIC concluded that GCM approach was conservative and that upside potential existed with regard to the calculated mineral resource tonnages, but recommended that in situ bulk density determinations should be undertaken before higher density values can be used in the Resource Model.

CCIC used the average density values of 2.7 t/m^3 from the GCM table for the conversion of volume to tonnes for the KTO model.

T-17 Open Pit

CCIC undertook limited density determinations of the various stratigraphic units to verify GCM empirical densities. The determinations were undertaken on selected lithological cores using the Archimedes' Principle by which a sample is weighed in air and then in water using a Clover Scale. The measured masses then are entered into a simple formula to calculate the density. CCIC limited density determinations for T-17 Open Pit are presented in the table below by stratigraphic unit.

Table 14: T-17 Open Pit: Density Determinations on Various Lithologies

Stratigraphic Unit	Number of samples	Minimum t/m^3	Maximum t/m^3	Average t/m^3
SDB	7	2.10	2.76	2.38
BOMZ	1	2.09	2.09	2.09
SDB	7	2.10	2.76	2.38
RSC	5	2.21	2.63	2.34
RSF	6	2.06	2.51	2.32
DSTRAT	5	1.88	2.40	2.13

As a cross check and by way of a second method, CCIC also submitted samples for density checks to Set Point Laboratories where density determinations were undertaken using a multivolume gas pycnometer 1305 for helium displacement.

Two samples were also tested by the Mintek and these provided figures of 2.84 for the siliceous material from T-17 Open Pit, and 2.74 for the dolomitic material from the same Resource Area. The method of density determination undertaken by Mintek has not been specified in the CCIC report.

On the basis of the limited density determinations, CCIC indicated that GCM approach was conservative and upside potential existed with regard to the calculated mineral resource tonnages. However, CCIC recommended that in-situ bulk-density determinations should be undertaken before higher density values can be used in the Resource Model.

For the conversion of volume to tonnage in the T-17 Open Pit model, CCIC applied density values of 2.2 t/m^3 and 2.4 t/m^3, consistent with the GCM categories of oxide and mixed ore types.

KOV Open Pit

In the models generated for KOV Open Pit, SRK used an inferred density of 2.2 t/m^3. The inference is based on the visual inspection of the mineralization in the cores and observations in the field, where the predominant copper mineral is malachite.

Intersections of mineralization from the drilling at KOV Open Pit confirm that the predominant mineralization is malachite, considered as an oxide, with minor sulphides at depth. There are limited density determinations from selected cores of the recent drilling. Although considered statistically inadequate to represent the sample dataset, indications from these determinations are that the density applied is appropriate.

Mashamba East Open Pit

CCIC undertook limited density determinations of the various stratigraphic units to verify GCM's empirical density values in the Mashamba East Open Pit. The method is as described above under KTO. CCIC's limited density determinations for Mashamba East Open Pit are presented in the table below, by stratigraphic unit.

Table 15: Mashamba East Open Pit: Density Determinations on Various Lithologies

Stratigraphic Unit	Number of samples	Minimum t/m^3	Maximum t/m^3	Average t/m^3
SDB	17	2.34	2.76	2.52
RSC	10	2.40	2.61	2.51
RSF	5	2.28	2.50	2.39

CCIC used the average density values of 2.2 t/m^3 and 2.4 t/m^3 from the GCM table for the conversion of volume to tonnes in siliceous and dolomitic mineralized zones, respectively, for the Mashamba East model.

Kananga Mine

The procedures adopted for the density determinations at Kananga are the same as described for Tilwezembe Open Pit and the values are listed in the table Table 16 below.

Table 16: Kananga Mine: Density Determinations on Various Lithologies

Domain	Declustered mean
Upper ore body oxides (UOB_OX)	1.8
Middle low-grade oxides (MID_OX)	1.8
Lower ore body oxides (LOB_OX)	2
Upper ore body sulphides (UOB_SL)	2.1
Middle low-grade sulphides (MID_SL)	2
Lower ore body sulphides (LOB_SL)	2.1

Tilwezembe Open Pit

Snowden Mining Services ("**Snowden**") undertook density determinations on selected core samples using Archimedes' Principle. The sample core pieces of approximately 100 mm to 200 mm length were wrapped in cling-film (Saran wrap) to prevent oxidation and weighed first in air and then when submerged in water. The difference in the weights is the weight of the water displaced.

No work has been done to determine the free moisture content of the samples. Resultantly, wet bulk densities were used during estimation.

Snowden indicate that no relationship exists between grade and density and therefore, bulk density factors were determined for each geological unit from the means of the specific gravity measurements after outliers were cut from the dataset. The de-clustered means were used and a maximum of 5% of the composites were cut from the dataset. The composite data was declustered using a cell size of 25 mE by 25 mN by 1 mRL that approximates the drill-hole spacing. The bulk densities are presented in the table below.

Table 17: Tilwezembe Open Pit: Density Determinations on Various Lithologies

Domain	Bottom Cut	Top Cut	Percentage cut	Declustered mean (before cut)	Declustered mean (after cuts)
Ox_MnDol	1.1	3	5	2.04	1.96
Ox_Brec	-	2.7	4	1.9	1.81
Ox_TillArg	-	3	5	2.09	1.98
Sl_MnDol	-	2.6	3	2.28	2.26
Sl_Brec	1.5	2.7	3	2.23	2.24
Sl_TillArg	1.8	2.5	3	2.18	2.18

Summary

The table below indicates the densities that have been used in the conversion of volume to tonnes within the various project areas.

Table 18: Summary Density Determinations on Various Lithologies

Project Area	Mineralized Zone	Density, t/m^3
T-17 Open Pit	Oxide mineralized Zones	2.2
	Sulphide mineralized Zones	2.4
Tilwezembe Open Pit	Ox_MnDol	1.96
	Ox_Brec	1.81
	Ox_TillArg	1.98
	Sl_MnDol	2.26
	Sl_Brec	2.24
	Sl_TillArg	2.18
KTO	All	2.7
Kananga Mine	Upper ore body oxides (UOB_OX)	1.8
	Middle low-grade oxides (MID_OX)	1.8
	Lower ore body oxides (LOB_OX)	2
	Upper ore body sulphides (UOB_SL)	2.1
	Middle low-grade sulphides (MID_SL)	2.0
	Lower ore body sulphides (LOB_SL)	2.1
KOV Open Pit	All	2.2
Mashamba East Open Pit	Oxide mineralized zones	2.2
	Mixed mineralized zones	2.4

19.1.3 Mineral Resource Classification

As part of this ITR, GAA reviewed the mineral resource estimation methodologies and results from the estimations as produced by SRK and other independent consultancies.

The mineral resources for all the mines were estimated in accordance with the JORC Code. The following were considered when classifying the mineral resources:

- The quantity, quality and age of the data used in the generation of the mineral resources;
- The availability of assays in portions of the package due to selective sampling on the basis of visible copper mineralization;
- The relatively incomplete assays for %ASCu and %CaO compared to the %TCu data in the historical data;
- Limited density determinations undertaken on the various lithologies;
- The risk in the data informing the mineral resource estimate;
- The robustness of the geological model;
- Historical mining activities and the reconciliation of tonnes and grade; and
- The risk in the grade estimates.

The classification of the mineral resources is considered to be conservative, due to the large bulk of historical data that had to be used during the mineral resource estimation for the 2008 feasibility study. As new data becomes available, using modern drilling and sampling techniques and controls, the confidence in the mineral resource estimate will increase, and therefore the mineral resource classification may be upgraded.

19.2 Consolidated Mineral Resource Estimate

Table 19 sets out the consolidated mineral resources of KCC as at December 31, 2010.

Table 19: KCC's Consolidated Mineral Resources as at December 31, 2010

Classification	Project Area	Mt	%TCu	%TCo
Measured	KTO	30.7	4.54	0.54
	Subtotal	**30.7**	**4.54**	**0.54**
Indicated	KTO	35.7	4.69	0.6
	Mashamba East Open Pit	75.0	1.80	0.38
	T-17 Open Pit	8.5	2.75	0.87
	KOV Open Pit	123.9	5.37	0.4
	Kananga Mine	4.1	1.61	0.79
	Tilwezembe Open Pit	9.5	1.89	0.6
	Subtotal	**256.7**	**3.95**	**0.45**
Total Measured and Indicated	KTO	66.4	4.62	0.57
	Mashamba East Open Pit	75.0	1.80	0.38
	T-17 Open Pit	8.5	2.75	0.87
	KOV Open Pit	123.9	5.37	0.4
	Kananga Mine	4.1	1.61	0.79
	Tilwezembe Open Pit	9.5	1.89	0.6
	TOTAL	**287.4**	**4.02**	**0.46**
Inferred	KTO	10.6	5.11	0.59
	Mashamba East Open Pit	65.3	0.76	0.1
	T-17 Open Pit	15.3	1.91	0.61
	KOV Open Pit	71.2	3.56	0.32
	Kananga Mine	4.0	2.00	0.98
	Tilwezembe Open Pit	13.8	1.75	0.60
	TOTAL	**180.2**	**2.32**	**0.32**

1) Mineral resources have been reported in accordance with the classification criteria of the JORC Code. If the classification criteria adopted in NI 43-101 were to be used in this ITR instead of the JORC Code, the mineral resource estimates would be substantially similar.

2) Mineral resources are inclusive of mineral reserves.

3) Mineral resources are not mineral reserves and do not have demonstrated economic viability.

19.2.1 Comparison of the 2010 and 2009 Mineral Resources

In Table 20 below, the consolidated mineral resources of KCC as at December 31, 2010 are compared with those as at December 31, 2009.

Table 20: Comparison of the 2010 and 2009 Mineral Resources (as at December 31)

Classification	Project Area	2010			2009		
		Mt	% TCu	% TCo	Mt	% TCu	% TCo
Measured	KTO	30.7	4.54	0.54	32.0	4.51	0.58
	Subtotal	**30.7**	**4.54**	**0.54**	**32.0**	**4.51**	**0.58**
Indicated	KTO	35.7	4.69	0.6	35.7	4.69	0.6
	Mashamba East Open Pit	75.0	1.80	0.38	75.0	1.80	0.38
	T-17 Open Pit	8.5	2.75	0.87	11.7	3.41	0.67
	KOV Open Pit	123.9	5.37	0.4	126.9	5.33	0.4
	Kananga Mine	4.1	1.61	0.79	4.1	1.61	0.79
	Tilwezembe Open Pit	9.5	1.89	0.6	9.5	1.89	0.6
	Subtotal	**256.7**	**3.95**	**0.45**	**262.4**	**3.97**	**0.45**
Measured and Indicated	KTO	66.4	4.62	0.57	67.7	4.60	0.59
	Mashamba East Open Pit	75.0	1.80	0.38	75	1.8	0.38
	T-17 Open Pit	8.5	2.75	0.87	11.7	3.41	0.67
	KOV Open Pit	123.9	5.37	0.4	126.9	5.33	0.4
	Kananga Mine	4.1	1.61	0.79	4.1	1.61	0.79
	Tilwezembe Open Pit	9.5	1.89	0.6	9	1.89	0.6
	TOTAL	**287.4**	**4.02**	**0.46**	**294.4**	**4.03**	**0.46**
Inferred	KTO	10.6	5.11	0.59	10.6	5.11	0.59
	Mashamba East Open Pit	65.3	0.76	0.1	65.3	0.76	0.1
	T-17 Open Pit	15.3	1.91	0.61	15.3	1.91	0.61
	KOV Open Pit	71.2	3.56	0.32	71.2	3.56	0.32
	Kananga Mine	4.0	2.00	0.98	4	2	0.98
	Tilwezembe Open Pit	13.8	1.75	0.60	13.1	1.8	0.62
	TOTAL	**180.2**	**2.32**	**0.32**	**179.5**	**2.33**	**0.32**

1) Mineral resources have been reported in accordance with the classification criteria of the JORC Code. If the classification criteria adopted in NI 43-101 were to be used in this ITR instead of the JORC Code, the mineral resource estimates would be substantially similar.

2) Mineral resources are inclusive of mineral reserves.

3) Mineral resources are not mineral reserves and do not have demonstrated economic viability.

19.3 Consolidated Mineral Reserve Estimate

Table 21 sets out the **consolidated** mineral reserves of KCC as at December 31, 2010.

Table 21: KCC Consolidated Mineral Reserves as at December 31, 2010

Reserve Classification	Project Area	Mt	% TCu	% TCo
Proved	KTO	14.6	3.47	0.51
	Subtotal	**14.6**	**3.47**	**0.51**
Probable	KTO	19.4	3.70	0.53
	T-17 Open Pit	1.5	2.61	0.46
	Mashamba East Open Pit	5.9	3.00	0.37
	KOV Open Pit	55.7	4.73	0.45
	Subtotal	**82.5**	**4.33**	**0.46**
Total Proved and Probable	KTO	34.0	3.60	0.52
	T-17 Open Pit	1.5	2.61	0.46
	Mashamba East Open Pit	5.9	3.00	0.37
	KOV Open Pit	55.7	4.73	0.45
	TOTAL	**97.0**	**4.20**	**0.47**

1) Mineral reserves have been reported in accordance with the classification criteria of the JORC Code. If the classification criteria adopted in NI 43-101 were to be used in this ITR instead of the JORC Code, the Mineral Reserveestimates would be substantially similar.

19.3.1 Comparison of the 2010 and 2009 Mineral Reserves

In Table 22 below, the mineral reserves of KCC as at December 31, 2010 are compared with those as at December 31, 2009.

Table 22: Comparison of the 2010 and 2009 Mineral Reserves[1 and 2] (as at December 31)

Reserve Classification	Project Area	2010			2009		
		Mt	% TCu	% TCo	Mt	% TCu	% TCo
Proved	KTO	14.6	3.47	0.51	15.9	3.5	0.51
	Subtotal	**14.6**	**3.47**	**0.51**	**15.9**	**3.5**	**0.51**
Probable	KTO	19.4	3.70	0.53	19.4	3.7	0.53
	T-17 Open Pit	1.5	2.61	0.46	2	2.01	0.81
	Mashamba East Open Pit[2]	5.9	3.00	0.37	10.2	4.39	0.52
	KOV Open Pit[2]	55.7	4.73	0.45	90.1	4.93	0.38
	Subtotal	**82.5**	**4.33**	**0.46**	**121.7**	**4.64**	**0.42**
Total Proved and Probable	KTO	34.0	3.60	0.52	35.3	3.61	0.52
	T-17 Open Pit	1.5	2.61	0.46	2	2.01	0.81
	Mashamba East Open Pit	5.9	3.00	0.37	10.2	4.39	0.52
	KOV Open Pit	55.7	4.73	0.45	90.1	4.93	0.38
	TOTAL	**97.0**	**4.20**	**0.47**	**137.6**	**4.51**	**0.43**

[1] Mineral reserves have been reported in accordance with the classification criteria of the JORC Code. If the classification criteria adopted in NI 43-101 were to be used in this ITR instead of the JORC Code, the mineral reserve estimates would be substantially similar.

[2]A variance exists between the mineral reserve estimate dated as at December 31, 2010 compared with that dated as at December 31, 2009 that can be attributed to mining depletion and the optimisation of KOV Open Pit and Mashamba East Open Pit based on updated technical, cut-off and economic criteria. With the optimisation of KOV Open Pit, the mining strategy was adjusted to include the bulk of the Kamoto East mineral resource and a component of the Virgule mineral resource (previously part of KOV Open Pit) as part of future underground mining with access from the existing KTO infrastructure. On this basis, the Kamoto East mineral resource has now been excluded from the mineral reserve estimate pending finalisation of mine plans for KTE.

20.0 OTHER RELEVANT DATA AND INFORMATION

20.1 Risk Analysis

The risk analysis in this ITR comes from the following sources:

- the "Competent Persons", as defined in the JORC Code, involved in the technical analysis of the Material Assets were interviewed to identify and record project risks; and
- the risks identified by SRK in the 2009 Technical Report were reviewed and included in this analysis if they were determined to still be valid.

20.2 Mining risks

The major risks that could have a negative impact on the planned production profile are:

- Dewatering: Initial and continuous dewatering of the KOV Open Pit and Mashamba East Open Pit is required. The current dewatering strategy has recently been revised to accommodate the pit designs referenced in the 2010 Technical Report and historical hydrogeological data which is difficult to validate. As such, the current dewatering strategy could potentially prove to be not as effective at maintaining dry slope conditions as anticipated. This potentially could introduce risks associated with potential impacts on both the economics of the pit, pit stability and the production schedule. This risk is being mitigated by performing further studies to gain a better understanding of the hydrogeology so that an appropriate dewatering strategy is defined that enables safe mining as cost effectively and efficiently as possible;
- Access and slope failures: KOV Open Pit will develop into a large operation up to 400m deep. Production rates are high with up to 45 million tonnes of material that should be moved from the KOV Open Pit per annum. Small slope failures could have a negative impact on access to the production benches. A strategy should be developed to establish an alternative ramp access to production areas;
- Available pit space: A high production rate requires sufficient working areas or face length. Additional face length should be established and maintained on the southern section of the KOV Open Pit;
- Available waste dumping space: The KOV Open Pit will produce 462 million tonnes of waste up to 2030. The available waste dumping space close to the KOV Open Pit is insufficient although as part of the AJVA additional surface rights have been allocated to KCC to the north of the current KOV Open Pit concession. However, for improved cost efficiency, a detailed technical plan to back fill mining waste into depleted pits should be developed. With the appropriate mining sequence in KOV Open Pit, a total of 150 million tonnes could be back filled while the T-17 Open Pit is available for back filling from 2013 onwards should the appropriate technical studies be completed;
- Grade control: An operational cut-off grade of 0.6% Cu has been applied to the mining models. Grade control practices for a high volume operation should be developed. Inefficient grade control systems may result in mineral resource losses or cause uneconomic production tonnes to be processed in situations where the planned revenues does not cover the processing and selling costs;

- Waste Rock: Site personnel interviewed, indicated radio-active waste rock occurring within the T-17 Open Pit is handled and stored separately from non radio-active waste rock. KCC has capped this radio-active waste rock dump with non radio-active waste rock in compliance with international accepted standards; and
- Collapsed Zone: The presence of a collapsed zone in the central plateau portion of the KTO ore body may influence stress distribution in adjacent areas.

20.3 Processing risks

Unavailability and Quality of Key Reagents for Metallurgical Processing:

There is a risk that critical process reagents (like lime) may not be available in the required quantities or quality, leading to reduced production of copper and cobalt. This risk has a high rating, but can be managed with a detailed supply management plan.

Power Availability and Supply Fluctuations:

Power requirements to operate at the scheduled production profile are approximately 230-250MW and there are risks that this power may not be available through the national grid and may lead to power disruptions or supply fluctuation. KCC has entered into an agreement with the state utility, Société Nationale d'Electricité ("**SNEL**"), to refurbish the DC link between Kinshasa and Kolwezi SCK / RO stations to increase power availability to KCC to a minimum 160MW in 2011. KCC is also in advanced negotiation with SNEL to provide capital to refurbish additional power infrastructure within the DRC to increase the available power supply from the Inga hydroelectricity facility to 450MW to the Katanga Province by 2015.

20.4 Capital risks

Escalation of Costs:

Projects in the mining industry world-wide have recently experienced unpredictable capital cost overruns due to various macroeconomic and microeconomic factors that cannot be predicted with any reliable degree of certainty. Capital cost overruns require more funding and reduce project returns. This risk is rated as high but is being mitigated by management through regular reviews of capital cost estimates by the KCC project team and their appointed independent engineers who provide certified project control software and an extensive an up-to-date database of capital costs for many aspects of the development.

20.5 Operating risks

Poor Condition of Railway Line:

The poor condition of the railway line may impede efficient production by not allowing the efficient, on-time delivery of finished products or the supply of key input materials on time, leading to reduced production of copper and cobalt and higher logistics costs. This risk is rated very high. Possible mitigation measures include:

- rescheduling production plans to match rail capacity;
- engaging with governments and railway operators;
- engaging with other potential rail users; and.
- resorting to road transportation (at a higher cost) for logistics, although road costs have been factored into the financial model.

Availability of Rolling Stock:

Locomotives and wagons may not be available on time to transport the planned increases in finished products and key input materials, also leading to reduced production of copper and cobalt and higher logistics costs. This risk is rated very high. This risk may be mitigated by establishing required capacity and negotiating with SNCC (the rail operator) and other railway groups to ensure sufficient capacity.

Logistics to and from site present an issue which needs to be carefully planned around and will result in KCC holding a larger than normal critical spares holding; however, this has also been factored into the financial model.

Underdeveloped In-country Institutional Infrastructure and Capacity:

The DRC's national and local governments and their agencies may not have the ability to deliver on the infrastructure requirements of the project, reducing the project feasibility or causing delays. This risk is rated high, and may be mitigated by developing relationships with other stakeholders, governments and agencies; and supporting capacity development initiatives.

Senior Management and Technical Expertise:

Recruiting and retaining senior management and operation-critical technical expertise to manage and operate the mines and processing plants is an issue, rated as a high risk. It potentially affects the ability of the project to run optimally and comply with legislation. Mitigation measures include reviewing KML's and KCC's employment strategy, recruitment and retention plan; and facilitating the provision of contractor's services with Government and other service providers. KML has appointed a significant proportion of expatriate employees amongst its management level.

Artisanal Miners:

There are a large number of artisanal miners working on the adjacent tailings dam and waste rock dumps. This may create a danger of loss of life and injury through congestion of access roads around site. There may also be loss of production through social unrest if the artisanal miners protest against KCC activities or state legislation to manage their activities.

20.6 Sovereign risk

The DRC has in the past been subject to political and civil unrest. Although such unrest has historically taken place in parts of the country away from KML/KCC's operations, which are located in the Kolwezi District of the Katanga Province in the DRC, the DRC (as a whole) continues to be at risk of being affected by varying degrees of political and economic instability in the future which is outside of KML/KCC's control and which may adversely affect KML/KCC's operations in this region. Furthermore, the developing legal system in the DRC may expose KML/KCC's operations in this region to new or changing laws and regulations, which may lead to increased operational risks and/or compliance costs.

20.7 Economic and Market risk

Commodity prices:

Copper and cobalt market prices are significant drivers of the profitability for KCC and the value of KML's interest in KCC. These prices are subject to wide fluctuations beyond the control of KCC or KML due to factors such as demand for the commodities caused by global economic conditions and prospects, supply from various sources, currency and interest rate changes, and speculative activities. Sustained commodity prices below the costs of production may cause the curtailment or suspension of operations. There is some scope to manage market risk through hedging, but this may lead to loss of upside during periods of high commodity prices.

Operating costs:

Project operating costs also affect the profitability of KML and the value of the KCC project. These are subject to a wide range of pressures such as energy prices, oil prices, chemical prices, labour costs and inflation.

Currency risk:

Project revenues are in United States dollars; however, input costs may be in other currencies, specifically the South African Rand. Variations in currency exchange rates can affect production costs and affect project profitability.

20.8 Environmental and Social risks

These risks were identified during an environmental and social audit conducted by GAA at KCC on December 8, 2010.

KOV Open Pit dewatering:

The KOV Open Pit mine pit-lake is being dewatered at a rate of 5,000 to 6,000 m^3/hour, and this water is discharged into the Musonoi River. There is a risk of possible elevated concentrations of TSS, %Cu, %Co and %Mn but these are monitored at the point of discharge on a daily basis and to date concentrations have been >98% compliant with DRC legislation.

Dust fallout on communities:

Dust fall out in neighbouring villages exceeds acceptable limits, with environmental incident registers recording community complaints of dust fall. It should be noted that the dust fall from historical GCM waste rock facilities contributes significantly to the overall dust fall out, and dust fall out is also impacted by mining activity from other operators in the area, particularly artisanal miners on the GCM concession area. KCC manages dust fall out from its operations with appropriate dust suppression measures.

Acid rock drainage:

While copper oxide ores are currently being mined at KCC, the underlying sulphide ore may be mined in future, which could result in a potential for acid rock drainage ("**ARD**"). Although the country rock in the area is dolomitic, and any acid generated is likely to be neutralised in situ, this has not been confirmed. This risk may be mitigated by geochemical testing of mining and waste materials to determine the likelihood and significance of ARD impacts.

Non-compliance with the DRC Mining Code:

If the project does not fulfill the commitments of the recently submitted ESIA which details project development for full compliance of environmental aspects of the DRC Mining Code, the title of the PE's may be revoked. An Environmental Impact Study ("**EIS**") and an EMP, which supersede the current existing ESIA submitted and approved for the KCC concession by GCM in 2006, have been compiled for the KCC project by SRK and were submitted to the Department for the Protection of the Mining Environment ("**DPEM**") in January of 2011 for approval, as per the DRC Mining Code and DRC Mining Regulations. Adherence to the EMP once approved should mitigate this risk.

21.0 INTERPRETATIONS AND CONCLUSIONS

The results and interpretations of exploration on the Material Assets are reported elsewhere in this document and have been relied upon to compile the mineral resource estimate included in Item 19.

22.0 RECOMMENDATIONS

The Qualified Person recommends the following actions be taken in respect of the Material Assets:

22.1 Dewatering

Continued de-watering of the KOV pit is required to ensure that the current mine plan can be carried out.

22.2 Mining and Exploration

The systematic exploration programme currently underway needs to be continued and extended particularly for the operations which have underground mine potential, such as T-17 underground extension and KTE.

This will mean the current drilling programme will need to be continued and expanded. The mining pit design and optimisation models will need to be updated in 2011 to maximize mine production.

22.3 Tailings and Waste

New deposition sites need to be investigated since the existing tailings and waste facilities will require expansion in the future given that the plant upgrade project has reached major milestones in 2010. Increased mining production and plant capacity will generate greater volumes of mining waste.

23.0 REFERENCES

- Metago (2009). KML Due Diligence Environmental and Mine Waste Review. Report Number C001-02-01, February 2009.
- SRK (2010). Kamoto Project: EIS and EMP for the Project. SRK Report 411167/1, March 2010.
- C.G.E.A./A.P.KAT (2010). Letter: Evaluation de la Radioactivité et Programme de Radioprotection dans les Installations Minières et Radiologiques de KAMOTO COOPER COMPANY. République Démocratique du Congo, Commissariat Général à l'Energie Atomique / Antenne Provinciale du Katanga (C.G.E.A./A.P.KAT), 20 Mai 2010.
- KCC (October 2009). Site environmental incident register: November 2008 to October 2009.
- KCC (October 2010). Site environmental incident register: November 2009 to October 2010.
- KCC Luilu Metallurgical Laboratory Excel spreadsheet: "Water results up to March 2010" (Water sample quality laboratory data from various locations for the period May of 2009 to March of 2010).
- KCC Luilu Metallurgical Laboratory Excel spreadsheet: "Dust samples 2010" (Monthly KCC dust fall monitoring data for the period January to September of 2010).
- SRK (2009). An ITR on the Material Assets of KML, Katanga Province, DRC. SRK Project: 389772, March 17, 2009.
- Talbot & Talbot Laboratories water quality analytical data reports dated as follows:
  - Report: Katanga 8636/10 R1, dated June 24, 2010 (samples collected 27 May 2010);
  - Report: Katanga 11806/10, dated August 16, 2010 (samples collected 14 to 20 July 2010); and
  - Report: Katanga 13881/10, dated September 16, 2010 (samples collected September 1 – 2, 2010).

24.0 DATE AND SIGNATURE PAGES

CERTIFICATE OF A QUALIFIED PERSON

1 I, Willem van der Schyff, Professional Natural Scientist, am a Geologist at Golder Associates Africa. I reside at 11 Marauder Street, Pierre van Ryneveld, Centurion, South Africa.

2 This certificate applies to the technical report of Katanga Mining Limited ("**Katanga**") entitled "An Independent Technical Report on the Material Assets of Katanga Mining Limited, Katanga Province, Democratic Republic of Congo" dated March 31, 2011 (the "**Technical Report**").

3 I am a graduate of the University of Pretoria, South Africa with a BSc Hons in Geology in 1990 and a Graduate Diploma in Engineering (Mining) in 2000 from the University of Witwatersrand, South Africa. I am a registered Professional Geologist with the South African Council for Natural Scientific Professions and a member of the Geological Society of South Africa. I am a "qualified person" as that term is defined in National Instrument 43-101 – Standards of Disclosure for Mineral Projects ("**NI 43-101**").

4 I completed site visits to Katanga's Material Assets (as defined in the Technical Report) between October 22, 2010 and November 10, 2010.

5 I am responsible for preparing and supervising the preparation of the Technical Report.

6 I am independent of Katanga as described by Section 1.4 of NI 43-101.

7 I previously assisted in the preparation of a report on the properties subject to the Technical Report and I had prior involvement with the Material Assets from 1997 to 1999 before Katanga became involved in the Material Assets, and in each case was independent of Katanga.

8 I have read NI 43-101 and the Technical Report has been prepared in compliance with NI 43-101.

9 As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated March 31, 2011.

/s/ Willem van der Schyff

Willem van der Schyff

25.0 ADDITIONAL REQUIREMENTS FOR PRODUCTION PROPERTIES

25.1 Mining and Stripping Operations

25.1.1 Overview of Mining Operations

Ukwazi Group visited the Material Assets of KCC during October of 2010 and received geological and mineralogical data to assess and optimise mining plans developed for LOM. The active operations for KCC can be classified into underground operations, namely KTO and surface mining operations, namely T-17 Open Pit and KOV Open Pit.

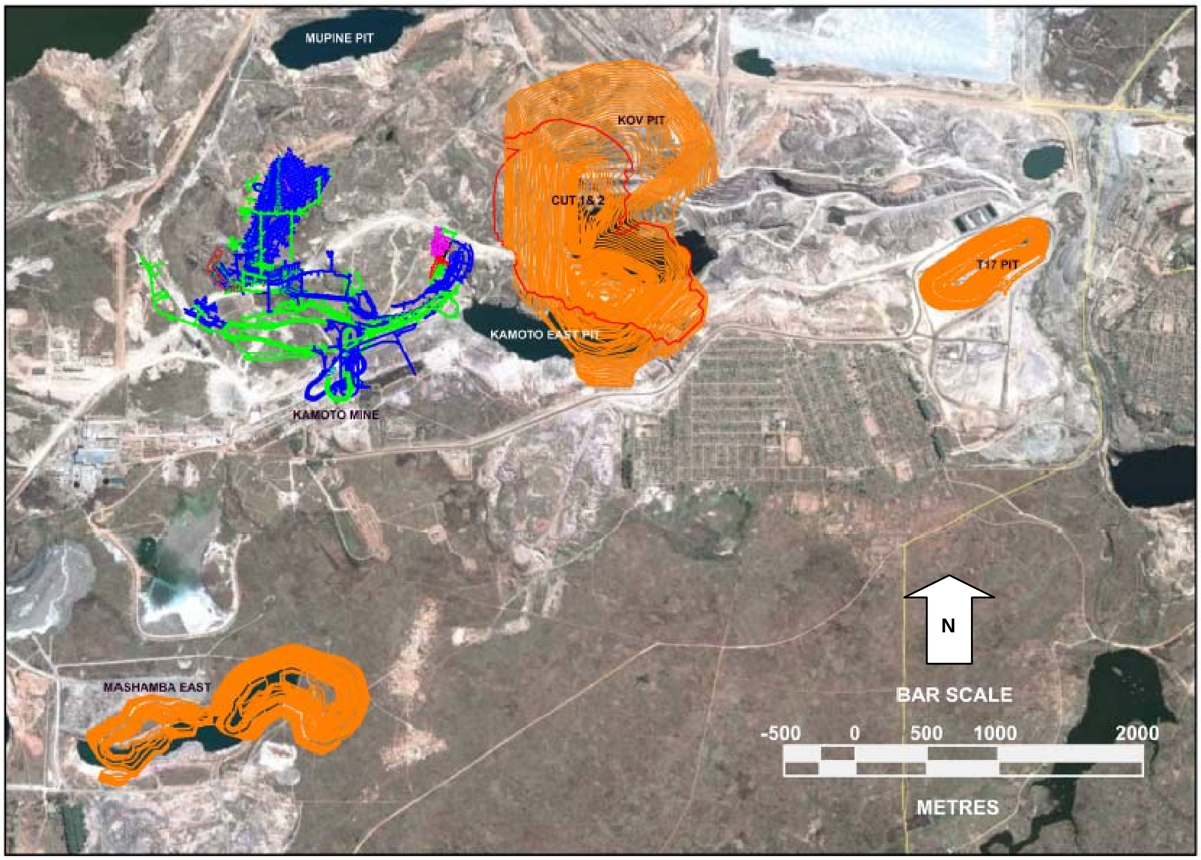

Figure 10: Relative Location of KCC Mining Assets

Underground operations included in the current LOM Plan are the operational KTO and two future projects of KTE and T-17 Underground Mine (as defined in section 25.1.3 below).

KTO is an operational mine that produced 0.5 million tonnes run of mine ("**ROM**") sulphide ore in 2008, 1.1 million tonnes at 3.9% Cu in 2009 and 1.3 million tonnes at 3.8% Cu in 2010. The current plan is to ramp yearly production to 2.2 million tonnes sulphide ore, to coincide with the completion of the Phase 4 processing plant expansion. The KTO LOM plan and mineral reserve estimate stated in this report, is based on the feasibility study conducted by SRK Consulting in 2008 and depleted on a yearly basis to declare mineral reserves. The ROM head grade remains relatively constant over the LOM production of 37 million tonnes, at an average 3.85% Cu head grade.

A range of mining methods is used and planned for KTO that includes Room and Pillar ("**RAP**"), Cut and Fill ("**CAF**") and Sublevel Caving ("**SLC**"). Mining related modifying factors applied are based on actual historic mining method performance. The dilutions and mining over breaks applied vary from 4% to 13% and mining extractions, including geological losses from 90% to 50%, depending on the mining methodology used. Waste rock and cemented backfill is applied depending on the mining methodology in each production area.

The KTO plan is based on proved mineral reserves and probable mineral reserves with only 10% inferred mineral resources included in the LOM plan. The high levels of development required for the production ramp up poses a risk to the achievement of this profile. Any delay in the development required would result in a delayed ramp up profile from KTO. The economic assessment is preliminary in nature, it includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the preliminary assessment will be realized.

Two underground mines are planned for a production ramp up from 2018 to replace or supplement production from the open pit operations. Conceptual work has been completed on both the T-17 Underground Mine and KTE Underground projects.

The KTE underground production schedule is based on mining a portion of the vertical Kamoto East mineral resource not included in the KOV Open Pit optimisation. A minimum pillar with a width of 30m is allowed for between the KOV Open Pit and underground workings. Mining related modifying factors are based on historical dilutions, extractions and losses achieved for an SLC mining method at KTO. The total ROM production scheduled is 20.5 million tonnes at 4.4% Cu and peaks at a yearly production of 2.4 million tonnes ROM from 2027. Access to the underground workings is from the existing underground infrastructure with an additional incline developed for the handling of ore by a crusher and conveyor infrastructure.

Current estimates on the capital cost requirements to develop and operate KTE through the LOM plan are $360 million excluding contingencies. This allowance includes costs for dewatering, mining equipment, initial access development, ventilation requirements and underground engineering installations from 2017 up to first ore production in 2019. Additional technical work is required before the production from KTE can be converted to mineral reserves.

Ore extraction from the T-17 Underground Mine is scheduled at a total of 13.7 million tonnes ROM at a head grade of 2.6% Cu. The T-17 Underground Mine schedule is based on the T-17 mineral resource which is directly beneath the current T-17 Open Pit and at an elevation below 1,270m. A minimum crown pillar of 30m is allowed for to prevent subsidence at surface. Mining related modifying factors are based on historical dilutions, extractions and losses achieved for the longitudinal and transversal mining methods currently used at the KTO. The production scheduled peaks at a yearly production of 1.4 million tonnes ROM. Access to the underground workings is by a decline ramp system with ore conveyance to surface by a fleet of haulers.

Current estimates on the capital cost requirements to develop and operate the T-17 Underground Mine through the LOM plan is $231 million excluding contingencies. This allowance includes costs for dewatering, mining equipment, initial access development, ventilation requirements and underground engineering installations and infrastructure from 2015 up to first ore production in 2018. Additional technical work is required before the production from the T-17 Underground Mine can be converted to mineral reserves.

Three surface operations are included in the LOM plan, namely T-17 Open Pit, KOV Open Pit and Mashamba East Open Pit. Tilwezembe Open Pit and Kanaga Mine are not included and require further technical study. The LOM plan and resulting mineral reserve estimate for the surface operations was determined by first principles. The processes include a mining model, pit optimisation to determine the economic pit extent and subsequent designs and schedules. All mining operations are conducted by a mining contractor with technical control and management support from KCC.

T-17 Open Pit is approaching depletion and surface mining will conclude within the current open pit economic boundaries during 2012. A total of 2.0 million ROM tonnes at 2.53% Cu was produced during the 2010 calendar year. A cut-off of 0.6%Cu has been applied which resulted in 30% mining losses of material below the specified cut-off grade. Mining dilutions of 10% is planned while a 5% geological loss is allowed for. The production plan is to achieve a total of 1.4 million tonnes of ROM oxide ore during 2011 and 2012 at an average head grade of 2.6% Cu. The production scheduled up to 2012 is converted to probable mineral reserves.

KOV Open Pit is a recently dormant pit that is currently in the final stages of dewatering and in the production ramp up phase. A total of 0.7 million ROM tonnes at 4.21% Cu were produced from KOV Open Pit in 2010. The operation is planned in two phases, namely Cuts 1&2 followed by Cuts 3&4. Mining related modifying factors include 1% mining losses below a cut of grade of 0.6% Cu and mining dilutions of 9% with a 5% applied geological loss. The KOV Open Pit delivers a ROM head grade of 4.1% Cu for a total of 83.1 million tonnes of ROM ore up to the year 2030. Ore production from the KOV Open Pit is primarily oxide material at 78% on average. The mineral reserve is estimated at 55.7 million tonnes at 4.7% Cu, classified as probable mineral reserve.

Mashamba East Open Pit is a dormant pit that requires dewatering. A total ROM production of 12.8 million tonnes at 2.8% Cu is planned at a production rate of 1.8 million tonnes per year. Mining related modifying factors applied include 9% dilution and 5% geological losses. Due to the high portion of low grade material in this pit, the mining losses below the applied cut-off grade of 0.6% Cu is as high as 39% of the in-pit resource. Mashamba East Open Pit produces only oxide ore and the probable mineral reserve is estimated at 5.9 million tonnes at 3.0% Cu.

The major risks that could have a negative impact on the planned production profile from the surface operations are dewatering, access and slope failures, available pit space, and available waste dumping space and grade control. These aspects could be mitigated by good operational management with specific reference to KOV Open Pit due to the high required production rate.

The cumulative LOM production profile for the KCC operation ramps up to a peak of more than 10 million tonnes per annum. Assuming that the processing plant is constrained by recovered copper, the production target of 310 000 tonnes of copper recovered per year for the Phase 4 expansion is achieved up to the year 2027. The cumulative waste stripping requirements for the three open pit operations are high at a peak of 50 million tonnes per year.

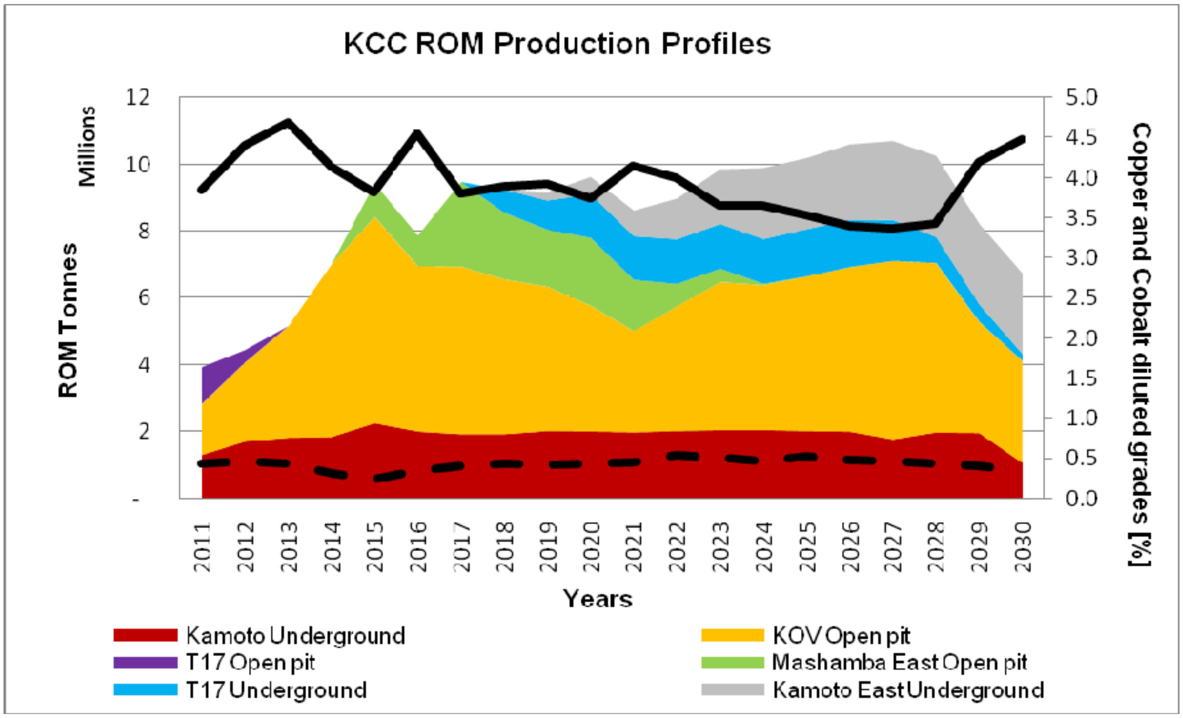

Figure 11: KCC ROM Production Profile

The recovered copper contribution from each of the operations at KCC can be seen below. It is noted that KOV Open Pit produces the majority of the recovered copper over the project life based on the current LOM plan.

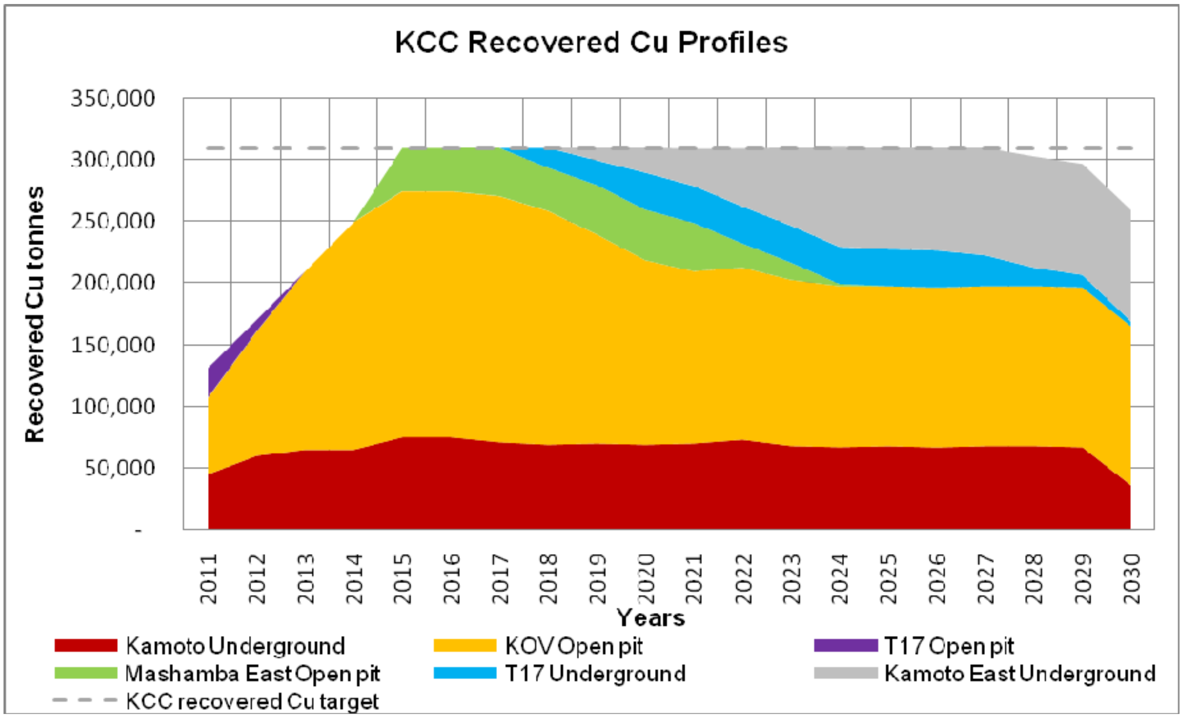

Figure 12: KCC Recovered Copper Production Profile

The total mineral reserve estimate for KCC is 97 million tonnes at 4.2% Cu of which 14.6 million tonnes is from proved mineral reserves.

25.1.2 Underground Mining Operations and Projects

Previous design and engineering studies undertaken for KTO include a feasibility study by Read, Swatman & Voigt (Pty) Ltd. ("**RSV**") in 2006, a detailed design by RSV in 2007 and a feasibility study by SRK in 2008. The LOM plan and mineral reserve estimate outlined in this report is based on the feasibility study conducted by SRK in 2008. Extracts from the KTO feasibility are included below.

KTO

An overall layout of KTO, illustrating the various mining zones is shown in Figure 13. This figure is a graphical representation of the design areas as discussed in this section.

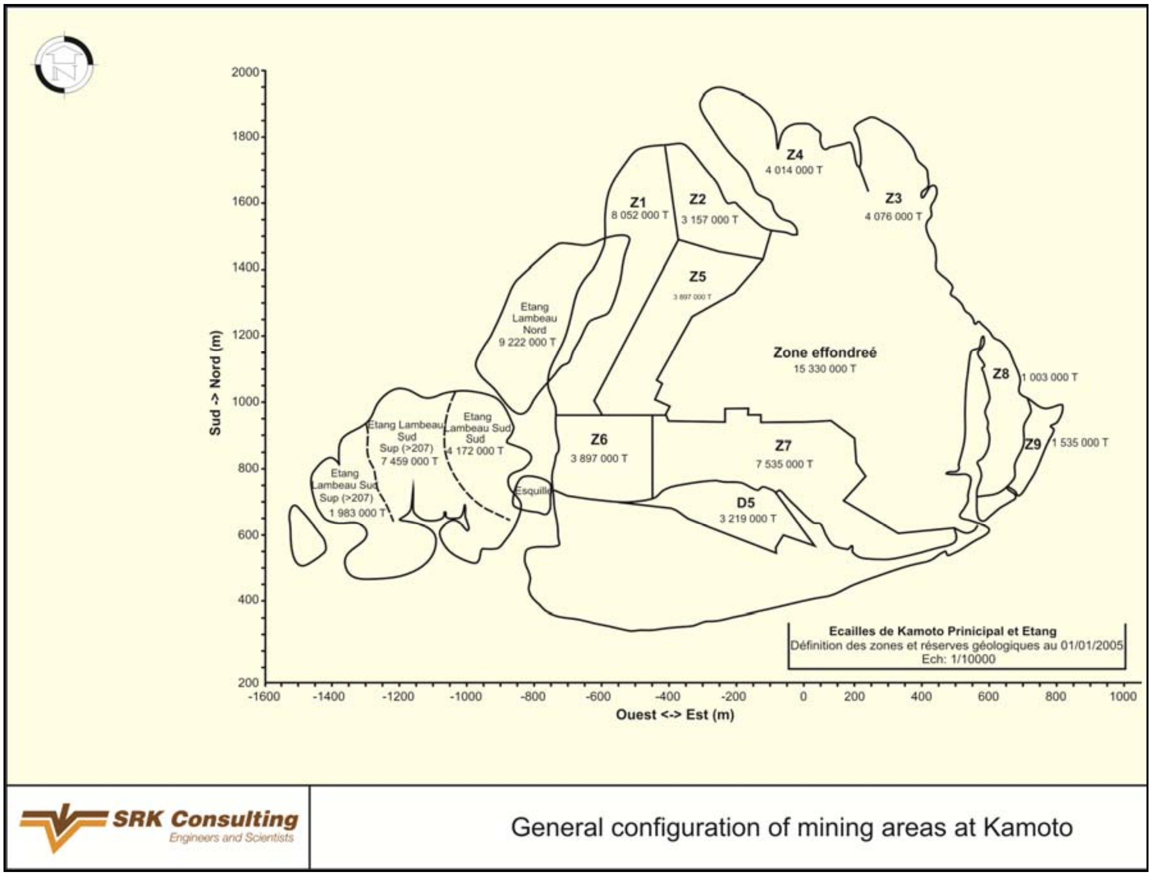

Figure 13: General Configuration of Mining Areas at KTO

Details of zone geometry and mining methods that were considered by SRK in 2008 together with an indication of ore tonnages available have allowed for the relative importance of each zone to be determined, as presented below.

Table 23: Summary of Proposed Mining Methods

Zone	Geometry	SRK 2008 Feasibility Study
Z1 Bottom and Top OBS and OBI	Flat & steeply dipping portions.	CAF
Z2 OBS and OBI	Flat & steeply dipping portions.	CAF
Z3 & Z4 OBS	Flat	RAP
Z3 & Z4 OBI	Flat	RAP
Z5 OBS	Flat	RAP
Z5 OBI	Flat	RAP
Z6 OBI	Flat & steeply dipping portions.	PPCF and CAF
Z7 OBI	Very steeply dipping	SLC
Z8 OBS	Flat	RAP
Z8 OBI	Flat	RAP
Z9 OBS	Very steeply dipping	SLC
Z9 OBI	Very steeply dipping	SLC
Etang OBS & OBI	Steeply dipping	PPCF and CAF
Etang North OBS & OBI	Steeply dipping	PPCF and CAF
Etang Middle & Bottom OBS & OBI	Steeply dipping	PPCF and CAF

Design Constraints Applicable to KTO

Particular characteristics of the Kamoto ore body that influence mining practice and geotechnical conditions include:

- presence of a collapsed zone in the central "Plateure" portion of the ore body, which may influence stress distributions acting on adjacent areas;
- mining, and subsequent backfilling and waste dumping in the Kamoto North Open Pit ("**KNOP**") directly overlying the underground workings, which also may influence stress distributions underground;
- underground mining will take place in conjunction with development of the KOV Open Pit lying to the East, which may influence stress distributions;
- overlying mined areas and flooded areas in the dormant Kamoto East Open Pit ("**KEOP**"), east of Zone 9 currently pose a water-ingress hazard. Should Zone 9 mining proceed before dewatering, a monitoring program should be introduced to provide early warning of such ingress;
- with the exception of the Etang mining zones and Zone 3 and Zone 4, the ore body generally has been extensively mined and new operations must interact with old workings;
- the dip of the ore body varies from flat to near vertical. For the purposes of mining-method classification, a dip range from 0º to 12º is considered to be flat, from 13º to 55º to be steeply dipping and greater than 56º to be very steeply dipping. At < 45º ore body dip, ore that is blasted will not run readily to gathering points.

- mining methods within the ore body are required to maximize recovery of ore;
- hanging-wall strata immediately overlying the OBS are reported to be weak and friable and limit the extent of mining spans that can be developed;
- two ore bodies are present which are considered to be wide (between 8m and 16m) and are separated by a parting of variable width (5m to 15m);
- due to the width of the ore body, backfilling is an essential part of the mining strategy to increase overall recovery and protect against uncontrolled collapse of workings; and
- there is a limited amount of rock generated from waste development for use as backfill and additional sources of fill are needed.

RAP Mining Method

RAP mining practised at KTO on OBS and OBI horizons, takes place in three phases:

- development of drives, 6m wide by 5m high on 25m centres to create square pillars 19m wide and 5m high;
- stripping of drives to a full width of 12.5m to create square pillars 12.5m wide and 5m high; and
- benching of drives to the full height of the ore body to create square pillars 12.5m wide and up to 15m high.

Benching operations take place under a hanging wall that is supported in the first two stages of mining. Following benching, stopes should be filled to at least two thirds of the pillar height with waste rock or hydraulic fill or both, to provide support for pillars.

Pillars on the different mining horizons should be superimposed to avoid adverse stress concentrations on roadways. As they are first developed, pillars have high width-to-height ratios and high safety factors which provide a very stable layout. Following stripping of the drives, the width-to-height ratio and safety factor of the pillars both decrease significantly and instability can be expected. Benching reduces safety factors to much less than unity, and instability can be expected. It is essential that stripping and benching activities take place quickly before the onset of pillar deterioration. Filling is essential to provide lateral support to pillars and maintain strength by preventing scaling.

CAF Mining Methods including Post Pillar Cut and Fill (“PPCF”)

CAF mining methods envisioned for KTO include conventional up-dip retreat together with a post-pillar method for areas in which the hanging-wall span or stope span exceeds 15m.

Where the dip ranges from 12º to 55º, preferred mining methods involve taking the ore body as a series of cuts, 5m in height, advancing up dip and placing fill consisting of waste rock, cyclone-classified tailings, cemented classified tailings, or a combination of waste rock and tailings fill, once stoping has been completed.

Because the horizontal width and exposed hanging wall spans of the two ore bodies may be considerable, particularly at shallow dip, two methods are considered:

- PPCF; and
- CAF.

The choice of method in any area will depend on the horizontal width of the ore body. The methods are considered in detail for use in three mining areas at KTO:

- Etang North;
- Etang South; and
- Zone 1 Upper.

SLC Mining Methods

To maximize the tonnage that can be recovered without using backfill, an additional mining method has been proposed for Zone 9.

General Considerations include:

- the practice of SLC is well established. Provided the appropriate mining practice is applied, the method will be applicable for OBS and OBI stopes alike;
- it is not expected that there will be rock-mechanic constraints to scheduling; and
- a potential benefit of this method lies in its ability to provide backfill to facilitate Zone 8 mining.

Backfill

Backfill is a critical component of the mining strategy that must be employed at KTO because it will:

- provide a working platform in CAF-based mining systems; and
- provide support to pillar sidewalls in RAP and PPCF operations.
- reduce pillar sizes in RAP and PPCF mining; and
- allowing full implementation of the RAP layout in flat-lying areas.

Extensive backfill will also help to provide regional support, thereby reducing stress on mining areas and facilitating safer and more efficient production. SRK considers that this benefit is of value to KTO given the uncertainties associated with the 1990 ‘Plateure’ collapse.

Ventilation benefits achieved with backfilling are not considered in this report. Backfill waste material can be obtained from sources underground, waste rock from surface or cyclone or cemented tailings. An estimate of the backfill requirements is presented in the table below.

Table 24: LOM Backfill Requirement

ZONE	% backfill	Backfill factor	Backfill solids (kt)
Z1 Btm OBI & OBS CAF	90	0.6	1,169
Z1 Top OBI & OBS CAF	90	0.6	1,358
Z2 CAF	90	0.6	1,022
Z3&4 OBS RAP	90	0.5	648
Z3&4 OBI LHRS	90	0.6	1,169
Z5 OBS RAP	90	0.5	201
Z5 OBI RAP	90	0.5	680
Z6 OBI CAF	90	0.6	53
Z7 SLC	90	0.0	0
Z8 OBI RAP	90	0.5	195
Z8 OBS RAP	90	0.5	119
Z9 OBS SLC	90	0.0	0
Z9 OBI SLC	90	0.0	0
ETANG CAF	90	0.6	83

Production Scheduling

The software used for the mine design and scheduling, namely Mine 2-4D, has the ability to optimise any given design by assigning priorities to different development and stoping areas, to assess the relative effect of changes in the mining sequence.

Capital development metres per annum are shown in the table below. The decision was that all main accesses (including inclines, declines and connecting crosscuts) and ventilation development (drives and ventilation shafts) were taken as capital development and the remainder (footwall drives, crosscuts and inter-level vent holes) as working-cost development.

Table 25: KTO LOM Production Schedule

KTO	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Ore	kt	1,309	1,709	1,823	1,846	2,258	2,011	1,928	1,930	2,026	2 015
Cu grade	%	3.80	3.88	3.94	3.89	3.67	4.12	4.07	3.95	3.82	3.78
Co grade	%	0.49	0.57	0.58	0.57	0.57	0.57	0.57	0.59	0.54	0.52
Waste Dev.	km	5.9	5.5	4.7	3.7	3.7	3.2	3.2	3.0	3.0	2.8
Cu content	kt	50	66	72	72	83	83	78	76	77	76
Co content	kt	6	10	11	11	13	11	11	11	11	11

KTO	Unit	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Ore	kt	1,990	2,022	2,050	2,056	2,021	2,008	1,775	1,983	1,966	1,069	**37,795**
Cu grade	%	3.89	3.99	3.67	3.61	3.71	3.68	4.19	3.80	3.77	3.72	**3.85**
Co grade	%	0.51	0.55	0.57	0.55	0.62	0.53	0.49	0.46	0.50	0.49	**0.54**
Waste Dev.	km	2.8	2.9	2.7	2.4	2.3	2.2	2.2	2.0	1.5	0.8	**61**
Cu content	kt	77	81	75	74	75	74	74	75	74	40	**1 454**
Co content	kt	10	11	12	11	13	11	9	9	10	5	**206**

The KTO expansion plan considers the development required to ramp up to >2.0 million tonnes per annum and to sustain production at that level throughout the LOM for a period of 20 years. The ROM head grade remains relatively constant over the life of the operation of 37,8 million tonnes ROM at a 3.85% Cu head grade.

25.1.3 T-17 Underground Mine

T-17 Open Pit is an operational open pit with a current pit design to 1 300amsl for a maximum depth of 130m. An opportunity exists to develop an underground mine at T-17 (the "**T-17 Underground Mine**") to exploit the remaining classified mineral resources directly below the planned pit design floor and through an access ramp developed from the open pit. The known mineral resources are near vertical and extend approximately 200m below the planned pit design floor.

Current mine design and engineering is at a conceptual level of detail. Further work is required to establish the technical, practical and economic viability of the project before the remaining T-17 mineral resources could be converted to mineral reserves.

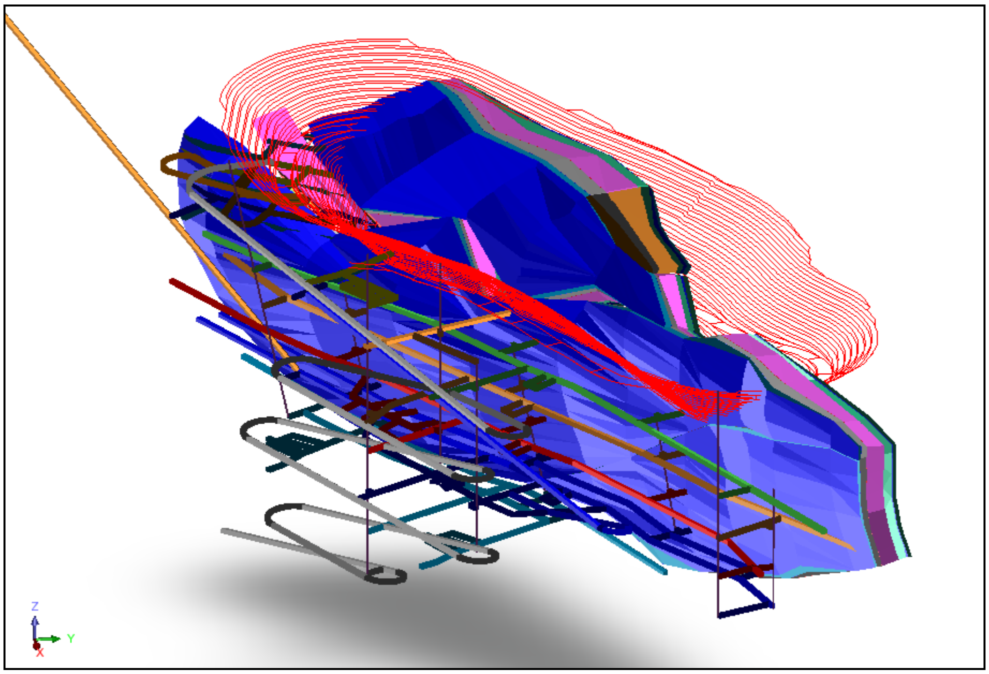

Figure 14: Conceptual Design of T-17 Underground Mine

T-17 Underground Mine will utilize transverse and longitudinal CAF mining methods. The transverse CAF mining method consists of the main access drive longitudinally developed to the ore body. From the main access drive, stope drives are developed perpendicular to the main access drive. The stope drive width in then increased to create stopes, leaving a pillar between adjacent stopes.

For the longitudinal CAF mining method, the stope drives are placed longitudinally in the centre of the ore body and slyped towards both the hanging wall and footwall contacts for the top and bottom levels. Once the top and bottom levels have been slyped, parallel long hole drilling is utilised to extract the portion of ore in between the levels. This mining method has a higher extraction ratio than the transverse CAF mining method.

The LOM schedule based on the conceptual mining plan is tabulated below.

Table 26: T-17 Underground Mine LOM Production Schedule

T-17 Underground Mine	Unit	2015	2016	2017	2018	2019	2020	2021	2022	2023
Ore	Kt				697	872	1,307	1,307	1,337	1,337
Ore Dev.	Km				1.3	1.6	2.4	2.4	2.5	2.5
Waste Dev.	Km	1.0	2.0	2.5	2.5	2.5	2.5	2.5	2.0	1.5
Cu grade	%				2.7	2.7	2.7	2.7	2.64	2.64
Co grade	%				0.53	0.53	0.53	0.53	0.62	0.62
Cu content	Kt				19	24	35	35	35	35
Co content	Kt				4	5	7	7	8	8

T-17 Underground Mine	Unit	2024	2025	2026	2027	2028	2029	2030	Total
Ore	Kt	1,337	1,412	1,412	1,220	774	516	206	**13,734**
Ore Dev.	Km	2.5	2.6	2.6	2.3	1.4	1.0	0.4	**25.5**
Waste Dev.	Km	1.0	1.0	1.0	0.5	0.5	0.5	0.3	**23.8**
Cu grade	%	2.64	2.5	2.5	2.41	2.28	2.28	2.28	**2.57**
Co grade	%	0.62	0.75	0.75	0.86	1.03	1.03	1.03	**0.69**
Cu content	Kt	35	35	35	29	18	12	5	**353**
Co content	Kt	8	11	11	11	8	5	2	**94**

An average ROM head grade of 2.6% Cu is achieved over the LOM.

Additional technical work is required to covert the T-17 Underground Mine mineral resources to mineral reserves. The conceptual access designs created are reasonable in principle and the mining methodology is similar to existing mining methods at KTO. Mining related modifying factors were derived from the actual mining method efficiencies experienced at KTO.

25.1.4 KTE

The mining method proposed for implementation at KTE is SLC as this mining method is well suited for the extraction of the steep dipping portion of the ore body being targeted by KTE. The key advantages of the SLC mining method is a rapid production ramp up due to the large number of loading points being created, a low intensity support requirement and a high percentage extraction of the ore body.

A 30m crown pillar is left between KOV Open Pit and KTE. The planned underground operations deliver a ROM head grade of 4.44% Cu for a total of 20.5 million tonnes of ROM ore from 2019 to 2030. The peak production rate from underground operations is 2.4 million tonnes ore per annum from 2028 to 2030.

The LOM schedule based on the conceptual mining plan is tabulated below.

Table 27: KTE LOM Production Schedule

KTE	Unit	2016	2017	2018	2019	2020	2021	2022	2023
Ore	kt				257	515	772	1,218	1,636
Ore Dev.	km				0.9	1.5	2.3	2.9	3.8
Waste Dev.	km	0.6	3.0	4.0	4.5	4.5	4.5	5.0	5.0
Cu grade	%				4.57	4.57	4.57	4.54	4.53
Co grade	%				0.28	0.27	0.27	0.25	0.24
Cu content	kt				12	24	35	55	74
Co content	kt				1	1	2	3	4

KTE	Unit	2024	2025	2026	2027	2028	2029	2030	Total
Ore	kt	2,130	2,130	2,260	2,369	2,429	2,406	2,406	**20,528**
Ore Dev.	km	4.8	4.8	4.2	4.4	3.6	3.6	1.4	**38**
Waste Dev.	km	4.0	3.0	2.6	1.5	1.0	0.5	0.2	**44**
Cu grade	%	4.53	4.53	4.32	4.32	4.36	4.40	4.40	**4.44**
Co grade	%	0.24	0.24	0.24	0.24	0.23	0.21	0.24	**0.24**
Cu content	kt	97	97	98	102	106	106	106	**912**
Co content	kt	5	5	5	6	6	5	6	**49**

An average ROM head grade of 4.4% Cu is achieved over the LOM.

The access development to KTE is illustrated in the figure below.

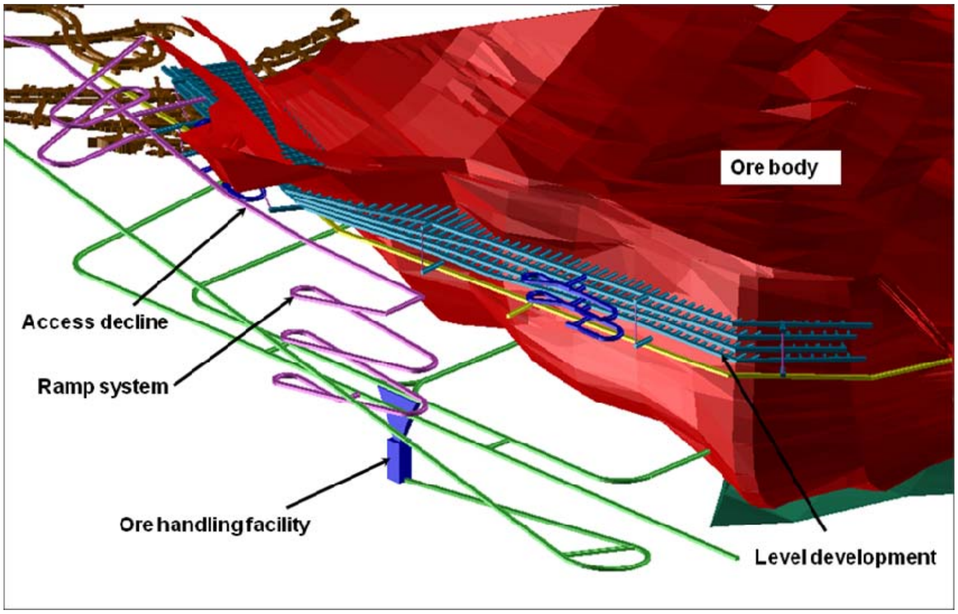

Figure 15: KTE Conceptual Development Layout

25.1.5 Underground Mining Mineral Reserve Estimate

The updated mineral reserve estimate is based on the mining methods described in the sections above and is compliant with the JORC Code. The entire mineral resource area was sub-divided into smaller portions per zone to aid the mine design and schedule process. The basis of conversion from mineral resource to mineral reserve will be that measured mineral resources will convert to proven mineral reserves and indicated mineral resources to probable mineral reserves.

The mineral reserve estimate is based on the 2008 SRK feasibility study and updated based on the actual production performance achieved in 2008, 2009 and 2010.

Table 28: Underground Mining Mineral Reserve Estimate as at December 31, 2010

Mining operation	Proved			Probable		
	Mt	% T Cu	% T Co	Mt	% T Cu	% T Co
KTO	14.6	3.47	0.51	19.4	3.70	0.53

25.1.6 Surface Mining Operations and Projects

The mineral reserve estimations for surface mining assets included in this ITR are based on LOM plans created from first principles. The first section below outlines the process followed.

25.1.7 LOM Planning Process

The processes involved in LOM planning for surface mining operations can be summarised as follows:

- selective mining unit ("**SMU**") selection;
- pit optimisation;
- pit design;
- scheduling unit selection and design; and

- production planning.

A brief description of each step is given below. For this ITR, the open pits considered for the LOM plan and mineral reserve estimation process are T-17 Open Pit, KOV Open Pit and Mashamba East Open Pit.

SMU Model / Mining Model

The SMU is defined as the smallest volumetric unit that can be mined as a complete unit. The outcome of the SMU selection process is to determine an appropriate SMU that enables an informed decision on a modelling strategy that most realistically estimates actual practice and that lowers the overall mining risk. It is important to note that:

- SMU selection considers more than the selected equipment fleet; and
- cut-off grades should be applied on an SMU basis and not on a geological block model or blast block basis.

Factors considered in determining a realistic SMU include:

- mining equipment;
- structural complexity of the ore body in terms of dip, thickness and structural continuity;
- ore block continuity and the way it was modelled;
- mining rate;
- degree of continuity above the cut-off grade; and
- mining strategy, consisting of blending (in-pit blending versus stockpile blending) and product requirements.

This process is usually an iterative process that includes resource block model re-blocking for a number of different SMU's. It is important to note that the SMU can vary per pit at a single operation, based on the defined SMU drivers. Although the purpose of the SMU is not to determine dilutions and losses, it does support the appropriate modelling of dilutions and losses, based on the dips and structure of the ore. Outcomes of the SMU selection process should include:

- SMU models and cut-off grade strategy;
- initial indication on mining losses and dilutions; and
- scheduling and blending approach.

SMUs applied to the various resource block models for KCC's surface mining operations are tabled below.

Table 29: Selected SMU Dimensions per Open Pit

Mining Operation	Unit	SMU
T-17 Open Pit	m	5 x 5 x 5
Mashamba East Open Pit	m	10 x 10 x 5
KOV Open Pit	m	10 x 10 x 5

Dilution

Dilution is defined as the waste material intentionally included during mining block modelling to the site specific in-situ mineral resources in order to make it practically mineable. The methodology applied in determining the dilution is as follows:

On the ore contacts (where the in-situ mineral resource block consists of a percentage ore material and a percentage waste material) the tonnage and grade of the mineral reserve block is defined as the weighted average tonnage and grade of the materials contained in the original mineral resource block.

In cases where the total in-situ mineral resource block is ore, the corresponding mineral reserve block is defined as a 100% ROM block with the same grade attributes as the in-situ blocks.

Mining loss

Mining loss is defined as reported mineral resources which are contained in SMU’s that are not defined as mineral reserve type blocks.

The methodology in determining mining loss is as follows.

Mining loss is addressed through the application of a copper cut-off to the diluted ore material.

The ore blocks that originally had a high percentage of in-situ ore will normally fall above the cut-off grade while ore blocks that originally had a low percentage of in-situ ore will fall below the cut-off.

Dilution and mining loss curves on a diluted SMU cut-off grade basis were produced for each of the pits and detailed later in this report.

Pit Optimisation

One of the outputs of the pit optimisation process is to determine the position and extent of the final pit boundary. The GEMCOM Whittle pit optimisation software ("**Whittle**") is employed for this purpose.

Whittle uses the Lerchs-Grossmann algorithm to determine the optimal shape for an open pit in three dimensions. The method is applied to a block model of the ore body, and progressively constructs lists of related blocks that should, or should not, be mined. The final lists define a pit outline that has the highest total relative value, subject to the required pit slopes. This outline includes every block that "adds value" when waste stripping is taken into account and excludes every block that "destroys value". It takes into account all revenues and costs as well as mining and processing parameters.

Although a detail description of the Whittle methodology is beyond the scope of this report, the following provides a brief summary. The optimisation process can be divided into two processes:

- creation of a range of nested pit shells of increasing sizes. This is done by varying the product price and generating a pit shell at each price point; and
- selection of the optimal pit shell. This is achieved by generating various production schedules for each pit shell and calculating the NPV for each schedule. The output of this process is a series of “pit-versus-value” curves.

Pit Design

The mining method applied is conventional open pit mining, consisting of drilling, blasting, loading and hauling.

A pit design is undertaken once an optimal pit shell has been selected. The pit design process considers:

- safe operations;
- continuous access to individual blocks and the working benches;

- equipment units and movement requirements;
- geotechnical recommendations;
- water handling;
- backfill opportunities; and
- the phasing of operations or pre-stripping.

Design work was performed in GEMCOM Surpac mine planning software ("**Surpac**"). The selected optimum pit shell was used as the design limit for KOV Open Pit and Mashamba East Open Pit with all the input parameters incorporated to create a three dimensional pit design. The pit design is used to evaluate the tonnage and grades of the different ore types.

Pit designs were created based on the current mining methodology that includes mining at 5m or 10m benches. Ramp and pit access designs considered the largest expected haul truck dimension and specifications, ensuring safe and practical execution

Scheduling Units

Block designs are conducted based on typical blast block or practical bench and production block dimensions. Ramps are designed and scheduled separately at appropriate rates. The block designs simulate the scheduling units. Each block could contain a range of material types that could be selectively loaded to separate locations (ROM stockpile, various stockpiles or waste dumps etc.).

Production Scheduling

Schedules were produced in RUNGE Xpac and consider the available pit space, number and size of excavators required and the practical constraints of each pit.

25.1.8 T-17 Open Pit

T-17 Open Pit is approaching depletion and surface mining will conclude within the current open pit economic boundaries during 2012. A total of 2.0 million ROM tonnes at 2.53% Cu was produced during the 2010 calendar year. A cut-off grade of 0.6%Cu is applied and a mining dilution of 10% is achieved with mining losses estimated at 30%. The production plan is to achieve a total of 1.5 million tonnes of ROM oxide ore during 2011 and 2012 at an average head grade of 2.7% Cu.

This section of the report only considers T-17 Open Pit within the approved pit design.

Modifying Factors

A total of 5% geological losses have been applied. This implies that 5% of the material modelled as ore are mined as waste due to structural mineral resource losses. This is a tonnage loss that does not impact the ROM head grade.

Dilution and losses are applied on an SMU basis. Due to the low production requirement and small loading and hauling units active in the T-17 Open Pit, a SMU unit of 5m x 5m x 5m was selected. The figure below is a tonnage and grade profile that illustrates the undiluted mineral resource portion (green) with the dilution portion (brown) in a cumulative area profile. The effect of the dilutions can be seen in the difference between the diluted ROM Cu % (black) head grade line profile and the undiluted mineral resource grade line profile in green.

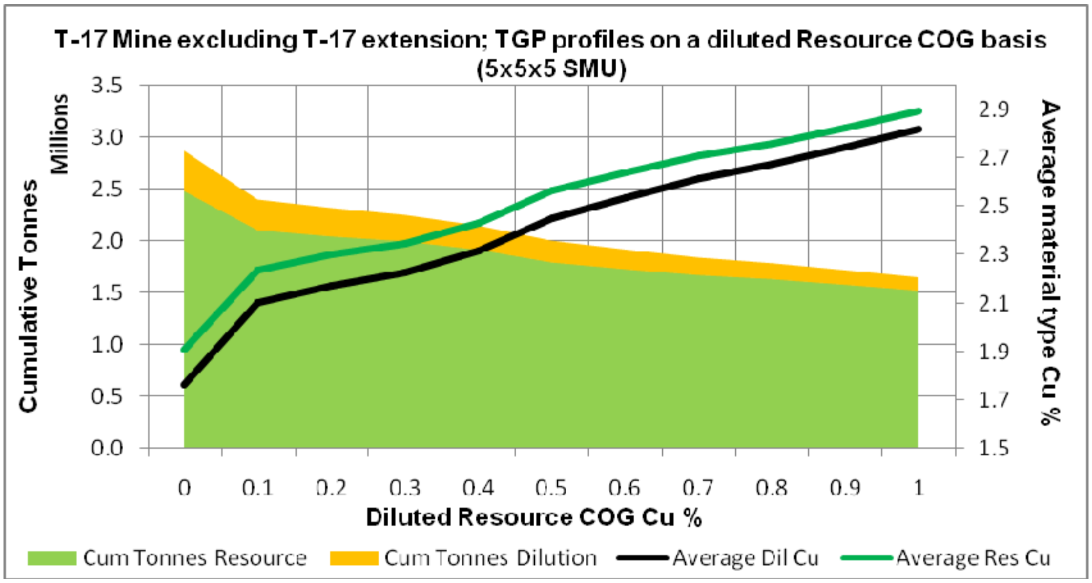

Figure 16: T-17 Open Pit Diluted Mineral Resource Tonnage and Grade Profile

At a cut-off grade of 0.6%Cu, losses of material below the SMU cut-off grade are expected at 30% while mining dilutions allowed for are 10% on average as seen from the figure below.

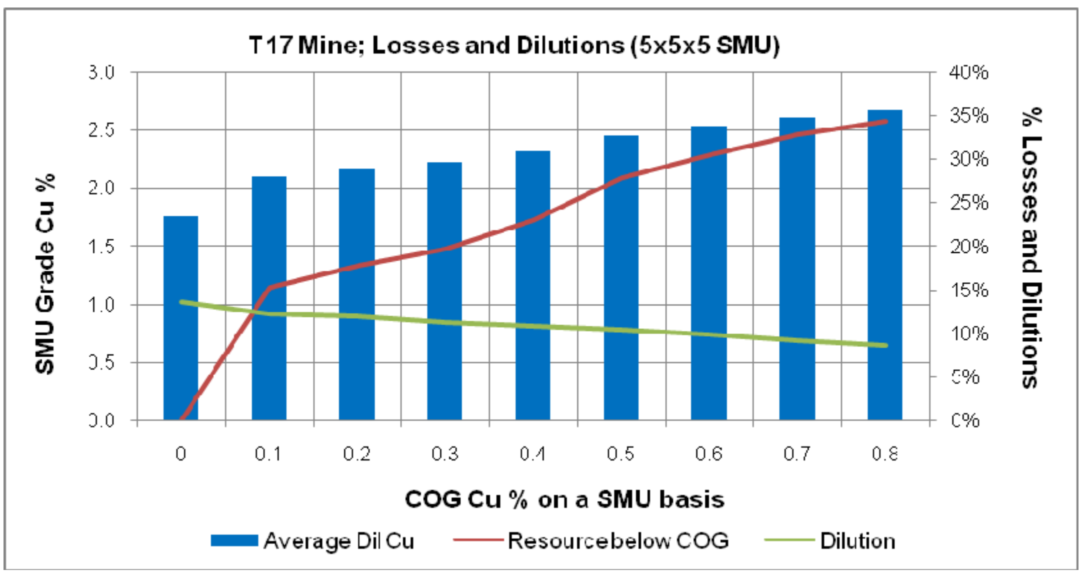

Figure 17: T-17 Open Pit In-pit Losses and Dilutions

Pit Optimisation

Due to the proximity of the current mining faces to the final pit design, no pit optimisation was conducted for the T-17 Open Pit.

Pit Design

The T-17 Open Pit is a well-managed operation nearing depletion. Figure 18 is a view in a eastern direction from the lookout point. The depletion of this pit entails cutting the 10m benches to 5m on the ore interface and overall deepening of the pit without any pushbacks required.

Figure 18: T-17 Open Pit

The current pit design used as basis for the LOM plan and mineral reserve estimate is shown below. The final pit depth is 130m to an elevation of 1,300amsl.

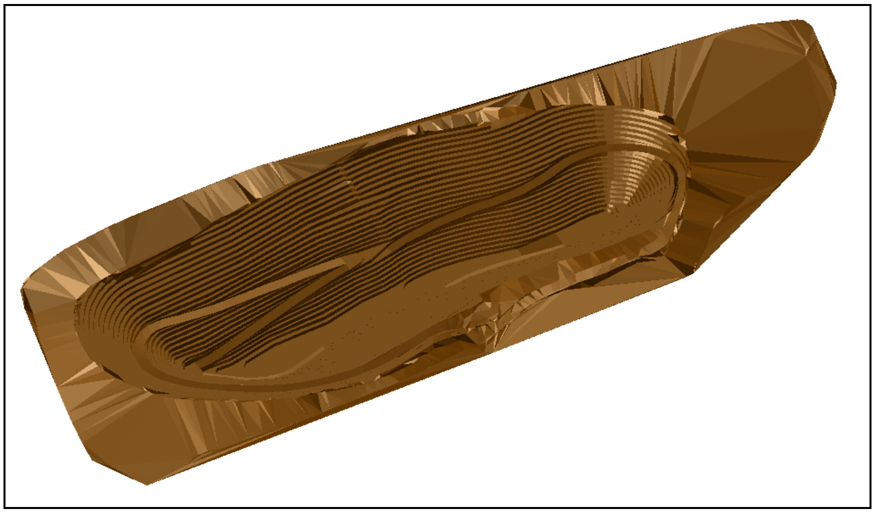

Figure 19: T-17 Open Pit Final Design

The pit design criteria are based on current practice and are tabulated below.

Table 30: T-17 Open Pit Design Criteria

Pit Design Criteria	Unit	T-17 Open Pit
Bench height	m	5.0
Berm width	m	4.3
Batter angle	Degrees	78.0
Ramp width	m	16.0
Ramp gradient	Degrees	5.0 (1 in 12)

The total tonnes contained in the pit design with stripping ratio on a tonnes basis are tabulated below.

Table 31: Ore and Waste Contained in the T-17 Open Pit

Parameter	Unit	T-17 Open Pit
Ore	kt	1,474
Waste	kt	2,555
Total	kt	4,025
Stripping Ratio	t/t	1.7
Cut cut-off grade	%Cu	0.6

Production Scheduling

Production from the T-17 Open Pit is planned at 1.1 million tonnes per annum ("**mtpa**") in 2011 which reduces in 2012 due to depletion. The LOM production profile is tabulated below.

Table 32: T-17 Open Pit LOM Production Profile (excl. East Extension)

Year	Unit	2011	2012	Total
Ore	kt	1,100	370	**1,470**
Waste	kt	2,261	295	**2,555**
Cu grade	%	2.57	2.93	**2.66**
Co grade	%	0.46	0.44	**0.45**
Cu content	kt	28	11	**39**
Co content	kt	5	1.7	**6**

Ore from the T-17 Open Pit is exclusively oxide ore and is converted to the probable mineral reserve category.

25.1.9 KOV Open Pit

KOV Open Pit is a recently dormant pit that is currently in the final stages of dewatering and in the production ramp up phase. A total of 0.7million ROM tonnes at 4.21% Cu were produced from KOV Open Pit in 2010. Mining related modifying factors include 1% mining losses below a cut of grade of 0.6% Cu and mining dilutions of 9%. KOV Open pit will produce a ROM head grade of 4.14% Cu for a total of 83.2 million tonnes of ROM ore up to the year 2030. Ore production from the KOV Open Pit is primarily oxide material at 78% on average.

Modifying Factors

As with the T-17 Open Pit, a total of 5% geological losses have been applied.

Dilution and losses are applied on an SMU basis. Due to the high production requirement and the size of the loading and hauling units active in the KOV Open Pit, a SMU unit of 10mx10mx5m was selected. The figure below is a tonnage and grade profile that illustrates the undiluted mineral resource portion (green) with the dilution portion (brown) in a cumulative area profile. The effect of the dilutions can be seen in the difference between the diluted ROM Cu % (black) head grade line profile and the undiluted mineral resource grade line profile in green.

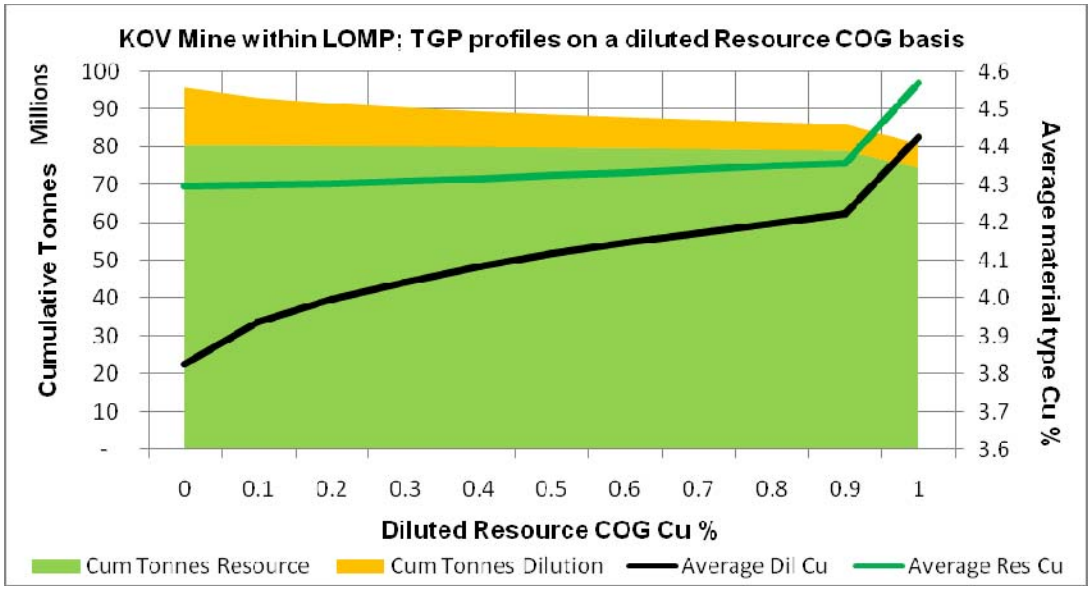

Figure 20: KOV Open Pit Diluted Mineral Resource Tonnage and Grade Profile

A cut-off grade of 0.6% Cu was applied at KOV Open Pit. The basis of the cut-off grade calculation is to determine the break even cost based on selling, processing and royalty cost. The cut-off grade considers revenues generated from copper and cobalt with the appropriate processing recoveries applied. A total of 1% mineral resource losses of material below the SMU cut-off grade are estimated while mining dilutions are 9% on average.

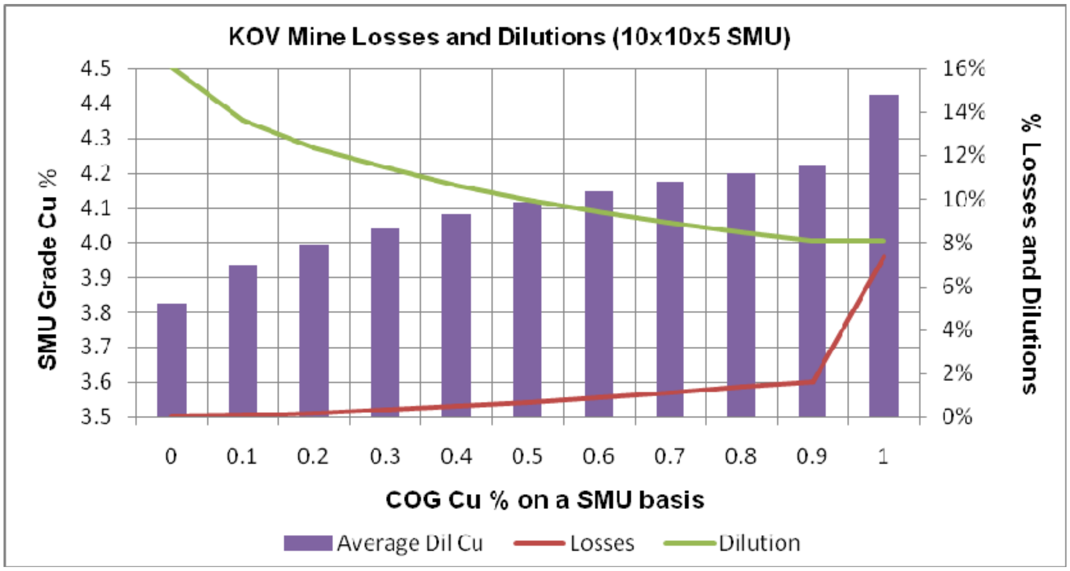

Figure 21: KOV Open Pit In-Pit Losses and |Dilutions

Pit Design

The current pit is active and in the final stages of dewatering. The overall operational face angle allowed for in the production plan should allow access on multiple levels and minimise the risk of large slope failures. The final slope angles used for the pit design process assume lower final slope angles to the north of the pit. Figure 22 is viewed in a northern direction from the lookout point.

Figure 22: KOV Open Pit

The current open pit Cut 1 and Cut 2 design (for production through to 2020) was used as the basis for the further development of KOV Open Pit with the addition of Cut 3 and Cut 4 based on the optimised pit shell for the LOM plan. A graphical representation of the final pit design with current topography is shown in Figure 23 with the current Cut 1 and Cut 2 pit designs shown in blue.

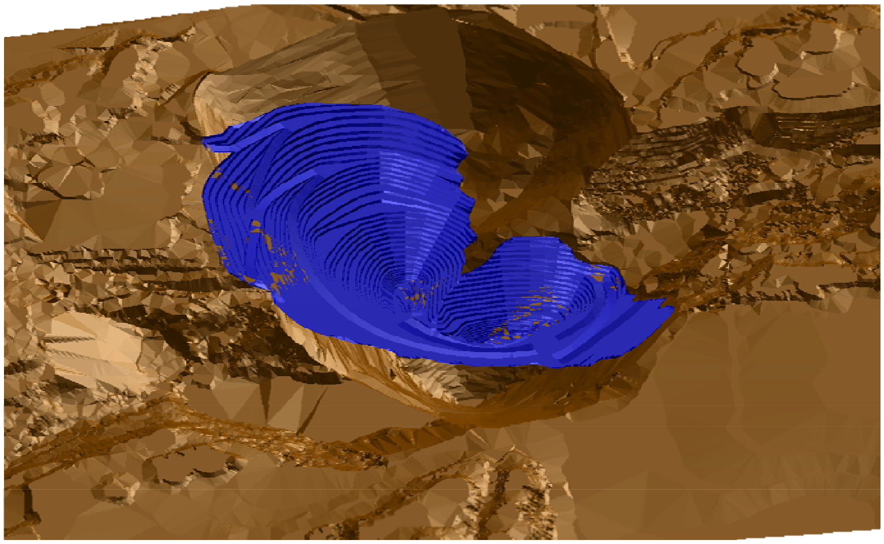

Figure 23: KOV Open Pit Design (Cut 1 and Cut 2)

The pit design criteria are based on current practice and are tabulated below.

Table 33: KOV Open Pit Design Criteria

Pit Design Criteria	Unit	KOV Open Pit
Bench height (< depth:335m)	m	10.0
Bench height (> depth:335m)	m	5.0
Berm width (10m benches)	m	13.5
Berm width (5m benches)	m	4.0
Batter angle (10m benches)	Degrees	75.0
Batter angle (5m benches)	Degrees	66.0
Ramp width	m	35.0
Ramp gradient	Degrees	5.7 (1 in 10)

KOV Open Pit Design Criteria

The total tonnes contained in the pit design with stripping ratio on a tonnes basis are tabulated below.

Table 34: Ore and Waste Contained in KOV Open Pit

Parameter	Unit	KOV Open Pit
Ore	Kt	83,114
Waste	Kt	463,350
Total	Kt	546,464
Stripping Ratio	t/t	5.6
Cu cut-off grade	% Cu	0.6

Ore and Waste Contained in KOV Open Pit

Production Scheduling

Production from the KOV Open Pit is planned at up to 6.1mtpa ore based on the available pit space and to maintain the KCC overall recovered copper profile at 310 000 tonnes per annum copper.

Table 35: KOV Open Pit LOM Production Profile

KOV Open Pit	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Ore	kt	1,517	2,365	3,337	5,165	6,177	4,948	5,020	4,633	4,322	3,764
Waste	kt	22,483	42,635	41,663	39,835	34,362	37,052	36,980	30,367	28,918	31,236
Cu grade	%	4.81	5.02	5.11	4.21	3.81	4.76	4.69	4.82	4.63	4.69
Co grade	%	0.38	0.39	0.35	0.22	0.15	0.30	0.40	0.34	0.36	0.45
Cu content	kt	73	119	171	218	235	235	235	224	200	176
Co content	kt	6	9	12	11	9	15	20	16	16	17

KOV Open Pit	Unit	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Ore	kt	3,031	3,736	4,433	4,334	4,633	4,926	5,339	5,073	3,335	3,062	**83,151**
Waste	kt	31,969	31,264	25,567	17,221	5,070	2,208	1,366	627	482	509	**461,813**
Cu grade	%	5.43	4.41	3.58	3.56	3.30	3.10	2.86	3.01	4.59	4.97	**4.14**
Co grade	%	0.45	0.63	0.56	0.50	0.56	0.51	0.46	0.43	0.37	0.32	**0.40**
Cu content	kt	165	165	159	154	153	153	153	153	153	152	**3,445**
Co content	kt	14	24	25	22	26	25	24	22	12	10	**333**

A material portion of the ROM tonnes generated throughout the LOM plan is from inferred mineral resources. The economic assessment is preliminary in nature, it includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the preliminary assessment will be realized.

25.1.10 Mashamba East Open Pit

Mashamba East Open Pit is a dormant pit that requires dewatering. This pit is included in the LOM plan to supplement the lower recovered copper production from KOV Open Pit from 2018 onwards. A total ROM production of 12.8 million tonnes at 2.8% Cu is planned at a maximum production rate of 2.5 million tonnes per year. Mining related modifying factors applied include 9% dilution. Due to the high portion of low grade material in this pit, the mining losses below the applied cut-off grade of 0.6% Cu are as high as 39% of the mineral resource. Mashamba East Open Pit produces only oxide ore.

Modifying Factors

As with T-17 Open Pit and KOV Open Pit, a total of 5% geological losses have been applied.

Dilution and losses are applied on an SMU basis. Due to the high production requirement and size of the loading and hauling units active in the Mashamba East Open Pit, a SMU unit of 10mx10mx5m was selected. The figure below is a tonnage and grade profile that illustrates the undiluted mineral resource portion (green) with the dilution portion (brown) in a cumulative area profile. The effect of the dilutions can be seen in the difference between the diluted ROM Cu % (black) head grade line profile and the undiluted mineral resource grade line profile in green.

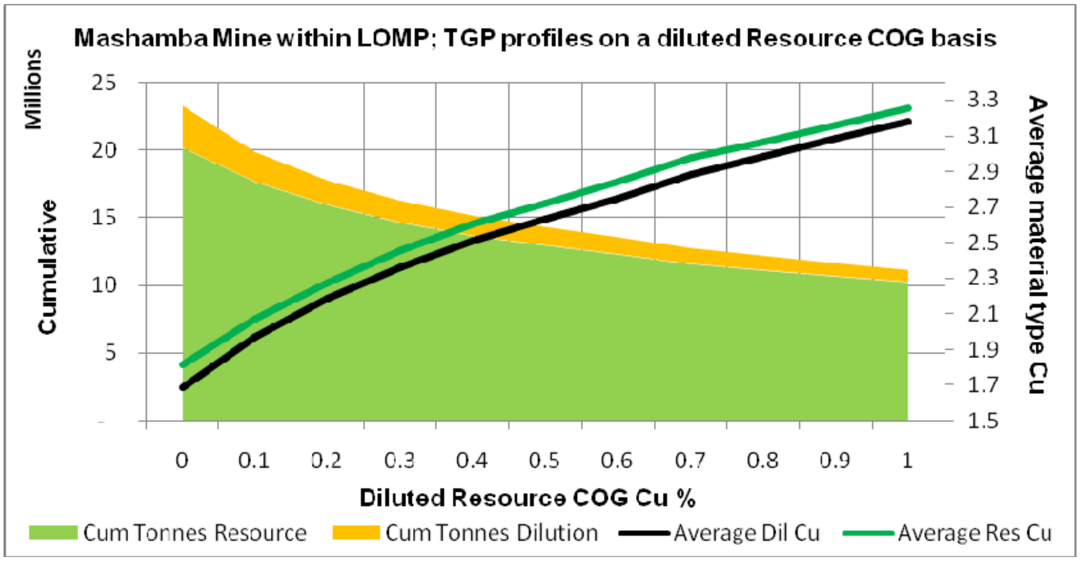

Figure 24: Mashamba East Open Pit Diluted Mineral Resource Tonnage and Grade Profile

As previously indicated, a cut-off grade of 0.6% Cu was applied at the Mashamba East Open Pit. A total of 39% mineral resource losses of material below the SMU cut-off grade are estimated due to the high sensitivity of material at low Cu grades. An average of 9% additional tonnes are applied as dilution as seen from the figure below.

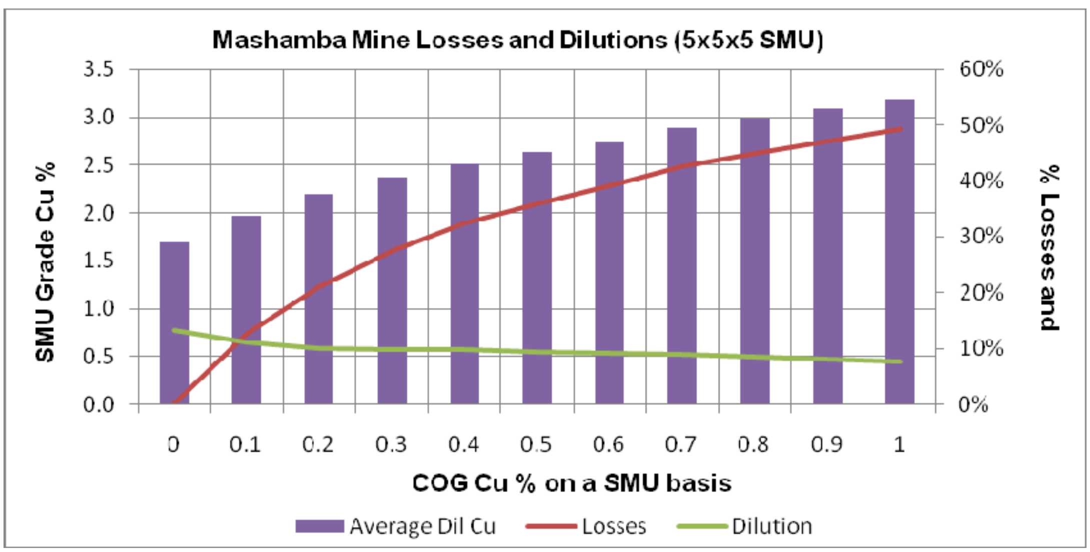

Figure 25: Mashamba East Open Pit In-Pit Losses and Dilutions

Pit Design

The current pit survey of this dormant operation and optimised pit shell was used as the basis of the pit design. A graphical representation of the final pit design with current topography is shown in Figure 26.

Figure 26: Mashamba East Open Pit Design

Mashamba East Open Pit design criteria are tabulated below.

Table 36: Mashamba East Open Pit Design Criteria

Pit Design Criteria	Unit	Mashamba East
Bench height	m	10.0
Berm width	m	8.0
Batter angle	Degrees	65.0
Ramp width	m	25.0
Ramp gradient	Degrees	5.2 (1 in 11)

The total tonnes contained in the pit design with stripping ratio on a tonnes basis are tabulated below.

Table 37: Ore and Waste Contained in Mashamba East Open Pit

Parameter	Unit	Mashamba East Open Pit
Ore	Kt	12,797
Waste	Kt	89,378
Total	Kt	102,175
Stripping Ratio	t/t	7.0
Cu cut-off grade	%	0.6

Production Scheduling

Production from the Mashamba East Open Pit is planned at a maximum of 2.5mtpa. The LOM production profile is tabulated below.

Table 38: Mashamba East Open Pit LOM Production Profile

Mashamba East Open Pit	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Ore	kt	-	-	-	-	995	916	2,524	1,991	1,704	2,027
Waste	kt	-	-	-	-	14,005	14,084	12,476	13,009	13,296	12,973
Cu grade	%	-	-	-	-	4.14	4.50	1.82	2.07	2.76	2.38
Co grade	%	-	-	-	-	0.10	0.19	0.29	0.49	0.43	0.30

Mashamba East Open Pit	Unit	2021	2022	2023	2024	Total
Ore	Kt	1,528	670	402	42	**12,797**
Waste	Kt	4,472	4,907	144	11	**89,378**
Cu grade	%	3.02	3.42	4.10	4.62	**2.75**
Co grade	%	0.41	0.36	0.37	0.29	**0.34**

A material portion of the ROM tonnes generated throughout the LOM plan is from inferred resources category. The preliminary economic assessment is preliminary in nature, it includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the preliminary assessment will be realized.

25.1.11 Surface Mining Reserve Statement

The mineral reserve estimate of the surface mining operations is based on pit optimisations, pit designs and production schedules generated with a December 31, 2010 base date.

Table 39: Surface Mining Mineral Reserve Estimate as at December 31, 2010

Surface Mining Operation	Proved			Probable		
	Mt	% T Cu	% T Co	Mt	% T Cu	% T Co
T-17 Open Pit	-	-	-	1.5	2.61	0.46
Mashamba East Open Pit	-	-	-	5.9	3.00	0.37
KOV Open Pit	-	-	-	55.7	4.73	0.45
Total	**-**	**-**	**-**	**63.0**	**4.52**	**0.44**

Mineral reserves have been reported in accordance with the classification criteria of the JORC Code. If the classification criteria adopted in NI 43-101 were to be used in this ITR instead of the JORC Code, the mineral reserves estimates would be substantially similar.

The KOV Open Pit mineral reserve estimate as at December 31, 2009 was declared at 90 million tonnes at 4.9% Cu. The variance with this ITR is due to an updated optimisation of the pit design using differing technical and economic data which has resulted in the development of a smaller more optimal pit without sterilisation of any mineral resources.

25.2 Plant and Equipment

25.2.1 General Process Commentary

The KTC and the Luilu Refinery constitute the process plants of KCC with KTC being approximately 4km from Kolwezi and the Luilu Refinery being 6 km distance from KTC.

KCC process plants produce copper cathode metal, cobalt metal and copper concentrate as products from ores received from KOV Open Pit, T-17 Open Pit and the KTO. Future production may be derived from Mashamba East Open Pit and potentially T-17 Underground Mine and KTE mine. As detailed in the Section 3.0, ores sourced from the open pits are predominantly oxide, disseminated with up to 35% sulphide mineralization in certain locations and depths within the pits and this has the potential to produce a mixed ore feed to KTC. Ore sourced from KTO is almost exclusively sulphide.

The metallurgical processing is currently divided into two areas, namely crushing, milling and flotation at KTC and copper and cobalt metal recovery through a leach and electro winning process at the Luilu Refinery.

The value of the plant and equipment has been taken into account in the economic evaluation as set out in Section 25.11.2.

25.3 Processing Facilities

25.3.1 KTC

The original KTC consisted of Kamoto 1 and 2 sections built in 1968 and 1972 respectively and DIMA 1 and 2 sections built in 1981 and 1982 respectively.

Kamoto 1 treated mixed ore and oxides. The circuit comprised the following unit processes:

- autogenous milling operating in closed circuit with hydro cyclones;
- sulphide flotation including roughing, cleaning and middlings regrind to produce a sulphide concentrate;
- sulphidisation of oxide minerals; and
- oxide flotation including roughing and cleaning to produce an oxide concentrate.

Kamoto 2 primarily treated sulphide ore from the KTO. The circuit comprised the following unit processes:

- autogenous milling operating in closed circuit with hydro cyclones; and
- sulphide flotation including roughing, cleaning and middlings regrind.

The DIMA 1 circuit primarily treated oxides and mixed oxide / sulphide ore feeds. The circuit comprised the following unit processes:

- primary autogenous milling and secondary ball milling operating in closed circuit with hydro cyclones;
- sulphide flotation including roughing, cleaning, re-cleaning and middlings re-grind to produce a sulphide concentrate;
- sulphidisation of oxide minerals; and
- oxide flotation including roughing and cleaning to produce an oxide concentrate.

The DIMA 2 circuit treated oxide ore. The circuit comprised the following unit processes:

- primary autogenous milling and secondary ball milling operating in closed circuit with hydro cyclones;
- sulphidisation of oxide minerals; and
- oxide flotation including roughing and cleaning to produce an oxide concentrate.

25.3.2 Milling

25.3.2.1 Oxide Ore Milling

Oxide ore from KOV Open Pit and T-17 Open Pit is transported by truck and stockpiled near the B3 jaw crusher at KTC. The B3 jaw crusher has a nameplate capacity of 500 tph. Oxide ore is blended, crushed to minus 400 mm and conveyed to stockpiles. Ore is milled in two 28’ cascade mills with nameplate capacities of 150 tph each and one 32’ cascade mill with a nameplate capacity of 350 tph, all in closed circuit with cyclones. Cyclone underflow is milled in ball mills. Final milled product is nominally 70 to 75% minus 75µm.

25.3.2.2 Sulphide Ore Milling

Sulphide ore from KTO is crushed underground by gyratory crushing to minus 400 mm and hoisted to surface. From there it is conveyed to stockpiles ahead of KTC. The ore is milled in two 28’ cascade mills with a nameplate capacity of 150 tph each in closed circuit with cyclones to 90% minus 75µm.

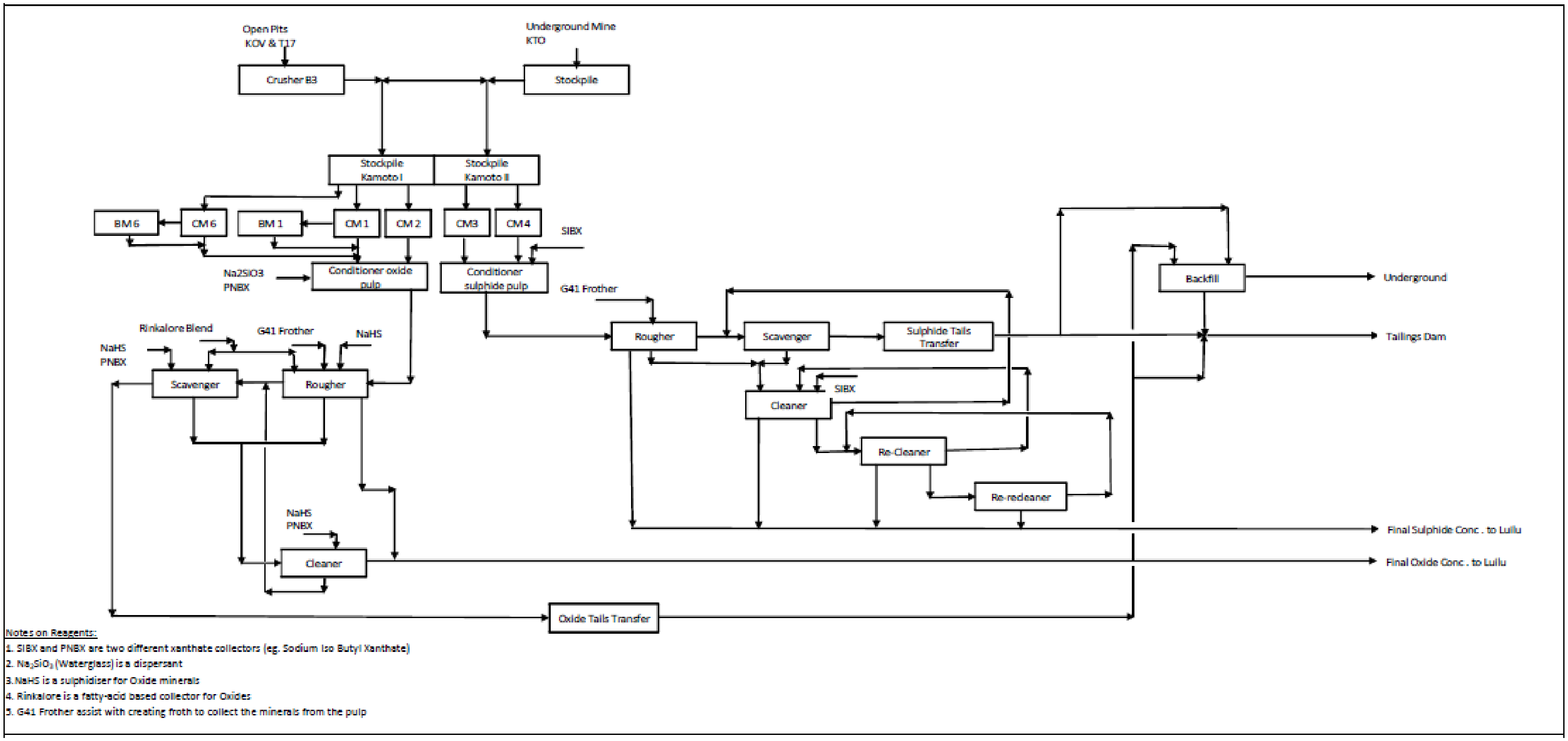

Figure 27: KTC Concentrator Block Flow Diagram (Present Arrangement)

Note: There is a primary crusher underground, not shown on the flow sheet.

Figure 28: 32' DIMA Mills

25.3.3 Flotation

25.3.3.1 Oxide Flotation

Milled oxide ore is subjected to three phase flotation, namely roughing, scavenging and cleaning. Reagent addition in the oxide flotation section is more complex than in the sulphide flotation section, namely a collector, potassium normal butyl xanthate ("**PNBX**"), a dispersant ("$\mathbf{Na_2SiO_3}$" - waterglass), a sulphidiser ("**NaHS**"), a frother ("**G41**") and a blend of fatty acid collectors ("**Rinkalore**"). Copper recovery in the oxide circuit is consistent with industry standards. Final oxide concentrate is pumped via pipelines to the Luilu Refinery. Tailings are classified through a bank of cyclones and either pumped to the tailings dam or underground for back-fill.

25.3.3.2 Sulphide Flotation

The milled sulphide ore is subjected to a five phase flotation process of roughing, scavenging, cleaning, re-cleaning and final re-cleaning. Final sulphide concentrate is pumped via pipelines to the Luilu Refinery. In the sulphide flotation section, only G41 and a collector, sodium iso-butyl xanthate ("**SIBX**") are used. Tailings are cycloned and either pumped to the tailings dam or underground for back-fill.

Figure 29: Flotation Cells

25.3.4 KTC Project Development

As part of the implementation of Phase 3, KTC is in the process of being refurbished to its original installed milling capacity of 7.6Mtpa by July 2011, equivalent to 230ktpa finished copper production at standard process efficiencies and resource model grades.

In conjunction with the mills refurbishment program, KCC are site manufacturing flotation cells, consistent with the original design, to add more flotation capacity and eventually greater copper recovery to the process. On completion of the flotation cell refurbishment, the DIMA mill, CM6 will have the capability to mill either oxide ore or a mixed ore without loss of process efficiency.

As part of the scoping study, a review of the existing DIMA mills identified the potential to return these mills from autogenous operation to a semi-autogenous operation. This had the potential to increase total installed milling capacity from 7.6Mtpa to ~9Mtpa, equivalent to 270ktpa finished copper production.

The front end engineering and early works project confirmed that a total KTC throughput equivalent to an output of 270 ktpa copper can be achieved. The increase to 310 ktpa copper will necessitate the installation of additional crushing, milling and flotation capacity.

Note that although CM2's primary duty is oxide, it can also operate on a sulphide feed depending on feedstock availability and concentrate demand.

Oxide concentrate that is surplus to the Luilu Refinery Phase 3 capacity will be forwarded to a filtration, bagging and storage plant currently under construction at KTC. The oxide concentrate will be exported as a final product up to a design plant capacity of 10 ktpm concentrate (grading > 22% Cu).

25.3.5 Luilu Refinery

Production at the Luilu Refinery, located approximately 6 km north of KTC, commenced in 1960. The process route employed was roast leach-electro-winning typical of other contemporary DRC and Zambian Copperbelt operations. The circuit comprised the following unit processes:

- sulphide and oxide concentrate receipt, dewatering and storage;
- sulphide concentrate roasting;
- sulphuric acid copper leach of roaster calcine and oxide concentrate (oxidising leach assisted by air injection);
- secondary leach using high acid-consuming (dolomitic) concentrates;
- counter-current decantation and clarification;
- leach tailings filtration and residual sulphide flotation;
- tailings neutralisation and disposal;
- selenium removal via up-flow reactor containing copper granules;
- copper EW onto copper starter sheets (being converted to stainless steel blanks);
- de-copperising of cobalt bleed solution – two-stage EW;
- cobalt bleed solution purification including the following steps;
- iron removal by controlled pH precipitation using milk of lime;
- copper removal by two-stage controlled pH precipitation using milk of lime;
- nickel removal by controlled pH precipitation using NaHS and cobalt chips;
- zinc removal by the addition of hydrogen sulphide ("**H_2S**") and neutralisation with sodium carbonate solution;
- controlled pH precipitation of cobalt with milk of lime;
- cobalt re-leaching with spent electrolyte and sulphuric acid under controlled pH;
- cobalt EW; and
- cobalt vacuum degassing and burnishing.

The Luilu Refinery was designed to process sulphide and oxide concentrates with an initial capacity of 80 ktpa copper cathode. During the 1970's, capacity was expanded to 175 ktpa copper cathode and 8 ktpa cobalt cathode. The grade of cathode copper produced in the first EW stage never met LME Grade 'A' quality, while most of the cathode and copper sponge produced in the secondary EW was not of commercial quality and was recycled to the Shituru smelter at Likasi. Cobalt recovery across the plant was <65%, with the majority of the cobalt losses occurring at nickel and zinc sulphide precipitation with some also at iron removal and cobalt precipitation.

The condition of the plant in 2004, when taken over, was extremely poor and almost totally run down. A progressive renewal programme was planned, to match the increasing throughput. Considerable progress has been made to-date in the phased rehabilitation exercise. Completion of Phase 1 was in December of 2007 and completion of Phase 2 in December of 2009. The new roaster was commissioned in late 2009.

Phase 3 for which SNC-Lavalin (South Africa) are undertaking the engineering and procurement services will essentially complete the rehabilitation of KTC and the Luilu Refinery. A process simulation model has been developed, which indicates that Phase 3 of the KTC and Luilu Refinery will produce 150 ktpa of copper and 8 ktpa of cobalt.

A block flow diagram of the current Luilu Refinery operation is shown in Figure 30.

25.3.6 Concentrate Reception

The primary purpose of concentrate thickening and filtration is to create a storage buffer capacity at the Luilu Refinery prior to sulphide roasting and oxide leaching. In addition it removes water from the concentrates to lower reagent consumption in the subsequent leaching circuit.

Concentrates received from KTC are dewatered in two oxide and two sulphide thickeners prior to being pumped to a set of four drum filters. In Phase 3 an oxide thickener and a drum filter were installed.

The filtered oxide and sulphide concentrate remain in separate circuits and are conveyed to a storage shed. They are reclaimed for feeding to the roasting and leaching circuits respectively.

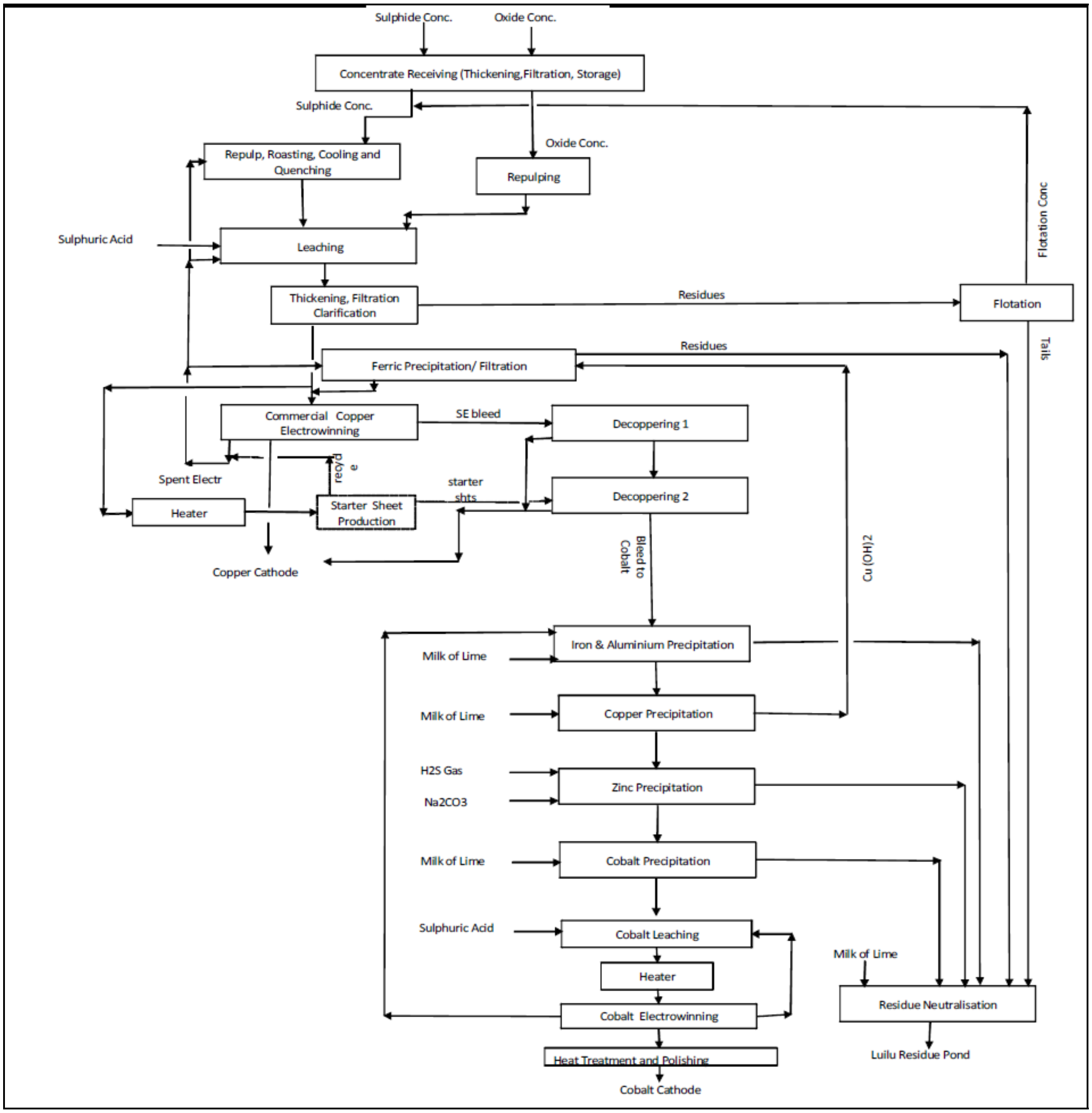

Figure 30: Luilu Refinery Block Flow Diagram (Present Arrangement)

25.3.7 Copper Production

The sulphide and oxide concentrates are treated to recover the contained metals.

25.3.7.1 Sulphide Concentrate

Sulphide concentrate is reclaimed from a bay in the storage shed and conveyed to a repulp mill where it is slurried at high pulp density. The slurry is injected into two or three of three roasters; one of 450 tpd nameplate capacity and two of 150 tpd nameplate capacity. The roasters operate at 650°C. Slurry is injected with excess fluidizing air. The sulphide concentrate is roasted to a calcine which comprises acid soluble compounds of copper and cobalt. The hot calcine is cooled to below 300°C and quenched in spent electrolyte from the copper EW tank-house. Hot gases are passed through cyclones for dust capture, cooled with spent electrolyte, scrubbed and discharged through stacks. The calcine / spent electrolyte slurry is pumped to the leaching section.

Figure 31: Sulphide Roaster at Luilu

25.3.7.2 Oxide Concentrate

Oxide concentrate is reclaimed from a bay in the storage shed and repulped with spent electrolyte.

25.3.8 Leach Circuits

In the atmospheric leach section, the repulped oxide slurry is combined with the calcine / spent electrolyte slurry from the roasters and with sulphuric acid. In order to improve the dissolution of cobalt, controlled amounts of sodium meta-bisulphite ("$Na_2S_2O_5$") is added to the leach.

After leaching, the slurry is thickened and the overflow clarified. The underflow is subjected to counter current decantation and residue filtration to separate liquid and residue solids. The residue solids contain most of the sulphides entering the circuit with the oxide concentrate which bypasses the sulphation roast and remain in a form which is not acid soluble.

The residue solids are subjected to flotation where most of the remaining sulphides are recovered and pumped to the sulphide thickeners for recovering the metal values. Residue flotation tailings are pumped to ponds after neutralization with lime.

The clarified overflow is pumped to the copper EW tank-house where commercial copper is electro-won in cells with lead-antimony anodes and stainless steel cathodes. A small stream of the clarified overflow goes to a starter sheet section where starter sheets are made for the de-coppering section. A bleed stream of spent electrolyte is taken off and subjected to iron removal by oxidation and by adjustment of the pH with copper hydroxide from a de-coppering step in the cobalt plant. The precipitated ferric-hydroxide is thickened, filtered and pumped to residue tailings. Another bleed stream of spent electrolyte is subjected to secondary copper electro winning in two stages to remove the bulk of the copper before pumping it to the cobalt plant. The bulk of the spent electrolyte is pumped to leaching and to cool the off gas and calcine in the roasters.

Figure 32: Finished Copper Product

25.3.9 Cobalt Circuit

The feed to the cobalt recovery circuit is a bleed stream taken from the copper EW tank-house feed.

In the purification part of the cobalt plant, impurities are removed by precipitation, thickening and filtration in the following order:

- iron and aluminium by oxidation with air and pH adjustment with milk of lime;
- copper precipitation by pH adjustment with milk of lime (filter cake recycled back to ferric precipitation);
- nickel removal with gaseous H_2S and recycled cobalt granules and pH adjusted with sulphuric acid this is currently not in operation as nickel levels are very low; and
- zinc removal with gaseous H_2S and sodium carbonate for pH adjustment.

After zinc removal, the cobalt is precipitated from solution with milk of lime at pH of 7.8 to 8.4 and filtered. The washed cobalt hydroxide is then dissolved with spent cobalt electrolyte and sulphuric acid, subjected to thickening, clarification and polishing filtration before pumping as advance electrolyte to the cobalt EW tank-house.

In the cobalt EW tank-house, the electrolyte is heated to 70°C and cobalt is electro-won in cells with lead-antimony anodes and stainless steel cathodes. After stripping, the cobalt cathode pieces are subject to heat treatment and polishing for production of final product.

The stripped electrodes are returned back into the electro winning circuit to repeat the process.

Figure 33: Finished Cobalt Product

25.3.10 Luilu Copper Electro-Refinery

In a refurbishment programme initiated in 1987 an electro-refining circuit consisting of a copper melting and anode casting facility and a 100ktpa electro-refining cell house was constructed at Luilu. The melting and casting facility was apparently only operated for a few weeks before a runaway halted production and in addition only one of the three sections of the cell house were ever operated. Historically the option to convert the facility to an EW was considered to be a non-viable option compared to the construction of a new 250 ktpa EW plant. This was re-evaluated as part of a Scoping and Engineering study in 2010 and its suitability for a conversion to an EW plant has been confirmed. Conversion will enable 200 ktpa of LME Grade A copper to be produced by EW from the converted electro-refinery. This conversion will be carried out as part of the New Phase 4 expansion.

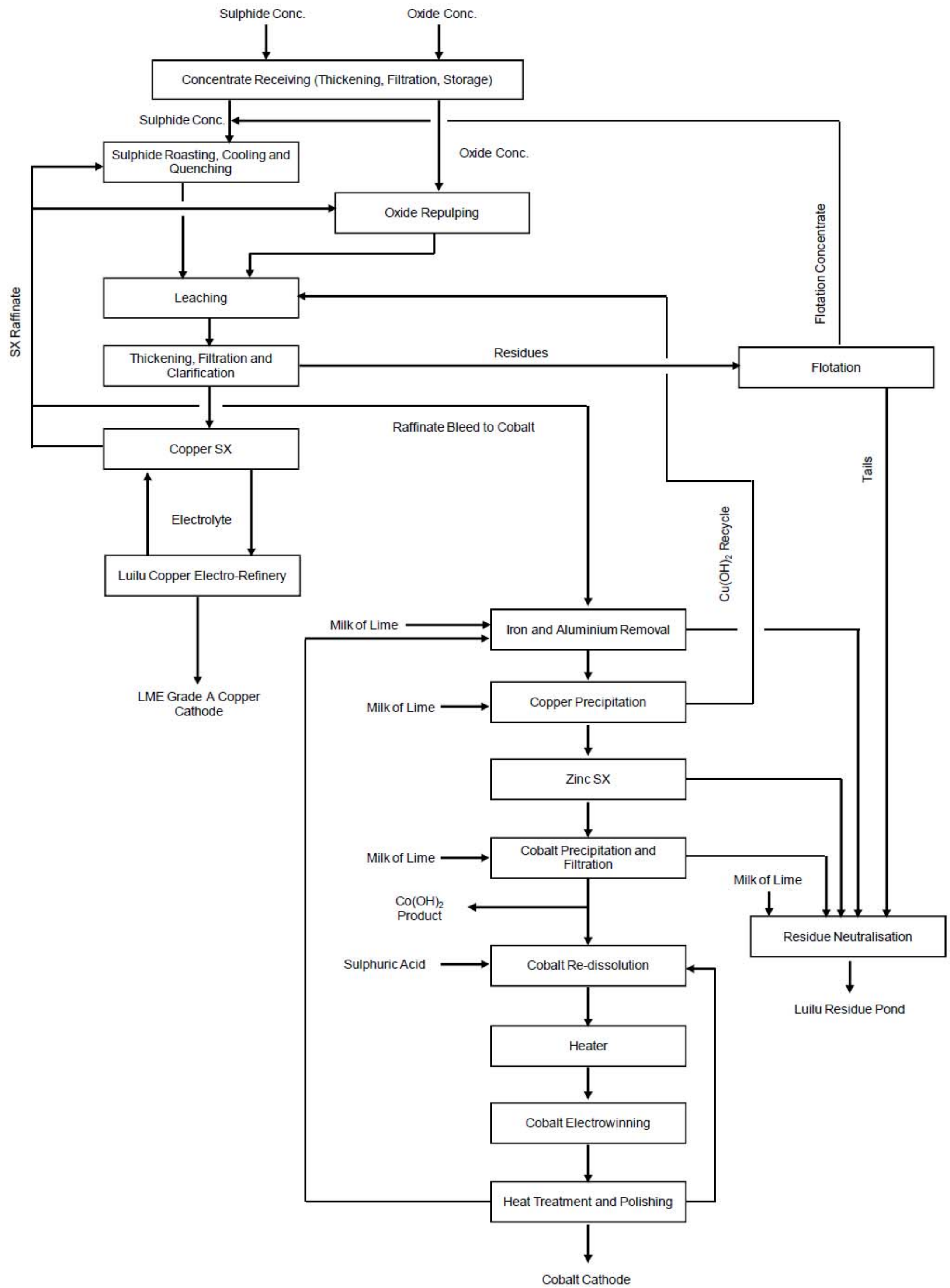

Figure 34: Block Flow Diagram for Luilu Copper Electro-Refinery

Further work is being done to confirm the requirements for the conversion and the process flow.

25.4 Completion of Phase 3

As of December 31, 2010 the milling capacity at KTC had been increased to 5.6 million tonnes of ore per year which is in excess of the projected final capacity of the Luilu Refinery. The Luilu Refinery production capacity had increased to 130,000 tonnes of copper per annum.

The completion of Phase 3 requires the following work to be completed:

- new concentrate thickening and filtration facilities;
- rehabilitation of concentrate storage area;
- rehabilitation of the oxide repulp area;
- rehabilitation of the counter current decantation area;
- addition of new residue belt filters;
- rehabilitation of final copper EW hall;
- rehabilitation of cobalt purification;
- addition of an effluent treatment plant;
- rehabilitation of the lime plant; and
- rehabilitation of certain utilities.

With the completion of the works the plant will have a capacity of 150,000 tonnes of copper per annum and 8,000 tonnes of cobalt per annum.

25.5 New Phase 4

The front end engineering and early works project envisage the following major developments for Phase 4:

- additional concentrate filtration facilitites;
- additional residue filtration and flotation facilities;
- concentrate reclaiming facilities;
- a new neutral leach process;
- a new roaster;
- a new SX plant;
- conversion of the existing unused electro-refinery to EW;
- upgrading the cobalt purification facilities; and
- cobalt hydroxide bagging facility.

The above work will enable 200 ktpa of LME Grade A copper to be produced by EW from the converted electro-refinery plus 110 ktpa from the existing Luilu Refinery.

25.6 Tailings and Waste

The Kamoto Interim Tailings Dam ("**KITD**") is the only tailings dam in operation at KCC. It was commissioned in 2008 for the safe disposal of copper tailings from the KTC which is located 500 m northwest of the tailings dam. The design life of the dam was initially envisaged to be 11 months, but due to an increase in tailings production, a revised design, aimed at increasing the life of the tailings dam by 2 years is in place. The dam covers an area of approximately 61 ha and was designed for a storage capacity of 1.3 Mm^3.

The tailings dam is a side-hill impoundment with a starter wall located around the western, southern and eastern flanks perimeter. The main delivery pipe is 350NB rubber lined steel spigot pipeline, which is laid around the full perimeter of the starter wall and has one valve in the north-western corner. A spigot system is being used to deposit tailings around the dam. The dam has four penstock intake structures i.e. the main penstock structure which is located in the northern portion of the dam, and three intermediate intakes which are located on the same outlet pipe to the south and at progressively lower elevations. The supernatant water drains out of the dam through the penstock pipeline to the outfall trench, located south west of the western embankment, which discharges into the Luilu River, further west. A toe drain constructed along the inner toe of the main embankment also discharges into the outfall trench at the same location as the penstock outlet.

As of October 2010, there was a total of approximately 2.2 Mt of tailings being stored in the dam with an average of 90 000 tonnes being deposited into the tailings dam per month.

Figure 35: Layout of the Kamoto Interim Tailings dam

Figure 36: Western Flank of the KITD Starter Wall (looking south)

Figure 37: Spigot System Deposition on the eastern flank of the dam

25.6.1 Desktop Review of Available Environmental Reports

The following reports and documents are in place for the operation, maintenance and the sustainability of the KITD:

- Operating and Maintenance Manual for the KITD (DRAFT COPY), Report No.380266/1, September 2008, SRK Consulting (SRK 2008).
- KITD Technical Evaluation, Report No. 410528/1, January 2010, SRK Consulting ("**SRK 2010a**").
- Stability analysis document for the starter wall, November 2010, Swanepoel Laboratories Kolwezi ("**Swanepoel 2010**").
- KCC EIS Final Review Report for the Client, Report No. 411167/1, March 2010, SRK Consulting ("**SRK 2010b**").

25.6.2 Assessment of Compliance with Statutory Requirements

According to Article 64 of the DRC Mining Code, to own and operate a tailings facility, a mine only requires an operating license or PE for the concession on which it has constructed the tailings facilities or discharge effluent. As part of the process of obtaining this license, the method of tailings containment or effluent discharge must be referenced in either the Feasibility Study or EIS, submitted by the mine to the DPEM. KCC has an operating license for concession PE525, which is the concession on which the KITD is constructed. Article 64 then allows for KCC to mine the mineral resource and develop / construct the necessary supporting infrastructure (i.e. tailings facilities), effectively rendering KCC the license to own and operate the KITD.

25.6.3 Review of Rehabilitation Provisions and Liabilities

A closure plan for the tailings dam is included in the SRK 2010b report. This plan highlights the long term maintenance procedures for the facility. No cost estimate of the closure plan or any other financial implications are presented.

25.7 Closure

25.7.1 Approach and Limitations to Closure Cost Review

25.7.1.1 Approach

An indicative closure cost estimate, based on available information, was conducted to serve as a basis for the review of the provided closure costs. The estimate also allows commenting on possible shortcomings with respect to the provided closure costs and additional financial provision required. The approach followed is summarised as follows:

- identification and delineation of the relevant mining areas and associated infrastructure, primarily from Google Earth imagery and limited available plans;
- identification of infrastructure and land use sub-categories within the above mining operations area characterised by similar conditions, for example light, medium or heavy infrastructural areas, waste rock and spoils stockpiles, and moderately or severely disturbed surface conditions, etc;
- interpretation of the type, nature and sizes of structures from available information and measurement of the delineated areas in AutoCAD;
- determination/verification of unit rates for plant dismantling and demolition, as well as associated reclamation, as per recent tenders available to GAA, similar work conducted recently in Africa, as well as consultation with demolition practitioners;

- application of the above unit rates and associated quantities in spreadsheets arranged into sub-categories to illuminate the respective closure cost components for the cost review;
- objectively determining the indicative closure cost based on the approach and criteria adopted by GAA for this review and comparing the findings from this costing to the existing closure costs conducted by the other consultants; and
- compilation of a report reflecting the approach applied by GAA in determining the closure costs, as well as the cost comparison. Matters requiring attention to ensure that future closure costing is improved and more realistic are also listed.

25.7.1.2 Limitations

- This review of the existing closure costs was conducted as a desktop assessment based on limited information and subject to time constraints. As a result the closure cost estimation provided by GAA is **indicative only**, acting as a basis for comparison of the available costs and to assess whether these are appropriate (order of magnitude). Due to the mentioned limitations, the closure costs determined by GAA could not be regarded as definitive.
- An overall one day site visit to the mine site in support of the overall project, also addressing closure cost aspects, was conducted. This time on site was not sufficient to gain a full understanding of the closure related site aspect.

25.7.2 Available Information

The sources of information used for the closure cost estimate were as follows:

- EIS and EMP for Kamoto Copper Company. March 2010. Report no. 411167/1. SRK Consulting; and
- map of the Tilwezembe Concession PE 4963 DCP. Infrastructures on perimeters of the Convention JVACR. July 2009. KCC – Kolwezi DRC.

The above SRK report includes an EIS and EMP for KCC's intended integration of the processing facilities and phased refurbishment of the operations. As part of the EIS provision for environmental rehabilitation financial guarantee was included. The costing from SRK in respect of decommissioning and restoration, conducted in 2010, towards determining the financial guarantee included the following limitations:

- the costing assumes that closure of the operations occurs with no remedial work having been done, with the liability being what it was when it was assessed. If material changes are made to the operation, it will be necessary to update the liability assessment;
- the liability assessment does not include any operating or capital costs that are likely to be incurred to management of the environment during operations;
- although a liability has been included for the metallurgical plants, the AJVA with GCM indicates that once KCC has finished utilising them, they will revert to GCM. These facilities are currently leased from GCM on terms defined in the AJVAfor a period to 2024, with two 10 year renewable options;
- the liability assessment does not include infrastructure that falls within KCC concession area, but which has not been operated by KCC. Examples include but are not limited to: Poto Poto Tailings dam, Kamoto Tailings dam and any waste dumps from KOV Open Pit, Mashamba East Open Pit or any other dormant open pits that pre-existed 2004 or has recently been constructed due to GCM related activities within the KCC concessions etc; and
- the assessment does not include infrastructure previously operated by KCC, but which has now been transferred out of the concession area, such as the Kolwezi Concentrator.

25.7.3 Battery Limits

The above reports and associated information do not clearly stipulate the battery limits for which the documented closure costs apply. The battery limits were deduced and assumed from the available information and the interpreted Google Earth imagery.

The infrastructure description obtained from the available information is listed separately from those aspects inferred from the imagery and/or added by GAA.

25.7.3.1 Available information

The following battery limits were obtained from the SRK report as well as from the areas deduced from the maps made available for this work:

- overall mine site and plant complexes, including fugitive disturbed areas (but excluding areas defined as GCM's liability): 2,323 ha;
- Luilu Refinery and related areas: 51.6ha;
- KTC and related areas: 36.4ha;
- heavy vehicle workshops ("**SKM**") and related areas: 5.4ha;
- KTO and related areas: 25ha;
- KOV Open Pit and related areas: 50ha;
- T-17 Open Pit: and related areas: 35.7 ha; and
- riverine areas requiring reclamation and reinstatement: 4ha.

Although a number of tailings storage facilities are evident on aerial imagery, none of these facilities are located within the overall battery limit that was assumed by GAA. Both GAA and SRK excluded the Kamoto Tailings Storage Facility ("**TSF**"), the Poto Poto TSF, the Kingamyambe TSF and the sulphide TSF. However, the mine has to utilise tailings storage facilities as part of operations and therefore the unnamed TSF to the south of the Luilu Refinery were included in GAA's cost assessment. It is noted that the full rehabilitation costs for the latter has not been included in GAA's cost assessment, as this TSF is pre-existing 2004 and closure costs have to be confirmed between KCC and GCM.

25.7.3.2 Additions by GAA

The following closure costing components and related activities were also considered by GAA in the determination of their indicative closure cost estimate:

- collection, handling and disposal of demolitions waste;
- the reclamation and reinstatement of affected streams and drainage lines;
- reclamation of disturbed areas, including the collection, handling and disposal of contaminated soil as well as the removal and disposal of fugitive concrete; and
- additional allowances, including preliminary and general ("**P&G**") and contingencies.

Although there could be the possibility of ongoing management of contaminated excess mine water arising from the reclaimed mine workings, involving collection , handling , treatment and safe disposal of the treated mine water, the need and nature of this is unknown and hence has been omitted from the closure cost estimate. If required this could add a notable additional cost.

The battery areas indicated in red dashed lines on Figure 38 were assumed and considered. This includes the PE525 and PE4961 concession areas. An area described as Area No.2 includes the Luilu Refinery, and

PE11602 which includes the T-17 Open Pit and surrounding infrastructure. The battery limits also includes the TSF to the south of the Luilu Refinery as is described above.

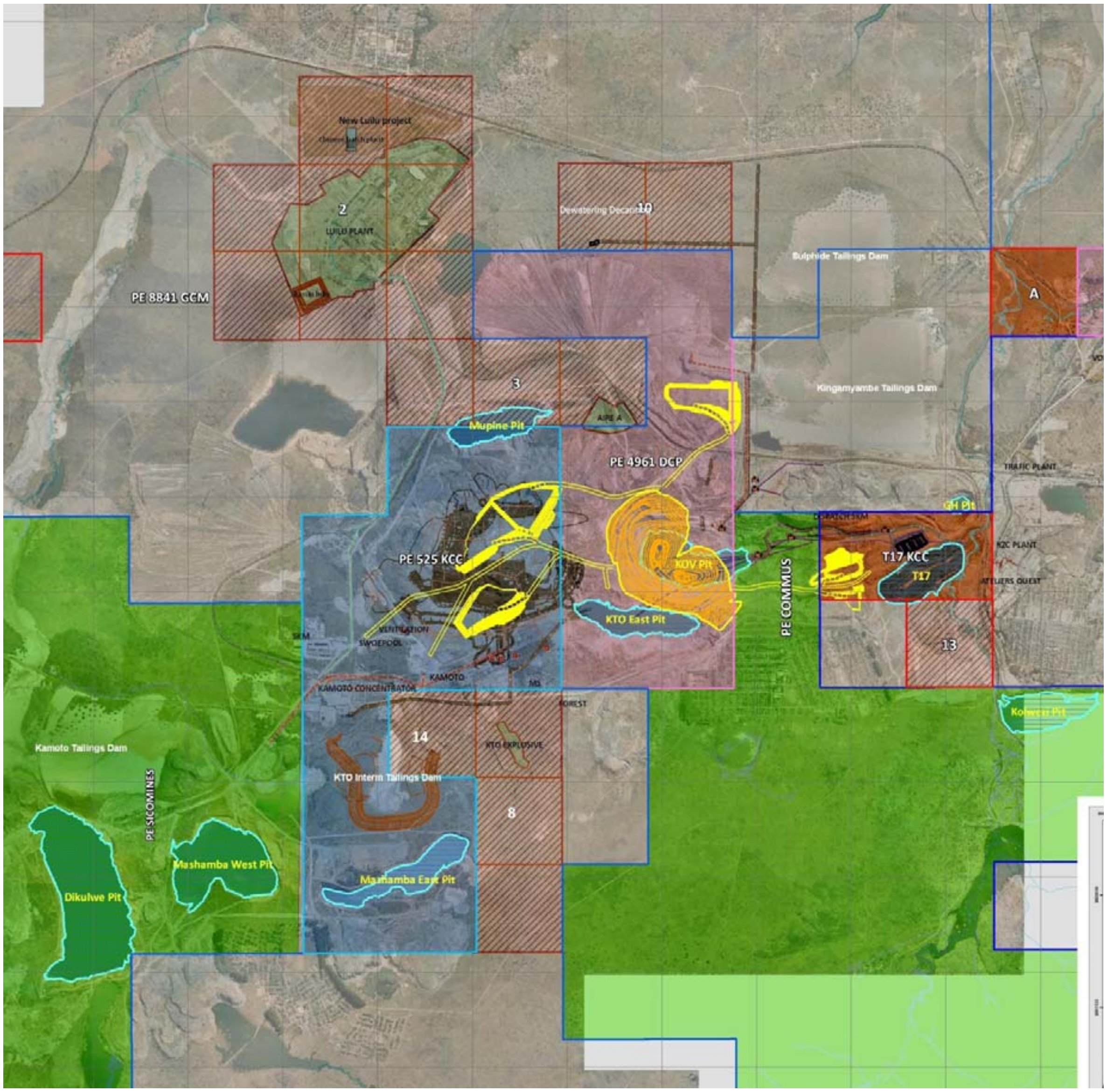

Figure 38: Map of infrastructure on perimeters of the convention AJVA - KCC

25.7.4 Assumptions and Qualifications

The assumptions and qualifications listed below have been made with respect to the closure cost estimate.

25.7.4.1 General

- The closure costs for the plant site could comprise a number of cost components. This report only addresses the decommissioning and reclamation/restoration costs, equating to an outside (third party) contractor establishing on-site and conducting the decommissioning and reclamation-related work. Other components such as staffing of the plant site following decommissioning, the infrastructure and support services (e.g. power supply, etc.) for the staff, as well as workforce matters such as separation packages, re-training/re-skilling, etc., are outside the scope of this report.

- Based on the above, dedicated contractors would be commissioned to conduct the demolition and work on the mining site and associated areas. This would *inter alia* require establishment costs for the demolition and reclamation contractors and hence, the allowance of P&G in the cost estimate. Allowance has also been made for third party contractors and consultants to conduct post closure care and maintenance work, as well as compliance monitoring.
- It is foreseen that demolition waste, such as concrete and building rubble, would be largely inert and that a dedicated waste disposal facility will be licensed and constructed for the purpose of disposal of demolition waste. Provision has also been made for the reclamation and closure of the waste disposal site. Steel and related material from the plant demolition which has salvage value will remain on-site for sale to third parties with any salvage value from demolition waste material for GCM's benefit.
- As there would be no salvage value to KCC, no cost off-sets due to salvage values were considered in terms of accepted practice and thus only **gross** closure costs are reported.
- Concrete footings and bases would be demolished to a maximum of 1 000 mm below the final surface topography.
- All useable stockpiles of raw and/or saleable material would have been processed and removed off-site at closure and none of these would remain on site, thus requiring reclamation.
- The existing villages would not be demolished, but would be transferred to third parties. This also applies to the services related to the village such as water supply and sewage treatment.

25.7.4.2 Site specific

It has been assumed that at mine closure the mine site and associated disturbed areas will be reclaimed to a sustainable predetermined final land use. This will not only require the dismantling of the physical infrastructure and addressing the aesthetic effects of the reclaimed mine site, but also addressing the residual impacts of the operations on the receiving environment. Therefore, the GAA closure cost estimate addresses, as far as reasonable, the possible latent and residual effects. In this regard the following site-specific closure measures have also been included in the cost estimate:

- Covering of the relevant TSF's with a 900 mm thick vegetated soil cover to limit the ingress of rainfall into the tailings that could result in contaminated net percolation (waste load) over the TSF footprint area, as well as the reinstatement of at least a beneficial post closure land use of grazing over the upper surface of the TSF.
- The rehabilitation of evaporation/pollution control ponds will include the following:
  - removal of sediment up to a depth of 400 mm;
  - removal of synthetic liner;
  - removal of contaminated soil that could have occurred in those places where the liner has leaked; and
  - collection, transport and disposal of the contaminated sediment and soil.
- The remaining waste rock and/or over burden dumps will be shaped and vegetated.
- Different shaping, levelling and re-vegetation methods will apply for disturbed areas based on the nature, extent and severity of disturbance. The following categories have been assumed:
  - generally disturbed areas, characterised by transformation or partial absence of vegetation with limited erosion or soil contamination;

  - areas from which infrastructure has been removed, characterised by severe transformation of the landscape and significant soil contamination and harmful material; and
  - severely disturbed areas characterised by excessive erosion and complete transformation of the land cover.

  Dedicated rates for the shaping, levelling and reclamation have been applied for the above categories.

- The KTO workings are assumed to be accessed by one incline shaft with associated portal.
- In addition to the above underground mining, the rest of the mining is conducted from three open pits on surface.
- The final mining voids or remaining open pits will not be in-filled and allowed to become open lakes over time with the required access control whilst these are re-watering (flooding). In order to limit access, an open rock enviro-bund to a height of at least 3 meters and its inside toe 20 m from the long term break-back line of the pit/void will be constructed . The bund will also serve the following purposes:
  - safety measure to isolate the pit from people and animals by restricting access to the pit and voids;
  - visual screening; and
  - divert surface water runoff away from and around the pit, preventing erosion of pit or void lip/edge.
- Removal of contaminated soil from disturbed areas as part of general surface reclamation is required for approximately 20% of the reclaimed infrastructural footprint areas.
- Allowance has been made for a nominal amount of fugitive concrete to be removed and disposed of.
- Allowance has been made for care and maintenance as well as surface and groundwater quality monitoring to be conducted for a minimum period of 5 years to ensure and assess success of the implemented reclamation and closure measures.

25.7.4.3 Additional allowances

- Fixed ratios for P&G (6%) and contingencies (10%) have been applied.

25.7.5 Closure Cost Comparison

To provide a structure for the cost comparison, the costs are presented in a format routinely used for closure cost determinations, addressing the following categories:

- infrastructural areas;
- mining areas;
- general surface reclamation;
- water management;
- post closure aspects; and
- additional allowances.

The closure costs determined by SRK and GAA are reflected in Table 40 and Table 41. Table 40 provides an overall summary of the cost comparison, whilst Table 41 provides a comparison of closure measures and related costs. Owing to the manner in which the SRK costs were presented these could not be fully assigned to the above categories, but was nevertheless attempted for the purpose of the cost comparison.

Due to the severely disturbed and possibly contaminated nature of the mining area, even small differences in battery limits could have a notable effect on the computed closure costs. Notwithstanding uncertainty in this regard, the indicative closure costs determined by GAA indicate that the cost determined by SRK appears to be appropriate. Differences between the SRK and GAA costs are most likely due to the following:

- a general discrepancy in the battery limits adopted for the respective closure cost estimates;
- the base date for the SRK cost estimate is 2008. If a 10% escalation due to inflation is allowed for the two years plus period, the adjusted SRK cost amounts to about **$111 million**;
- differences in the approach towards the rehabilitation of open pits;
- reclamation and reinstatement of affected streams and drainage lines, albeit being limited;
- reclamation of disturbed areas, including the collection, handling and disposal of contaminated soil as well as the removal and disposal of fugitive concrete;
- safe disposal of demolition waste and the creation and final reclamation of a dedicated site for this purpose;
- clean-up and safe disposal of contaminated soils and fugitive contamination; and
- allowance for P&Gs and contingencies.

Table 40: Overall cost comparison

Aspect	SRK 2008	GAA 2010
1. Infrastructural areas	$14,748,760.00	$37,488,097.50
2. Mining areas	$83,675,436.00	$8,804,457.05
3. General surface reclamation	$0	$45,186,054.10
4. Water management	$0	
Subtotal 1 (for infrastructure and related aspects)	**$98,424,196.00**	$94,100,578.65
5. Post closure aspects	$2,714,787.00	$1,757,960.00
Subtotal 2 (for post-closure aspects)	**$2,714,787.00**	$1,757,960.00
6. Additional allowances	Not clear whether included in SRK costs	$15,056,092.58
Subtotal 3 (for additional allowances)	**$0**	$15,056,092.58
GRAND TOTAL	**$101,890,223.00**	**$110,914,631.23**

Table 41: Detailed comparison of closure measures and related costs

Category with sub-categories	Evaluation
Infrastructural areas	
■ Dismantling of processing plant and related structures; ■ Demolition of steel buildings and structures; ■ Demolition of reinforced concrete buildings and structures; ■ Reclamation of access roads, railways and power lines; ■ Demolition of offices, workshops and residential buildings; ■ Fencing; and ■ Disposal of demolition waste.	■ The respective battery limits for the surface infrastructure appears to be different. Since no map was supplied with the SRK costing this could not be clarified; ■ The quantities and areas in the SRK document could not be verified. The GAA costing was based on the extrapolation/adaptation of verified costs for similar mining/industrial complexes; ■ The GAA costing includes the establishment, operation and closure of a dedicated waste disposal site for the decommissioning and restoration as it is assumed that another suitable site is not available; and ■ The GAA costing for infrastructural areas is comparable with the SRK costs when computed for the Luilu Refinery, KTC and KTO. ■ It is however noted that there may be no significant closure cost associated with infrastructural areas if GCM decide to retain the assets in the closed state following cessation of mining on the KCC concession. This aspect may have been considered in the SRK costing and is not taken into consideration in the review done by GAA.
Mining areas	
■ Opencast reclamation including final voids and ramps; ■ Excavations; ■ Sealing of shafts, adits and inclines; ■ Shaping of stockpiles, waste rock and overburden dumps; ■ Vegetation of stockpiles, waste rock and overburden dumps; ■ Reclamation of processing waste deposits and evaporation	■ The SRK costing allowed for decommissioning and restoration of the Luilu Refinery, KTC; SKM; KTO; KOV Open Pit; T-17 Open Pit and Mashamba East Open Pit. It is assumed that their cost of $83,675,437.00 is inclusive of general surface reclamation. If this is not the case it is anticipated that the SRK cost is too high; ■ It is unclear what SRK envisaged for the rehabilitation of open pits. The GAA costs allowed for the open pits to be left as is, and an open rock enviro-bund to a height of at least 3 meters and its inside toe 20 meters from the long term break-back line of the pit/void be constructed; ■ Both SRK and GAA omitted the Poto Poto and Kamoto tailings dams from the

Category with sub-categories	Evaluation
ponds; and ■ Reclamation of subsided areas.	respective costs. However, it is unclear from the SRK costs whether provision was made for any of the other tailings dams. The GAA costs includes a provision for the TSF to the south of the Luilu Refinery, and allows for the facilities to be provided with a 900mm thick evaporative cover; ■ The GAA costing allowed for shaping and vegetation of stockpiles footprint areas, assuming that the stockpiled material will be processed before decommissioning; ■ The GAA costs allows for the sealing of one incline shaft and the infilling of the associated access ramp portal to the KTO. However infilling of underground workings have not been provided for in the GAA costs. It is unclear what the SRK costs provided in this regard; ■ Both SRK and GAA omitted the Poto Poto and Kamoto tailings dams from the respective costs. However, it is unclear from the SRK costs whether provision was made for any of the other tailings dams. GAA did not include any tailings storage facilities in the assessment; ■ GAA costs allow for the reclamation of all generally disturbed areas and the clean-up of possible contamination over these areas, while it appears that the SRK costs provided for reclamation in predefined management areas only; and ■ The GAA costing is less expensive, but this could be attributed to differences in rehabilitation approaches, as well as battery limit areas.
General surface reclamation	
■ Shaping of disturbed areas; and ■ Vegetation of disturbed areas.	■ It is unclear whether the SRK costs provides for general surface reclamation of disturbed areas, although it can be assumed that surface reclamation of footprint areas of facilities were provided for; ■ In addition, the GAA costs allow for the removal and disposal of 500m³ of fugitive concrete;

Category with sub-categories	Evaluation
	■ The costs under this cost category cannot be compared, because these appear to have been omitted from the SRK costs.
Water management	
■ Reinstatement of drainage lines; and ■ River reclamation.	■ The SRK costs do not allow for the reinstatement of drainage lines, and reclamation of contaminated rivers and stream, whereas GAA provides for reclamation of affected streams and the reinstatement of drainage lines over the full reclaimed area; ■ The costs under this cost category cannot be compared, because these are omitted from the SRK costs.
Cost comparison based on the rate per hectare:	
Post closure aspects	
■ Surface water quality monitoring; ■ Groundwater quality monitoring; ■ Reclamation monitoring; ■ Care and maintenance; and ■ Ongoing water treatment.	■ Although the SRK cost provides a cost per management area for monitoring and maintenance, it is not clear what the amount entails; ■ GAA cost allows for surface, groundwater and reclamation monitoring, as well as care and maintenance for a minimum period of 5 years over an area of 2080 hectares; ■ GAA has not made any allowance for ongoing water treatment, but due to the nature and extent of contamination this could be required. This could have a notable effect on the computed closure costs.
Additional allowances	
■ P&G ■ Contingencies	It is unclear what the SRK costs provided for in terms of additional allowances. The GAA costs allow 6% for P&G and 10% for contingencies

25.7.6 Matters Requiring Further Attention

The following matters require attention to arrive at a definitive closure cost estimate:

- possible need for ongoing water treatment to ensure that possible contaminated decant from the flooded pits and underground working do not pose a long term threat to surface water quality and associated aquatic health;
- confirmation and documentation of battery limits for the closure costing and providing the motivations/reasons for the inclusion and exclusion of areas;
- compilation of proper inventories of infrastructure and mining activities within the respective battery limits and obtain sign-off by the mine on these; and
- on-site quantification and measurement of those closure cost components with uncertainty with respect to the closure measures required and/or which are not adequately addressed in the indicative closure costs.

The possibility exists that significant impact by mining related spillages on the local stream/river systems may exist and needs to be confirmed by on-site assessment of potentially affected areas by a suitably qualified specialist, In the event that contamination that can safely be removed without causing excessive damage to the streambeds is identified, allowance has to be made for at least the de-silting and re-instatement of contaminated stream beds and banks. Other measures may also be required in order; to allow the natural aquatic ecosystems to return as far as possible. This could have a notable cost and has been excluded from this cost estimate, mainly due to uncertainty of responsibility for this environmental liability and the fact that such areas could not be detected from aerial imagery.

25.7.7 Conclusion

The findings as reflected in this report have primarily been based on the interpretation of Google Earth images of the respective sites. Moreover, in those instances where the required information was not available, estimates were made based on experience. Unit rates for the purpose of the review were obtained from GAA existing data base and/or from demolition practitioners. Where required, these were adapted to reflect site-specific conditions.

The review of the existing closure costs as well as recommendations in this regard has been completed from a risk-averse perspective and mainly errs on the side of caution. This approach allows for the costs to be refined as appropriate information becomes available, as opposed to possible under-estimation and associated provision that could lead to liability shortfalls.

Due to the severely disturbed and possibly contaminated nature of the mining area, even small differences in battery limits could have a notable effect on the computed closure costs. Notwithstanding uncertainty in this regard, the indicative closure costs of $111 million determined by GAA indicate that the 2008 cost determined by SRK appears to be appropriate and can be applied as the basis for reclamation and restoration related financial provision at this point in time.

More work is required to arrive at definitive closure costs, also giving attention to those aspects highlighted in this report.

25.8 Environmental, Health and Safety

25.8.1 Terms of Reference

The key objective of this audit was to identify major environmental or social impacts and stakeholder concerns associated with KCC operations which might represent a significant liability. Specifically this involved assessing the following items:

- the scope and content of the EIS and EMP;
- the status of environmental authorisations;
- compliance with permit and statutory conditions;
- compliance with the Equator Principles where sufficient site information was available to do so; and
- major environmental and social risks and liabilities, specifically in regards mine closure.

The geographical extent of the audit was limited to the Material Assets.

Additional assets and/or facilities within the KCC concession also included were:

- WRD and TSF associated with the mining and processing operations, respectively; and
- infrastructure ancillary to KCC mining and processing activities such as roads, pipelines, an analytical and metallurgical laboratory, mine stores, clinics, etc.

25.8.2 Information Sources Reviewed

The information sources on which the audit was based included:

- site documentation provided to GAA including the EIS;
- interviews which GAA conducted with site personnel on December 8, 2010; and
- GAA observations during the site visit of December 8, 2010.

These sources are discussed further below.

25.8.2.1 Site documentation

The key site documents which provided background to the KCC audit were as follows:

- a due diligence environmental and mine waste review of KML conducted by Metago Consulting Engineers in February of 2009 ("**Metago, 2009**"); and
- the EIS and EMP compiled by SRK Consulting for the Kamoto Project in March 2010 ("**SRK, 2010**").

The Metago, 2009 and SRK, 2010 investigations provide extensive coverage of: existing environmental and social management practices implemented at KCC; gaps that are significant in respect of compliance with Equator Principles and IFC Performance Standards; and necessary measures to ensure compliance going forward. This audit relies heavily on these reports, with additional comment where circumstances have changed or the mine has progressed with respect to implementation of the recommendations of the studies.

Additional sources of information which were reviewed during the audit included:

- Annual site environmental incident registers (KCC October 2009; KCC October 2010).
- Water quality data collected at various KCC monitoring locations during the following periods:
  - between May of 2009 and March of 2010 (KCC Luilu Metallurgical Laboratory);
  - on May 27, 2010 (Talbot & Talbot, 24th June 2010);
  - between July 14-20, 2010 (Talbot & Talbot, August 16, 2010); and
  - on September 1-2, 2010 (Talbot & Talbot, September 16, 2010).
- Site dust fall monitoring data collected on a monthly basis from January to September of 2010.

- An ITR on KML material assets (SRK, 2010).

25.8.2.2 Interviews with site personnel

The following site personnel participated in the audit interviews and site visit:

- Secretary General;
- Manager Community Development and Public Relations; and
- Environmental Co-ordinator.

25.8.2.3 Site areas visited

On December 8, 2010 brief visits were conducted to specific areas of the concession which were identified in the site documents and site interviews as presenting potentially significant environmental and social areas of concern that may give rise to environmental liability.

These areas specifically included the following:

- the Haute (High) Kalemba and Basse (Low) Kalemba TSFs, at which wall integrity and operational freeboard concerns pose the risk of seepage and overflow of tailings and supernatant water to the receiving Luilu River system;
- the point of discharge of process plant effluent to the Luilu River;
- the KITD including effluent discharge from the Luilu Refinery and bypass infrastructure; and
- WRD (T-17 Open Pit) and open pit facilities with the potential to cause nuisance impacts (dust, noise, vibration and structural damage) to the nearby Musonoi Village.

25.8.3 Limitations of the Audit

This review is based on a high level overview of the KCC mine operations by experienced GAA staff. The review involved a one day visit to the mine, with the time divided between travel, the identification and review of available documents, discussion with key personnel and a brief visit to areas of greatest concern on site. The review therefore focuses only on critical environmental and social issues, so as to identify risks that could be major liabilities. Wherever possible, existing documentation has been used as a basis for conclusions drawn.

In a number of instances it has not been possible to fully verify statements made by mine personnel. Where this was the case, it is noted in the review and the source of the information is indicated.

25.8.4 Results of Audit

The results of the environmental audit of KCC operations and activities are presented in the subsections that follow.

25.8.4.1 Authorisations and Operating licences

Article 64 of the DRC Mining Code (Law No 007/2002 of July 11, 2002) requires a mine to hold an operating license or PE from CAMI before mining the mineral resource or developing the necessary supporting infrastructure.

KCC holds approved operating licenses for all of its concessions (see section 6.1). In terms of these operating licences, KCC may mine the mineral resources and develop the necessary supporting infrastructure (such as TSF and WRD), provided that the method of containment or effluent discharge is referenced in either the Feasibility Study or EIS which has been received by the DPEM.

25.8.4.2 EIS and EMP

In terms of the DRC Mining Code and the DRC Mining Regulations (Decree No 038/2003 of March 2003) the applicant of an exploitation licence is required to submit an EIS and EMP to the DPEM.

SRK 2010 has compiled a draft EIS and EMP for KCC which, subject to approval by DPEM, will replace the EIS and EMP reports previously approved for the DCP and KCC projects pre-merger. These documents address impacts associated with all KCC assets and operations obtained through the AJVA, including infrastructure upgrades such as those to the Luilu Refinery.

The KCC EIS and EMP were compiled to meet DRC regulatory requirements (specifically the DRC Mining Code and Mining Regulations). The EIS and EMP documents were submitted to DPEM in January 2011.

25.8.5 Compliance against Equator Principles

Table 42, as set out below, provides a synopsis of the key findings of the audit of KCC's compliance against Equator Principles and IFC Performance Standards, including the identification of environmental and social risks associated with KCC operations relative to the EIS compiled by SRK in March 2010.

It takes into account the Metago, 2009 results and builds on them, taking into account that progress has been made since and that site conditions have changed.

Table 42: Synopsis of key environmental and social findings of the Metago, 2009 due diligence report.
Items in red font are biophysical impacts/risks that could/do result in non-compliance with Equator Principles.

Equator Principle	Requirement	Compliance Rating	Reasons for Compliance / Non Compliance
Principle 1: Review and Categorisation	Projects are categorised on the basis of the magnitude of potential impacts and risks	Compliant	■ The KCC project was appropriately classified as a Category A project due to nature and scale of potential impacts
Principle 2: Social and Environmental Assessment	Social and Environmental Assessment Process required to address impacts and risks of construction, operation and closure. Mitigation required which is appropriate and implementable	Compliant	■ EIS and EMP completed (SRK, 2010) at appropriate level of detail covering all relevant elements of environmental/social assessment. Compliance when public consultation completed and EIS submitted and approved. ■ According to Article 64 of the DRC Mining Code, to own and operate a tailings facility, a mine only requires an operating license or "Permit d'Exploitation" for the concession on which it has constructed the tailings facilities or discharge effluent. Copper oxide ores are currently mined by KCC. ■ Possible future mining of underlying sulphide ore could be associated with the potential for ARD from inflow into exposed mine workings, waste rock and tailings. While the country rock in the area is dolomitic in nature, and any acid generated is likely to be neutralised in situ, this has not been confirmed.
Principle 3: Applicable Social and Environmental Standards	IFC PS 1: Social and Environmental Management System	Partially compliant	■ Organizational capacity currently considered inadequate to achieve the implementation of the EMP's and strategies on the site. This is being addressed through recruitment of appropriate environmental personnel. ■ Greater buy-in to environmental management practices is required, as the responsibility of all members of staff required. ■ Job specific environmental training of employees required ■ Retrenchments a concern in respect of environmental performance ■ Implementation of an EMS would be expected to resolve most of the above issues and this is currently in draft form for review and implementation in 2011.

	IFC PS 2: Labour and worker conditions – working conditions and management of worker relationship	Compliant	■ KCC labour policies and practices are based on DRC law. Formal retrenchment process exists and is a consultative process for local workers, involving discussion with unions, community leaders and others.
	IFC PS 2: Labour and worker conditions – protecting the workforce	Compliant	■ KCC does not employ children or undertake forced labour practices
	IFC PS 2: Labour and worker conditions – Occupational Health and Safety	Compliant	■ Workplace Occupational Health and Safety Plan in place and implemented with some limitations ■ On-site risk assessments undertaken. Currently an Emergency Response Team ("**ERT**") has been initiated and trained to internationally recognised standards ■ Occupational Health and Safety Centre constructed as part of a capital project which included construction of a hospital designed to accommodate all employees and contractors and their immediate dependents. The hospital was commissioned in 2010 and is fully compliant with DRC requirements.
	IFC PS 2: Labour and worker conditions – workers organizations	Compliant	■ Workers organizations (unions) represented at KCC ■ Mine uses contractors who are reputable and legitimate enterprises
	IFC PS 2: Labour and worker conditions – non employee workers and supply chain	Partially compliant	■ Based on the standard contractual terms applied by KCC for contractors, it places an obligation on them to demonstrate that they are registered with the relevant DRC authorities for compliance with DRC legislation ■ Presently no indication of how contractor environmental performance is monitored ■ Although issues regarding child or forced labour practices amongst contractors and suppliers are not specifically tested with each supplier or contractor during the tender processes, all contractors engaged on site have to undertake an extensive induction programme which details health, safety and environmental requirements and which would eliminate any potential for child labour.

	IFC PS3: General requirements	Partially compliant	■ An integrated water and waste management plan ("**IWWMP**") has been compiled for KCC which must still be implemented (waste categorisation has started) ■ There are several domestic waste landfill sites and hazardous waste landfill sites in the concession area. No specific permit is required for construction / operation of either the domestic waste or the hazardous waste landfill site, as these facilities are mandated within the EIS. On construction of the hazardous waste landfill site, KCC has an obligation to notify the DPEM which has already been completed. ■ The disposal of mine effluent, underground dewatering and contaminated storm water has impacted negatively on rivers flowing through the concession area. However this is not solely due to mining activities by KCC. The impact of artisanal mining activities adjacent to the KCC concession which have a significant adverse effect of river water quality and flow must also be taken into account, as well as the historical and current activities and liabilities of GCM. ■ The potential for TSF's to pollute groundwater has not been adequately quantified by contaminant transport modelling ■ KTC has no system to separate clean and dirty water, as its' storm water drains flow directly to the environment rather than being captured in a containment pond ■ Dust generated from TSF's, WRD's and unpaved roads during the dry season may impact on the health of employees and community members, as well as reducing visibility (safety hazard). To mitigate the impact KCC has made extensive use of mobile dust suppression equipment (both from KCC and contractors) to minimise the potential for dust generation.
	IFC PS 4: Community Health, Safety and Security – Community Health and Safety	Compliant	■ KCC Community Health and Safety Policy and Community Health and Safety Plan, take into account PS 4 and World Bank standards. The Plan considers a wide range of diseases and interventions including malaria and HIV Aids and potential loss of social benefits when the mine closes

	IFC PS 4: Community Health, Safety and Security – Security	Partially compliant	■ Security Plan developed which is compliant with PS 4 and World Bank requirements into account, but is still to be implemented
	IFC PS 5: Land Acquisition and Involuntary Resettlement – general requirements	Compliant	■ There are no plans to relocate any of the surrounding communities nor are there any foreseeable operational requirements to do so.
	IFC PS 5: Land Acquisition and Involuntary Resettlement – private sector responsibilities under government managed resettlement	N/A	■ -Not applicable
	IFC PS 7: Protection of Indigenous Peoples	N/A	■ -Not applicable
	IFC PS 8: Cultural Heritage – protection of cultural heritage in project design and execution	Compliant	■ A Heritage assessment has not been undertaken for the proposed new development sites such as the Far West Tailings Dam as no decision has yet been taken as to whether it is required.
	IFC PS 8: Cultural Heritage – project's use of cultural heritage	Compliant	■ The mine does not use cultural heritage resources
Principle 4: Action Plan and Management System	Environmental and Social Action Plan	Partially compliant	■ Implementation of the EMS is required which is in draft form for implementation in 2011
Principle 5: Consultation and Disclosure	Ongoing consultation with affected communities in a structured and appropriate manner	Compliant	■ Appropriate public consultation was undertaken to develop the SRK EIS and EMP
Principle 6: Grievance Mechanism	Formal grievance mechanism required as part of the management system	Compliant	■ Grievances to be recorded as part of the EMS when this is operational
Principle 7: Independent Review	Independent social or environmental expert not directly associated with the borrower to review the assessment, consultation process and Equator Principle compliance	Not Applicable	■ Not Applicable

Principle 8: Covenants	The following covenants to be included in financing documentation: The borrower will: ■ Comply with all host country social and environmental laws, regulations and permits; ■ Comply with the action plan during construction and operation in all material respects; ■ Provide reports (not less than annually) to document compliance with laws, regulations and permits; and ■ Decommission the facilities in accordance with an agreed decommissioning plan	Potentially compliant	■ Recommended that the covenants should be included in the financing documentation for KCC financiers ■ If the EMP and EMS are implemented, the KCC operation appears to be capable of meeting Equator Principle requirements.
Principle 9: Independent Monitoring and Reporting	An independent, experienced external expert to verify monitoring information	Not compliant	■ Not consistently undertaken

Note: 'IFC' refers to the International Finance Corporation. 'PS' refers to 'Performance Standard'

25.8.6 Key environmental risks relating to KCC operations

25.8.6.1 Impact of TSF and plant effluent discharges on river systems

The key risk areas in which tailings deposition and effluent discharges impact on river system in the KCC concession include the following:

- hazardous and non-hazardous effluents from the Luilu Refinery are currently being disposed to a ground depression to the south of the plant and overflow into the Luilu River. This is primarily due to problems with inadequate facilities to neutralise the leach residue effluent and the concern that the low pH of the effluent will corrode the pipeline transporting tailings to KITD. This activity has been practiced since construction of the Luilu Refinery and represents a legacy issue. However, KCC has recognised the potential environmental risk it poses and is addressing the issue through an engineering study which has been completed by SNC-Lavalin and which is currently scheduled for implementation in 2011;

- uncontrolled release of minor quantities of tailings from the KITD through the penstocks and spillways into downstream redundant tailings facilities and eventually into the Luilu River, which represent a significant environmental risk to KCC by virtue of their high total dissolved solids ("**TDS**"), variable pH, high total suspended solids ("**TSS**") (> 500 mg/l) and non-compliant levels of Cu. These releases were addressed in 2010 with an extension to the KITD facility and with further works scheduled to be completed on KITD in 2011 in advance of the LOM tailings facility being engineered and constructed in preparation for long term tailings management in 2012; and

- historical and current discharge of tailings material into the Luilu River represents a significant environmental risk to KCC. During the site visit to the Basse Kalemba and Haute Kalemba TSF's it was observed that the wall integrity and operating freeboard appeared insufficient to prevent the seepage and overflow of tailings and supernatant to the Luilu River. Aerial photographs of the area show extensive silting of the Luilu River with tailings material. However the Basse Kalemba and Haute Kalemba TSF's were designed and constructed by GCM and were operated and filled prior to KCC commencing operations in the area. The deposition in the Luilu River basin predominantly originated from the collapse of the Poto-Poto tailings facility which does not form part of KCC concession.

The only activity which is attributable to KCC impacting on water quality in the Musonoi River is the discharge of water from KOV Open Pit into the river. Although high levels of contamination occur in the Musonoi both upstream and downstream of the concession, the impact from KOV Open Pit dewatering is relatively minor as discussed below.

25.8.6.2 Impact of KOV Open Pit dewatering on Musonoi and Luilu River quality

SRK (2010) indicated that the KOV Open Pit lake is being dewatered at a rate of 5 000 to 6 000 m^3/hour. Daily silt monitoring data collected by KCC indicates that the pit water exceeds the DRC TDS discharge limit of 100 mg/l infrequently (on approximately ten occasions per year and generally after heavy rains) and this water is therefore discharged straight to the Musonoi River.

As the water level in the KOV Open Pit approaches the pit bottom there is the expectation that the accumulated sludge will be suspended in the water column due to the agitation caused by pumping, thereby exceeding the DRC TDS discharge limit. It is anticipated that KCC will make use of two existing lined settling ponds to control the silt load before discharge of the water to the Musonoi River. The accumulated sediments would be periodically mechanically removed to an adjacent waste rock dump.

In the absence of detailed chemical analysis of the discharge water, SRK (2010) anticipated that the pit water would pose a relatively low risk, except for possible elevated concentrations of Cu, Co and Mn. This should be confirmed through regular monitoring.

Concurrent with pit lake dewatering is a strata dewatering program in which groundwater is abstracted from boreholes around the pit perimeter and collected into the "Koppies" Dam. The current planned short term abstraction rate is 1,200 m^3/hour; however, this will increase to 2,500 m^3/hour and finally 4,000 m^3/hour as the size of KOV Open Pit increases.

Any excess water in Koppies Dam that is not used for either potable water (in Luilu or UZK villages) or as process water (in Luilu Refinery) is discharged to the Luilu River.

In summary, the impacts of KOV Open Pit dewatering on the Luilu River relate to a relatively low risk of silt loading and an unknown risk of contamination with Cu, Co and Mn which should be confirmed through monitoring.

25.8.6.3 Impact of dust fallout on communities

The draft EIS and EMP for KCC (SRK, 2010) indicates that modelled baseline PM_{10} concentrations exceeded the DRC guideline (500 µg/m^3) at various locations concentrated within the concession boundary.

For comparison, total baseline dust fall exceeded South African “Action” (1200 to 2400 mg/m^2/day) and “Alert” (< 2400 mg/m^2/day) guidelines at various locations within the KCC concession and along the main roads

Figure 39 shows dust fall monitoring results for the period July 2007 to September 2008 (SRK, 2010) as well as for the period January 2010 to September 2010 (data received from KCC). Dust fallout frequently exceeded the South African “Alert” guideline during 2010 at each of the monitoring sites, including those within the Luilu, Tshamundende, Kapata and Musonoi villages. Site personnel indicated that the relatively higher dust fall rates in 2010 relative to previous years likely relates to an improvement in the method by which KCC now monitors dust fall.

Annual KCC environmental incident registers (KCC, October 2009; KCC, October 2010) record community complaints of dust fall, particularly within the village of Musonoi, which is located approximately 500 m from the disposal of waste rock at the T-17 Open Pit WRD (refer Figure 40).

It should be noted that the dust fall from historical GCM waste rock facilities contributes significantly to the overall dust fall out. The overall dust fall out is also impacted by mining activity from other operators in the area particularly artisanal miners on the GCM concession area.

Although the majority of the dust fallout (which leads to the South African "Alert" guidelines being exceeded) can be attributed to the GCM waste rock facilities, to minimize the potential for KCC's own dust generation, KCC has made extensive investment in and use of mobile dust suppression equipment (both from KCC and contractors).

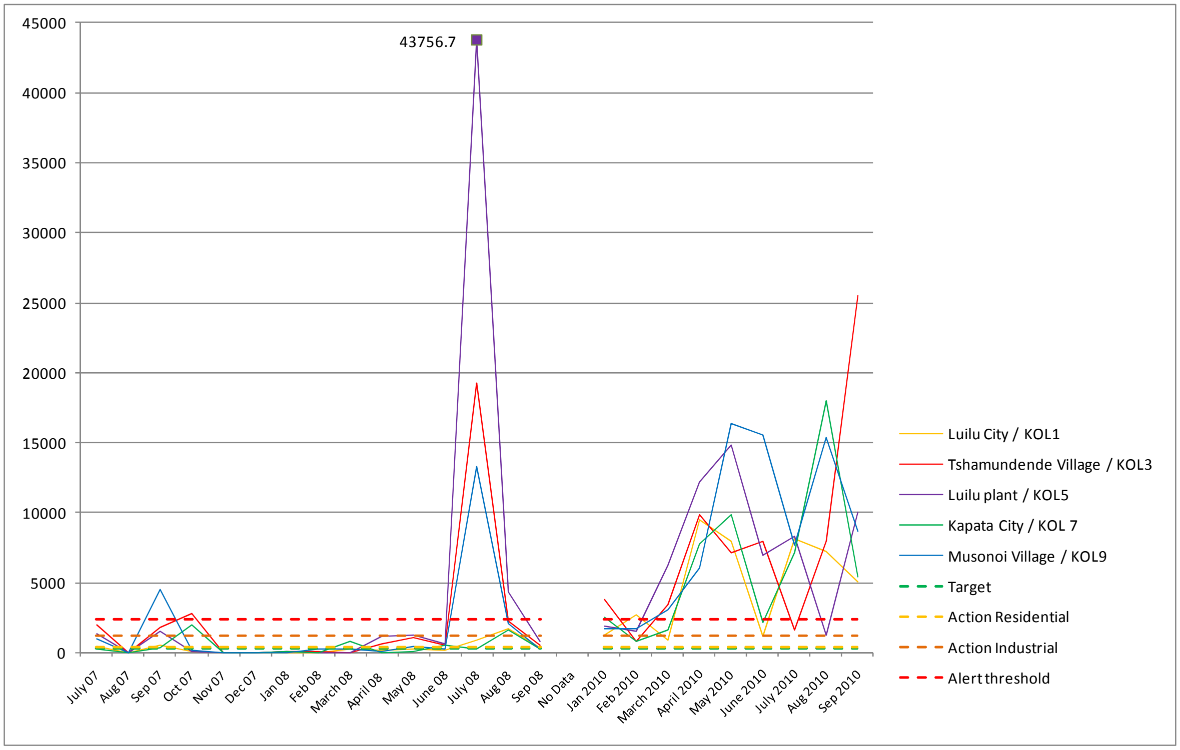

Figure 39: Dust fallout (mg/m2/day) at various monitoring locations within the KCC complex

Figure 40: Musonoi village photographed from T-17 waste rock dump

25.8.6.4 Impact of blasting and vibration on communities

There are amplitude contours for blasting of open pits (KOV Open Pit and T-17 Open Pit) and KTO in the SRK, 2010 report.

The amplitude contours were defined as follows:

- 0.5 mm/s - vibration is distinctly felt by humans;
- 5.0 mm/s - disturbing to human beings and complaints are likely;
- 15 mm/s - 5% probability of cosmetic damage to buildings;
- 150 mm/s - damage road surfaces, dam walls, slimes dams and minor cracking of walls and concrete structures;
- 600 mm/s - steel structures should be secured to concrete foundations to ensure that buckling of structures does not occur.

KCC will not blast within a proximity to Musonoi village which will result in the 5mm/s vibration amplitude being exceeded.

The draft EIS (SRK, 2010) requires the mine to develop a monitoring protocol for air blasts and vibration measurement associated with blasts 200 m away in the direction of Musonoi and Kolwezi (KOV Open Pit and T-17 Open Pit blasting). Approval of the draft EIS and EMP by the DPEM would make this commitment binding.

25.8.6.5 Radioactivity impacts

A Gamma radiation survey conducted over the KCC concession and adjacent properties indicated the following:

- Substantially elevated radiation levels occur at:
  - the uranium ore storage area south of Kingamyambe TSF;
  - the uranium storage area north of the KOV Open Pit;
  - the Luilu tailings area south of the Luilu Refinery;
  - the Kolwezi Concentrator; and
  - areas on the eastern side of the historical KOV Open Pit WRD.
- Areas with moderately elevated radiation levels include:
  - Kingamyambe TSF;
  - the sulphide tailings area;
  - the historical KOV Open Pit WRD;
  - in and around the dormant Musonoi Open Pit; and
  - the Luilu Refinery.
- Surface water sites showing elevated radiation levels include:
  - Luilu River near Nana Village;
  - south of the Luilu Refinery;

- the KOV Open Pit;
- green tank discharge to the south side of the Kingamyambe TSF; and
- the Mashamba West Open Pit.

Site personnel interviewed during the KCC audit indicated that radioactive waste rock occurring within the T-17 Open Pit is handled and stored separately from non-radioactive waste rock. KCC has capped this radioactive WRD with non-radioactive waste rock in compliance with internationally accepted standards.

Although the uranium storage areas mentioned above are posted with radiation warning signs, these are largely ignored by artisanal miners who access these areas either intentionally or through lack of awareness. All waste dumps with elevated uranium levels are historical dumps which remain the liability of GCM. KCC has previously been prevented by GCM from relocating or covering these waste dumps to reduce the potential for exposure to artisanal miners.

Artisanal miners also access WRDs in the GCM concession, and while this falls outside of KCC liability, there is a risk of reputational damage to KCC if the resultant health effects are perceived to relate to KCC operations.

25.8.6.6 Rehabilitation of waste rock dumps

The draft EMP for KCC, SRK, 2010, contains the following obligations in regards the rehabilitation and closure of WRD's:

- where WRD slopes exceed 24^{o}, KCC should (where possible) cut back the slopes to a lesser angle. Where this is not possible, erosion control measures such as anchors, gabions or vegetation must be constructed;
- KCC should repair erosion on the WRD top and side slopes;
- un-stripped weathered overburden should be used as a dump dressing to provide a growth medium for vegetation;
- indigenous species must be used for re-vegetation. Soil ameliorants (fertilizers, mulch) will be applied until organic matter accumulates in the soils;
- as erosion is still expected from the dumps, a series of toe paddocks will be established to reduce the impact of sediment on the receiving environment, and
- although it is unlikely that groundwater will be significantly impacted by WRD leachate, this should be confirmed by ongoing monitoring during operations.

The current steep slope angles of WRD's at KCC will significantly impede rehabilitation efforts and re-contouring is therefore required, particularly at the T-17 Open Pit WRD due to the abovementioned dust impacts on Musonoi Village.

25.8.6.7 Disposal of hazardous and non-hazardous wastes

- Domestic waste landfill sites have been constructed on KCC site as appropriate. Under DRC legislation, landfill sites do not need certification but must be constructed under acceptable practices, which has been complied with.
- Hazardous wastes identified within the KCC concession (primarily at the KTC and the Luilu Refinery) include: used oil; fluorescent tubes; batteries; old chemicals and chemical containers; spent anodes and catalysts. The handling and disposal of these hazardous wastes represents an environmental and safety liability to KCC. The relevant statutory authority will be visiting KCC in January of 2011 to assess KCC's proposal for the location, design and layout of a hazardous waste disposal site and to approve its construction.

25.8.6.8 Historical soil pollution sites

A number of sites of historical soil pollution exist on the site, for example the contamination of soils with Cu and Co from Luilu Refinery effluent. It is recommended that an assessment of the areas of soil pollution be undertaken to determine the extent and significance of historical soil contamination in the KCC concession. An action plan should then be compiled to rehabilitate these soils.

25.8.6.9 Risk of ARD with future mining of sulphide ores

Copper oxide ores are currently being mined at KCC. There is potential to mine the underlying sulphide ore in future, which could result in a potential for ARD from inflow into exposed mine workings, waste rock and tailings. While the country rock in the area is dolomitic in nature, and any acid generated is likely to be neutralised in situ, this has not been confirmed. Geochemical testing of mining and waste materials is therefore advised to determine the likelihood and significance of ARD impacts.

25.8.7 Key Social Aspects and Risks Relating to KCC Operations

With reference to the EIS and EMP (SRK, 2010) and the discussions held with KCC personnel on site, the following comments are made in relation to key social issues raised in Table 42:

- **Social Assessment (Equator Principle 2):** KCC submitted the SRK EIS to the DPEM in January 2011. Completion of this process will bring the company into line with requirements for impact assessment and environmental licensing;

- **Social / Environmental permits (Equator Principle 2):** All environmental permitting is in place**.**

- **Corporate Social Responsibility (Equator Principles 3 & 4):** An appropriate organisational structure and staffing for social impact management on the mine has been set up under the Community Development Manager. The Department is responsible for the management of community affairs, including: day-to-day interaction between the community and the mine; grievance reporting; and the implementation of the company's Corporate Social Responsibility programme.

  The department consists of 17 people, including superintendents, supervisors and community liaison officers ("**CLO**") for each community directly affected by KCC operations. In addition, representatives in each community have been identified to interface with the KCC team who are compensated for work they perform. CLO's report daily to the Community Development Manager and monthly reports are prepared.

  In 2010, approximately $8 million was allocated to community development projects. The list of projects includes: construction of community infrastructure (schools, water supplies roads, hospitals); health interventions (malaria and HIV control); and agricultural projects. While comprehensive documentation about the rationale for project selection was not available for review, the budget is managed by the Community Development Department and there appears to be an appropriate, structured, method for deciding about project allocation, with the involvement of stakeholders. The Community Development Manager anticipates a budget of approximately $10 million for 2011.

- **Incidents (Equator Principle 3 - IFC PS 4 Community Health, Safety and Security).** Six major sulphuric acid spills were recorded in the 2009 incidents register and a further two less-significant spills were logged in 2010. No community injury or health issues were recorded, although in some instances the outcome of the spill was not recorded. Staff interviewed during the audit indicated that a materials transport hazard analysis was recently undertaken by KCC. Relevant procedures were apparently also compiled to reduce and control the risk of future acid spills by, for example: auditing suppliers against minimum safety and transport operating standards; operating with two drivers on a shift basis; and making available an emergency response vehicle to cope with incidents. Neither the hazard analysis nor the spills procedures were sighted during the audit.

- **Resettlement (Equator Principle 3, IFC PS 5):** There are no plans to re-locate any of the surrounding communities and no foreseeable operational requirements to do so.

- **Community Grievances (Equator Principle 6):** Community issues and concerns appear to have been meticulously managed in 2010 through the communication and grievance procedures set up by the Community Development Department. The main grievances identified appear to be as a result of blasting and mine waste disposal at T-17 Open Pit and KOV Open Pit, which affects the nearby Musonoi community. A number of households claim that blasting has caused cracking of their houses and dust is an issue in the dry season. Actions to evaluate and resolve this issue include periodical mapping of structural damage to buildings, damage compensation where appropriate, and the following of operational procedures to reduce these impacts.

- Overall compliance (social): GAA agree with Metago's conclusion that the EIS forms an acceptable basis for the social and environmental management of the mine in the future. Fully implemented, the EIS and EMP will guide the actions necessary to comply with world standards, including Equator Principles and IFC performance standards.

- Sufficient financial and human resources have been allocated to ensure the effective implementation of the EMS, once finalised

- With regard to social compliance, KCC's Community Development Department has significant capacity, is appropriately structured to manage social issues going forward and has demonstrated capability to implement KCC's Corporate Responsibility Programme.

- A key challenge facing this department will be to continue to develop relationships and goodwill in surrounding communities, whilst minimising unrealistic expectations.

- At present, there appears to be no material grievances in surrounding communities that could place mining at risk.

25.8.8 Summary of Key Audit Findings

The limitations of this audit notwithstanding, the following observations were noted:

- KCC holds the requisite operating licences that it requires for all of its concessions.

- Environmental (current and potential) impacts were identified that may represent a risk to KCC operation and to compliance with the Equator Principles.

- These impacts relate primarily to the following:

  - current and historic discharges of tailings and process effluents to the Luilu River, which represent a significant risk to KCC. However this is in the context of a separation of liability between KCC and GCM as detailed in the AJVA;

  - discharge of KOV Open Pit water to the Musonoi River, which is subject to remedial action already being taken;

  - nuisance impacts to community villages associated with dust fall and blasting vibrations, which is also subject to remedial action already being taken;

  - potential exposure of communities (and particularly artisanal miners) to radioactivity. This is a historical and legacy issue associated with GCM and not a KCC liability;

  - cost liabilities for rehabilitation and closure, including WRD's and historical contamination sites;

  - the lack of an appropriate facility for the safe disposal of hazardous wastes from the Luilu Refinery and KTC - these are being dealt with appropriately and are not in violation of any statute or regulation; and

  - the unquantified risk of generating ARDfrom future mining of sulphide ores.

- In regards to KCC management of environmental and social issues:
  - the Environmental Department is being ramped up to implement the EMS; and
  - the organisational structure, staffing, budget and practices of the Community Development Department work well. There appears to be good interface with local communities and projects focus clearly on community needs.

25.8.9 Market

25.8.9.1 Copper

Copper is a major industrial metal (ranking third after iron and aluminium by consumption) because it is highly conductive (electrically and thermally), highly ductile and malleable, and resistant to corrosion. Electrical applications of copper include power transmission and generation; building wiring; motors; transformers; telecommunications; electronics and electronic products; and renewable energy production systems. Copper and brass (an alloy of copper) are the primary metal used in plumbing pipes, taps, valves and fittings. Further applications of copper include decorative features; roofing; marine applications; heat exchangers; and in alloys used for gears, bearings and turbine blades.

Global copper mine production was 15.7Mt in 2009, with 5.4Mt (or 35%) produced in Chile, by far the largest producer. Zambia and the DRC produced 0.6Mt (3.8%) and 0.3Mt (1.9%) respectively. Global refinery production in 2009 was 18.4Mt, including 2.9Mt of secondary refined production. Global consumption was slightly lower at 18.2 Mt. The International Copper Study Group (1 October 2010) estimates global mine production for 2011 at 17Mt, with global consumption at 19.7Mt. Table 43 shows the historical and 2011 forecast global refined copper market balance.

Table 43: Global refined copper market balance (Source: USGS)

Thousand metric tonnes	2006	2007	2008	2009	2010 Jan-Sept	2010 forecast	2011 forecast
Global Mine Production	14 991	15 474	15 528	15 754	11 853	16 235	17 076
Primary Refined Production	14 678	15 191	15 399	15 466	11 729		
Secondary Refined Production	2 613	2 743	2 823	2 911	2 513		
Total World Refined Production	17 291	17 934	18 222	18 377	14 242	19 278	20 498
Consumption	17 058	18 239	18 056	18 198	14 678	18 882	19 729
LME Copper Price ($/t avg)	6 727	7 126	6 952	5 164	7 175	7 543	

The copper price has demonstrated significant volatility in the last 5 years, as shown in Figure 41. The price was $4,585/tonne on 1 January 2006, at that point a near-record high. The price rapidly increased, reaching a high of $8,800 /tonne in May 2006. By February 2007 it had declined to $5,302 /tonne. In the immediate wake of the collapse in the housing bubble that precipitated the global financial crisis, the price of copper increased, reaching a new high of $8,900 /tonne by July 2008. Thereafter, as the financial crisis took effect on the global economy, the price declined to $2,810 /tonne in December 2008, the lowest level in almost 5 years. Since then, the price has generally trended upward, reaching a new record high of $9,695 /tonne on January 12, 2011.

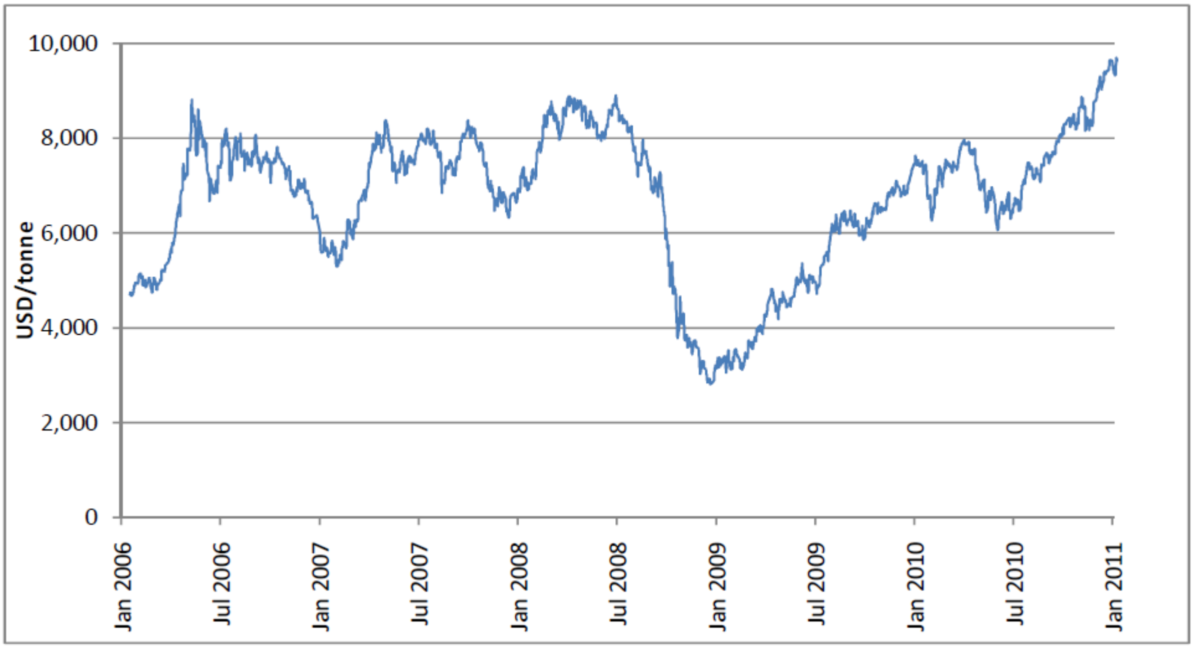

Figure 41: The London Metal Exchange copper price from January 2006 to date (Source: LME)

The copper price forecast used in the economic evaluation of the project is shown in Table 44. The forecast is based on published LME monthly futures prices, using the June contracts as the basis for each respective year through to 2019. These publically available prices are quoted in nominal terms. The financial model used for the economic evaluation is in real terms (2011 United States dollar), and the real copper price forecast is derived from the nominal prices using the US CPI estimates in Table 44. The forecast nominal average price for 2011 is $9,600 /tonne, declining to $6,800 /tonne in 2019.

Table 44: Copper price forecast

Copper price ($/tonne)	2011	2012	2013	2014	2015	2016	2017	2018	2019	Long Term
Nominal	9,600	9,300	9,000	8,600	8,200	7,800	7,500	7,100	6,800	6,861
Real	9,600	9,208	8,822	8,347	7,880	7,240	6,859	6,397	6,036	6,000
US CPI	1.0%	1.0%	1.0%	1.0%	1.0%	1.5%	1.5%	1.5%	1.5%	

25.8.9.2 Cobalt

Cobalt has many commercial, industrial and military applications. The leading use of cobalt is in rechargeable battery electrodes. The temperature stability and heat- and corrosion-resistance of cobalt-based superalloys makes them suitable for use in turbine blades for jet turbines and gas turbine engines. Other uses of cobalt include vehicle airbags; catalysts for the petroleum and chemical industries; cemented carbides and diamond cutting and abrasion tools; drying agents for paints, varnishes, and inks; dyes and pigments; ground coats for porcelain enamels; high-speed steels; magnetic recording media; magnets; and steel-belted radial tyres.

Far less cobalt is produced than copper: global mine production of cobalt was 62,000 tonnes in 2009, with 25,000 tonnes (or 40%) produced in the DRC, the largest producer. Australia, China and Russia each produced about 6,200 tonnes (10%). Global refinery production in 2008 was 57,600 tonnes, with global consumption slightly higher at 60,654 tonnes. Table 45 shows the historical global refined cobalt market balance. Roskill Information Services, a mineral industry information research group, has forecast cobalt demand of 72,500 tonnes in 2011 (October 2010).

Table 45: Global refined cobalt market balance

Metric tonnes	2004	2005	2006	2007	2008	2009
Global Mine Production	60 300	66 200	69 800	72 600	75 900	62 000
Total World Refined Production	48 500	54 100	53 800	53 300	57 600	No publicly available data
Consumption	51 400	54 685	54 685	56 250	60 654	59 000
Cobalt Price ($/t avg)	22.77	14.56	15.35	28.31	36.16	15.89

Source Cobalt News (Oct 2005 – Jan 2011) Published by the Cobalt Development Institute

The cobalt price reached a record of $48.63 /pound in March 2008, falling in line with other commodities to a 5-year low of $11 /pound in December 2008. The price has recovered, and since cobalt started trading on the LME in May 2010, the price has averaged $17.55 /pound, with a maximum of $19.64 /pound and a minimum of $15.94 /pound.

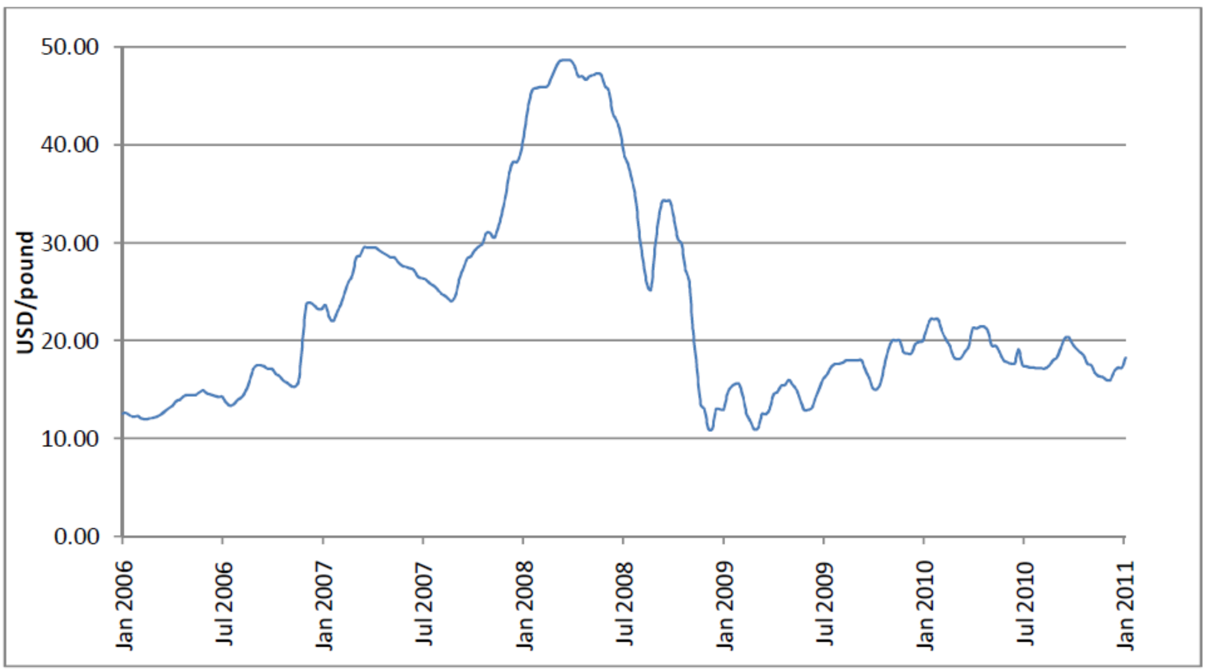

Figure 42: The cobalt price from January 2006 to date (Source: Inet Bridge)

The cobalt price forecast used in the economic evaluation of the project is shown in Table 46. The forecast is based on the Metal Bulletin 99.8%Co $/pound price (in nominal terms) available for the next spot delivery. The forward curve is assumed to gradually decline for the next three years, before falling to its long term value. The financial model used for the economic evaluation is in real terms (2011 $), and the real cobalt price forecast is derived from the nominal prices using the US CPI estimates in Table 46. The forecast average price for 2011 is $17.24 /pound, declining to $13.00 /pound in 2019.

Table 46: Cobalt price forecast

Cobalt price ($/pound)	2011	2012	2013	2014	2015	2016	2017	2018	2019	Long Term
Nominal	17.24	16.78	16.00	15.00	15.00	15.00	13.00	13.00	13.00	13.00
Real	17.24	16.62	15.68	14.56	14.41	13.92	11.89	11.71	11.54	11.00
US CPI	1.0%	1.0%	1.0%	1.0%	1.0%	1.5%	1.5%	1.5%	1.5%	

25.9 Technical and Economic Assumptions

25.9.1 Capital Cost Estimate

A summary of the capital cost estimate by major cost items is presented in Table 47 below. The capital expenditure items are as follows:

- **KTO:** Capital expenditure is for the purchase of underground mining equipment to meet LOM plans, development costs to access mining areas and ventilation infrastructure;
- **KOV Open Pit:** Capital expenditure includes waste stripping to access the ore body;
- **KTE:** Initial capital is for the development from the KTO through to the new mine. Thereafter, capital expenditure is for the purchase of mining equipment required to meet LOM plans, development costs to access mining areas and ventilation infrastructure;
- **T-17 Underground Mine:** Initial capital is for the development of a portal from surface. Thereafter, capital expenditure is for the purchase of mining equipment required to meet LOM plans, development costs to access mining areas and ventilation infrastructure;
- **Mashamba East Mine:** Capital expenditure is for the purchase of mining equipment required to meet LOM plans;
- **Processing plant:** Capital expenditure is for the development of the processing plant as described in Section 25.2;
- **Effluent Ponds and Tailings:** Capital expenditure is for the development of the ponds and tailings facilities as described in Section 25.6;
- **Power:** Capital expenditure is for the development and refurbishment of power supply infrastructure as described in Section 20.3;
- **Environmental and Social:** Expenditure is for Far West Tailings Dam stakeholder engagement, jobs and economic opportunities, tarring of roads (to reduce dust and road safety hazards), dust monitoring equipment, equipment for sulphur dioxide emission reductions/monitoring, surface water management (containment an management), general and hazardous waste management (trenches and buildings), ad hoc equipment for ground water ; water settlement facilities for suspended solids radiation monitoring and survey equipment, emergency response equipment and vehicles; and
- **General:** Capital expenditure is for unallocated infrastructure of a general nature required to sustain the operations of KCC.

Table 47: Capital Expenditure

$ million	2011	2012	2013	2014	2015	2016 - 2035	Total
Mining							
KTO	30.9	30.9	30.9	23.8	11.8	91.0	**219.2**
KOV Open Pit mobile mining fleet proceeds on sale	-28.0	0.0	0.0	0.0	0.0	0.0	**-28.0**
KOV Open Pit pre-stripping, dewatering and other	13.5	5.0	5.0	20.8	16.8	0.0	**61.0**
Mashamba East	0.0	8.0	12.4	21.5	31.2	8.7	**81.8**
KTE	0.0	0.0	0.0	0.0	0.0	343.8	**343.8**
T-17 Underground Mine	0.0	0.0	0.0	0.0	6.4	220.9	**227.2**
Mining subtotal	**16.4**	**43.9**	**48.2**	**66.1**	**66.1**	**664.3**	**905.0**
Processing							
Phase 3	103.0	0.0	0.0	0.0	0.0	0.0	**103.0**
New Phase 4	107.4	204.9	224.9	0.0	0.0	0.0	**537.2**
Processing subtotal	**210.4**	**204.9**	**224.9**	**0.0**	**0.0**	**0.0**	**640.2**
Other Cost Centres							
Tailings	5.1	15.1	15.1	15.0	12.7	113.5	**176.4**
Environmental and social costs	10.0	10.0	10.0	10.0	10.0	147.5	**197.5**
Power	50.0	53.2	47.6	16.4	6.4	58.1	**231.7**
General capital expenditure	28.5	26.4	25.0	25.0	25.0	368.8	**498.6**
Other subtotal	**93.6**	**104.6**	**97.7**	**66.4**	**54.1**	**687.8**	**1 104.2**
Total capital expenditure	**320.4**	**353.4**	**370.8**	**132.5**	**120.2**	**1 352.0**	**2 649.4**

25.9.2 Operating Cost Estimate

The major operating costs are as follows:

- **Open Pit and Underground Mining:** these costs include:
  - **KTO:** the costs are based on current and budgeted costs as an owner operation. The weighted average cost applied over the LOM is $29.46/t ore mined;
  - **KOV Open Pit:** the costs are based on contractual mining contractor rates charged by Enterprise Generale Malta Forrest, a mining contractor, and includes $6.23/bcm for mining and $2.27/t ore for haulage;
  - **T-17 Open Pit:** the costs are based on contractual mining contractor rates charged by Enterprise Generale Malta Forrest, and are $7.70/bcm for mining and $2.70/t ore for haulage;
  - **KTE:** the costs are based on estimated costs as an owner operation. The weighted average cost applied over the LOM is $26.50/t ore mined;

- **T-17 Underground Mine:** the costs are based on estimated costs as an owner operation. The weighted average cost applied over the LOM is $28.47/t ore mined; and
- **Mashamba East Open Pit:** the costs are based on a contractor performing the works. The weighted average cost applied over the LOM is $29.30/t ore mined;

- **KTC:** this includes plant costs for reagents, consumables and electricity, and is based on fixed costs of $13 million per annum and variable costs of $1.91/t ore feed for the sulphide circuit and $11.65 ore feed for the oxide circuit;
- **Luilu Refinery:** this includes $0.19/lb for finished Cu and $0.11/lb for finished Co, excluding acid and lime costs;
- **General and Administration:** this includes head office and other centralised costs; and
- **Freight, Insurance and Sales:** this is based on the expected costs of transporting all finished products (Cu and Co) to final market.

The major operating items are detailed on an annual basis in Table 48 below.

Table 48: Major Operational Expenditure

$ million	2011	2012	2013	2014	2015	2016 - 2035
Operating Costs						
Open Pit and Underground Mining	139.3	209.9	203.4	202.1	248.4	3 213.2
Luilu Refinery	108.9	142.4	150.1	179.3	220.7	3 689.7
KTC Costs	59.3	53.5	55.4	76.7	100.9	1 538.6
Tailings	0.7	0.7	0.9	1.2	1.7	247.8
Total Operating Costs	308.3	406.4	409.8	459.3	571.7	8 689.3
General and Administrative Costs	81.5	78.5	76.9	71.4	66.8	1 348.8

25.10 Taxation, Royalties and Other Business Parameters

The major parameters which govern royalties, tax capital allowances and import duties applicable to the project are shown in Table 49.

Table 49: Royalty, tax and import duty assumptions

Description	Application	Rate
DRC Royalty	% of revenue less selling expenses	2.0%
GCM Royalty	% of revenue less selling expenses	2.5%
DRC Corporate Tax		30%
DRC Capital Allowance:		
Year 1		60%
Years 2 - 10	Reducing balance	12% to 1%
Import Duty	Charged on certain imported items	3% to 5%

According to DRC legislation, taxation can be offset against capital and deferred. All capital expenditure is subject to a DRC Capital Allowance of 60% in the first year and is depreciated on a reducing balance each year thereafter. Pas de porte payments are required to be made to Gecamines, and $85.5 million has been budgeted to 2016.

25.11 Economic Analysis

This section presents a valuation of KML's interest in KCC. KML owns 75% of KCC via various subsidiaries, while GCM (with SIMCO) owns 25% of KCC. GCM is entitled to receive royalty, dividend and Pas de porte payments from KCC over the life of the mining project. The valuation presented is of the value of KCC attributable to KML. KML's interest in KCC comprises the 75% shareholding and shareholder's loans.

25.11.1 Valuation Methodology

KCC is an operational mining company with several active mines. Its mineral resources and mineral reserves are well-defined, and a comprehensive body of technical and financial information on its current and planned operations is available. This information allows the future cash flows of KCC throughout the life of the mine to be projected. This is compatible with the discounted cash flow ("**DCF**") methodology, which determines the value of an asset by calculating the NPV of the future cash flows over the useful life of that asset.

The DCF valuation approach provides a "going concern" value, which is the value indicated by a company's future economic capabilities. Using this technique, value is calculated by the summation of the present value of projected cash flows, both income and expenditure, for a determined period, plus the present value of the residual or terminal value at the end of the projection period. When using the DCF technique, the following four key areas must be assessed for accuracy and appropriateness:

- the assumptions underlying the projection of cash flow;
- the length of the projection period, in this case the LOM;
- the residual or terminal value at the end of the projection period; and
- the discount rate, which is usually the risk adjusted weighted average cost of capital ("**WACC**") of the project.

The valuation was based on a financial model provided by KML. GAA verified the integrity and structure of the model to ensure that calculations are performed correctly and that the model is comprehensive and fully accounts for all cash flows of the project. The input assumptions of the model were checked against historical performance, contracts and the results of the studies by the Qualified Person who produced this report to ensure that the assumptions are reasonable. Additional analysis was added to the model to produce some of the results, graphs and tables presented in this report.

25.11.2 Valuation Assumptions

The following assumptions were used in the valuation model:

- the valuation date is 1 January 2011;
- the discount rate is set at 10% in real terms. The valuation model was prepared on a quarterly basis;
- mining and processing production rates, head grades and recoveries are as described in Section 25.1;
- commodity prices are as described in Section 25.8.9;
- capital expenditure is as described in Section 25.9.1;
- operating expenditure is as described in Section 25.9.2;
- royalties, tax and capital allowances are as described in Section 25.10;
- KML's equity share in KCC is 75%; and
- KML's attributable economic interest in KCC is derived after the deduction of cash flows attributable to GCM from KCC's free cash flow.

25.11.3 The Valuation of KML's Interest in KCC

The results of the DCF model are shown in Table 50, presenting the free cash flow attributable to KML. The cash flow projections are based on expected future mining, production, metal sales, capital expenditure, operating costs and other expenses over the life of the project.

Table 50: Project cash flows over the LOM

Cash Flow Analysis	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Revenue	**M$**	**1,365**	**1,583**	**1,795**	**2,497**	**2,789**	**2,637**	**2,609**	**2,455**	**2,324**	**2,320**	**2,318**
Freight, Insurance and Sales Costs	M$	(151)	(123)	(145)	(208)	(243)	(247)	(263)	(261)	(258)	(262)	(262)
Royalties		(55)	(66)	(74)	(103)	(83)	(78)	(106)	(99)	(93)	(93)	(93)
Net Revenue	**M$**	**1,160**	**1,394**	**1,575**	**2,185**	**2,464**	**2,313**	**2,240**	**2,095**	**1,973**	**1,966**	**1,964**
Operating Costs	M$	(388)	(483)	(485)	(529)	(637)	(606)	(648)	(651)	(656)	(696)	(676)
Other Costs	M$	(47)	(17)	(17)	(17)	(17)	(17)	(2)	(2)	(2)	(1)	(1)
Net change in working capital	M$	24	(28)	(84)	10	(36)	15	(3)	10	8	(7)	8
Total Expenses	**M$**	**(411)**	**(528)**	**(586)**	**(536)**	**(690)**	**(608)**	**(652)**	**(642)**	**(650)**	**(704)**	**(669)**
Taxation	M$	(1)	(2)	(2)	(284)	(653)	(544)	(452)	(414)	(359)	(330)	(335)
Capital Expenditure	M$	(320)	(353)	(371)	(133)	(120)	(89)	(105)	(119)	(97)	(110)	(103)
Gécamines Dividends	M$	(11)	(21)	(15)	(74)	(91)	(158)	(260)	(236)	(218)	(205)	(209)
Net Free Cash	**M$**	**416**	**490**	**601**	**1,159**	**910**	**915**	**771**	**683**	**649**	**617**	**647**
Cash Flow Analysis	**Unit**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Revenue	**M$**	**2,354**	**2,362**	**2,369**	**2,363**	**2,332**	**2,273**	**2,258**	**2,167**	**1,843**	**–**	**–**
Freight, Insurance and Sales Costs	M$	(266)	(267)	(268)	(267)	(264)	(257)	(255)	(243)	(204)	–	–
Royalties		(94)	(94)	(95)	(94)	(93)	(91)	(90)	(87)	(74)	–	–
Net Revenue	**M$**	**1,993**	**2,000**	**2,007**	**2,002**	**1,975**	**1,925**	**1,913**	**1,837**	**1,565**	**–**	**–**
Operating Costs	M$	(702)	(734)	(724)	(703)	(698)	(680)	(670)	(577)	(480)	–	–
Other Costs	M$	(2)	(1)	(1)	(2)	(1)	(1)	(2)	(1)	(1)	(57)	(56)
Net change in working capital	M$	(7)	(1)	4	4	3	9	(0)	35	24	192	–
Total Expenses	**M$**	**(711)**	**(736)**	**(722)**	**(701)**	**(697)**	**(673)**	**(672)**	**(543)**	**(457)**	**135**	**(56)**
Taxation	M$	(356)	(355)	(346)	(362)	(369)	(354)	(342)	(348)	(358)	(263)	–
Capital Expenditure	M$	(103)	(94)	(87)	(76)	(77)	(75)	(83)	(77)	(56)	–	–
Gécamines Dividends	M$	(206)	(204)	(211)	(213)	(209)	(207)	(202)	(218)	(176)	(72)	–
Net Free Cash	**M$**	**618**	**611**	**641**	**650**	**622**	**616**	**615**	**652**	**517**	**(200)**	**(56)**

The base case valuation of KML's interest in KCC is $6,008 million.

Table 51 to Table 53 present the sensitivity of the NPV to changes in the discount rate applied and revenue, capital expenditure and operating costs, respectively.

Table 51: Sensitivity of NPV to discount rate and changes in metal prices

NPV ($ million)		*Change in metal prices*				
		-20%	**-10%**	**0%**	**10%**	**20%**
Discount Rate	8.0%	4,582	5,717	6,860	7,935	8,987
	10.0%	4,012	5,008	6,008	6,946	7,859
	12.0%	3,547	4,431	5,315	6,142	6,944
	14.0%	3,162	3,954	4,744	5,481	6,193

Table 52: Sensitivity of NPV to discount rate and changes in operating costs

NPV ($ million)		*Change in operating costs*				
		-20%	**-10%**	**0%**	**10%**	**20%**
Discount Rate	8.0%	7,513	7,155	6,860	6,511	6,210
	10.0%	6,525	6,265	6,008	5,704	5,442
	12.0%	5,769	5,541	5,315	5,047	4,816
	14.0%	5,147	4,945	4,744	4,505	4,299

Table 53: Sensitivity of NPV to discount rate and changes in capital expenditure

NPV ($ million)		*Change in capital expenditure*				
		-20%	**-10%**	**0%**	**10%**	**20%**
Discount Rate	8.0%	6,986	6,967	6,860	6,752	6,641
	10.0%	6,128	6,108	6,008	5,908	5,805
	12.0%	5,429	5,409	5,315	5,220	5,124
	14.0%	4,854	4,833	4,744	4,654	4,564

The sensitivity of the base case valuation to all three factors is shown graphically in Figure 43.

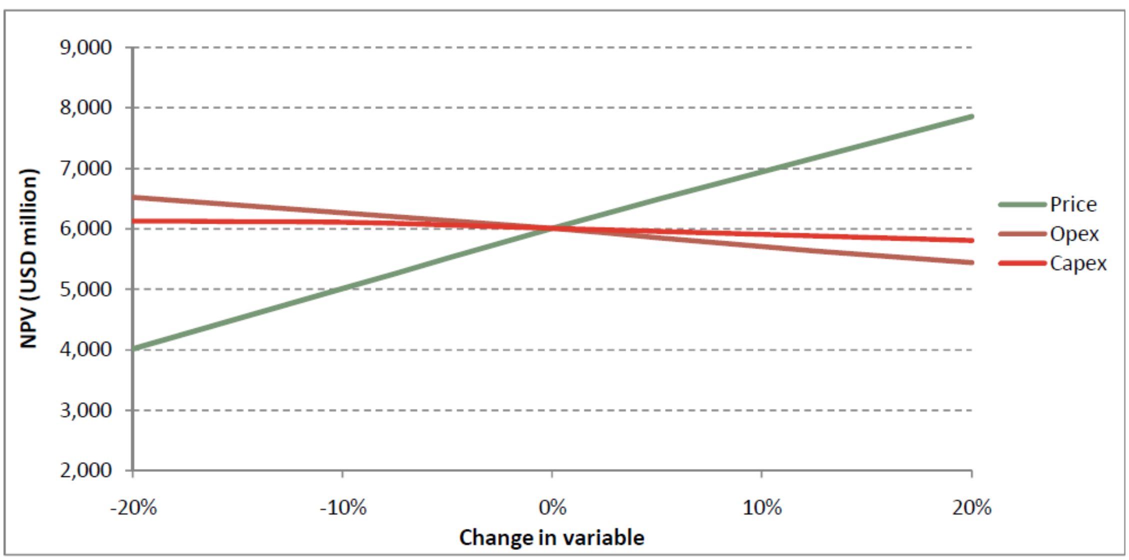

Figure 43: The sensitivity of Base Case NPV to changes in metal price, opex and capex

The project is most sensitive to metal prices – a 1% increase/decrease in metal prices causes a $103 million increase/decrease in NPV. A 1% increase/decrease in operating costs causes a $30 million decrease/ increase in NPV. The project is least sensitive to changes in capital expenditure – a 1% increase/decrease causes a $10 million decrease/ increase in NPV.

25.12 Payback

The pay back for the capital invested in Phase 3 and the New Phase 4 of $640 million is less than 1 year. The payback for the invested capital at an interest rate of 7.38% (the sum of the United States Federal Reserve five year interest rate swap of 2.38% and a 5.00% risk premium) is approximately 1 year.

25.13 Mine Life

Based on the assumptions as at 31 December 2010, KCC has proven and probable mineral reserves of 97 million tonnes of ore with a grade of 4.2% Cu and 0.47 %Co, which support the LOM plans described in section 25.1.

GOLDER ASSOCIATES AFRICA (PTY) LTD.

/s/ W van der Schyff

W van der Schyff
Project Manager

Reg. No. 2002/007104/07
Directors: FR Sutherland, AM van Niekerk, SAP Brown, L Greyling

APPENDIX A

Abbreviations and Glossary of Terms

LIST OF ABBREVIATIONS

Abbreviations

3D	Three dimensional
AAS	Atomic Absorption Spectroscopy
AICo	Acid-Insoluable Cobalt
AICu	Acid-Insoluable Copper
ARD	Acid rock drainage
ASCu	Acid Soluble Copper
BH	Breche Heterogene or Heterogenous breccias
BOMZ	Black Ore Mineral Zone
CAF	Cut and Fill
CAMI	Cadastre Minier de la Republique Démocratique du Congo
CCIC	Caracle Creek International Consulting (Pty) Ltd (CCIC) - South Africa
CV	Coefficient of Variation
D Strat	Dolomie Stratifie or Stratified Dolomite
DCF	Discount Cash Flow
DCP	DRC Copper and Cobalt Project SARL
DPEM	Department for the Protection of the Mining Environment
DRC	Democratic Republic of Congo
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMS	Environmental Management System
ERT	Emergency Response Team
ESIA	Environmental and Social Impact Assessment
EW	Electrowinning
GAA	Golder Associates Africa (Pty) Ltd
GCM	La Generale des Carrieres et des Mines
GEC	Global Enterprises Corporate Ltd
IFC	International Finance Corporation
ITR	Independent Technical Report
IWWMP	Integrated Water and Waste Management Plan
JORC	Australian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, 2004 Edition
KCC	Kamoto Copper Company SARL
KEOP	Kamoto East Open Pit
KFL	Katanga Finance Limited
KITD	Kamoto Interim Tailings Dam
KML	Katanga Mining Limited
KNOP	Kamoto North Open Pit
KOV	Kamoto Oliviera and Virgule

KTC	Kamoto Concentrator
KTE	Kamoto East Underground Mine
KTO	Kamoto Underground
Libor	London Interbank Offering Rate
LME	London Metal Exchange
LOM	Life of Mine
Luilu Refinery	Luilu Metallurgical Plant
MAX	Maximum
MIN	Minimum
MVT	Mississippi Valley Type
NPV	Net Present Value
OBI	Lower Ore Body or Ore Body Inferior
OBS	Upper Ore Body or Ore Body Superior
OK	Ordinary Kriging
P&G	Preliminary and General
PE	Permit d'Exploitation
PPCF	Post Pillar cut and fill
QA/QC	Quality Assurance and Quality Control
RAP	Room and Pillar
RAT	Roches Argilleuses Talceuse
RATGR	Mineralization in the Rat Grises
ROAN	Roan Supergroup
ROM	Run of Mine
RSC	Roches Silicieuses Cellulaires or Siliceous Rocks with Cavities
RSF	Roches Siliceuses Feuilletées Foliated (Laminated) and Silicified Rocks
RSV	Read, Swatman & Voigt (Pty) Ltd.
SDB	Schistes De Base or Basal Schists
SDS	Shales Dolomitiques Superieurs or Upper Dolomitic Shales
SGS	SGS Consulting (Pty) Ltd.
SIMCO	La Société Immobilière du Congo
SKM	Heavy vehicle workshops
SLC	Sublevel Caving
SMU	Selective Mining Unit
SNEL	Société Nationale d'Electricité
SNOWDEN	Snowden Mining Services
SRK	SRK Consulting (South Africa) (Pty) Limited
Surpac	GECOM Surpac Mining Planning Software
SX	Solvent Extraction
TDS	Total Disolved Solids
TSF	Tailing Storage Facility
TSS	Total Suspended Solids

UG	underground
WACC	Weighted Average Cost of Capital
Whittle	GEMCOM Whittle Pit Optimisation Software
WRD	Waste Rock Dump
Units	
%	percentage
%ASCu	percentage Acid Soluble copper
%CaO	percentage calcium oxide
%Cu	percentage copper
%CuO	percentage copper as oxide
%TCo	percentage total cobalt
%TCu	percentage total copper
±	plus or minus
°	Degrees
kg	Kilogram
km	kilometre
km2	square kilometres
kt	kilo tonne
m	metre
Mt	Million tonnes
Mtpa	Million tonnes per annum
tpa	tonnes per annum
tpd	tonnes per day
tph	tonnes per hour
Chemical Elements	
$(Co,Cu)_2S_4$	Chemical composition of carrolite
(Co,Cu,Mn,Fe)O(OH)	Chemical composition of heterogenite
$(Cu,Co)_2(CO_3)(OH)_2$	Chemical composition of kolwezite
(Fe,Co)O(OH)	Chemical composition of goethite
Co	Chemical composition of cobalt
$Co(OH)_2$	Chemical composition of cobalt hydroxide
Cu	Chemical composition of copper
$Cu_2CO_3(OH)_2$	Chemical composition of malachite
Cu_2O	Chemical composition of cuprite
Cu_2S	Chemical composition of chalcocite
$Cu_3(PO_4)(OH)_3$	Chemical composition of cornetite
$Cu_5(PO_4)_2(OH)_4H_2O$	Chemical composition of pseudomalachite

Cu_5FeS_4	Chemical composition of bornite
CuO	Chemical composition of copper oxide
CuS	Chemical composition of covellite
H_2S	Hydrogen sulphide
Mn	Manganese
$Na_2S_2O_5$	Sodium meta-bisulphite
NaHS	Sodium hydrogen sulphide

GLOSSARY OF TECHNICAL TERMS AND DEFINITIONS

2008 Feasibility Study	Feasibility Study on Kamoto Operating Limited compiled by SRK Consulting (South Africa) (Pty) Limited dated November 2008
2009 Technical Report	SRK Consulting (South Africa) (Pty) Limited Technical Report dated 17 March 2009
2010 Technical Report	Technical report prepared by KML, entitled "A Technical Report on the Material Assets of KML, Katanga Province, DRC" dated 31 March 2010
AJVA	Has the meaning ascribed to it in Section 6.1 "KCC Rights"
Argillaceous	Term describing sedimentary rock with modal grain size in the silt fraction
Assay	The chemical analysis of mineral samples to determine the metal content
Basal conglomerate	A conglomerate formed at the earliest portion of a stratigraphical unit
Bond Rod Mill Work Index	Refers to the traditional measurements of ore grindability for large/intermediate particle sizes or course rock sizes (75mm – 50mm)
Bond Ball Mill Work Index	Refers to the tradition measurements of ore grinability for small particle sizes (<3mm)
Dip	Angle of inclination of a geological feature/rock from the horizontal
Diamictite	A sedimentary rock with particle sizes ranging from clay to boulder size
Drill-hole	Method of sampling rock that has not been exposed
D Strat (Stratified Dolomite or Dolomie Stratfie)	This is a well bedded to laminated, argillaceous dolomite, which forms the base of the traditional "Lower Ore Zone" in GCM' nomenclature
Fault	The surface of a fracture along which movement has occurred
Gecamines	Generale de Carrieres et des Mines, State-owned Mining Company in the DRC - principally concerned with Copper Mining in Katanga province
Grade	The measure of concentration of copper or cobalt within mineralized rock
indicated mineral resource	The part of a mineral resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a reasonable level of confidence. It is based on exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. The locations are too widely or inappropriately spaced to confirm geological and/or grade continuity but are spaced closely enough for continuity to be assumed
Katangan Copperbelt	Refers to the copper mineral complex which stretches between Zambia and the DRC and in this instance refers to the copper found in the Katangan region
KOV Open Pit	KOV open pit mine, an operating open pit mine
Lithology or lithogical	Geological description pertaining to different rock types
Lower Roan	Subgroup of the Roan Group consisting of shales with grit; dolomites; Argillaceous dolomites; arenites and argillites; main Cu stratiform

	mineralization, also referred to as R2
Mashamba East Open Pit	Mashamba East mine, a dormant open pit mine
Material Assets	Shall have the meaning ascribed to such term in Section 3.2 of the ITR.
measured mineral resource	The part of a mineral resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a high level of confidence. It is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. The locations are spaced closely enough to confirm geological and grade continuity
Metasedimetary	Metamorphosed sedimentary rock
mineral resource	A concentration or occurrence of material of economic interest in or on the earth's crust in such form, quality and quantity that there are reasonable and realistic prospects for eventual economic extraction. The location, quantity, grade, continuity and other geological characteristics of a mineral resource are known, estimated from specific geological evidence and knowledge, or interpreted from a well constrained and portrayed geological model. Mineral resources are sub-divided in order of increasing confidence, in respect of geoscientific evidence, into inferred, indicated and measured categories
Musonoie-T-17 West	The Musonoie-T17 open pit mine is the initial oxide source for the mine complex. It is a new site, with no significant production history to date. Pre-stripping began in May 2007 and the first blast was fired at the end of September 2007
Mwashya or R4	Altered stratified greyish siliceous dolomitic rock with oolitic horizons and a few bands of light yellow talcose schist
Nappe	A highly folded body of rock which has suffered considerable tectonic transport on an orogenic belt
Orogeny	An orogeny is a period of mountain building leading to the intensely deformed belts which constitute mountain ranges
probable mineral reserve	The economically mineable material derived from a measured and/or indicated mineral resource. It is estimated with a lower level of confidence than a proved mineral reserve. It is inclusive of diluting materials and allows for losses that may occur when the material is mined. Appropriate assessments, which may include feasibility studies, have been carried out, and including consideration of, and modification by, realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction is reasonably justified
Proterozoic	Era of geological time between $2,5x10^9$ and $570x10^6$ years ago
proved mineral reserve	The economically mineable material derived from a measured mineral resource. It is estimated with a high level of confidence. It is inclusive

	of diluting materials and allows for losses that may occur when the material is mined. Appropriate assessments, which may include feasibility studies, have been carried out, including consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction is reasonably justified
Pseudomorph	A secondary mineral which has replaced another but maintained its shape
Roches Argilleuses Talceuse (RAT)	The RAT is considered the boundary between the R2 and R1 units and consists of an upper RAT Grises (R2) and a lower RAT Lilas (R1)
Roches Siliceuses Feuilletées Foliated (Laminated) and Silicified Rocks (RSF)	This is a grey to light brown thinly bedded laminated and highly silicified dolomites
Roches Silicieuses Cellulaires or Siliceous Rocks with Cavities (RSC)	Vuggy and infilled massive to stromatolitic silicified dolomites
Sandstone	Clastic sedimentary rock with more than 25% clasts of sand
Schist/s	A regionally metamorphosed rock characterised by a parallel arrangement of the bulk of the constituent minerals
Schistes De Base or Basal Schists (SDB)	Reddish-brown to grey silty and nodular dolomite to siltstone
Sedimentary	Rocks formed by the accumulation of sediments, formed by the erosion of other rocks
Shales Dolomitiques Superieurs or Upper Dolomitic Shales (SDS)	Yellowish, cream to red bedded laminated dolomitic siltstones and fine-grained sandstones.
Standard deviation	Is the square root of the variance
Stratigraphy	Study of stratified rocks in terms of time and space
Sedimentary	Rocks formed by the accumulation of sediments, formed by the erosion of other rocks
Silicilastics	Clastic rock where the clasts within the rock are mostly silicate minerals
Shale	Argillaceous rock with closely spaced, well defined laminae
Syn	Together with
Tectonic	Relating to a major earth structure and its deformation
T-17 Open Pit	T-17 Musonoi Open Pit Mine
Tilwezembe Open Pit	Tilwezembe, a recently closed open pit mine
Transgression	An incursion of the sea over land area or over a shallow sea
Variance	Is the difference between the sample value and the mean grade
Volcanics	One of three groups into which rocks have been divided. The volcanic assemblage includes all extrusive rocks and associated intrusive ones
Volcaniclastics	One of the three groups into which rocks have been divided. The volcanic assemblage includes all extrusive rocks and associated

	intrusive ones

APPENDIX B

Exploratory Data Analysis and Variography Analysis

EXPLORATORY DATA ANALYSIS

KTO Mine

The tables below present statistics for Kamoto Principal, Etang North and Etang South.

Statistical Analysis of Kamoto Principal

Lithology	Variable	No Samples	Minimum	Maximum	Mean	Std. dev
Dstrat	**%TCu**	427	0.11	9.56	4.08	1.4
RSF		404	0.14	22	4.79	1.66
RSC_B		241	0.1	27.4	7.59	3.87
RSC_T		165	0.24	18.3	5.97	3.53
SD1A		326	0.4	22.4	5.87	2.19
Dstrat	**%TCo**	393	0.01	8.24	0.36	0.44
RSF		378	0.01	3.15	0.3	0.26
RSC_B		224	0.03	5.99	0.51	0.68
RSC_T		159	0.01	4.39	0.73	0.65
SD1A		307	0.01	6.4	0.63	0.51

Statistical Analysis of Etang South

Lithology	Variable	No Samples	Minimum	Maximum	Mean	Std. dev
Dstrat	%TCu	89	0.3	7.62	2.89	1.33
RSF		103	0.2	16.16	3.44	1.44
RSC_B		50	0.18	12.05	2.98	2.35
RSC_T		39	0.25	12	2.46	1.87
SD1A		155	0.15	13.2	5.92	2.97
Dstrat	%TCo	91	0.08	17.61	0.75	1.84
RSF		104	0.1	2.55	0.6	0.42
RSC_B		49	0.22	5.94	1.22	1.06
RSC_T		40	0.17	2.96	0.96	0.61
SD1A		154	0.07	3.96	1.04	0.74

Statistical Analysis of Etang North

Lithology	Variable	No Samples	Minimum	Maximum	Mean	Std. dev
Dstrat	**%TCu**	28	0.5	3.37	2.03	0.67
RSF		23	0.59	5.15	3.02	1.15
RSC_B		16	0.88	12	3.58	2.8
RSC_T		9	0.67	7.3	3.54	2.54
SD1A		45	0.22	8.07	3.36	1.47
Dstrat	**%TCo**	23	0.12	0.84	0.42	0.17
RSF		17	0.09	0.99	0.42	0.26
RSC_B		12	0.31	2.32	1.14	0.65
RSC_T		7	0.58	2.52	1.24	0.59
SD1A		31	0.32	2.39	0.82	0.54

T-17 Open Pit

The lithological wireframes were used to extract the sample data, and the data was composited to 2.5m lengths. Statistics from the composite files are tabulated below. GAA could reproduce this table.

Statistical Analysis of T-17 Open Pit

Lithology	Variable	No. Samples	Minimum	Maximum	Mean	Std. dev	CoV
BOMZ	%TCu	386	0,10	15.87	**4.18**	3.36	0.80
SDB		202	0,10	15.87	**5.14**	4.04	0.79
RSC		202	0,00	19.20	**1.65**	2.84	1.72
RSF		135	0,15	10.72	**2.94**	2.47	0.84
DSTRAT		101	0,27	9.85	**3.93**	2.60	0.66
BOMZ	%TCo	386	0,00	7.40	**0.51**	0.87	1.73
SDB		202	0,00	7.40	**0.78**	1.07	1.38
RSC		202	0,00	4.70	**0.44**	0.81	1.84
RSF		135	0,08	7.60	**0.99**	1.18	1.20
DSTRAT		101	0,07	4.06	**0.39**	0.48	1.24

KOV Open Pit

Assay data for each lithology were extracted from the database using the lithological wireframes. The lithological sample data were then composited separately at intervals of 2,5 m. The RSC was composited across the entire lithology unit, and the statistics reflect the sample intervals.

Statistics from the lithological composites within each of the four fragments are presented in the tables below.

Statistical Analysis of KOV Open Pit; Virgule

Lithology	Variable	No Samples	Minimum	Maximum	Mean	Std dev
BOMZ	%TCu	77	0.10	12.00	3.54	3.10
	%TCo	112	0.00	3.62	0.46	0.67
SDB	%TCu	296	0.02	12.92	5.97	3.60
	%TCo	371	0.00	11.50	0.46	0.84
RSC	%TCu	384	0.08	23.14	4.39	3.47
	%TCo	587	0.00	5.00	0.21	0.40
RSF	%TCu	171	0.14	12.00	6.20	3.03
	%TCo	244	0.00	2.25	0.19	0.32
DSTRAT	%TCu	103	0.50	12.00	6.43	2.41
	%TCo	128	0.00	1.52	0.22	0.31
RATGR	%TCu	49	0.80	14.35	6.36	3.42
	%TCo	103	0.00	0.99	0.09	0.16

Statistical Analysis of KOV Open Pit; Oliviera

Lithology	Variable	No Samples	Minimum	Maximum	Mean	Std dev
BOMZ	%TCu	72	0.15	7.88	2.05	1.99
	%TCo	80	0.00	2.25	0.41	0.42
SDB	%TCu	250	0.10	13.68	5.59	2.48
	%TCo	239	0.00	3.66	0.93	0.70
RSC	%TCu	266	0.10	16.59	4.72	3.71
	%TCo	512	0.00	4.58	0.29	0.55
RSF	%TCu	120	0.40	14.99	5.40	3.16
	%TCo	111	0.00	2.90	0.38	0.48
DSTRAT	%TCu	73	0.91	12.00	4.92	2.31
	%TCo	71	0.00	1.61	0.32	0.33
RATGR	%TCu	43	0.60	16.41	4.80	2.78
	%TCo	60	0.00	1.24	0.23	0.33

Statistical Analysis of KOV Open Pit; FNSR

Lithology	Variable	No Samples	Minimum	Maximum	Mean	Std dev
BOMZ	%TCu	9	0.53	12.00	5.24	3.41
	%TCo	11	0.00	2.85	0.67	0.89
SDB	%TCu	71	1.11	12.00	7.93	3.16
	%TCo	79	0.00	6.15	0.42	0.88
RSC	%TCu	69	0.15	12.00	5.27	4.28
	%TCo	110	0.00	1.96	0.18	0.29
RSF	%TCu	25	1.66	12.47	5.76	2.40
	%TCo	25	0.02	0.47	0.18	0.13
DSTRAT	%TCu	7	4.30	8.98	7.17	1.48
	%TCo	9	0.00	0.16	0.04	0.05
RATGR	%TCu	2	4.06	8.02	6.04	1.98
	%TCo	2	0.02	0.07	0.04	0.02

Statistical Analysis of KOV Open Pit; Kamoto East

Lithology	Variable	No Samples	Minimum	Maximum	Mean	Std dev
BOMZ	%TCu	27	0.17	13.22	6.16	3.31
	%TCo	43	0.00	4.96	0.71	0.97
SDB	%TCu	133	0.08	14.38	6.32	3.34
	%TCo	173	0.00	4.63	0.41	0.59
RSC	%TCu	206	0.11	16.07	4.20	3.72
	%TCo	288	0.00	2.52	0.22	0.29
RSF	%TCu	76	0.21	10.84	5.09	3.11
	%TCu	96	0.00	1.50	0.26	0.30
DSTRAT	%TCo	43	0.21	11.55	5.53	2.89
	%TCu	70	0.00	1.40	0.21	0.28
RATGR	%TCo	15	3.02	9.02	6.37	1.71
	%TCu	25	0.00	0.86	0.13	0.19

Mashamba East Open Pit

The lithological wireframes were used to extract the sample data, and the data were composited to 2,5m lengths. Statistics from the composite files are tabulated below.

Statistical Analysis of Mashamba East Open Pit

Lithology	Geozone	Variable	No Samples	Minimum	Maximum	Mean	Std. dev	CV
BOMZ	WEST	%TCu	125	0.01	10.60	0.48	1.40	2.94
		%TCo	125	0.01	0.44	0.09	0.11	1.20
	EAST	%TCu	66	0.01	12.00	0.70	1.78	2.53
		%TCo	66	0.01	1.08	0.14	0.23	1.65
SDB	WEST	%TCu	237	0.01	19.26	1.19	2.46	2.06
		%TCo	237	0.01	4.14	0.36	0.61	1.69
	EAST	%TCu	64	0.01	9.15	1.82	2.51	1.38
		%TCo	64	0.01	2.63	0.33	0.48	1.42
RSC	WEST	%TCu	248	0.01	12.00	0.60	2.00	3.34
		%TCo	248	0.00	2.01	0.07	0.23	3.24
	EAST	%TCu	112	0.01	12.00	0.69	2.06	2.98
		%TCo	112	0.01	0.66	0.04	0.08	2.31
RSF	WEST	%TCu	440	0.01	12.00	2.28	2.85	1.25
		%TCo	440	0.00	2.80	0.37	0.54	1.46
	EAST	%TCu	119	0.01	11.37	3.83	2.96	0.77
		%TCo	119	0.00	1.28	0.14	0.22	1.56

Kananga Mine

The summary statistics of the declustered one-metre composite data of the various rock types are tabulated below. The composite data was declustered using a cell size of 25 m E by 25 m N by 1 m RL that approximates the drill-hole spacing in the closer spaced areas.

Statistical Analysis of Kananga Mine

Domain	Variable	No Samples	Minimum	Maximum	Mean	CV
UOB_OX	%TCu	250	0.08	10.05	1.13	1.1
MID_OX		528	0.02	0.64	0.16	0.6
LOB_OX		297	0.03	9.28	1.93	0.8
UOB_SL		122	0.01	6.1	1.83	0.6
MID_SL		269	0.02	1	0.26	0.6
LOB_SL		234	0.13	6.75	2.18	0.6
UOB_OX	%AsCu	250	0.02	9.05	0.85	1.2
MID_OX		528	0.01	0.62	0.12	0.8
LOB_OX		297	0.01	9.26	1.26	1.1
UOB_SL		122	0.01	1.61	0.15	1.2
MID_SL		269	0.01	0.39	0.07	1
LOB_SL		234	0.01	2.99	0.22	1.6
UOB_OX	%TCo	250	0.06	4.51	0.64	1.2
MID_OX		528	0.02	2.73	0.27	0.8
LOB_OX		297	0.02	3.37	0.7	0.8
UOB_SL		122	0.01	4.79	0.94	1.1

Domain	Variable	No Samples	Minimum	Maximum	Mean	CV
MID_SL		269	0.06	2.03	0.53	0.6
LOB_SL		234	0.02	3.49	1.05	0.7

Tilwezembe Open Pit

The summary statistics of the declustered one-metre composite data of the various rock types are presented in table below. The composite data was declustered using a cell size of 25 mE by 25 mN by 1 mRL that approximates the drill-hole spacing in the closer spaced areas.

Statistical Analysis of Tilwezembe Open Pit

Domain	Variable	Samples	Minimum	Maximum	Mean	CV
OX_MNDOL	%TCu	1054	0.01	26.5	1.27	1.91
OX_BREC		485	0.1	19.84	3.78	0.89
OX_TILAR		674	0.05	4.92	0.56	1.05
SL_MNDOL		511	0.03	37	1.19	2.42
SL_BREC		339	0.02	21.38	3.29	0.97
SL_TILAR		406	0.01	6.27	0.53	1.28
OX_MNDOL	%ASCu	1054	0.01	14.12	0.91	1.85
OX_BREC		485	0.05	14.28	3.16	0.96
OX_TILAR		674	0.01	4.9	0.44	1.17
SL_MNDOL		511	0.01	6.88	0.24	2.97
SL_BREC		339	0.01	3.52	0.33	1.19
SL_TILAR		406	0.01	1.09	0.13	1.21
OX_MNDOL	%TCo	1054	0.01	11.15	0.5	1.47
OX_BREC		485	0.01	13.47	0.96	1.58
OX_TILAR		674	0.01	3.61	0.29	1.02
SL_MNDOL		511	0.01	7.94	0.38	1.52
SL_BREC		339	0.03	4.98	1.19	1.01
SL_TILAR		406	0.02	4	0.34	1.15

VARIOGRAPHY ANALYSIS

The objectives of variography are to establish the major directions of continuity and to provide the variogram parameters required for geostatistical grade interpolation. The experimental semi-variogram (commonly referred to as the variogram) is the basic diagnostic tool of geostatistics. It is a mathematical function used to quantify the spatial variation and correlation of sample grades in various directions in a deposit. The variogram calculation is similar to the variance and it is arithmetically simple: the differences between pairs of sample values a particular distance apart are squared. This is repeated for increasing distances for all samples within a homogeneous zone. The variogram value is the sum of the squared differences divided by twice the number of pairs.

The experimental variogram can incorporate several important geological characteristics of a deposit in the estimation process. In order to use the experimental variogram in practical applications, the information it conveys must be quantified by fitting a smooth curve (called a model variogram) to the experimental variogram data points. The model variogram is based on a numerical equation and the numerical parameters are used to control various factors of geostatistical grade interpolation. There are a number of standard models that are used.

As the experimental variogram is based on a variance function and the variances must be positive, the model used must be such that all the values calculated from it are positive. It is best to use one of the various models that have been found, from experience, to be representative of the spatial variation that exists in ore deposits. The spherical scheme model is most widely used; other models include exponential model, Gaussian models, etc.

The variography parameters as reported by SRK and reproduced by GAA are tabulated below.

KTO Mine: Omni-directional Variography Parameters

Lithology	DSTRAT		RSF		RSC		SDB		BOMZ	
Variable	%TCu	%TCo	%TCu	%TCo	%TCu	%TCo	%TCu	%TCo	%TCu	%TCo
C0 Nugget Variance	0.01	0	0.031	0.003	0.043	0.004	0.124	0.005	0.042	0.021
C1 Variance	1.26	0.07	1.97	0.12	2.29	0.11	3.26	0.17	1.83	0.18
Range 1 XDirection	9.96	11.87	3.92	3.05	7.83	7.52	6.98	10.96	7.93	56.65
Range 1 YDirection	9.96	11.87	3.92	3.05	7.83	7.52	6.98	23.97	7.93	170
Range 1 ZDirection	5.4	8.4	3.92	8.5	6.7	7.2	6.98	4.96	7.8	11.68
C2 Variance	1.83	0.03	2.82	0.12	5.08	0.11	5.31	0.27	1.39	
Range 2 XDirection	30.98	147.85	30.17	184.05	52.19	70.59	74.36	31.98	272.1	
Range 2 YDirection	30.98	147.85	30.17	184.05	52.19	70.59	74.36	324.92	272.1	
Range 2 ZDirection	24.1	18.2	8.5	15.3	27.4	7.2	8.3	11.3	20.3	
C3 Variance	1.44		1.82				2.43			
Range 3 X Direction	324.96		296.61				189.72			
Range 3 YDirection	324.96		296.61				189.72			
Range 3 ZDirection	24.1		20.3				27.4			

T-17 Open Pit: Omni-directional Variography Parameters

Zone	Variable	C0 Nugget Variance	C1 Variance	Range	C2 Variance	Range2
DSTRAT	%TCu	0.5135	1.775	232.79		
	%TCo	0.03565	0.04481	397.72		
RSF	%TCu	1.589	2.356	126.01	3.421	565.56
	%TCo	0.08955	0.1464	321.98		
RSC	%TCu	0.1042	1.87	178.33		
	%TCo	0.006679	0.2475	180.73		
SDB	%TCu	0.3691	0.8281	256.58		
	%TCo	0.01728	0.05536	194.02		
BOMZ	%TCu	1.984	3.257	283.48		
	%TCo	0.03098	0.02172	283.32		

KOV Open Pit: Omni-directional Variography Parameters for Virgule

Lithology	Variable	C0 Nugget Variance	C1 Variance	Range
BOMZ	%TCu	1.65	3.38	309.38
	%TCo	0.03	0.07	204.17
SDB	%TCu	8.74	3.78	380.12
	%TCo	0.05	0.13	204.08
RSC	%TCu	8.59	3.44	209.69
	%TCo	0.08	0.07	266.89
RSF	%TCu	2.44	0.68	245.78
	%TCo	0.00	0.01	217.35
DSTRAT	%TCu	3.06	2.51	243.89
	%TCo	0.01	0.01	317.03

KOV Open Pit: Omni-directional Variography Parameters for Oliviera

Lithology	Variable	C0 Nugget Variance	C1 Variance	Range
BOMZ	%TCu		2.68	289.22
	%TCo	0.04	0.06	284.57
SDB	%TCu	3.15	1.17	303.40
	%TCo	0.01	0.03	192.65
RSC	%TCu	3.19	1.56	261.88
	%TCo	0.03	0.01	221.57
RSF	%TCu	1.01	2.90	265.60
	%TCo	0.00	0.02	178.66
DSTRAT	%TCu	0.28	1.12	350.92
	%TCo	0.02	0.09	253.91

Mashamba East Open Pit: Omni-directional Variography Parameters

Lithology	Variable	C0 Nugget Variance	C1 Variance	Range
RSF	%TCu	1.943	1.425	157.67
	%TCo	0.04157	0.08539	332.59
RSC	%TCu	1.006	0.6158	210.88
	%TCo	0.07737	0.03845	256.14
SDB	%TCu	1.235	1.564	216.8
	%TCo	0.05093	0.1141	291.64
BOMZ	%TCu	0.1709	2.731	353.88
	%TCo	0.02193	0.03127	467.49

Tilwezembe Open Pit: Variogram Parameters for Manganiferous Dolomites

Variable (%)	C0 Nugget Variance	Structure 1				Structure 2				Direction (Major, Semi-major, Minor)
		C1 Variance	Range Dir 1 (m)	Range Dir 2 (m)	Range Dir 3 (m)	C2 Variance	Range Dir 1 (m)	Range Dir 2 (m)	Range Dir 3 (m)	
%TCu	0.05	0.52	40	20	7	0.43	160	60	14	70,160,-40
%TCo	0.04	0.59	40	15	12	0.37	130	70	12	70,160,-40
%TMn	0.05	0.63	30	10	8	0.32	160	70	12	70,160,-40

Tilwezembe Open Pit: Variogram Parameters for Breccia

Variable (%)	C0 Nugget Variance	Structure 1				Structure 2				Direction (Major, Semi-major, Minor)
		C1 Variance	Range Dir 1 (m)	Range Dir 2 (m)	Range Dir 3 (m)	C2 Variance	Range Dir 1 (m)	Range Dir 2 (m)	Range Dir 3 (m)	
%TCu	0.12	0.13	20	70	10	0.75	160	70	10	70,160,-60
%TCo	0.11	0.22	40	10	3	0.19	40	100	12	70,160,-60
%TMn	0.22	0.48	30	50	7	0.3	180	50	7	70,160,-60

Tilwezembe Open Pit: Variogram Parameters for Tillites and Argillites

Variable (%)	C0 Nugget Variance	Structure 1				Structure 2				Direction (Major, Semi-major, Minor)
		C1 Variance	Range Dir 1 (m)	Range Dir 2 (m)	Range Dir 3 (m)	C2 Variance	Range Dir 1 (m)	Range Dir 2 (m)	Range Dir 3 (m)	
%TCu	0.15	0.4	110	80	15	0.44	125	110	15	80,170,-45
%TCo	0.09	0.18	180	50	2	0.73	180	50	20	80,170,-45
%TMn	0.12	0.53	35	90	12	0.36	160	90	12	80,170,-45

Kananga Mine: Variogram Parameters for Upper Orebody

Variable (%)	C0 Nugget Variance	Structure 1				Structure 2				Direction (Major, Semi-major, Minor)
		C1 Variance	Range Dir 1 (m)	Range Dir 2 (m)	Range Dir 3 (m)	C2 Variance	Range Dir 1 (m)	Range Dir 2 (m)	Range Dir 3 (m)	
%TCu	0.1	0.62	60	90	11	0.36	300	90	11	65,155,-40
%TCo	0.06	0.61	50	20	9	0.33	300	70	9	55,145,-35
%TMn	0.23	0.29	60	10	9	0.49	180	140	9	55,145,-35

Kananga Mine: Variogram Parameters for Internal/Middle Zone

Variable (%)	C0 Nugget Variance	Structure 1				Structure 2				Direction (Major, Semi-major, Minor)
		C1 Variance	Range Dir 1 (m)	Range Dir 2 (m)	Range Dir 3 (m)	C2 Variance	Range Dir 1 (m)	Range Dir 2 (m)	Range Dir 3 (m)	
%TCu	0.12	0.41	50	20	10	0.47	460	230	25	65,155,-40
%TCo	0.02	0.47	70	50	11	0.51	340	290	27	55,145,-35
%TMn	0.05	0.53	50	130	13	0.41	360	130	13	55,145,-35

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

Africa	+ 27 11 254 4800
Asia	+ 86 21 6258 5522
Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 55 21 3095 9500

solutions@golder.com
www.golder.com

Golder Associates Africa (Pty) Ltd.
PO Box 6001
Halfway House, 1685
Thandanani Park
Matuka Close
Halfway Gardens
Midrand
South Afrika
T: [+27] (11) 254 4800

Golder Associates