SECTION XIV: INDEPENDENT TECHNICAL REPORTS

SUB-SECTION C: KATANGA REPORT

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04 May 2011

GLENCORE INTERNATIONAL PLC

Mineral Expert's Report: Kamoto Copper Company (KCC)

Submitted to:
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REPORT

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MINERAL EXPERT'S REPORT: KATANGA MINING LIMITED

Dear Sirs

PURPOSE OF REPORT

Golder Associates Africa (Pty) Ltd ("GAA") has been commissioned by Glencore International AG ("Glencore") on behalf of Glencore International plc (the "Company"), which is expected to be the ultimate parent company of the group, to prepare a Mineral Expert's Report ("MER") in respect of the mining assets owned by and operated by Katanga Mining Limited ("KML") (the "Material Assets"), a company in which Glencore has an interest.

KML owns a 75% equity interest in Kamoto Copper Company SARL ("KCC") which owns the Material Assets which are the subject of this MER.

The Material Assets comprise of the following:

- Kamoto Underground Mine ("KTO");
- T17 Open Pit;
- KOV Open Pit;
- Mashamba East Open Pit;
- Tilwezembe Open Pit;
- Kananga Mine;
- Extension of Kananga Mine;
- The Kamoto Concentrator ("KTC"); and

- Luilu Metallurgical Plant (“Luilu Refinery”).

This MER has been prepared by a team of Competent Persons with each team member possessing the appropriate technical and professional qualifications.

This report, which summarises the findings of GAA’s review, accords with the requirements set out in the United Kingdom Financial Services Authority’s Prospectus Rules (“Prospectus Rules”) and has been prepared having regard to the recommendations for the consistent implementation of the European Commission’s Regulation on Prospectuses No. 890/2004 (the European Securities and Markets Authority (“ESMA”) recommendations) published by the Committee of European Securities Regulators (now the ESMA, as updated on 23 March 2011 following the publication of a consultation paper in April 2010 in relation to content of prospectuses regarding mineral companies) and Chapter 18 of the Hong Kong Listing Rules.

GAA understands that this MER will be included as part of the prospectus (the “Prospectus”) to be published in connection with a global offering of shares and the admission of the ordinary shares of the Company to the Official List of the United Kingdom Financial Services Authority and the admission of such shares to trading on the London Stock Exchange plc’s market for listed securities and the main board of the Hong Kong Stock Exchange Limited (together, “Admission”).

This MER provides an audit of the mineral resource estimates, classification of resources and reserves (to the extent applicable) and evaluation of the Material Assets.

The practices and estimation methods undertaken by GAA are in accordance with the criteria for internationally recognised reserve and resource categories of the “Australasian Code for Reporting Mineral Resources and Ore Reserves” (2004) published by the Joint Ore Reserves Committee (“JORC”) of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and the Minerals Council of Australia (the “JORC Code”).

In addition, GAA is of the opinion that such practices and estimations accord with the requirements set out in the Prospectus Rules in conjunction with the ESMA recommendations. In this report, all reserves and resources estimates, initially prepared by KCC in accordance with the JORC Code, have been substantiated by evidence obtained from GAA’s site visits, interviews, own data collection, analysis and modelling. Where appropriate reliance has been placed on the work of other experts, in particular the Independent Technical Report on KML’s Material Assets Report (March 2009) compiled by SRK Consulting, which was prepared in order to ensure compliance with the National Instrument 43-101: Standards of Disclosure for Mineral Companies (“NI 43-101”). Only proven and probable reserves have been valued, which accords with the requirements set out in the Prospectus Rules in conjunction with the ESMA recommendations. Other assets of KML, which include extensive resources, have not been included in the valuation.

CAPABILITY AND INDEPENDENCE

GAA has 50 years of mining and engineering expertise built up on 6 continents. GAA operates as an independent technical consultant providing resource evaluation, mining engineering and mine valuation services to clients. GAA has received, and will receive, professional fees for its preparation of this report. However, neither GAA nor any of its directors, staff or sub-consultants who contributed to this report has any interest in:

- the Company, Glencore, KML, KCC or any of their subsidiaries; or
- the Material Assets reviewed.

Drafts of this report were provided to Glencore, KML and KCC, but only for the purpose of confirming both the accuracy of factual material and the reasonableness of assumptions relied upon in the report.

For the purposes of Prospectus Rule 5.5.3R(2)(f), GAA is responsible for this report as part of the Prospectus and declares that it has taken all reasonable care to ensure that the information contained in this report is, to the best of its knowledge, in accordance with the facts and contains no omission likely to affect its import. This declaration is included in the Prospectus in compliance with item 1.2 of Annex I and item 1.2 of Annex III of the Prospectus Directive Regulation.

This MER has been prepared based on a technical and economic review by a team of consultants and associates sourced from the GAA's Johannesburg offices. Details of the qualifications and experience of the consultants who carried out the work are included in the MER.

METHODOLOGY

The methodology used to compile this report consists of the following:

- site visits conducted by GAA representatives between October and December 2010 to inspect the mine site (open pits and underground workings), plant and processing facilities, waste dumps and tailings facilities in order to audit technical content of previous Technical Reports and studies conducted for and on behalf of KML and where necessary for GAA staff to evaluate current requirements and future developments;
- interviews with various senior KCC managers;
- GAA own data analysis, engineering, financial, resource, mining and resource modelling; and
- reliance on previous technical studies and experts reports.

The information contained in this report is current and effective from 1 January 2011, unless otherwise indicated. The results of GAA evaluation are as set out in this MER.

All opinions, findings and conclusions expressed in this report are those of GAA and its sub-consultants.

DECLARATIONS

GAA will receive a fee for the preparation of this MER in accordance with normal professional consulting practice. This fee is not contingent on the outcome of Admission and GAA will receive no other benefit for the preparation of this report. GAA does not have any pecuniary or other interests that could reasonably be regarded as capable of affecting its ability to provide an unbiased opinion in relation to the mineral resources, ore reserves and the valuation of Material Assets.

GAA does not have, at the date of this report, and has not previously had any shareholding in or other relationship with the Company, Gelncore, KML or KCC and consequently considers itself to be independent of the Company, Glencore, KML and KCC.

The results of the technical and economic reviews are summarised herein.

GLOSSARY OF TERMS

Defined and technical terms used in this report are set out in APPENDIX A of this MER.

QUALIFICATIONS OF CONSULTANTS

The individuals listed in the table below, have provided input to this MER are Qualified/ Competent Persons as defined in the JORC Code, the Prospectus Rules, the ESMA recommendations and Chapter 18 of the Hong Kong Listing Rules and have extensive experience in the mining industry and are members in good standing of appropriate professional institutions.

Name	Company	Qualification
Peter Onley	GAA	MBA MSc BSc(Hons) FAusIMM CP Peter Onley has more than 40 years experience in the mining industry holding qualifications in geology, geotechnical engineering and business.

Name	Company	Qualification
		He has worked in a variety of roles, starting as an exploration geologist, a mining geologist, exploration manager, mineral industry consultant, business manager and director of two Australian listed companies. He has worked as a mining industry consultant for over 25 years. He was formerly a director of Golder Associates Pty Ltd employing more than 800 staff in Australia. He has consulted to the industry on a wide range of commodities including diamonds, gold, uranium, iron-ore, bauxite, base metals and both sulphide and lateritic nickel together with some minor commodities such as molybdenum and tungsten. He has for some years been a member of the Geological Survey Liaison Committee which reviews and advises on future work programs for the Geological Survey of Western Australia. He is also a member of the AusIMM Geoscience Committee.
Willem van der Schyff	GAA	BSc (Geology), GDE (Mine Engineering) Willem is an Associate with Golder Associates, the Business Unit Leader for the Mining Services Business Unit and a geologist specialising in resource modelling and evaluation. He has 20 years experience on diverse commodities, ranging from Iron Ore, Coal, Heavy Mineral Sands, Base Metals, Gold, Bauxite and Industrial Minerals, on five continents. This experience includes exploration geology, mining geology and resource modelling and estimation. He is a registered Professional Geologist with the South African Council for Natural Scientific Professions and is a member of the Geological Society of South Africa.
Jaco Lotheringen	Ukwazi	B Eng Mining Engineering (UP), Mine Manager's Certificate of Competency Jaco is currently a director of Ukwazi Mining and it its senior mine engineer. He has 12 years mining experience and has been involved in resource estimates, mine feasibility and mine design studies for the past 6 years for major mining companies such as Kumba, BHP Billiton and Anglo Platinum. His professional memberships include: Registered as a Professional Engineer at Engineering Council of South Africa (20030022); Registered as a Member at South African Institute of Mining and Metallurgy (SAIMM) (701237). Member of the Institute of Directors in South Africa.

Name	Company	Qualification
		Jaco has specific commodity experience in precious metals (gold, platinum), base metals (iron and copper) and minerals such as coal.
Anthony James Nieuwenhuys	SNC Lavlin	BSC (Eng) MDP Anthony James Nieuwenhuys is Managing Director – SNC-Lavalin South Africa with over 30 years of extensive experience in managing international multi-disciplinary projects in the mining, metallurgical and beverage sectors. This experience includes both technical and financial aspects of major projects. Mr Nieuwenhuys' management capabilities include sourcing and arranging financing for projects, strong organizational and interpersonal skills, leadership, initiative, marketing, managing a multi-disciplinary engineering company and the ability to work in different business environments. On the technical side, James has extensive experience in the design, construction and operational aspects of most metallurgical facilities and has specific mining and commodity experience in respect of gold, nickel, diamonds and cobalt.

This report was prepared by GAA in order to support the mineral reserve and resource information contained in the Prospectus. The project manager of the Technical Report was Spencer Eckstein and project director was Frank Wimberley.

Yours Faithfully,

GOLDER ASSOCIATES AFRICA (PTY) LTD.

Frank Wimberley
Project Director

Willem van der Schyff
Competent Person

SE/WvdS/kf

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

Golder Associates Africa (Pty) Ltd (“GAA”) was commissioned by Glencore International AG (”Glencore”) on behalf of Glencore International Plc (the “Company”) which is expected to be the ultimate parent company of the group, in November 2010 to prepare a Mineral Experts Report (“MER”) in respect of the Material Assets (as described below) owned and operated by, Katanga Mining Limited (“KML”), a company in which Glencore has a majority shareholding.

KML owns a 75% equity interest in Kamoto Copper Company SARL (“KCC”) which owns the Material Assets, which are the subject of this report.

The Material Assets comprise of the following

- Kamoto Underground Mine (“KTO”)
- T-17 Open Pit
- KOV Open Pit
- Mashamba East Open Pit
- Tilwezembe Open pit
- Kananga Mine
- Extension of Kanaga Mine
- The Kamoto Concentrator (“KTC”)
- The Luilu Metallurgical Plant (“Luilu Refinery”)

Further details of the Material Assets are set out in the paragraphs below

The purpose of the MER is to provide a technical report which evaluates the nature and value of the Material Assets held by KCC in order to assist Glencore in listing on the London and Hong Kong stock exchange.

The MER is based on the KML Technical Report dated 17 March 2009 compiled by SRK Consulting (South Africa) (Pty) Limited which has been up-dated to confirm current resource and reserve statements and to include amendments to mine plans and project development activities. The MER also includes observations and comments from GAA following site audits conducted in December 2010 to determine environmental compliance with Equator Principles and to assess closure costs.

This MER has been prepared in accordance with the Australasian Code for Reporting of Exploration Results Mineral Resources and Ore Reserves (2004) published by the Joint Ore Reserves Committee (“JORC”) of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and the Minerals Council of Australia. In respect of the valuations, they have been prepared under the guidelines of the Code for the Technical Assessment and Valuation of Mineral and Petroleum Assets and Securities for Independent Expert Reports (2005 edition), as prepared by the VALMIN Committee, a joint committee of the Australasian Institute of Mining and Metallurgy, the Australian Institute of Geoscientists and the Mineral Industry Consultants Association.

The methodology used to compile this report consists of the following:

- Site visits conducted by GAA representatives between October and December 2010 to inspect the mine site (open pits and underground workings), plant and processing facilities, waste dumps and tailings facilities in order to audit technical content of previous technical reports and studies conducted for and on behalf of KML and where necessary for GAA staff to evaluate current requirements and future developments;

- Interviews with various senior KCC managers;
- GAA own data analysis, engineering, financial, resource, mining and resource modelling
- Reliance on previous technical studies and experts reports.

The information contained in this report is current and effective from 1 January 2011, unless otherwise indicated. The results of GAA evaluation are set out below.

1.2 Ownership

KML, an entity listed on the Toronto Stock Exchange in Canada (TSX:KAT), holds a 75% stake in KCC a joint venture with La Generale des Carrieres et des Mines ("GCM"), a State-owned mining company in the DRC.

1.3 History

Following the merger of KML and Nikanor PLC ("Nikanor") in January 2008, the Material Assets were held by KML through a 75% equity interest in KCC and a 75% equity interest in DRC Copper and Cobalt Project SARL ("DCP"). The balance of the equity interest in both KCC and DCP was owned by GCM.

In April 2007, prior to the merger of KML and Nikanor, a Commission of Enquiry was formed by the DRC government to review approximately sixty (60) mining agreements entered into by para-statal companies of the Congolese government. The KCC joint venture agreement and the DCP joint venture agreement were included in the mining agreements to be reviewed.

The Commission provided its conclusions in its report made public in November 2007.

KCC and DCP were notified on 11 February 2008 by the DRC Ministry of Mines of the objections and requirements regarding their partnerships with GCM further to the above-mentioned November 2007 report.

In July 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 2008, the DRC Ministry of Mines issued terms of reference for the renegotiations 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 on 25 July 2009 (which is also its date of entry into force) an agreement (the "Amended Joint Venture Agreement") which resulted in the termination of the original KCC joint venture agreement and DCP joint venture agreement. The merger of KCC and DCP was ratified by Presidential Decree on 27 April 2010.

The consequences of the Amended Joint Venture Agreement on KCC mining rights and equipment installations are;

- The whole of PE525 (comprising 13 carres) and part of PE4958 (i.e. new PE11602 described below and comprising two carres containing the T17 deposit) was transferred to KCC. The Kamoto, Mashamba East and T17 deposits and any extensions of these deposits which are within the perimeter of PE525 and the two carres of PE4958 have been transferred, shall be for the sole benefit of KCC. Such transfer was completed pursuant to a transfer deed dated 27 July 2009 and evidenced by the CAMI in its exploitation certificate No. CAMI/CE/5621/2009 dated 27 November 2009.

- The DCP exploitation permits were transferred to KCC following completion of the merger with DCP. In addition, one carre 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 27 July 2009 and evidenced by CAMI in its exploitation certificate no. CAMI/CE/5622/2009 dated 27 November 2009.
- The perimeter of the merged KCC/DCP concession area will contain the Necessary Surfaces as defined in the Amended Joint Venture Agreement.

Pursuant to the Amended Joint Venture Agreement, the Necessary Surfaces will be sourced from PE8841 held by GCM and from one carré close to the T17 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 reserves are discovered, the relevant surfaces shall be converted into multiple exploitation permits (where required) and shall be leased to KCC Should any reserves be discovered in the identified surfaces, the reserves shall be transferred to KCC and shall count as Replacement Reserves (as defined below) under the terms of the Amended Joint Venture Agreement.

In addition, under the Amended Joint Venture Agreement, KCC was granted an option for a period of three years following the 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 3 year period) amounts to USD 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 Amended Joint Venture Agreement, 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 Amended Joint Venture Agreement, GCM and KCC have signed an agreement relating to the lease by GCM to KCC of the equipment and installations described in an annex to the Amended Joint Venture Agreement (the "Equipment and Installations"). The rent for the Equipment and Installations payable by KCC to GCM is USD 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 Amended Joint Venture Agreement.

As part of the Amended Joint Venture Agreement, 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) 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.

1.4 Legal Tenure

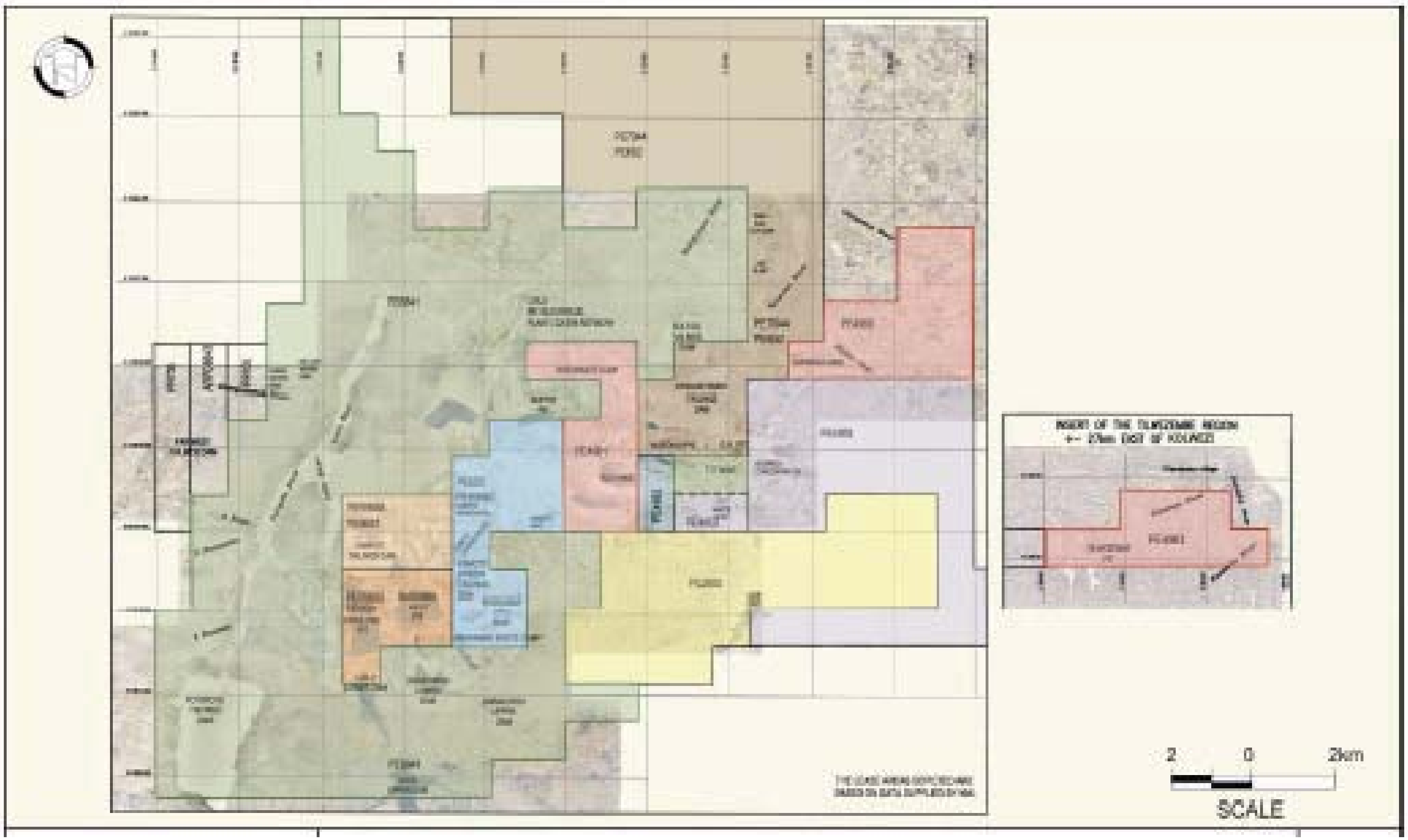
Following on from the ratification of the Amended Joint Venture Agreement, KCC holds the permits listed in the table below.

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

An exploitation permit 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.

Property	Exploitation Permit Number	Rights Granted	Location	Held By	Area of Title	Valid Until
Kamoto Undergound Mine and Mashamba East Open Pit	PE525	Cu, Co and associated minerals	10°43'S 25°24'E	KCC	13 blocks, 11,04km^2	03/04/2024 Renewable
T17 Open Pit	PE11602	Cu, Co, nickel and gold		KCC	2 blocks, 1,698km^2	03/04/2024 Renewable
Extension of Kananga	PE11601	Cu, Co, nickel and gold		KCC	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	KCC	10 blocks, 8,49km2	03/04/2024 Renewable
Tilwezembe Open Pit	PE4963	Cu, Co and associated minerals + Use of Surface	10°47'S 25°42'E	KCC	9 blocks, 7,64km2	03/04/2024 Renewable
Kananga Mine	PE4960	Cu, Co and associated minerals + Use of Surface	10°40'S 25°28'E	KCC	13 blocks, 11,04km2	03/04/2024 Renewable

The property boundaries of the exploitation permits of KCC are described in the figure below. Such figures also show the Necessary Surfaces.


2 0 2km
SCALE

The boundaries have been taken from the maps at the CAMI relating to the boundaries of the KCC exploitation permits. 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.

Status of Material Assets

This MER covers the following operations, projects and associated infrastructure of KCC located in the Kolwezi District of the Katanga Province in the Democratic Republic of Congo ("DRC") which are collectively referred to herein as the "Material Assets" and which are tabulated below.

Property	Holder	Type	Status	Licence		Comments
				Expiry Date	Area	
KTO Mine Mashamba East Open Pit	KCC	Ug OP	Operating Development	3 April 2024	11,04 km^2	Mine Operational Development project, dewatering to commence in 2013
T17 Open Pit	KCC	OP	Operating	3 April 2024	1,698 km^2	Mine Operational
KOV Open Pit	KCC	OP	Operating	3 April 2024	8,49 km^2	Mine Operational
Tilwezembe Open Pit	KCC	OP	Dormant	3 April 2024	7,64 km^2	Operations ceased in November 2008 due to lower copper/cobalt prices
Kananga Mine	KCC	OP	Dormant	3 April 2024	11,04 km^2	Operations ceased due to pending relocation of rail line
Extension of Kananga	KCC	OP	Dormant	7 May 2022	0,849 km^2	Operations ceased due to pending relocation of rail line

OP = Open Pit

Ug = Underground

Summary Table of Mineral Processing Assets:

Property	Holder	Status
Kamoto Concentrator	KCC	Operating
Luilu Metallurgical Plant	KCC	Operating

Replacement Reserves

Pursuant to the Amended Joint Venture Agreement, the 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" shall be paid to GCM in relation to the transfer of the reserves to be transferred to KCC as compensation for the Released Deposits (the "Replacement Reserves").

Pursuant to the Amended Joint Venture Agreement, 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 1 July 2015. The Exploration Programme can take place within the perimeters of: (i) the KCC Exploitation Permits (excluding the Kamoto, Mashamba East, Tilwezembe, Kananga, T17 and KOV Open Pit deposits and any extensions of these deposits), (ii) the Necessary Surfaces, or (iii) in 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 by way of 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 Australasian Code for Reporting of Mineral Resources and Ore Reserves prepared by the Joint Ore Reserves Committee 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 exploitation permits, 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 1 July 2015 it must pay USD 285,000,000 as financial compensation. KFL, GEC and GCM agreed that the financial compensation would be due from 1 July 2015 and that interest would be changed 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.

1.5 Resources Model

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, cobalt and uranium deposits.

These deposits are hosted mainly by metasedimentary rocks of the late proterozoic Katangan system, a 7 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 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 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.

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 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 Mine 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 minerals (psilomelane and manganite).

Mineral Resources

The consolidated Mineral Resources of the various areas of KCC as on 31 December 2010 in summarised in the table below. The actual mined out areas as on 31 October 2010 were used in conjunction with the forecasted tonnes for the last two months of the year.

KCC: Consolidated Mineral Resources as at 31 December 2010

Classification	Project Area	Mt	%TCu	%TCo
Measured	KTO Mine	30.7	4.54	0.54
	Subtotal	30.7	4.54	0.54
Indicated	KTO Mine	35.7	4.69	0.6
	Mashamba East Open Pit	75.0	1.80	0.38
	T17 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 Mine	66.4	4.62	0.57
	Mashamba East Open Pit	75.0	1.80	0.38
	T17 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 Mine	10.6	5.11	0.59
	Mashamba East Open Pit	65.3	0.76	0.1
	T17 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 Australian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, 2004 Edition (the "JORC Code").

2) Mineral Resources are inclusive of Ore Reserves.

3) Mineral Resources are not Ore Reserves and do not have demonstrated economic viability.

1.6 Reserve Estimate

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

The current plan for KTO is to ramp yearly production up to 2.2 million tonnes of sulphide ore, to coincide with the completion of the Phase 4 processing plant expansion. 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. The run-of-mine ("ROM") head grade remains relatively constant at an average of 3.9% Cu over the life of 37,8 million tonnes ROM.

Two underground mines are planned for a production ramp up from 2018 onwards to replace and / or supplement production from the open pit operations. Conceptual work has been completed on T-17 underground and Kamoto East underground projects. These projects are planned on a total of 13.7 and 20.5 million tonnes ROM respectively at diluted grades of 2.6% Cu and 4.4% Cu.

T-17 Open Pit is approaching depletion and surface mining will conclude within the current open pit economic boundaries during 2012. 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. The production scheduled up to 2012 is converted to probable mineral reserves.

The KOV Open Pit delivers a ROM head grade of 4.14% Cu for a total of 83.2 million tonnes of ROM ore up to 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. KOV Open Pit is the major operational source of copper based on the current LOM plan.

For Mashamba East open pit, a total ROM production of 12.8 million tonnes at 2.8% Cu is planned at a production rate of up to 2.0 million tonnes per year. The pit would produce only oxide ore and the Probable Mineral Reserve is estimated at 5.9 million tonnes at 3.0% Cu.

KCC currently has an operational plan up to 2030 to mine a total of 169 million tonnes of copper ore, at an average copper grade of 3.9% Cu. The reserve estimate is 97 million tonnes at an average grade of 4.2% Cu.

KCC: Consolidated Mineral Reserves as at 31 December 2010

Proved			Probable			Total		
Tonnes (*000)	% TCu	% TCo	Tonnes (*000)	% TCu	% TCo	Tonnes (*000)	% TCu	% TCo
14 589	3.47	0.51	82 450	4.33	0.46	97 039	4.20	0.47

1.7 Plant and Equipment

The Kamoto Concentrator ("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.

Kamoto Concentrator

The original Kamoto Concentrator consists 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 mine. 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.

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 electro-winning onto copper starter sheets (being converted to stainless steel blanks);
- de-copperising of cobalt bleed solution – two-stage electro-winning;
- 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 with sodium hydrogen sulphide (“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 electro-winning; 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 1970s, capacity was expanded to 175 ktpa copper cathode and 8 ktpa cobalt cathode. The grade of cathode copper produced in the first electro-winning stage never met London Metal Exchange Limited ("LME") Grade 'A' quality, while most of the cathode and copper sponge produced in the secondary electro-winning 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 December 2007 and completion of Phase 2 December 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 KTC and Luilu Refinery will produce 150 ktpa of copper and 8 ktpa of cobalt. Completion of Phase 3 will be in July 2011

Further production increases above the capacity of 150 ktpa copper and 8 ktpa cobalt have been assessed by a scoping study completed in July 2010. The study compared alternatives for increasing copper output to 270 ktpa or 310 ktpa.

A front end engineering and early works project is currently in progress. The design output will be 270 ktpa or 310 ktpa of copper and 8000 ktpa of cobalt metal with the additional cobalt sold as cobalt hydroxide. The most significant construction works to realise the 310ktpa copper production capacity are:

- Conversion of the DIMA mills from an autogenous application to a semi-autogenous application;
- Additional milling and flotation facilities;
- Additional concentrate filtration facilities;
- Additional roasting facilities;
- A neutral leach circuit;
- A copper solvent extraction ("SX") plant;
- Conversion of the existing unused electro-refinery to electrowinning as base load copper production;
- Refurbishment and re-use of the existing copper electrowinning facility as variable top up capacity;
- Upgrading the cobalt purification facilities; and
- Cobalt hydroxide bagging facility.

It is currently anticipated that the conversion and construction works will be completed in 2013 which will allow for 250ktpa copper production in 2014. The refurbishment of the existing copper electrowinning facility will be completed in 2014 to allow for 310ktpa copper production in 2015.

1.8 Closure

A closure assessment was conducted on the mine infrastructure and footprint. The key findings from the closure assessment have 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 USD 111million 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.

1.9 Environmental, Health and Safety

This report presents the findings of an environmental and social audit conducted by GAA at KCC on 8th December 2010.

Results of the Audit: Permits

In regards to authorisations required, it was demonstrated during the audit that:

- KCC holds approved operating licenses for all its concessions (PE525, PE4960, PE4961, PE4963, PE11601 and PE11602) in accordance with Article 64 of the DRC Mining Code (Law No 007/2002 of 11th July, 2002).

- A draft Environmental Impact Study (“EIS”) and Environmental Management Plan (“EMP”) has been compiled for the KCC Project by SRK in March, 2010. KCC has submitted this document to the Department for the Protection of the Mining Environment (“DPEM”) in January 2011 for their approval, as per the DRC Mining Code and DRC Mining Regulations (Decree No 038/2003 of March 2003). The main body of the report includes a table summarises the extent to which KCC environmental and social management complies with Equator Principles and the International Finance Corporation (“IFC”) performance standards. This assessment is heavily based on the findings of a previous audit (Metago, 2009) which were then updated with information from EIS and EMP (SRK, 2010) and our findings in this audit.

Results of the Audit: Environmental Impacts

Environmental impacts which may represent a risk to KCC operation and to compliance with the Equator Principles include:

- Tailing and plant effluent discharges to the Luilu River which include, amongst other sources:
  - Process effluents and residues from the Luilu Refinery entering a ground depression to the south of the plant and overflowing into the Luilu River. 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; and

  - Uncontrolled release of minor quantities of tailings from the Kamoto Interim Tailings Dam ("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 copper ("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. .

- Discharge of KOV Open Pit water to the Musonoi River resulting in a relatively low risk of silt loading. and contamination with Cu, cobalt ("Co") and manganese ("Mn"). The KOV Open Pit discharges to the Musonoi River are monitored daily and to date have been >98% compliant with DRC discharge limits for TSS and the other referenced metals.

- Dust fall and vibration impacts to surrounding villages (particularly Luilu and Musonoi) from KCC blasting, Waste Rock Dumps ("WRD"), tailings storage facilities ("TSF"), haul roads and other activities. These impacts represent a nuisance factor, a potential health/safety risk, and potential source of community complaints and compensation claims. KCC has taken note of the issue and provided capital to monitor and address these concerns. It should be noted that dust fall can not exclusively be assigned to KCC operations due to the presence of artisan mining activities and historical WRD and tailings facilities from GCM operations.

- Radioactivity impacts associated with various ore storage areas, TSF, WRD and processing plants. The most significant risk to KCC is possibly via exposure of artisanal miners to radioactive waste rock which is stored separately from non-radioactive waste rock. However, the radioactive waste rock dumps adjacent to KOV Open Pit, are a consequence of historical mining activities by GCM and remain GCM's liability.

- The rehabilitation of steep-sloped WRD on which re-contouring is first required. This represents rehabilitation and closure cost liability to KCC.

- Historical sites of soil pollution within the KCC Concession, particularly those associated with copper and cobalt effluent releases from the Luilu Refinery and KTC. As previously stated, where this has occurred prior to 2004, the reclamation and rehabilitation remains the responsibility of GCM.

- The risk of generating acid rock drainage with future mining of deeper sulphide ores. Geochemical testing of geological and waste materials would assist in characterising and quantifying this risk.

The following observations were made in relation to overall management of KCC environmental issues:

- Following the drafting of the Environmental Management System ("EMS"), it requires dedicated human and financial resources in order to be effective.

Results of the Audit: Community Relations

The following observations were made in relation the management of KCC social issues:

- The organisational structure, staffing, budget and allocation of funds to corporate social investment projects are well managed. Approximately USD 8M was allocated to community development projects in 2010 with projects including: construction of community infrastructure (schools, water supplies roads, hospitals); health interventions (malaria and HIV control); and agricultural projects. The Community Development Manager anticipates a budget of approximately USD 10M for 2011.

- There is a good interface between KCC and communities directly affected by KCC operations

- A resettlement program was conducted in 2006 / 2007 to relocate (1) approximately 25 families from KCC owned ground within Kolwezi town; and (2) approximately 80 people from ground which was allocated for the Far West Tailings Dam which they were occupying on a seasonal basis for farming activities. All resettlement was conducted in compliance with Equator Principles and involved local community leaders.

- 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 T17 Open Pit and KOV Open Pit, which affects the nearby Musonoi community.
- The draft 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

In our opinion, implementation of the site EMP (once submitted and approved by the DPEM) and EMS will be fundamental in enabling KCC to meet Equator Principle requirements and to adequately address its' key environmental and social liabilities.

1.10 Economic Evaluation

An economic evaluation of KML's interest in KCC was done using the discounted cash flow method. Revenue, capital expenditure and operating costs were projected over the life of mine and discounted to give the expected value of KCC.

Revenue, capital and operating cost estimates

Production levels of copper and cobalt for KCC were based on the mine plans for the various operations and the expected recoveries from the processing plants. The price obtained for the production was derived from futures prices on the LME. Operating cost estimates were based on contractual, current and budgeted costs.

Capital expenditure is required for development of future mining operations, the completion of the existing phase 3 and the new phase 4 plans to enable annualised copper production of 310 ktpa, and associated support infrastructure. USD 25 million per annum is required as sustaining capital. The future capital requirements for KCC over the life of the mine are shown in the following table:

Capital Expenditure for KCC

USD million	2011	2012	2013	2014	2015	2016 - 2035	LOM Total
Capital expenditure	320	353	370	132	120	1 352	2 649

Valuation

The valuation was done at a discount rate of 10%, base date 1 January 2011. The net present value ("NPV") of KML's investment in KCC is USD 6 008 million.

1.11 Katanga MER Extraction Table

*Capacities refer to annualized capacity at year end - 31 December

* Overall plant recovery is 85% for Copper and 65% for Cobalt

		2008	2009	2010	2011	2012	2013	2014	2015
Finished metal production capacity	**Units**								
Copper	t	40 800	70 000	130 000	150 000	150 000	200 000	250 000	310 000
Cobalt	t	2 050	3 240	5 500	8 000	8 000	8 000	8 000	8 000
Cobalt Hydroxide	t						22 000	22 000	22 000
Finished metal actual / forecast production									
Copper	t	22 122	41 964	52 179	110 414	150 000	174 546	246 669	308 194
Cobalt	t	749	2 534	3 437	5 017	6 995	6 807	8 000	8 000
Cobalt Hydroxide	t						2 821	9 574	6 869
Copper contained in concentrate for sale	t	-	1 773	6 054	21 881	-	-	-	-
Cobalt contained concentrate for sale	t	1 776	-	-	-	-	-	-	-
Cash cost (excl. royalties, realisation charges, before by-product revenues)	US$m	276	286	291	388	483	485	529	637
By-products revenues	US$m	164	77	155	343	251	294	451	391
Royalties (as a % of net revenue)	%	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
Depreciation & amortisation	US$m	364	287	200	310	371	323	214	179
Statutory Tax rate	%	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Capex									
Sustaining	US$m	119	18	56	60	87	86	95	83
Expansionary	US$m	319	100	165	260	266	285	38	38

Production Numbers - Mining

		2008	2009	2010	2011	2012	2013	2014	2015
KTO	Unit								
Mined ore	t	551 333	1 094 088	1 309 735	1 308 520	1 708 720	1 822 924	1 846 355	2 258 118
Cu grade	%	3.93	3.85	3.82	3.80	3.88	3.94	3.89	3.67
Co grade	%	0.43	0.49	0.56	0.49	0.57	0.58	0.57	0.57
KOV									
Mined ore	t	-	-	722 324	1 517 348	2 364 753	3 336 993	5 164 689	6 176 646
Cu grade	%	-	-	4.43	4.81	5.02	5.11	4.21	3.81
Co grade	%	-	-	0.30	0.38	0.39	0.35	0.22	0.15
T-17									
Mined ore	t	479 543	1 687 978	1 944 742	1 100 000	370 000	-	-	-
Cu grade	%	1.72	1.30	2.55	2.57	2.93	-	-	-
Co grade	%	0.89	0.85	0.95	0.46	0.44	-	-	-
Tilwezembe									
Mined ore	t	609 792	-	-	-	-	-	-	-
Cu grade	%	1.39	-	-	-	-	-	-	-
Co grade	%	1.17	-	-	-	-	-	-	-
Mashamba East									
Mined ore	t	-	-	-	-	-	-	-	994 510
Cu grade	%	-	-	-	-	-	-	-	4.14
Co grade	%	-	-	-	-	-	-	-	0.10

Production Numbers - KTC

		2008	2009	2010	2011	2012	2013	2014	2015
Sulphide circuit	Units								
Capacity *	t	840 000	1 680 000	2 520 000	2 520 000	2 520 000	2 520 000	2 520 000	2 520 000
Actual Milled KTO ore	t	562 833	1 099 902	1 324 782	1 308 520	1 708 720	1 822 924	1 846 355	2 258 118
Cu grade	%	3.80	3.70	3.73	3.80	3.88	3.94	3.89	3.67
Co grade	%	0.40	0.47	0.54	0.49	0.57	0.58	0.57	0.57
Sulphide Concentrate produced	t	48 909	92 477	113 678	113 122	134 175	145 767	145 892	170 383
Cu grade	%	40.80	40.70	39.56	40.00	42.00	42.00	42.00	42.00
Co grade	%	4.40	5.00	5.66	3.70	4.70	4.70	4.70	4.90
Oxide and Mixed Circuit									
Capacity *	t	840 000	1 440 000	3 000 000	5 160 000	5 160 000	5 160 000	7 680 000	7 680 000
Actual Milled T-17 ore	t	437 754	885 318	1 236 354	2 195 060	827 389	-	-	-
Cu grade	%	2.70	2.34	2.45	1.99	2.30	-	-	-
Co grade	%	0.70	0.76	0.95	0.70	0.70	-	-	-
Actual Milled KOV ore	t	-	-	364 455	1 561 348	2 364 753	3 336 993	5 164 689	6 176 646
Cu grade	%	-	-	4.43	4.81	5.02	5.11	4.21	3.81
Co grade	%	-	-	0.30	0.38	0.39	0.35	0.22	0.15
Actual Milled Mashamba East ore	t	-	-	-	-	-	-	-	994 510
Cu grade	%	-	-	-	-	-	-	-	4.14
Co grade	%	-	-	-	-	-	-	-	0.10
Actual Milled Total ore	t	437 754	885 318	1 600 809	3 756 408	3 192 142	3 336 993	5 164 689	7 171 156
Cu grade	%	2.72	2.34	2.78	3.16	4.32	5.11	4.21	3.86
Co grade	%	0.74	0.76	0.63	0.57	0.47	0.35	0.22	0.14
Oxide Concentrate produced	t	55 323	97 495	189 386	447 576	426 574	347 384	452 004	687 917
Cu grade	%	16.87	16.95	18.20	22.50	24.00	24.00	24.00	24.00
Co grade	%	3.30	3.76	2.83	2.40	1.70	1.70	1.70	0.70
Sulphide Concentrate produced	t					38 619	154 580	183 127	170 318
Cu grade	%					42.00	42.00	42.00	42.00
Co grade	%					2.30	2.10	1.60	1.10

Production Numbers – Kolwezi Concentrator ("KZC") (No longer an asset of KCC - returned to Gecamines)

		2008	2009	2010	2011	2012	2013	2014	2015
Capacity	**Unit**								
Actual Milled Tilwezembe ore	t	555 753	-	-	-	-	-	-	-
Cu grade	%	1.84	-	-	-	-	-	-	-
Co grade	%	0.83	-	-	-	-	-	-	-
Concentrate produced	t	36 573	-	-	-	-	-	-	-
Cu grade	%	12.31	-	-	-	-	-	-	-
Co grade	%	4.87	-	-	-	-	-	-	-

Number of employees (As of 31 December 2010)	
Mining	831
Metallurgical	1 335
Engineering	431
Administration	397
General Management and Finance	153
Total KCC Employees	**3 147**
Contractor	2 354
Project Contractor	959
Total Contractors	**3 313**
SA Office	22
Head Office	6
Total Personnel	**6 488**

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2.0 INTRODUCTION

2.1 Project Description and Location

2.1.1 Project Description

SRK compiled a feasibility study in 2008 on the material assets of the project. This study and other documentation as received during the site visits, were used as the basis for reporting the Mineral Resources in this MER. GAA reviewed the resource models of KOV Open Pit, KTO and T17 Open Pit as received from KCC, and the resource models of Kanaga Mine, Tilwezembe Open Pit and Mashamba East Open Pit as received from SRK. KCC is made up of several separate land packages for a total concession area of 15,235 hectares. The physical facilities include the Kamoto Concentrator and Luilu Refinery, related shops, warehouses, railroads and power lines.

2.1.2 Location

The geographical location for the site is set out below.

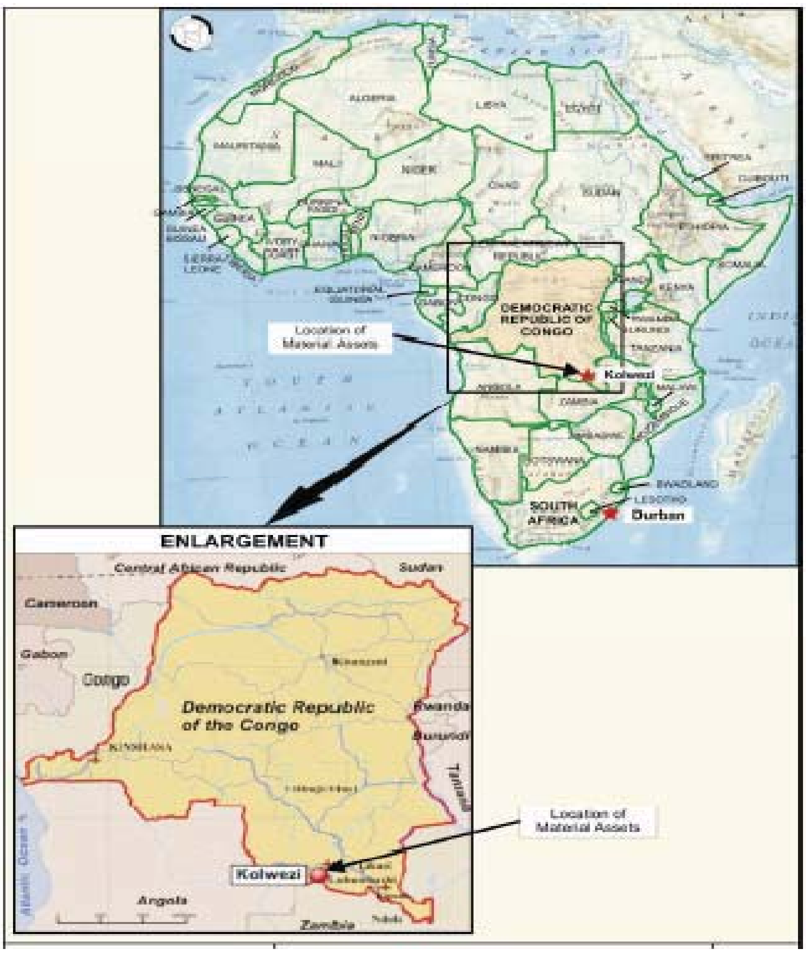


Figure 1: Geographic Location Map of the Material Assets

2.2 Ownership

KML, an entity listed on the Toronto Stock Exchange in Canada (TSX:KAT), holds a 75% stake in Kamoto Copper Company ("KCC") a joint venture with La Generale des Carrieres et des Mines ("GCM"), a State-owned mining company in the DRC.

2.2.1 History

Following the merger of KML and Nikanor PLC ("Nikanor") in January 2008, the Material Assets were held by KML through a 75% equity interest in KCC and a 75% equity interest in DRC Copper and Cobalt Project SARL ("DCP"). The balance of the equity interest in both KCC and DCP was owned by GCM.

In April 2007, prior to the merger of KML and Nikanor, a Commission of Enquiry was formed by the DRC government to review approximately sixty (60) mining agreements entered into by para-statal companies of the Congolese government. The KCC joint venture agreement and the DCP joint venture agreement were included in the mining agreements to be reviewed.

The Commission provided its conclusions in its report made public in November 2007.

KCC and DCP were notified on 11 February 2008 by the DRC Ministry of Mines of the objections and requirements regarding their partnerships with GCM further to the above-mentioned November 2007 report.

In July 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 2008, the DRC Ministry of Mines issued terms of reference for the renegotiations 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 on 25 July 2009 (which is also its date of entry into force) an agreement (the "Amended Joint Venture Agreement") which resulted in the termination of the original KCC joint venture agreement and DCP joint venture agreement.

The merger of KCC and DCP was ratified by Presidential Decree on 27 April 2010.

The consequences of the Amended Joint Venture Agreement on KCC mining rights and equipment installations are;

- The whole of PE525 (comprising 13 carres) and part of PE4958 (i.e. new PE11602 described below and comprising two carres containing the T17 deposit) was transferred to KCC. The Kamoto, Mashamba East and T17 deposits and any extensions of these deposits which are within the perimeter of PE525 and the two carres of PE4958 have been transferred, shall be for the sole benefit of KCC. Such transfer was completed pursuant to a transfer deed dated 27 July 2009 and evidenced by the CAMI in its exploitation certificate No. CAMI/CE/5621/2009 dated 27 November 2009.
- The DCP exploitation permits were transferred to KCC following completion of the merger with DCP. In addition, one carre 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 27 July 2009 and evidenced by CAMI in its exploitation certificate no. CAMI/CE/5622/2009 dated 27 November 2009.
- The perimeter of the merged KCC/DCP concession area will contain the Necessary Surfaces as defined in the Amended Joint Venture Agreement.

Pursuant to the Amended Joint Venture Agreement, the Necessary Surfaces will be sourced from PE8841 held by GCM and from one carré close to the T17 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 reserves are discovered, the relevant surfaces shall be converted into multiple exploitation permits (where required) and shall be leased to KCC Should any reserves be discovered in the identified surfaces, the reserves shall be transferred to KCC and shall count as Replacement Reserves (as defined below) under the terms of the Amended Joint Venture Agreement.

In addition, under the Amended Joint Venture Agreement, KCC was granted an option for a period of three years following the 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 3 year period) amounts to USD 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 Amended Joint Venture Agreement, 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 Amended Joint Venture Agreement, GCM and KCC have signed an agreement relating to the lease by GCM to KCC of the equipment and installations described in an annex to the Amended Joint Venture Agreement (the "Equipment and Installations"). The rent for the Equipment and Installations payable by KCC to GCM is USD 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 Amended Joint Venture Agreement.

As part of the Amended Joint Venture Agreement, 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) 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.

2.2.2 Legal Tenure

Following on from the ratification of the Amended Joint Venture Agreement, KCC holds the permits listed in the table below.

Table 1: KCC Permits

Property	Exploitation Permit Number	Rights Granted	Location	Held By	Area of Title	Valid Until
Kamoto Undergound Mine and Mashamba East Open Pit	PE525	Cu, Co and associated minerals	10°43'S 25°24'E	KCC	13 blocks, 11,04km^2	03/04/2024 Renewable
T17 Open Pit	PE11602	Cu, Co, nickel and gold		KCC	2 blocks, 1,698km^2	03/04/2024 Renewable
Extension of Kananga	PE11601	Cu, Co, nickel and gold		KCC	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	KCC	10 blocks, 8,49km2	03/04/2024 Renewable
Tilwezembe Open Pit	PE4963	Cu, Co and associated minerals + Use of Surface	10°47'S 25°42'E	KCC	9 blocks, 7,64km2	03/04/2024 Renewable
Kananga Mine	PE4960	Cu, Co and associated minerals + Use of Surface	10°40'S 25°28'E	KCC	13 blocks, 11,04km2	03/04/2024 Renewable

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

An exploitation permit 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.

The property boundaries of the exploitation permits of KCC are described in the figure below. Such figures also show the Necessary Surfaces.

The boundaries have been taken from the maps at the CAMI relating to the boundaries of the KCC exploitation permits. 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.

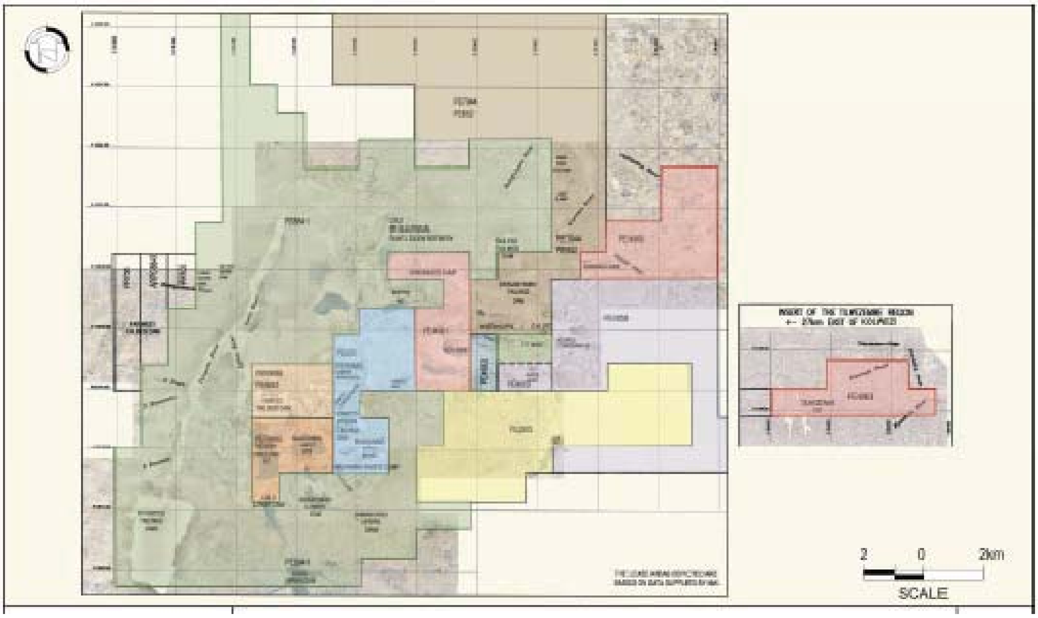


Figure 2: Concession Boundries

2.2.3 Status of Material Assets

This MER covers the following operations, projects and associated infrastructure of KCC located in the Kolwezi District of the Katanga Province in the Democratic Republic of Congo ("DRC") which are collectively referred to herein as the "Material Assets" and which are tabulated below.

Table 2: Mining Assets

Property	Holder	Type	Status	Licence		Comments
				Expiry Date	Area	
KTO Mine and Mashamba East Open Pit	KCC	Ug OP	Operating Development	3 April 2024	11,04 km^2	Mine Operational Development project, dewatering to commence in 2014
T17 Open Pit	KCC	OP	Operating	3 April 2024	1,698 km^2	Mine Operational
KOV Open Pit	KCC	OP	Operating	3 April 2024	8,49 km^2	Mine Operational
Tilwezembe Open Pit	KCC	OP	Dormant	3 April 2024	7,64 km^2	Operations ceased in November 2008 due to lower copper/cobalt prices
Kananga Mine	KCC	OP	Dormant	3 April 2024	11,04 km^2	Operations ceased due to pending relocation of rail line
Extension of Kananga	KCC	OP	Dormant	7 May 2022	0,849 km^2	As above

Table 3: Mineral Processing Assets

Property	Holder	Status
Kamoto Concentrator	KCC	Operating
Luilu Metallurgical Plant	KCC	Operating

2.2.4 Replacement Reserves

Pursuant to the Amended Joint Venture Agreement, the 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" shall be paid to GCM in relation to the transfer of the reserves to be transferred to KCC as compensation for the Released Deposits (the "Replacement Reserves").

Pursuant to the Amended Joint Venture Agreement, 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 1 July 2015. The Exploration Programme can take place within the perimeters of: (i) the KCC Exploitation Permits (excluding the Kamoto, Mashamba East, Tilwezembe, Kananga, T17 and KOV Open Pit deposits and any extensions of these deposits), (ii) the Necessary Surfaces, or (iii) in 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 by way of 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 Australasian Code for Reporting of Mineral Resources and Ore Reserves prepared by the Joint Ore Reserves Committee 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 exploitation permits, 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 1 July 2015 it must pay USD 285,000,000 as financial compensation. KFL, GEC and GCM agreed that the financial compensation would be due from 1 July 2015 and that interest would be changed 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 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.

3.0 DESCRIPTION OF RESOURCES

3.1 Geological setting

3.1.1 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, cobalt and uranium deposits.

These deposits are hosted mainly by metasedimentary rocks of the late proterozoic Katangan system, a 7 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 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 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.

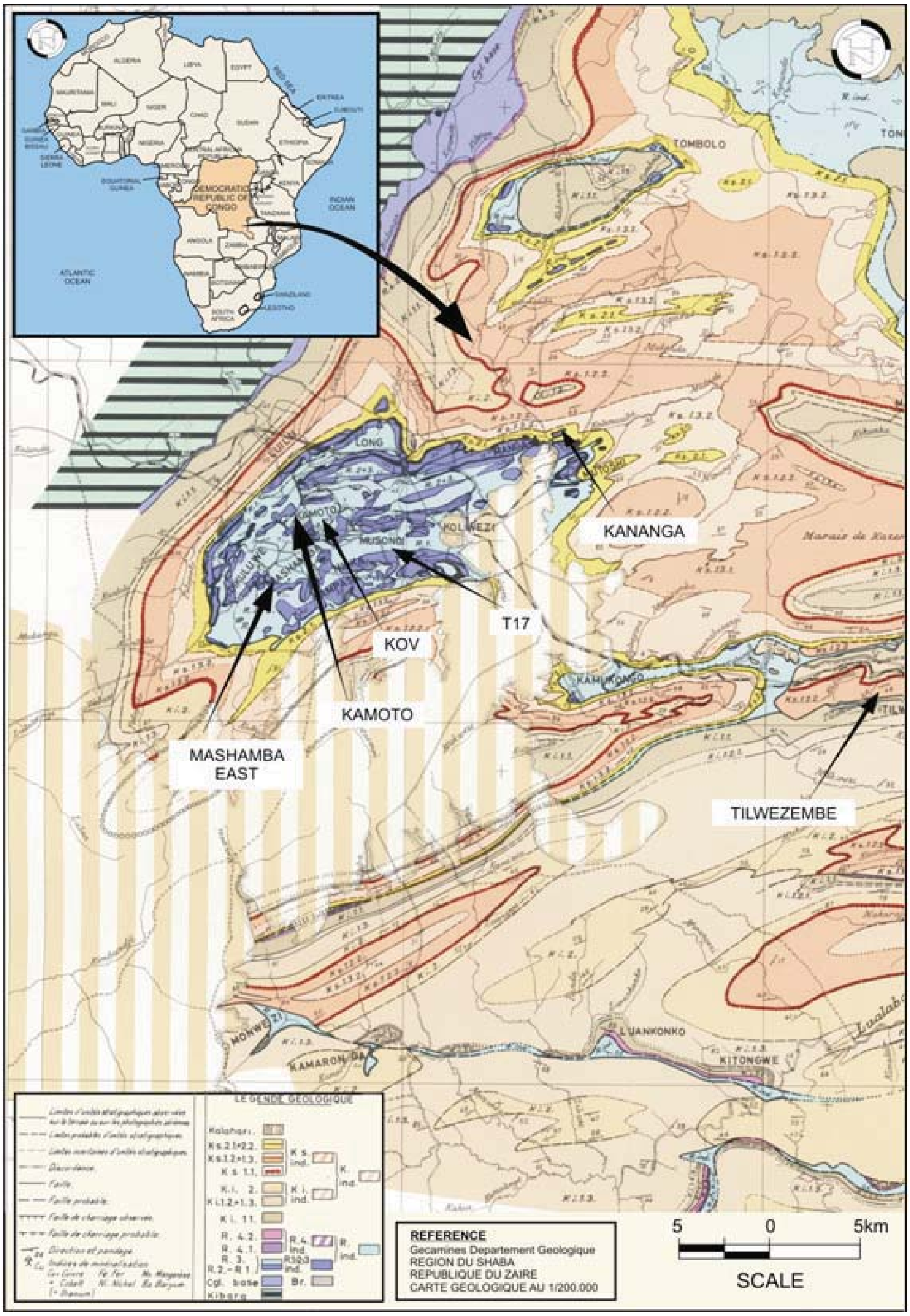


Figure 3: Regional Geology

3.1.1.1 General Stratigraphy

The generalized stratigraphy of the Katangan System is shown in Table 4. The Roan has been correlated across the Katangan Copperbelt into four main formations or groupings, R1 to R4. The divisions between each of the R series are often marked by an unconformity.

Table 4: General Stratigraphy of the Katangan System

KATANGA SYSTEM						STRATIGRAPHY	
System	Series	Formation	Local Name			Description	Thickness (m)
	UPPER KUNDELUNGU					Sediments	30-50
	LOWER KUNDELUNGU					Sediments, sandstones and shales	200-500
KATANGA	ROAN	R4-1 AND 2	MWASHYA			Shales, siltstone, sandstone to dolomites	50-100
		R3-2	DIPETA			Shales and sandy schists	1000
		R3-1	RGS			Roches Greseuse Superieur	100-200
		R2-3	CMN			Calcaire a Minerais Noirs	130
		R2-2	SDS			Schistes Dolomitic Superieur	50-80
		R2-1	SDB	LOB	COMBINED OREBODY	Schistes Dolomitic Superieur	10-15
			RSC	LOB		Schistes De Base	12-25
			RSF	LOB		Roches Silicieuses Cellulaire	5
			D STRAT			Roches Silicieuses Feuilletees	3
			RAT Grises			Dolomie Stratifiee, argilitic dolomite	2-5
			RAT 2			Roches Argilleuses Talceuse	190
		R1	RAT 1			Roches Argilleuses Talceuse	40
			POUDINGUE			Unknown formation, transgression conglomerate	?

The main ore-body lithologies belong to the R2 formation, but R3 and R4 formations are also known to contain mineralization. Within each of the R series are sub-divisions identifying the different lithological units. Rocks belonging to the Roan Supergroup are described briefly below from the oldest to the youngest:

- Breche heterogene or heterogeneous breccia ("BH"): This breccia is composed of angular and sometimes well rounded fragments of all the various rock types of the Roan. The fragments vary in size from a few millimetres to several tens of millimetres in diameter, while the matrix is made up of finer-grained sandy particles of the same material as the fragments.

- Breche RAT or brecciated RAT ("B RAT"): A reddish-pink brecciated rock with calcite and silica veinlets and is at times well mineralized with specular haematite, occurring as veinlets.
- 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"). Both are massive but sheared in places, silty or sandy, dolomitic rocks. Mineralization in the form of malachite and black oxides occurs associated with the upper RAT.
- Dolomie Stratifie or Stratified Dolomite ("D Strat"): This is a well-bedded to laminated, argillaceous dolomite, which forms the base of the traditional "Lower Ore Zone" in GCM' nomenclature. The mineralization consists of copper and cobalt oxides.
- Roches Siliceuses Feuilletées Foliated (Laminated) and Silicified Rocks ("RSF"): These are grey to light-brown, thinly bedded laminated and highly silicified dolomites. The unit is generally well mineralized with copper and cobalt oxides. Together with the D Strat, the RSF comprise the Ore Body Inferior ("OBI").
- Roches Silicieuses Cellulaires or Siliceous Rocks with Cavities ("RSC"): Vuggy and infilled massive to stromatolitic silicified dolomites. Copper mineralization is almost absent in these rocks, which were therefore regarded as barren. However, the infillings are enriched in wad (manganese oxide) and heterogenite (cobalt oxide), and RSC is the target of artisanal activity.
- Schistes De Base or Basal Schists ("SDB"): Reddish-brown to grey silty and nodular dolomite to siltstone. This unit is well mineralized with copper and cobalt in varying amounts and forms the Ore-Body Superior ("OBS").
- Shales Dolomitiques Superieurs or Upper Dolomitic Shales ("SDS"): Yellowish, cream-to-red, bedded laminated dolomitic siltstones and fine-grained sandstones. The rock is sparsely mineralized with malachite.
- Calcaire a Minerais Noirs or Calcareous Unit with Black Minerals ("CMN"): A slightly banded and laminated light-grey to grey, silicified dolomite mineralized with black oxide of iron, manganese and cobalt. The unit bears some similarities with the RSC.
- Dipeta ("R3"): Greyish to dark red or brown stratified shales and micaceous schist.
- Mwashya ("R4"): altered stratified greyish siliceous dolomitic rock with oolitic horizons and a few bands of light-yellow, talcose schist. Nodules of hematite often occur.

3.1.2 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, T17 Open Pit, KTO Mine, 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.

3.1.2.1 KTO Mine

The 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 4:

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

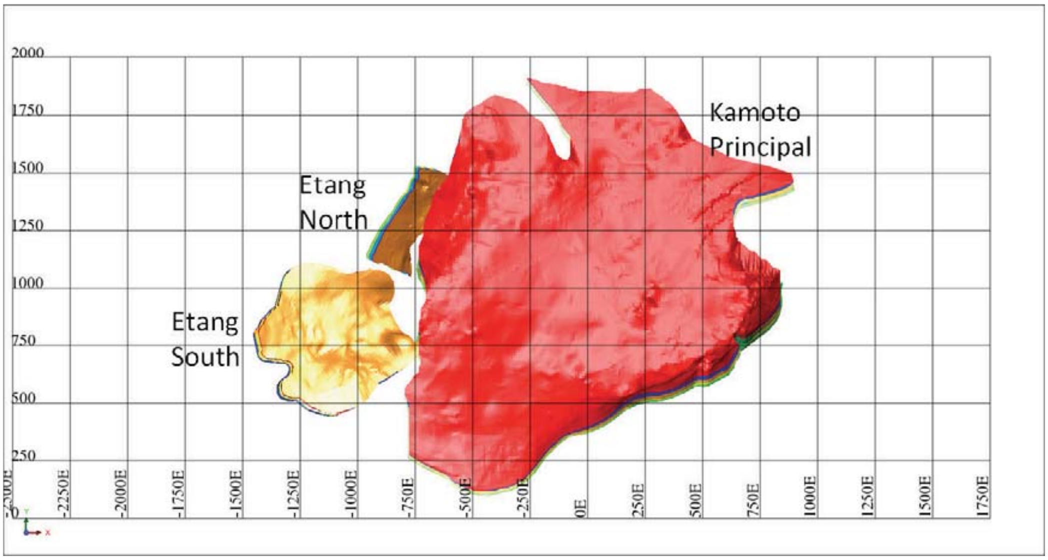


Figure 4: Plan view of KTO Mine Resource Model

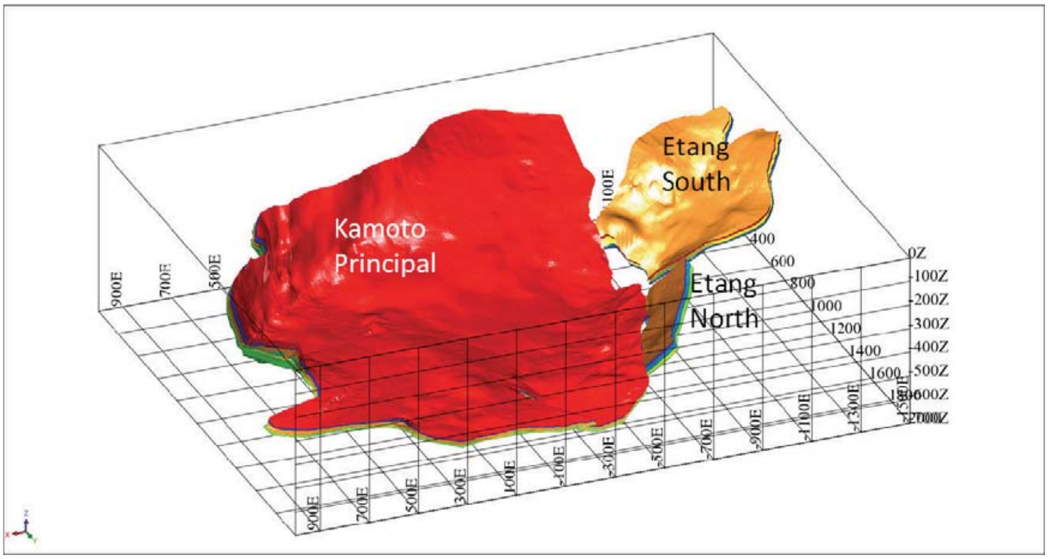


Figure 5: Oblique view of KTO Mine with Resource Model

3.1.2.2 T17 Open Pit

The T17 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 6.

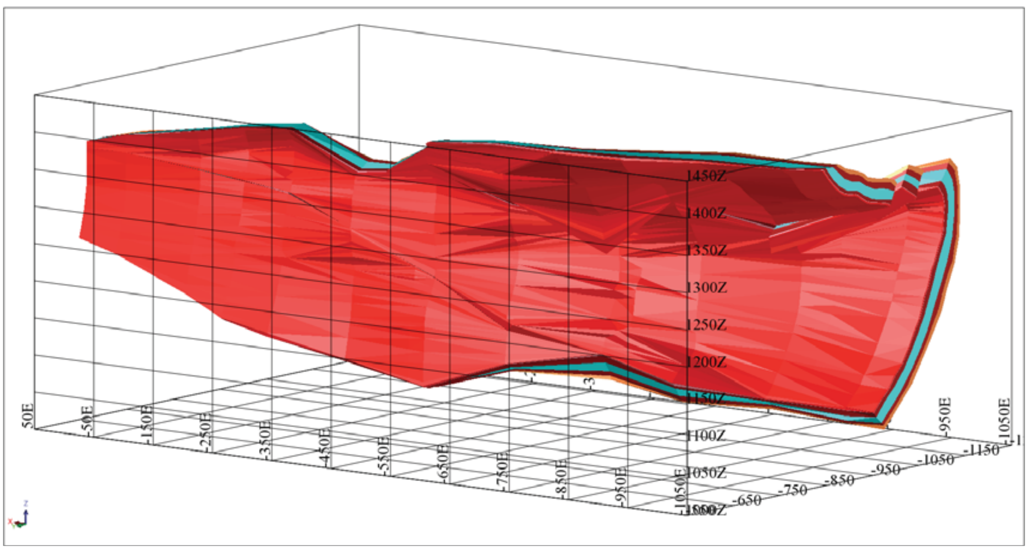


Figure 6: Oblique view of T17 Open Pit Resource Model

3.1.2.3 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 orebody.

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 orebody 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 orebody in faulted contact with and below the Virgule orebody.

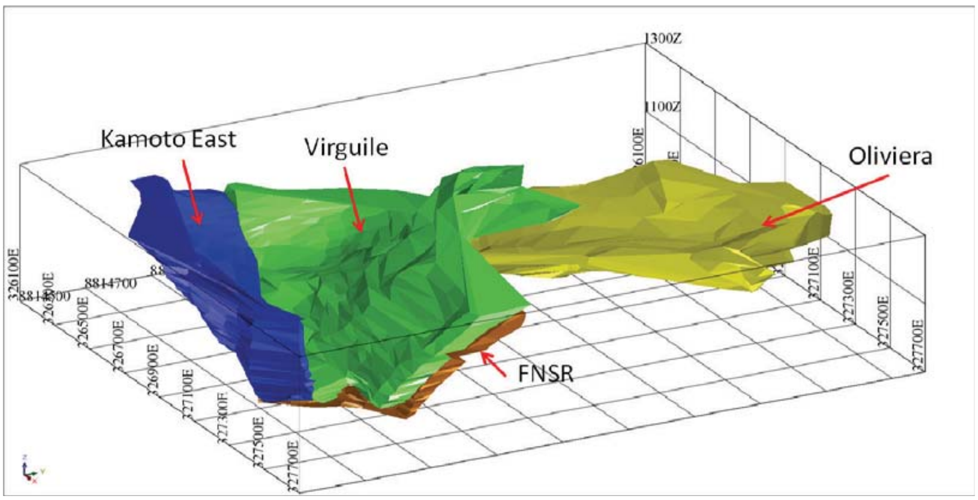


Figure 7: Oblique view of KOV Open Pit Resource Model

3.1.2.4 Mashamba East Open Pit

Mashamba East Open Pit operated from 1985 through 1988 and the open pit produced a total of 9,8 Mt of ore at an average grade of 4,96% copper and 0,35% cobalt. By 1998, due to the lack of funds and increasing costs, the open pit was allowed to flood.

Structurally, the lithologies of the Mashamba East orebody 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 orebody consist of four units, RSF, SDB, BOMZ and RSC.

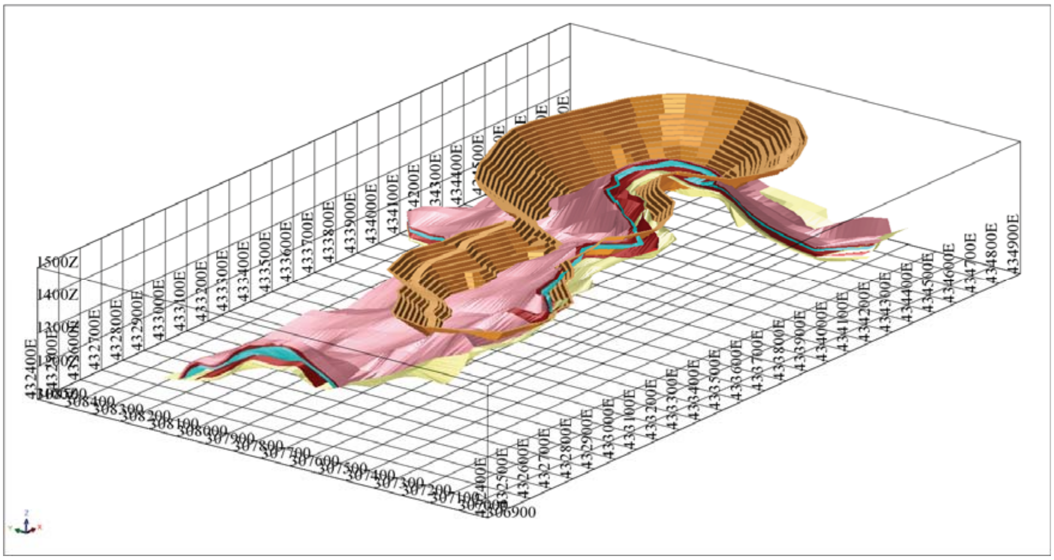


Figure 8: Oblique view of Mashamba East Resource Model and Planned Pit Layout

3.1.2.5 Kananga Mine

The Kananga orebody 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 orebody. GCM' 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 9.

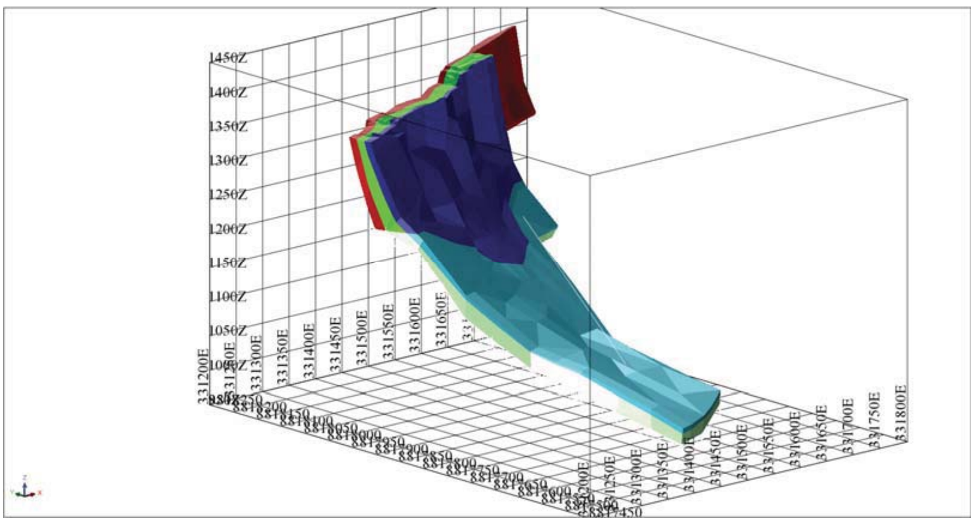


Figure 9: Oblique view of the Kananga Resource Model

3.1.2.6 *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 10.

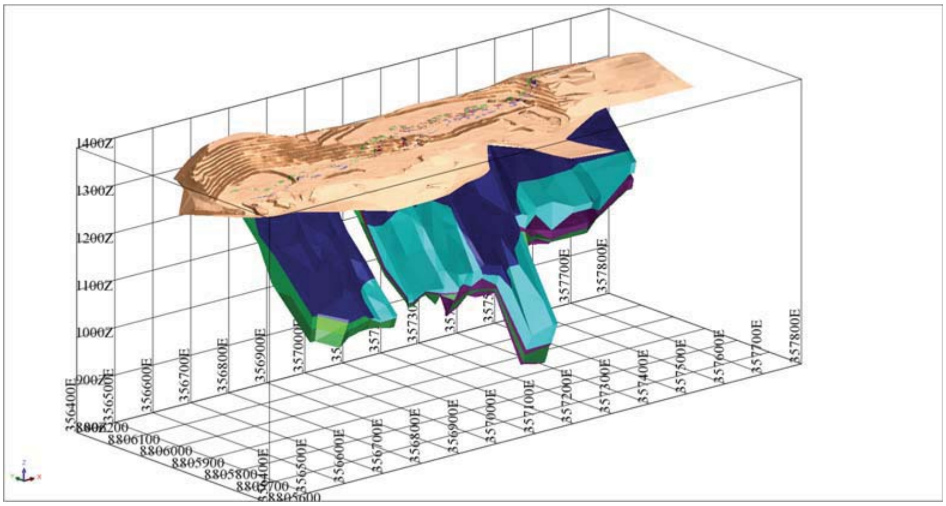


Figure 10: Oblique view of Tilwezembe Pit with Resource Model and Pit Layout

3.1.3 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 important copper deposits of Zambia and 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

3.1.4 Mineralisation

Primary mineralization, 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 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 minerals (psilomelane and manganite).

3.2 Mineral Resource Estimation Methodology

Mineral Resource models from which Mineral Resources are quoted in this report were generated by the following independent consultants:

- KTO Mine — CCIC
- T17 Open Pit — SRK
- KOV Open Pit — SRK
- Mashamba East Open Pit — SRK
- Kananga Mine — Snowden
- Tilwezembe Open Pit — Snowden

GAA has the overall responsibility for the sign-off on the Mineral Resources and Reserves and as part of that process has reviewed the methods and results adopted in the generation of the Mineral Resource models from the respective consultants. GAA’s review of the methods indicates similarities of approach between the various consultants, and the findings of the review are summarized below:

- Collate all the GCM geological information in the form of plans and sections and drill-hole logs in hard-copy format;
- Digitize the plans and sections for the generation of wireframe lithological models and capture drill-hole data;

- Define the envelopes outlining the limits of the zones of mineralization within each fragment in the project. Generally, this is a lithological cut-off (or a 0%TCu cut-off) defining the OBI as mineralization in the Rat Grises (“RATGR”, an argillaceous dolomite), DTSRAT and RSF and the OBS mineralization within the SDB, the black ore mineral zone (“BOMZ”) and to a lesser extent, the shalle dolomitic (“SD1a”, the argillaceous part of the SDB). The RSC, which is intermediate between the OBI and OBS, is defined separately and split into a top, mid and bottom RSC. An exception was the work undertaken by Snowden on Kananga and Tilwezembe, where a 0,5%TCu cut-off was used;
- Undertake statistical and geostatistical analyses of the sample data within the defined envelopes of mineralization and derive variogram parameters;
- Estimate grades into the zones of mineralization using kriging techniques with attendant geostatistical parameters, search neighbourhood and input composite data; and
- Classify the Mineral Resources into the various categories defined by the JORC Code.

3.2.1 Exploration and Data

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 T17 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 statements although the resource models are being updated continually by personnel from KCC.

3.2.1.1 Drilling

KTO Mine

GCM carried out both extensive surface and underground drilling to delineate the KTO orebodies. A total of 83 surface boreholes have been identified – drilled between 1952 and 1991. Underground holes were generally drilled as fans of three or more holes from especially mined-out cubbies. A total of 569 holes have been identified, drilled between 1972 and 2002. The upper parts of the Etang orebody – above 400 levels – are covered only by surface drilling. Borehole surveys appear to have been carried at regular intervals for surface boreholes, but deviations are rarely more than a few degrees. Historically, underground collared boreholes have not been surveyed.

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 from by GCM which was used by CCIC and reported by SRK in the 2009 Technical Report.

T17 Open Pit

The T17 orebody has been the subject of two diamond drilling programs by GCM, with 3 287m drilled between 1938 and 1954, and 8 011m drilled from 1986 to January 1988. The holes were drilled generally to a nominal 100m by 100m grid, with certain areas being on 50m by 50m spacing.

KCC has drilled 20 holes in 2009 and 2010 within the current pit perimeter to confirm the continuation of the 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 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 5. This is leading to the delineation of additional mineral resources and a subsequent increase in the life of the current pit.

Table 5: Summary of 2010 drill data for T-17

	Hole_id	Depth	OBS	RSC	OBI	%Cu	%Co
T17 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		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

KOV Open Pit

The drill-hole logs indicate that exploration drilling commenced in the early 1940s on the Kamoto East ore body, and initial holes were prefixed as KTO. Although the target was the Kamoto East ore body, a substantial number of KTO holes were later drilled into the present-day KOV Open Pit.

In the 1980s, another drilling campaign was aimed at defining the KOV Open Pit mineralized zones, and this campaign continued into the early 1990s. The drilling was carried out along section lines spaced about 100m apart. Where feasible, drill holes were spaced about 100m along these section lines. The holes were prefixed KOV Open Pit.

The KOV Open Pit drill-hole database contains a total of 214 drill-holes spaced on average about 100 m. There are 100 intersections of the Virgule fragment, 75 for the Oliveira, 33 for Kamoto East and 19 for the FNSR. The demarcation between Virgule and Kamoto East is based on a boundary string file obtained from the GCM sections. However, for the modelling and grade estimation, certain drill holes overlap into the Virgule and Kamoto East and are therefore counted twice. Similarly, there are holes intersecting Virgule that also intersect FNSR and these are also counted twice.

There is adequate drill-hole coverage for the Virgule and Oliveira while the FNSR and Kamoto East intersections are limited (excluding recent drilling in Kamoto East reported below). The extent of the FNSR is limited as it is a remnant of the fragment mined in the Musonoi Pit, to the east of the KOV Open Pit, and the data distribution is therefore relatively adequate. The data distribution compared to the extent and volume of the Kamoto East fragment is inadequate, especially considering that the bulk of the data are well above the current pit bottom and there are limited drilling intersections in this steeply dipping limb.

Most of the historical drill holes within the Kamoto East and the KOV Open Pit areas were drilled vertically, with only a few being inclined. Kamoto East drilling was problematic due to the steepness in the dip of the strata. As a result, the majority of the holes intersect the near surface expression of the Kamoto East ore body, and only the inclined holes provide intersections at depth.

In general, the majority of the historical drill hole intersections in Kamoto East were within the areas that have been subsequently mined out, and there are very few ore-body intersections below the current pit bottom.

During 2010, a total of 10 holes (3461 metres) were drilled in the Kamoto East orebody 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 resource model with regards to location and grade.

Table 6: 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	N. Int.	N. Int.	N. 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	N/Int	4.42	0.32
		3461.4			AVERAGE	4.47	0.63

KCC have recently drilled 11 holes (1 577m) in the Virgule orebody (Cut1a and Cut 2 of the scheduled mine plan) on the north west section of KOV Open Pit which confirmed location and grade of the 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 resource model.

Table 7: 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

Mashamba East Open Pit

For the Mashamba East Open Pit, drilling was undertaken from surface on a 100m by 100m spaced grid on a local co-ordinate system parallel to the strike of the mineralized zone. A total of 122 holes were drilled, comprising 20,466.4m drilled, with 1,788m intersecting copper mineralization of more than 1% TCu.

Kananga Mine

The historical drilling at Kananga was limited to about eight holes drilled by GCM. Details of the drilling, sample collection and sample analyses for the holes are not available.

Currently there are 52 holes drilled in Kananga captured in the database.

Tilwezembe Open Pit

The historical drilling was undertaken by GCM, and the information was the basis for the first pass mineral resource estimates for Tilwezembe Open Pit undertaken by SRK. The drilling information included drill holes on a 25m spacing within the operational Tilwezembe Open Pit and 100m by 50m on Tilwezembe East. A total of 157 holes have been drilled at Tilwezembe.

3.2.1.2 Sampling Method and Approach

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.

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 Lakefield and the check sample pulps at Set Point.

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 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 analyzed 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.

3.2.1.3 Data quality and quantity

Historically, the core recoveries are in general low throughout the various project areas. This is mainly because of the fractured nature of the ore, as well as the drilling techniques used.

Table 8: Historical Core Recoveries per Area

Area	Average Core Recovery (%)
Kamoto	65
T17	63
KOV	42
Mashamba East	71
Tilwezembe	80
Kananga	86

The bulk of the data within the project areas is historical, with the exception of the recent drilling data reported above which has validated the G|CM data. .

It is clear that modern drilling techniques improve core recovery.

The recent drilling campaigns in T17 and KOV Open Pits and KTO provide confirmation of this fact with the average core recovered in T17 Open Pit increasing to 82%, in KOV Open Pit increasing to 79% and in KTO to 91%. This is clearly an indication that current drilling techniques are much more focused towards sample recovery.

Using the historical low core recoveries in a resource model, there are two options to account for core loss:

- Adjustment of the assay grades to account for core loss and regard the adjusted data as representative; and
- Assume the assay grades of the recovered core represent the sample length, but account for the core loss in the classification on the premise of quality of data used in the estimation.

Adjustment of grade is considered preferable for recently acquired drill-hole information. As the bulk of the drilling information is historical for the project areas, SRK has considered the option of accounting for core loss in the classification. GAA agrees with this assessment.

3.2.1.4 Sampling Preparation and Analyses

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.

Recent Sample Preparation and Analyses

All the recent drilling for the feasibility study was done according to JORC standards.

The samples from Kananga and Tilwezembe were sent to two laboratories, Alfred H. Knight (Alfred Knight) in Kitwe and SGS in Ndola, for preparation and analysis. Sample preparation consisted of the following methodology:

- Drying of sample;
- Primary jaw and roll crushing of sample;
- Splitting a sub sample of 250 g using a riffle splitter; and
- Pulverizing of the sub-sample to 75 micrometres and homogenizing.

The prepared samples were analyzed for the following variables, namely; %TCu, %TCo, %Mn, %ASCu and %ASCo.

Both Alfred Knight and SGS determined %TCu, %TCo, %Mn assays by multi-acid digestion (using hydrofluoric, nitric and perchloric acids) followed by dissolution in hydrochloric acid and AAS.

For %ASCu and %ASCo, both laboratories used cold leaching with 5% sulphuric acid. However, Alfred Knight saturated with sulphur dioxide while SGS saturated with potassium sulphite before finishing with AAS. The laboratories may also have used different temperatures and digestion times.

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 atomic absorption spectrometry ("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.

3.2.2 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.

3.2.2.1 Quality Control and Quality Assurance ("QA/QC")

Quality assurance and quality control 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 resource estimates and grade control.

3.2.2.2 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 till 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 standards 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.

3.2.3 Exploratory Data Analysis

3.2.3.1 KTO Mine

Table 9 to Table 11 presents statistics for Kamoto Principal, Etang North and Etang South.

Table 9: 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

Table 10: 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

Table 11: 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

3.2.3.2 T17 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 given in Table 12. GAA could reproduce this table.

Table 12: Statistical Analysis of T17 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

3.2.3.3 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 Table 13 to Table 16.

Table 13: 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

Table 14: 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

Table 15: 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

Table 16: 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

3.2.3.4 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 shown in Table 17.

Table 17: 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

3.2.3.5 Kananga Mine

The summary statistics of the declustered one-metre composite data of the various rock types are presented in Table 18. 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.

Table 18: 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
MID_SL		269	0.06	2.03	0.53	0.6

Domain	Variable	No Samples	Minimum	Maximum	Mean	CV
LOB_SL		234	0.02	3.49	1.05	0.7

3.2.3.6 Tilwezembe Open Pit

The summary statistics of the declustered one-metre composite data of the various rock types are presented in Table 19. 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.

Table 19: 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

3.2.4 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, is shown per area from Table 20 to Table 29.

Table 20: 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			

Table 21: T17 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		

Table 22: 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

Table 23: 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

Table 24: 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

Table 25: Tilwezembe Open Pit: Variogram Parameters for Manganiferous Dolomites

Variable (%)	C0 Nugget Variance	Structure 1				Structure 2				Direction
		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)	(Major, Semi-major, Minor)
%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

Table 26: Tilwezembe Open Pit: Variogram Parameters for Breccia

Variable (%)	C0 Nugget Variance	Structure 1				Structure 2				Direction
		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)	(Major, Semi-major, Minor)
%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

Table 27: Tilwezembe Open Pit: Variogram Parameters for Tillites and Argillites

Variable (%)	C0 Nugget Variance	Structure 1				Structure 2				Direction
		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)	(Major, Semi-major, Minor)
%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

Table 28: Kananga Mine: Variogram Parameters for Upper Orebody

Variable (%)	C0 Nugget Variance	Structure 1				Structure 2				Direction
		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)	(Major, Semi-major, Minor)
%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

Table 29: Kananga Mine: Variogram Parameters for Internal/Middle Zone

Variable (%)	C0 Nugget Variance	Structure 1				Structure 2				Direction
		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)	(Major, Semi-major, Minor)
%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

3.2.5 Estimation Parameters

3.2.5.1 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 unbiasedned 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.

3.2.5.2 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 three main categories of densities as shown in the table below.

Table 30: 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 Mine

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 Mine are presented in the table below by stratigraphic unit.

Table 31: KTO Mine: 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
DSTRAT	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 resource tonnages, but recommended that 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 Mine model.

T17 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 T17 Open Pit are presented in the table below by stratigraphic unit.

Table 32: T17 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 laboratory in Johannesburg and these provided figures of 2.84 for the siliceous material from Musonoie-T17 West, 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 resource tonnages. However, CCIC recommended that 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 T17 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' empirical density values in the Mashamba East Open Pit. The method is as described above under Kamoto Mine. CCIC's limited density determinations for Mashamba East Open Pit are presented in the table below, by stratigraphic unit.

Table 33: 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 for the Mashamba East model.

Kananga Mine

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

Table 34: 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 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 35: 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 36: Kananga Mine: Density Determinations on Various Lithologies

Project Area	Mineralized Zone	Density, t/m³
T17 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 Mine	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

3.2.6 Mineral Resource Classification

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

3.2.7 Mineral Resource Statement

Table 37 represents the consolidated Mineral Resources of the various areas of KCC as on 31 December 2010. The actual mined out areas as on 31 October 2010 were used in conjunction with the forecasted tonnes for the last two months of the year.

Table 37: KCC: Consolidated Mineral Resources as at 31 December 2010

Classification	Project Area	Mt	%TCu	%TCo
Measured	KTO Mine	30.7	4.54	0.54
	Subtotal	30.7	4.54	0.54
Indicated	KTO Mine	35.7	4.69	0.6
	Mashamba East Open Pit	75.0	1.80	0.38
	T17 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 Mine	66.4	4.62	0.57
	Mashamba East Open Pit	75.0	1.80	0.38
	T17 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 Mine	10.6	5.11	0.59
	Mashamba East Open Pit	65.3	0.76	0.1
	T17 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 Australian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, 2004 Edition (The JORC Code).

4) Mineral Resources are inclusive of Ore Reserves.

5) Mineral Resources are not Ore Reserves and do not have demonstrated economic viability.

4.0 DESCRIPTION OF RESERVES

4.1 Overview of Mining Operations

Ukwazi Group visited the Material Assets of KCC during October 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 Kamoto underground mine ("KTO") and surface mining operations, namely T-17 Open Pit and KOV Open Pit.

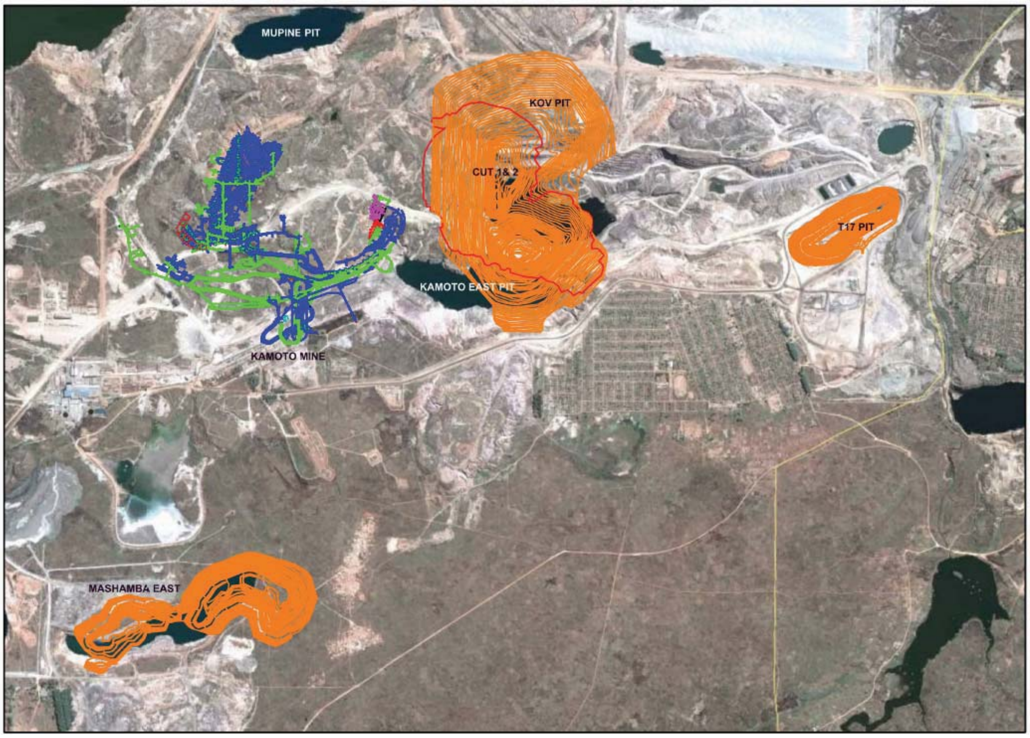


Figure 11: Relative Location of KCC Mining Assets

Underground operations included in the current LOM Plan are the operational KTO mine and two future projects of Kamoto East underground ("KTE") and T-17 underground.

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 life of mine ("LOM") plan and 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 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 mine plan is based on proved and probable mineral reserves with only 10% inferred 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.

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 and KTE underground projects.

The KTE underground production schedule is based on mining a portion of the vertical Kamoto East 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 USD360 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 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 schedule is based on the T-17 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 T-17 underground through the LOM plan is USD 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 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 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.

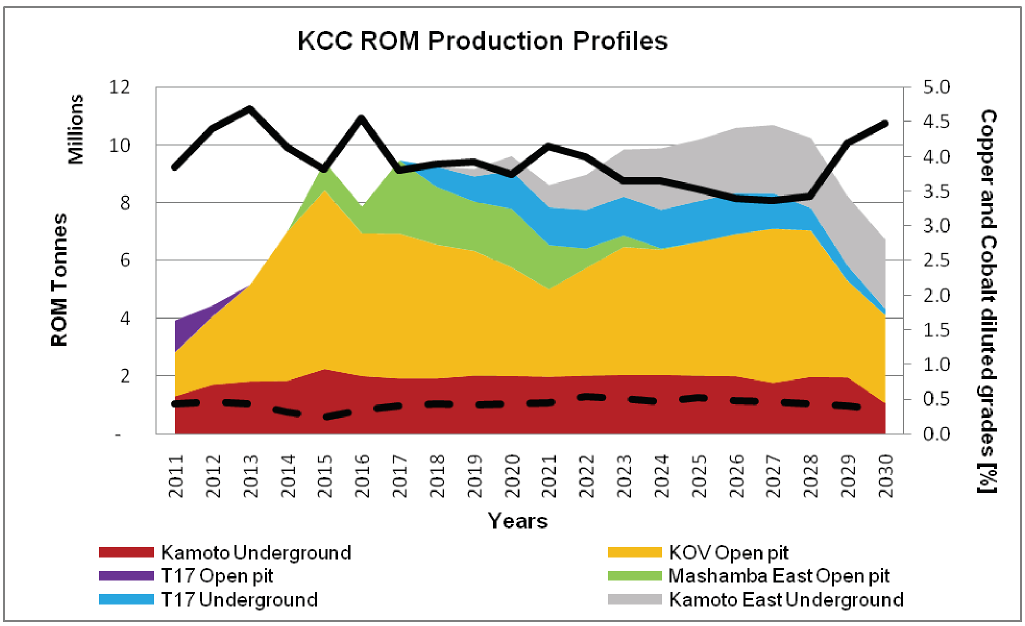


Figure 12: KCC ROM Production Profile

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.

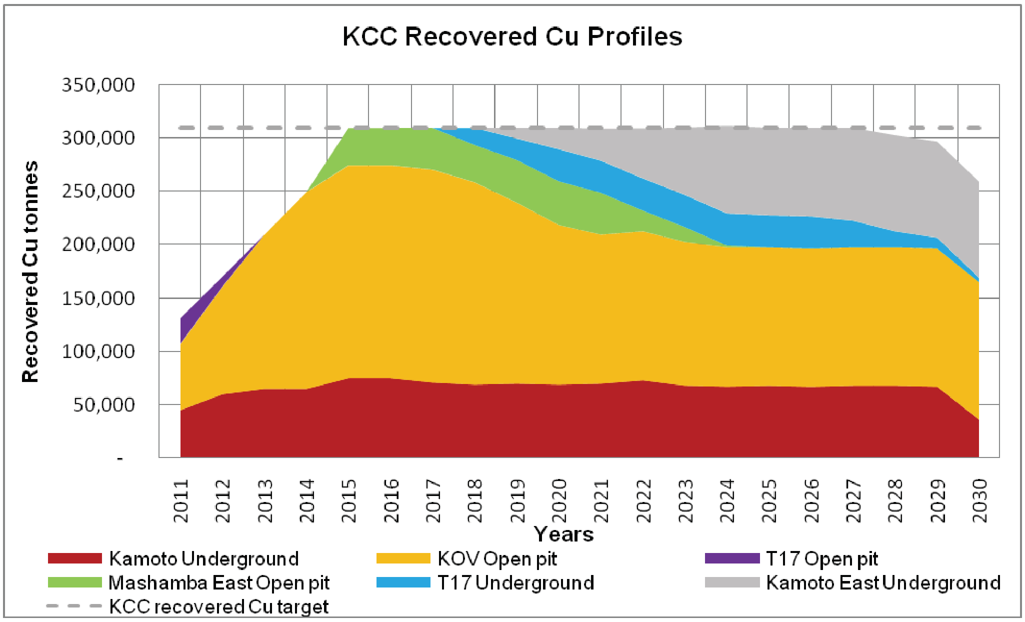


Figure 13: KCC Recovered Copper Production Profile

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

Table 38: Mineral Reserve Estimate

Mining operation	Proved			Probable			Total		
	Tonne (*000)	% TCu	% TCo	Tonne (*000)	% TCu	% TCo	Tonne (*000)	% TCu	% TCo
KTO	14 589	3.47	0.51	19 400	3.70	0.53	33 989	3.60	0.52
T-17 Open Pit				1 470	2.61	0.46	1 470	2.61	0.46
Mashamba East Open Pit				5 914	3.00	0.37	5 914	3.00	0.37
KOV Open Pit				55 666	4.73	0.45	55 666	4.73	0.45
Total	**14 589**	**3.47**	**0.51**	**82 450**	**4.33**	**0.46**	**97 039**	**4.20**	**0.47**

A variance exist relative to the reserve statement dated 31 December 2009 which 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 ore resource as part of future underground mining with access from the existing KTO mine infrastructure. On this basis, the Kamoto East ore resource has now been excluded from the reserve statement pending finalisation of mine plans for KTE.

4.2 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 Consulting (“SRK”) in 2008. The LOM plan and 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.

4.2.1 KTO Mine

An overall layout of KTO Mine, illustrating the various mining zones is shown in Figure 14. This figure is a graphical representation of the design areas as discussed in this section.

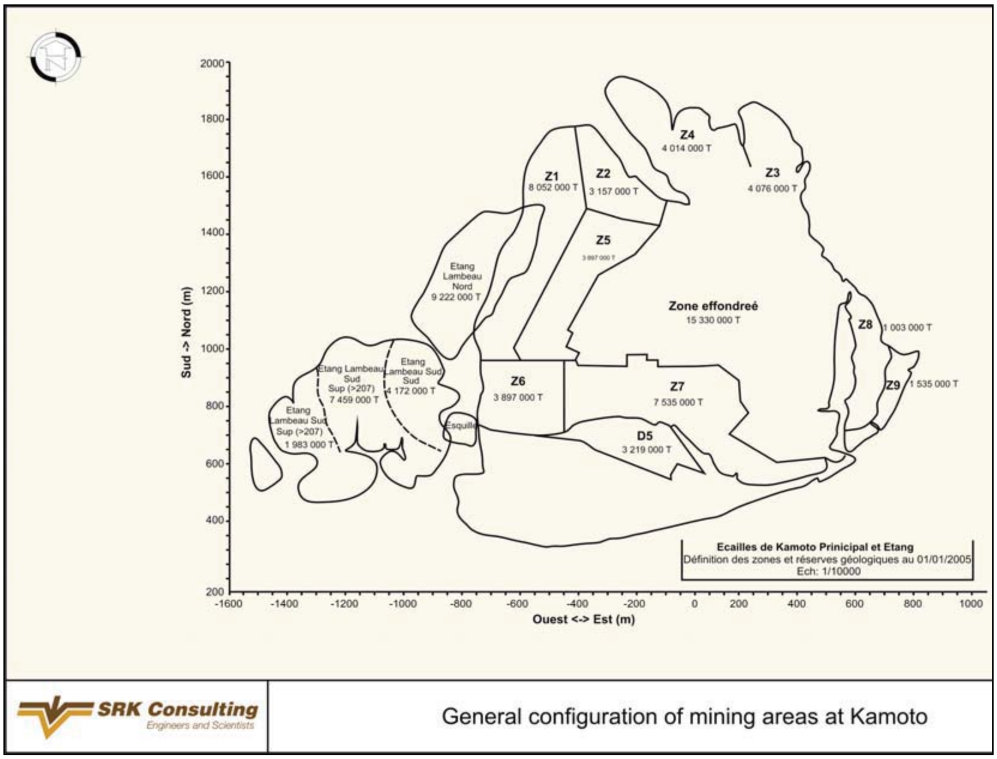


Figure 14: General Configuration of Mining Areas at KTO

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 39: 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

4.2.1.1 Design Constraints Applicable to KTO

Particular characteristics of the Kamoto orebody 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 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, 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

4.2.1.2 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 112.5m 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 provides 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.

4.2.1.3 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
- Longitudinal Cut and Fill ("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.

4.2.1.4 Sub-level Caving 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 sub level caving 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.

4.2.1.5 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 40: Life of Mine 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
Z8 OBI RAP	90	0.5	195
Z8 OBS RAP	90	0.5	119
Z9 OBS SLC	90	0	0
Z9 OBI SLC	90	0	0
ETANG CAF	90	0.6	83

4.2.1.6 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 41: 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.

4.2.2 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 to exploit the remaining classified resources directly below the planned pit design floor and through an access ramp developed from the open pit. The known 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 resources could be converted to reserves.

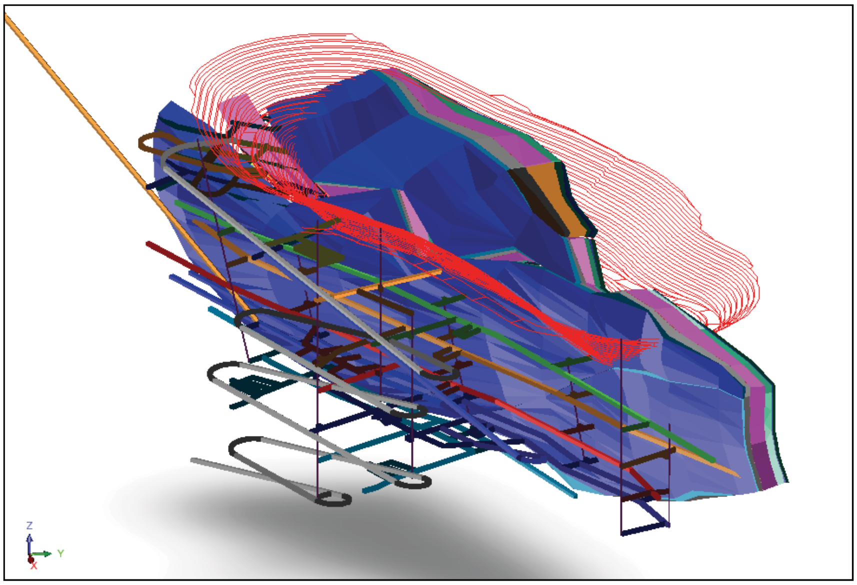


Figure 15: Conceptual Design of T-17 Underground

T-17 Underground will utilize transverse and longitudinal CAF mining methods. The transverse CAF mining method consists of the main access drive longitudinally developed to the orebody. 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 42: T-17 Underground LOM Production Schedule

T-17 Underground	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	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 resources to 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.

4.2.3 Kamoto East Underground Mine (“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 43: 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.

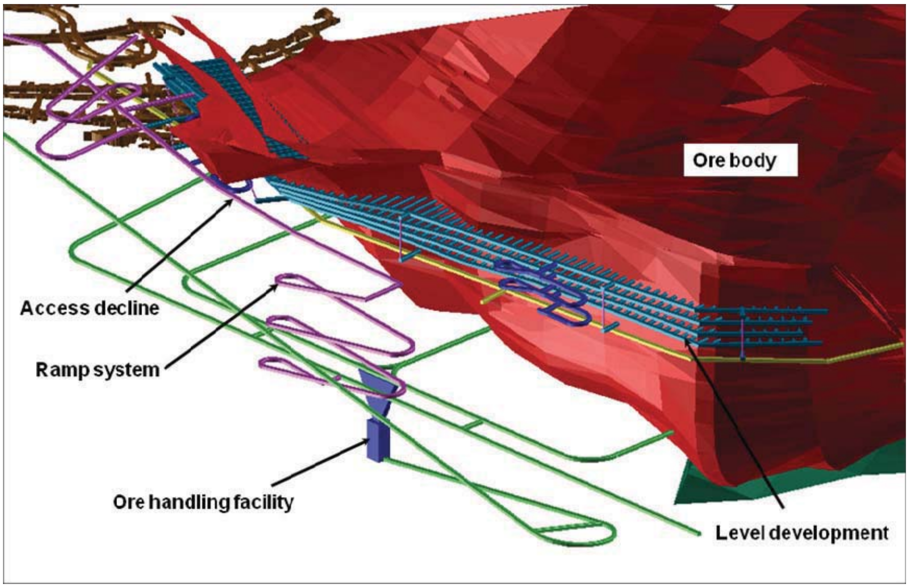


Figure 16: KTE Conceptual Development Layout

4.2.4 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 JORC. The entire resource area was sub-divided into smaller portions per zone to aid the mine design and schedule process. The basis of conversion from resource to reserve will be that measured resources will convert to proven reserves and indicated resources to probable reserves.

The 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 44: Underground Mining Mineral Reserve Estimate as at 31 December 2010

Mining operation	Proved			Probable		
	Tonnes (*000)	% T Cu	% T Co	Tonnes (*000)	% T Cu	% T Co
KTO	14 589	3.47	0.51	19 400	3.70	0.53

4.3 Surface Mining Operations and Projects

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

4.3.1 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;
- Production planning.

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

4.3.1.1 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.

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

Table 45: 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 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 resource block consists of a percentage ore material and a percentage waste material) the tonnage and grade of the reserve block is defined as the weighted average tonnage and grade of the materials contained in the original resource block;

In cases where the total resource block is ore, the corresponding reserve block is defined as a 100% ROM block with the same grade attributes as the 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 ore will normally fall above the cut-off grade while ore blocks that originally had a low percentage of 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.

4.3.1.2 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;
- Selection of the optimal pit shell. This is achieved by generating various production schedules for each pit shell and calculating the net present value for each schedule. The output of this process is a series of "pit-versus-value" curves.

4.3.1.3 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

4.3.1.4 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.).

4.3.1.5 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.

4.3.2 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.

4.3.2.1 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 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 5mx5mx5m was selected. The figure below is a tonnage and grade profile that illustrates the undiluted 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 resource grade line profile in green.

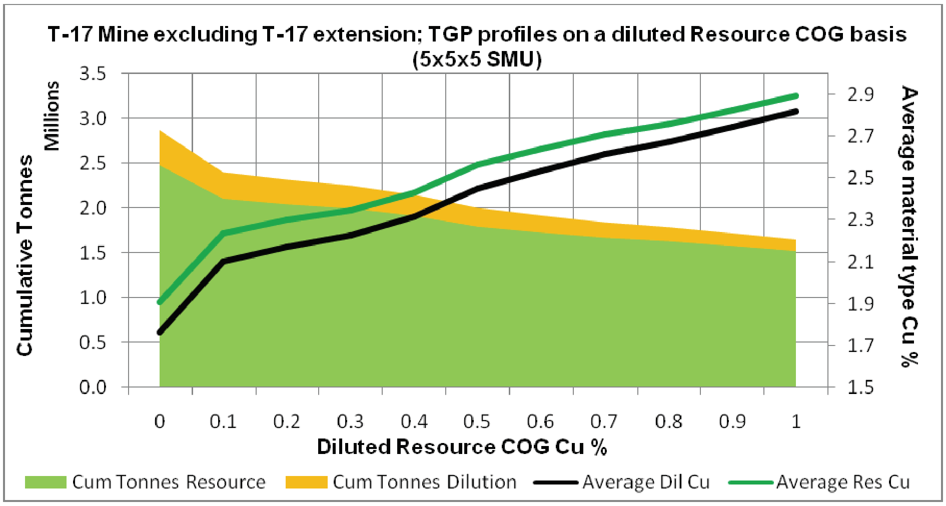


Figure 17: T-17 Open Pit Diluted Resource Tonnage and Grade Profile

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.

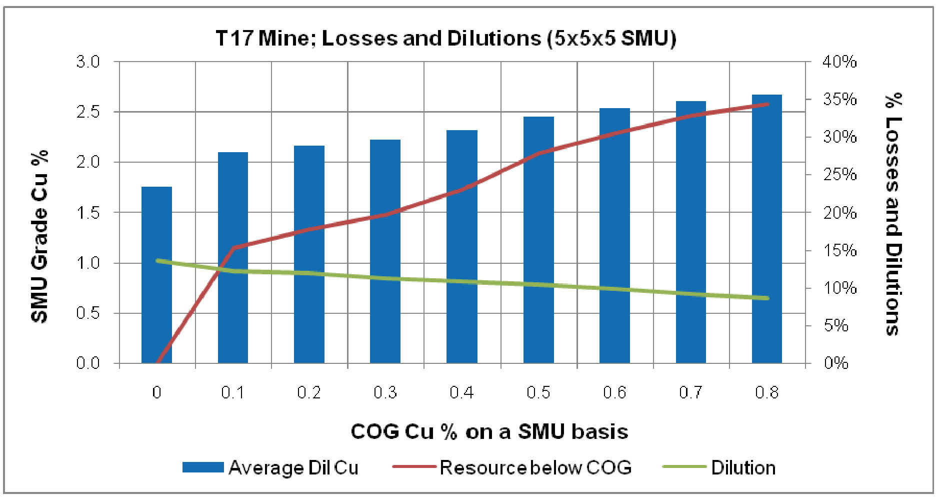


Figure 18: T-17 Open Pit In-pit Losses and Dilutions

4.3.2.2 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.

4.3.2.3 Pit Design

The T-17 Open Pit is a well-managed operation nearing depletion. The figure below 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 19: T-17 Open Pit

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

Figure 20: T-17 Open Pit Final Design

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

Table 46: 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 47: 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

4.3.2.4 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 48: 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.

4.3.3 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.

4.3.3.1 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 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 resource grade line profile in green.

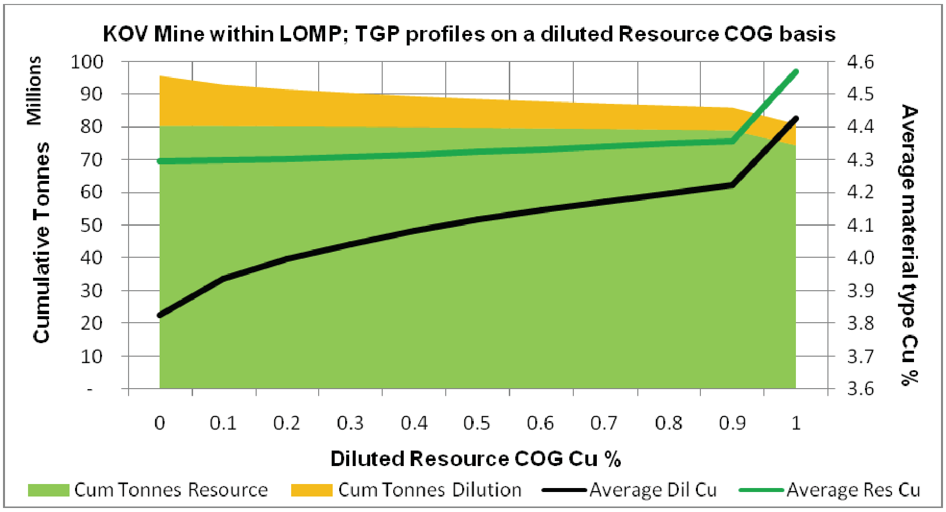


Figure 21: KOV Open Pit Diluted Resource Tonnage and Grade Profile

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% resource losses of material below the SMU cut-off grade are estimated while mining dilutions are 9% on average.

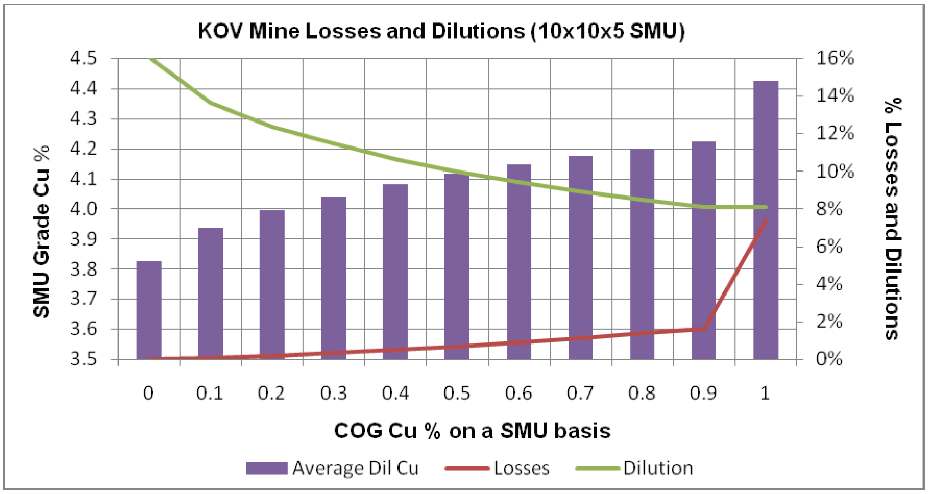


Figure 22: KOV Open Pit In-Pit Losses and |Dilutions

4.3.3.2 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. The figure below is viewed in a northern direction from the lookout point.

Figure 23: 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 the figure below with the current Cut 1 and Cut 2 pit designs shown in blue.

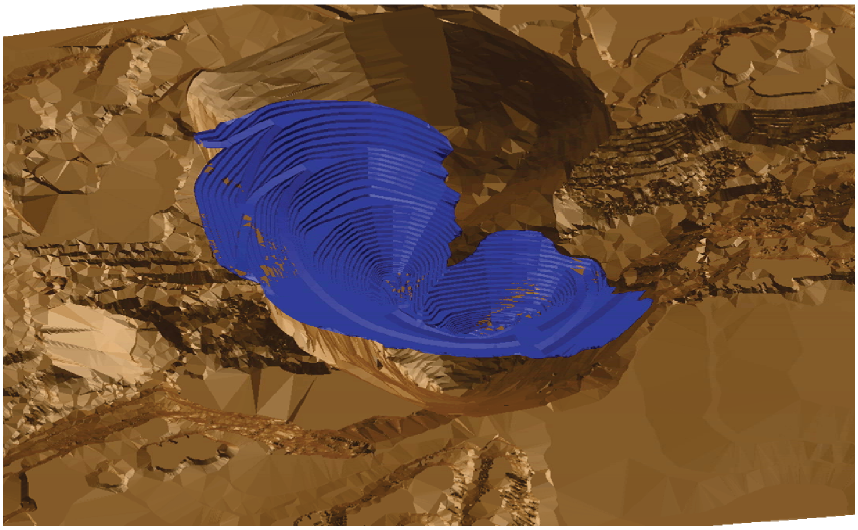


Figure 24: KOV Open Pit Design (Cut 1 and Cut 2)

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

Table 49: 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 50: 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

4.3.3.3 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 51: 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	17221	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	klt	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 the Inferred Resource category and cannot be converted to reserves.

4.3.4 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 resource. Mashamba East Open Pit produces only oxide ore.

4.3.4.1 Modifying Factors

As with T-17 and KOV Open Pits, 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 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 resource grade line profile in green.

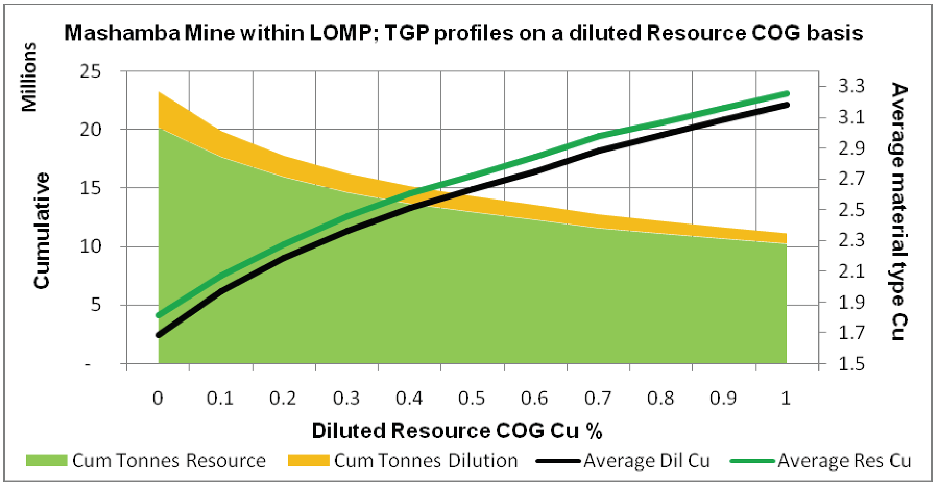


Figure 25: Mashamba East Open Pit Diluted Resource Tonnage and Grade Profile

As previously indicated, a cut-off grade of 0.6% Cu was applied at the Mashamba East Open Pit. A total of 39% 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.

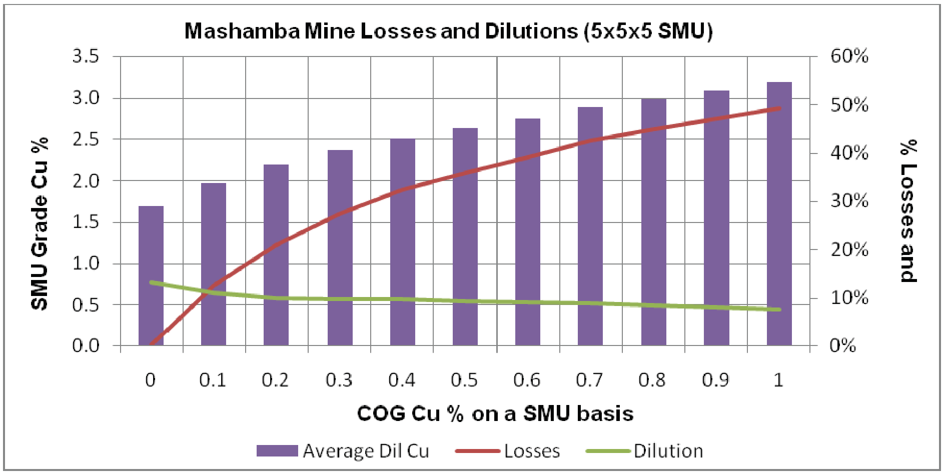


Figure 26: Mashamba East Open Pit In-Pit Losses and Dilutions

4.3.4.2 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 the figure below.

Figure 27: Mashamba East Open Pit Design

Mashamba East Open Pit design criteria are tabulated below.

Table 52: 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 53: 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

4.3.4.3 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 54: 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 the Inferred Resource category and cannot be converted to reserves.

4.3.5 Reserve Statement

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

Table 55: Surface Mining Mineral Reserve Estimate as at 31 December 2010

Surface Mining Operation	Proved			Probable		
	Tonnes (*000)	% T Cu	% T Co	Tonnes (*000)	% T Cu	% T Co
T-17 Open Pit				1 470	2.61	0.46
Mashamba East Open Pit				5 914	3.00	0.37
KOV Open Pit				55 666	4.73	0.45
Total				**63 050**	**4.52**	**0.44**

The KOV Open Pit reserve estimate as at 31 December 2009 was declared at 90 million tonnes at 4.9% Cu. The variance with this MER 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 resource.

4.4 Mining Risks

4.4.1 KTO Mine

The high levels of development required for the production ramp up, poses a risk to the achievement of the LOM profile. Any delay in the development requirements would result in a delayed ramp up profile from the KTO section.

4.4.2 T-17 Underground and KTE Mine

Although both the T-17 Underground and KTE mines are included in the LOM plan, additional work is required to convert the ROM tonnes from resource to reserve. The access and mining strategies on which the LOM plan is based for both of these underground mining projects are developed and operational at KTO while mining related modifying factors are based on actual efficiencies at KTO. The risk could be mitigated by a comprehensive engineering and design study.

4.4.3 Surface Operations

- 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 above and historical hydrogeological data which is difficult to validate. As such, the current dewatering strategy could potentially prove to be not as effective as designed in order to maintain dry slope conditions. This potentially could introduce risks associated with the economics of the pit, pit stability and the production schedule. This risk is being mitigated by conducting 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 50 million tonnes of material scheduled to be moved from the 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. This is a not an unknown risk and is monitored by on site personnel on a continual basis. Dual access to working areas could be established to decrease the risk of production losses.

- 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 produces 462 million tonnes of waste up to 2030. The available waste dumping space close to the KOV Open Pit is insufficient. However, additional surface rights have been allocated to KCC to the north of the current KOV Open Pit concession as detailed in the Amended Joint Venture Agreement. For improved cost efficiency, a detailed technical plan to back fill mining waste into depleted pits is also being 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 could result in resource losses or alternatively the uneconomic processing of ore production where the planned revenues do not cover the processing and selling costs.

5.0 PLANT AND EQUIPMENT

5.1 General Process Commentary

The Kamoto Concentrator (“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 mine. Future production may be derived from Mashamba East Open Pit and potentially T-17 Underground 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 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 10.0.

5.2 Processing Facilities

5.2.1 Kamoto Concentrator

The original Kamoto concentrator consists 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 mine. 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.

5.2.2 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 electro-winning onto copper starter sheets (being converted to stainless steel blanks);
- de-copperising of cobalt bleed solution – two-stage electro-winning;
- 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 sodium hydrogen sulphide ("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 electro-winning; 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 electro-winning stage never met LME Grade 'A' quality, while most of the cathode and copper sponge produced in the secondary electro-winning 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 December 2007 and completion of Phase 2 December 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.

Further production increases above the capacity of 150 ktpa copper and 8 ktpa cobalt have been assessed by a scoping study completed in July 2010. The study compared alternatives for increasing copper output to 270 ktpa or 310 ktpa.

A front end engineering and early works project is currently in progress. The design output will be 270 ktpa or 310 ktpa of copper and 8000 ktpa of cobalt metal with the additional cobalt sold as cobalt hydroxide.

5.3 The Kamoto Concentrator

A block flow diagram of the current KTC operation is shown in Figure 28.

5.3.1 Ore Reception and Crushing

Feed is received from three main sources; KTO, the T17 open pit and the KOV Open Pit.

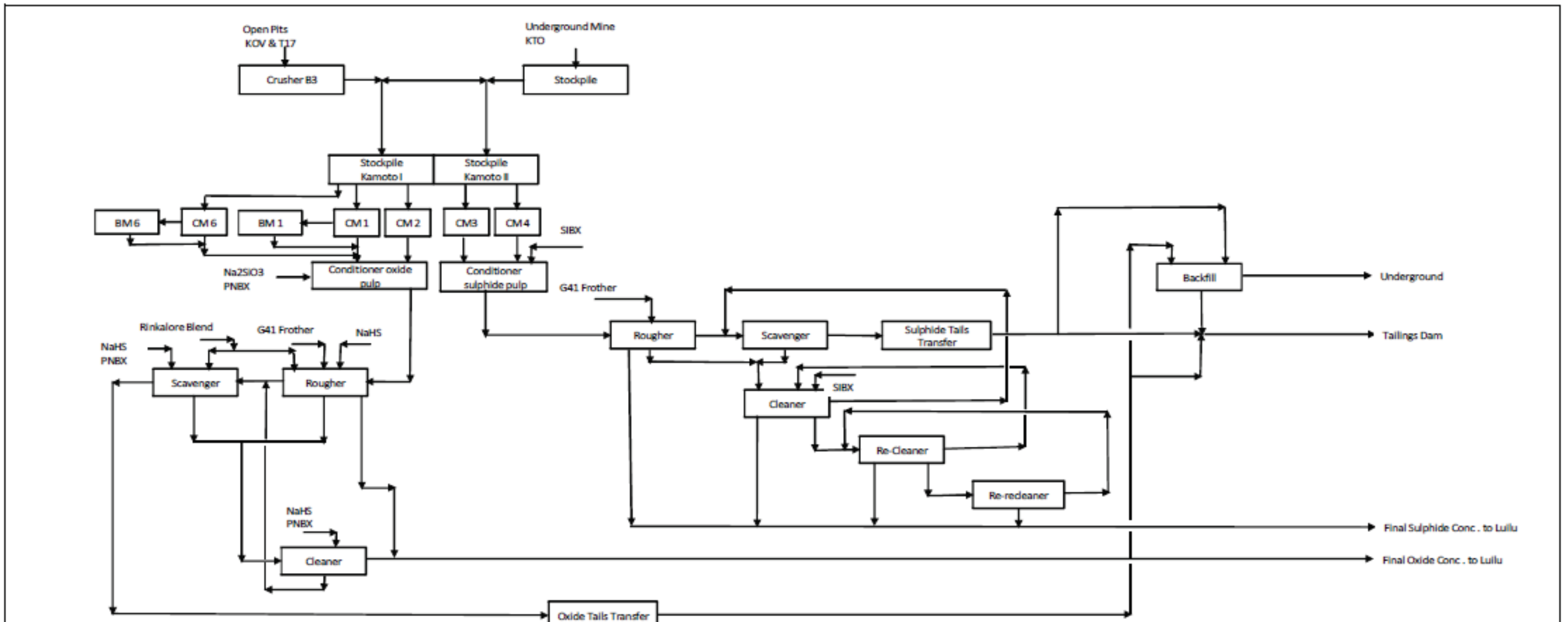
5.3.2 Milling

5.3.2.1 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 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.

5.3.2.2 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.



Notes on Reagents:
1. SIBX and PNBX are two different xanthate collectors (eg. Sodium Iso Butyl Xanthate)
2. Na_2SiO_3 (Waterglass) is a dispersant
3. NaHS is a sulphidiser for Oxide minerals
4. Rinkalore is a fatty-acid based collector for Oxides
5. G41 Frother assist with creating froth to collect the minerals from the pulp

Figure 28: KTC Concentrator Block Flow Diagram (Present Arrangement)

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

Figure 29: 32' DIMA Mills

5.3.3 Flotation

5.3.3.1 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 ("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 standard. 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.

5.3.3.2 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 a frother ("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 30: Flotation Cells

5.3.4 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).

5.4 Luilu Refinery

Both concentrate streams (oxide and sulphide) are received at the Luilu Refinery for recovery of the contained copper and cobalt. The oxide and sulphide streams are kept apart as the oxide copper is already acid soluble whereas the sulphide concentrate receives additional processing in the roaster to render it acid soluble. A block flow diagram of the current Luilu Refinery operation is shown in Figure 31.

5.4.1 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.

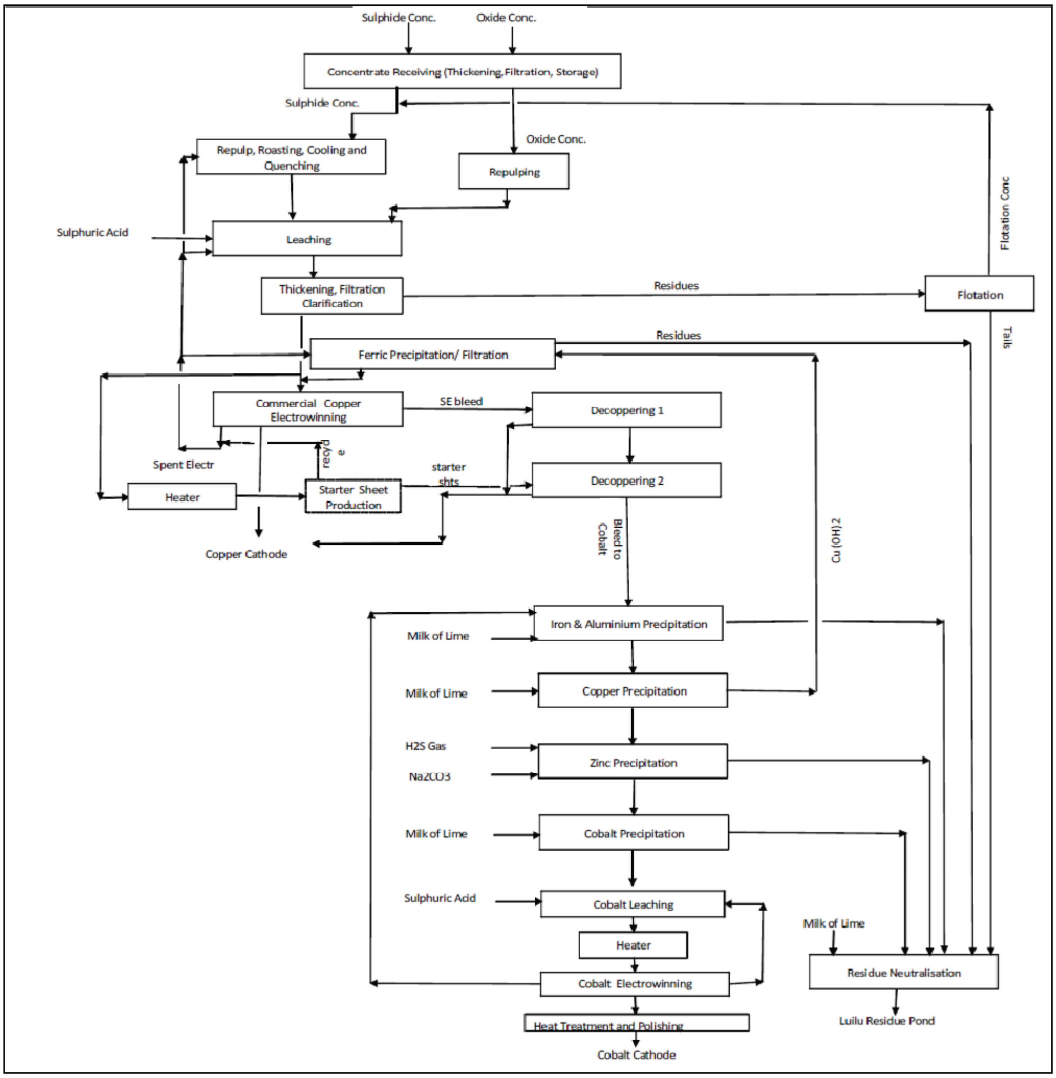


Figure 31: Luilu Refinery Block Flow Diagram (Present Arrangement)

5.4.2 Copper Production

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

5.4.2.1 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 electrowinning 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 32: Sulphide Roaster at Luilu

5.4.2.2 Oxide Concentrate

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

5.4.3 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 electrowinning 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 33: Finished Copper Product

5.4.4 Cobalt Circuit

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

In the cobalt electrowinning 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 34: Finished Cobalt Product

The implementation of Phase 3 consists of the following primary scopes of work:

- New concentrate thickening and filtration facilities;
- Rehabilitation of concentrate storage area;
- Rehabilitation of the original two roasters;
- Rehabilitation of the oxide repulp area;
- Rehabilitation of the counter current decantation area;
- Addition of new residue belt filters;
- Rehabilitation of copper electro-winning;
- Rehabilitation of cobalt purification;
- Addition of an effluent treatment plant;
- Rehabilitation of the lime plant; and
- Rehabilitation of certain utilities.

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

- Additional concentrate filtration facilities;
- Additional roasting facilities;
- A neutral leach circuit;
- A copper solvent extraction (“SX”) plant;
- Conversion of the existing unused electro-refinery to electrowinning as base load copper production;
- Use of the existing copper electrowinning facility as variable top up capacity;
- 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 electrowinning from the converted electro-refinery plus ~70 ktpa from the existing electro-winning facility. It will be possible to increase production in the existing electro-winning facility to ~110 ktpa, i.e. ~310 ktpa total production. Finally, provision is being made to include an additional SX facility for installation at a later date, so that all copper production from the Luilu facilities will be LME A Grade.

5.5 Risks

The project is at risk from a number of different areas, examples of which are as follows:

- Movements and changes in the markets and commodity prices which are dependent upon the global financial situation.
- Power outages and stability of the grid negatively impact upon production and at present KCC is not able to isolate itself from these issues although it has entered into agreement with SNEL, the national power utility company, to upgrade capacity of the DC link between Inga hydro-electricity facilities and Katanga Province to its installed capacity;
- Fluctuation in the power supply negatively impacts upon the performance of the electrowinning section;
- 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 inventory; and
- Sourcing of and maintaining skilled staff on site is an issue.

6.0 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

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 Environmental Impact Study Final Review Report for the Client, Report No. 411167/1, March 2010, SRK Consulting (SRK 2010b).

6.2 Assessment of Compliance with Statutory Requirements

According to Article 64 of the Mining Code of the DRC, to own and operate a tailings facility, a mine only requires an operating license or "Permit d'Exploitation" ("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 Environmental Impact Statement ("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 resource and develop / construct the necessary supporting infrastructure (i.e. tailings facilities), effectively rendering KCC the license to own and operate the KITD.

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.

7.0 CLOSURE

7.1 Approach and Limitations to Closure Cost Review

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.

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 aspects;

7.2 Available Information

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

- Environmental Impact Study and Environmental Management Plan for Kamoto Copper Company. March 2010. Report no. 411167/1. SRK Consulting.
- 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 Environmental Impact Study ("EIS") and Environmental Management Plan 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 SRK decommissioning and restoration costing, 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 Amended Joint Venture Agreement with GCM indicate that once KCC has finished utilising them, they will revert to GCM. These facilities are currently leased from GCM on terms defined in the Amended Joint Venture Agreement for 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.
- 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.

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.

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): 2323 ha;
- Luilu Refinery and related areas: 51.6ha
- KTC and related areas: 36.4ha
- Heavy vehicle workshops ("SKM") and related areas: 5.4ha
- KTO mine and related areas: 25ha
- KOV Open Pit and related areas: 50ha
- T17 Open Pit: and related areas: 35.7 ha
- 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 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.

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.
- 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 T17 Open Pit and surrounding infrastructure. The battery limits also includes the TSF to the south of the Luilu Refinery as is described above.

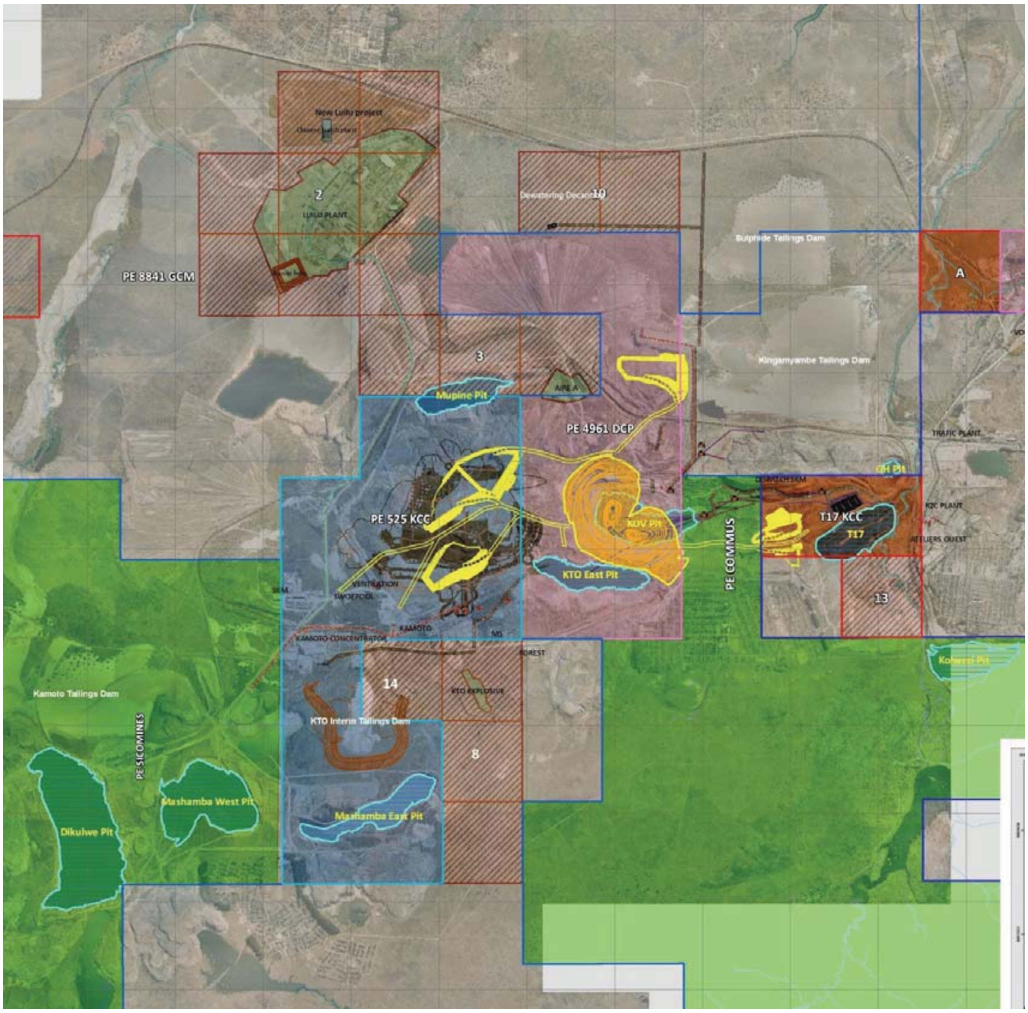


Figure 38: Map of infrastructure on perimeters of the convention JVACR - KCC

7.4 Assumptions and Qualifications

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

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; and
- 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.

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;

7.4.3 Additional allowances

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

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 56 and Table 57. Table 56 provides an overall summary of the cost comparison, whilst Table 57 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 **USD 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; and
- Clean-up and safe disposal of contaminated soils and fugitive contamination; and
- Allowance for P&Gs and contingencies.

Table 56: 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 57: Detailed comparison of closure measures and related costs

Category with sub-categories	Evaluation
7.6 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 mine. ■ 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.
7.7 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 ponds; and	■ The SRK costing allowed for decommissioning and restoration of the Luilu Refinery, KTC; SKM; KTO mine; KOV Open Pit; T17 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 respective costs. However, it is unclear from the SRK costs whether provision

Category with sub-categories	Evaluation
■ Reclamation of subsided areas.	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 mine. 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.
7.8 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; ■ The costs under this cost category cannot be compared, because these appear

Category with sub-categories	Evaluation
	to have been omitted from the SRK costs.
7.9 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:	
7.10 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.
7.11 Additional allowances	
■ Preliminary and general ■ 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

7.12 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;
- 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 on responsibility for this environmental liability and the fact that such areas could not be detected from aerial imagery.

7.13 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 USD 111million 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.

8.0 ENVIRONMENTAL, HEALTH AND SAFETY

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 in regard to the proposed listing of Glencore International plc (or such other relevant group company) on the London and Hong Kong Stock Exchanges. Specifically this involved assessing the following items:

- The scope and content of the Environmental Impact Study ("EIS") and Environmental Management Plan ("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;
- Major environmental and social risks and liabilities, specifically in regards mine closure;

The geographical extent of the audit was limited to mining-related facilities and activities in the KCC Concession Area as defined in the relevant section of this report.

8.2 The KCC Concession Area

Mining assets within the KCC concession are as follows:

- T-17 Open Pit, an operating open pit mine;
- KTO mine, an operating underground mine;
- KOV Open Pit, an operating open pit mine which is currently ramping up to full scale production;
- Mashamba East Open Pit, a development project;
- Tilwezembe Open Pit, a recently closed open pit mine; and
- Kananga Mine, a dormant open pit mine.

Processing assets within the KCC concession are as follows:

- The Kamoto Concentrator ("KTC");
- Luilu Refinery, an metallurgical plant;

Additional assets and/or facilities within the KCC concession include:

- Waste rock dumps ("WRD") and tailings storage facilities ("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.

8.3 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 8th December 2010; and
- GAA observations during the site visit of 8th December 2010.

These sources are discussed further below.

8.3.1 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 2009 (Metago, 2009).
- The Environmental Impact Study and Environmental Management Plan 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 2009 and March 2010 (KCC Luilu Metallurgical Laboratory);
  - On 27th May 2010 (Talbot & Talbot, 24th June 2010);
  - Between 14th to 20th July 2010 (Talbot & Talbot, 16th August 2010); and
  - On 1st and 2nd September 2010 (Talbot & Talbot, 16th September 2010).
- Site dust fall monitoring data collected on a monthly basis from January to September 2010.
- An independent technical report on KML material assets (SRK, 2009).

8.3.2 Interviews with site personnel

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

- Mr. Louis Kasuyi: Secretary General;
- Mr. Luck Mumba: Manager: Community Development and Public Relations; and
- Mr. Patrick Mbaya: Environmental Co-ordinator

8.3.3 Site areas visited

On 8th December 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.

8.4 Limitations of the Audit

This report 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 report and the source of the information is indicated.

8.5 Results of the Audit

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

8.5.1 Authorisations

8.5.1.1 Operating licences

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

KCC holds approved operating licenses for all of its concessions as detailed in the Legal Tenure section of the Executive Summary of this MER. In terms of these operating licences, KCC may mine the 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 Environmental Impact Statement (EIS) which has been received by the Department for the Protection of the Mining Environment ("DPEM").

8.5.1.2 Environmental Impact Study and Environmental Management Plan

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 Environmental Impact Study ("EIS") and Environmental Management Plan ("EMP") to the Department for the Protection of the Mining Environment ("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 Amended Joint Venture Agreement, 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.

8.5.2 Compliance against Equatorial Principles

Table 58, 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 58: 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 Mining Code of the DRC, 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 acid rock drainage ("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, 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:	Potentially compliant	■ Recommended that the covenants should be included in the

	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		financing documentation for KCC financiers ■ If the Environmental Management Plan and EMS are implemented, the KCC operation appears to be capable of meeting Equator Principle requirements.
Principle 9: Independent Monitoring and Reporting	An idependent, 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'

8.6 Key environmental risks relating to KCC operations

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; and

- 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 copper ("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.

- 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.

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, cobalt ("Co") and manganese ("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.

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).

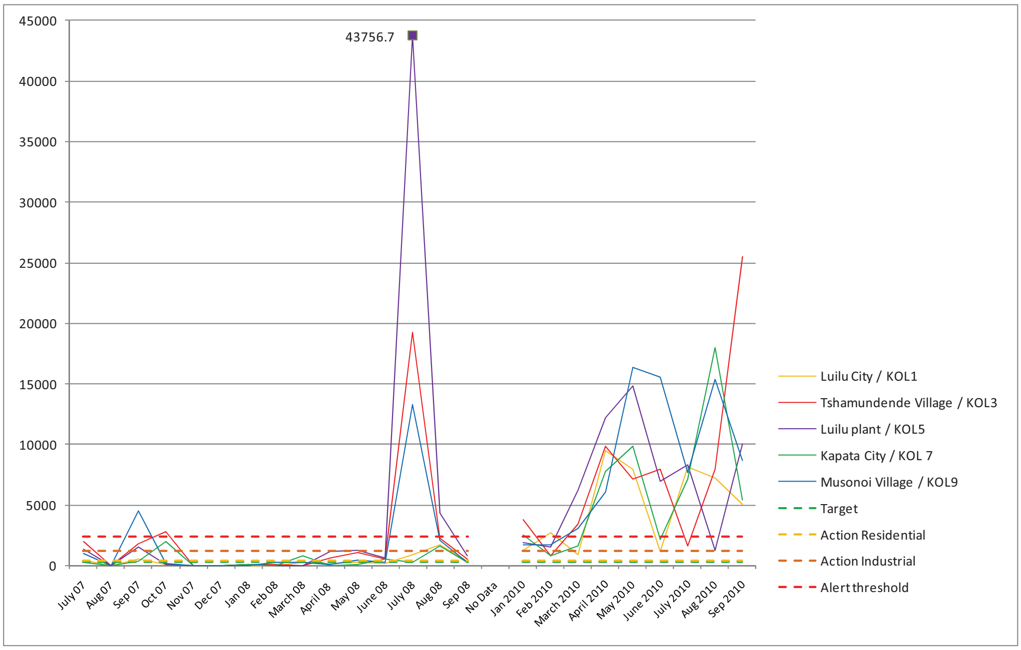


Figure 39: Dust fallout (mg/m2/day) at various monitoring locations within the KCC complex

Figure 40: Musonoi village photographed from T17 waste rock dump

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 mine 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.

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 (“GT”) 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.

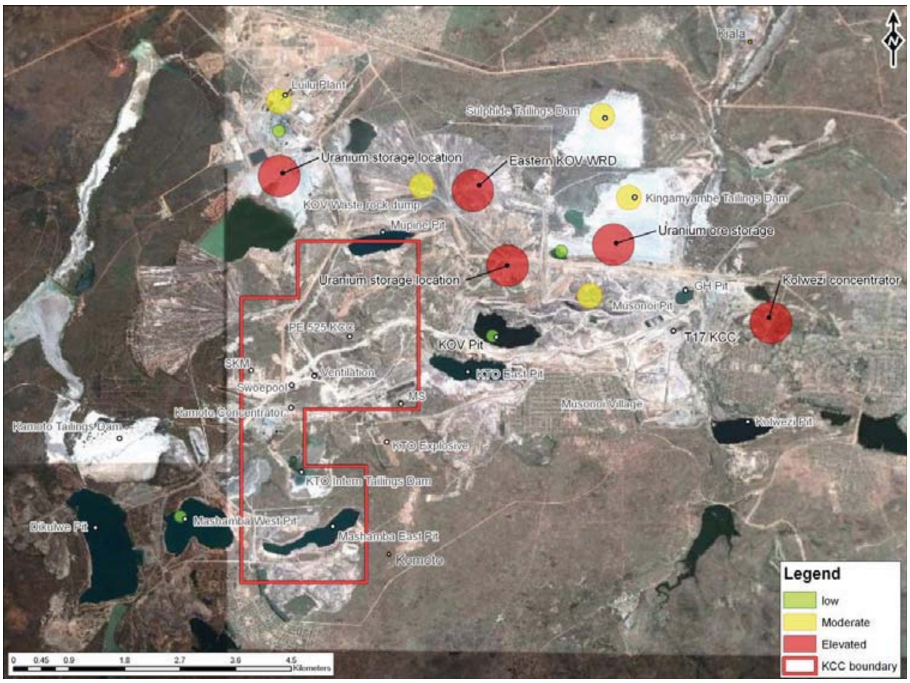


Figure 41: Relative levels of radioactivity in the KCC Concession and surrounds

Site personnel interviewed during the KCC audit indicated that radioactive waste rock occurring within the T17 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.

8.6.6 Rehabilitation of waste rock dumps

The draft EMP for KCC (SRK, 2009) contains the following obligations in regards the rehabilitation and closure of WRD's:

- Where WRD slopes exceed 24°, 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.

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 2011 to assess KCC's proposal for the location, design and layout of a hazardous waste disposal site and to approve its construction.

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.

8.6.9 Risk of acid rock drainage 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 acid rock drainage ("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, this has not been confirmed. Geochemical testing of mining and waste materials is therefore advised to determine the likelihood and significance of ARD impacts.

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 58

- **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 USD8 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 USD10 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.

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 Amended Joint Venture Agreement `
  - 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.
  - The unquantified risk of generating acid rock drainage from 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.
  - 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.

8.9 References

1) Metago (2009). Katanga Mining Limited Due Diligence Environmental and Mine Waste Review. Report Number C001-02-01, February 2009.

2) SRK (2010). Kamoto Project: Environmental Impact Study and Environmental Management Plan for the Project. SRK Report 411167/1, March 2010.

3) 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.

4) KCC (October 2009). Site environmental incident register: November 2008 to October 2009.

5) KCC (October 2010). Site environmental incident register: November 2009 to October 2010.

6) KCC Luilu Metallurgical Laboratory Excel spreadsheet: "Water results up to March 2010" (Water sample quality laboratory data from various locations for the period May 2009 to March 2010).

7) KCC Luilu Metallurgical Laboratory Excel spreadsheet: "Dust samples 2010" (Monthly KCC dust fall monitoring data for the period January to September 2010).

8) SRK (2009). An Independent Technical Report on the Material Assets of Katanga Mining Limited, Katanga Province, Democratic Republic of Congo ("DRC"). SRK Project: 389772, 17 March 2009.

9) Talbot & Talbot Laboratories water quality analytical data reports dated as follows:

   a) Report: Katanga 8636/10 R1, dated 24 June 2010 (samples collected 27 May 2010);

   b) Report: Katanga 11806/10, dated 16 August 2010 (samples collected 14 to 20 July 2010); and

   c) Report: Katanga 13881/10, dated 16 September 2010 (samples collected 1 to 2 September 2010);

9.0 MARKET

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 59 shows the historical and 2011 forecast global refined copper market balance.

Table 59: 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 (USD/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 42. The price was USD4 585/tonne on 1 January 2006, at that point a near-record high. The price rapidly increased, reaching a high of USD8 800 /tonne in May 2006. By February 2007 it had declined to USD5 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 USD8 900 /tonne by July 2008. Thereafter, as the financial crisis took effect on the global economy, the price declined to USD2 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 USD9 695 /tonne on 12 January 2011.

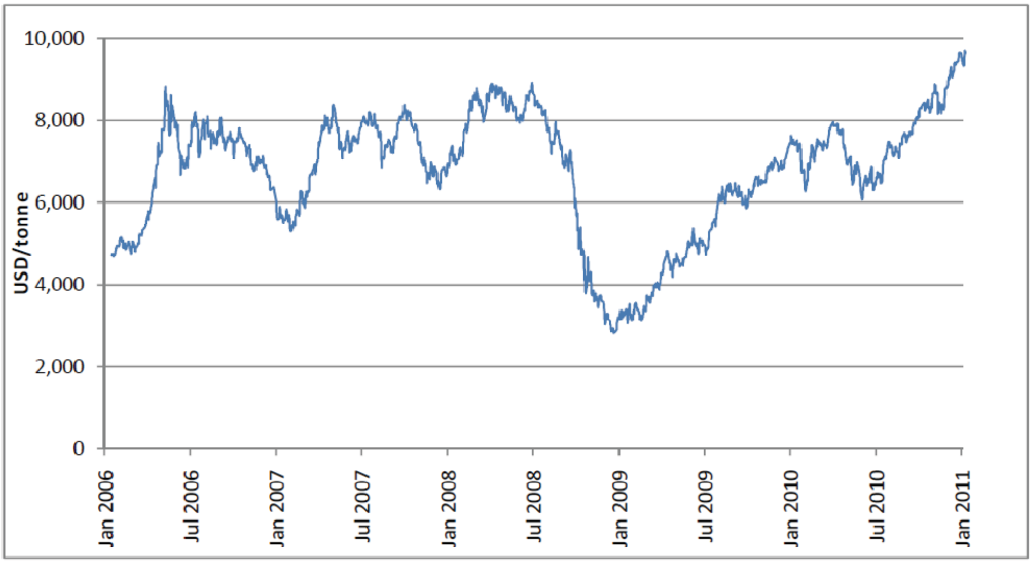


Figure 42: The London Metal Exchange copper price from January 2006 to date (Source: LME)

The copper price forecast used in the economic evaluation of the project is shown in Table 60. The forecast is based on published London Metal Exchange (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 USD), and the real copper price forecast is derived from the nominal prices using the US CPI estimates in Table 60. The forecast nominal average price for 2011 is USD9 600 /tonne, declining to USD6 800 /tonne in 2019.

Table 60: Copper price forecast

Copper price (USD/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%	

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 61 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 61: 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 (USD/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 USD48.63 /pound in March 2008, falling in line with other commodities to a 5-year low of USD11 /pound in December 2008. The price has recovered, and since cobalt started trading on the LME in May 2010, the price has averaged USD17.55 /pound, with a maximum of USD19.64 /pound and a minimum of USD15.94 /pound.

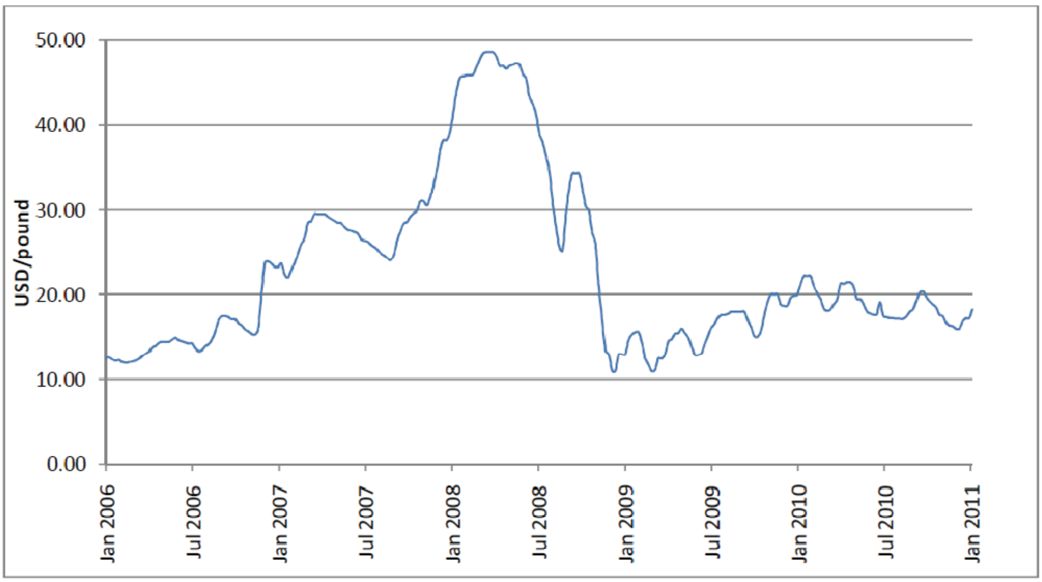


Figure 43: The cobalt price from January 2006 to date (Source: Inet Bridge)

The cobalt price forecast used in the economic evaluation of the project is shown in Table 62. The forecast is based on the Metal Bulletin 99.8%Co USD/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 USD), and the real cobalt price forecast is derived from the nominal prices using the US CPI estimates in Table 62. The forecast average price for 2011 is USD17.24 /pound, declining to USD13.00 /pound in 2019.

Table 62: Cobalt price forecast

Cobalt price (USD/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%	

10.0 TECHNICAL AND ECONOMIC ASSUMPTIONS

10.1 Revenue assumptions

KML has entered into offtake agreements with Glencore International AG, pursuant to which Glencore will buy 100% of the quantities of Cu and Co produced by KCC over the life of the mine. The offtake agreements are negotiated at arm's length at standard market terms.

10.2 Capital Cost Estimate

A summary of the capital cost estimate by major cost items is presented in Table 63 below. The capital expenditure items are as follows:

- **KTO Mine:** 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;
- **Kamoto East Underground Mine:** Initial capital is for the development from the KTO Mine 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 5.0;
- **Effluent Ponds and Tailings:** Capital expenditure is for the development of the ponds and tailings facilities as described in Section 6.0;
- **Power:** Capital expenditure is for the development and refurbishment of power supply infrastructure as described in Section 12.2;
- **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 63: Capital Expenditure

USD 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**
Kamoto East Underground	0.0	0.0	0.0	0.0	0.0	343.8	**343.8**
T-17 Underground	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**
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**

10.3 Operating Cost Estimate

The major operating costs are as follows:

- **Open Pit and Underground Mining:** these costs include:
  - **KTO Mine:** the costs are based on current and budgeted costs as an owner operation. The weighted average cost applied over the LOM is USD 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 USD 6.23/bcm for mining and USD 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 USD 7.70/bcm for mining and USD 2.70/t ore for haulage;
  - **Kamoto East Underground Mine:** the costs are based on estimated costs as an owner operation. The weighted average cost applied over the LOM is USD 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 USD 28.47/t ore mined;

  - **Mashamba East Open Pit:** the costs are based on a contractor performing the works. The weighted average cost applied over the LOM is USD 29.30/t ore mined;

- **Kamoto Concentrator:** this includes plant costs for reagents, consumables and electricity, and is based on fixed costs of USD 13 million per annum and variable costs of USD 1.91/t ore feed for the sulphide circuit and USD 11.65 ore feed for the oxide circuit;

- **Luilu Refinery:** this includes USD 0.19/lb for finished Cu and USD 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) through Durban (the FOB point) either to Europe or the Far East.

The major operating items are detailed on an annual basis in Table 64 below.

Table 64: Major Operational Expenditure

USD 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	120.5	62.3	107.3	1 868.9
Kamoto Concentrator Costs	59.3	53.5	55.4	76.7	100.9	1 538.6
Phase 4 Refinery	0.0	0.0	29.6	117.0	113.4	1 820.8
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**

10.4 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 65.

Table 65: 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 USD 85.5 million has been budgeted to 2016.

11.0 ECONOMIC ANALYSIS

This section presents a valuation of Katanga Mining Limited's (KML) interest in KCC. KML owns 75% of KCC via various subsidiaries, while GCM owns 25%. 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.

11.1 Valuation Methodology

KCC is an operational mining company with several active mines. Its resources and 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 net present value 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 life of mine;
- 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 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 Competent Persons 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.

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, which is the discount rate used by Glencore across its portfolio. The valuation model was prepared on a quarterly basis.
- Mining and processing production rates, head grades and recoveries are as described in Sections 4.0 and 5.0:
- Commodity prices are as described in Section 9.0;
- Capital expenditure is as described in Section 10.2;
- Operating expenditure is as described in Section 10.3;
- Royalties, tax, capital allowances and exchange rates are as described in Section 10.4;
- 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.

11.3 The Valuation of KML's Interest in KCC

The results of the DCF model are shown in Table 66, 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.

KATANGA MER EXTRACTION TABLE

*Capacities refer to annualized capacity at year end - 31 December

* Overall plant recovery is 85% for Copper and 65% for Cobalt

	Units	2008	2009	2010	2011	2012	2013	2014	2015
Finished metal production capacity	**Units**								
Copper	t	40 800	70 000	130 000	150 000	150 000	200 000	250 000	310 000
Cobalt	t	2 050	3 240	5 500	8 000	8 000	8 000	8 000	8 000
Cobalt Hydroxide	t						22 000	22 000	22 000
Finished metal actual / forecast production									
Copper	t	22 122	41 964	52 179	110 414	150 000	174 546	246 669	308 194
Cobalt	t	749	2 534	3 437	5 017	6 995	6 807	8 000	8 000
Cobalt Hydroxide	t						2 821	9 574	6 869
Copper contained in concentrate for sale	t	-	1 773	6 054	21 881	-	-	-	-
Cobalt contained concentrate for sale	t	1 776	-	-	-	-	-	-	-
Cash cost (excl. royalties, realisation charges, before by-product revenues)	US$m	276	286	291	388	483	485	529	637
By-products revenues	US$m	164	77	155	343	251	294	451	391
Royalties (as a % of net revenue)	%	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
Depreciation & amortisation	US$m	364	287	200	310	371	323	214	179
Statutory Tax rate	%	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Capex									
Sustaining	US$m	119	18	56	60	87	86	95	83
Expansionary	US$m	319	100	165	260	266	285	38	38

Production Numbers - Mining

		2008	2009	2010	2011	2012	2013	2014	2015
KTO	Unit								
Mined ore	t	551 333	1 094 088	1 309 735	1 308 520	1 708 720	1 822 924	1 846 355	2 258 118
Cu grade	%	3.93	3.85	3.82	3.80	3.88	3.94	3.89	3.67
Co grade	%	0.43	0.49	0.56	0.49	0.57	0.58	0.57	0.57
KOV									
Mined ore	t	-	-	722 324	1 517 348	2 364 753	3 336 993	5 164 689	6 176 646
Cu grade	%	-	-	4.43	4.81	5.02	5.11	4.21	3.81
Co grade	%	-	-	0.30	0.38	0.39	0.35	0.22	0.15
T-17									
Mined ore	t	479 543	1 687 978	1 944 742	1 100 000	370 000	-	-	-
Cu grade	%	1.72	1.30	2.55	2.57	2.93	-	-	-
Co grade	%	0.89	0.85	0.95	0.46	0.44	-	-	-
Tilwezembe									
Mined ore	t	609 792	-	-	-	-	-	-	-
Cu grade	%	1.39	-	-	-	-	-	-	-
Co grade	%	1.17	-	-	-	-	-	-	-
Mashamba East									
Mined ore	t	-	-	-	-	-	-	-	994 510
Cu grade	%	-	-	-	-	-	-	-	4.14
Co grade	%	-	-	-	-	-	-	-	0.10

Production Numbers - KTC

		2008	2009	2010	2011	2012	2013	2014	2015
Sulphide circuit	Units								
Capacity *	t	840 000	1 680 000	2 520 000	2 520 000	2 520 000	2 520 000	2 520 000	2 520 000
Actual Milled KTO ore	t	562 833	1 099 902	1 324 782	1 308 520	1 708 720	1 822 924	1 846 355	2 258 118
Cu grade	%	3.80	3.70	3.73	3.80	3.88	3.94	3.89	3.67
Co grade	%	0.40	0.47	0.54	0.49	0.57	0.58	0.57	0.57
Sulphide Concentrate produced	t	48 909	92 477	113 678	113 122	134 175	145 767	145 892	170 383
Cu grade	%	40.80	40.70	39.56	40.00	42.00	42.00	42.00	42.00
Co grade	%	4.40	5.00	5.66	3.70	4.70	4.70	4.70	4.90
Oxide and Mixed Circuit									
Capacity *	t	840 000	1 440 000	3 000 000	5 160 000	5 160 000	5 160 000	7 680 000	7 680 000
Actual Milled T-17 ore	t	437 754	885 318	1 236 354	2 195 060	827 389	-	-	-
Cu grade	%	2.70	2.34	2.45	1.99	2.30	-	-	-
Co grade	%	0.70	0.76	0.95	0.70	0.70	-	-	-
Actual Milled KOV ore	t	-	-	364 455	1 561 348	2 364 753	3 336 993	5 164 689	6 176 646
Cu grade	%	-	-	4.43	4.81	5.02	5.11	4.21	3.81
Co grade	%	-	-	0.30	0.38	0.39	0.35	0.22	0.15
Actual Milled Mashamba East ore	t	-	-	-	-	-	-	-	994 510
Cu grade	%	-	-	-	-	-	-	-	4.14
Co grade	%	-	-	-	-	-	-	-	0.10
Actual Milled Total ore	t	437 754	885 318	1 600 809	3 756 408	3 192 142	3 336 993	5 164 689	7 171 156
Cu grade	%	2.72	2.34	2.78	3.16	4.32	5.11	4.21	3.86
Co grade	%	0.74	0.76	0.63	0.57	0.47	0.35	0.22	0.14
Oxide Concentrate produced	t	55 323	97 495	189 386	447 576	426 574	347 384	452 004	687 917
Cu grade	%	16.87	16.95	18.20	22.50	24.00	24.00	24.00	24.00
Co grade	%	3.30	3.76	2.83	2.40	1.70	1.70	1.70	0.70
Sulphide Concentrate produced	t					38 619	154 580	183 127	170 318
Cu grade	%					42.00	42.00	42.00	42.00
Co grade	%					2.30	2.10	1.60	1.10

Production Numbers – Kolwezi Concentrator ("KZC") (No longer an asset of KCC - returned to Gecamines)

		2008	2009	2010	2011	2012	2013	2014	2015
Capacity	**Unit**								
Actual Milled Tilwezembe ore	t	555 753	-	-	-	-	-	-	-
Cu grade	%	1.84	-	-	-	-	-	-	-
Co grade	%	0.83	-	-	-	-	-	-	-
Concentrate produced	t	36 573	-	-	-	-	-	-	-
Cu grade	%	12.31	-	-	-	-	-	-	-
Co grade	%	4.87	-	-	-	-	-	-	-

Table 66: Project cash flows over the LOM

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

The base case DCF model uses the values of the input parameters as described in Section 4.0. The base case valuation of KML's interest in KCC is USD 6 008 million, with an upper limit of USD 6 860 million (discount rate of 8%, reflecting a high outlook) and a lower limit of USD 4 744 million (discount rate of 14%, reflecting a low outlook).

Table 67 to Table 69 present the sensitivity of the NPV to changes in the discount rate applied and revenue, capital expenditure and operating costs respectively.

Table 67: Sensitivity of NPV to discount rate and changes in metal prices

NPV (USD 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 68: Sensitivity of NPV to discount rate and changes in operating costs

NPV (USD 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 69: Sensitivity of NPV to discount rate and changes in capital expenditure

NPV (USD 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 44.

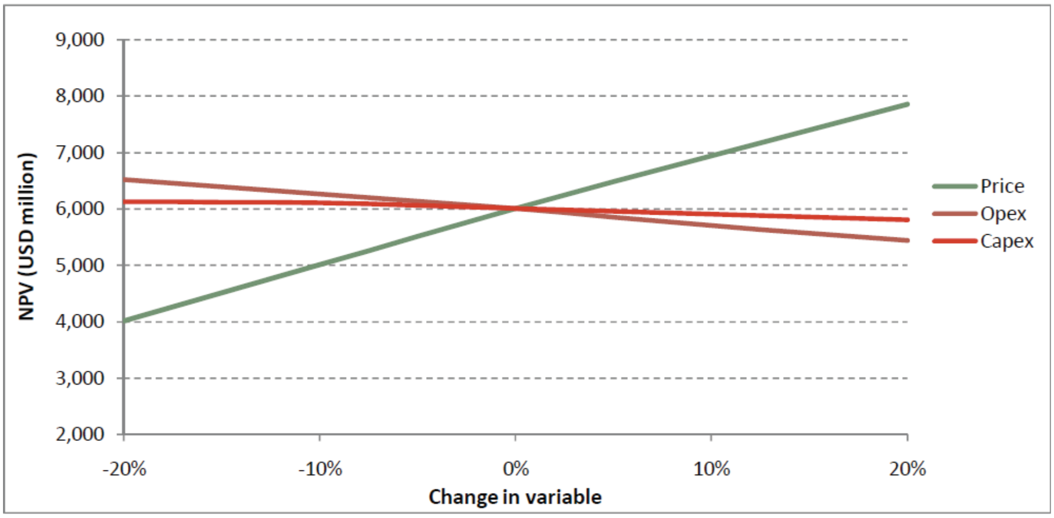


Figure 44: The sensitivity of Base Case NPV to changes in metal price, opex and capex

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

12.0 RISK ANALYSIS

The risk analysis in this report has two sources.

- The Competent Persons involved in the technical analysis of the project were briefed to identify and document project risks during the course of their work; and
- Risks identified in a previous independent technical analysis of KCC done by SRK Consulting in March 2009 were reviewed and included in this analysis if they were deemed to still be valid.

12.1 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 as designed to maintain dry slope conditions. 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 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 produces 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 ARJVA 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 could result in resource losses or that uneconomic production tonnes are processed where the planned revenues does not cover the processing and selling costs.

12.2 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 to availability of power supply from the Inga hydroelectricity facility to 450MW to the Katanga Province by 2015.

12.3 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.

12.4 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 the company'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.

12.5 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 changing new laws and regulations, which may lead to increased operational risks and/or compliance costs.

12.6 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 the company 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 USD, but input costs may be in other currencies, specifically South African Rand. Variations in currency exchange rates can affect production costs and affect project profitability.

12.7 Environmental and Social risks

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

KOV mine 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, 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 Environmental Management Plan (“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 have been submitted to the Department for the Protection of the Mining Environment (“DPEM”) in January 2011 for approval, as per the DRC Mining Code and DRC Mining Regulations. Adherence to the EMP once approved should mitigate this risk.

Legacy environmental issues:

In terms of an agreement with GCM, KML is not liable for historical environmental issues preceding the date of transfer of title of the PE's with effect from 04th February, 2004 and these issues **are not regarded as risks**. However, legacy environmental issues exist on the project site and must be managed as they present a risk to the project of non-compliance with the Equator Principles. These include discharges of tailings and process effluents to the Luilu River, potential exposure of communities and artisanal miners to radioactivity, and rehabilitation of historical contamination sites.

GOLDER ASSOCIATES AFRICA (PTY) LTD.

Frank Wimberley
Project Director

Willem van der Schyff
Competent Person

SE/WvdS/kf

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

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APPENDIX A

Abbreviations and Glossary of Terms

LIST OF ABBREVIATIONS

Abbreviations	
3D	Three dimensional
AAS	Atomic Absorption Spectroscopy
AHK	Alfred H. Knight Laboratory
AICo	Acid-Insoluable Cobalt
AICu	Acid-Insoluable Copper
AJVA	Amended Joint Venture Agreement
ARD	Acid rock drainage
ASCu	Acid Soluble Copper
B RAT	Breche RAT or brecciated RAT
BH	Breche Heterogene or Heterogenous breccia
BOMZ	Black Ore Mineral Zone
CAF	Cut and Fill
CAMI	Cadastre Minier de la Republique Démocratique due Congo
CCIC	Caracle Creek International Consulting (Pty) Ltd (CCIC) - South Africa
CLO	Community Laiason Officers
CMN	Calcaire a Minerais Noirs or Calcareous Unit with Black Minerals
Company	Clencore International PLC
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	Emergancy 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
Glencore	Clencore International AG
HG	High Grade
IFC	International Finance Corporation
ITR	Independent Technical Report
IWWMP	Intergrated 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

KFL	Katanga Finance Limited
KITD	Kamoto Interium Tailings Dam
KML	Katanga Mining Limited
KOV	Kamoto Oliviera and Virgule
KTC	Kamoto Concentrator
KTE	Kamoto East Underground Mine
KTO	Kamoto Underground
LG	Low Grade
Libor	London Interbank Offering Rate
LME	London Metal Exchange
LOM	Life of Mine
Luilu Refinery	Luilu Metellurgical Plant
MAX	Maximum
MER	Mineral Expert's Report
MIN	Minimum
MVT	Mississippi Valley Type
Niknor	Niknor PLC
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
QC	Quality control
R 1	RAT Lilas
R 2	RAT Grises
R 3	Greyish to dark red or brown stratified shales and micaceous schist
R 4	Altered stratified greyish siliceous dolomitic rock with oolitic horizons and a few bands of light-yellow, talcose schist. Nodules of hematite often occur.
RAP	Room and Pillar
RAT	Roches Argilleuses Talceuse
RATGR	Mineralization in the Rat Grises
ROAN	Roan Series in the Katanga System
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

SG	specific gravity
SGS	SGS Consulting (Pty) Lyd
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
$Cu_5(PO_4)_2(OH)_4.H_2O$	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 Katanga Mining Limited, entitled "A Technical Report on the Material Assets of Katanga Mining Limited, Katanga Province, DRC" dated 31 March 2010
Argillaceous	Term describing sedimentary rock with modal grain size in the silt fraction
Arkose	A sandstone with less than 15% matrix material with a quartz and feldspar ratio of at least 25%.
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
Dip	Angle of inclination of a geological feature/rock from the horizontal
Dolomite	The name of a sedimentary carbonate rock and a mineral, both composed of calcium magnesium carbonate
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
Effective Date	Effective date of the Technical Report
Euhedral	Descriptive of a mineral which has a fully developed crystal form
Facies	All lithological features of a specific sedimentary rock from which a depositional environment may be inferred
Fanglomerate	A clastic rock deposited in an alluvial fan
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
Inferred Mineral Resource	That part of a mineral resource for which tonnage, grade and mineral content can be estimated with a low level of confidence. It is inferred from geological evidence and assumed but not verified geological and/or grade continuity. It is based on information gathered through appropriate techniques from locations such as outcrops, trenches,

	pits, workings and drill holes which may be limited or of uncertain quality and reliability
KOV Open Pit	KOV open pit mine, an operating open pit mine
Lithology or lithogical	Geological description pertaining to different rock types
Mashamba East Open Pit	Mashamba East mine, a dormant open pit mine
Material Assets	Collectively, KTO Mine, T17 Open Pit, KOV Open Pit, Mashamba East Open Pit, Tilwezembe Open Pit, Kananga Mine, Kamoto Concentrator, Luilu Metallurgical Plant, and infrastructure necessary for the production of the saleable metals
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
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
Proterozoic	Era of geological time between $2,5x10_9$ and $570x10_6$ years ago
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
T17 Open Pit	T17 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

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