KAMOA COPPER SA
Société anonyme avec conseil d'administration
1148-6 Avenue de la Libération, Quartier Golf les Battants
Commune de Lubumbashi, Ville de Lubumbashi
Province du Haut-Katanga, République Démocratique du Congo
www.ivanhoemines.com

REQUEST FOR QUOTATION

FOR THE SUPPLY OF A LABORATORY INFORMATION MANAGEMENT SYSTEM

TO KAMOA COPPER SA

ENQUIRY NUMBER: RFQ - 10388

SECTION 1

INSTRUCTIONS TO TENDERERS

These instructions will not form part of the Agreement with the successful Tenderer.

1. GENERAL

This Request for Quotation ("RFQ") covers the supply of the Services defined in Section 2 Supply Specifications.

2. TENDERER

The Tenderer is the organisation or company which submits a tender. The Tenderer has been provided with specific enquiry documentation to do so.

3. COVER LETTER TO TENDER

The Tenderer's letter accompanying the tender shall state: name of company, contact person's contact cellular phone and e-mail address.

4. CONSORTIUM OR JOINT VENTURE

Should an invited Tenderer wish to form a consortium or a joint venture or some other form of collaboration, the Tenderer shall formally notify KCSA within 7 days from the RFQ issue date, advising him of the details and seek KCSA's agreement to tender in such a manner.

KCSA's agreement is not assured and should the Tenderer continue without KCSA's written approval the resultant tender may be rejected.

5. INSTRUCTIONS

Tenderers are advised to familiarise themselves with all aspects of this RFQ before inserting any prices or rates. It is hereby understood and agreed that the successful Tenderer shall not be entitled to any increase in the Price quoted caused by contract provisions not taken into account by the Tenderer. The Tenderer's Price will be considered to be strictly nett, inclusive of all overheads and ancillary costs to supply to the Employer, as set out herein, no claims for items and activities excluded from the tender will be allowed.

The Tenderer shall investigate the whole of this RFQ to establish and comply with any

requirement to provide any information via attachments and shall briefly describe and include the following with their tender:

5.1 A Power of Attorney authorising the signatories of the Tender to irrevocably bind the Tenderer to their tender.

5.2 Information regarding any pending, imminent and current arbitration, mediation and litigation in which the Tenderer is involved including details of the parties concerned, the subject of such arbitration, mediation and litigation and the disputed amount.

5.3 The Tenderers safety statistics and related performance data of similar comparison as the scope of this RFQ.

5.4 The name and contact details of 3 (three) previous but recent Employer / Client Representatives who may vouch for the Tenderers previous performance and cooperation, should the need arise.

5.5 Provide a list of clients to which the Tenderer has successfully delivered similar services and nature / magnitude and include a short description of the project, value of the project and your specific role delivered at each client. Please provide references and contact details for a selection of these clients.

5.6 Certification that the Tenderer is in good standing with the appropriate government and quasi government organisations such as The Revenue Service and The Department of Labour of the Democratic Republic of the Congo.

5.7 Where and when was the organisation or company founded?

5.8 Who are the major shareholders in the organisation or company?

5.9 In which country is the organisation or company registered? Provide registered organisation or company name and registration details in the Democratic Republic of the Congo.

5.10 In which countries is your organisation or company represented?

5.11 Specify the location of your organisation or company head office.

5.12 Specify the location of all your organisation or company offices, locally and internationally.

5.13 Has your organisation or company or entity or any former business ever failed in the past five financial years to complete a contract, had the contract partially or fully been taken over or had a contract been varied to delete substantial work to overcome poor performance under the contract? If yes, provide details.

5.14 Has any partner, principal or director in your organisation or company ever been associated with any other organisation that has failed in the past five financial years to complete a contract? If yes, provide details.

5.15 What benefits will your organisation or company gain through providing this service to the Employer?

5.16 What is your organisation or company structure and ownership?

5.17 What is the total number of staff employed? Provide an organisation chart. Identifying senior partners/directors and other staff.

5.18 Has any partner, principal or director in your Company ever been convicted of an offence?

5.19 Describe the skill sets and competencies of the resources your organisation or company has, as well as the number of resources your organisation or company has in the skill sets that would likely be called for by the Employer.

5.20 Provide a summary of your “order book" commitments for the next 3 years.

5.21 Provide information that approximately defines where the focus of your business lies and indicate which are the prime services your organisation or company provides and those that it typically sub-contracts.

5.22 The Tenderer shall submit with the Tenderer’s tender, as a separate document, “Corporate Social Investment". Such document shall show any measurements taken to fulfil corporate social investment initiatives in areas where the Tenderer is present/the willingness to contribute to

existing initiatives i.e. Development, Training, Local employment and Corporate spend.

5.23 Preamble to Bill of Quantities or Basis of Pricing.

5.24 Bill of Quantities or Schedule of Rates.

5.25 Alterations by Tenderer.

5.26 Rates for personnel (labour).

5.27 Schedule of equipment to supply to the Employer, including rental rates and purchase values of these items.

5.28 Procurement mark-up.

5.29 Cash flow Prediction.

5.30 Services Supply Programme.

5.31 Method Statements.

5.32 Schedule of Subcontractors and/or Suppliers proposed by Tenderer.

5.33 Project Team Structure.

5.34 CV's of proposes Site Management Team.

5.35 Quality Assurance Programme.

5.36 Insurance Details.

5.37 Additional Facilities Required.

5.38 Tender Correspondence.

SUBMISSION OF TENDER

The “Original Tender” with all related tender data, annexures, addenda, and enclosures shall be submitted via email to tenders@kamoacopper.com, before the closing time, as follows:

Marked:	Confidential
RFQ Number:	RFQ - 10388
Description:	This enquiry covers the supply of LIMS services.
Employer:	Kamoa Copper SA.
Tender’s Close:	Tuesday 6th October 2020, 12h00 Kolwezi time.

PLEASE NOTE:

You are reminded to keep a copy of the tender for your records.

DO NOT DELIVER YOUR TENDER TO INDIVIDUALS. TENDERS SHOULD BE IN NORMAL LETTERS I.E. NOT BOLD OR CAPITALZED.

It is the responsibility of the Tenderer to ensure that its tender has been received by KCSA.

The tender shall remain valid and open for acceptance by KCSA for a period of 90 (Ninety) days from the closing date of the tender.

Before the closing date, KCSA may modify, change or amend the tender documents by formally issuing written addenda.

The Tenderer shall acknowledge receipt of each modification, change or addendum by the Tenderer’s letter headed written notice to KCSA.
In order to take an addendum into account in preparing the tender, the Tenderer may apply to KCSA for an extension to the closing date, such application is to be received at least seven days prior to the RFQ closing date and time.

Should KCSA grant such extension, KCSA will notify all Tenderers in writing thereof.

Tenderers shall note that despite the foregoing there is no assurance that a requested extension of time will be granted by KCSA.

The Tenderer shall check the number of pages and attachments within this entire RFQ document and should any be found to be missing or in duplicate or the written text or details are indistinct or there is any obvious errors herein or if any doubt exists as to the full intent or meaning of any wording or text or dimensions or sketch or drawing or any ambiguity is found as to the scope of this RFQ, the Tenderer shall promptly notify KCSA in writing and have the same rectified.

No liability whatsoever will be admitted in respect of errors in tenders due to the foregoing if they have not previously been notified in writing to KCSA and it shall be taken that the RFQ and documentation is fully understood and no variations to the Price shall be accepted.

All queries technical, commercial, financial, contractual, and/or errors and other clarifications shall be formally communicated in writing to KCSA who will redirect such matters to the appropriate person, and ensure the suitable written response is distributed to all tenderers. Non adherence may lead to rejection.

Unless queries relate to method of operation and a specific request is received from Tenderers to treat a particular query and / or answer as confidential, then all Tenderers will receive a copy of all queries received together with the answers and / or corrections. These queries / answers shall constitute the rulings and shall be incorporated into the contract documents.

The closing time for clarification of queries and / or request for correction of errors and ambiguities are 48 hours prior to the RFQ closing date and time.

The tendered price is inclusive of all work required to be provided to complete the supply. Activities not listed or priced, and items for which no rate or price is provided by the Tenderer, will not be paid for by KCSA. Such activities and items are deemed to be covered by and included in the other prices and or rates and / or fees contained within the RFQ and or the tender.
All duties and taxes, levies, tolls, registrations, enrolments and other amounts payable by the Tenderer under the contract, or for any other cause, as of the date of tender submission must be included in the rates, prices, and the tendered price (excluding Value Added Tax (VAT)).
Value Added Tax (VAT) payable by KCSA shall be shown separately as an addition to the tendered price.

The Tenderer shall not be permitted to make any alterations and / or adjustments to his tender documents

after the date and time for submission elapsed.

In the event of any discrepancies occurring between the prices detailed by the Tenderer in the forms provided with the RFQ and those contained in any additional letter or document submitted by the Tenderer, the former shall prevail.

Errors shall be corrected by KCSA as follows:

- Where there is a discrepancy between the amounts in figures and in words, the amount in words shall take precedence.

- Where there is discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate shall take precedence, unless in the opinion of KCSA there is an obvious gross misplacement of the decimal point in the unit rate, in which case the line item total as quoted shall take precedence, and the unit rate is corrected. Where an individual rate is considered unrealistic, such rate is adjusted as agreed following consultation with the Tenderer.

- Where there is an error in the price, either as a result of the other corrections required by this checking process or in the Tenderer's addition of prices, the price shall be corrected.

The Tenderer shall submit the main offer in accordance with the commercial and technical requirements as set out in this RFQ.

The Tenderer may in addition to the main offer submit an alternative proposal indicating, but not limited to, technical, financial, contractual, health, safety and environmental advantages to KCSA.

Should the Tenderer desire to make any departures from, or modifications to the RFQ provisions, scope, or to qualify the tender in any way, the Tenderer shall set out the proposals clearly. The alterations detailed will be the only alterations considered by KCSA. A schedule of alterations needs to accompany the tender.

The acceptance and / or rejection of such alternative proposals shall be at the sole discretion of KCSA, but such alternative proposal will not be considered where the Tenderer has not submitted a main offer in compliance with this RFQ.

CONDITIONS OF AGREEMENT

The conditions of contract shall be the KCSA's Standard Commercial Terms and Conditions for Supply of Services, attached hereto in Section 3.

PRICE ADJUSTMENT

Tender documents shall contain a clear statement on whether prices quoted by bidders may be fixed or subject to adjustment (upwards or downwards) on the occurrence of specified events over which the Tenderer has no control and which are likely to affect the prices of major cost constituents of the contract, such as labour, imported materials and equipment. Prices may be adjusted by the use of a prescribed formula (or formulae) which breaks down the total price into components that are adjusted by price indices specified for each component or, alternatively, on the basis of documentary evidence (including actual invoices) provided by the Tenderer. The use of the formula method of price adjustment is preferable to that of documentary evidence. The method to be used, the formula (if applicable) and the base date for application shall be clearly defined in the tender documents. If the payment currency is different from the source of the input and corresponding index, a correction factor shall be applied in the formula, to avoid incorrect adjustment. Price adjustment shall be computed separately for each currency of payment.

CURRENCY

The United States Dollar (USD) or equivalent amount in Congolese Franc (FC) should be used to quote the Price. The Employer shall make payments in the currency of the Agreement.

TERMS OF DELIVERY

The scope of matters relating to the rights and obligations of the parties in relation to delivery of the Goods shall be specified using Incoterms 2010 terminology. The Tenderer shall motivate the advantages of its choice of Incoterm to KCSA.

ACCEPTANCE OF TENDER

KCSA reserves the right to reject or accept the whole or part of any tender, or reject all tenders without being obliged to give reasons.

REJECTION OF TENDER

A tender may be rejected if:

- It is received after the closing date and time stipulated in the RFQ or subsequent official written amendment thereto;

- It contains any unauthorized erasure, alteration, text addition or irregularity;
- There is no adherence to communication protocol for communication during the enquiry process;
- It is considered unbalanced, or does not include the required information necessary for proper comparison and evaluation;
- It is not submitted on the forms provided or is not in accordance with the commercial and technical requirements of the RFQ;
- The Tenderer fails to attend meetings convened by KCSA to which he is invited;
- The tender is delivered to individuals;
- It contains conditions of sale;
- The Tenderer or some person's apparently acting on behalf of the tenderer, approaches a member of KCSA's team in an inappropriate manner concerning this RFQ;
- A single invited Tenderer, tendered as a consortium or a joint venture or some other form of collaboration without KCSA's written authorisation.
- Any other reason which KCSA views as valid.

CONFIDENTIALITY OF ENQUIRY DOCUMENTATION

The RFQ issued by KCSA and the tender submitted by the Tenderer shall be treated as confidential and no aspects thereof shall be disclosed to any third parties, except as necessary for the purpose of the RFQ.

Tenders submitted by the Tenderer along with all other responses will become the property of KCSA.

EXPENSES IN THE PREPARATION OF TENDERS

The Tenderer shall investigate, calculate, compile and issue his tender and incur such costs at the sole expense of the Tenderer.

The Employer shall not be responsible for any direct or indirect expenses and / or losses that the Tenderer may incur in the preparation and submission of this tender.

EMPLOYER'S LIABILITY

Tenderer's are hereby advised that KCSA will not accept any financial liability whatsoever should the Tenderer's or prospective Tenderer's wish to place orders on their suppliers and / or subcontractors prior to receiving KCSA's official written acceptance and / or order.

ATTENDANCE AT MEETINGS

The Employer may during the adjudication process convene several types of meetings. These may include site inspection meetings, tender clarification meetings and pre-award meetings. When invited to attend, the Tenderer shall ensure that he is properly represented at such meeting by experienced employees familiar with the tender.

SECTION 2: SCOPE OF SERVICES

This Business Requirements Document represents the requirements for a Laboratory Information Management System (LIMS) capability for the Kamoa Copper operation, to meet governance and best practice compliance in line with the requirements for Metal Accounting capability to deliver King III audit principles and compliance to the AMIRA P754 Code while remaining solution and/or product independent.

This system is aimed to provide analytical records and information based on accurate measurements of mass and assays.

The solution will interface / integrate with ancillary equipment and systems such as process control, Weighbridge, Metal Accounting, Online Analysers, Enterprise Resource Planning etc.

The Business Requirements Document (BRD) details the business solution capability outcome for the project including the documentation of operational needs and expectations where applicable.

1 PURPOSE / SCOPE

It is envisaged that the Central Analytical Laboratory will be designed, furnished, managed and operated by a third party as described in the following reference document:

0113 - Laboratory Specification - Rev0_encrypted_ (1).pdf

The Business requirements Specification describes the business requirements / specifications for the Kamoa Copper Analytical Laboratory Information Management System capability. The LIMS needs to cater for all the requirements listed below in line with the Laboratory Specification referenced above:

The LIMS is to be used to enable the following:

- Registering of Samples (normal routine samples and ad-hoc special samples), Worksheet generation and reporting of results.
- Manage the quality control of data generated
- Monitor effectiveness, efficiency, and productivity
- Manage the respective processes followed and associated data generated
- Ultimately to render an efficient, and professional service
- Produce reports (Management and QC Reports)

LIMS should be able to register samples based on electronic ARFs (Analytical Request Forms / Sample or Work lists) received from Geology, Plant and ad-hoc / special samples. The functionality must include the automatic registration of samples as well as the manual logging of samples.

Once the samples have been registered into LIMS, all the data related to the analysis of the samples will be captured by LIMS. Provision needs to be made for results to be reported in different formats including *.pdf, *.xls, *.doc etc. External systems would need access (interface) to the LIMS data.

2 OFFERS

The Service Provider will send two submissions **separately**

- Commercial Offer
  - Company's profile (Presentation, RCCM, status…)
  - Rates/ Pricing/ BOQ
  - Any other relevant information related to commercial purpose
- Technical Offer
  - Company's Technical profile (Presentation, references, certificate…)
  - Technical presentation on current project
  - Any other relevant information on technical purpose

A template of BOQ is provided in annexure, the tenderer shall base its quotation according to it.

3 ANALYTICAL LABORATORY

The laboratory will fall under Process Management and is a service sector within the company. The laboratory carries out the analysis and reporting of results for the company's departments: Geology, Mine, Ore Preparation, Beneficiation, Smelting, Refining, Shipping, Warehouse, Environment and external clients when applicable.

The Laboratory will be responsible for the execution of all analytical work on the stages of mining, mineral preparation, metallurgy and quality control. Results are used to manage, control and maintain operations.

The Laboratory will be analysing a large volume of samples and therefore is designed to minimise

effort and maximise results.

(**refer to: KCDEBR0571 Kamoa Kakula Sampling and Functional Requirements Rev B.xlsx**)

4 LABORATORY AREAS

DESCRIPTION	ACTIVITIES
Reception area	Samples are registered and weighed in this area. Batch lists and labels are printed before further treatment.
Sample preparation room of low grade samples	Samples are physically prepared to produce a pulp material to be submitted for preparation and chemical analysis.
Sample preparation room of high grade samples	Metal samples are prepared in this room to produce a smooth surface for XRF analysis, and metal drillings for carbon and sulfur analysis by LECO are produced.
Samples room	This area provides shelving for sample storage.
Analytical room balances	The main function of this room is to house analytical balances and analytical top balance scales.
The wet room	The main functions of this area are related to the classic technical analysis: Volumetric, colorimetric, gravimetric, etc. Preparation of solutions, fusions, water distillation and handling volumetric instruments, supplies and reagents.
XRF-spectrometer room	XRF analysis are performed in this room.
ICP analyzers room	ICP analysis are undertaken in the ICP area.
Room for Coordinator/ Managment	Independent rooms for the administrative and technical control of the area.
Environmental analysis room	The main function of this area is to accommodate the equipment for analysis of water samples.

5 TYPICAL HIGH LEVEL PROCESS FLOW

5.1 PREPARATION OF PHYSICAL ANALYSIS

The purpose of the physical analyzes is to determine the moisture content and the particle size distribution of the samples received at the central laboratory.

ACTIVITY	DETAILED DESCRIPTION
Receipt and sample identification	The samples are duly collected in their respective areas (Mine, production, process, warehouse and environment) and taken to the central laboratory. Upon arriving at the laboratory, the assistant will check the integrity of the sample as well as its identification. All samples are weighed upon receipt and the mass recorded. Sample labels are generated after receipt. After registration in the LIMS system, samples go to the drying stage.
Weighing	Upon receipt, the samples for moisture determination are transferred to trays, accompanied by their original identification. The tray and sample assembly are weighed, with automatic mass transfer into LIMS.
Drying	After weighing, the sample trays for moisture determination are taken to the electric stoves for a minimum of sixteen hours (varying by type, quantity and initial moisture of the sample) at a temperature of ±105ºC. The trays with samples for granulometric analysis are taken to the electric ovens, remaining necessary time (varying by type, quantity and initial moisture of the sample) for Drying at a temperature of ±105ºC. Samples must be dried to constant mass (<0.02% difference of original mass between two consecutive weighing steps).
Final weighing	After drying, trays with samples for moisture analysis are weighed. Their weight is recorded and the material discarded later.

	Samples must be dried to constant mass (<0.02% difference of original mass between two consecutive weighing steps).
Sieving	Samples for granulometric analysis are taken to the sieve already prepared with the sieves defined according to the customer's needs. After sieving the sieves are weighed individually and subsequently the samples are discarded. Automatic mass capture is required.
Sample Disposal	Upon completion of the analyzes, all samples are discarded in the ore tailings bin.
Validation and issue of results	The results, are automatically transferred or inserted (where applicable) into the LIMS system, reviewed and authorized for release to the client.

5.2PREPARATION OF HIGH GRADE SAMPLES

The purpose of the preparation of high grade samples is to transform the material collected in the production areas so that the chemical analysis is possible.

ACTIVITY	DETAILED DESCRIPTION
Receipt and sample identification	The samples are duly collected in their respective areas (reduction and refining) and taken to the central laboratory. Upon arrival at the laboratory the assistant will check the integrity of the sample as well as its identification. As soon as they are registered in the LIMS system, the samples go to the metal sample room. All samples are weighed upon receipt and the mass recorded. Sample labels are generated after receipt.

Face	Part of the sample received passes through the slag removal process in the lattice vial, exposing the metal still in a corrugated form. When the sample presents a smooth surface, the step finishes and the polishing starts.
Polishing	A smooth metal disk must be formed from the metal sample to analyse on the XRF Spectrometer. The metal disk is filed, polished and cooled before analysis.
Disposal of filings	Part of the sample is chosen so that metal filings are removed through a column drill. These filings are sent for determination of Carbon and Sulfur.
Storage	The samples are stored according to their characteristics and origin. *We may not need to log the storage position or disposal dates at this point.*
Validation and issue of results	The last step of the sample preparation process is to record in the LIMS that the preparation has been completed and to make available the samples prepared for the chemical analysis. The results, are automatically transferred or inserted (where applicable) into the LIMS system, reviewed and authorised for release to the client.

5.3PREPARATION OF NON-METALLIC SAMPLES

The purpose of the preparation of non-metallic samples is to transform the material collected in the productive areas into homogenized materials with low granulometry.

ACTIVITY	DETAILED DESCRIPTION
Receipt and sample identification	The samples are duly collected in their respective areas (Mine, production, process, warehouse and environment) and taken to the central laboratory. Upon arriving at the laboratory, the assistant will check the integrity of the sample as well as its identification. All samples are weighed upon receipt and the mass recorded. Sample labels are generated after receipt. After registration in the LIMS system, samples go to the drying stage.
Drying	The samples are transferred to trays accompanied by their original identification. These trays are carried to the electric ovens, remaining necessary time (varying by type, quantity and initial moisture of the sample) for partial drying at ±105ºC. After drying, samples are sent for crushing. Sample mass + trays must be automatically captured.
Crushing	Samples of ore, calcined ore and slag are sent to the crusher. The top size of the samples taken to the crushers should be a maximum of 110mm and the product generated should be 90% below 2mm.
Splitting	After Crushing the samples are sent for splitting. A load of up to 15 kg is allowed.
Pulverization	The portion of the sample collected in the splitter step is sent to the pulverizers. The particle size should be less than 2mm. The pulverizers are sized to produce 90% of the particles below 75 micrometers (microns).
Micro Splitter	With the sample pulverized, the micro-splitter is started, which will generate the sample portions for granulometry, chemical and physical analysis and storage.
Validation and issue of results	The last step of the sample preparation process is to record in the LIMS that the preparation has been completed and to make available the samples prepared for the chemical analysis. The results, are automatically transferred or inserted (where applicable) into the LIMS system, reviewed and authorized for release to the client.

5.4CHEMICAL ANALYSIS

The purpose of the instrumental chemical analysis is to determine the contents of the elements of interest present in samples.

ACTIVITY	DETAILED DESCRIPTION
Receipt and sample identification	Samples are taken to the chemical analysis room after preparation.
Drying	As soon as they are received, the non-metallic samples are placed in electric stoves for a period of time that ensures that all moisture is withdrawn. Metallic samples, so received are forwarded for weighing. Samples for environmental analysis are forwarded to the environmental analysis room. Automatic mass transfer of sample and trays is required.
Weighing	All solid samples must be weighed in order to correctly perform the determinations of the contents of the elements. Worksheets are used for the weighing and includes all the QC samples. A barcode scanner will read the name of the sample to be weighed, and if it is not the correct sample, the LIMS must flag the error and not allow the work to continue. Sample mass must be automatically transferred to LIMS. Limits are applied during the weighing step.
Fusion	With the sample / flux ratio duly weighed, the crucibles containing this mixture are brought to the fusion machine for the preparation of the beads. Worksheets are used for the weighing and includes all the QC samples. A barcode scanner will read the name of the sample to be weighed, and if it is not the correct sample, the LIMS must flag the error and not allow the work to continue. Sample mass must be automatically transferred to LIMS. Limits are applied during the weighing step. Labels for the XRF disks are required.
Instrumental analysis	For the LOI analysis the muffle and the Leco TGA thermo gravimetry apparatus are used. The fused disks are taken to the X-ray spectrometer for analysis. The acid digestion samples are submitted for ICP-OES optical emission spectrometer (ICP) determination.

	The metallic samples and some ores are analyzed on the Leco CS / SC apparatus where the carbon (C) and sulfur (S) contents will be determined. For the samples of the environment several bench equipment is used according to the origin of determination of interest of the samples. For the granulometry sample, the sieve and the Master Sizer (Laser PSD analyser) are used.
Sample Storage	After analysis the samples are archived according to their origin. *We may not need to log the storage position or disposal dates at this point.*
Validation and issue of results	The results, are automatically transferred or inserted (where applicable) into the LIMS system, reviewed and authorized for release to the client.

5.5WET CHEMICAL ANALYSIS

The purpose of wet chemical analysis is to prepare solutions and perform determinations of contents of the elements of interest in the different samples, available in the reception area.

ACTIVITY	DETAILED DESCRIPTION
Receipt and sample identification	Samples after preparation are taken to the chemical analysis room.
Drying	As soon as they are received, the environmental samples are filtered and/or dried for certain determinations.
Digestion and filtering	For certain methods, samples are digested by acids and/ or filtered in preparation of the analysis. (Eg: determination of Fe++). LIMS activity involves only a weighing step.

Dilution	Samples may be diluted in calibrated flasks, prior to reading (analyzes) on high sensitivity equipment such as ICP-OES (Plasma). Dilution factors must be included in the worksheet calculations, based on the “catch-weight” and final volume used.
Preparation of solutions	Certain methods of analysis depend on solutions prepared internally. The type of solution, concentration and reagents used depends on the type of analysis to be applied.
Determination of results	The methods of analysis are applied in the determination of the contents of the elements in the samples and they vary according to the origin and chemical element to be analyzed.
Sample ~~file~~ storage	After analysis the samples are archived according to their origin. *We may not need to log the storage position or disposal dates at this point.*
Validation and issue of results	The results, are automatically transferred or inserted (where applicable) into the LIMS system, reviewed and authorized for release to the client.

5.6ENVIRONMENTAL ANALYSIS

The objective of the environmental analysis is to determine the levels of the elements of interest present in the various samples sent to the central laboratory.

ACTIVITY	DETAILED DESCRIPTION
Receipt and sample identification	Samples are collected at various areas and are taken to the laboratory. Upon arrival at the laboratory, the assistant will verify the integrity of the sample and its identification. Once they are registered in the LIMS system, the samples go to the environmental analysis room.

Solutions preparation	Samples will be prepared in several different ways, for example: filtration, acid treatment, addition of reagents, dilutions, etc.
Analysis	The methods of analysis (ICP-OES analysis, pH meter, conductivity meter, colorimeter, turbidimeter, chlorine) are applied in determining the content of the elements in the samples and vary according to the origin and chemical element to be analyzed.
Dilution	Dilution is required in some analyzes to decrease mass versus volume for analysis in ICP (Plasma). Dilutions must be captured in LIMS and the final results adjusted accordingly.
Storage	Samples are discarded at the end of the shift after results are released.
Validation and issue of results	The results, are automatically transferred or inserted (where applicable) into the LIMS system, reviewed and authorized for release to the client.

6 USERS

6.1 NUMBER OF USER LICENCES

The LIMS must have 5 concurrent licenses for the employees of the Kamoa Copper Laboratory and one license for the designer/integration user.

6.2 USER ACCESS LEVELS

LIMS should allow different levels of approvals to be performed on results. The different levels will serve different purposes. Results need to be approved based on quality control standards. This would typically be performed after instrumental analysis, to ensure all

quality control samples are within the specified limits. This will be done after the samples have been checked against pre-set limits per method and per analyte.

Once all results have been completed and samples can be compared based on pre-set twin stream limits, an approval should be performed. Should any of the results fall outside of the specified limits and therefore cannot be approved, the sample or analyte should be flagged for repeat assay.

Once all results have been approved and are ready for reporting, a final approval step should take place and effectively lock results. Once results have been approved at this point, it will not be possible / allowed to change the results. The results may not be overwritten by any means. This approval step should automatically complete the batch. The time of this action must be recorded in LIMS.

It should be noted that interim results might be reported to the client and the final results reported at a later stage. This would typically be done when all results are not available, but some methods are complete.

In a case where results were reported as final data, and then later were queried by the client, the samples should be re-assayed and all historical data should remain unchanged. The new results should be referenced back to the originally reported results through adequate database design.

Levels must be definable to provide multiple levels of data access to restrict data entry, data approval, data retrieval, data modification, and database structure creation or modification functions.

DESCRIPTION OF THE GROUP	DEFINITION OF STAFF
Admin	• Administrator – access to all
Coordinator/Laboratory Manager/ Technical Expert/ Chemist	• System specifications • Analyst / User levels definition • Definition of clients • Material types • Method set-up/ Run templates • Worksheet design • Standards and QC Setup • Validation and approval of final results • Management reports • QC/QA reports • Queries
Senior technician	• Receive samples • Create worksheets • Custody/tracking • Upload worksheets/download results • Repeats • Validation and approval of results • Interim and final reporting • WIP (work in progress) reports • QC graphs • Reagents • Equipment maintenance
Laboratory technician	• Create samples • Create worksheets • Upload worksheets/download results • First level QC • Interim result reporting

Laboratory Assistant	• Create samples, labels • Storage

6.3 SECURITY AND PASSWORDS

It is necessary for the LIMS to have strong password utilisation capabilities for Lab users.

- All users are required to exchange initial and temporary passwords at the first access
- It has confirmation procedure in the creation / modification password to prevent typing mistakes
- It is mandatory to use strong passwords with combinations of letters, numbers and symbols
- Keeps track of the last registered passwords
- It does not show the passwords on the screen when you type it
- The passwords has encrypted form to store
- 8 characters minimum
- Password exchange as required parameter (number of days) defined in the user's account

7 CLIENTS

The LIMS should allow the registration of new clients and the configuration of each area and associated methods.

7.1 KAMOA COPPER ROUTINE CLIENTS

The Kamoa Copper laboratory clients:

CODE	CLIENT	RESPONSIBLE
01	MINING	NAME DEPARTMENT PHONE EMAIL
02	GEOLOGY	

03	ORE PREPARATION
04	CONCENTRATOR
05	SMELTING
07	ENVIRONMENT
08	WAREHOUSE
09	LABORATORY

7.2ADDITIONAL CLIENT

There may be a demand for samples in the Laboratory for analysis of samples for testing. These samples originate from several differentiated sites and products and there is no pattern of elements to be analyzed. To meet this demand, it is necessary that the LIMS allows the creation of these extra samples with the following functionalities:

- Have an Exclusive Customer called <Create Name>.
- Have all methods associated with this client.
- Allow selection of methods and analytes for that sample.
- Generate a report for these samples

8 AREAS AND MATERIAL TYPES

The following document refers to sampling requirements:

KCDEBR0571 Kamoa Kakula Sampling and Functional Requirements Rev B.xlsx

Also refer to APPENDIX B

SAMPLE NAME	SAMPLE Description / Origin	Sample Material Type	Material Movement type	Frequency	Material Parameter Source	Analysis Required	Moisture Source	Unit of Measure	KPI Type
- METALACCOUNTING									
Rougher Flotation #1 Feed	Secondary Cyclone #1 O/Flow at Rougher Feed Surge Tank	Feed	Continuous	Shift	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO Moisture	Manual	g/t ppm %	Ratio
Rougher Flotation #2 Feed	Secondary Cyclone #2 O/Flow at Rougher Feed Surge Tank	Feed	Continuous	Shift	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO PSD Moisture	Manual	g/t ppm %	Ratio
Final Tailings	Final Tails Sump	Tails	Continuous	Shift Month	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO PSD	N/A	g/t ppm %	Ratio
Final Concentrate	Concentrate Thickener Underflow at Filter Feed Tanks	Concentrate	Batched	Shift	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO Moisture	Manual	g/t ppm %	Ratio
- PROCESS CONTROL									
Rougher Flotation #1 Tails	Rougher Flotation #1 Tails Sump	Midlings	Continuous	Shift	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO	N/A	g/t ppm %	Ratio
Rougher Flotation #2 Tails	Rougher Flotation #2 Tails Sump	Midlings	Continuous	Shift	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO	N/A	g/t ppm %	Ratio
Scavenger Cleaner Flotation #1 Tails	Scavenger Cleaner Flotation #1 Tails Sump	Midlings	Continuous	Shift	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO	N/A	g/t ppm %	Ratio
Scavenger Cleaner Flotation #2 Tails	Scavenger Cleaner Flotation #2 Tails Sump	Midlings	Continuous	Shift	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO	N/A	g/t ppm %	Ratio
High Grade Concentrate	Concentrate Thickener Feed Area	Concentrate	Continuous	Shift	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO	N/A	g/t ppm %	Ratio
Low Grade Concentrate	Concentrate Thickener Feed Area	Concentrate	Continuous	Shift	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO	N/A	g/t ppm %	Ratio
Bulk Dispatched Concentrate	From Bulk Truck	Concentrate	Batched	Per Dispatch	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO Moisture	Calculated	g/t ppm %	Ratio
Bagging Carousel Concentrate	Bagging Plant Carousel Unit	Concentrate	Continuous	Shift	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO Moisture	Calculated	g/t ppm %	Ratio
Tailings Thickener #1 O/F	At Thickener #1 Overflow Discharge/launder	Tails	Batched	Month	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO TDS SS	N/A	g/t ppm %	Ratio
Tailings Thickener #2 O/F	At Thickener #2 Overflow Discharge/launder	Tails	Batched	Month	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO TDS SS	N/A	g/t ppm %	Ratio
Concentrate Thickener O/F	At Concentrate Thickener Overflow Discharge/launder	Midlings	Batched	Month	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO TDS SS	N/A	g/t ppm %	Unit Number Ratio
Filtered Water	Water Filtration Plant Product Tank	Tails	Batched	Month	LIMS	TDS pH SS	N/A	g/t ppm pH	Unit Number Ratio
- GEOLOGY									
Muck sampling	Mined grade at the ore source	Feed	Continuous	Shift	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO	N/A	g/t ppm %	Ratio
Core	Exploration sampling	Feed	Batched	Ad Hoc	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO	N/A	g/t ppm %	Ratio
MINING - Stay on Reef	Stay on Reef development sampling	Feed	Continuous	Shift	LIMS	Cu Fe Si S Mn Mo Pb Rb Sr Zn Zr As Cr Ni Sc Th U V CaO SiO2 Al2O3 MgO	N/A	g/t ppm %	Ratio

9 METHODS AND ANALYTES

An '**Entity'** (**analyte**) is *what* is being determined when quantitative measurement is done. Not all entities are reported to the client e.g. 'mass' in a catch weight may not be reported while 'gold' would be.

Some methods have no entities, results or units (e.g. DRY). In the gold concentration of 2ppm, 2 is the '**Result'** and ppm is the **'Unit'**. Some methods may have mixed units e.g. percent, ppm or ppb for different entities. An entity may have no units (e.g. a specific gravity, (SG) determination is a unit-less result).

Each entity for each method will have a user defined lower detection limit and may have an upper measurement limit.

The reporting units for the method must be definable and may be mixed. Units commonly in use are g/t, ppm (g/t is preferred to ppm in the precious metal industry), ppb, ppt, percent, mg/l, g/l and more.

CODE	NAME	DESCRIPTION
%	%	Percentage
CAL	Calorie	Calorie
CAL/G	Calorie per gram	Calorie per gram
G	Gram	Gram
G/L	Gram per liter	Gram per liter
G/T	Gram per ton	Gram per ton
J	Joule	Joule
KGF	Kgf	Kilogram-force
KGS	kgs	Kilograms
MG/L	Milligram per liter	Milligram per liter
MG/T	Milligram per ton	Milligram per ton
MIN	Minutes	Minutes
ML	Milliliters	Milliliters
NOUNIT	Not defined	Not defined
NTU	Turbidity	Nephelometric Turbidity Unit

PPM	PPM	Parts per million
S	Seconds	Seconds
TONNES	Tons	Tons
UM	Micrometer	Micrometer
US/CM	Conductivity	Micro Siemens per Centimeter
°C	Degrees Celsius	Temperature in degrees Celsius

10 SAMPLE REGISTRATION

LIMS should allow the laboratory staff to pre-register the set of samples expected. Samples may have barcode labels upon receipt. LIMS should be able to register the samples by scanning the labels (automatic), manual entry or importing a client work list (ARF – Analytical Request Form).

In the case of an automatic registration, the system must allow the cancellation of a sample that was not physically sent to the laboratory for receipt. Provision must be made to enter a comment / reason for the cancellation of a sample. This implies that the sample name is retained in the system as part of a batch report with a code (See Point 18); but it may be deleted from a worksheet.

Each sample should be identified by its specific material type since more than one type of sample material may be submitted to the laboratory in a batch. It is an ISO requirement that the material type of the sample, as submitted to the laboratory, is shown on the result report.

Each sample will be weighed upon registration and the weight should be captured in the LIMS system.

The laboratory will also receive ad-hoc samples which will not form part of the standard set of samples expected daily. LIMS should allow for ad-hoc login of these samples and a manual way to populate the fields as described above.

The sample code must be unique. The LIMS must not allow the creation of more than one sample

with the same identification.

The LIMS must automatically assign unique identification codes to each samples.

Complete traceability is required from registration, processing and reporting of samples. This includes names of operators, dates and time records, results history, authorized signature (name) per work area, per instrument, etc.

A “login” and “log out” function per workstation/method is required to enable tracking and monitoring of turnaround time (TAT)

The LIMS must allow for the creation of samples by manual entry, automatic generation and importing a sample list.

10.1 MANUAL REGISTRATION

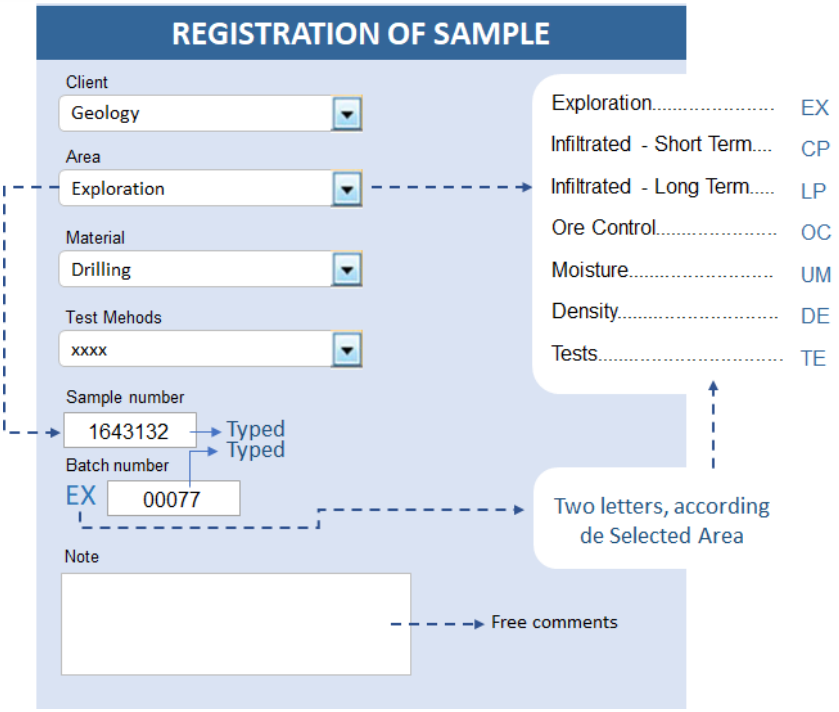
The LIMS must have a user-friendly interface to identify when the sample is registered manually.

There are several particularities for creating samples according to the selected area and / or material. In some cases, it will be necessary to inform the batch, the invoice number, the production number, the number of the spout, the number of the seal and others.

The figures below present some examples:

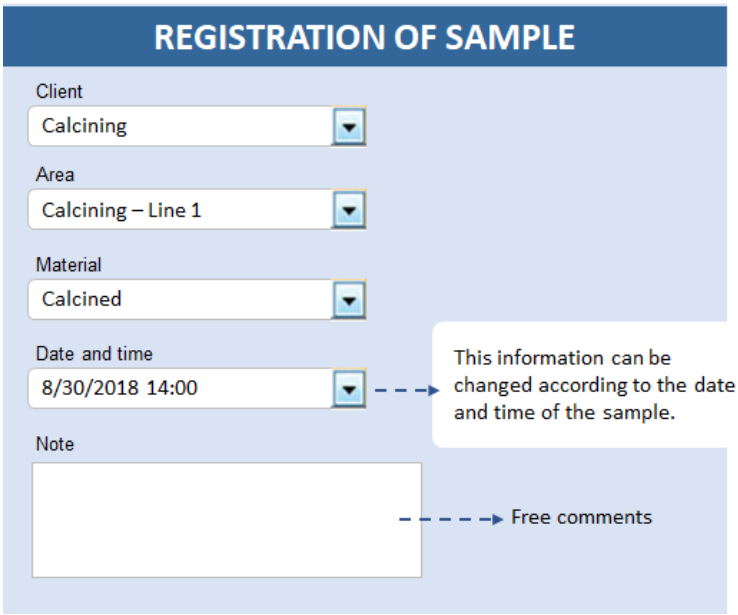
EXAMPLE 1

- When creating samples from Geology the LIMS must allow the identification of the consignment always composed of 2 letters and 5 numbers.
- Sample creation should occur only if the batch number is entered.
- The batch number is not part of the sample number but must be recorded in the database with relationship to the sample number.



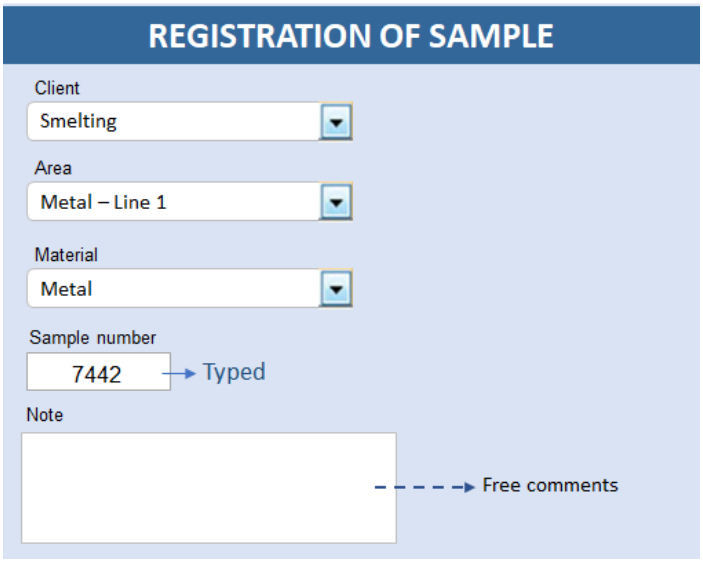
EXAMPLE 2

For these areas the date and time of sample collection are part of the code.



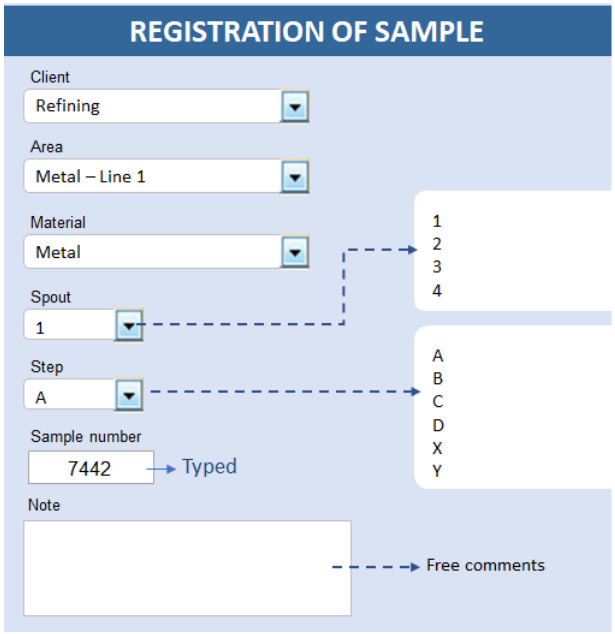
EXAMPLE 3

this model refers to the metal of Smelting.

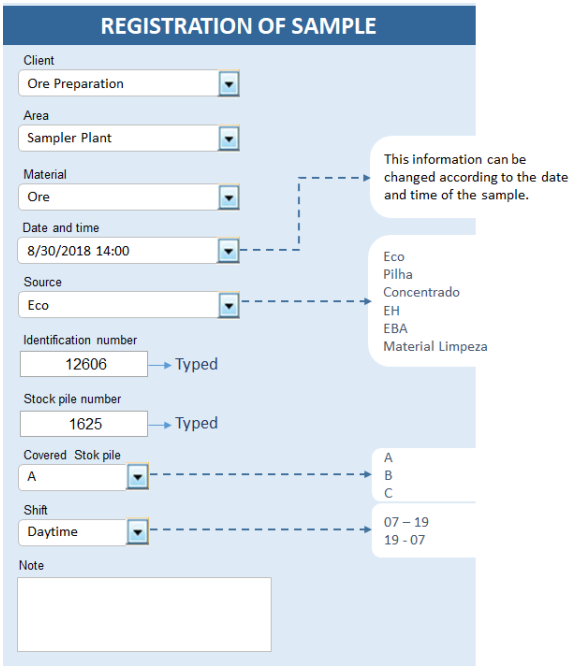


EXAMPLE 4

This model refers to the metal of Refining.



EXAMPLE 5



10.2 AUTOMATIC CREATION OF SAMPLES – ROUTINE SAMPLES

We have several samples that are created daily at pre-defined times. It is necessary that the LIMS has a functionality for automatic creation of these samples at a scheduled time, such as at zero hour of each day. This functionality should be configurable.

If there is a need to include a new client for generating automatic samples, the LIMS must allow the inclusion of this clients and all the configurations to define:

- Define sample intervals (For example, every 6 hours, even, odd hours, etc.);
- Define the execution time for creation (e.g: samples should be created daily at 00:30).
- Enable security rules to be used to allow change, configuration, and functionality only for authorized users;
- To avoid inappropriate database growth with automatically created samples, the LIMS should allow the option to flag certain samples as "**No Sample**" where samples were not delivered (See Point 18).

Enable security rules to be used to allow change, configuration, and functionality only for authorized users (Administrator, Coordinator and Technical expert).

10.3 IMPORTING SAMPLE LIST

The LIMS must allow the import of a file .CSV or TXT with the sample list. For Geology this will be an excellent feature due to the number of samples that are sent per batch.

11 SAMPLE CODE

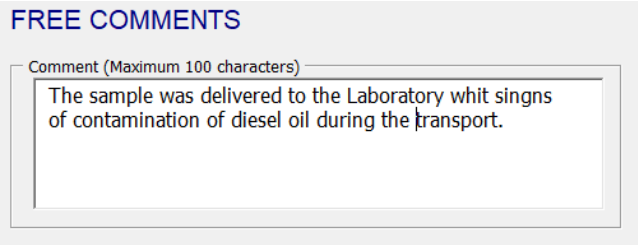
Samples codes (consists of ±20 digits) will be defined during the detailed design phase of the project.

12 SAMPLE COMMENTS

When the sample is received in the laboratory, the LIMS must allow the typing of an optional free text to describe details about the sample received and also select from pre-defined comments in a drop down box.

12.1 FREE COMMENTS

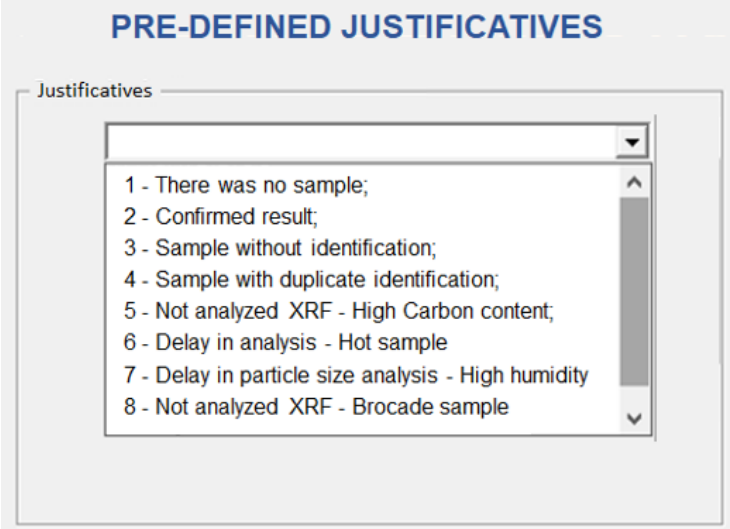
The LIMS must permit the user to enter an explanation in textual format to describe unusual conditions or circumstances.



12.2 PRE-DEFINED COMMENTS

The user must have the facility to select the comment from a drop-down box.

The laboratory should be able to customise these codes and statuses.



Additional comments to be included in the drop-down list:

- U: Unusable: e.g. Sample has been contaminated / leaked during transport
- I: Insufficient: e.g. Sample does not have enough material or was spilt
- C: Cancelled: e.g. Sample was submitted, but analysis is no longer required

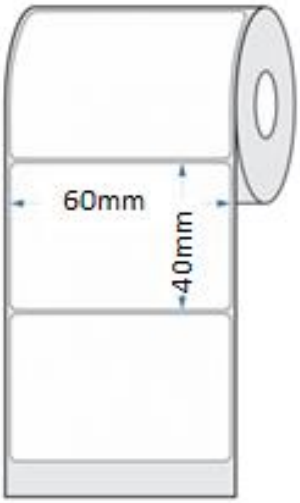
13 SELECTING SAMPLES FOR ANALYSIS

Once the samples have been logged into the system and the relevant Sample Preparation and -QC (e.g. grind size checks) have been completed, the samples must be logged out of the Sample Preparation area and should become available to be selected for the first set of analysis. Samples may be labelled “available” as an indicator that the sample preparation was completed.

This can be achieved from a drop-down list, firstly of batches, and then the sample names associated with this batch, where either “all” samples can be selected for a particular method, or else individual samples. Selecting individual samples for an analysis would be required for repeat assays.

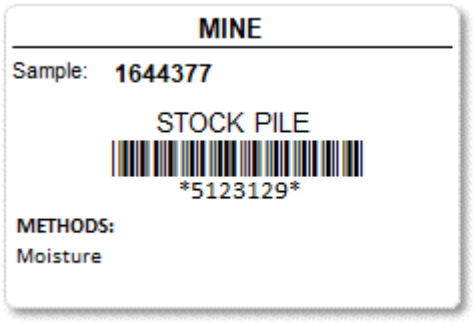
14 LABELS

Two label templates will be used to be used on sample envelopes and tablets to be routed to X-ray.

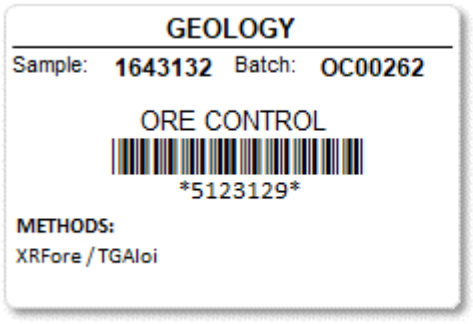


EXAMPLES OF LABELS

Mine



Geology



KAMOA COPPER SA
Société anonyme avec conseil d'administration

Ore Preparation

ORE PREPARATION
Date of Sample: 30/08/18 – 05:00
ORE FRESH – AM001
5123129
METHODS:
XRFore / TGAloi / Moisture / Granulometry

ORE PREP
ORE FRESH - AM001
5123129
30/08/18
05:00

Smelting

SMELTING
Sample: **7418** Spout: **1**
DATE OF SAMPLE: 30/08/18 – 05:00
METAL – LINE 1
5123129
METHODS:
XRFmetal / ICPmetal / LECO200metal / LECO600metal

SMELTING
7418
METAL – LINE 1
5123129
30/08/18
05:00

SMELTING
Date of Sample: 30/08/18 – 06:00
SLAG – LINE 1
5123129
METHODS:
XRFslagsmelting

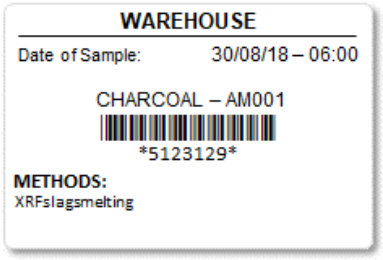
SMELTING
SLAG – LINE 1
5123129
30/08/18
06:00

Environment

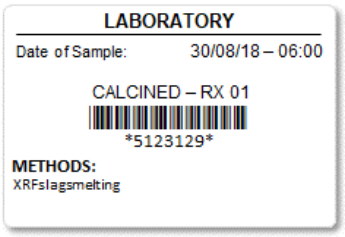
ENVIRONMENT
Date of Sample: 30/08/18 – 08:00
WATER - TREATMENT
5123129
METHODS:
ICPWater / TURBIDITY / CHLORINE_TOTAL / PH / CONDUTIVITY / HARDNESS

-

Warehouse



Laboratory



15 CONTROL SAMPLES AND LIMITS

The LIMS must allow the set-up or maintenance of a series of QC samples and standards, which will include recommended values, waring limits, control (flag and stop) values, trending values, etc. Examples of these control samples are:

- Quartz blanks
- Reagent blanks
- Standards (CRM or IRM – Certified or Internal Reference Material)
- Coarse duplicates
- Pulp duplicate
- Replicates
- Instrument Monitor

Samples – trending

The names and values for Control Standards will be defined during the detailed design phase of the project.

16 WORKSHEETS

16.1 SAMPLE CODES – SAMPLE TYPE

Sample codes are used for the worksheets to identify the sample type:

O - Original sample

CD - Coarse duplicate

PD - Pulp duplicate

R - Replicate

RX - Repeat

QC - CRM/IRM

Qz Blk - Quartz blank

Rg Blk – Reagent blank

Inst chk - Instrument check solutions

Bld - Blind re-submissions

16.2 WEIGHING USING TARED CONTAINERS

Where samples are weighed, during registration, afterwards for drying purposes, mass percentage determination, or other methods, it may be possible to use containers that are labelled and pre-weighed.

There are many containers used during the preparation (trays, dishes, buckets, sieves, pans, splitter cups etc.). The empty weight of these containers needs to be stored in the system. When a user scans the barcode of one of these containers, the empty weight should then be retrieved. It should be possible to re-tare a container. An audit trail of the history of who tared the container when should be available.

When an operator scans in the barcode of a container, the system needs to check when its next tare date is due. If it's already past its due date, and exceedance must be created, and the user informed. They may however continue with the container.

For most of the weighing steps (except for an analytical balance where a very small portion is weighed for analysis) an empty container mass will be required (captured in LIMS) in the worksheet,

which is then followed by the mass of the empty container plus the sample. A calculation follows where the sample mass is calculated by difference.

16.3 WORKSHEET CREATION

Samples will be grouped together as lots to be processed through the laboratory. However, it may be possible that a single sample be processed due to short TAT required.

The batch sizes will vary per method and per site, for example the batch size or work sheet per method e.g. XRF vs LECO or TGA will be different.

An application should be available where worksheets can be configured. Worksheets will contain a set number of samples and associated Quality Control samples such as replicates, reference materials and blanks. The application should allow the user to define the following:

- Configuration maintenance by authorised user
- Tests (methods) to be associated with samples on the worksheet
- Maximum number of samples allowed
- Position and type of blanks and standards
- Instruments to be associated for uploading worksheets and result retrieval
- Must allow for duplicate and repeat worksheet
- Blank subtraction must be incorporated if required
- On-line quality control (flag outliers)
- Warning/Action limits method-entity range defined in Method Maintenance
- Standards, warning and rejection limits
- Blanks, warning and rejection limits
- Replicates, and duplicate tolerance levels
- Percentage of normal replicates to be added, when required
- Sequence of analytes (elements)
- Calculations to be done on analytes within the worksheet e.g. averages, blanks, repeats, total oxides, etc.

It should be possible, where required, to create a worksheet or worksheets for sample preparation steps separately from the final worksheet to be used for instrumental analysis.

When a worksheet is created, the following must be noted:

- There must be a dropdown menu for the Section
- For the selected Section, there will be another dropdown menu where the Batch must be chosen
- Select the Samples and QC's for that Worksheet
- The Worksheet will be created with the Samples and QC's
- The sample barcode of a sample will be scanned and the worksheet loaded.
- Weigh out the sample mass within limits.
- Catch-weight limits must be set per method. When a sample is weighed out, it must not allow these limits to be exceeded. The system must not allow the operator to continue with weighing another sample if the sample scanned does not match the sample on the worksheet.
- The system must not allow you to continue to the weighing of the next sample if the correct mass is not weighed out and captured.
- The mass weighed out per sample, must be used in the worksheet calculation for the dilution factor.

Quality samples listed on the preparation worksheets should be carried through to the instrument worksheets along with the samples. At times it will be required to add a quality sample at a later stage such as a synthetic check solution/XRF disk on an instrument run. Default results should be available in cases where preparation analytes are used to calculate final results.

Each batch will have a certain amount of replicate samples. The replicate samples must be referenced to the original samples as well as having the same functionality available as the original samples. Original and replicate sample results sets should be able to be compared seamlessly.

Where normal replicates are chosen rather than twin stream replicates, the system should present a random list of samples from the worksheet to be added. The number presented should be in line with the percentage defined in the worksheet maintenance (set-up) application. The final selection of replicates should be editable by the user.

When worksheets are printed it should be possible to choose several options as the printed report such as a portrait worksheet, a landscaped worksheet or a loading list containing the sequence of samples to be analysed by a specific instrument to name a few.

Below are examples of the different worksheets for the different methods:

16.3.1 SAMPLE PREPARATION VERIFICATION WORKSHEETS

- Oven temperature monitoring
- Balance verification (Daily recording of the balance mass pieces' reading
- Mass loss
- A percentage of samples (normally 5%) will be flagged to monitor mass loss across the sample preparation procedures. This requires a comparison of the initial mass and the final mass before release for analysis (log out from sample preparation).
- Crusher efficiency
- Prepared samples should have a specific grind size of 95% passing 150µm. To ensure that samples conform to this specification, LIMS should randomly flag a

redefined percent (usually 5%) of samples submitted to be checked for grind size (milling efficiency).

- A portion of each sample flagged for QC (Quality Control) checks will be analysed by manual screening. LIMS must record the mass before (including the empty trays), during and after screening and calculate the % pass rate.
- All samples associated with samples being tested for grind should only be made available for processing once the QC tests have been completed and the samples have passed. Should any sample fail the test, all samples of that type submitted, would be flagged and back-up samples called for and or prepared again.
- Pulveriser efficiency
- Splitter efficiency

17 CALCULATIONS AND SPECIAL FUNCTIONS

17.1 TWO OR MORE SAMPLES

The LIMS must support calculations based on the results of multiple analyses. In the case of Refining, for example, there may be more than one result for the same sample, which is defined by the sequence of letters of the alphabet.

In this case, the LIMS must perform the calculation of the final result of the sample which is composed of the result of the arithmetic mean of the last 2 analyses

The results of all phases of the results must be kept in the production database. In the query database only the final result, i.e. the calculated result of the last two samples, must be reported.

17.2 CALCULATIONS

A function should be available to calculate certain analytes using the result from analysed analytes. These could be part of the same worksheet or could be from a different worksheet. Should one of the variables to be used in the calculation not be done the calculated result should be flagged with status such as “Pending” until all variables to be used in the calculation are available and validated.

Some are there to show the sum of the results of the samples, which serve as guides for the responsible for the results do or not to validate the results. Where a “catch-weight” was recorded in the system, a correction for the mass factor must be made in the worksheets.

Example:

VARIABLE	AREA	MATERIAL	FORMULA
REACTIVITY	Warehouse	Lime	(ml Hcl 4N*50) / (Sample weight)
PRE REDUCTION	Calcining	Calcined	(Fe / Fe++) * 100
RELATION Ni/Co	Smelting Refining	Metal	Ni/Co* 100
ASH	Calcining Warehouse	Charcoal	(Ash weight / Sample weight) * 100
MOISTURE	Mine	Stock pile Channel	((Tare weight + Sample weight – Dry weight) / Sample weight) * 100
	Up grading Covered stock - Collar Linear sampling Sampler plant - Crushing Sampler conveyor Sampler plant - Ore dryer Pulverized charcoal	Collar Wet dust Ore Charcoal	
RELATION Ni/Cu	Smelting Refining	Metal	Ni/Cu * 100
RELATION SiO2/MgO	Mine	Stock pile Channel	SiO2 / (MgO + CaO)
	Ore Preparation	Ore Dust Collar	

	Calcining	Calcined Dust	
	Smelting	Slag	

17.3 TOTAL OXIDE COUNT FOR XRF ANALYSIS

During the validation of the sample results the LIMS must provide a total field of the results to verify the proximity of 100% of the sum of the elements. This calculation must take into account the oxide/element conversion value of some elements, for example it is not enough to add the result of Al2O3 + Fe because it is necessary to multiply the result of the Fe content by 1.4296, so the correct calculation is (Al2O3 + Fe x 1.4296).

The table below shows an example of how these calculations are performed:

VARIABLE	FORMULA (NOTE: Factors to be confrimed as per site specific mineralogical results)
SUM	(PF + (Co*1,271) + (Cu*1,252) + (Ni*1,273) + (Fe*1,4296) + SiO2 + MgO + CaO + Al2O3 + MnO + Al2O3 + Cr2O3 + LOI)

18 INSTRUMENT ANALYSIS

When samples are analysed on an instrument the instrument should be interfaced with LIMS to ensure that no manual entry of data is required. Worksheets and/or sample names must be uploaded by entering a worksheet number and/or using the barcode scanners.

The calibration data of the instrument should also be stored in LIMS.

It is imperative to record the specific instrument used for the analysis for traceability and to allow the users to monitor and evaluate individual instruments' performance over time. There must be a link between the data point and the instrument used to obtain the data point. Data such as analysis date, time and instrument should be recorded in the database.

The instruments to be interfaced are discussed in a later section in this document.

19 DATA TRANSFER OR RESULTS ENTRY

Data entry should be performed though automated transfer from the instruments. The different instruments to be purchased may all have different means of making the data available for LIMS. LIMS must be able to handle any of these formats which might include *.csv, *.xls, ASCII files to name a few. Where transfers are not possible, such as where the volume of a flask may be a parameter, LIMS should allow for manual entry of the data point.

During the data entry stage, many operations are required such as:

- Blank subtraction where required
- Calculation of results e.g. applying a dilution factor
- Correction because of the “catch-weight” mass used
- Rounding of results to show significant figures
- Validation of results based on pre-set conditions

20 DATA EVALUATION

LIMS should be able to accept alphanumerical results. The results should be checked against pre-defined control limits (e.g. pH can only have results between 0 and 14) as well as method detection limits. Where a result is below the method detection limit, it should be presented as “< xxx” where xxx would present the lower limit of detection. Similarly, should the results fall above the upper method limit, the result should be presented as “> yyy” where yyy would present the upper method limit. The number of decimals should be shown in relation to the significant figures of the method at that level.

All Quality Control samples need to be flagged against pre-defined limits and LIMS should visually show where results of QC samples fail the pre-set conditions. LIMS should also allow the user to use Quality samples such as blanks as part of the result calculation. An example of

this type of function would be Blank Subtraction whereby the value of a specific analyte measured in the blank sample is subtracted from all samples for that analyte.

Additional functions which should be available include calculating the absolute average between two replicates as well as averaging of multiple results per leg. A function should be available to view and evaluate different result streams. The laboratory may perform analyses in twin stream (duplicate) at times as part of QC. LIMS should allow for the comparison of the duplicate numbers and compare the difference to defined limits per analyte per sample type, pre-recorded in LIMS.

20.1 CONTROL LIMITS

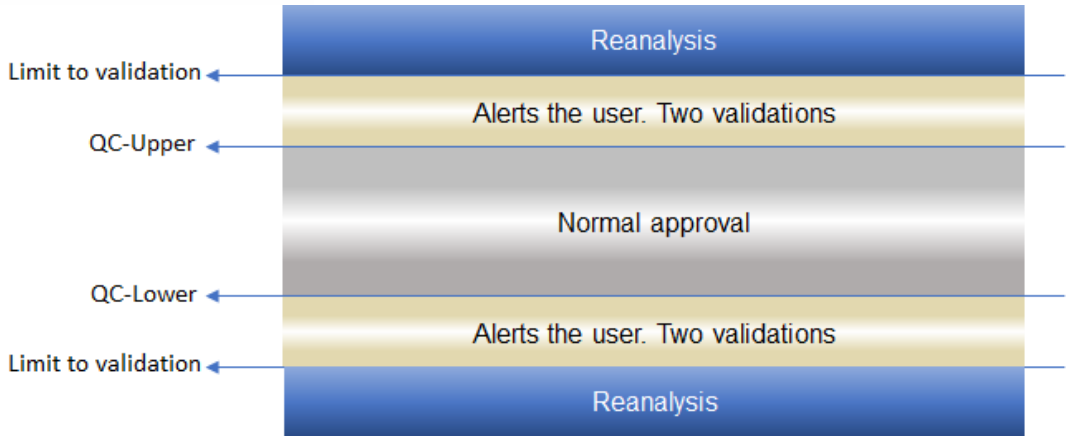
The LIMS must have the functionality for authorised users to enter acceptable regulatory limits for QC and other functions.

There are several types of control limits:

- Sample preparation (mass loss, grind size, splitter efficiency, etc.)
- Mass – during weighing
- QC sample limits (reagent blanks, instrument monitors, quartz blanks, standards (CRM, IRM), coarse or pulp duplicates, replicates, etc.)
- Twin-stream (duplicate pairs)
- Certain samples; for example, trending of final product values

Several types of control charts with the limits indicated and outliers flagged, will be required. These are discussed in detail under the “Quality Control” section.

The system must allow for two levels of warning: one where a QC sample falls within 2s deviation but still below 3s deviation. This “flag” must be a warning only. Where results fall outside of the 3s deviation control limits, it should be flagged with a status such as “Out of Spec”. The user must not be allowed to continue with reporting. Repeat assays may be selected at this point.



21 PARTIAL OR PROVISIONAL RESULTS

The LIMS should allow the user to approve partial results of the sample, such as only result C and S while the other results will be made available later.

Approved results should be made available in reports for end-user consultation.

22 REPEAT ASSAYS

Samples occasionally need to be repeated for various reasons. Reasons to repeat assays might include twin stream results fall outside the pre-set limits, a reference material result falls outside the accepted limits causing the entire worksheet's results to be questioned, or a sample of unknown concentration being higher than an instrument's calibration range requiring a higher dilution of the sample to be analysed etc.

LIMS should allow samples to be repeated for an entire method, for all or selected analytes or a repeat from any point of the analysis process such as from the weighing step or a re-analysis on the instrument only. When repeat assays are performed, LIMS should create a new record which should be traceable to the original result without over writing the initial result (result history). Once both the original and repeat result is available the operator should be able to decide based on pre-defined rules about the choice of result to be reported.

LIMS should allow for multiple repeat assays without over writing any of the historical results. LIMS should record a comment for all repeat assays for auditing purposes. The comments should be chosen from a standard list of comments (the list of comments must be configurable);

however, a free text field should also be available for non-standard comments. The repeat assay should be reported with the quality samples associated with the repeated worksheet.

For repeat assays, the option must be available to select samples to calculate an average value, or to select anyone of the results to be the final accepted results.

23 APPROVAL OF RESULTS

LIMS should allow different levels of approvals to be performed on results. The different levels will serve different purposes. Results need to be approved based on quality control standards. This would typically be performed after instrumental analysis, to ensure all quality control samples are within the specified limits. This will be done after the samples have been checked against pre-set limits per method and per analyte.

Once all results have been completed and samples can be compared based on pre-set twin stream limits, an approval should be performed. Should any of the results fall outside of the specified limits and therefore cannot be approved, the sample or analyte should be flagged for repeat assay.

Once all results have been approved and are ready for reporting, a final approval step should take place and effectively lock results. Once results have been approved at this point, it will not be possible / allowed to change the results. The results may not be overwritten by any means. This approval step should automatically complete the batch. The time of this action must be recorded in LIMS.

It should be noted that interim results might be reported to the client and the final results reported at a later stage. This would typically be done when all results are not available, but some methods are complete.

In a case where results were reported as final data, and then later were queried by the client, the samples should be re-assayed and all historical data should remain unchanged. The new results should be referenced back to the originally reported results through adequate database design.

24 RESULTS REPORTS

Apart from the required routine formats of reports, there should also be a facility to send and report results via e-mail in *.pdf, *.xls or *.doc formats.
Data can be reported either as interim or final and records should be maintained of these.

According to the ISO17025 standard, test or results reports must include the following:

- A title such as “Test Report”
- The name and address of the laboratory
- A serial number
- The name and address of the client
- Identification of method(s) used
- Description of the samples analysed
- Date of sample receipt
- Results with units of measurement
- The names, functions and signatures of the staff authorising the report
- A statement to the effect that the results relate only to the items tested.
- If no sample preparation is performed a statement “analysed as received”.

The SANAS logo should be displayed on reports where accredited methods are reported. On a report where results are reported from both accredited and non-accredited methods, reference should be made to which results are obtained by accredited methods and which results were not. Should a report be issued where only non-accredited methods were used, the SANAS logo must not be used.

When an amended report is issued for any reason, the amended report should be referenced back to the original report issued. All reports (original and all amended versions) should be maintained and referenced in the system.
It should be noted that all samples (all streams analysed) should be reported including all quality control data such as reference materials and blanks with appropriate referencing between samples and associated quality control samples.

The integrity of the electronically reported data must be ensured; this can be by means of a password on editable formats or transmission of un-editable formats. LIMS must be able to export reports to the following formats:

- CSV (delimited by commas)
- PDF
- Excel
- Word
- PNG, JPG or TIF

The functionality must be available to import results from External Labs (Excel sheets) into LIMS to perform comparisons between the laboratory and External Laboratory's results.

Many reports would be required as standard reports. The reports should be user customizable. A few examples are shown, but the list is not inclusive of all reports. Additional reports might be required.

25 ANALYTICAL INSTRUMENT INTERFACE – KAMOA COPPER

The LIMS must be able of receiving results directly into its database from interfaced analytical instruments. Refer to: **Metal Accounting BRS.docx** – paragraph 13

25.1 REPORTS, DASHBOARDS AND GRAPHS

The LIMS need to generate trend analyses, QA/QC charts and graphically formatted reports for administrative planning purposes. The LIMS must provide a third party report development tool that is capable of integrating a wide variety of data types from multiple sources.

Information from the LIMS database must be available for report generation.

- Calculation such as total, subtotal, subtraction, addition, mean, median, and more;
- Format option such as font size and type, page headers and footer, number of significant digits according to the currently used standard;
- Merging graphics, charts and text into a single report;
- Create charts of different formats, such as bar charts, trend lines, pie charts and others.

25.2 SAMPLE LOGIN REPORT (BATCH REPORT OR SAMPLE LIST)

A report will be required after sample login to show samples received as well as the statuses of the samples. The report should include the following:

- Sample ID – (internal in LIMS)
- Batch ID
- Section ID
- Sample name
- Date received
- Time logged in
- Logged in by
- Status

25.3 WORK IN PROGRESS (WIP) REPORT

A WIP report will be required and will form the basis of the production monitoring of the laboratory. The report should show the status and location of each batch submitted to the laboratory per method. It should show whether the batch is still being processed or whether the data is undergoing quality checking. It should be possible to show the number of days the batch has been at the laboratory and flag all batches not reported after a certain number of days. The number of days will vary depending on the method.

A WIP report should also be available to show all batches ready for processing at a certain step in the process. An example would be a report which shows all samples ready for analysis by ICP- OES.

Suggested sections for the WIP status report is as follows:

- Sample receipt
- Sample Preparation
- Secondary Preparation (fusion, digestion, dilution, etc)
- Instrument analysis
- Data evaluation
- Reporting

To enable tracking of batches according to these sections, users must log a batch (by worksheet) in and out a section. A date and time must be registered, plus the user's name. Repeats must be flagged in red.

25.4 STORAGE REPORT

Samples will be stored for up to three months after processing and hence a report would be required to show the status of samples in the sample store. It must be possible to draw a report showing all samples in the store submitted more than three months earlier to facilitate the return of the samples to the process.

26 QUALITY CONTROL GRAPHS AND REPORTING

LIMS should allow the user to view and monitor the on-line control charts as well as other QC/QA tables as defined below. In addition, a function is required to extract historical data to provide sufficient information for the monthly QC/QA reports. For control charts, a minimum of the last six months' data are required. It is preferable that data that originate from a specific shift, be indicated in a certain colour on the graph. It is important that ALL QC standards data be recorded in the control charts, and not just the ones that "passed" the criteria.

To ensure that results conform to the stated precision or accuracy for a method for an analyte, results of QC samples are required to be monitored over a period, for batch(es) or worksheets using various charts. These charts present (QC) sample results in such a way that, if necessary, corrective actions can be taken as quickly as possible.

LIMS recognises different types of QC samples. All type of charts described in this document can relate to each of these QC samples. The types of QC samples are:

- Blanks (quartz blanks, reagent blanks or instrument blanks)
- Standards or reference materials that may be certified.
- Check solutions such as the liquid QC solution to be analysed by ICP-OES
- Instrument monitors or checks (XRF disks, LECO etc.)
- Replicates
- Twin streams (duplicate samples) if required (and/or Blind re-submissions)

- Repeats

In addition, unknown samples are trend-plotted to check the magnitude of the data. Data out of the ranges commonly encountered for any element may then be checked.

26.1 TREND ANALYSIS

A trend analysis is used to monitor analysis for different types of samples. Trend analysis techniques (eg. Matrix interference and elemental interference methods) will be used to monitor results over a specific time-period. The trend analysis will plot a graph per analyte per sample stream retained by a query. Selecting a sample stream must automatically activate the underlined query.

Since the laboratory will receive a set sample stream load per day, it would be possible to calculate limits for each analyte and stream to be plotted on the graphs. The trend analysis must be available at approval of the worksheet and for viewing as a standardized query report.

The system should display data and analysis results through one or more indicators below:

- Trend graph
- Bar chart
- Scorecards
- KPIs
- Pareto's chart

The user must be able to adjust the x- and y-axis scale and headers.

26.2 SINGLE-ANALYTE CONTROL CHARTS

A single-analyte chart is a simple control chart that can be used for monitoring single analytes. For each QC sample, historical data are plotted over a definable period or number of samples. When a test is under control the results are normally distributed

around a certified or accepted value for that element for that standard or reference material.

To monitor deviations for the norm, the chart has two **fixed** limits. The limits are calculated by the accepted value ± 2 and 3 standard deviations. Some of these limit pairs are used as warning limits and another pair is used as action limits.

Before using a chart, certain pre-recorded data will be required. The data needed to create a chart will likely be recorded as a combination of a QC sample and an analyte for a test.

The static data table for each single-analyte chart are:

- For which QC sample the chart is used.
- For which analyte the chart is used.
- Certified or accepted value (determined empirically from historical data).
- Standard deviation (determined empirically from historical data).
- Which limits to use for warning limits (2S, 3S)
- Which limits to use for action limits (2S, 3S)
- Maximum number of results allowed to trend up or down
- Maximum number of results allowed plotting above or below the accepted value.
- Flexible time scale – up to one year of data

When creating a single-analyte control chart the last data point need to be checked for the following:

- Results outside the warning or action limits
- A greater -than 7 results plotting above or below the accepted value- as defined in the static data. (See example I)

All sample points falling outside the criteria should be coloured a different colour and a message should be displayed to warn the user of the data point falling outside the set criteria.

26.3 MULTI-ANALYTE CHARTS

A multi-analyte chart is a control chart that can be used for monitoring multi-analyte QC samples. For each QC sample, all analytes are plotted around a certified or accepted value. When multi-analyte QC samples are under control the results of the analytes are normally distributed around the certified or accepted value.

The results of different QC sample analytes cannot be plotted directly, because every analyte has its own unit and analysis range. The values to plot for multi-analyte QC samples are the **standardized** values of the results. These standardized values are calculated for each result using the static data entered for that specific QC sample and analyte. It is therefore mandatory to have a single-analyte chart available for each QC-sample for each analyte.

The chart plots analytes on the x-axis and the standardized values of the results on the y-axis for each QC-sample.

To monitor exceptions, the chart has three **fixed** limits. The limits are ± 2 and 3 standard deviations. One of these limit pairs are used as warning limits and another pair is used as action limits. Which pair of limits to use, must be recorded for each chart for each analyte.

Before using a chart, pre-recorded data must be supplied. The data needed to create a chart will be recorded for each QC sample:

The static data tables for each multi-analyte chart are:

- For which QC sample the chart is used.
- Certified or accepted value (determined empirically from historical data).
- Standard deviation (determined empirically from historical data).
- Which limits to use for warning limits (2S and 3S)
- Which limits to use for action limits (2S and 3S)

- Maximum number of analytes allowed on one side of the mean.
- Maximum number of analytes allowed outside of ±2S from the mean.

26.4 MULTI-STANDARD CHARTS

A multi-standard chart is a control chart that can be used for simultaneously monitoring all standards or check solutions on a worksheet. For each worksheet, all analytes of all the standards are plotted around a certified or accepted value. When multi-analyte standards are under control the results of the analytes are normally distributed around the certified or accepted value ("mean").

The chart plots analytes on the x-axis and the standardized values of the results on the y-axis for all standards on a worksheet. A line is drawn from the minimum to maximum standardized value for each analyte.

Before using a multi-standard chart, pre-recorded data will be required. The data needed to create the chart will be recorded using the QC samples defined for a worksheet.

The static data table for each multi-standard chart are:

- For which QC samples the chart is used (more than one).
- Certified or accepted value (determined empirically from historical data).
- Standard deviation (determined empirically from historical data).
- Which limits to use for warning limits (2s and 3s)
- Which limits to use for action limits (2s and 3s)

The standardized values of the analytes' results are calculated in the same way as the values in multi-analyte charts. It is therefore mandatory to have a single-analyte chart available for each QC-sample per analyte.

26.5 REPLICATE CHARTS / DUPLICATES

Duplicates and Replicates are samples for which analyses are performed twice. In addition to having more confidence in results, and monitoring potential sample mix-ups, the tests are done twice to monitor the reproducibility or precision of the test and to ascertain if the precision conforms to the stated precision for that test.

The replicate chart plots values using the original result on the x-axis and the replicate result on the y-axis. The scatter of the replicates can be monitored by drawing a diagonal (slope, m = 1) line through (0;0) to the max concentration. If the test is under control, the replicate values will be normally distributed around this line. Poor replicates or fliers can easily be identified~~. The option of a log-log axis is also required.~~

Additional graphs are required to monitor duplicates, replicates and blind re-submissions, such as: MPD (Mean percentage difference), absolute difference, *T-H95% Confidence Plot, Difference – Percentiles, and Precision-Concentration Curve.* These are required for the monthly quality control reports, and are further illustrated in the attached excel sheet

26.6 PRECISION

To check the precision of a test (the precision of twin stream pairs), a precision-concentration curve is used. The relationship between an acceptable precision and a concentration is statistical and can be calculated per analyte (see calculations from formula).

The precision-concentration curve will show the concentration on the x-axis and the precision on the y-axis. To calculate the precision for an analyte, static data must be recorded.
The static data needed per analyte are:

- $\square_0$ value (sigma zero)
- k value (precision limit constant value)

On average 95 percent of the replicate pairs will lie within the confidence limit if a test is under control. This can be represented in a graph by setting out the limit minus the absolute difference of the replicate pairs against the concentration of 95 percent confidence (see definitions later in the document for the formula used to calculate). The system must calculate the percentage of replicates outside the 95 percent confidence limit.

The 95 percent confidence limits calculated by the Thompson Howarth relationship must also be plotted on the original replicate pair graph. The Thompson Howarth relationship is discussed later in the document.

26.7 BLANK CHARTS (TWO TYPES – SAMPLE PREPARATION AND REAGENT BLANKS)

Blanks charts are used to monitor all analytes of blanks. Per worksheet, charts must be created per "blank" sample used. In the chart all analytes are represented. If blanks are under control, the results of the analytes must be zero. In addition, a single analyte control chart for each analyte must be plotted using historical blank data – analogous to the single analytes charts.

For each blank, the results for each analyte will be plotted in a log scale multi analyte chart (not standardized).

26.8 BLIND RE-SUBMISSIONS

A certain percentage of samples are selected and re-analysed at a later stage in the laboratory to confirm the original result and monitor potential instrument drift. These are called "Blind" samples, and are monitored in a similar method to the duplicates and replicates

26.9 OTHER

In addition, there are some method specific QC required:

- Particle size monitoring
- Fusion Machine Control

27 MANAGEMENT REPORTS

27.1 SUMMARY OF REPORTS (FORESEEN)

The following pre-programmed reports must be delivered to customers and areas.

CLIENT / AREA	QTY.	COMMENTS
GEOLOGY	14	By Date and Shipping.
Exploration	2	batch by reports are formatted according to the standard of GDMS.
Infil Short Term	2	
Infil Long Term	2	
Ore Control	2	
Moisture	2	
Density	2	
test	2	
ORE PREPARATION	5	
Moist Dust	1	By date.
Ore	1	By date.
Dust Dryers	1	By date. Lines 1 and 2 and total.
Ring Collage	1	By date.
Ore Crushing	1	By date.
CALCINING	5	
Calcined Composite	1	By date. Lines 1 and 2 and total.
Calcined	1	By date. Lines 1 and 2 and total.
Dust	1	By date. Lines 1 and 2 and total.
Pelletizing Resistance	1	By date. Lines 1 and 2 and total.
Pulverized Charcoal	1	By date.
SMELTING	3	
Metal	1	By date. Lines 1 and 2 and total.
Slag	1	
Dust	1	
REFINING	3	
Metal	2	By date. Lines 1 and 2 and total.
Slag	1	
LABORATORY	18	
Ore standards	5	By date, standard and analyte.
Geology	1	Per batch

Others	12	Others
MANAGEMENT	**7**	
Calcined Slag Metal	2	Lines 1 and 2. Graph and report. Last 12 results.
Others	5	
ENVIRONMENT	**3**	
Water	1	By date.
Ohters	2	By date.
WAREHOUSE	**5**	
Supplies	5	By date and invoice
TOTAL	**63**	

27.2 LABORATORY PRODUCTION REPORTS

The LIMS must have functionality for the registration of shift scales and administrative calendar for productivity calculations per shift. All holidays must be considered in this functionality according to Kamoa Copper's Annual Holiday Calendar. There is the administrative calendar and the shift production and TAT.

This is an exclusive access report for Lab employees. The purpose is to allow the monitoring of the batches of samples from Geology. It's possible to verify the quantity of samples in the batches, how many were analyzed, how many are missing for the dissemination of the results and the time elapsed between the receipt of each sample and the moment of validation.

27.3 LABORATORY MANAGEMENT REPORT 1

This report is for the exclusive use of the Laboratory. The purpose is to demonstrate the amount of sample analyzed per customer and the percentage distribution. The start and end dates can be selected

27.4 LABORATORY MANAGEMENT REPORT 2

This report is for the exclusive use of the Laboratory. The purpose is to demonstrate the

number of analyzes performed by Laboratory, Method, Equipment, Customer, Area and Element.

27.5 EXAMPLE - LABORATORY MANAGEMENT REPORT 3

This report is for the exclusive use of the Laboratory. The purpose is to show the quantity of samples performed per month. The report must have filters and options for selecting a time scale, laboratory, client, area, method, etc.

27.6 EXAMPLE– LABORATORY MANAGEMENT REPORT 4

This report is for the exclusive use of the Laboratory. The purpose is to show the total of samples taken per customer per day. You can select the lab, the day, the month, and the year.

27.7 EXAMPLE – ORE CRUSHING

This report shows the results of the crushed ore and the time in hours and minutes since the sample was delivered to the Laboratory and the time to update the results of the X-ray.

27.8 DATE AND TIME INFORMATION (LIFE CYCLE OR TURNAROUND TIME)

The date and time of update of the data of each equipment and each event occurred, such as sample registration, validation must be updated in the database for the generation of reports of the sample life cycle in the Laboratory, including the possibility of separating Physical Laboratory and Chemical Laboratory. This report is similar to the WIP report.

DESCRIPTION
• The sample was registered
• The sample received in the laboratory
• The sample was prepared

- The X-RAY results are complete
- The results of Carbon and Sulfur are complete
- The result of LOI is complete
- The results of Plasma are complete
- The results of moisture are complete
- sample record retested for income verification purposes.
- Result (s) validated (s)/ reported, etc.

28 INTERNAL LABORATORY CONTROLS

28.1 EQUIPMENT MAINTENANCE

Allow complete management of calibrations, preventive maintenance and other interventions performed with date and time mechanisms and schedules with automatic alerts. The administrator must be allowed to configure the deadlines and the period of issuance of the alerts according to the complexity of the equipment. This entire process should provide traceability reports.

Equipment maintenance records and calibration validity information should be recorded in LIMS. When services or calibrations have not been done by the set date, users should not be allowed to use instruments.

The LIMS must allow the registration of the equipment for efficiency control, where it will be possible to register which items will be verified in each equipment and the dates for future verification.

The LIMS should signal the need for these verifications and allow the recording of the evidence that the activity was performed.

Examples of reports to be made available:

- Performed by date / equipment;
- Upcoming checks by period;
- Delayed checks.

Examples of equipment are part of this control:

- Eye washer shower;
- Clean the deionizer filters.

28.2 DOCUMENT CONTROL

The LIMS must provide valid document control. With functionalities to register the type of document, the expiration date, the time interval before the expiration date that the Lab administrator must be advised of the expiration and record of the action that was taken.

Examples of valid documents:

- Operation license of the Laboratory
- Certificate of State authorisation for operation

28.3 CONSUMABLES - STANDARDS AND REAGENTS

The LIMS must have functionality for inventory control with an interface in **JD Edwards**. Each standard or reagent must have the expiration date registered at the time of receipt and have a warning mechanism on the approximation of this date. A parameter is necessary with the number of days before the due date that the warning will be issued and the frequency of these warnings. Examples of reagents and standards:

LAB EQUIPMENT	ITEM	REAGENT BATCH / LOT NUMBER	CURRENT STOCK	EXPIRY DATE	ACTION
Calorimetric unit	Benzoic acid				
Mastersizer	Standard sample - Mastersizer 2000 Hidro MU				
TGA 701	Crucible of TGA 701				

Deionizer	Activated charcoal				
CS 600	Catalyst Silicagel FR.15GR				
X-ray	Ultra grade oil 19 (vacum pump)				
CS 632	External Combustion Tube				

The physical samples will be routed to different locations in the laboratory and when the different processes have been started. At any point, the laboratory staff will need to know exactly where the physical samples are located, as well as the processing status of any of the sub-portions. Functionality should be available to manage the sample locations in the laboratory by batch.

Sample portions and steps in methods should be associated with employees for traceability and performance management measures. Date and timestamps for all the tests / methods must be recorded and available in LIMS. This will include all the steps from Registration to Validation of Results. The system also needs to record the name of the operator that performed each test / method.

28.4 AUDITING

The system should allow for auditing. Any changes made to pre-set core data should be recorded as well as the identity of the user which affected the change and the reason for the change. User names and comments should be recorded against changes affected in various applications such as pre-set core data changes, when samples are sent back for repeat assays etc. These will be specified during the design phase.

28.5 CATCH WEIGHTS

Catch weights are the mass of samples that are within a defined range and recorded accurately. For an XRF fused bead, for example, an accurate sample mass of 0.5000g must be carefully weighed. However, it is faster to weigh between 4.9990 and 5.0010 grams

and then to perform a calculation afterwards to correct for the dilution factor. Each individual sample mass must be recorded against a sample ID and a worksheet to enable the mass correction being done.

29 DATA EXPORT

The Database System must be able to extract and convert data elements into other formats for use outside of the LIMS application environment. The following formats are desired.

- CSV;
- Excel;
- PDF;
- PNG, JPG or TIF.

30 LOG FILES

The LIMS should generate LOG files of essential functionality for traceability of system administrator queries and problems. In addition to the examples given below, it is important to access files to see the actual behavior of your system, how it is actually working, what the flow of the operations it does, and etc:

- Log for automatic creation of samples
- Log of files found for reading
- Log of content of files found for reading

31 CHECK LIST

The table below describes the main items considered important for choosing the new application. The objective is to evaluate each item by pointing out what exists in each offer to avoid errors and forgetting the necessary functionalities.

DESCRIPTION	DETAILS	MANDATORY?
User interface	Have a friendly and intuitive interface. To be well intuitive and simple, making your use.	Yes

Licensed users	12 concurrent licenses for the Barro Laboratory Unlimited access to reports.	Yes
Architecture	Use client-server architecture.	Yes
Cloud computing	Have feature for cloud installation with guaranteed availability and security.	No
Compatibility	Be compatible with Windows versions of servers, workstations, and database.	Yes
Security	Have groups with different access levels for data entry, approvals, changes, etc.	Yes
Data archiving and purging	Carry out the cleaning (deteel) in a certain period of time of the samples that do not have results and create base of consultation with automatic update of the last results validated.	No
Data export	Allow to convert data to text or CSV. Mainly for the following formats: text, excel, xml, pdf, etc.	Yes
Data import	Import historical data from the current LIMS. SQL database.	Yes
Data dictionary	Provide complete data dictionary with data definitions and table relationship.	Yes
Customization	Allow customizations to create new tables, add fields to existing tables. Be ready to attend different processes or increments of laboratory demands.	Yes
Sample scheduling	Have mechanism to automatically create the pre-scheduled routine samples.	Yes
Bar code sample labels	The application should allow you to print barcode labels in different sizes and make the quantity available for printing.	Yes
User ID	Identify the user and grant the accesses in the respective Laboratory.	Yes
Instrument interface	Receive results directly from the Laboratory instruments to update the database.	Yes

Sample status	Allow sample monitoring through the life cycle. Change the status code according to any updates that occur.	Yes
Sample status code	Table of codes to monitor the status of the sample according to the condition of the sample, for example: sample result has to be reviewed, sample barcode and other codes defined by the Laboratory.	Yes
Quality assurance / Quality Control	Have specific tools for compliance controls and process quality assurance. Also allow comparison of results with standards and CEP.	Yes
Sample comment	Allow the analyst to include free text comments on the sample. For example adverse conditions or circumstances.	Yes
Results limits	To have minimum and maximum limits for each type of analyte and to associate these limits for the different areas, allowing the check of the result at the moment of the update through warnings to the user.	Yes
Historical data	Allow access to historical data including the previous application through reports, graphs, etc.	Yes
Significant figures	Submission of numerical results should follow formatting, including the decimal places used on sites.	Yes
Data validation	Validation of data including QC should be allowed according to user profile and results made available for queries (reports for example) only after approval.	Yes
On-line Help	For each functionality of the application should be available the help on line for the user to clarify the doubts.	No
Audit trail	Provide information for auditing, such as changing results, typing results that should be updated through interface with equipment, access controls, etc.	Yes
Partial results approve	Allow partial results approval. For example, a sample has 10 analytes and 2 are ready, they can be released to end users.	Yes

Protection of final approved result	When released the result to end users does not allow modification of results by the technician. Study possibility of change to be approved by the coordinator or manager of the Laboratory.	Yes
Calculated results	Allow the presentation of calculated results at the time of updating the results that give rise to the calculations.	Yes
Sum of results	Allow samples to be closed and warn when the result is outside acceptable limits.	Yes
Reports	Generate trend reports, QA / QC, managerial, end users with information: miscellaneous calculations, title formatting, headers, footers, decimal places, etc.	Yes
E-mail reports and results	Option to send results and reports by E-mail	No
Sample cost	Allow to associate inputs and labor with specific samples for cost analysis.	Yes
Instrument calibrations	Have ability to track calibration of instruments with notifications about required dates.	Yes
Technical support	The supplier must provide full support regarding the application.	Yes
Update / fixes	Functional fixes and updates to the software must be provided and made available by the vendor. According to the signed contract.	Yes
Documentation	Provide complete application documentation including installation, instructions, administration and maintenance, technical references, user manuals, data dictionary, etc.	Yes
Training	Conduct training of application users on sites with updated material and sufficient workload. Differentiated training for the system administrator is required.	Yes

Installation	The installation, including the necessary configurations on the servers, workstations and instruments, must be performed by the vendor with the assistance of an IT professional with a copy of the documented instructions delivered after the installations.	Yes
Test perform	Configure test environment to demonstrate functionalities and performance with monitoring during specified contract period.	Yes
Regulatory compliance	Ensure controls and traceability in accordance with standard 17025 and quality internal and external standards.	Yes
Material stock	Control the consumption of inputs in order to allow the monitoring of validity and minimum and critical stocks to control acquisitions.	Yes
Accessible data via the web	Allow access to results and various reports by Web.	No
System integration	Enable integration with enterprise systems (ERP, MES, PIMS e SCADA).	Yes
KPI's	Possess the resources to define metrics and performance indicators to be monitored by managers.	Yes

32 SOFTWARE SPECIFICATION

32.1 DATABASE DESIGN

The standard operating system should be Windows 10 Enterprise; SQL 2016 is the preferred standard for all databases. LIMS must follow and support the Microsoft latest technology upgrade path into the future.

The application should be a true three tier application to ensure that the business rules and core functionality of the system are separated. This means that the database business rules can be updated without affecting the normal daily running of the application.

Database integrity will be viewed as non-negotiable. Primary keys, foreign keys and table indexes and constraints must be defined and implemented. Unique identifiers must be numeric and must be auto incrementing. The unique identifiers may not be text fields such as sample names or analyte names to allow for changes to be done without compromising the integrity of the data. Referential integrity is integral to the system. Related records must never be deleted.

No “hard coding” of any kind should be necessary and all variables should be maintained in the front-end by end users without the need of accessing the coding of the programme.

The database administration should be of such a nature that the in-house database administrator is able to update or change the database using a strict change control philosophy and procedure. No changes may affect the core LIMS technology.

All pre-set core data such as QC set-up, QC limits, analyte limits must be maintained in the database in SQL tables. Any changes made should be maintained as historical data.

An optimum data maintenance plan must be implemented including issues such as re-building of indexes, back-ups of both the database and the transaction log etc.

32.2 BACK-UP, RECOVERY AND ARCHIVING

The system should allow for effective back-up as well as recovery of the data which had been backed-up. Archiving of records should be available. Daily back-ups will be done via Symantec/Veritas backup exec. Manual SQL back-ups will be performed weekly as an additional safety measure.

The backup file will be compressed via WinRAR and stored on the AR file server. Once a predefined size of compressed backups is reached, these will be moved onto a duplicate set of DL DVD media and be catalogued into a database for archival.

33 HARDWARE REQUIREMENTS

33.1 NETWORK ENVIRONMENT (ASLO REFER TO APPENDIX A)

The LIMS will be located on the IIT Network. The LIMS is divided into 2 servers; Application Server and Database Server.

The following general firewall rules needs to be applied:

Application Server – Needs HTTP (TCP port 80) to be open to the commercial network if commercial access is required. Otherwise HTTP access is required between the APP server and all other LIMS workstations as well as the DB server.

DB Server – SQL (TCP port 1433 and UDP port 1434) open to Application Server, as well as any third-party database servers that needs to integrate with LIMS (MES, PIMS, acQuire, JDE, Weighbridge, etc.).

If a separate server is commissioned for reporting services (SSIS), the SQL ports will need to be open between the reporting and DB servers, as well as between workstations accessing these reports and the reporting server (TCP port 1433).

33.2 SERVERS

Virtual Servers will be deployed – VM Ware.

There must be provision made for a Development and Test Database / System.

33.3 WORKSTATIONS, SCANNER AND PRINTER REQUIREMENTS

The following table displays the workstation details and locations. Some of the workstations would need to be replaced / upgraded.

The standard specifications (IIT Standards) of the workstations, Barcode Scanners and Barcode printers, are as follows:

Workstation

Windows 10

Intel® Core™ i7-6500 CPU @ 3.2GHZ

8.00GB RAM

Barcode Scanner

Motorola Symbol DS3608CR Handheld Barcode Scanner (corded)

Barcode Printer

ZEBRA GK420 (TT) STD EPL / ZPL Barcode Printer

The barcode labels that needs to be used must be waterproof and heat resistant. The barcode ribbons need to be the Resin Out ribbon.

33.4 UPS UNINTERRUPTED POWER SUPPLY (NO BRAKES)

This is included as part of the specifications for hardware requirements.

It will be necessary to carry out a study to determine the UPS requirements for the site, since historically power surges and interruptions caused system failure and physical damage to equipment.

- It is important to consider the analytical equipment requirements as well as the network computers' requirements
- A maintenance contract will be required with periodic visits by specialized technicians for testing, replacement of batteries, etc.

34 WEBSERVER

The LIMS must provide the possibility to access the operation screens using a web browser. This is a non-mandatory item that needs to be reviewed along with the vendor and link resources on the site.

35 DATABASE

35.1 SQL

The default database for the LIMS is SQL. The LIMS must be compatible with SQL 2016 and is part of the requirements that the vendor supports technological upgrade for future versions.

35.2 DATA DICTIONARY

The data dictionary helps improve communication between the system administrator, the database administrator, and analysts. Therefore, the LIMS must have an organized DD and compatible with all elements pertinent to the system. This DD must be shared with Ivanhoe Mines for readability and clarity.

35.3 RESEARCH DATABASE

In addition to the production database the LIMS must have a second Database structured with records of all validated results. The function of this database is to facilitate in the

consultation that several areas use in the day to day. There are some features required for this database:

- Be updated automatically every 2 minutes with the new records and changes or exclusions that occurred;
- Only validated results can be made available in this database;
- This database should be a mirror of the production base

36 CUSTOMISATION

The LIMS should allow the system administrator to do customisations such as:

- Create new table with relationships and links to existing tables;
- Add fields to existing tables;
- Add functions to the program menus;
- Modify existing table properties;
- Create queries, forms and design custom reports;
- Create buttons, custom reports and graphs/charts.
    - Ore Preparation
    - Calcining
    - Smelting
    - Refining

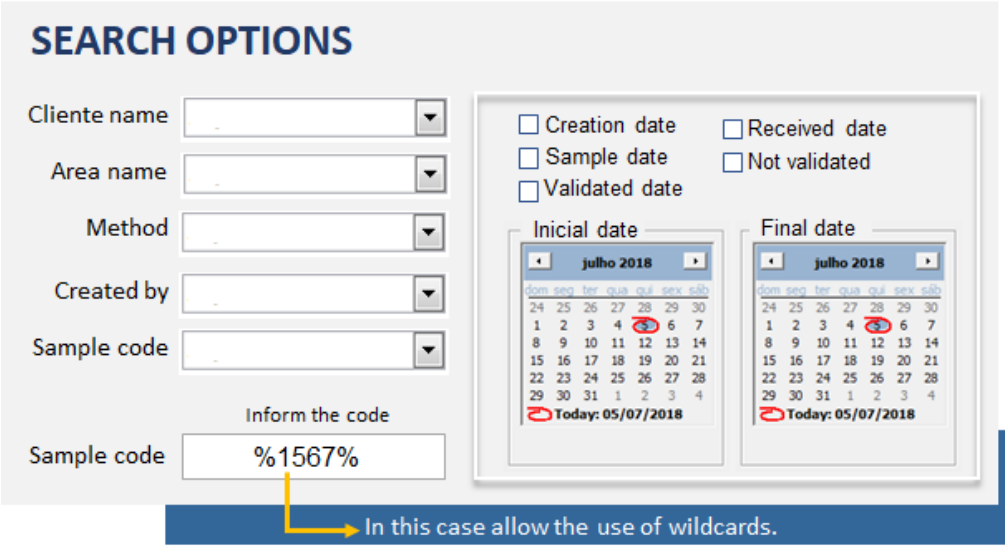
37 AUDIT TRAIL FOR CHANGES

The LIMS must provide complete audit control of input and modification of data to maintain and verify the integrity of the data. Fields such as date, time, old data values, reason for the change of the responsible must be recorded when the data update is done.

38 FACILITIES IN THE SEARCH FOR SAMPLES

The LIMS should have a user-friendly tool for locating the sample for validation. Among the facilities we can highlight: individual identification of the sample, customer, project, shipment, method, intervals between dates, the use of wildcards should be allowed for cases where it is allowed.

When locating the sample, methods related to the sample should be presented allowing the selection of the method in order to avoid revalidation of results from other methods.



39 HELP DESK

The LIMS vendor must have a coordinated procedure for reporting system problems.

40 DOCUMENTATION

All documentation of the LIMS must be legible, in English and French and written clearly, allowing users to understand the system with which they are working. It should also be guaranteed to update this material every time LIMS undergoes any change or update

41 SIGN OFF

Role based signatory	Name	Date approved
Business Owner		

42 Document Version Control

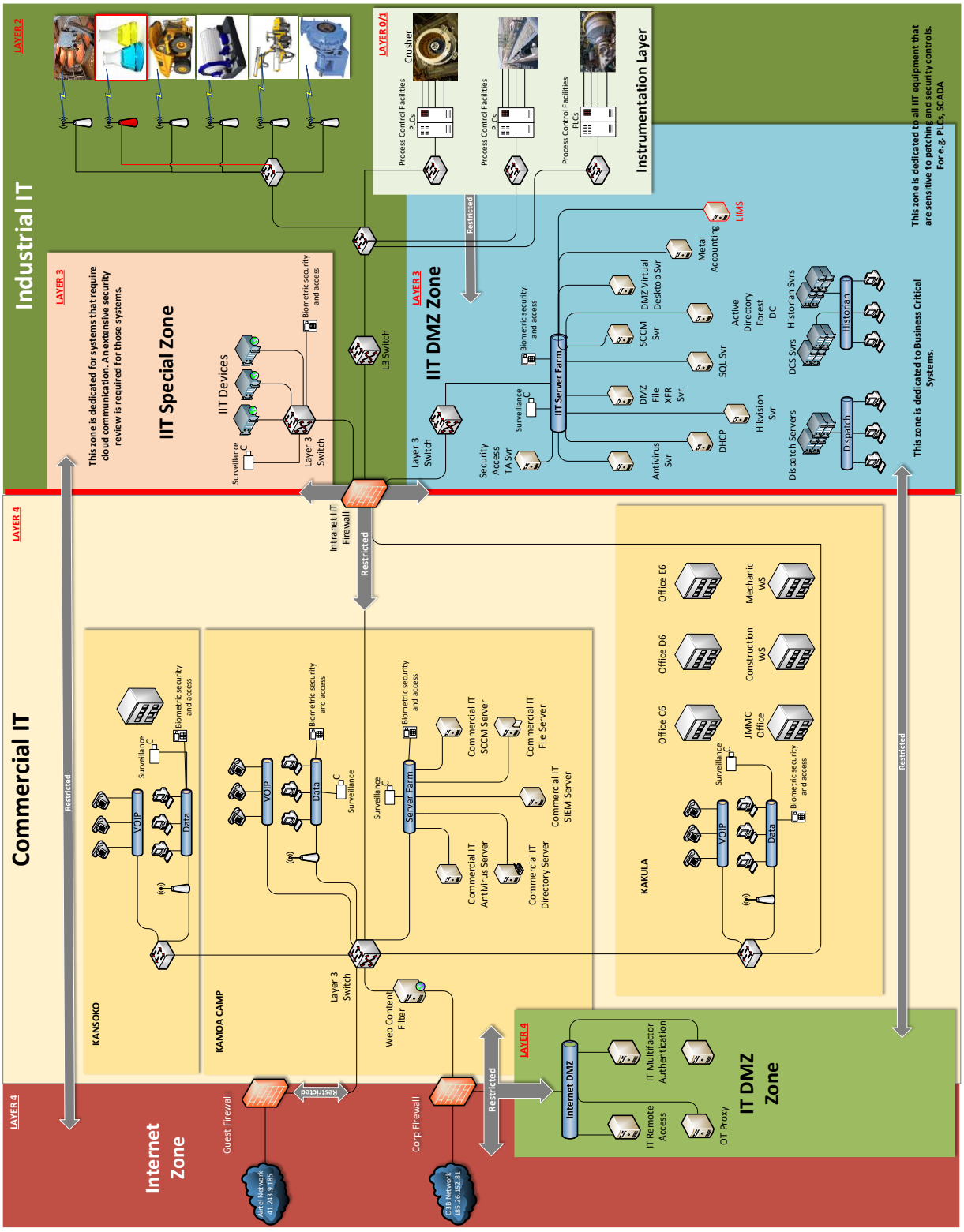
Version	Update summary	By
0.0	First document – issue first draft	Hubert Mostert – 10 January 2020
0.1	Marked up comments (K Bisaka)	Hubert Mostert – 17 February 2020

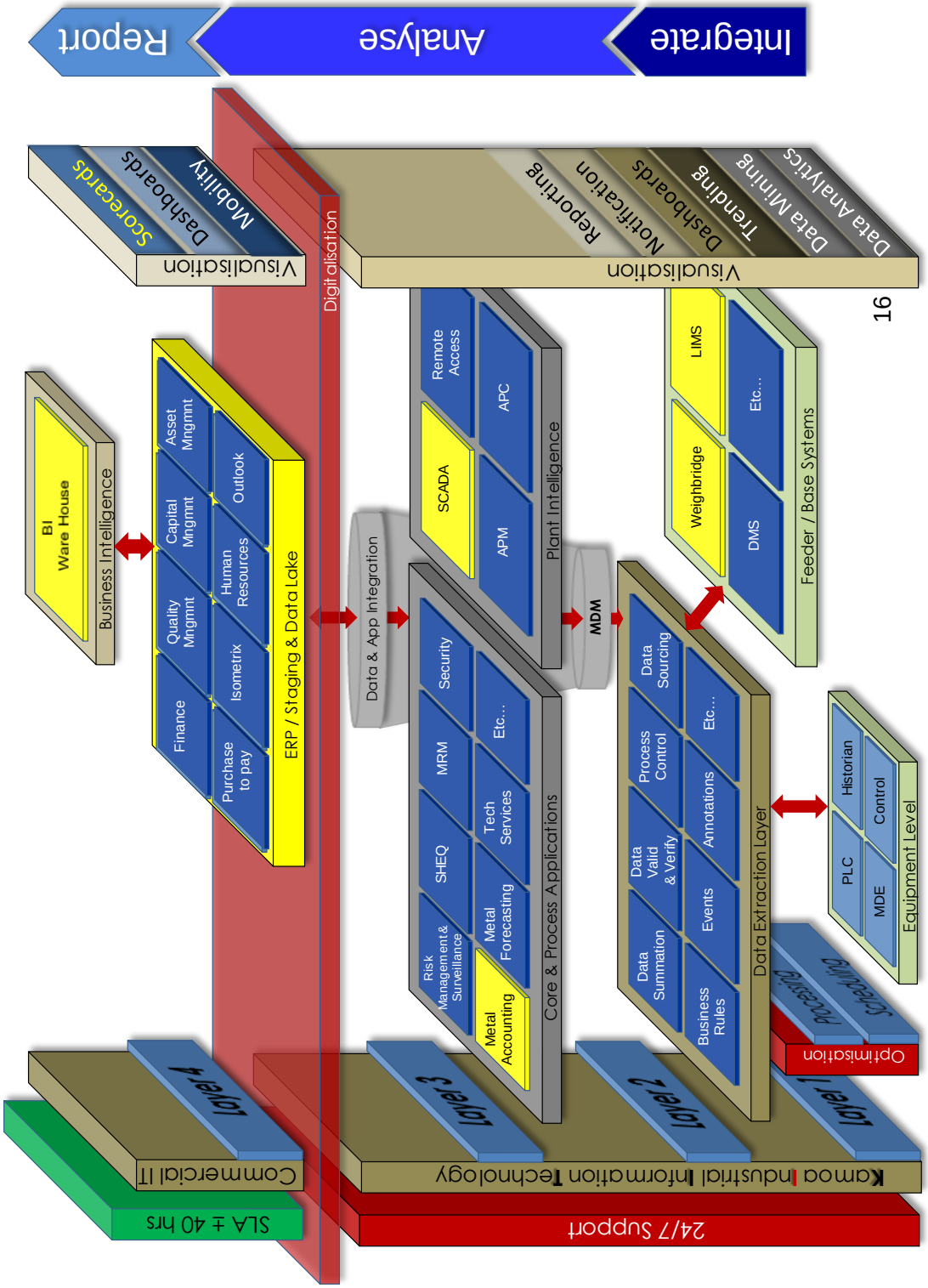
Note: version control is such that

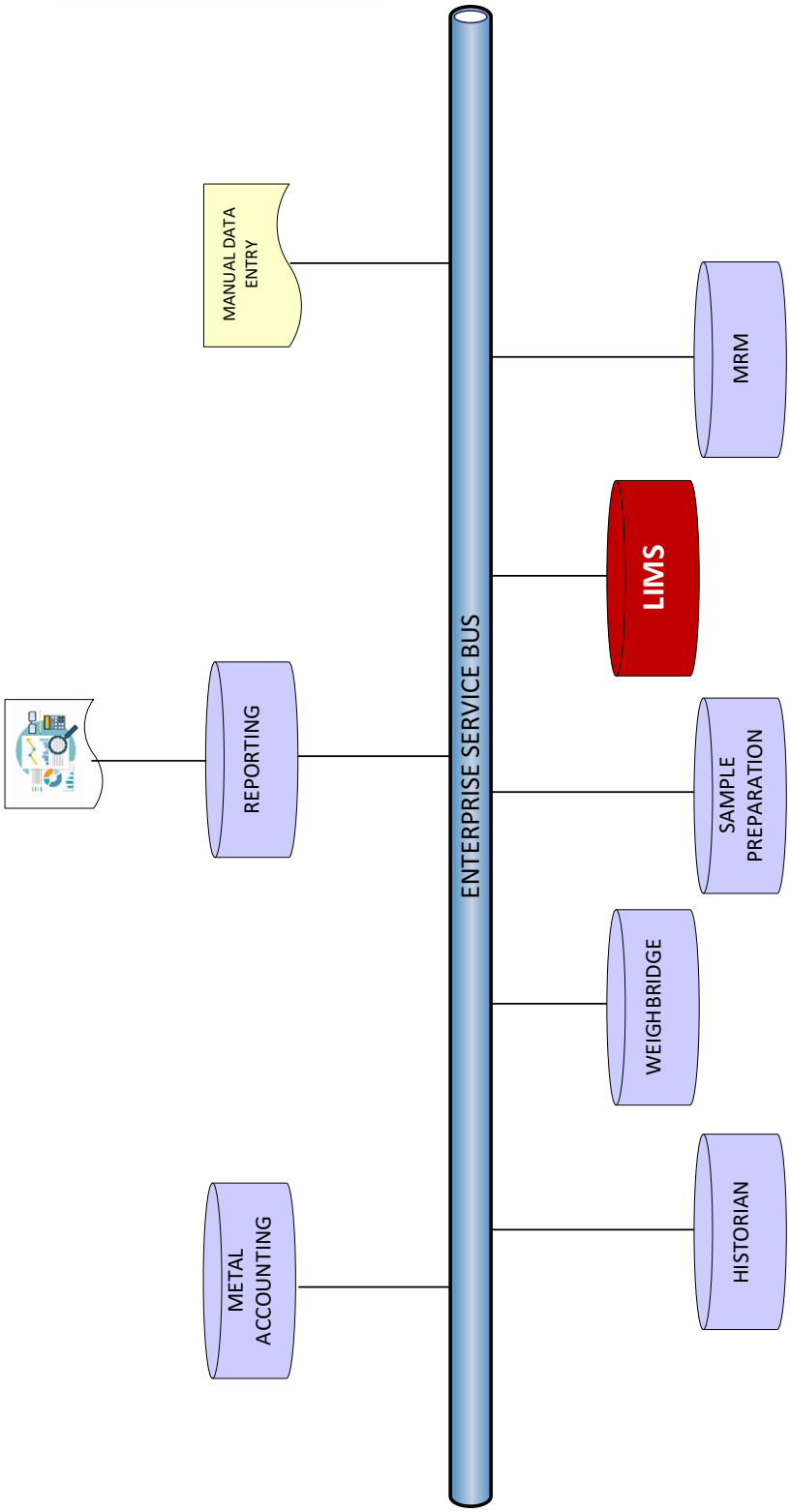
0.0 = first document.

0.1 = minor adjustments and so forth; a major number change e.g. 1.0 implies that the document has had an approval

APPENDIX A

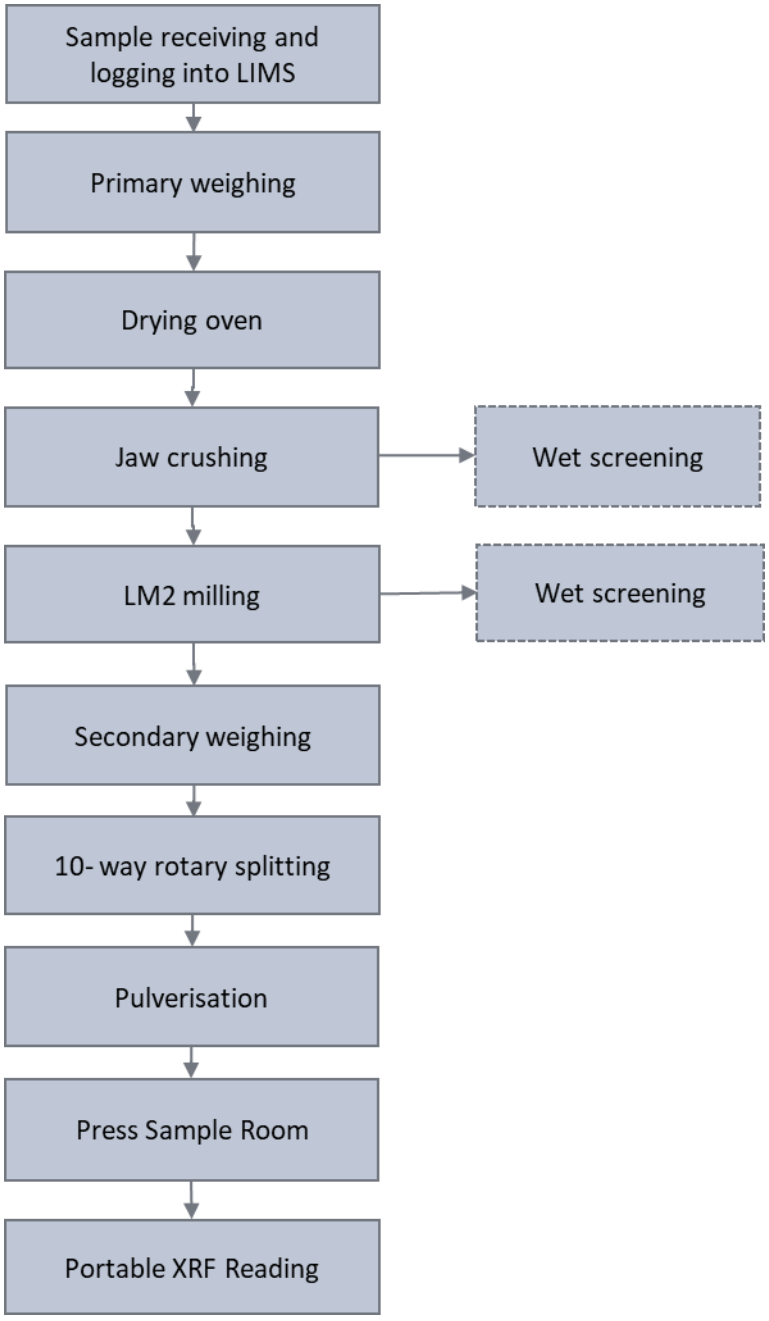

Industrial IT
LAYER 2
LAYER 0/1
Crusher
Process Control Facilities PLCs
Instrumentation Layer
LAYER 3
IIT Special Zone
This zone is dedicated for systems that require cloud communication. An extensive security review is required for those systems.
IIT Devices
Surveillance
Biometric security and access
Layer 3 Switch
L3 Switch
IIT DMZ Zone
Restricted
IIT Server Farm
Security Access TA Svr
Antivirus Svr
DHCP
DMZ File XFR Svr
SQL Svr
SCCM Svr
DMZ Virtual Desktop Svr
Metal Accounting
LIMS
Active Directory Forest DC
Hikvision Svr
Historian Svrs
Historian
DCS Svrs
Dispatch Servers
Dispatch
This zone is dedicated to Business Critical Systems.
This zone is dedicated to all IIT equipment that are sensitive to patching and security controls. For e.g. PLCs, SCADA
LAYER 4
Commercial IT
Intranet IIT Firewall
KANSOKO
VOIP
Data
KAMOA CAMP
Server Farm
Commercial IT SCCM Server
Commercial IT File Server
Commercial IT SIEM Server
Commercial IT Antivirus Server
Commercial IT Directory Server
KAKULA
Office C6
Office D6
Office E6
JMMC Office
Construction WS
Mechanic WS
Layer 3 Switch
Web Content Filter
Internet Zone
Guest Firewall
Corp Firewall
Internet DMZ
IT Multifactor Authentication
IT Remote Access
OT Proxy
IT DMZ Zone
Airtel Network 41.243.9.185
O3B Network 185.26.152.81


Integrate
Analyse
Report
Visualisation
Scorecards
Dashboards
Mobility
Digitalisation
Data Analytics
Data Mining
Trending
Dashboards
Notification
Reporting
Business Intelligence
BI
Ware House
ERP / Staging & Data Lake
Asset Mngmnt
Capital Mngmnt
Outlook
Quality Mngmnt
Human Resources
Isometrix
Finance
Purchase to pay
Data & App Integration
Plant Intelligence
Remote Access
APC
SCADA
APM
MDM
Feeder / Base Systems
LIMS
Weighbridge
DMS
Etc...
Core & Process Applications
Security
MRM
Etc...
SHEQ
Tech Services
Risk Management & Surveillance
Metal Forecasting
Metal Accounting
Data Extraction Layer
Data Sourcing
Process Control
Etc...
Annotations
Data Valid & Verify
Events
Data Summation
Business Rules
Equipment Level
Historian
Control
PLC
MDE
Optimisation
Scheduling
Processing
Kamoa Industrial Information Technology
Layer 1
Layer 2
Layer 3
Layer 4
24/7 Support
SLA ± 40 hrs
Commercial IT
16

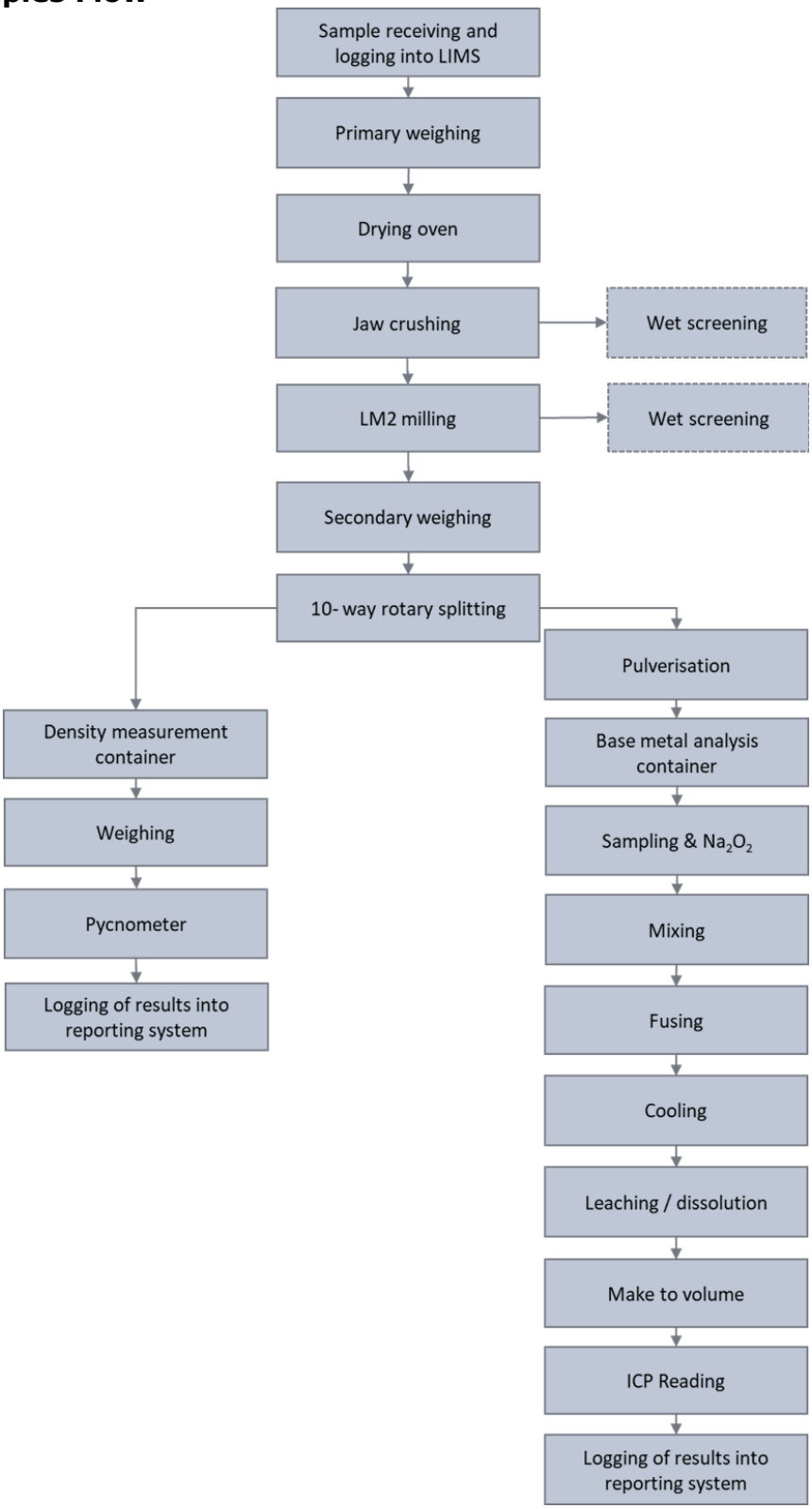

MANUAL DATA ENTRY
MRM
LIMS
REPORTING
SAMPLE PREPARATION
ENTERPRISE SERVICE BUS
WEIGHBRIDGE
METAL ACCOUNTING
HISTORIAN

APPENDIX B

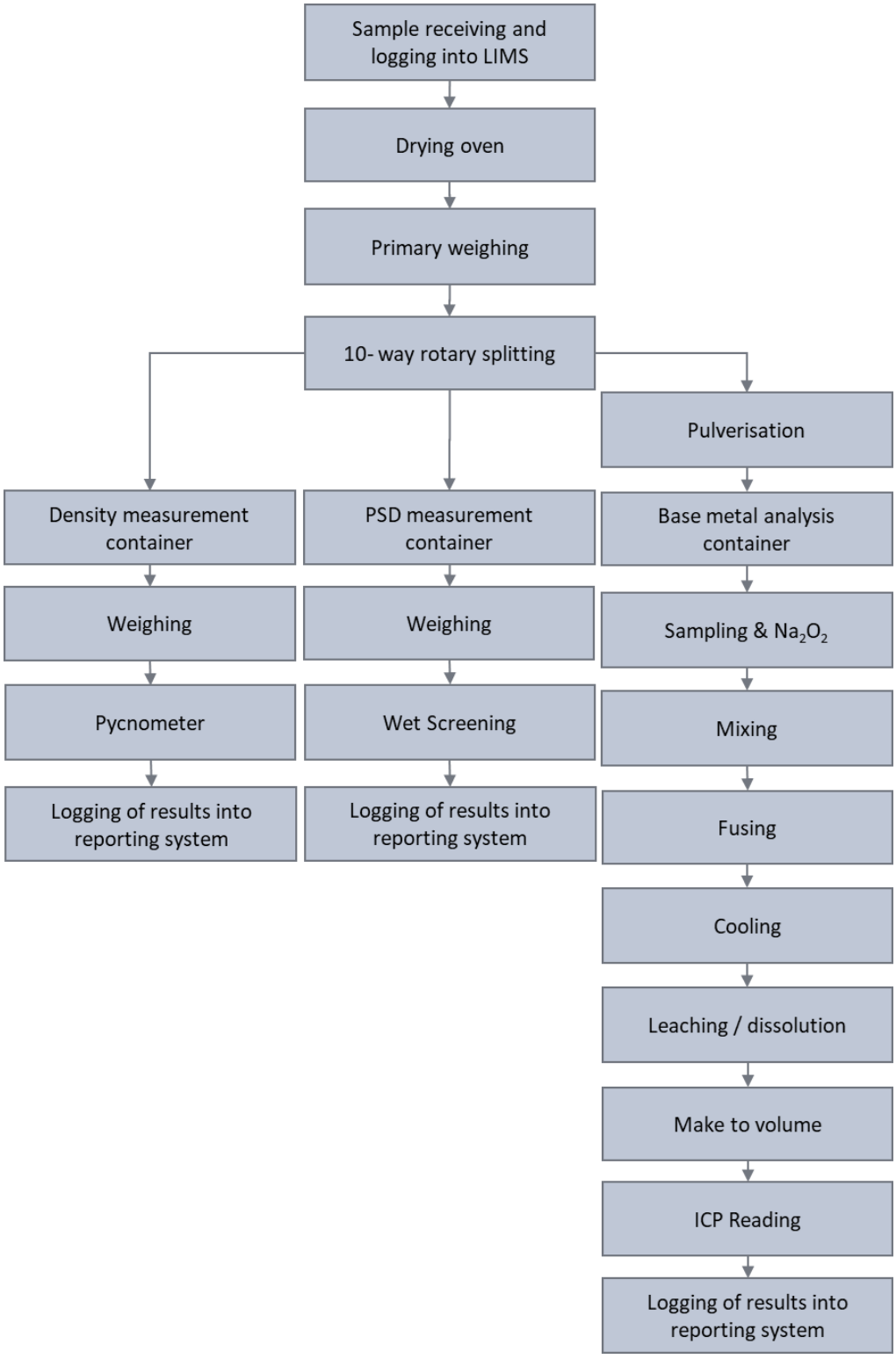
Geology Sample Flow



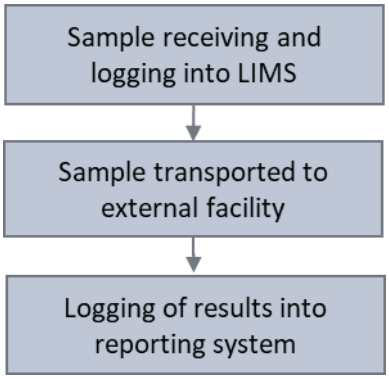
Mining Samples Flow



Concentrator Samples Flow



SHEQ Monitoring



Water Analysis

SANS241													
SSTDS	Water Analysis												
	Thickener O/F	Clarifier O/F	Process Water	Backfill Thickener	Mine Dewatering Tank	6000 area potable water tank	2000 area potable water tank	6000 area raw water tank	Raw water Flag Boschielo	Raw Water WWTW	Pre-Chlorinated Water
pH	x	x	x	x	x	x	x	x	x	x	x
Electrical Conductivity (maximum)	x	x	x	x	x	x	x	x	x	x	x
Total Dissolved Solids	x	x	x	x	x	x	x	x	x	x	x
Suspended Solids	x	x	x	x	x	x	x	x	x	x	x
Fluoride as F	x	x	x	x	x	x	x	x	x	x	x
Nitrate as N	x	x	x	x	x	x	x	x	x	x	x
Nitrite as N	x	x	x	x	x	x	x	x	x	x	x
Ortho Phosphate as P	x	x	x	x	x	x	x	x	x	x	x
Free Cyanide as CN	x	x	x	x	x	x	x	x	x	x	x
Chemical Oxygen Demand	x	x	x	x	x	x	x	x	x	x	x
Soap, Oil & Grease	x	x	x	x	x	x	x	x	x	x	x
Total Coliform Bacteria / 100 ml	x	x	x	x	x	x	x	x	x	x	x
Faecal Coliform Bacteria / 100 ml	x	x	x	x	x	x	x	x	x	x	x
Heterotrophic Plate Count / ml	x	x	x	x	x	x	x	x	x	x	x
Kjeldahl Nitrogen	x	x	x	x	x	x	x	x	x	x	x
Free & Saline Ammonia as N	x	x	x	x	x	x	x	x	x	x	x
Arsenic as As (Dissolved)	x	x	x	x	x	x	x	x	x	x	x
Boron as B (Dissolved)	x	x	x	x	x	x	x	x	x	x	x
Cadmium as Cd (Dissolved)	x	x	x	x	x	x	x	x	x	x	x
Chromium as Cr (Dissolved)	x	x	x	x	x	x	x	x	x	x	x
Iron as Fe (Dissolved)	x	x	x	x	x	x	x	x	x	x	x
Lead as Pb (Dissolved)	x	x	x	x	x	x	x	x	x	x	x
Manganese as Mn (Dissolved)	x	x	x	x	x	x	x	x	x	x	x
Mercury as Hg	x	x	x	x	x	x	x	x	x	x	x
Selenium as Se (Dissolved)	x	x	x	x	x	x	x	x	x	x	x
Zinc as Zn (Dissolved)	x	x	x	x	x	x	x	x	x	x	x
Frequecy	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly

APPENDIX C: Rates/ Pricing/ BOQ

NO:	DETAILED ITEM DESCRIPTION:	QTY	Year 1	Year 2	Year 3
1	Detailed scoping	1	$ -	$ -	$ -
2	Licence	1	$ -	$ -	$ -
3	Development & configuration	1	$ -	$ -	$ -
4	Implementation	1	$ -	$ -	$ -
5	Site acceptance testing	1	$ -	$ -	$ -
6	System monitoring	1	$ -	$ -	$ -
7	Training/ documentation	1	$ -	$ -	$ -
8	Maintenance fees	1	$ -	$ -	$ -
9	Travel & accomodation	1	$ -	$ -	$ -
10	Project Management fees	1	$ -	$ -	$ -

SECTION 3: STANDARD COMMERCIAL TERMS AND CONDITIONS FOR SUPPLY OF SERVICE

SUPPLY OF SERVICE AGREEMENT

Entered into between

KAMOA COPPER SA

1148-6 Avenue de la Libération

Quartier Golf les Battants Commune de Lubumbashi

Lubumbashi

Haut-Katanga Province

Democratic Republic of Congo

Registration Number: 6-118-N37233J

(Hereafter called "KCSA")

And

SERVICE PROVIDER

(Hereafter called "Service Provider")

KAMOA COPPER SA
Société anonyme avec conseil d'administration

TABLE OF CONTENTS

1. DEFINITIONS AND INTERPRETATION....3
2. WHOLE AGREEMENT....12
3. SCOPE OF SERVICES....12
4. PERFORMANCE MANAGEMENT....14
5. OBLIGATIONS OF KCSA....14
6. OBLIGATIONS OF THE SERVICE PROVIDER....15
7. WARRANTIES AND UNDERTAKINGS....16
8. RIGHT OF AUDIT....18
9. REMUNERATION....19
10. INDEMNITIES, LIMITATION OF LIABILITY AND INSURANCE....21
11. LIQUIDATED DAMAGES....22
12. ASSIGNMENT AND SUBCONTRACTING....22
13. CONFIDENTIALITY AND PUBLICITY....23
14. ETHICAL BUSINESS PRACTICES....25
15. GIFTS AND ENTERTAINMENT....26
16. GOOD FAITH....26
17. DOCUMENTS....26
18. NO RESTRICTION OF RIGHTS....26
19. CONFLICT OF INTEREST....26
20. FRAUD....26
21. FAILURE OR DELAY IN PROVIDING SERVICE....27
22. DISPUTE RESOLUTION....28
23. BREACH....30
24. ANNUAL REVIEW....30
25. HOLDING COMPANY GUARANTEE....31
26. CHANGE OF OWNERSHIP....31
27. LAWS, RULES AND REGULATIONS....31
28. LIENS AND CLAIMS BY THIRD PARTIES....32
29. INDEPENDENT STATUS, COST AND EXPENSES....32
30. INTELLECTUAL PROPERTY RIGHTS....33
31. FORCE MAJEURE....34
32. TERMINATION FOR CONVENIENCE....35
33. COMMUNICATIONS, NOTICES AND DOMICILIUM....35
34. OCCUPATIONAL HEALTH AND SAFETY....37
35. GENERAL....39

KAMOA COPPER SA
Société anonyme avec conseil d'administration

1. DEFINITIONS AND INTERPRETATION

1.1 DEFINITIONS

The expressions defined below shall have the meanings assigned to them unless inconsistent with the context of this Agreement:

Additional Services	shall have the meaning ascribed in 3.3 hereof.
Affiliate	means in relation to any person, a Subsidiary of that person or a Holding Company of that person or any other Subsidiary of that Holding Company.
Agreement	means the documents comprising the RFQ, the Response to RFQ, the Purchase Order, the Terms and Conditions set out in this document, the Annexures referenced in this document, and documents incorporated by reference by KCSA, as amended from time to time.
Anti-Corruption Legislation	includes, but is not limited to, the United Kingdom Bribery Act 2010, the U.S. Foreign Corrupt Practices Act, the US OFAC Regulations, the US Export Administration Regulations, the Canadian Corruption of Foreign Public Officials Act 1998, the OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions 1997, the United Nations Convention against Corruption 2003 and the South African Prevention of Organised Crime Act of 1998, as amended from time to time and any applicable law, rule, regulation and other legally binding measure relating to the prevention of bribery, corruption, fraud or similar or related activities in Canada, South Africa, the DRC or any other relevant

KAMOA COPPER SA
Société anonyme avec conseil d'administration

	jurisdiction, as well as any relevant policies listed in KCSA' Policies attached as Annexure A.
Applicable Laws	means all Democratic Republic of Congo laws, regulations, codes, rules, judgments, notices, approvals, orders, decrees, permits, directives, protocols, consents, authorisations, guidelines, orders, policies, generally applied standards and similar requirements by any Authority applicable to the Services and/or to the performance and/or subject matter of this Agreement (as applicable).
Authority	is any government department, local government council, government, provincial, municipal or statutory authority or any other party under a law which has a right to impose a requirement or whose consent is required either in respect of the Services or for the Service Provider's performance of its other obligations under this Agreement.
Bill of Quantities	comprises a list of units of work which are briefly described. It provides a measure of the extent of work and the consideration due for each unit. The work included in each unit is defined in detail. The unit descriptions are shorthand. The measure may be a single item or number, dimension (linear metre, square metre, cubic metre), time (hrs., weeks) or weight, a template of which is attached as Annexure B.
Confidential Information	means all and any information or data in whatever form (including in oral, written, electronic and visual form and including this

KAMOA COPPER SA
Société anonyme avec conseil d'administration

Agreement and its terms) relating to the Disclosing Party which by its nature or content is identifiable as, or could reasonably be expected to be, confidential and/or proprietary to the Disclosing Party, including, without limitation, any information relating to the Disclosing Party's existing and future strategic objectives and existing and future business plans and corporate opportunities, trade secrets, technical or scientific information, techniques, know-how, operating methods and procedures, details of costs, sources of materials and customer lists (whether actual or potential) and other information relating to the existing and prospective customers of the Disclosing Party; pricing, price lists and purchasing policies; any and all methodologies, formulae and related information in development of the Products by the Disclosing Party; products, drawings, designs, plans, functional and technical requirements and specifications; intellectual property that is proprietary to the Disclosing Party or that is proprietary to a third party, and in respect of which Disclosing Party has rights of use or possession, information relating to any contracts to which Disclosing Party is a party, any information which is not readily available to a competitor of Disclosing Party or in the normal course of business; the intellectual property in respect of inventions, market opportunities, or the business or affairs of the Disclosing Party. For purposes hereof the Party disclosing information shall be referred to as the Disclosing Party and the other Party shall be referred to as the Receiving Party.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

Default	any failure by either Party to comply with its obligations in terms of this Agreement.
DRC	Democratic Republic of Congo.
Effective Date	the date when KCSA issues the Purchase Order to the Service Provider, with a copy of the Agreement, signed by a Duly authorised agent of KCSA.
Expiry Date	means the date upon which the Initial Period or any Renewal Period expires in accordance with the provisions of clause 2.3.
Holding Company	means in relation to a person, any other person in respect of which it is a Subsidiary.
KCSA	Kamoa Copper SA, Registration Number: 6-118-N37233J, a company duly registered and incorporated in accordance with the laws of the DRC, with its principal place of business at 1148-6 Avenue de la Libération, Quartier Golf les Battants, Commune de Lubumbashi, Lubumbashi, Haut-Katanga Province, DRC.
KCSA's Policies	means those policies and procedures of KCSA as listed in Annexure A, and those policies and procedures of KCSA applicable to staff and suppliers, service providers, contractors and other third parties which policies and procedures may be amended from time to time.
Labour Code	means law No. 015-2002 of 16th October 2002 establishing the labour code, as modified and

KAMOA COPPER SA
Société anonyme avec conseil d'administration

	supplemented by law No. 16-010 of 15th July 2016.
Mining Code	means Decree No. 038/2003 of 26 March 2003 establishing the mining regulation, as modified and supplemented by Decree No. 18/024 of 08 June 2018.
Mining Regulation	means Decree No. 038/2003 of 26 March 2003 establishing the mining regulation, as modified and supplemented by Decree No. 18/024 of 08 June 2018.
Order	means Ministerial Order No. 047/CAB.VPM/METPS/2015 of 08 October 2015 modifying and supplementing Ministerial Order No. 12/CAB.MIN/TPS/062/08 of 18 September 2008 setting out conditions for the opening, accreditation and functioning of private placement agencies.
Other Contractors	means any third party (other than the Service Provider) engaged by KCSA in carrying out any works or services of whatever nature at or in the vicinity of the Site, but specifically excluding all KCSA's Personnel and subcontractors of the Service Provider.
Party or Parties	the party or parties to this Agreement.
Personnel	means directors, employees, agents, contractors or subcontractors but a reference to KCSA's Personnel excludes the Service Provider and its Personnel.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

Project	Kamoa Copper SA, a joint venture between Ivanhoe Mines and Zijin Mining, which entails amongst others the developing of a underground copper mine.
Purchase Order	a printed, official purchase order form with a unique order number issued to the Service Provider by KCSA, a template of which is attached as Annexure C.
Response to RFQ	The response to the RFQ by the Service Provider, which is attached as Annexure D.
RFQ	a request for quotation which may be issued by KCSA, from time to time, which is attached as Annexure E.
Schedule of Rates	is a list setting out the staff, labour, plant hire rates and any other rates which may be necessary for the execution of the Services that will be used to calculate the consideration due to the Service Provider for the Services, a template of which is attached as Annexure F. It does not contain any quantities for specific work units.
Service Level(s)	means all or any (as the context requires) of those performance indicators listed in clause 4.1 below and/or as further detailed in Annexure G.
Scope of Services	the document attached as Annexure H alternatively if no such Services are specified in Annexure "H", then the Scope of Services shall be as set out in KCSA's RFQ.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

Services	the services described in the Scope of Services and/or Additional Services as may be applicable to be provided in terms of this Agreement.
Site(s)	the area of the Project located approximately 40km west of the town Kolwezi in the Katanga province of the DRC where the Service Provider is providing the Services, and/or where the Service Provider is engaged in executing the Services or any ancillary task necessary for the completion of the Services and/or where KCSA instructs the Service Provider to provide the Services.
Subsidiary	a company is a subsidiary of another company if that other company – holds a majority of the voting rights in it, or is a member of it and has the right to appoint or remove a majority of its board of directors, or is a member of it and controls alone, pursuant to an agreement with other members, a majority of the voting rights in it, or if it is a subsidiary of a company that is itself a subsidiary of that other company and a company is to be treated as a member of a subsidiary even if its shares are registered in the name of (i) a nominee, or (ii) any party holding security over those shares, or that secured party's nominee.
Subcontracting Law	means DRC law No. 17/001 of 8th February 2017 setting out the rules governing subcontracting in the private sector.
Taxes	means any and all taxes, fees, levies, duties and charges (including any related fine, penalty,

KAMOA COPPER SA
Société anonyme avec conseil d'administration

	surcharge or interest) imposed or assessed in respect of this Agreement by any government authorities, state or municipality, or any local, state, federal or other fiscal, revenue, customs, or excise authority, body or official anywhere in the world including income tax, payroll tax, statutory superannuation contributions and workers compensation payments and contributions, withholding tax, sales tax, customs and import duty, excise tax, stamp duty and VAT.
Termination Date	the date when this Agreement is terminated in accordance with its Terms and Conditions.
Terms and Conditions	the Terms and Conditions as set out in this Agreement.
The Service Provider	the provider of the Services stated in the Purchase Order, with particulars reflected in its Vendor Application Form submitted to KCSA.
VAT	means any value-added tax, goods and services tax or any tax analogous thereto imposed by the DRC.
Working Day	Monday through Friday between the hours 07:30 to 16:30 excluding Saturdays, Sundays and Public Holidays.

1.2 INTERPRETATION

1.2.1 Any reference in this Agreement to a clause is, subject to any contrary indication, a reference to a clause of this Agreement, and a person means any natural or juristic person, firm, company, corporation, government, state, agency or organ of a state, association, trust or partnership (whether or not having separate legal personality).

KAMOA COPPER SA
Société anonyme avec conseil d'administration

1.2.2 Where a word or expression is given a particular meaning, other parts of speech and grammatical forms of that word or expression have a corresponding meaning.

1.2.3 The headings do not govern or affect the interpretation of this Agreement.

1.2.4 If any provision in a definition confers rights, or imposes obligations on any Party, effect is given to it as a substantive provision of this Agreement.

1.2.5 Unless the context indicates otherwise an expression which denotes any gender includes both the others; reference to a natural person includes a juristic person; the singular includes the plural, and the plural includes the singular.

1.2.6 Unless the context indicates otherwise if the day for payment of any amount or performance of any obligation falls on a day which is not a Working Day, that day will be the next Working Day.

1.2.7 The words "including" and "in particular" are without limitation.

1.2.8 Any reference to a document or instrument includes the document or instrument as ceded, delegated, novated, altered, supplemented or replaced from time to time.

1.2.9 A reference to a Party includes that Party's successors-in-title and permitted assigns.

1.2.10 A time of day is a reference to Kolwezi, DRC time.

1.2.11 The rule of interpretation that, in the event of ambiguity, a contract must be interpreted against the Party responsible for the drafting of the contract does not apply to this Agreement.

1.2.12 Should any provision in a definition be a substantive provision conferring rights or imposing obligations on any Party, then effect shall be given to such provision as if it were a substantive provision in the body of this Agreement.

1.2.13 The Service Provider's standard terms and conditions and/or those contained in the Service Provider's credit application, notwithstanding their reference to or inclusion in any quotation, offer, order, invoice, or otherwise, shall have no application to this Agreement and shall not be binding on KCSA.

1.2.14 The expiration or termination of this Agreement shall not affect such provisions of this Agreement that expressly provide that they will operate after any such expiration or termination or which of necessity must continue to have effect after such expiration or termination, notwithstanding the fact that the clauses themselves do not expressly provide this.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

1.2.15 The Service Provider shall be deemed to have based its Response to RFQ and entered into this Agreement of its own interpretation, deduction, inspection and examinations of the RFQ and the Site, and shall be deemed to have satisfied itself before pricing as to the correctness and sufficiency of the rates and/or prices stated in its Response to RFQ, which rates and/or prices shall cover all its obligations under the Agreement, and all matters and things necessary and ancillary for the proper execution of the Services.

2. WHOLE AGREEMENT

2.1 The Agreement between the Parties comprises the documents listed below, in the following order of precedence:

2.1.1 these Terms and Conditions;

2.1.2 the Purchase Order;

2.1.3 the RFQ;

2.1.4 the Response to the RFQ;

2.1.5 the annexures referenced in this document;

2.1.6 the Vendor Application Form completed by the Service Provider in connection with its supply of Services to KCSA.

2.2 These Terms and Conditions and the other documents listed in clause 2 above shall be taken to be mutually explanatory of one another but if any ambiguity, discrepancy, divergence or inconsistency in or between them, the order of priority shall be as listed in clause 2 above.

2.3 This Agreement shall be deemed to have entered into force on the Effective Date and shall remain in force and effect for a period of 1 (one) year from the Effective Date ("the Initial Period") or the Termination Date, whichever date is earlier.

2.4 Upon the expiry of the Initial Period, KCSA shall have the option to renew this Agreement for a further period of 1 (one) year from the Expiry Date ("the Renewal Period").

3. SCOPE OF SERVICES

3.1 The Service Provider is hereby appointed on a non-exclusive basis to provide the Services.

3.2 KCSA shall issue Purchase Orders for specific Services as may be required.

3.3 KCSA may, from time to time, request the Service Provider to provide Additional Services falling outside the Scope of Services. All Additional Services shall be governed by this Agreement and the Additional Services shall form part of the Scope of Services.

3.4 KCSA will issue Purchase Orders to the Service Provider, for any Additional Services.

KAMOA COPPERSA
Société anonyme avec conseil d'administration

3.5 These Purchase Order's will be system generated and placed by KCSA by electronic mailing of a copy thereof to the Service Provider, and may contain details of the Services or Additional Services ordered.

3.6 If there is any discrepancy or ambiguity in description and/or quantities in a Purchase Order, the Service Provider shall immediately submit the matter to KCSA's Procurement Manager for decision. Should the Service Provider proceed before such decision and without the issuing of an amended Purchase Order, KCSA shall be absolved of all liability from any claim (for payment or otherwise) made by the Service Provider.

3.7 Purchase Orders may be cancelled by KCSA at any time provided that KCSA shall pay the Service Provider for costs reasonably incurred up to the date of cancellation. The Service Provider will use all reasonable and practical endeavours to mitigate its losses in this regard.

3.8 The consideration payable for the Services and/or Additional Services shall be specified in the Purchase Order and shall be paid to the Service Provider in the amount as indicated therein, and determined as provided for in terms of this Agreement. Unless expressly stated to the contrary in the Purchase Order, the consideration shall be exclusive of VAT, (whether VAT or any other value added taxes charged by any non-DRC government), and no additional charges of whatever nature shall be recoverable from KCSA unless the Service Provider has, prior to the execution of the Purchase Order, obtained KCSA's agreement in writing for such additional charges. The difference in cost, if any, occasioned by any Additional Services, will be added to or deducted, as the case may require.

3.9 Additional Services will be priced as follows:

3.10 Subject to and without limiting the terms of this Agreement, using the following order of precedence (in descending order):

3.10.1 this Agreement;

3.10.2 using applicable rates or prices in this Agreement;

3.10.3 reasonable market related rates or prices, consistent with sound practices.

3.10.4 If the Service Provider fails to submit pricing in relation to Additional Services within a period of 21 (twenty one) days from the date of the request to provide Additional Services, then the Service Provider shall be deemed to have waived and/or abandoned its claim for additional cost and/or time and KCSA shall be absolved from all liability in relation to any such claim.

3.11 No invoice shall be considered by KCSA unless supported by a valid Purchase Order issued by KCSA.

3.12 This Agreement does not govern, inter alia, the following:

KAMOA COPPER SA
Société anonyme avec conseil d'administration

3.12.1 If applicable, private placement services that may be provided to KCSA by the Service Provider, in accordance with Article 2 b of the Order, under the terms of which, at KCSA's request, the Service Provider would recruit workers in order to make them temporarily available to KCSA, it being specified that the Service Provider would be and remain, for the entire duration of their placement with KCSA, the sole employer of the workers concerned; and

3.12.2 such potential services would be covered by a separate contract between the Parties, under the terms of which no remuneration would be due to the Service Provider by KCSA for activities related to the search, selection and recruitment of the workers concerned.

3.13 The Service Provider, who is deemed to be a subcontractor within the meaning of Article 1.48 of the Mining Code and Article 2 of the Mining Regulation, shall act, pursuant to the Agreement, as "principal enterprise" or "principal contractor" within the meaning of Article 3.5 of the Subcontracting Law, on behalf of KCSA.

4. PERFORMANCE MANAGEMENT

4.1 Notwithstanding the specific performance requirements as contemplated in this Agreement, the Service Provider's performance of the Services will be managed as follows:

4.1.1 The Services shall be measured in accordance with the provisions of this Agreement on a continuous basis and Service Levels, as provide for in Annexure G.

4.1.2 In order for KCSA to measure the Service Provider's performance of the Services, the Service Provider shall provide KCSA with a monthly report in respect of the work performed for the previous month. This report shall be in the form of a summary of compliance with the Scope of Services and any Service Levels as contained in this Agreement.

4.1.3 If the Service Provider fails to furnish KCSA with the monthly report twice within any six month period, KCSA shall, at its sole discretion, be entitled to levy penalties or issue a termination notice to the Service Provider.

5. OBLIGATIONS OF KCSA

5.1 KCSA shall provide to the Service Provider free of cost, all information that may be reasonably required for the provision of the Services. Should the Service Provider require any further documentation or information it shall forthwith request same in writing from KCSA, which documentation or information shall not be withheld unreasonably.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

5.2 KCSA shall upon a request as set out above, respond within a reasonable time period, so as not to delay the Services provided that such time period is no shorter than five Working Days, according to the procedures agreed to by the Parties, prior to the commencement of each Purchase Order.

5.3 KCSA shall cooperate with the Service Provider and shall subject to clauses 7 and 28 below, not interfere with or obstruct the proper performance of the Services.

5.4 On becoming aware of any matter that may result in a material change or may impact on the Services, or on becoming aware of any defect or deficiencies in the execution of the Services, KCSA shall give notice of such change, defect or deficiency to the Service Provider.

5.5 KCSA may, either itself or by appointing others, carry out an obligation under the Agreement which the Service Provider was obliged to carry out, but which it failed to carry out within the time required in accordance with the Agreement.

5.6 The costs incurred by KCSA in so carrying out such obligation will be a debt due and payable from the Service Provider to KCSA.

6. OBLIGATIONS OF THE SERVICE PROVIDER

6.1 The Service Provider shall exercise reasonable skill, care and diligence in the performance of the Services.

6.2 The Service Provider shall, in the provision of the Services, have due regard to the operational requirements of KCSA and shall not do, or permit to be done, anything which may negatively impact such operational requirements.

6.3 Where the Services include the exercise of powers to certify, decide or exercise discretion in terms of a contract between KCSA and any third party, then the Service Provider shall act in accordance with that contract and this Agreement.

6.4 The Service Provider shall designate a full-time employee of the Service Provider during each stage of a Project, who shall be the representative and shall have complete authority to receive information and give information to KCSA. The name and other details shall be contained in the Response to RFQ.

6.5 The Service Provider will be required to attend regular meetings with KCSA and any other party as directed by KCSA.

6.6 Where the Service Provider shall be required to perform the Services in conjunction with any Other Contractor, the Service Provider will cooperate in good faith and in a professional manner with such other consultants / specialists in order to ensure effective cooperation and integration of the Services provided by Other Contractors.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

6.7 The Service Provider shall notify KCSA immediately on becoming aware of any matter that may result in a material change, or may impact on the Project requirements or on becoming aware of any defects or deficiencies in the Services.

6.8 The Service Provider will have no contractual relationship with any Other Contractors undertaking the work, but will be responsible as project manager for ensuring the Other Contractor's compliance with that contract.

6.9 The Service Provider shall be adequately staffed with competent and suitably qualified personnel to comply with its obligations under this Agreement. The Service Provider shall furthermore maintain such offices, systems, employ such technologies, operate such equipment and do any other thing as is or may be required to effectively comply with its obligations under this Agreement.

7. WARRANTIES AND UNDERTAKINGS

7.1 The Service Provider warrants, acknowledges and undertakes, for the duration of this Agreement, to KCSA that:

7.1.1 it has exercised and will continue to exercise all skill, care and diligence to be expected of a properly qualified and competent Service Provider experienced in carrying out Services of a similar size, scope and complexity to the Services, to the professional standards which may reasonably be expected in the circumstances of a competent provider of similar Services;

7.1.2 the entry into and performance by the it of its obligations in terms of this Agreement do not conflict with its constitutional documents;

7.1.3 it has the power to enter into and perform in terms of this Agreement and has taken all necessary action to authorise the entry into and performance of this Agreement in accordance with its terms;

7.1.4 this Agreement constitutes legal, valid, enforceable and binding obligations on it in accordance with its terms.

7.2 The Service Provider warrants that there are no circumstances, facts or reasons which are known, or ought to be known by the Service Provider, which should have been disclosed to KCSA and which would have influenced KCSA's decision in appointing the Service Provider to supply the Services.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

7.3 The Service Provider confirms that it is a duly incorporated and registered Congolese law legal entity with Congolese financing, in the meaning of (i) Article 1.48 of the Mining Code and (ii) Article 2 of the Mining Regulations is in good standing with all DRC administrations and commits to remain so for the full term of the Agreement. The Service Provider shall comply with all DRC laws relating to subcontracting and shall indemnify KCSA for any claims arising from its non-compliance.

7.4 The Service Provider holds all permits and authorisations, of any nature whatsoever, required to perform in full compliance with applicable laws and regulations, and commits to maintain, as needed, the validity of said permits and authorisations for the full term of the Agreement, and it's performance is not in breach of any applicable law or regulation as of the Effective Date or as may be enacted after the Effective Date.

7.5 The Service Provider must, throughout the term of this Agreement, comply (and ensure, as appropriate, that its Personnel, direct and indirect service supplier and other representative comply throughout the term of this Agreement) with all laws and regulations applicable to them at any moment, including those set out in the Mining Code, the Mining Regulations, the Subcontracting Law, the Order and any tax and customs law, Anti-Corruption Legislation and labour and social security laws (including the Labour Code) and regulations applicable in the DRC (and which for the avoidance of doubt shall include the obligation to communicate to the Congolese administration a copy of all subcontracting agreements within 15 days of their signature in accordance with Article 94 of Ordinance Law No. 13/003). The Parties agree that the provisions in this clause 7.5 are an essential obligation of the Service Provider.

7.6 The Service Provider agrees, for the full term of the Agreement, to communicate to KCSA, at the latest on 31 December of every year, the complete list of all its subcontractors, in the meaning of the Subcontracting Law, involved in the performance of the Service Provider's obligations towards KCSA.

7.7 In order for Congolese nationals to acquire the technical expertise and qualifications necessary to perform certain activities, the Parties agree to cooperate in good faith, for the duration of the Agreement, within the specialised training structure put in place by KCSA, to the activities thereof in the Service Provider's field of expertise, with particular attention to activities for which local expertise is lacking.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

7.8 Without prejudice to the other possible causes and modalities for termination of the Agreement arising out of applicable laws and regulations at the time, KCSA will be entitled, in the event of the non-performance by the Service Provider of all or part of its obligations, to unilaterally terminate the Agreement if a formal demand remains unheeded for more than 30 (thirty) Working Days following the receipt thereof by the Service Provider, as of right, by means of simple notification to the Service Provider of its decision to unilaterally terminate the Agreement, without any further formality and without the exercise of this right entitling the Service Provider to claim damages or any other payment, with the exception of the payment of invoices not disputed by KCSA relating to Services actually rendered or works actually carried out by the Service Provider in accordance with the Agreement, until the date on which termination takes effect.

7.9 The Service Provider shall be liable for, and shall indemnify and hold harmless KCSA, KCSA's Personnel and KCSA's Affiliates, against any loss, costs (including legal costs), expenses, liabilities and damage (including direct and indirect loss and damage) incurred by KCSA, KCSA's Personnel and KCSA's Affiliates due to, or caused by, the Service Provider's non-compliance with clause 7.3. This clause 7.9 shall survive termination of this Agreement.

8. RIGHT OF AUDIT

8.1 KCSA shall be entitled, at its own expense, to access any Site for purposes of inspecting and auditing at any time, with or without notice to the Service Provider, any of the Services.

8.2 KCSA shall be entitled, at its own expense, but giving the Service Provider 2 (two) Working Days' notice thereof, to access the Service Provider's office for the purpose of inspection and audit of those records of the Service Provider pertaining to the Services provided by the Service Provider to KCSA. The Service Provider shall make available to KCSA in respect of such inspection and audit such records as KCSA may reasonably require. Any such inspection or audit shall be undertaken by KCSA in attendance with duly authorised representatives of the Service Provider.

8.3 The Service Provider shall at its own expense provide reasonable support to KCSA during such inspections or audits.

8.4 Should the audit find that the Service Provider has not been providing the Services in accordance with the provisions of this Agreement or the applicable Service Level Annexure, the provision of clauses 20 and/or 21 shall apply.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

8.5 The findings of the audit shall be prima facie evidence of its contents and shall entitle KCSA to exercise its remedies stipulated in this Agreement.

9. REMUNERATION

9.1 KCSA will pay the Service Provider for performing the Services in accordance with this Agreement.

9.2 The Service Provider shall submit it's invoice to KCSA supported by supporting vouchers indicating VAT on all relevant amounts. The invoice and supporting vouchers must reflect all expenses properly and necessarily incurred by the Service Provider in providing the Services, in particular but not limited to, the following:

9.2.1 a detailed account of the Services rendered;

9.2.2 the total number of hours worked in providing the Services;

9.2.3 the names of the personnel providing the Services;

9.2.4 the Service Provider's income tax and VAT registration numbers;

9.2.5 the Service Provider's statement of account;

9.2.6 supporting vouchers of any materials and/or goods purchased for the Services;

9.2.7 the names of any and/or all sub-Service Providers used in executing the Services;

9.2.8 supporting vouchers of any and/or all sub-Service Providers accounts relating to the Services.

9.3 The consideration payable to the Service Provider shall be payable within 30 days of date of statement.

9.4 If any item or part item is disputed in an invoice submitted by the Service Provider, KCSA will give due notice before the date of payment, and shall not be obliged to effect payment until the cause of dispute has been resolved. The cause of dispute will be resolved by the Parties before the date of next payment or will be referred to the dispute resolution procedures outlined under clause 22.

9.5 Subject to clauses 9.2 and 9.3, KCSA shall be invoiced within 3 (three) months for all valid expenses incurred as part of the Services. KCSA shall be entitled to demand any supporting documentation that it deems fit. Such expenses will be incorporated as a sub-section of the relevant invoice. Should any expenses be issued/invoiced to KCSA after this date, they are deemed to be rejected and KCSA shall be absolved of all liability in relation to these expenses and payment thereof.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

9.6 Should the Service Provider undertake the Services on a reimbursable basis, the Service Provider shall maintain records which clearly identify individual time and expenses and shall retain such records for a period of 120 (hundred and twenty) months following completion or termination of the said Services. All such records should be available to KCSA or appointed auditors within 5 (five) Working Days following written request.

9.7 Should the Service Provider undertake the Services using a Bill of Quantities or a Schedule of Rates, the total consideration payable to the Service Provider shall be based on the work as set out in the Bill of Quantities or Schedule of Rates.

9.8 Unless otherwise expressly provided in this Agreement, the Service Provider shall pay all taxes including sales tax, payroll tax, fringe benefits tax, levies, duties and assessments due in connection with its provision of the Services and the Service Provider's performance of its other obligations under this Agreement.

9.9 If any Party is required to reimburse or indemnify the other Party for a cost, expense or liability (Cost) incurred by the other Party, the amount of that Cost for the purpose of this Agreement is the amount of the Cost incurred less the amount of any credit or refund of VAT to which the Party incurring the Cost is entitled to claim in respect of the Cost

9.10 Notwithstanding any other provision of this Agreement, KCSA may set-off or deduct from any amounts due to the Service Provider under this Agreement any moneys due from the Service Provider to KCSA on any account under this Agreement, including but not limited to:

9.10.1 all debts and moneys due from the Service Provider or its personnel to KCSA under or by virtue of this Agreement;

9.10.2 all costs, charges, damages and expenses which KCSA may have paid or incurred and which or for which the Service Provider is liable to bear, pay or make reimbursement to KCSA;

9.10.3 any amount which KCSA is required by law, or which KCSA may reasonably consider it is required by law, to deduct for charges, assessments or levies of any government or applicable Authority.

9.11 This clause survives the termination or expiry of this Agreement. If the amount which the Service Provider owes KCSA is not liquidated, set-off will operate to the extent of the amount which, in the written opinion of KCSA's auditors, is the value of KCSA's claim against the Service Provider, without prejudice to the rights of either Party subsequently to have the amount determined by arbitration.

9.12 If, after set-off in terms of clause 9.10, the amount which the Service Provider owes KCSA is determined in an amount different from that assessed by KCSA's auditors, the Party to whom money is owed may immediately recover it from the other Party.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

10. INDEMNITIES, LIMITATION OF LIABILITY AND INSURANCE

10.1 The Service Provider agrees to indemnify, hold harmless and defend KCSA and its Personnel from and against the following damages, losses and liabilities (hereinafter collectively referred to as "Liability") arising as a result of the negligent or wilful acts or omissions of the Service Provider:

10.1.1 with regard to claims by Authorities or others for non-compliance by the Service Provider with the provisions of all laws (federal, state, provincial or municipal) in any way affecting or applicable to the execution of the Services.

10.1.2 arising out of any wilful or negligent acts or omissions to act, of the Service Provider.

10.1.3 arising from claims with regard to the death of/or injury to the Personnel of the Service Provider or the death of/or injuries to third parties due to the Service Provider's negligence or misconduct.

10.1.4 arising from any loss of/or damage to property which is the property of KCSA or any third party.

10.2 Without limiting the Service Provider's liabilities or responsibilities in terms of this Agreement, the Service Provider will provide adequate insurance, to cover its liability and responsibilities in terms of this Agreement, which insurance is to be taken out from a reputable insurance company.

10.3 In addition to the insurance aforementioned and without prejudice to its obligations under this Agreement or otherwise at law the Service Provider shall effect and use its best endeavours to maintain for the duration of this Agreement and for a period of 1 (one) year from the expiry or termination date with a well-established insurance office or underwriter of repute, adequate professional indemnity insurance with a limit of indemnity commensurate to the risk at hand (adequacy to be determined by KCSA), for any one occurrence or a series of occurrences arising out of any one event (which for the avoidance of doubt shall include any negligent act, error omission or default) on the part of the Service Provider in the performance of its duties under this Agreement and shall produce to KCSA on demand from time to time reasonable evidence that the terms of this clause have been complied with.

10.4 The Service Provider warrants that the provisions of this Agreement have been disclosed to the Service Provider's insurers and such insurers have expressly accepted that any breach of such provisions by the Service Provider is covered by the Service Provider's insurance.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

10.5 KCSA will have the right to examine the policies maintained by the Service Provider at any time during the existence of this Agreement and to demand from the Service Provider to appoint another underwriter if it is not satisfied with the underwriter that underwrites the insurance policy.

10.6 This Clause 10 shall survive the termination of this Agreement.

11. LIQUIDATED DAMAGES

11.1 If at any time an event of Default with respect to the Services has occurred and is continuing, due to the actions or bad faith of the Service Provider, KCSA may claim liquidated damages, as follows:

Days late	**Amount**
Day 1 – 4	0.02% of total Purchase Order value/day;
Day 5 – 8	0.06% of total Purchase Order value/day;
Day 9 – 12	0.10% of total Purchase Order value/day;

Thereafter 0.20% of total Purchase Order per day, up to 15% of the total value of the Purchase Order. The aforementioned will not affect the effectiveness and performance of this Agreement.

12. ASSIGNMENT AND SUBCONTRACTING

12.1 The Service Provider shall not without the prior written consent of KCSA have the right to cede or assign the rights, benefits or obligations under this Agreement or any part thereof.

12.2 If the Service Provider wishes to subcontract the Services to be rendered in terms of this Agreement or any part thereof or the Additional Services it shall obtain KCSA's written approval, which approval shall not unreasonably be withheld.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

12.3 Irrespective of the foregoing any subcontracting of Services with or without KCSA's consent shall not relieve the Service Provider of any of its obligations to KCSA under this Agreement.

12.4 Irrespective of the foregoing the Service Provider undertakes that its procurement process when selecting subcontractors shall be transparent, open, auditable and impartial and in line with Applicable Law.

12.5 The Service Provider may, with the prior written approval of KCSA, enter into subcontracts for the vicarious performance of any part (but not exceeding forty percent) of the Services. It shall provide KCSA with the proposed subcontract as well as scope of work and any other information required by KCSA to enable KCSA to provide its approval.

12.6 The Service Provider must manage the performance of each subcontractor to ensure the quality and timeliness of its performance to meet the requirements of this Agreement for the Services.

12.7 The Service Provider's responsibilities or obligations under this Agreement are not lessened or otherwise affected by subcontracting the performance of those obligations or KCSA giving, or failing to give, its approval under this clause.

12.8 The Service Provider must ensure that all subcontracts for the Services adequately address all industrial relations, safety, environmental and programming issues relevant to the Services (including compliance with Applicable Law and KCSA's Policies).

12.9 The Service Provider will be liable to KCSA for all acts, omissions and defaults of the subcontractors (and those of the officers, Personnel and agents of the subcontractors), as if they were the acts, omissions and defaults of the Service Provider itself.

13. CONFIDENTIALITY AND PUBLICITY

13.1 Notwithstanding the expiry or termination of this Agreement, neither Party ("the receiving Party") shall at any time after the Effective Date disclose to any person or use in any manner whatever the other Party's confidential information, provided that the receiving Party may disclose the other Party's confidential information in the following circumstances:

13.1.1 to the extent required by law (other than in terms of a contractual obligation of the receiving Party) or as directed by any Authority. The Party required to make such disclosure must inform the other in writing prior to any such disclosure; or

KAMOA COPPER SA
Société anonyme avec conseil d'administration

13.1.2 to, and permit the use thereof by, its employees, agents, consultants, representatives, professional advisors and sub-contractors to the extent strictly necessary for the purpose of implementing or enforcing this Agreement or obtaining professional advice or conducting its business, it being specifically agreed that any disclosure or use by any such persons of such confidential or other information for any other purpose shall constitute a breach of this clause by the receiving Party.

13.2 In the performance of this Agreement, the Parties may disclose to each other certain materials, information, data, techniques and procedures which relate to each other's' business which the Parties agree to keep confidential and will confine such materials, information, data, techniques and procedures only to those persons, if any, on a "need to know" basis.

13.3 Neither Party will use the name of the other, nor of any Party to this Agreement in publicity releases or advertising, nor for other promotional purposes, without securing the prior written approval of the Parties concerned.

13.4 The provisions of this clause shall cease to apply to any confidential information of a Party which:

13.4.1 is or becomes generally available to the public other than as a result of a breach by the receiving Party of its obligations in terms of this Agreement; or

13.4.2 is also received by the receiving Party from a third party who did not acquire such confidential information subject to any duty of confidentiality in favour of the other Party; or

13.4.3 was known to the receiving Party (having not breached any confidentiality obligations) prior to receiving it from the other Party.

13.5 Each of the Parties shall procure that those of their authorised representatives and/or advisors which have access to confidential information furnish the other Party, if so required by the other Party, an undertaking in respect of confidentiality of such confidential information on the same terms as set out in this clause.

13.6 Save as provided in this Agreement or otherwise agreed between the Parties, neither Party shall release any information to the public or media in respect of any issue affecting this Agreement, KCSA or the Services.

13.7 Both Parties' obligations in terms of this clause will survive the expiry or termination of the Agreement, for a period of five years.

13.8 The Service Provider shall:

13.8.1 comply with all Applicable Laws and directives or instructions of Authorities when performing its obligations under this Agreement and the conditions of all authorisations;

KAMOA COPPER SA
Société anonyme avec conseil d'administration

13.8.2 comply with all the relevant guidelines issued by Authorities and relevant KCSA Policies in respect of the Site or the performance of the Services and its other obligations under this Agreement;

13.8.3 promptly give KCSA copies of all relevant documents issued by Authorities.

14. ETHICAL BUSINESS PRACTICES

14.1 The Parties undertake that so long as this Agreement remains in force and effect it will, and it will procure that its Personnel, Affiliates, or related parties will, comply with all applicable Anti-Corruption Legislation, all applicable competition, state aid, anti -trust, anti-restrictive or anti abusive trade practice or merger control laws in any jurisdiction; and it will implement and maintain appropriate policies and procedures designed to ensure, and which are reasonably expected to ensure, compliance by each of their directors, officers, employees and subsidiaries or authorised representatives with all Anti-Corruption Legislation in relation to its business and the business of any of its holding company, subsidiary companies or related parties.

14.2 KCSA is committed to conducting its business ethically and to achieving and maintaining the highest standards of corporate governance. KCSA requires all of its business partners, consignors, vendors, contractors and service providers, who play an important and valued role in its continuing business success, to behave ethically and to avoid engaging in corrupt business activities. KCSA's requirements are contained in Annexure A to this Agreement.

14.3 The Service Provider undertakes to comply with the above and all Applicable Laws and specifically all Anti-Corruption Legislation.

14.4 The Service Provider shall not give nor offer to give (directly or indirectly) to any person any bribe, gift, gratuity, commission or any other thing of value for obtaining favourable treatment or taking any action for the purpose of influencing any act or decision of such official or of the government to obtain or retain business, or to direct business to any person.

14.5 The Service Provider undertakes to comply with and implement policies in furtherance of the Voluntary Principles on Security and Human Rights and the United Nations Guiding Principles on Business and Human Rights.

14.6 The Service Provider shall ensure fair labour practice by complying with the industrial relations and Personnel policies and/or directives of KCSA.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

15. GIFTS AND ENTERTAINMENT

15.1 Save for gifts of minimal value, KCSA discourages the exchange of gifts between the Parties or the Service Provider and Other Contractors. The prior written approval of KCSA is required for the exchange of significant gifts between KCSA, KCSA Personnel and the Service Provider.

16. GOOD FAITH

16.1 KCSA and the Service Provider shall at all times undertake to conduct themselves in good faith towards each other and shall not bring the other into disrepute.

17. DOCUMENTS

17.1 The Service Provider shall provide to KCSA such information and documents relating to the Services as may reasonably be requested by KCSA or required by law subject to KCSA paying the Service Provider all reasonable costs properly incurred by the Service Provider in providing the same.

18. NO RESTRICTION OF RIGHTS

18.1 This Agreement shall in no way prejudice or affect any other rights and remedies of KCSA against the Service Provider whether at common law or otherwise in respect of the Services or other matters referred to herein.

19. CONFLICT OF INTEREST

19.1 The Parties undertake:

19.1.1 Not to offer any employee of the other Party an interest in its business; and/or

19.1.2 Not to employ the staff of the other Party on a full- or part time basis. This includes directorships on boards etc.

20. FRAUD

20.1 If, at any time during the period of this Agreement, KCSA in its reasonable discretion determines that anyone employed by the Service Provider, in respect of this Agreement acted dishonestly and/or in bad faith or made any wilful or material negligent misrepresentation to KCSA, whether in any negotiations preceding the conclusion or, or in the execution of, this Agreement then KCSA shall have the option either to:

KAMOA COPPER SA
Société anonyme avec conseil d'administration

20.1.1 By written notice to the Service Provider, to terminate this Agreement or any part thereof. Upon such termination KCSA shall be entitled, in addition to all other remedies available to it, to recover from the Service Provider all damages it has suffered by virtue of such conduct by the Service Provider. If, at the time of such termination, KCSA be indebted to the Service Provider for any amounts whatsoever, KCSA shall be entitled to withhold payment in respect thereof for a period of 90 (ninety) days from the date of termination in order to investigate the Service Provider's conduct and any damages suffered by KCSA. No payment by KCSA to the Service Provider after the lapse of such period shall preclude KCSA thereafter, from recovering from the Service Provider any such damages as it may have suffered; or

20.1.2 be entitled to request in writing that the Service Provider cause such person to cease to be employed by the Service Provider for purposes of the provision of any of the Services under this Agreement, and upon receipt of such written request the Service Provider shall be obliged forthwith at its own expense to cause such person to cease from provision or being involved in any manner whatsoever with the provision of the Services to KCSA under this Agreement.

21. FAILURE OR DELAY IN PROVIDING SERVICE

21.1 The dates and times specified in this Agreement are critical. Time is therefore of the essence. Non-compliance with said dates and times will constitute a material breach of the Agreement unless the Service Provider can show to KCSA's satisfaction that the failure or delay was caused by factors outside the control of the Service Provider. KCSA shall have the election to decide whether to place the Service Provider in breach in terms of the breach provisions of this Agreement or to apply the liquidated damages provided for in this Agreement and/or the alternative relief described hereunder.

21.2 KCSA may, without terminating the Agreement, be entitled forthwith to obtain similar Services from a third party as KCSA may require, to duly perform the Services without derogating from any other rights KCSA may have such as but not limited to termination of the Agreement and to claim damages.

21.3 KCSA will recover from the Service Provider any adverse difference in price it may incur as well as any other damages, which may be suffered by KCSA due to the Service Provider's non- or late performance of the Services.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

22. DISPUTE RESOLUTION

22.1 Save as may be otherwise provided for in this Agreement, any dispute of whatsoever nature which arises out of or in connection with this Agreement, including any disputes as to the validity, existence, enforceability, interpretation, application, implementation, breach, termination or cancellation of this Agreement or as to the Parties' rights and/or obligations in terms of this Agreement or in connection with any documents furnished by the Parties pursuant to this Agreement, shall be resolved in accordance with this clause.

22.2 Amicable resolution:

22.2.1 If a dispute (of any kind whatsoever) arises between the Parties in connection with, or arising out of, the Agreement or the execution of the Services, the Parties shall give notice to the other Party to resolve such dispute. The notice shall identify the issue(s) in dispute and the relief sought and shall state that it is a notice given in terms of this sub-clause.

22.2.2 Within five Working Days after the date of the notice, the Parties shall, through its senior representatives, attempt to settle the dispute in good faith before the commencement of arbitration.

22.2.3 Any resolution of a dispute in terms of this clause shall (unless expressly otherwise stated therein) be final and binding on the Parties when reduced to writing and signed by the senior representatives of each Party. To this end, the Parties respectively agree and warrant to each other that the senior representatives have full authority to so bind them.

22.2.4 Where the dispute is not resolved within 20 days of the notice given in terms of this sub-clause, arbitration may be commenced.

22.3 Arbitration:

22.3.1 Unless settled amicably, a dispute (of any kind whatsoever) arising between the Parties in connection with, or arising out of, the Agreement or the execution of the Services, including any dispute as to any certificate, determination, instruction, opinion or valuation of KCSA, or a dispute as to whether or not the Agreement was induced by a fraudulent misrepresentation, shall be finally settled by arbitration.

22.4 Unless otherwise agreed by the Parties:

22.4.1 the dispute shall be finally settled by private arbitration under the latest edition of the OHADA Uniform Act on Arbitration and revised Rules on Arbitration of the Common Court of Justice and Arbitration (the "Rules");

22.4.2 the dispute shall be settled by a single arbitrator to be appointed by the Parties by agreement, failing such agreement, by the President of the Common Court of Justice and Arbitration, or his nominee;

22.4.3 the arbitration shall be held at Kolwezi, DRC, and

KAMOA COPPER SA
Société anonyme avec conseil d'administration

22.4.4 the arbitration shall be conducted in English.

22.5 The arbitrator shall have full power to open up, review and revise any certificate, determination, instruction, opinion or valuation of (or on behalf of) KCSA.

22.6 Nothing in this sub-clause shall preclude either Party from seeking urgent interim relief, not otherwise provided for herein, from a Court of competent jurisdiction.

22.7 Subject to the time limits set out in clause 9.5, arbitration may be commenced prior to or after completion of the Services. The obligations of the Parties shall not be altered by reason of any arbitration being conducted during the progress of the Services.

22.8 For the avoidance of doubt, this arbitration clause shall be severable from this Agreement and shall survive the termination of this Agreement.

22.9 Notwithstanding that a formal dispute may have been declared, the Service Provider must:

22.9.1 continue without delay to provide the Services and perform its other obligations under this Agreement; and

22.9.2 comply with all directions of KCSA in connection with this Agreement which do not otherwise affect the ultimate resolution or determination of the Dispute.

22.10 The arbitrator shall have discretionary powers to make orders as to any matters which he may consider proper in the circumstances of the case with regard to submissions, pleadings, discovery, inspection of documents, examination of witnesses and any other matter relating to the conduct of the arbitration.

22.11 The arbitrator shall fully motivate any of his findings and his final determination and shall make an appropriate costs order.

22.12 The award of the arbitrator shall be final and binding upon the Parties (who hereby agree to carry out the award).

22.13 The arbitrator's award may be made an order of any Court of competent jurisdiction.

22.14 The Parties agree to keep the arbitration proceedings including the subject matter thereof and the evidence heard during such proceedings confidential and not to disclose same to anyone except for the purposes of the arbitration proceedings in terms of this clause.

22.15 The Parties agree to waive the exercise of any recourse challenging the validity of the arbitral award rendered. This award, having the force of res judicata, will be binding on the Parties and will be immediately enforceable.

22.16 The Parties expressly, irrevocably and unconditionally waive, each in so far as it is concerned, within the framework of the resolution of a dispute, the right to avail themselves of any protection based on any immunity, in particular, any immunity from jurisdiction, immunity from execution and diplomatic immunity from which they may benefit.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

22.17 Each Party, as far as it is concerned, confirms that it can validly be a party to arbitration and therefore renounces to invoke any provision of Applicable Law to contest the arbitrability of a dispute, its capacity to compromise or the validity of clause 22.

22.18 The language of this Agreement shall be English. All communications, technical and commercial documents as well as any other information related to this Agreement shall be provided by each Party to the other in the English language.

22.19 This constitutes an irrevocable consent by the Parties to any proceedings in terms hereof, and is severable from the other provisions of this Agreement and shall remain in effect notwithstanding the termination or invalidity for any reason of this Agreement.

23. BREACH

23.1 If any Party breaches any material provision or term of this Agreement (other than those which contain their own remedies or limit the remedies in the event thereof without derogating the provisions of this clause) and fails to remedy such breach within 14 (fourteen) days of receipt of written notice requiring it to do so (or if it is not reasonably possible to remedy the breach within 14 (fourteen) days, within such further period as may be reasonable in the circumstances, provided that the Party in breach furnishes evidence within the period of 14 (fourteen) days, reasonably satisfactory to the other Party, that it has taken whatever steps are available to it, to commence remedying the breach) then the aggrieved Party shall be entitled without notice, in addition to any other remedy available to it at law or under this Agreement (except as provided for in clause 20), including obtaining an interdict, to cancel this Agreement or to claim specific performance of any obligation whether or not the due date for performance has arrived, in either event without prejudice to the aggrieved Party's right to claim damages.

24. ANNUAL REVIEW

24.1 The agreed rates contemplated in this Agreement may, in KCSA's sole discretion, be subject to an annual review. Any adjustments in the agreed rates shall become effective on the anniversary date of each year of this Agreement.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

25. HOLDING COMPANY GUARANTEE

25.1 Where the majority of the shares of the Service Provider are being held by a company then such holding company may be required to bind itself as a guarantor for the due and proper performance of the Service Provider, in the form set out in Annexure "I", if so required by KCSA. Failure by such holding company to bind itself as a guarantor for the due and proper performance of the Service Provider, shall amount to an event of Default by the Service Provider, entitling KCSA to exercise its remedies provided for in terms of the Agreement.

26. CHANGE OF OWNERSHIP

26.1 It is recorded that in the event that the holding company of the Service Provider disposes of its interest (shareholding and/or loan account, as the case may be), this Agreement shall immediately terminate and be of no further force or effect unless KCSA's written approval has been obtained prior to such transaction.

27. LAWS, RULES AND REGULATIONS

27.1 The Service Provider agrees to comply with KCSA's security, safety, health, environmental and quality procedures.

27.2 KCSA may allow the Service Provider access to KCSA's premises in terms of its security procedures, as amended from time to time.

27.3 KCSA will be entitled to request the Service Provider to remove anyone employed or contracted by the Service Provider from its team if KCSA is of the opinion that such a person is a security or safety risk. Such a person will be removed by the Service Provider within the time stipulated by KCSA. The Service Provider indemnifies KCSA against any claims that might arise due to such removal.

27.4 The Service Provider shall comply strictly with all obligations and duties imposed upon it and upon KCSA in terms of all laws (federal, state, provincial or municipal) and any other laws, regulations, directions, permissions and other requirements which are applicable to the Service Provider's operations in the performance of the Services under this Agreement, together with all amendments and regulations to such legislation. The Service Provider shall accept all appointments made by KCSA in terms of all laws, regulations, directions, permissions and other requirements applicable to the Service Provider.

27.5 The Service Provider shall pay any fines, which may be imposed as a result of the activities of the Service Provider in the performance of the Services.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

27.6 The Service Provider shall, at the request of KCSA, furnish KCSA with proof that all and any payments required by any laws, regulations, directions, permissions and other requirements, have been effected by the Service Provider.

28. LIENS AND CLAIMS BY THIRD PARTIES

28.1 The Service Provider waives all liens and rights of possession pertaining to KCSA and relating to the Services.

28.2 If a third party makes a claim on KCSA to anything connected with the Services provided by the Service Provider in terms of this Agreement, the Service Provider will:

28.2.1 After notification to KCSA, deal with such a claim in such a manner as to avoid all prejudice to KCSA and keep KCSA fully informed; or

28.2.2 Alternatively, KCSA may deal with such a claim at its discretion, in which event the Service Provider will render to KCSA all necessary assistance.

28.3 If KCSA incurs any fair and reasonable expenses or makes any disbursements in terms of this clause, then such disbursements may be set-off against moneys owed to the Service Provider and in the event that no monies are due by KCSA to the Service Provider the Service Provider shall reimburse KCSA within 14 (fourteen) days after written proof of such expenses has been forwarded to the Service Provider.

29. INDEPENDENT STATUS, COST AND EXPENSES

29.1 Nothing in this Agreement constitutes a joint venture, agency, partnership or other fiduciary relationship between KCSA and the Service Provider.

29.2 The Service Provider acknowledges that it has no authority to bind KCSA.

29.3 At all times during the provision of the Services and the performance of the Service Provider's other obligations under this Agreement the Service Provider is an independent contractor and not an employee or agent of KCSA.

29.4 The Service Provider shall at all relevant times disclose its status as independent Service Provider to all third parties.

29.5 Other Contractors:

29.5.1 The Service Provider acknowledges that Other Contractors may be present on the Site during the provision of the Services.

29.5.2 The Service Provider shall in carrying out the Services:

KAMOA COPPER SA
Société anonyme avec conseil d'administration

29.5.2.1. permit Other Contractors and KCSA Personnel to carry out their work;

29.5.2.2. fully co-operate with Other Contractors and KCSA Personnel;

29.5.2.3. if applicable, carefully co-ordinate and interface the Services with the work carried out or to be carried out by Other Contractors and KCSA Personnel;

29.5.2.4. avoid interfering with, disrupting or delaying the work of Other Contractors and KCSA Personnel.

29.5.3 The Service Provider must comply with all written directions from KCSA regarding Other Contractors and their work, and allow any Other Contractors engaged by KCSA to use the amenities, facilities and services which are available for use on the Site.

29.5.4 The Service Provider shall be deemed to have made contingencies for the carrying out of works or services by third parties contracted by KCSA and shall not be entitled to additional payment and/or an extension of time for its compliance with the obligations in this clause.

29.5.5 Each Party shall bear all costs and expenses incurred by it towards the conclusion and execution of this Agreement.

30. INTELLECTUAL PROPERTY RIGHTS

30.1 Intellectual property rights resulting from this Agreement will be owned by KCSA and will be used for KCSA's purposes only. All documents including information, data, plans, investigation schedules, working papers, diagnostic models, methodology, reports or the like developed or used by the Service Provider for this Agreement and supplied or delivered to KCSA pursuant to this Agreement shall be the property of KCSA.

30.2 Ownership of data, drawings, designs and documents will reside with KCSA following payment to the Service Provider by KCSA. The Service Provider shall ensure that upon completion of a specific task, job or service within the ambit of the Services, all data, drawings, designs and documents relating to the aforementioned will be immediately transferred to KCSA in both hard copy and electronic format.

30.3 If KCSA purchases products from the Service Provider, and the Service Provider is the owner of the intellectual property rights, the Service Provider will grant KCSA the right to access at no cost to KCSA, all source code and object code, relating to the product, should the following events occur:

30.3.1 if the Service Provider is liquidated (provisionally or final) or enters into an agreement / arrangement with its creditors or commits an act of insolvency; or

30.3.2 if the Service Provider transfers or attempts to transfer any intellectual property rights of the product; or

KAMOA COPPER SA
Société anonyme avec conseil d'administration

30.3.3 if the Service Provider is in material default of its obligations to provide any maintenance; or

30.3.4 if the Service Provider is in breach of any terms of this Agreement and fails to remedy such breach within 14 (fourteen) days after having received a written notice from KCSA calling on it to do so; or

30.3.5 if the Service Provider ceases to trade.

30.4 Irrespective of the events in clause 30.3 materialising or not, the Service Provider grants KCSA access, at no cost to KCSA, to the object code, source code, all configuration files, script files and templates, including but not limited to interference configuration files and event handling configuration templates for purposes of Maintenance, Enhancements, Integration, Compatibility and the like, by KCSA, or a third party acting on behalf of KCSA, if in KCSA's sole discretion said Maintenance, Enhancements or Integration, Compatibility are to be done by KCSA or a third party acting on behalf of KCSA. KCSA will ensure that, if such information is made available to third parties, the necessary confidentiality agreements are entered into.

30.5 If the Service Provider is not the owner of the intellectual property rights, the Service Provider will endeavour its best efforts to secure, on behalf of KCSA, the rights to enforce clause 30.2 and 30.3.

30.6 Both Parties' obligations in terms of this clause will survive the completion or termination of this Agreement.

31. FORCE MAJEURE

31.1 If circumstances which were not foreseeable with reasonable foresight or avoidable with reasonable care ("circumstances"), arise or be reasonably anticipated and delayed or have potential to delay the performance, whether in whole or in part, the Party whose performance is affected, or whose performance may be affected ("affected Party"), will forthwith, in good faith and by the most expeditious means, notify the other Party in writing of:

31.1.1 the cause, nature and extent of the circumstances;

31.1.2 the expected duration of the circumstances; and

31.1.3 the extent to which the performance will be affected.

31.2 If the circumstances change after the affected Party has notified the other Party in accordance with clauses stated above, the affected Party shall, forthwith, in good faith and by the most expeditious means, inform the other Party of such changes and keep the other Party updated on such changes.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

31.3 Subject to the clauses stated above, the circumstances will not terminate this Agreement between the Parties, or absolve the affected Party from performance.

31.4 If the circumstances make the agreed performance impossible, the affected Party will, having regard for all relevant factors, as soon as possible and in good faith, put proposals for alternatives to the other Party. Such proposals will be in sufficient detail to enable the other Party to technically and informationally assess the alternatives and to decide whether any alternative is acceptable.

31.5 If the Force Majeure subsists for longer than 90 days, then either Party has the right to terminate this Agreement by notice to the other party with immediate effect and without prejudice to any other rights it may have.

31.6 If the circumstances delay the agreed performance:

31.6.1 The affected Party will, forthwith and in good faith, take all reasonable steps to mitigate delay and recover lost time.

31.6.2 Having regard for all relevant factors and in good faith, notify the other Party as soon as possible of the steps to be taken to mitigate the delay and recover lost time and keep the other Party updated on changes and progress thereof.

31.6.3 The other Party may, if the extent to which the delay may be mitigated and time lost be recovered is unacceptable to it, elect to terminate this Agreement.

31.6.4 Neither of the Parties will have any claim, arising from the circumstances, on the other.

31.7 Without limiting the generality and intention of the clauses above in any way, the circumstances may include, without being limited thereto:

31.7.1 War, riots, civil or military insurrection and like political happenings.

31.7.2 Natural disasters such as earthquakes, fire, storms and floods.

31.7.3 Governmental acts and omissions.

31.7.4 Terrorism and sabotage.

32. TERMINATION FOR CONVENIENCE

32.1 The Agreement and/or any Purchase Order may be terminated by KCSA at any time, upon notice in writing, provided that KCSA shall pay the Service Provider for costs reasonably incurred up to the date of cancellation. The Service Provider will use all reasonable and practical endeavours to mitigate its losses in this regard.

33. COMMUNICATIONS, NOTICES AND DOMICILIUM

33.1 For the purpose of the Agreement the Parties' respective addresses will be:

33.1.1 KCSA:

Physical address:

KAMOA COPPER SA
Société anonyme avec conseil d'administration

1148-6 Avenue de la Libération
Quartier Golf les Battants Commune de Lubumbashi
Lubumbashi
Haut-Katanga Province
Democratic Republic of Congo
Email: kcpprocurement@ivanplats.com

33.2 The Service Provider:

As per the Response to the RFQ

33.3 Communications:

33.3.1 Where this Agreement requires or makes provision for any Party to:

33.3.2 receive or send any communication; or

33.3.3 consent; or

33.3.4 confirm; or

33.3.5 approve; or

33.3.6 agree; or

33.3.7 waive; or

33.3.8 nominate; or

33.3.9 accept;

33.3.10 such communication, consent, confirmation, approval, waiver, agreement, nomination or acceptance (hereafter referred to as a "communication") must be in writing and delivered by hand (against receipt), sent by couriers, or transmitted using email to be effective.

33.4 Communications sent by email transmission shall only be valid if sent in PDF format.

33.5 However:

33.5.1 if the recipient gives notice of another address, communications shall thereafter be delivered accordingly; and

33.5.2 if the recipient has not stated otherwise when requesting an approval or consent, it may be sent to the address from which the request was issued.

33.6 The Communications shall clearly state on the face of the document that it is an approval, certificate, consent, determination, notice or request, as the case may be, made in accordance with this Agreement and where applicable, it must note the number of the clause under which the Communication is made.

33.7 Where either Party is to provide information to the other and no time period is specified, the Party requiring the information shall provide a minimum five Working Day's notice period.

33.8 Both Parties shall respond to communications within a reasonable time period and in any event within five Working Days where the communication is operational in nature.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

33.9 Approvals, certificates, consents and determinations shall not be unreasonably withheld or delayed. When a certificate is issued to a Party, the certifier shall send a copy to the other Party.

34. OCCUPATIONAL HEALTH AND SAFETY

34.1 KCSA and the Service Provider agree, that the following arrangements and procedures apply between them to ensure that the Service Provider complies with KCSA's safety requirements. The Service Provider warrants that it is familiar with all legislation relevant to KCSA and the Services, which includes but shall not be limited to:

34.1.1 DRC laws and legislation; and

34.1.2 The Mining Regulations; and

34.1.3 The Mining Code; and

34.1.4 The Subcontracting Law; and

34.1.5 Republic of South Africa Explosives Act 26 of 1956; and

34.1.6 Republic of South Africa Mine Health and Safety Act No. 29 of 1996 (MHSA) wherever the DRC Mining Regulations and mining codes do not provide guidance; and

34.1.7 South African national standards (SANS); and

34.1.8 International standards (IEC, DIN, FEM, CEA, ISO); and

34.1.9 KCSA specifications and standards, where available; and

34.1.10 Mining industry specifications and standards where KCSA specifications and standards are not available.

(hereafter individually and collectively referred to as the "Regulations")

34.2 The Service Provider undertakes to acquaint its employees, agents, consultants and subcontractors with all relevant provisions of the Regulations.

34.3 The Service Provider undertakes that all relevant duties, obligations and prohibitions imposed in terms of the regulations will at all times be fully complied with.

34.4 The Service Provider accepts sole liability for such due compliance with the relevant duties, obligations and prohibitions imposed by the Regulations, and expressly absolve KCSA from itself being obliged to ensure compliance with any of the aforesaid duties, obligations and prohibitions.

34.5 The Service Provider agrees that any duly authorized employee of KCSA is entitled, although not obliged, to take such steps as may be necessary to ensure that the Service Provider has complied with the undertakings mentioned in clause 34.1.8, 34.2 and 34.3 above, which steps may include without limitation, the right to inspect any records held by the Service Provider.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

34.6 The Service Provider is obliged to report forthwith to KCSA any investigation, complaint or criminal charge that may arise as a result of non-compliance with the Regulations, pursuant to work performed in terms of this Agreement, and must, upon written demand, provide full details in writing to KCSA of such investigation, complaint or criminal charge.

34.7 The Service Provider must, on demand by KCSA appoint a safety coordinator to liaise with KCSA on safety matters and inform KCSA in writing of the identity of the safety coordinator.

34.8 In addition and without prejudice to its other rights in terms of this Agreement or in law, KCSA may at any time require the Service Provider to remove from KCSA's Site any person against whom KCSA has reasonable objection and/or to immediately stop work if, in the reasonable opinion of KCSA, the Service Provider has breached any provision of this clause 34 and KCSA may recover from Service Provider any loss suffered as a result of the cessation of work, including the cost of having the work performed by a third party.

34.9 In addition to the remedies set out above, KCSA may elect to impose penalties upon the Service Provider as set out below:

Item	Deficiency	Per offence
1	Poor Housekeeping report by KCSA's Safety Officer or designate.	USD1 000.00 (One thousand United States Dollars).
2	Poor quality work.	USD2 500.00 (Two thousand five hundred United States Dollars).
3	Non-compliance with any other obligations imposed on the Service Provider in terms of the	USD5 000.00 (Five thousand United States Dollars) or termination of the Agreement.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

	Agreement, but which does not resort under 1 and 2.	

Before a penalty is imposed in terms of the Schedule of Deficiencies and Penalties, KCSA will notify the Service Provider, in writing, stating reasons and / or details of the Service Provider's conduct which will be penalized. Within one week of receipt of these reasons the Service Provider shall present reasons to KCSA, in writing, indicating either the Service Provider's acceptance of the penalty or reasons why the Service Provider believes the penalty should not be imposed by KCSA. KCSA notifies its decision with regards to the imposition of the penalty to the Service Provider within one week of receipt of the aforementioned reasons. If the Service Provider does not deliver a notice of acceptance and / or rejection with reasons within the one week stipulated in this clause, the penalty will be deemed accepted by the Service Provider.

35. GENERAL

35.1 The law of the Democratic Republic of Congo shall govern this Agreement. The United Nations Convention on the International Sale of Goods shall not apply to this Agreement;

35.2 No alteration or variation or agreed cancellation of this Agreement shall be of any effect unless it is recorded in writing and signed by all the Parties.

35.3 This Agreement constitutes the whole Agreement between the Parties in regard to the subject matter thereof and no warranties or representations of any nature whatever other than as set out in this Agreement read with its appendices have been made or given by any of the Parties.

35.4 No relaxation or indulgence which any Party may show to any other Party to this Agreement shall in any way prejudice or be deemed to be a waiver of any Parties' rights hereunder.

35.5 In the event that any provision of this Agreement is held to be invalid or otherwise unenforceable, such provision will be deemed to be deleted from this Agreement, while the remaining provisions of this Agreement will be unaffected and continue in full force and effect.

35.6 Unless otherwise agreed in writing by KCSA, the Service Provider and its personnel shall have no interest in nor receive remuneration in connection with any of the Services except provided for in the Agreement.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

35.7 This Agreement supersedes any previous oral or written agreements or arrangements between the Parties relating to the matters contained in this Agreement and shall be the entire contract between the Parties.

35.8 The Parties shall carry out their respective obligations, whether express or implied, in a spirit of mutual trust, co-operation and good faith including, ensuring that each Party will not wilfully or negligently prejudice the interests and/or rights of the other Party under the Agreement or at law.

35.9 The Service Provider undertakes to conduct its affairs in connection with the carrying out of the Services, and its relationship with KCSA, in good faith and in the best interests of KCSA.

35.10 The Service Provider hereby undertakes to not directly or indirectly, through any act or omission, allow itself to be put in a position where a conflict of interest could arise between its position vis-a-vis KCSA under this Agreement and its other (existing or potential) business interests and/or activities and/or the existing or potential business interests and/or activities of it. Without derogating from the foregoing, to the extent that any such conflict exists or arises at any time prior to the expiration of the term or earlier termination of this Agreement, the Service Provider shall immediately declare such conflict to KCSA in writing.

35.11 A Party shall immediately notify the other Party upon becoming aware of any governmental or regulatory review, audit or inspection of items related to the other Party or any other activities in connection with this Agreement.

35.12 The Parties undertake to cooperate in good faith to execute and fully implement the Agreement and, generally, to take all measures that may be necessary or useful to give full effect to each of the stipulations of the Agreement and the consequences thereof in order to ensure full execution of the Agreement.

35.13 The Parties further undertake to adapt this Agreement as strictly required, in the event that, during the term of this Agreement, a change in Law or a new administrative interpretation, of which the Parties are made aware, prevents the full execution of this Agreement. In such a case, the Parties shall meet as soon as possible following the receipt of the notification addressed by the most diligent Party to the other Party, to examine together how to take into account the new circumstances preventing the full execution of the Agreement.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

_____

SIGNED on behalf of the Service Provider at _____ on this the _____ day of _____ 20___.

_____

GERARD ROCHELLE DE VILLIERS

Mandataire dûment habilité

SIGNED on behalf of KCSA at _____ on this the _____ day of _____ 20___.

KAMOA COPPER SA
Société anonyme avec conseil d'administration

ANNEXURE "A"

The responsibility to ensure compliance with KCSA's Ethics, rest with the Service Provider. KCSA's Ethics Compliance Framework is detailed in the below.

DOCUMENT NO.	TITLE
2014-02	IVN Companion Booklet to the Code of Business Conduct and Ethics
2014-02	IVN Code of Business Conduct and Ethics
2014-02	IVN Corporate Disclosure, Confidentiality and Securities Trading policy
2014-02	IVN Corporate Citizenship

KAMOA COPPER SA
Société anonyme avec conseil d'administration

KAMOA COPPER SA
Société anonyme avec conseil d'administration

ANNEXURE "B"

Bill of Quantities - Template

KAMOA COPPER SA
Société anonyme avec conseil d'administration

BILL NO: 01 - GENERAL ITEMS FOR WORKS					
Item No	Description	Unit	Qty.	Rate	Amount
	Allow for all costs and expenses for complying with the Agreement and Scope of Work.				
	Note : Any Services not specially provided for will be deemed to be included in the rates of items in the Bill of Quantities.				
	CLASS A : GENERAL ITEMS				
0.01	Provision for insurances under the contract.	provisional sum			
0.02	Provision for establishment, maintenance and removal at completion of Engineers Office and equipment, as specified in the conditions of contract.	sum			
0.03	Provision for transport and vehicle facilities for Engineer's staff as specified in the conditions of contract..	sum			
0.04	Provision for testing and disinfection of works as specified.	sum			
0.05	Provide and display contract sign board where directed (xxxxXxxxmm) including lettering as per the instructions given by Engineer.	sum			
	Total of Page No. / carried to Summary in Page No. /				
0.06	Safety of contractor's employees, Engineer's staff (Helmets, Gumboots, dust filters etc.) and site safety barricades including open trench round up with barrigates and luminous tape, danger sign boards etc.	sum			
0.07	Provision for electricity, water and security services for Engineer's office	sum			
0.08	Provision for keeping the site clean during the construction period and removal debris at the completion to the satisfaction of Engineer.	sum			
	Dayworks				
0.09	Labour	provisional sum			
0.10	Materials	provisional sum			
0.11	Plant	provisional sum			
0.12	Provision for providing two sets of hard copy and a soft copy of the as built drawings on the completion of contract.	sum			
0.13	Provision for Construction Management Services as specified in the Contract. (Only for specialized services during contract period.)	provisional sum			
0.14	Provision for price escalation	provisional sum			
0.15	Provision for cleaning and applying all exposed pipes and specials with two coats of black colour enamel paint after completion of work.	sum			
	Total of Page No. / carried to Summary in Page No. /				

ANNEXURE "C"

KAMOA COPPER SA
Société anonyme avec conseil d'administration

KAMOA COPPER SA Société anonyme avec conseil d'administration	Contact Details	
	Tel:	
	Email:	
	Vat No.	
	Reg No.	

Purchase Order

Supplier	Ship To	Order	
		Number:	
		Date:	
		Requested:	
		PR Number:	
		Page:	1 of 1
		Print Date:	

		Delivery Instructions	Internal	
Payment Terms:				
Incoterms 2010:			Department:	
Supplier Reference:			Buyer:	

Line No	Revision Number	Revision Description	Quantity	UM	Description	Unit Price	Extended Price

EXAMPLE

Subtotal:	0.00
VAT:	0.00
Order Total: ()	

Procurement Manager

Date

*"Please refer to the standard terms and conditions of purchase and service which govern all orders for goods and/or services placed by the Ivanhoe Mines Group (including any division or subsidiary company thereof) ("**Company**") and all contracts and sub-contracts entered into by the Company with the counterparty to the order ("**Supplier**") for the purchase of any goods and/or the supply of any services ("**Terms and Conditions**"). This Order has been placed under the Terms and Conditions, which shall be read with the Order as containing the entire agreement between the Company and the Supplier in relation to the subject matter hereof. The Supplier shall be bound by the Terms and Conditions upon acceptance of this Order. The Terms and Conditions can be obtained from the Company's procurement department at the contact details above.*

ANNEXURE "D"

KAMOA COPPER SA
Société anonyme avec conseil d'administration

KAMOA COPPER SA
Société anonyme avec conseil d'administration

Response to RFQ

ANNEXURE "E"

KAMOA COPPER SA
Société anonyme avec conseil d'administration

Request for Quotation

ANNEXURE "F"

KAMOA COPPER SA
Société anonyme avec conseil d'administration

Schedule of Rates - Template

SCHEDULE No. 1 - GENERAL ITEMS						
Item	Description	Unit	Qty	Rate	Amount
	CONDITIONS OF CONTRACT				
	STANDARD COMMERCIAL TERMS AND CONDITIONS FOR SUPPLY OF SERVICE				
1.00	Insurances in accordance with the General Conditions of Contract	Item	1		
2.00	Contractor's superintendence during the execution of the Works	Item	1		
3.00	All charges, costs and obligations relating to the General Conditions of Contract not provided for elsewhere	Item	1		
	GENERAL REQUIREMENTS				
101.00	**DESCRIPTION OF WORKS**				
101.01	Provision of access for others to undertake works	Item	1		
101.02	Contractors programs	Item	1		
101.03	Project works sign	No.			
	102 SURVEY INFORMATION				
102.01	Survey information, control and setting out of the works	Item	1		
	103 SITE FACILITIES				
	Contractors Site Facilities				
103.01	Provision of Contractor's site facilities	Item	1		
103.02	Maintenance of Contractor's site facilities	Item	1		
103.03	Removal of Contractor's site facilities	Item	1		
	Superintendent's Site Facilities				
103.04	Provision of the Superintendent site facilities	Item	1		
103.05	Maintenance of the Superintendent site facilities	Item	1		
103.06	Removal of the Superintendent site facilities	Item	1		
	Superintendent's Living Facilities				
103.07	Provision of the Superintendent living facilities	Item	1		
103.08	Maintenance of the Superintendent living facilities	Item	1		
103.09	Removal of the Superintendent living facilities	Item	1		
103.10	Superintendent's meals	M/day			
	104 ENTRY TO LAND				
104.01	Entry to land	Item	1		
	105 WATER SUPPLIES				
105.01	Water supplies	Item	1		
	106 UTILITIES AND SERVICES				
106.01	Liaison, programming, location and protection of utilities and services	Item	1		
106.02	Relocation of utilities and services	Item	1		
	MANAGEMENT REQUIREMENTS				
	202 - TRAFFIC				
202.01	Traffic management	Item	1		
202.02	Traffic control devices	Item	1		
202.03	Traffic controllers	Item	1		
202.04	Construction, maintenance and removal of sidetracks, temporary driving surfaces and temporary pedestrian access	Item	1		
202.05	Maintenance of existing roads	Item	1		
	203 - OCCUPATIONAL SAFETY AND HEALTH				
203.01	Occupational safety and health including safety and health plans and safety and health audits	Item	1		
	204 - ENVIRONMENT				
204.01	Environmental Management Plans	Item	1		
204.02	Protection, preservation and monitoring of Aboriginal sites	Item	1		
204.03	Protection of flora and fauna	Item	1		
204.04	Fire prevention	Item	1		
204.05	Waste disposal	Item	1		
204.06	Dieback control	Item	1		
204.07	Protection of public and property	Item	1		
204.08	Pre-construction property inspections	No.			
204.09	Dust control	Item	1		
	To Summary				

ANNEXURE "G"

KAMOA COPPER SA
Société anonyme avec conseil d'administration

Service Levels – Template

No.	Performance Metric	Performance Target	Definition	Calculation	Frequency of Review
KPI	Deliverables Submitted On Time	All deliverable(s) completed by the agreed upon due date.	This KPI measure the Service Provider's adherence to the agreed upon schedule.	Deliverable completed by date	Quarterly (the KPI should be evaluated for each deliverable submitted in the quarter)

ANNEXURE "H"

KAMOA COPPER SA
Société anonyme avec conseil d'administration

KAMOA COPPER SA
Société anonyme avec conseil d'administration

Scope of Services

ANNEXURE "I"

KAMOA COPPER SA
Société anonyme avec conseil d'administration

KAMOA COPPER SA
Société anonyme avec conseil d'administration

Form of Holding Company Guarantee

(*To be completed on letterhead of Service Provider's Ultimate Holding Company*)

TO: **KAMOA COPPER SA**
1148-6 Avenue de la Libération
Quartier Golf les Battants Commune de Lubumbashi
Lubumbashi
Haut-Katanga Province
Democratic Republic of Congo
Registration Number: 6-118-N37233J

ATTN: **TO WHOM IT MAY CONCERN**

Dear Sirs,

SUBJECT: **REQUEST FOR QUOTATION NO. RFQ-KCSA-[INSERT]**

We refer to the accompanying Request for Quotation for **[INSERT]** ("Service Provider") of which we are the ultimate holding company, and hereby request Kamoa Copper SA ("KCSA") to enter into an Agreement with the Service Provider for the same. In the event of KCSA doing so and in consideration of KCSA entering into such Agreement:

1. We guarantee that the Service Provider shall duly perform all its obligations contained in the Agreement.

2. If the Service Provider shall in any respect fail to perform its obligations under the Agreement or shall commit any breach thereof, we undertake, on simple demand by KCSA, to perform or to take whatever steps may be necessary to achieve performance of said obligations under the Agreement and shall indemnify and keep indemnified KCSA against any loss, damages, claims, costs and expenses which may be incurred by KCSA by reason of any such failure or breach on the part of the Supplier.

3. Our guarantee and undertaking hereunder shall be unconditional and irrevocable and, without prejudice to the generality of the foregoing, we shall not be released or discharged from our liability hereunder by: -

KAMOA COPPER SA
Société anonyme avec conseil d'administration

3.1 Any waiver of forbearance by KCSA of or in respect of any of the Service Provider's obligations under the Agreement whether as to payment, time, performance or otherwise howsoever or by any failure by KCSA to enforce the Agreement or this instrument, or

3.2 Any alteration to, addition to or deletion from the Agreement to be performed under the Agreement, or

3.3 Any change in the shareholding relationship between ourselves and the Service Provider and our guarantee and undertakings hereunder shall continue in force until all the Service Provider's obligations under the Agreement and all our obligations hereunder have been duly performed.

4. This document shall be construed and take effect in accordance with the laws of the Democratic Republic of Congo.

Yours faithfully,

Signed: .....

Name: .....

Date: .....

For and on behalf of

.....

(Supplier's ultimate holding company)