KIBALI GOLD MINE

SCOPE OF WORK FOR ELECTRICAL EARTHING SYSTEM AUDIT

Document Title	ELECTRICAL EARTHING SYSTEM AUDIT, TESTING, INSPECTION AND COMPLIANCE ASSESSMENT
Department	Engineering
Service Required	Electrical Earthing Audit and Testing

1. INTRODUCTION

1.1 Company Presentation

Kibali Gold Mine is one of Africa's largest gold mining operations located in the north-eastern region of the Democratic Republic of Congo. The operation includes open-pit and underground mining activities supported by process plants, power generation facilities, workshops, warehouses, administration buildings, camps, water treatment facilities, fuel installations, substations, and numerous surface electrical installations.

The mine operates an extensive electrical distribution network consisting of high-voltage and low-voltage systems supplying critical production and life-support infrastructure. Maintaining an effective earthing system is fundamental to personnel safety, equipment protection, operational reliability, and regulatory compliance.

1.2 Background

Electrical earthing systems constitute one of the most critical safety components of any electrical installation. Their primary function is to provide a low-impedance path for fault currents, ensuring the correct operation of protective devices while safeguarding personnel against electric shock and protecting electrical equipment from damage. Throughout the operational life of a mining facility, earthing systems may deteriorate due to corrosion, mechanical damage, environmental conditions, soil movement, ageing of conductors or unauthorized modifications. Such deterioration can significantly reduce the effectiveness of the protection system and increase the risk of equipment failure, electrical accidents, arc flash incidents and production interruptions.

To ensure continued compliance with applicable international standards and Kibali Gold Mine's Electrical Safety Standards, the Company intends to undertake a comprehensive mine-wide audit, inspection and testing program covering all surface electrical installations and associated earthing systems.

1.3 Objective

The objective of this project is to conduct a comprehensive engineering assessment of the electrical earthing systems installed throughout Kibali Gold Mine. The assessment shall include detailed visual inspections, electrical testing, verification of earth continuity, evaluation of bonding systems, inspection of lightning protection systems and verification of compliance with applicable international standards. The study shall identify existing deficiencies, determine the operational condition of each earthing installation and provide practical engineering recommendations for corrective actions required to improve electrical safety, equipment protection and long-term

system reliability. The completed audit shall establish an accurate baseline of the mine's earthing infrastructure to support future maintenance planning and regulatory compliance.

2. SCOPE OF WORK

The Contractor shall undertake a comprehensive inspection, testing, assessment and technical evaluation of the complete electrical earthing infrastructure associated with Kibali Gold Mine surface operations. The work shall include all permanent and temporary electrical installations that form part of the mine's electrical distribution network and supporting infrastructure. The purpose of the assessment is to verify the integrity, effectiveness and compliance of each earthing installation while identifying any deficiencies that could compromise personnel safety, equipment protection or operational reliability.

The Contractor shall provide all labor, supervision, engineering expertise, calibrated testing instruments, transport, consumables and documentation necessary to execute the works in accordance with internationally recognized engineering practices. All testing shall be performed by suitably qualified personnel using calibrated equipment and approved testing procedures. Calibration certificates for all measuring instruments shall be submitted before commencement of the works.

The audit shall include detailed visual inspections, electrical testing and engineering assessments of all earthing systems associated with process plants, workshops, warehouses, accommodation camps, administration buildings, substations, transformers, switchrooms, motor control centres, generators, pumping stations, fuel storage facilities, communication towers, lighting towers, water treatment facilities, tailings installations, conveyor systems and all other surface electrical installations connected to the mine distribution network.

Where deficiencies are identified, the Contractor shall investigate the root cause, assess the associated risk and recommend practical engineering solutions. Recommendations shall distinguish between immediate safety-critical actions, medium-term improvements and long-term asset replacement requirements. The Contractor shall also identify any installations that do not comply with applicable international standards or Kibali Gold Mine engineering requirements.

3. APPLICABLE STANDARDS AND REFERENCES

All work shall be carried out in accordance with the latest editions of internationally recognized standards, applicable statutory requirements and Kibali Gold Mine engineering specifications. As a minimum, the Contractor shall demonstrate compliance with IEC 60364 for low-voltage electrical installations, IEC 61936 for high-voltage power installations, IEC 62305 for lightning protection systems, IEEE Standard 80 for AC substation grounding and IEEE Standard 81 for earth resistance

and soil resistivity measurements. Where conflicts exist between standards, the more stringent requirement shall apply unless otherwise agreed by Kibali Gold Mine.

4. CONTRACTOR QUALIFICATIONS AND EXPERIENCE

The Contractor shall demonstrate proven experience in performing electrical earthing assessments within mining, heavy industrial or comparable environments. The successful Contractor shall employ suitably qualified electrical engineers and technicians with demonstrated competency in earthing system design, inspection and testing.

All personnel assigned to the project shall possess the necessary trade qualifications, relevant certifications and practical experience required to perform the work safely and competently. The Contractor shall also provide evidence of previous projects of similar scope and complexity together with details of available testing equipment and current calibration certificates. Kibali Gold Mine reserves the right to verify the Contractor's technical capability prior to award of the contract.

5. DETAILED TECHNICAL REQUIREMENTS

The Contractor shall perform a comprehensive engineering assessment of every accessible earthing installation included within the project scope. Each installation shall be uniquely identified, inspected and tested using calibrated instruments and recognized engineering practices.

The assessment shall verify the condition and integrity of earth electrodes, earth conductors, earth pits, protective bonding conductors, equipment earth connections and lightning protection systems where applicable. The Contractor shall identify corrosion, mechanical damage, loose connections, damaged conductors, missing bonding connections, inaccessible earth pits and any other condition that may compromise the effectiveness of the earthing system.

All test results shall be accurately recorded and supported by photographs, equipment identification details, test locations and measured values. Where non-conformances are identified, the Contractor shall classify the findings according to their severity and provide practical engineering recommendations together with an indication of the priority for corrective action.

6. DELIVERABLES

Upon completion of the works, the Contractor shall submit a comprehensive Final Report documenting all activities undertaken during the project. The report shall include an executive summary, a description of the methodology employed, a complete register of all assets inspected and tested, detailed test results, photographic records, identified deficiencies, risk assessments and engineering recommendations for corrective actions.

Electronic copies of all reports shall be submitted in both PDF and Microsoft Excel formats. The Contractor shall also provide all raw test data, calibration certificates for test instruments, asset registers and any supporting documentation generated during the execution of the works.

7. QUALITY ASSURANCE AND QUALITY CONTROL

The Contractor shall implement a documented Quality Assurance and Quality Control system to ensure that all work is executed in accordance with recognized engineering practices and the requirements of this Scope of Work. All testing instruments shall possess valid calibration certificates traceable to recognized standards, and all measurements shall be undertaken by competent personnel using approved testing procedures.

The Contractor shall ensure that all recorded data is independently verified prior to submission and that all reports are complete, accurate and technically reviewed before issue to Kibali Gold Mine.

8. OWNER RESPONSIBILITIES

Kibali Gold Mine will provide reasonable access to the facilities included within the project scope and shall facilitate the necessary site inductions, permits and operational coordination required for the execution of the works. Where available, existing electrical drawings, asset registers and relevant engineering documentation will be made available to the Contractor for reference purposes.

Kibali will nominate a Project Representative who will coordinate site access, facilitate communication between operational departments and review project progress throughout the duration of the contract.

9. TENDER SUBMISSION REQUIREMENTS

To facilitate a comprehensive technical and commercial evaluation, each bidder shall submit a complete tender proposal containing the documentation listed below. Failure to provide the required information may result in the tender being considered non-responsive.

The tender submission shall, as a minimum, include the following:

1. **Curriculum Vitae (CVs) of Key Personnel**: Detailed CVs for all personnel assigned to the project, including the Project Manager, Electrical Engineer(s), Supervisors and Lead Technicians. The CVs shall demonstrate relevant qualifications, professional registrations, certifications and experience on similar projects.

2. **Previous Similar Project Experience:** Evidence of successful completion of comparable electrical earthing audit, testing or electrical engineering projects within the mining,

industrial or heavy commercial sectors. The submission shall include project descriptions, client names, contract values, execution periods and client references.

3. **Calibration Certificates for Test Equipment**: Valid calibration certificates for all electrical test instruments proposed for use during the project. Calibration certificates shall be traceable to an accredited calibration laboratory and remain valid throughout the duration of the contract.

4. **Project Method Statement**: A detailed description of the proposed methodology for executing the works, including mobilization, inspection and testing activities, resource allocation, safety measures, quality control procedures and reporting methodology.

5. **Project Schedule**: A detailed project program indicating the proposed execution sequence, major activities, milestones, anticipated completion dates and key deliverables from mobilization through to final handover.

6. **Commercial Proposal**: A comprehensive commercial proposal providing a detailed breakdown of all project costs, including mobilization, labor, engineering services, testing, reporting, equipment, consumables, travel, accommodation and any other applicable costs. The proposal shall clearly identify any assumptions, exclusions or qualifications associated with the tender.

Note: A tender clarification meeting will be held seven days following the publication of this invitation to tender. Interested bidders are requested to contact the email address below to obtain the meeting schedule and further details.

Kibali.ServiceContract@barrick.com

BARRICK

PRE-BID RISK ASSESSMENT FORM

Document Reference:	Revision Number	Original Issue Date	Review Date
BGC-CORP-FORM-002	0	January 20, 2025	January 18, 2030

Project Name: (Reference SOW)	**ELECTRICAL EARTHING SYSTEM AUDIT, TESTING, INSPECTION AND COMPLIANCE ASSESSMENT**
Project Description:	**Inspection, testing and engineering assessment of electrical earthing systems associated with all surface electrical installations at Kibali Gold Mine.**

Tasks	Hazards	Controls
Site mobilisation	Vehicle movement	Licensed drivers, defensive driving, site speed limits
Access to electrical installations	Electric shock	Permit to Work, LOTO, isolation verification, authorised personnel only
Earth resistance testing	Contact with live equipme	Confirm isolation, test for dead, use insulated tools and PPE
Opening earth pits	Slips, trips and manual handling	Barricade work area, use correct lifting techniques, housekeeping
Working around substations	Arc flash and electrical hazards	Electrical permits, arc-rated PPE, minimum approach distances
Testing around transformers	High voltage exposure	Isolation, supervision by authorised electrical personnel
Working outdoors	Heat stress and dehydration	Hydration, rest breaks, weather monitoring
Walking between facilities	Slips, trips and falls	Good housekeeping, suitable safety footwear
Use of test equipment	Damaged equipment or incorrect readings	Pre-use inspections and valid calibration certificates
Travel across the mine	Mobile equipment interaction	High-visibility PPE, radio communication, adherence to traffic management plans
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Select all the Fatal Risks present:

☑ Stored Energy	☐ Falling from Heights	☐ Lifting	☐ Blasting and Explosives	☐ Hazardous Substances and Chemicals
☐ Confined Spaces	☑ Mobile Equipment	☐ Fall of Ground	☐ Rotating Equipment	☑ Fire

Control Effectiveness:	Fully Effective
Additional actions needed before job start:	N/A
Identified Risk Level:	☐ Low ☐ Medium ☒ High ☐ Very High

Responsible	Name	Signature	Date
Technical Representative	Melchi Mulaba		2026/07/21
Safety Representative	James Kahuma		25/07/26

Appendix

Risk Ranking matrix:
Compares likelihood of the risk with the consequence level based on the consequence criteria.

*This matrix will be used to evaluate the significance of the risk and its priority for attention.

Likelihood Level	1	2	3	4	5
5	Medium	Medium	High	Very High	Very High
4	Low	Medium	High	Very High	Very High
3	Low	Medium	High	High	Very High
2	Low	Medium	Medium	High	Very High
1	Low	Low	Medium	High	High
Consequence Level	1	2	3	4	5

Likelihood criteria:
Likelihood levels will be chosen from the table below based on the probability that the expected impact selected in from the consequence criteria will be experienced.

Level	Probability
5 Almost Certain	>90%
4 Likely	50% - 90%
3 Possible	>25% - <50%
2 Unlikely	10% - 25%
1 Very Unlikely	<10%

Consequence Criteria: Consequence levels will be chosen from the table below based on the expected impact on Barrick, choosing the worst case of the consequence types that are pertinent. This should reflect the assessment of the existing controls and their effectiveness.

Level	Financial (Operating cash flow)	Shareholder Value (NPV/ Market cap)	Health and Safety	Environment	Society (Community, NGO, Government, Media)	Legal
5	>$250m	>$1b	Multiple fatalities or significant loss of quality of life to multiple people.	Severe regional impact resulting in permanent long-term impact to the environment. Immediately reportable to Government or State	Significant loss of trust by affected, national and/ or government threatening the continued viability of the operation. International and national government, NGO and media condemnation. Systemic pattern of gross human rights violations affecting multiple people.	Prolonged litigation likely. Potential jail terms and/or high fines for executives and directors. Potential very high fines for the company.
4	>$100m<$250m	>$500m<$1b	Single fatality or critical injury with a permanent negative impact to quality of life for one person	Significant impact with medium to long-term impairment and residual ecosystem effects. Regulatory agency mandated remediation and/ or monitoring over a long-term period to determine extent of adverse environmental impact. Immediately reportable to Government or State.	Community unrest and/or protest requiring intervention and substantial management attention. National and/or regional media coverage over several days and/or NGO condemnation. Individual gross human rights violation or systemic negative human rights impacts.	Prosecution of individuals and/or significant fines for individuals and/or the company.
3	>$20m<$100m	>$50m<$500m	Serious injury to one or more persons resulting in temporary negative impact to quality of life. (RDI & LTI)	Moderate impact resulting in medium – term impacts to the environment. Remediation completed in compliance with regulations over a medium-term period without any anticipated residual adverse environmental impacts. Potentially reportable to State or government, but not immediately.	Persistent community grievances, complaints, unrest or protests. National and/ or regional media coverage and/ or NGO scrutiny. Systemic or severe individual negative impacts on human rights.	Significant legislation or permit non-compliance or litigation likely resulting in settlement costs and/or fines.
2	>$1m<$20m	>$10m<$50m	Reversible injury to one person, (no lost time to work performance) but requiring medical treatment. (MTI)	Localized, minor impact within the current or planned disturbance area (or isolated offsite impacts.) Limited remediation, and/ or controls required to meet regulatory standards. Potentially reportable to State or Government but not immediately	Persistent complaints and grievances, unrest or protests. Local Media coverage. Isolated negative impacts on human rights	Legislation or permit non-compliance or litigation likely resulting in need for legal engagement.
1	<$1m	<$10m	Minor injury not affecting work performance and requiring only a single first aid treatment.	Environmental incident with an area already distributed by operations, with short-term impacts. Remediation carried out as part of routine processes. Not reportable to the government.	Minor complaints and grievances from local communities. No impact on human rights.	Minor non-compliance with legislation or permits.

	Descriptor	Guide
Control Effectiveness: A relative assessment of the degree of modification that is currently present and effective compared with that which is reasonably achievable for a particular risk.	**Fully Effective**	Controls are as good as realistically possible, both well-designed and implemented as well as they can be.
	Substantially Effective	Controls are generally well-designed and well implemented but some improvement is possible in their design or implementation.
	Partially Effective	Controls are well-designed but are not implemented that well. OR While the implementation is diligent, it is clear that better controls could be devised.
	Largely Ineffective	There are significant gaps in the design or in the effective implementation of controls – much more could be done.
	Totally Ineffective	Virtually no credible controls relative to what could be done.

Fatal Risk	Critical Controls
Stored Energy	De-energize: Identify sources of energy and ensure they are zero-state
	LOTOTO: Remember to always lock out – tag out – try out
	Guards, Barriers, and Barricades: Ensure they are in position and effective
	Lock-out Device: Use the appropriate lock out device to isolate the energy source
	Personal Lock and Tag: Have your OWN lock and tag, with unique key
Falling from Heights	Rescue Plan: Ensure a rescue plan is in place before starting work above 1.8m.
	Fall Equipment: Inspect and wear the correct fall-restraint or arrest equipment when working above 1.8m.
	Tie Off: Stay 100% tied off at all times on approved anchor points.
	Elevated Platforms: Only work from certified elevated platforms.
	Barriers: Ensure barriers are in place to precent people or objects from falling over edge; ensure exclusion zones are demarcated.
Lifting	Lift Plan: Determine how the lift will be carried out with input from all persons involved.
	Equipment and Rigging: Ensure all lifting equipment is inspected, certified, and load is secured and controlled.
	Calculate and Confirm: Analyze the weight of the load and all associated equipment parameters.
	Drop Zone: Erect barricades and exclusion zones to restrict access to the area under a suspended load or within a drop zone.
	Communication: Positive communication from a single person to operator.
Blasting & Explosives	Communication: Scheduled and effective blast notification to all site personnel.
	Blast Design: Compliance with the approved drill and blast design.
	Transport Equipment: Safely transport explosives using approved, certified, and maintained explosives-transport equipment.
	Exclusion Zones: Establish and restrict access of personnel and equipment to blast exclusion zones with barricades.
	Access Control: Lock out – tag out on stinger and blast tag boards, to ensure all individuals are accounted for.
Hazardous Substances and Chemicals	PPE: Wear correct hazardous-materials PPE in line with Safety Data Sheet (SDS)
	Access: Restrict access to authorized personnel only
	Emergency Response: Containment: and exposure measures must be on hand and working according to SDS guidance
	Detection and Alarm Systems: Correct detection devices and alarms are in place and fully functional.
	Handling and Transfer: Protection protocols are in place when handling and transferring chemicals based on SDS.
Confined Space	Rescue Plan: Formulate a rescue plan and ensure that a spotter is in place at all times.
	Permit: Ensure you have a signed and complete permit to access entry point.
	Energy Isolation: All possible energy sources have been identified and controlled per lock out – tag out – try out (LOTOTO)
	Access Control: Work area to be demarcated and access control to be managed by a spotter at all entry points.
	Atmosphere: Test and confirm atmosphere is life-sustaining and continue monitoring.

Mobile Equipment	Pre-Use Inspection: Confirm functionality of braking, steering, and safety devices.
	Parking: Follow safe, secure, and stable parking practices in designated parking areas.
	Traffic Management Plan: Adhere to road designs, rules, signage, and segregation of equipment and pedestrians.
	Berms and Windrows: Ensure that berms and windrows are installed to standard and maintained.
	Communication: Ensure positive communication is maintained at all times.
	Mobile Devices: Do not use phones, smart watches, or tablets when driving.
Fall of Ground	Workplace Inspection: Inspected, properly scaled down, and made safe.
	Geotechnical Inspection: Ensure that inspections are completed, and workplaces are continuously monitored.
	Ground Control Management Plan: Ensure that the plan is implemented and communicated.
	Barricading and Exclusion Zones: Ensure exclusion zones have been identified and maintained.
	Water Management: Establish a water management plan.
Rotating Equipment	Guards, Barriers, and Barricades: Ensure these are effective, in place, and maintained.
	Safety Devices: Ensure safety devices and interlocks have been tested and are in working condition.
	Energy Isolation: All possible energy sources have been identified and controlled per lock out – tag out – try out (LOTOTO)_
Fire	Combustible Materials Storage: Store combustible/flammable materials separately and safely.
	Ventilation: Ensure adequate ventilation in working areas and that systems are functioning and maintained.
	Fire Detection, Alarm, and Suppression: Ensure fixed and mobile equipment has functional fire detection and suppression system.
	Evacuation Plan: Be prepared and know your emergency plan, egress, refuse chamber, self-rescuer, and muster point.
	Hot Work Permit: Obtain a permit and implement the associated controls before starting work.

BOQ – ELECTRICAL EARTHING SYSTEM AUDIT, TESTING, INSPECTION AND

PRELIMINARY & GENERAL

Item	Description	Unit	Qty
1	Mobilisation of personnel, vehicles, calibrated test equipment and tools	LS	1
2	Site establishment, inductions, permits and access arrangements	LS	1
3	Project planning, kick-off meeting and review of available documentation	LS	1
4	Preparation of Project Method Statement and Risk Assessment	LS	1
5	Demobilisation and site close-out	LS	1

EARTHING AUDIT & TESTING

(To be priced on a unit-rate basis. Exact Quantities will be communicated later and may be

Item	Asset Description	Unit	Qty
1	HV Substations	Each	TBC
2	LV Substations	Each	TBC
3	Distribution Transformers	Each	TBC
4	Power Transformers	Each	TBC
5	Ring Main Units (RMUs)	Each	TBC
6	Switchrooms	Each	TBC
7	Motor Control Centres (MCCs)	Each	TBC
8	Distribution Boards	Each	TBC
9	Standby Generators	Each	TBC
10	Process Plant Buildings	Each	TBC
11	Workshops	Each	TBC
12	Warehouses	Each	TBC
13	Administration Buildings	Each	TBC
14	Camp Buildings	Each	TBC
15	Pump Stations	Each	TBC
16	Water Treatment Facilities	Each	TBC
17	Fuel Storage Facilities	Each	TBC
18	Conveyor Systems	Each	TBC
19	Crusher Stations	Each	TBC
20	Communication Towers	Each	TBC
21	Lighting Towers	Each	TBC
22	Lightning Protection Systems	Each	TBC
23	Earth Pits	Each	TBC

24	Individual Earth Electrodes	Each	TBC
25	Earth Grid Systems	Each	TBC
26	Protective Bonding Systems	Each	TBC

REPORTING & ENGINEERING DELIVERABLES

Item	Description	Unit	Qty
1	Asset Register	LS	1
2	Earth Resistance Register	LS	1
3	Photographic Register	LS	1
4	Defect Register	LS	1
5	Risk Assessment and Classification	LS	1
6	Final Technical Report	LS	1

Unit Rate	Amount

e adjusted during execution.)

Unit Rate	Amount

Unit Rate	Amount