



REPORT OF THE PLAN FOR THE SUSTAINABILITY OF THE ICGLR ANALYTICAL LABORATORY

PREPARED BY

Arthemie Ndikumana
Manager AFP Laboatory

Mungyereza Ham
ICGLR Director of Admin and Finance

NOVEMBER 2022

TABLE OF CONTENTS

1. INTRODUCTION	3
2. THE ICGLR	3
3. BACKGROUND OF THE AFP ANALYTICAL LABORATORY	4
4. PROBLEM CONTEXT	5
5. METHODOLOGY	6
5.1 Meeting and discussions with AMGC	6
5.2 Attendance	7
5.3 Proceedings of the meeting	8
5.4 Visit and presentation of the AFP lab facilities	8
6. POTENTIAL CAPACITY OF THE AFP LABORATORY	12
6.1 Revenues and cost analysis	12
6.3 Cost analysis of the AFP laboratory and related infrastructure	13
6.3 Plenary session and roadmap for commercialization of AFP laboratory	14
6.4 Analysis of revenue and expenditure trends	15
7. ROLES OF THE ICGLR SECRETARIAT AND AMGC	16
7.1 The ICGLR Secretariat	16
7.2 The AMGC	16
7.3. Financial Management arrangements	16
8. ROAD MAP	17
9. CONCLUSION	19

REPORT OF THE PLAN FOR THE SUSTAINABILITY OF THE ICGLR ANALYTICAL LABORATORY

1. INTRODUCTION

In the framework of the follow up on the consultation meeting held in February 2022 between ICGLR, BGR and AMGC on the implementation and operationalization of the AFP Regional Analytical laboratory, the ICGLR delegation led by the Director of Administration and Finance Program, Mr. Ham Bungurure Mungyereza accompanied by the Head of Analytical Fingerprint Management Unit, Mrs. Arthemie Ndikumana had working sessions at African Minerals and Geosciences Centre (AMGC) from 10th to 13rd October with AMGC and BGR to discuss various issues including management and technical aspects along the commercialization for the sustainability of the AFP Regional Analytical laboratory hosted at AMGC.

This report has been written against the background that the Analytical Fingerprint Laboratory (AFP) has not been incorporated as part of the audit of the Mineral Exporting Firms by the Secretariat and further that it has potential market which can be tapped into in order to make the Laboratory sustainable in delivering services to the Member States.

2. THE ICGLR

The International Conference on the Great Lakes Region (ICGLR) is an inter-governmental organization of the countries in the African Great Lakes Region. Its establishment was based on the recognition that political instability and conflicts in these countries have a considerable regional dimension and thus require a concerted effort in order to promote sustainable peace and development. Most notable among the conflicts that have had cross-border impacts or origins are the 1994 Rwandan genocide that led to the loss of more than 800,000 lives, and the political instability in DRC. These conflicts constituted a major threat to international peace and security. The organization is composed of twelve member states, namely: Angola, Burundi, Central African Republic, Republic of Congo, Democratic Republic of Congo, Kenya,

Uganda, Rwanda, Republic of South Sudan, Sudan, Tanzania and Zambia. Its founding history began in 2000 when the United Nations Security Council, as stated in its resolutions 1291 and 1304, called for an International Conference on peace, security, democracy and development in the Great Lakes region. Later that year, the Secretariat of the International Conference was established in Nairobi, Kenya, under the umbrella of the United Nations and the African Union. In November 2004, the eleven Heads of State and Government of the member countries unanimously adopted the Declaration on Peace, Security and Development in the Great Lakes region in Dar es Salaam, Tanzania. This Dar-es-Salaam Declaration presented a political statement with the intention to address the root causes of intractable conflicts and constraints to development in a regional and innovative approach.

The ICGLR Secretariat which is the technical arm has the mandate the following functions:

- Ensuring the implementation of the decisions of Summit and the Inter-Ministerial Committee, and reporting on it;
- Ensuring implementation of the Pact and execution of the Programs of Action, Projects and Protocols;
- Organizing the meeting of the Summit, the Inter-Ministerial Committee and of the other conference structures and forums;
- Harmonizing of co-operation with the partners and relevant regional economic communities.
- Establishing a work program and budget relating to its activities ensuring of their implementation.

3. BACKGROUND OF THE AFP ANALYTICAL LABORATORY

This laboratory was established at AMGC in Dar es Salaam, Tanzania on the decision of the ICGLR Regional Inter-Ministerial Committee (RIMC) in Kampala, Uganda in December 2012, and ICGLR Secretariat, the AMGC and BGR signed a tripartite memorandum of Understanding in 2014 on the establishment and management of the analytical laboratory. The refurbishment and the equipment procurement were completed in 2017 and the laboratory was officially inaugurated by the Tanzania Prime Minister Hon. Kassim Majaliwa Majaliwa in June 2018.

In preparation for the phasing out of the ICGLR-BGR Support Project and for the sustainability of the AFP Analytical laboratory, the ICGLR Secretariat and AMGC signed in 2020 a bilateral MoU on the commercialization of the AFP Regional Analytical Laboratory services.

The Director General of AMGC deplored that since 2018, the AFP laboratory had not reached its full operation as there were no AFP samples that are analyzed, and no commercial services offered by the laboratory despite several requests from the Member States.

With regards to the analysis of AFP samples, the BGR explained that the only samples analyzed by the laboratory are reference for feeding the AFP database and ICGLR MS are the ones to request of the verification of origin of their minerals, what is not the case maybe there have been no doubts or disputes around the origin of minerals which could lead to the need to carry out AFP analyses. Concerning other samples not related to AFP, BGR team explained that some of the analyses that were requested such as uranium determinations could not be done due to political and security reasons as well as technical issues that could damage analytical equipment.

4. PROBLEM CONTEXT

The Analytical Fingerprint (AFP) is an important tool in fighting illegal exploitation of Natural resources in the Great Lakes Region. Its one of the key auditing tools in identifying the origins of conflict Minerals. The AFP method was developed with support from BGR since 2006 as a contribution towards the calls by the UN for a scheme to verify the origin of “conflict minerals” mined in the eastern Democratic Republic of the Congo and neighboring countries. As part of technical cooperation efforts within the regional German support program running from 2011-2022, BGR supported the International Conference on the Great Lakes Region (ICGLR) to make use the AFP method available to the ICGLR including a transfer of skills, technology, and management into the region. The ICGLR Analytical Fingerprint (AFP) was specifically established as a scientific tool to check the documented origin of tin, tungsten, and tantalum (3T) ore mineral shipments.

An AFP Management Unit (AMU) was established in Bujumbura in 2013 and has been fully integrated into the Technical Unit on Natural Resources of the

ICGLR secretariat in 2016. Reference sampling programs are implemented in Rwanda, the DRC and Burundi, and in-country petrographic laboratories have been established in Kigali, Bukavu and Bujumbura to prepare samples. A laboratory (hosting SEM and LA-ICP-MS units) to perform sample analysis were inaugurated in June 2018 at the African Minerals and Geosciences Centre (formerly SEAMIC) in Dar-es-salaam. AFP shall is currently applied as an optional forensic tool in the frame of audits or risk assessments of mineral supply chains associated with conflict-affected or high-risk areas.

Following its establishment at the at the African Minerals and Geosciences Centre (AMGC) in Dar Salaam in 2018 the AFP has been non-functional to the adverse effects of Covid 19, being an optional audit/assessment tool for audit and the lack of a plan/strategy for widening its functionality.

5. METHODOLOGY

The following methodology was applied to come up with this report.

5.1 Meeting and discussions with AMGC

In his introductory remarks, Mr. Shaddad asked for apologies for the delay and in his capacity as Director-General of AMGC welcomed the ICGLR delegation and thanked the ICGLR Secretariat for arranging the working sessions in his institution which is hosting the ICGLR Analytical Laboratory under the Regional Certification Mechanism framework within the Regional Initiative on Natural Resource of ICGLR Member States.

The ICGLR Director of Administration and Finance, Mr. Ham Bungurure Mungyereza thanked the AMGC Director-General and technical team members representing the ICGLR-BGR Regional Project for accepting the ICGLR's working sessions for visiting the AFP analytical laboratory facilities and to discuss issues for common understanding about the implementation of AFP laboratory activities as well as its utilization in the framework of the future sustainable way. He also mentioned that this visit is like a follow up on the consultation meeting held in February 2022 when they are some activities suggested to be done. This is a good opportunity to make concrete steps and action plan/roadmap. Concerning the management issues raised by the AMGC director general, Mr. Ham Bungurure Mungyereza drawled their attention to be

more focused on strategic issues for the sustainability of the lab and promised that the ICGLR Secretariat will enhance close relationships with AMGC and BGR in Dar es Salaam.

5.2 Attendance

The following attended the working sessions and plenary session in which the final report was presented:

(a) AMGC Management:

- (i) Mr. Ibrahim Shaddad, Director-General
- (ii) Mr. Charles Buteta, Quality Manager and Ag. Manager of Chemical & Environmental Department
- (iii) Mr. Gwakisa Mwaitete, Finance and Administration Manager
- (iv) Mr. Michael Clovis, Geochemist appointed for AFP analytical laboratory.

(b) The ICGLR delegation:

- (i) Mr. Ham Bungurure Mungyereza, Director of the Administration and Finance Program, Head of Delegation
- (ii) Mrs. Arthemie Ndikumana, Head of the AFP Management Unit.

(c) The ICGLR-BGR Regional Project:

- (i) Mr. Wilhelm Schink, BGR-AFP Statistician; and
- (ii) Mr. Timo Gawronski, BGR-AFP expert on the AFP laboratories.

b)



Group photo of participants to the working sessions at AMGC boardroom

5.3 Proceedings of the meeting

As per the agenda, the following items were discussed:

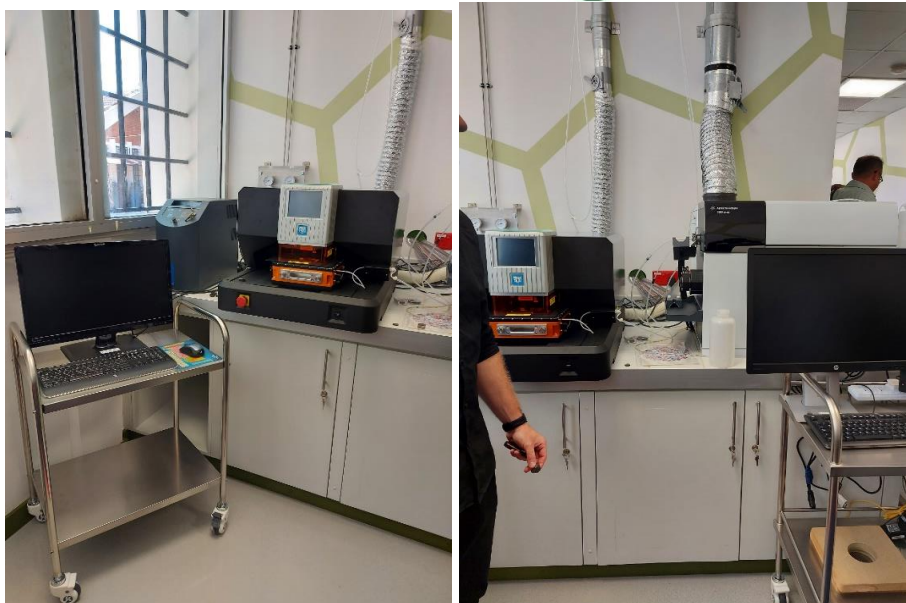
- (a) Introduction and Objectives of the visit
- (b) Background to Analytical Fingerprint Laboratory/AMGC/BGR
- (c) Visit and presentation of the AFP laboratory facilities
- (d) Analysis of the cost structure
- (e) Discussion of commercialization potential
- (f) Work Plan/Roadmap

5.4 Visit and presentation of the AFP lab facilities

The aim of the visit to the analytical laboratory is to know the whole infrastructure of the laboratory and have a good understanding of the cost related to its maintenance as well as the potential analysis that can be performed by the laboratory.



This is the scanning electron microscope (Tescan Integrated Mineral Analyzer-TIMA). It generates image with different colors according to the type of minerals and the legend as well as mineral composition. The analytical capacity is one sample in 20 minutes, 14 samples per day.



Laser Ablation inductively coupled plasma mass spectrometer (LA-ICP-MS). This equipment is made by two system, the Laser Ablation in left for the identification of minerals to be analyzed for geochemical by MS (Agilent 7900 inductively coupled mass spectrometer) to give signature. The analytical capacity is 2 samples fully analyzed by LA-ICP-MS



New equipment machine: UPS put in place for controlling the humidity in the analytical lab (left) and a machine connected to the mass spectrometer for water analysis (right)



For the back up and to prevent the power cut, the solar panel system was set up as well as the full generator. The system needs to be always ongoing even if there is no sample analysis.



The sample preparation laboratory was also visited in the frame of cost analysis. The scope of this laboratory is different to the laboratories installed in other countries for the analytical fingerprint even if the equipment is the same.

6. POTENTIAL CAPACITY OF THE AFP LABORATORY

In addition to its major role of checking the documented origin of tin, tungsten, and tantalum (3T) ore mineral shipments in the GLR, the AFP based the AMGC has the capacity to provide services in the following areas: water analysis; analysis of single mineral grains; soil and rock samples; automatic mineral identification from rocks; ores and concentrates; grainsize distribution (low resolution); grain size distribution (high resolution); pore volume determination; liberation grade determination; selective EDX element spectra acquisition; semi-micrographs, and training.

The above services have substantial demand from the rising industrial, service and research programs from the region and the world at large. Already demand for the above services has been exhibited from various customers but due to lack of a strategy/plan and standard operating procedures, the above demand for services has not been given attention.

6.1 Revenues and cost analysis

There are two components:

- (a) The applications related to the analytical fingerprint: this depends on the political will of ICGLR member states applying the AFP. The only applications are based on the ICGLR third party audits.
- (b) The AFP lab sustainability will rely on the commercialization of its activities to the public and private sectors across ICGLR and AMGC member states and the continent. Following the recommendations from the consultation meeting of February 2022, the AMGC and BGR had established the costs of different AFP Lab analyses; the team worked on the cost estimation and realistic cost according to the potential application and clients per year.
- (c) For the samples that need to be prepared before the analysis, the cost of the preparation and facilities were considered.

Table 1 below shows the potential revenue sources which shows that the AFP laboratory can generate USD 203,350 in the first year of application with an initial contribution of 60,000 from ICGLR Contribution.

TABLE 1: ESTIMATED REVENUE

AFP	1	30 audits = 30 samples	\$ 1,000	30	\$ 30,000
MS contribution	1	Member states contribution	\$ 5,000	12	\$ 60,000
LA-ICPMS	1	water analysis	\$ 25	300	\$ 7,500
	2	analysis of single mineral grains	\$ 150	50	\$ 7,500
	3	Soil and rock samples	\$ 75	240	\$ 18,000
	4a	training (LA-)ICPMS	\$ 1,600	15	\$ 24,000
	4b	advanced training LA-ICPMS	\$ 2,000	5	\$ 10,000
SEM	1a	Automatic mineral identification from rocks, ores, concentrates	\$ 95	60	\$ 5,700
	1b	Grain size distribution- Low Resolution	\$ 80	10	\$ 800
	1c	Grain size distribution- High Resolution	\$ 120	25	\$ 3,000
	1d	Pore Volume Determination	\$ 110	50	\$ 5,500
	1e	Liberation Grade Determination	\$ 110	25	\$ 2,750
	2	Selective EDX Element Spectra Acquisition	\$ 50	10	\$ 500
	3	Semi micrographs	\$ 82	50	\$ 4,100
	4	Training SEM	\$ 1,600	15	\$ 24,000
		TOTAL ESTIMATED REVENUE			\$ 203,350

6.3 Cost analysis of the AFP laboratory and related infrastructure

The cost overview analysis includes the following cost elements:

- (d) The procurement equipment costs,
- (e) Service contracts for the maintenance of analytical equipment and related infrastructure,
- (f) Consumables made mainly by gases for analytical equipment,
- (g) Operating costs: staffing (chemist and driver), utilities (water, electricity, car maintenance and fuel), security and governmental taxes.

After a discussion on the secondment of the chemist from the Tanzanian Ministry of Minerals, it was agreed that a delegation of AMGC and ICGLR visited Tanzanian Ministry of Minerals through the Ministry of Foreign Affairs and East African Cooperation to remind the commitment of Tanzania Government during the AMGC governing council in Khartoum in 2013 to

second a chemist to work in the AFP analytical laboratory without charges on the side of AMGC.

BGR will take the opportunity to discuss with the ministry of minerals other issues such as BGR registration in Tanzania and BGR will be recognized as a donor of AMGC and could be able to handle issues related to the establishment of BGR experts in Tanzania.

Concerning the service contracts for analytical equipment, which is very expensive, we need to train the chemist (user) on the instrumentalization to understand instrument, also to be able to detect a problem and solve it or be able to warn or call for a technician in the frame of saving money and time.

6.3 Plenary session and roadmap for commercialization of AFP laboratory

The plenary session discussed activities and timeline implementation as well as the responsible institutions, using the table of potential incomes.

The excel sheet of the roadmap is attached and part of this reports.

The roadmap also mentioned some general ideas such as the preparation step of samples to be analyses and the related infrastructure. It was suggested to use the existing areas for example the environmental laboratory, so that the depreciation of the building to be considered.

The AMGC asked also to consider the management project fees for the institution for facilitating project administrative procedures.

On the long-time basis, there is a need to have sample preparation laboratory for weight samples and the recruitment of the second chemist in the frame of the sustainability of the laboratory.

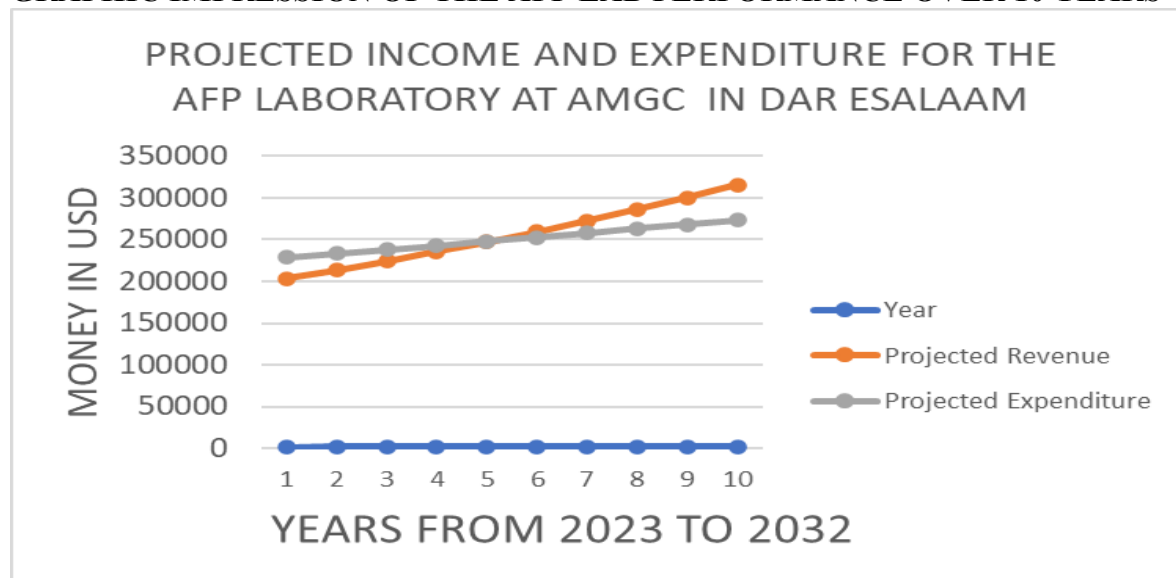
TABLE 2: ESTIMATED COST EXPENDITURE	AMOUNT IN USD
Service Contract Costs	74,344
Consumables	1,355
Operating Costs	53,399
Provision for new Equipment	99,883
TOTAL	228,980

6.4 Analysis of revenue and expenditure trends

After the analysis of the trend of performance of the revenues and expenditures over the period of 10 years, the following observations are relevant for mention.

- Initially, ICGLR needs to put in some capital of not less than USD 60,000 to enable the project to start off
- Progressively, the above contribution would be reduced to zero and later the Laboratory would be self-supporting and would even be able to recoup its capital costs.
- There is a large market for the above services and the revenue is expected to rise exponentially.
- The prospects for the laboratory to attract much more money are very high since it has limited competition on the continent of Africa.

GRAPHIC IMPRESSION OF THE AFP LAB PERFORMANCE OVER 10 YEARS



Year	Projected Revenue	Projected Expenditure	Projected NET INCOME
2023	203,350	228,980	- 25,630
2024	213,518	233,560	- 20,042
2025	224,193	238,231	- 14,038
2026	235,403	242,995	- 7,592
2027	247,173	247,855	- 682
2028	259,532	252,813	6,719
2029	272,508	257,869	14,640
2030	286,134	263,026	23,108
2031	300,441	268,287	32,154
2032	315,463	273,652	41,810
TOTAL	2,557,714	2,507,268	50,446

7. ROLES OF THE ICGLR SECRETARIAT AND AMGC

The ICGLR Secretariat and the AMGC will need to share responsibilities in order to achieve the objectives of the AFP Laboratory. Below are some of the major responsibilities to be shared by the two institutions.

7.1 The ICGLR Secretariat

- (i). This will provide overall guidance on the operations and policies of the Laboratory.
- (ii). Carry out regular supervision on quarterly basis on the performance of the laboratory in general including the financial performance.

7.2 The AMGC

The AMGC will be responsible day today management of the AFP laboratory. It will be responsible for carrying out the following activities.

- (i). Collecting revenue and ensuring that it is deposited on the agreed upon bank account which will be specifically opened and designated for this purpose.
- (ii). Delivering Services in the AFP laboratory to ensure efficiency, economy, and effectiveness of its operations.
- (c). Procurement of all materials, consumables, repairs, rehabilitations, and maintenance in accordance with the agreed procedures.
- (d). Develop and review standard operating procedures (SOPs) and other guideline for concurrence or review by the ICGLR.
- (e) Preparation and submission of quarterly reports to the ICGLR Secretariat in respect of the finances and activities of the AFP.
- (f). Managing, supervising and paying the staff of the AFP in a manner that promotes efficiency, economy and effectiveness of the operations of the AFP.
- (g). Managing the operations of the bank account through reconciliations and submission of monthly reports in a format provided by the ICGLR Secretariat.

7.3. Financial Management arrangements

A bank account shall be opened in the Republic of Tanzania on which the all the funds collected for the above services shall be banked. The ICGLR Secretariat and AMGC shall be joint signatories to the bank account. The money collected shall majorly be for purpose of funding the operations of the AFP laboratory, including payment of salaries and applicable allowances for the agreed upon staff.

In the situation where there are funds in excess of the recurrent needs of the labour, such funds shall be reserved AFP system enhancement and rehabilitation.

All funds collected for the purpose of the AFP Laboratory shall be through the bank account. No revenues or any other income relating to this AFP Laboratory shall be authorized to be spent on cash basis without first banking them.

8. ROAD MAP

A road map for the implementation of the project was unanimously agreed upon between the experts and the management of AMGC and the ICGLR Representatives as detailed in Table 3 below.

Broad area	Topic	Activity	indicative time	Responsible party
further AFP applications	30 audits = 30 samples	sensitize Audit Committee, Auditors, mine inspectors and companies	Jan-23	ICGLR
		set up budget for some AFP tests	Dec-22	ICGLR
		update AFP documents (brochures, manual)	Mar-23	ICGLR, BGR
		update Audit Committee documents	May-23	ICGLR, BGR
	MS contribution	Bring to the attention of RIMC	Dec-22	ICGLR
LA-ICPMS	water analysis	5 days specific training	Jan-23	BGR, AMGC
		contact potential customers: TBS, Ministry of Water/Environment, Universities, other agencies	Nov-22	AMGC, BGR
		purchase water distillery (\$25,000)	Apr-23	BGR, AMGC
		obtain consumables	Apr-23	BGR, AMGC
		SOPs (compare with existing one)	Jan 2023 (Apr 2023)	AMGC, BGR
	Soil and rock samples	obtain microwave digester (\$20,000)	Apr-23	BGR, AMGC
		obtain consumables (precleaned acids, ...)	Apr-23	BGR, AMGC
		SOPs	May-23	AMGC, BGR
	analysis of single mineral grains	obtain standards and build up reference material library	Apr-23	BGR, AMGC
	training (LA-ICPMS)	develop curriculum	Feb-23	AMGC, BGR
		perform mock trainings	May-23	AMGC, BGR
	advanced training LA-ICPMS	develop curriculum	Sep-23	BGR, AMGC
		perform mock trainings	Jan-24	AMGC, BGR

SEM	Automatic mineral identification from rocks, ores, concentrates	SOPs	end of Nov 2022	AMGC, BGR
	Grain size distribution- Low Resolution	training of technicians of AMGC to produce polished thin sections for SEM analysis	Mar-23	AMGC, ICGLR, BGR
	Grain size distribution- High Resolution			
	Pore Volume Determination			
	Liberation Grade Determination			
	Selective EDX Element Spectra Acquisition	SOPs	end of Nov 2022	AMGC, BGR
	Semi micrographs	SOPs	end of Nov 2022	AMGC, BGR
	Training SEM	develop curriculum	Jan-23	AMGC, BGR
generic		perform mock trainings	Mar-23	AMGC, BGR
		prepare training samples	Dec-22	AMGC, BGR
		contact Ministry of Minerals Tanzania concerning provision of chemist for AFP lab	Dec-22	ICGLR & AMGC
		smoothen the flow of AFP samples (import & export) in the region concerning custom waivers	Dec-22	AMGC, ICGLR
		check availability of service contracts for analytical equipment	Feb-23	BGR
		reactivate tripartite account	Jun-23	AMGC & ICGLR
		review MoU	May-23	AMGC, ICGLR, BGR
		produce advertisement material unrelated to AFP	Jan-23	AMGC, BGR
		update websites of AMGC and ICGLR	Feb-23	AMGC, ICGLR
		participate in meetings, exhibitions, fairs, ...	Feb-23	AMGC, BGR
		consider to reactivate membership TNZ Chamber of Mines	May-23	AMGC
		laboratory accreditation	Nov-22	BGR, AMGC

		after BMZ commissio n	AMGC, ICGLR, BGR
	management cost		
	depreciation cost AFP lab building	Oct 22	AMGC
	Building of chemical sample preparation laboratory	Jul-23	BGR, AMGC

9. CONCLUSION

This project was concluded to be highly feasible as long as there is initial capital injected of not less than 60,000 in the first year of operation and there is high quality of the services and adequate supervision.

Prepared by

Arthemie Ndikumana
Head of AFP management Unit

Mungyereza Ham
ICGLR Director of Admin and Finance

Date: 20th October 2022