



MINISTRY OF ENERGY AND MINERAL DEVELOPMENT



DIRECTORATE OF GEOLOGICAL SURVEYS AND MINES

P.O. Box 9, ENTEBBE



Geothermal Resources Exploration at Panyimur

PERFORMANCE REPORT FOR FY 2021/22

JULY, 2022

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DGSM Top management



AG. DIRECTOR/ DGSM



AG. COMMISSIONER/GSD



COMMISSIONER/MD



COMMISSIONER/GRD

ACRONYMS

AG	Attorney General
AAS	Atomic Absorptions Spectrophotometer
ACP	African Caribbean Pacific
ASM	Artisanal and Small-scale Miners
CoC	Chain of Custody
DGSM	Directorate of Geological Survey and Mines
EU	European Union
GoU	Government of Uganda
GRD	Geothermal Resources Department
GSD	Geological Survey Department
H.E	His Excellence
ICGLR	International Conference on the Great Lakes Region
IT	Information Technology
KENAS	Kenya Accreditation Service
Ltd	Limited
MD	Mines Department
MDA	Ministry Department Agency
MFPEd,	Ministry of Finance Planning and Economic Development
MoFA	Ministry of Foreign Affairs
MOU	Memorandum of Understanding
MTWA	Ministry of Tourism, Wildlife and Antiquities
MW	Mega Watts
MWAMID	Mineral Wealth and Mineral Infrastructure Development
NEMA	National Environment Management Authority
REE	Rare Earth Elements
TGH	Temperature Gradient Hole
UDC	Uganda Development Corporation
UK	United Kingdom

UNDP United Nations Development Program
UWA Uganda Wildlife Authority
XRF X-ray Fluorescence

EXECUTIVE SUMMARY

The Directorate of Geological Survey and Mines is mandate to *Establish, Promote the Development, and Strategically Manage and Safeguard the Rational and Sustainable Exploitation and Utilization of Mineral Resources for Social and Economic Development.*

Key priority areas that the Directorate implements include:

- (i) Providing a conducive Legal and Regulatory framework to boost investment in the Mineral Sector, spur industrial development, job creation and poverty reduction;*
- (ii) Institutional and human resource capacity building to harness optimal benefits from the mineral resources;*
- (iii) Promoting and monitoring mineral resources exploration, development and exploitation in order to contribute to socioeconomic development of Uganda;*
- (iv) Promoting Health and Safety in the mining industry, and the people of Uganda through geohazards mapping, and*
- (v) Promoting Regional and International cooperation for research and development in the mining industry.*

PROGRESS ON LEGAL AND REGULATORY FRAMEWORK

The Mining and Minerals Bill: The Mining and Minerals Bill was passed by Parliament on 17th February 2022, and was forwarded to H.E the President of the republic of Uganda for assent. However, it was later returned to Parliament for further scrutiny before assenting to it.

The Geothermal Policy draft: The draft geothermal policy was incorporated in the National Energy Policy still under review. However, regulation of geothermal resources for direct use is to be addressed by the Mining and Minerals Act, while production of electricity shall be regulated by the Electricity Act.

The communication Strategy: The communication strategy was completed and is ready for implementation.

PROGRESS ON INSTITUTIONAL AND HUMAN RESOURCE CAPACITY DEVELOPMENT

Infrastructure Capacity development: Included rewiring of the generator to pass through the power stabilizer, Equipping of the Mineral Laboratories, procurement of a new drilling Rig, construction of Mineral Beneficiation

Centres in Ntungamo (99%) and Fort Portal (99%). Others included purchase of a portable hammer drill for shallow temperature surveys particularly in areas with hard rock environment, and PPE including mapping coats, camping tents and gazebo tents.

Human Resources Capacity: One (1) Officer completed her MSc degree in Geoinformation Science at Makerere University, Uganda, and Nine (9) other Officers continue pursuing their Masters' degrees in South Africa (1), United Kingdom (2), Japan (1) and Uganda (5). Also, short term trainings including in-house coaching, mentoring, workshops, conferences, presentations, training of internship students, and preparation for retirement of staff were undertaken.

PROGRESS ON PROMOTING AND MONITORING MINERAL RESOURCES EXPLORATION AND DEVELOPMENT

Mineral exploration: involved supervision of the aerial geophysical survey and data acquisition in Karamoja region whose progress is magnetics (97%), radiometric (97%), and gravity (100%). Geological Survey of Karamoja at 1:250,000 scale under the Karamoja aerial survey project was completed in December, 2021 and the map is in place.

Investigation of Kirwa wolfram potential and data collection on sites for the planned drilling exercise in the 10 iron ore prospects of Southwestern Uganda (Kigezi region) was also undertaken.

Mineral Sector Promotion: DGSM continued with daily sector promotion through geodata dissemination at DGSM Offices, website and geodata portals. The sector was also promoted at various fora including Dubai Expo 2021, Africa Down Under 2021 in Perth, Western Australia, Mining Indaba Conference 2022 in Cape Town, South Africa, 10th Annual Mineral Conference 2021 at Serena Hotel among others. A compilation on opportunities in the mineral sector was compiled for state house.

Geothermal exploration: Geothermal Resources exploration included Geological structural mapping in Panyigoro areas around Panyimur Prospect and results suggest a geothermal potential in the area.

A joint tour of geothermal fields by MEMD, MFPED & MTWA informed the decision to develop a number of geothermal areas for spas and swimming pools to promote tourism by the MTWA.

Temperature measurements of Kibiro TGH revealed an average temperature between 70°C and 350°C well above the global 30°C implying presence of heat in the subsurface at Kibiro.

A draft Grant Contract was drafted and submitted to the African Union Commission-Geothermal Risk Mitigation Fund (AUC-GRMF) for funding a four (4) Temperature Gradient Holes (TGH) drilling programme at Panyimur. The draft Grant Contract is being reviewed by the AUC. The grant for Kibiro is pending approval of and ESIA by NEMA.

Reconnaissance survey of the Kanangorok geothermal area in Karenga District, Karamoja region was undertaken. The prospect is believed to be fault controlled deep-circulation system. The area has been proposed for detailed surface studies under the Karamoja Airborne geophysical survey project.

Follow up surveys on six (6) geothermal areas in Rukungiri and Kanungu districts to update their potential for detailed studies. The areas include Kiruruma in Kanungu district, and Ihimbo, Kanyinabarongo, Minera, Rubabo and Birara in Rukungiri district. The data collected includes status of electricity connection networks, current direct uses of geothermal, change in physical parameters of the hot springs (temperatures, conductivity, TDS, flow rates etc.). Results shall help in appraising the prospect for detailed investigations.

Drilling of Panyimur Temperature gradient (TGH) commenced in June, 2022 following improvement and refining of the geothermal conceptual model of Panyimur by using results of MSc studies of two (2) DGSM staff who recently graduated in Earth Resources Engineering at Kyushu University in Japan. The first hole intercepted an aquifer at close to 300 meters discharging warm water at a temperature of 40°C, confirming the presence of heat in the subsurface. Other holes are to be drilled in FY2022/23.

Geothermal Promotions: included a talk show about geothermal energy development in Uganda to fifteen (15) staff of African Center of Media Excellence at Bunga in Kampala. This was meant to enhance understanding of benefits of geothermal energy development in Uganda. Also, before drilling at Panyimur, the local authorities and community including land owners were sensitized. The land owners and the cultural institution were compensated for the crops on the drilling sites and the temporally roads where the drilling trucks would pass.

Licensing status: As at 30/06/2022, the number of active licences was seven hundred thirty (730) representing about 5.2% improvement in FY2021/22 compared to FY 2020/21. This was mainly attributed to the Blasting Certificates issued during the FY after full reopening of the country economic activities.

Production: Mineral production (Table 2) increased by 17% in 2021/22 compared to that of 2020/21. This was attributed to increased production of iron ore for local consumption as well as export by Kamuntu Investments Ltd.

The value of production of Iron ore increased from 2.6 Billion in 2020/21 to 79.6 Billion in 2021/22.

However, there was a general decrease in production of regularly mined minerals such as Limestone (34.6%), Pozzolana (58%), Kaolin (93.2%) for cement manufacture, possibly due to import of clinker and decreased demand for construction materials due current hard economic times globally.

Exports: The Value of exports for FY2021/22 was eighteen Billion, four hundred ninety-four Million, Nine hundred ten thousand shillings (**UGX 18,494,910,000**). Other than the iron ore exports by Kamuntu Investments Ltd, there were no mineral exports reported due to ban on raw mineral exports in quest for value addition for the country to have optimal benefits from its mineral resources. The Ban of export of unprocessed miner ore was lifted by H.E the President of Uganda for Kamuntu investments Ltd so that the company could fulfill an earlier contract for supply of iron ore to a foreign investor.

Imports: There were no Mineral imports during the year. This was mainly attributed to the limited market for minerals in Uganda besides the global after effects of Covid-19 on economy such as high operational costs due to high prices of commodities.

Non-Tax Revenue (NTR):

NTR dropped by 13.9% during FY2021/22 compared to that of FY2020/21. NTR has been decreasing for the last five FYs, and this is attributed mainly to: The ban on export of unprocessed minerals ores which affect mining and exploration activities, the global Covid-19 Pandemic which continue to adversely affect the exploration and mining activities globally, Temporary withdrawal of DGSM's licensing administration role during the FY2021/22 by AG's Office, when the Mining and Minerals Bill was passed, and Insecurity in Karamoja Region which has discouraged exploration and Mining activities in that mineral province.

To improve on the NTR generated therefore, there is need: to intensify mineral sector development promotions globally so as to attract investment in the mineral sector, since it is government's interest to promote value addition other than export of unprocessed ores, For DGSM to continue with its Licensing administration role till the Passed Mining and Minerals Bill is assented to into law, and For government to improve the security situation in Karamoja region so as to provide a conducive investment environment.

PROGRESS ON PROMOTING HEALTH AND SAFETY IN THE MINERALS AND MINING INDUSTRY

Kilembe Flood Management Plan: A trip to Kasese with the Inter-Ministerial Committee on Flooding to assess the impact of flooding in Kasese District on 30th July, 2021 was made to inform the flood management plan.

ESIA for Panyimur: Final Environmental and Social Impact Assessment (ESIA) Reports for Kibiro and Panyimur submitted to NEMA in June 2021 were reviewed and a Certificate of approval for Panyimur granted to the MEMD.

Environmental monitoring at Kibiro: The GRD continued with environmental monitoring at Kibiro. It was found out that the water levels of Lake Albert are retreating, with one of the Temperature Gradient Holes which had been submerged reappearing on shore. One TGH remains submerged. Monitoring of gases did not detect any dangerous gases around the TGH indicating that the environment is free of toxic gases. Plants around the TGH also show no stress

Earthquake monitoring: The National Seismic Network was maintained and operated. The seismic network recorded thirty-three (33) Earthquake events of which six (6) events originated (epicentres were) in Hoima, Rukungiri, Kasese, and Fort Portal. The caution as earthquake events become more common in the country is that building plans and or feasibility studies to inform construction designs should be carried out before the projects commence.

Personal Protective Equipment: including mapping coats, camping tents and gazebo tents were procured for GRD. DGSM also in collaboration with PSFU and Ministry of Trade, Industries and Corporation distributed Personal Protective Equipment (reflector jackets, Hammers, helmets, gum boots) to the women-led mining groups in Kasese district to enhance production.

Equal opportunities and gender issues: Gender mainstreaming in the mineral sector was undertaken. Sensitization of miners on issues of environment, health and safety, and gender mainstreaming in mining sector was undertaken in Kabarole, Busia, Bugweri, Namayingo districts.

PROGRESS ON PROMOTING REGIONAL AND INTERNATIONAL COOPERATION

The Directorate continued to cooperate with regional and international organizations including MOU with UDC provision of drilling and geological services in Loyo, Kaabong District. DGSM also maintained subscriptions to African Minerals and Geo-sciences Centre (AMGC) in Tanzania, African Mining Journal, International Journal of Mining Science (IJMS), Reclamation and Environment among others.

1 INTRODUCTION

The Directorate of Geological Survey and Mines is mandated to establish, promote the development, and strategically manage and safeguard the rational and sustainable exploitation and utilization of mineral resources for socio-economic development of the people of Uganda. The Directorate strives to be a model of excellence in sustainable management and utilization of mineral resources. This is done through ensuring reliable, adequate and sustainable exploitation, management and utilization of mineral resources.

2 INSITUITIONAL FRAMEWORK

The Directorate of Geological Surveys and Mines is composed of three Departments. These include: The Department of Geological Surveys; Mines Department; and Geothermal Resources Department. The Directorate is headed by a Director and each Department is headed by a Commissioner.

Geological Survey Department (GSD) is responsible for establishing the mineral potential of Uganda as well as promoting the development of the established mineral targets. This is done through geological, geochemical and geophysical surveys, Laboratory services and geoscientific data dissemination. The Department is also in charge of geohazards monitoring and advisory services.

Mines Department is mandated to license and regulate exploration and mining of mineral resources, ensuring compliance to the mining legislation and promotion of sustainable mining and development of the mineral resources.

Geothermal Resources Department On the other hand, is responsible for geothermal resources exploration and development.

3 PERFORMANCE OF THE DIRECTORATE

3.1 GEOLOGICAL SURVEY DEPARTMENT

3.1.1 Policy Formulation Regulation

3.1.1.1 Plan to implement the passed Mining and Minerals Bill

The Mining and Minerals Bill was passed in March, 2022. The Bill comes with a number of changes which require restructuring of GSD. Therefore, the proposed Geological Survey, Laboratory Departments and Mining Company

structures and functions were drafted in preparation for implementation of the passed Bill.

3.1.1.2 Communication Strategy

To enhance publicity and promotion and marketing of the mineral sector, Live-works was contracted to design a comprehensive communication strategy to guide on what, how, to whom, where and when to communicate using various platforms. The strategy is ready for implementation.

3.1.2 Institutional Capacity Building

3.1.2.1 Drilling Rig

The procured Drilling Rig (Figure 1) was delivered and Verification of deliverables of drilling rig and its accessories was done.



Testing of the rig was undertaken at Kyassampawu in Kassanda from 9th – 18th December, 2021. The rig was found to perform well with capabilities of drilling at given angles.

Figure 1: Newly acquired Drilling Rig being tested at Kyassampawu, Kassanda District

3.1.2.2 Procurement of dosimeters

Procurement of 10 dosimeters under IAEA Technical Cooperation on Evaluation of Uranium Program, for the UGA2004 Supporting Uranium Exploration and Evaluation Project was initiated;

3.1.2.3 Construction of Mineral Beneficiation Centres

Construction of Mineral Beneficiation Centres for both Ntungamo and Fort Portal is at 99% completion. What's pending for Ntungamo is concluding connection of power to the main building and for Fort portal, it is upgrading of power from 240V to 415V.

3.1.2.4 Strategic Mineral Research Facility

Completed the inception and feasibility study, concept and preliminary design, and schematic design of the Strategic Mineral Research Facility proposed for construction at the DGSM in Entebbe.

3.1.2.5 Equipping and maintenance of the Mineral Laboratories

The following activities to equip the Mineral Laboratories and put in place systems for sustainable analytical services for the mineral sub-sector were undertaken:

A) Equipment and analytical techniques:

- i) The Holman-Wilfrey laboratory concentrating table, Sepor 9" x 6" Selective Simplex Mineral Jig, RM1000 RockLabs swing mill/pulverizer, Eriez Dry Medium Intensity Magnetic Separator, and the Mettler Toledo Excellence XPR5003S Precision Balance with density application were successfully installed in the Mineral Dressing Laboratory under the contract for the supply, installation and commissioning of mineral beneficiation test, exploration sample preparation and density determination equipment. Pending is the installation of the Beckman Coulter LS 13 320 XR Laser Diffraction Particle Size Analyzer which was already delivered and the Salter hydro cyclone test rig which has not yet been delivered but is already at the supplier's premises in Kampala.
- ii) The GBC SavaantAA Atomic Absorption Spectrometer (AAS) was successfully reinstalled by Mr. Roscoe Dickinson, an instrument technician from SDL Instruments Private Limited of Harare, Zimbabwe pending installation of the hydride and graphite furnace which require an accessory and replacement of a blown capacitor and resistor, respectively.
- iii) Supplies under the contract for the supply of laboratory consumables for the fire assay analytical technique which the Ministry signed with M/s. Global Scientific Limited were supplied.
- iv) Contract for supply of laboratory gases (argon, acetylene, helium, oxygen and nitrous oxide) for the DGSM Laboratories in Entebbe under framework contract for three years was signed with M/s. Genome Scientific LLC Limited and the company supplied ten (10) argon gas cylinders, two (2) helium gas cylinders, one (1) nitrous oxide gas cylinders, and two (2) acetylene gas cylinders.
- v) The Carbolite Smelting Furnace was successfully installed by M/s. Beautiful Engineering and Equipment Limited, the supplier.
- vi) Completed the evaluation of bids for supply of laboratory standards, certified reference materials, reagents and chemicals, and small laboratory equipment.
- vii) The Ministry signed a contract with M/s. Oubuntu Consulting Limited to design a Strategic Minerals Research Facility (SMRF) (new laboratory building) at the Directorate of Geological Survey and Mines in Entebbe, and the company successfully completed the inception and feasibility study, concept and preliminary design, and schematic design; and has now embarked on detailed designs.
- viii) Laboratory worktops for installation of the Beckman Coulter LS 13 320 XR Laser Diffraction Particle Size Analyzer and Mettler Toledo Excellence XPR5003S Precision Balance with density application in the Mineral Dressing Laboratory were procured, supplied and installed.

- ix) Works were successfully procured for pre-installation requirements for the Rigaku MiniFlex 600 X-Ray Diffractometer (XRD) in the Petrology, Mineralogy and Gemology Laboratory which include water supply of specific requirements, air conditioning and a worktop, among others and they were successfully installed. The equipment manufacturer is now making plans to have the equipment installed in July 2022.

3.1.2.6 ISO/IEC 17025:2017 Accreditation of DGSM Laboratories

As part of the implementation of the contract for services of an accredited body to offer ISO/IEC 17025:2017 assessment and accreditation services to the DGSM Laboratories in Entebbe that the Ministry contracted M/s. Kenya Accreditation Service (KENAS) to undertake, an inception meeting was held on 31st August, 2021, and thereafter KENAS provided the DGSM Laboratories with all the requirements for ISO/IEC 17025:2017 accreditation, including application forms for tendering in to KENAS once all requirements are in place; the DGSM Laboratories drafted and submitted policies, procedure and forms to KENAS for its review; and is to now submit an application to KENAS so that it may commence processes leading to accreditation.

3.1.2.7 Generator rewiring

The generator power supply was rewired to pass through the power stabilizer by M/s. Ficah Enterprises Limited since its power stabilization mechanism was not effective.

B) Maintenance, service and calibration:

- i) Two (2) UV-Vis spectrometers, one water purification unit, and four (4) laboratory fume hoods and three (3) scrubbers in the Chemistry and Environment Laboratory were serviced and calibrated by M/s. Palin Corporation as planned under the framework contract for service, maintenance and calibration of laboratory equipment which runs for three (3) years.
- ii) Uganda National Bureau of Standards (UNBS) calibrated analytical balances, weighing balances and a compression strength machine in the DGSM Minerals Laboratories.
- iii) M/s. State-wide Insurance Company (SWICO) Limited signed a contract with the Ministry for insurance coverage of DGSM Laboratories in Entebbe which has successfully been implemented and it is to run out on 2nd August, 2022, thus requiring renewal.
- iv) DGSM Laboratories technical staff had a user engagement and feedback meeting, on 4th November, 2021, as well as practical trials, demonstrations and presentations on 15th November, 2021 with Mr. Komurubuga Ayebale Innocent, the consultant who developed the DGSM

Laboratory Management Information System under the consultancy for the design, installation, maintenance and support services for a Laboratory Information Management System for the DGSM Laboratories.

- v) M/s. Serefaco Consultants Limited, the company with which the Ministry signed a contract for service, maintenance and calibration of laboratory equipment in the Mineral Dressing Laboratory and Petrology Mineralogy and Gemology Laboratory for three (3) years successfully undertook service and maintenance of equipment under the contract, including recommending replacement of parts.

3.1.2.8 Human capacity Development

A) Short term

- i) Staff participated in a four-days Chain of Custody workshop at Lake Victoria Hotel, Entebbe, in preparation for the launch of the International Conference of the Great Lakes Region (ICGLR) Regional Mineral Certification (RCM) Certificate.
- ii) A total of twenty (20) geoscientists participated in a virtual Practical Session on Remote Sensing between 6th to 8th October 2021 by TectoSat under Karamoja Airborne Geophysical Survey of Karamoja Project;
- iii) GSD staff also participated in part one (1) of Airborne Geophysics training course from 8 to 15th September. The Course was delivered by XCalibur – the company executing airborne geophysical survey of Karamoja, as capacity building;
- iv) Mr. Chris Lubangakene, Assistant Commissioner - Laboratories; Mr. Gabriel Data, Assistant Commissioner – Geology; Mr. James F. Natukunda, Principal Geologist – Mapping; Mr. David Ssebagala, Senior Inspector of Mines; and Mr. John K. Okewling, Mining Engineer attended and successfully completed a five (5) weeks AusIMM Short Course in VALMIN Code Reporting;
- v) The newly recruited Mining Inspectors were trained in GIS principles and applications;
- vi) Three (3) officers participated in a workshop with the Environment and Natural Resources Committee of Parliament from 8th to 11th February, 2022 on the Mining and Minerals Bill 2021.
- vii) Mrs. Molly Bakka Male, Senior Geologist – Petrology and Ms. Stella Nankinga, Geologist underwent training in petrology at the African Minerals and Geoscience Center (AMGC) in Dar es salaam, Tanzania from 31st May to 13th June, 2022.
- viii) Ms. Grace Lajwe, Principal Chemist; Ms. Maria Assumpta Namaweje, Chemist and Mr. Isaac Moses Ajule, Chemist underwent training in calibration, troubleshooting, maintenance, service and operation of the

GBC SavaantAA Atomic Absorption Spectrophotometer (AAS) which was part of the reinstallation of the equipment by Mr. Roscoe Dickinson, an instrument technician from SDL Instruments Private Limited of Harare, Zimbabwe, from 30th May to 3rd June, 2022.

- ix) Mr. Chris Lubangakene, Assistant Commissioner, Laboratories; Ms. Naomi M. Nangoku, Senior Mineral Dresser; Mr. Adrian Kalagga, Mineral Dresser; and Ms. Ruth Nassingwa, Senior Laboratory Technician participated in a four (4) day Chain of Custody workshop at Lake Victoria Hotel, Entebbe, in preparation for the launch of the International Conference of the Great Lakes Region (ICGLR) Regional Mineral Certification (RCM) Certificate, from 30th May to 2nd June, 2022.
- x) Ms. Naomi M. Nangoku, Senior Mineral Dresser attended the SDG Value Chains Program training under the auspices of the ACP-EU Development Minerals Program which is being implemented by UNDP in June 2022.
- xi) Training for all DGSM staff on Insurance Coverage as part of the contract for Insurance Coverage for the DGSM Laboratories was conducted by M/s. State-wide Insurance Company Limited on 18th March, 2022.
- xii) Twelve (12) DGSM Laboratories technical staff were trained on ISO/IEC 17025:2017 and moderation of developed documentation in support of accreditation to ISO/IEC 17025:2017 from 4th to 8th October, 2021.
- xiii) Mr. Chris Lubangakene, Assistant Commissioner - Laboratories; Mr. Gabriel Data, Assistant Commissioner - Geology; Mr. James F. Natukunda, Principal Geologist - Mapping; Mr. David Ssebagala, Senior Inspector of Mines; and Mr. John K. Okewling, Mining Engineer attended and successfully completed a five (5) weeks AusIMM Short Course in VALMIN Code Reporting.
- xiv) DGSM Laboratories technical staff participated in a training workshop and meeting on the Analytical Finger Print on 30th November, 2021 at the Imperial Golf View Hotel in Entebbe. The workshop is part of technical assistance and capacity building/ support for the implementation of the ICGLR Regional Certification Mechanism in Uganda to the DGSM under the tripartite agreement signed with the Germany Federal Institute for Geosciences and Natural Resources (BGR) and the International Conference on the Great Lakes Region (ICGLR) Secretariat.
- xv) Mr. Chris Lubangakene, Assistant Commissioner - Laboratories attended and successfully completed an eight (8) weeks AusIMM Short Course in JORC Code Reporting.

- xvi) Chemistry and Environment Laboratory analysts were trained on the application of the Spectro Arcos Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES) by Mr. Lionel de Jager, Product Specialist from Ametek, South Africa, from 22nd to 25th November, 2021.
- xvii) Ms Naomi Nangoku Mumoita, Senior Mineral Dresser participated in virtual workshop on Digital Mining Series A5 on 30th November 2021.
- xviii) Ms. Maria Assumpta Namaweje, Chemist; Ms. Alice Biira, Laboratory Technician; and Mr. Jofrey Oliam, Laboratory Technician participated in a Regional Mineral Certification mock inspection at Nyamuliro Wolfram Mine in Rubanda District, from 17th to 22nd October, 2021.
- xix) Ms. Naomi M Nangoku, Senior Mineral Dresser participated in the 10th Annual Mineral Conference, from 5th to 6th October, 2021.
- xx) Ms Naomi Nangoku Mumoita, Senior Mineral Dresser participated in the Dialogue to eliminate violence against women and girls at workplaces on 10th December 2021 at Hotel Africana. This was organized by Private Sector Foundation Uganda in collaboration with EU-UN.
- xxi) Ms. Naomi Nangoku Mumoita, Senior Mineral Dresser participated in the 3rd Artisanal and Small-scale Miners Annual Conference that took place on 9th to 10th December 2021.

B) Long Term Training

- i) Ms. Jacqueline Nakirrija (Geologist) completed with a MSc in GIS at Makerere University
- ii) Mr. Paul Lugoko (Geologist) continues with a MSc in Engineering Geology at Leeds University in the UK since September, 2021;
- iii) Mr. Nelson Birungi (Senior Geophysicist) continues with his MSc in Geophysics at Leeds University in the UK since September, 2021;
- iv) Mr. Eddy Miiro (Mineral Dresser) continues to pursue a two (2) year's Master of Science in Chemical Engineering at the University of Cape Town, South Africa. As part of the course, he is conducting research on hydrometallurgical processing of REE from the ionic clay deposit of Makuutu at Makuutu in Bugweri District, Uganda.
- v) Mr. Martin Ekiryagana (Senior Staff Cartographer) and Stella Nankinga (Geologist) continue with their MSc. Degrees in Environment and Natural Resources management at Makerere University.
- vi) Ms. Stellah Pule (Staff Cartographer) and Mr. Henry Mulindwa (Geologist) continue with an M.Sc. In Natural Resources Management at Nkumba University.

3.1.2.9 Research and Development

A) Siting and installation of Geodetic GNSS-DRIAR sites

Under the Memorandum of Understanding (MoU) signed between the GoU represented by the Ministry (MEMD) and Virginia Polytechnic Institute and State University (Virginia Tech), USA serving as a leading institution of five (5) other collaborating academic institutions from the USA (University of Delaware, Woods Hole Oceanographic Institution, Northwestern University, University of Kansas, and Midwestern State University), is undertaking a collaborative geoscientific research study entitled Dry Rifting In the Albertine-Rhino Graben (DRIAR) of Uganda using geophysical, geochemical, and geological techniques.

During the month of January 2022, the technical staff participated in siting and installation of three (3) GNSS observation stations (Figure 3a, b, & Figure 4b) with Prof. Sarah Dorothy Stamps from Virginia Polytechnic Institute and State University (Virginia Tech), USA. The three (3) GNSS sites were installed at Queen's Pavilion (UGN4) in Queen Elizabeth Conservation Area (QECA), Hoima Seismic station (UGN5) located at Katasiha site, and at the Top of the Falls (UGN6) in Murchison Falls Conservation Area (MFCA). During the same field visit, the existing GNSS-GPS station site at Nakasongola (UGN3) was re-installed (Figure 4a).



Figure 2: (a) GNSS observation station install at Queen's Pavilion, QACE, Kasese (b) GNSS Observation Site was installed at Hoima Seismic Station, Katasiha Site.



Figure 3: . (a) GNSS observation station was restored at Nakasongola site. (b) GNSS Observation Site was installed at Top of the Fall, Murchison Falls Conservation Area.

B) Geophysical-Magnetotelluric (MT) survey in Albertine-Rhino Area

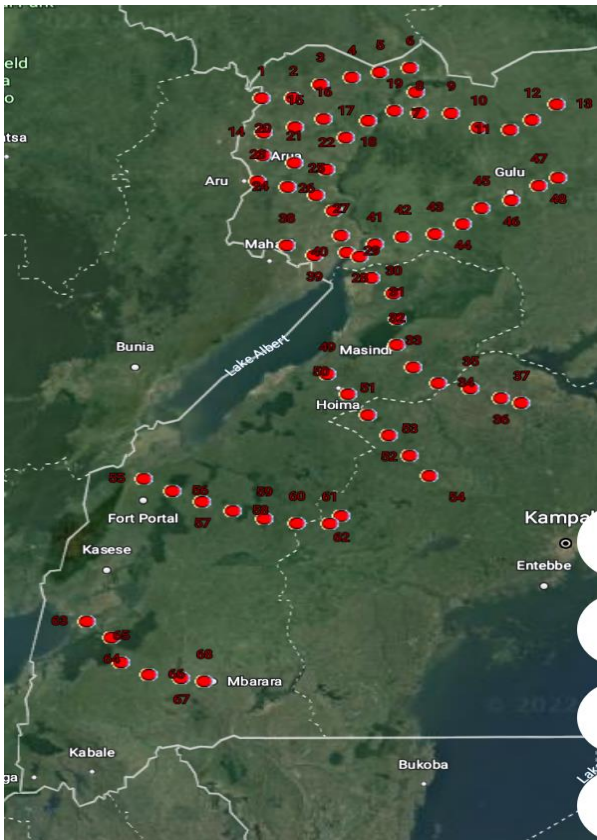


Figure 4: Google Map Extract showing the distribution of planned DRIAR MT sounding measurements in the entire Albertine-Rhino Graben Area under study.

The DGSM geophysics field team undertook geophysical MT survey measurements within the Albertine-Rhino (western rift) area. Sixty-Eight (68) soundings (measurement points) were planned to be executed along 7 profiles (lines) over the entire study area as shown in the Figure 4.

During phase 1 of the survey that covered the West Nile (Rhino) area and part of Acholi sub-region 45 measurements out of the 48 planned were sampled (Figure 5) as below.

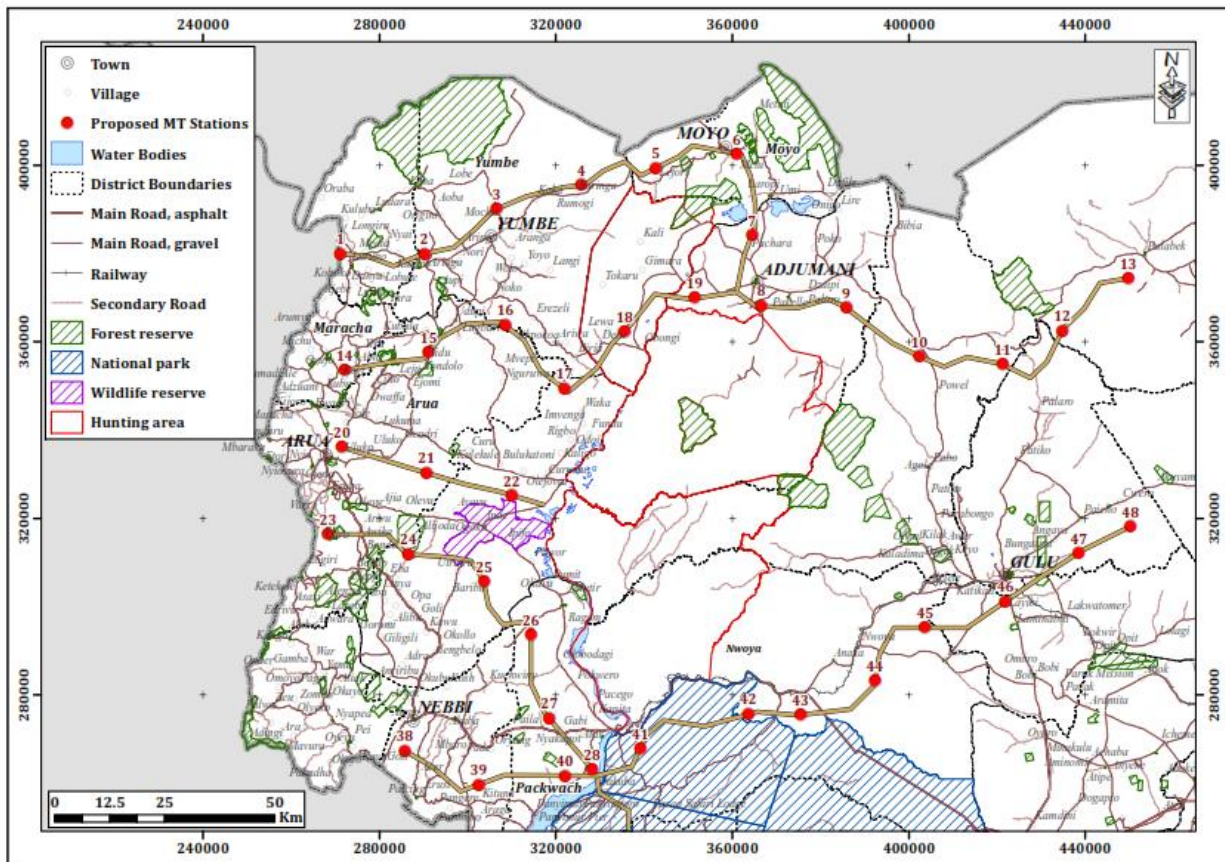


Figure 5: Map showing Rhino Area where the Phase 1 of MT survey has so far been undertaken. The red circles represent the location of MT sounding/measurement points.

3.1.2.10 Geoscientific data/information sharing and technical cooperation

DGSM continued to collaborate with other organizations in order to exchange geoscientific data/information relevant for not only staff empowerment but also other stakeholders in promoting the development of the mineral sector. Publications and reports were received and shared.

The Directorate also continued to cooperate with UDC in relation to MOU for provision of drilling and geological services in Loyoro, Kaabong District. The team made a presentation on the progress on marble drilling programme and a security framework deployed to ensure safety of the team.

3.1.2.11 Retirement

Mr. Baguma, Driver, retired during the FY after attaining the retirement age of sixty (60) years.

3.1.2.12 Obituary

Mr. Kiggwe Richard-Geologist, died during the financial year. May God rest his soul in eternal peace, and also strengthen and provide for his family.

3.1.3 Mineral exploration, promotion, production and value addition

3.1.3.1 Mineral Exploration

A) Geological, geochemical and Geophysical investigations of Kirwa Wolfram Prospect

The aim of the survey was to evaluate the Wolfram potential of Kirwa wolfram prospect. Geological, geochemical and geophysical surveys at the prospect were undertaken. Processing and interpretation of the data is ongoing and soon preliminary findings shall be made available.

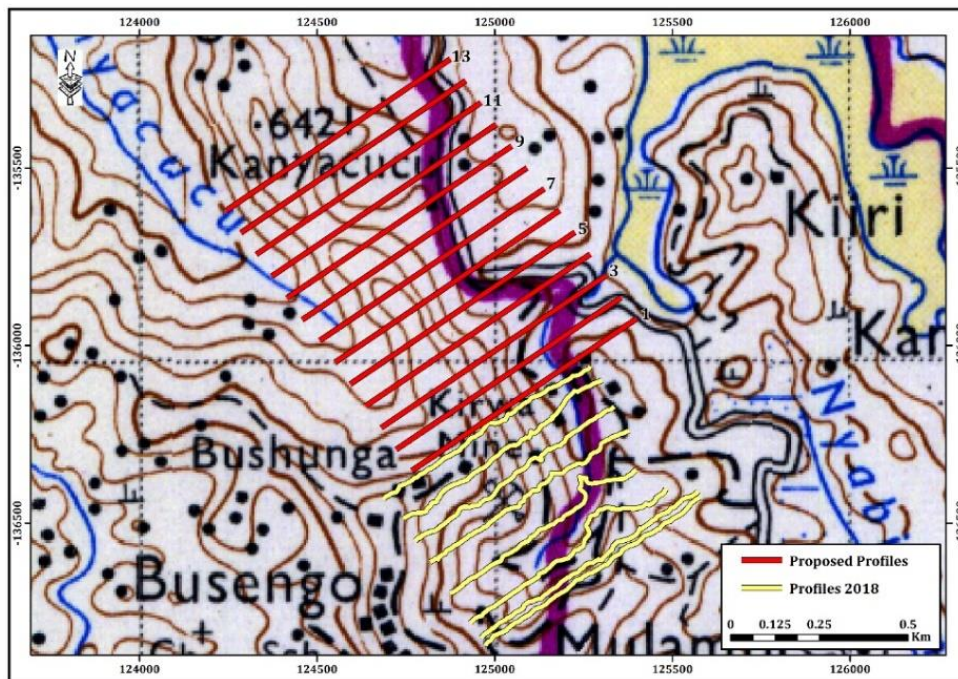


Figure 6: Topographic map of Kirwa wolfram prospect. Geophysical profiles (red) used in the survey and 2018 (yellow) geophysical survey lines.

B) Airborne Geophysical Data Acquisition in Karamoja region

Under the ongoing aerial geophysical data acquisition in Karamoja region, DGSM continued to receive raw and processed datasets and products. The deliverables are received via a secure ftp connection from the contractor Xcalibur Geophysics and downloaded to a secure data server for safe storage.

The datasets so far received from the concluded aerial surveys include magnetics, radiometric, and gravity. The progress of the survey is magnetics (97%), radiometric(97%), and gravity (100%).

C) EU- Uganda Iron ore evaluation

Staff carried out fieldwork and collected information on the planned drilling sites in the 10 iron ore prospects of Southwestern (Kigezi) region. The information collected focused on land ownership and accessibility to the drill sites. The planned 10 iron ore deposits to be evaluated are: Kijuguta, Katuna_1 (Rukaranga) and Kihumuro in Kabale District; Karukara and Nyamiringa in Rubanda District; Kamena and Kyanyamuzinda in Kisoro District; Katagata and Rwengongo in Rukiga District and, Rugando in Kanungu District. Information collected was submitted to European Union, Uganda Office, Kampala for use in preparation of bid documents for drilling.

D) Geological and geochemical Survey in Karamoja

Geological Survey at 1:250,000 scale was completed in December, 2021 and the map is in place. However Geochemical survey in in the region was terminated in March, 2022 over insecurity in Karamoja Sub Region. Coordination with the Joint Security Framework for the aerial surveys in Karamoja region to enable the geological mapping and geochemical surveys to continue was been initiated. The exercise is to be completed when the security situation in region improves

E) Laboratory Services

Laboratory services undertaken as part of efforts to establish the mineral potential of the country include:

- i) Prepared a total of two hundred thirty-three (233) samples for laboratory analysis. The samples consisted of rocks, soil sediments and tailings samples from field campaigns of the Geological Survey Department in Karamoja Region, geotechnical investigation activities, research activities, iron ore prospecting in South Western Uganda, assessment of ASM operations in Busia, mineral evaluation in Kirwa Wolfram Mine, and geological mapping activities being undertaken by Xcalibur Geophysics Spain SL in Karamoja Region.

- ii) Analysed three (3) gold samples for gold content; fifty-eight (58) water samples for lead, copper and arsenic; six (6) rock samples for iron; forty-three (43) samples for graphitic carbon; and seven (7) limestone samples, thirty (30) rock samples, and thirty-four (34) police exhibit samples received from the Police Mineral Protection Unit for elemental content. The analytical techniques used were gravimetric, acid digest Inductively Coupled Plasma Optical Emission Spectrophotometry (ICP-OES) Finish, X-Ray Fluorescence (XRF) spectrophotometry, and UV-Vis spectrometry.
- iii) A total of nineteen (19) samples were received for identification and analysis, a report was produced mainly from microscopy and observation results obtained. Five (5) similar gem bits for gemstone identification were also received. Online Consultation was carried out for the commonly available green chalcedony.
- iv) Gravity concentration test work of gold ore using the laboratory shaking table and the mineral jig were performed as part of training for students from Busitema University and Kyambogo University undergoing industrial training in the Directorate.
- v) The following rock identification and micro and macroscopic analyses were conducted:
 - a) Pebble/ gravel sample from a road construction company was examined for mica.
 - b) Pebble size sample from a DGSM geologist was examined and identified as magnetite.
 - c) An ultramafic and naturally occurring fibrous sample was examined and identified as Asbestos. The dangers associated with the material were drafted including guidance on how to handle such materials.

- d) Ten (10) white quartz pieces were each identified and confirmed as quartz and also not to have any unique features.
- e) Police exhibit from Moroto comprising of two big white boulders were identified as Calcite /marble.
- vi) Labelled seven (7) rock samples in the Petrology Laboratory, and also cleaned and arranged others, which samples shall be put on display for showcasing as well as used as easy reference and for effective management.
- vii) One (1) postgraduate and two (2) undergraduate civil engineering students from Makerere University who are undertaking research on alternative binder material for construction are currently undertaking their laboratory test works in the DGSM Laboratories with the support of laboratory staff. The research is focusing on kaolin as an alternative binder.
- viii) Mr. Chris Lubangakene, Assistant Commissioner, Laboratories; Mr. Adrian Kalagga, Mineral Dresser; and Ms. Maria Assumpta Namaweje, undertook a fieldtrip to the Rwenzori Rare Metals project in Makuutu, Bugweri District on 10th March, 2022 as part of activities to find out analytical techniques being used by the project and how the DGSM Laboratories can have such techniques locally available, and also the progress of the project as regards feasibility studies on beneficiation of the mineral resource.
- ix) Thin sections from the Airborne Geophysical Survey and Geological Mapping of Karamoja Project were prepared in the Petrology, Mineralogy and Gemology Laboratory.
- x) Mr. Chris Lubangakene, Assistant Commissioner, Laboratories and Mr. Kalajja Adrian, Mineral Dresser, together with staff from the Mines Department; Ms. Agnes Alaba, Ag. Director, Ms. Sheillah Kemigisa,

Inspector Mineral Certification, and Ms. Antonia Maria Nankinga, Inspector Mineral Certification went on an inspection field trip of mineral exploration project activities of M/s Samta Mines and Minerals Limited Arua, Zombo and Atiak, as well as the company's laboratory in Arua, from 8th to 10th December, 2021.

3.1.3.2 Mineral Sector Development Promotion

- i) A Paper on Uganda's Mineral Sector at a Glance was prepared and presented by the PS/MEMD in September, 2021 during the Dubai expo,
- ii) Another on opportunities in Uganda's Mineral sector was prepared and virtually presented by Hon/MoEMD to the Africa Down Under Conference 2021 in Perth – Western Australia
- iii) Mr. Gabriel Data (AC/Geologist) and Mr. Peter Mawejje (Geologist) presented on "Status, Prospects and Planned interventions of the NDPIII Priority Minerals" and "The relationship between rocks and food production/security respectively" during the 10th Annual Mineral Conference held at Serena Hotel, Kampala.
- iv) Mr. Chris Lubangakene, Assistant Commissioner, Laboratories and Mr. Kalajja Adrian, Mineral Dresser, went on an inspection field trip of mineral exploration project activities of M/s Samta Mines and Minerals Limited Arua, Zombo and Atiak, as well as the company's laboratory in Arua, from 8th to 10th December, 2021 to identify any technical support need from the Department for better operations.
- v) Mr. Chris Lubangakene, Assistant Commissioner – Laboratories and other technical staff of the Directorate, including Ms. Agnes Alaba, Ag. Director accompanied the Minister of State for Mineral Development, Hon. Peter T. Lokeris on 5th August, 2021 to the Alupe Gold Mining Project in Busia District which is being developed by M/S. Wagagai Limited to check on the progress of the project.
- vi) Mr. Chris Lubangakene, Assistant Commissioner – Laboratories and others went on a field trip on 24th September, 2021 to exploration projects being implemented by M/s. Samta Mines and Minerals Uganda Limited in Ntungamo and Mitooma districts to check on the progress of the projects.

Within the same field campaign, the team held a meeting in Mutaaka in Mitooma District with landowners and directors of M/s. ARRM Ltd, a company holding a location license over the Mutaaka Kaolin, to resolve disputes over compensation for land.

- vii) Participated in the 2nd Meeting on preparation for the Joint Commission for Cooperation (JCC) with the Republic of South Africa (RSA) at Wapa Auditorium, Ministry of Foreign Affairs. The meeting agreed to establishing cooperation in areas of Mineral Development.
- viii) As a member of the Technical Working Committee (TWC) on the Revamping of Kilembe Mines, Mr. Chris Lubangakene, Assistant Commissioner – Laboratories attended a series of meetings to fast-track the Kilembe Mines Redevelopment Project (KMRP) to update the Permanent Secretary/ Secretary to Treasury (PS/ST) and the Permanent Secretary of MEMD on the progress.

3.1.4 Value addition promotion

- i) Mr. Chris Lubangakene, Assistant Commissioner – Laboratories and other technical staff of the Directorate, including Ms. Agnes Alaba, Ag. Director travelled to Rwengoma in Ntungamo District on a field trip on 25th September, 2021 and assessed the progress of construction works of the mineral beneficiation centre.
- ii) Mr. Chris Lubangakene, Assistant Commissioner – Laboratories, Ms. Grace Lajwe, Principal Chemist, and Mr. Adrian Kalagga, Mineral Dresser travelled to the Fort Portal and Ntungamo on 27th and 28th April, 2022 and undertook a pre-handover inspection of the DGSM Regional Office and Mineral Beneficiation Centres.

3.1.5 Health and Safety

3.1.5.1 Kilembe Flood Management Plan

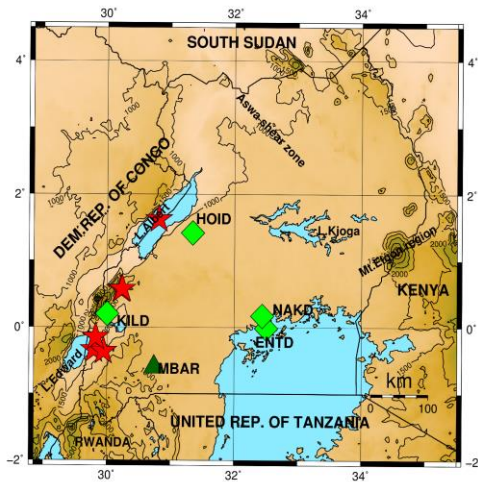
A trip to Kasese with the Inter-Ministerial Committee on Flooding to assess the impact of flooding in Kasese District on 30th July, 2021 was made. The team participated in assessment of River Nyamwamba Valley and Mubuku Valley flooding where the Ministry has asset namely Kilembe Copper Mines and Mubuku Power Station. The team contributed to the plan for the Flood Management Plan.

3.1.5.2 Earthquake Monitoring and advisory services

The Directorate continued to operate and maintain the National Seismic Network comprising of five (5) seismic stations located at Entebbe (ENTD/TEBE), Hoima (HOID), Nakauka (NAKD), Kilembe (KILD) and Mbarara-Kyahi (MBAR) (Figure)

Data collection and interpretation from the network revealed thirty-three (33) earthquakes events within the great Lakes region: Sudan, DR. Congo, Rwanda, Burundi, Tanzania and Uganda. Of the thirty-three (33) events, 6 happened in Uganda in the Districts of Rukungiri, Kasese, Kabarole and Hoima (Figure7 and Appendix1).

Figure
the



7: Map of Uganda showing seismic events (earthquakes) that occurred within Uganda during period July 2021 – June 2022. The RED stars show epicentres location of seismic events with body wave magnitudes in the range (4.0 - 5.0), LIGHT GREEN diamonds re

3.1.5.3 Gender Mainstreaming

Gender mainstreaming in the mineral sector was undertaken. Sensitization of miners on issues of environment, health and safety, and gender mainstreaming in mining sector was undertaken in Kabarole district.

3.1.5.4 Corona Virus/Corvid -19 Preparedness

- i) Continued with awareness campaigns and supply of materials to prevent escalation of the spread of Corona virus/Covid-19 in the Department;
- ii) A paper on the Impact of Covid-19 on Program Implementation was prepared.

3.2 MINES DEPARTMENT

3.2.1 Policy Formulation Regulation

3.2.1.1 Mining and Minerals Bill

The Mining and Minerals Bill was passed by Parliament on 17th February 2022, and was forwarded to H.E the President of the republic of Uganda for assent. However, it the President returned it to Parliament for further scrutiny before assenting to it.

In liaison with HR Division/MEMD and Public Service, MD also continued to prepare for the implementation of the proposed Mining and mineral bill, 2021 as passed by Parliament on 17/02/2022 by drafting functions and institutional adjustments to accommodate the new changes the Bill is coming with.

3.2.1.2 ICGRL Regulations 2022

The ICGRL Regulations 2022 for implementation of the pact on security, stability and development in the great lakes region (prevention of illegal exploitation of natural resources and illicit trade of designated minerals) was signed by MoFA and forwarded on 30th May, 2022 to MoJCA and MEMD. The Regulations await gazetting by MoJCA.

3.2.2 Institutional Capacity

3.2.2.1 Human Capacity Development

- (i) Sensitization and collaboration meeting with URA was held in DGSM Main Boardroom on Monday 13th May, 2022 on tax incentives.
- (ii) Stakeholders trained on gender mainstreaming at Elgon hotel in eastern Uganda One staff attended an ICGLR audit meeting from 4th – 8th April 2022 in Tanzania;
- (iii) MD staff attended a one-week capacity building workshop in the week of 30th May organized by GIZ and ICGLR secretariat in preparation of launch of the ICGLR certificate in Uganda. The workshop involved representatives of Ministry of Foreign Affairs, DGSM, GIZ and ICGLR secretariat with training on the how best to establish and track the chain of mineral custody in the mining sector as well as formalization of the ASM in the country to generate better contribution to the country economy;
- (iv) The Ministry of Energy and Mineral Development in conjunction with Rwenzori Rare Earth Metals organized stakeholders' engagement to

create awareness of the Makuutu Rare Earth Project and approach to be taken on land access and resettlement action plan project affected to be residents in Makuutu Sub-County, Bugweri District and conduct sensitization on the national and local benefits of the Makuutu Rare Earth Projects to Uganda and the local community on 6th June, 2022. This was led by the Hon. Ministers of Energy and Mineral Development and attended by LG Officials from Bugweri, Bugiri, Iganga and Mayuge Districts;

- (v) Technical staff of Mines Department participated in capacity-building workshop on the ICGLR-Regional Certification Mechanism (RCM) and preparation for the launch of the ICGLR Certificate in Uganda from 30/05/2022- 2/06/2022. The workshop provided highlights on the implementation of Chain of Custody (CoC) Systems in the region and the need for development of ASM gold strategy as well as Sensitization of mining communities on RCM before the launch of 1st certificate in Uganda.
- (vi) RCM Team participated in Geo-data mapping and Digitization of Development Minerals from Monday 13th June, 2022 up to 17th June, 2022. Five (5) field teams worked in Alebtong, Rwampara, Kasese, and Mubende Districts. The teams collected field geological data for geological mapping and Digitization as well as Reserve estimation as part of the Geodata training session with UNDP. Exercise will provide baseline data for regulation of development minerals.
- (vii) Staff of the Department continued to participate in an online Geodata training on Geological mapping of development minerals and digitization using QGIS software.
- (viii) Dorothy Namuli (LA), continues with a Master of Science in Information System management at Makerere University

3.2.3 Mineral exploration, promotion, production and value addition

3.2.3.1 Licensing Status

MD continued to receive, capture and reviewed Licence applications and returns, granted and maintained Licences in the Mining Cadastre and registry System (Table 1). The table shows about 5.2% increase in the number of valid licences by close of FY 2021/2022 compared to FY 2020/2021. This was mainly attributed to the Blasting Certificates issued during the financial after full reopening of the country economic activities which was not the case the previous FY.

Table 1: Licensing status as at 30/06/2022 compared to Licencing status as at 30/06/2021

Type of Licence	Licences as at 30/06/2021	Licences as at 30/06/2022
Prospecting License	132	108
Exploration License	341	341
Retention License	4	9
Location License	121	95
Mining Lease	46	49
Mineral Dealers*	58	44
Goldsmith License*	11	18
Blasting Certificates	-	66
Total	713	730

Note: * License expires on the 31st day of December of the year of issue

However, there was a general decreased in prospecting, exploration and location licences which normally contribute highly to active licences at any particular time. This is attributed to

- i) Effects of Covid-19 Pandemic such as the current high operational costs due to high commodity prices that to adversely affect social and economic activities in the world
- ii) Stopping of DGSM to continue with its licensing role by the attorney General's Office, following the passing of the Mining and Minerals Bill in February 2022
- iii) The ban on export of unprocessed minerals is also one of the local factors affecting mining and exploration activities. The ban demotivates the investor to acquire and or renew mineral rights.
- iv) Insecurity in Karamoja Region which one of the country's mineral province

To boost the mining sector and hence increase the number of licences therefore, there is need for:

- i) intensified mineral sector development promotions globally so as to attract investment in Uganda since it is government policy to promote value addition and no more export of unprocessed ores
- ii) DGSM to continue with its Licensing administration role till the Passed Mining and Minerals Bill is assented to into law.

- iii) government to improve the security situation in Karamoja region so as to provide a conducive investment environment

3.2.3.2 Mineral production

Table 2: Mineral production of FY2021/2022 Verses 2020/2021

Mineral	Average Price per Tonne in 10 ³ UGX	Production in Tonnes 2021-2022				Quantity in Tonnes		Average Value in 10 ³ UGX	
		Jul -Sept	Oct-Dec	Jan-Mar	Apr- Jun	FY2020-2021	FY2021-2022	FY2020-2021	FY2021-2022
		Q1	Q2	Q3	Q4				
Limestone	122	186857.78	179612.60	173605.91	43939.72	908051.41	584016.01	108,966,169	71,249,953
Pozzolana	21.29	383953.92	160032.1500	81578.12799	87667.044	1,724,765.34	713231.24	36,220,072	15,184,693
Gold	225,829,405	0.00321	0.0032	0.00151	0.00077	0.0025	0.01	382,898	1,953,424
Vermiculite	1038.345	5813.5	6035.1000	6182.2	4698.3	16,949.60	22729.10	9,813,818	23,600,647
Wolfram	71,913	28.507	23.5810	24.17	18.517	28,307.28	94.78	594,453	6,815,539
Syenitic Aggregate	30.59	1527.98	1356.7200	3627.2	3570.17	0.00	10082.07	0	308,411
Kaolin	506.084	5.6	6588.8000	24	30	32,749.58	6648.40	49,124	3,364,649
Iron Ore	558,437	39400	33145.0000	30000	40000	26,382.13	142545.00	2,638,213	79,602,402
Granite	50.6	62	39.0000	61	22	15,000.00	184.00	4,069,390	9,310
Lead	5000	0	0.0000	0	0	468.00	0.00	431,853	0
Coltan (30% Purity)	125,649	0	0.0000	0	0	262.59	0.00	7,461,083	0
Tin (75% Purity)	115,356	2.805	0.0000	0	0	0	2.81	0	323,573
Beryl (1% Beryllium)	279	0	0.0000	0	0	391.49	0.00	3,411,746	0
Diatomite	31						0.00		0
Graphite	3,476						0.00		0
Feldspar	186						0.00		0
Marble	16						0.00		0
Volcanic Ash	21	0		5746.7	53080.24	0	58826.94	0	1,252,426
Grand Total								174,038,820	203,665,028

Mineral production (Table 2) increased by 17% in 2021/22 compared to that of 2020/21. This is attributed to increased production of iron ore for local consumption as well as export by Kamuntu Investments Ltd. The Ban of export of iron ore was lifted by H.E the President of Uganda for Kamuntu investments Ltd so that the company could fulfill a contract entered into earlier on by the company. Consequently, the value of production of Iron ore increased from 2.6 Billion in 2020/21 to 79.6 Billion in 2021/22.

However, there was a general decrease in production of regularly mined minerals such as Limestone (34.6%), Pozzolana (58%), Kaolin (93.2%) for cement manufacture. This is possibly due to decreased demand for construction materials. People are currently more concerned with basic needs for survival, as hard economic times continue wrecking globally.

The Decrease in Limestone production may also be attributed to the fact that the Cement factories here in Uganda also import clinker (limestone product) into the country for cement manufacture instead of converting producing the clinker from locally sourced limestone.

3.2.3.3 Mineral imports statistics

There were no Mineral imports. This is mainly attributed to the limited market for minerals in Uganda and the global disruption of businesses by Covid-19 pandemic restrictions.

3.2.3.4 Mineral exports statistics

Table 3: Value of Iron Ore Exported in FY2021/22

Commodity	Quantity (Kg)					Value (UGX)
	Q1	Q2	Q3	Q4	Total	
Iron Ore	0	5,000,000	28,145,000	0	33,145,000	18,494,910,000
Total						18,494,910,000

The Value of exports for FY2021/22 was eighteen Billion, four hundred ninety four Million, Nine hundred ten thousand shillings (UGX 18,494,910,000). Other than the iron ore exports by Kamuntu Investments Ltd, there were no mineral exports reported due to ban on raw mineral exports in quest for value addition for the country to have optimal benefits from its mineral resources. Kamuntu was allowed to export Iron Ore so as to fulfill the terms of a contract the company had before ban of export unprocessed in Uganda.

3.2.3.5 Non-Tax-Revenue (NTR)

NTR (Table 3) reduced by 13.9% during FY2021/22 compared to that of FY2020/21. NTR has been decreasing for the last five FYs (Table3). This is attributed mainly to the following factors:

- (i) The ban on export of unprocessed minerals ores is the major factor affecting the NTR collection. The highest NTR (FY2017/18) was last collected when there was no ban on export of unprocessed minerals ores.
- (ii) The global Covid-19 Pandemic which adversely affected the exploration and mining activities globally. Mining activities are slowly recovering
- (iii) Withdrawal of DGSM's licensing administration role during the FY2021/22 by attorney General's Office, pending assent to the passed Mining and Minerals Bill into law by H.E the President of the Republic of Uganda, and
- (iv) Insecurity in Karamoja Region which has discouraged exploration and Mining activities

To improve on the NTR generated therefore, there is need:

- i) To intensify mineral sector development promotions globally so as to attract investment in Uganda since it is government policy to promote value addition and no more export of unprocessed ores
- ii) For DGSM to continue with its Licensing administration role till the Passed Mining and Minerals Bill is assented to into law.
- iii) For government to improve the security situation in Karamoja region so as to provide a conducive investment environment

Table 4: Non-Tax-Revenue (NTR) for FY2021/22 compared with previous FYs

	NTR SOURCE ITEM	ROYALTY/ITEM
1	ANNUAL MINERAL RENT (OTHER THAN FOR PROSPECTING LICENSE)-	2,843,270,000
2	ROYALTIES FROM HOLDERS OF MINERAL RIGHTS OR MINERAL DEALERS-	6,490,703,393
3	MINERAL DEALERS LICENSE-	290,000,000
4	APPLICATION FOR A PROSPECTING LICENSE-	53,000,000
5	REGISTRATION OF MINING INSTRUMENTS-	58,000,000
6	APPLICATION FOR EXPLORATION LICENSE-	172,000,000
7	APPLICATION FOR A LOCATION LICENSE-	24,800,000
8	APPLICATION FOR A MINING LEASE-	20,000,000
9	APPLICATION FOR RENEWAL OF A LOCATION LICENSE-	29,000,000
10	APPLICATION FOR RENEWAL OF EXPLORATION LICENSE-	35,000,000
11	APPLICATION FOR RENEWAL OF RETENTION LICENSE-	5,000,000
12	EXTRACT FROM ANY REGISTERED INSTRUMENT-	3,500,000
13	CERTIFICATE OF SURRENDER AREA COVERED BY A MINERAL RIGHT-	3,000,000
14	ANNUAL FEES FOR GOLDSMITHS LICENSE-	60,000,000
15	TRANSFER OF MINERAL RIGHT OR OF SHARE OF THE RIGHT	70,000,000
16	BLASTING CERTIFICATE	2,500,000
17	COPY ISSUED FOR LOST OR DESTROYED CERTIFICATES-	1,500,000
	GRAND TOTAL (FY2021/22)	10,161,273,393
	GRAND TOTAL (FY2020/21)	11,805,315,355
	GRAND TOTAL (FY2019/20)	12,530,908,718
	GRAND TOTAL (FY2018/19)	16,031,523,348
	GRAND TOTAL (FY2017/18)	16,702,115,814

3.2.3.6 Monitoring and inspection of exploration and Mining activities

- A) The Police Minerals Protection Unit undertook compliance monitoring and enforcement in Kisita and Kitanda in Kasanda District and is currently undertaking compliance monitoring and enforcement in Moroto, Tororo and Kasese Districts
- B) Kisita Mine remains under the protection of the PMPU after the failure by license holder to resume mining operations following the eviction of all illegal miners in the area. The License expires in August 2023. The sector has recorded increased cases of forged licenses, all forwarded to PMPU for follow up.

- C) Kilembe Mines-inaugural meeting for evaluation committee held on 08/06/2022; Evaluation of Expression of Interest (EOI) commences on Monday, 20 to 24th June 2022.
- D) Inspections and monitoring of exploration and mining operations continued in Karamoja, Eastern, Central and Ankole regions. Key issues of illegal mining operations in various parts of the country such as Busia, Kassanda, Buhweju noted.
- E) Sensitization workshop for political leaders (MPs, and districts leaders) for Bugweri, Bugiri, Mayuge and Iganga at Hotel Continental, Iganga on Makuutu REE Project for Rwenzori Rare Metals on Land access and Resettlement Action Plan.
- F) On 30/4/2022, three (3) staff of the department conducted an impromptu monitoring of Movement of iron ore by M/s Sino Minerals from Kabale to Iganga and Tororo. The team confirmed that iron ore is being transported to Tembo steel. There is also evidence that iron ore is being exported to Simba Mines (National Cement). Letter to URA was sent asking URA to ask for records of exports of iron ore over the last 5 years.
- G) Regional sensitization on Biometric registration continued and five (5) members of the department participated in a sensitization and awareness workshop of stakeholders in the mining sector in the northern region. Workshop organised by URA and held in Gulu city Boma Hotel with focus on mining tax regimes, tax incentives, mining rights, and mineral occurrences was held on 30th April, 2022. Over 30 ASM miners were sensitized on the mining and regulatory framework governing the sector.
- H) Participated in an online meeting organised by ICGLR secretariat to discuss current status of mineral traceability in the region. Case studies of Tanzania's Chain of Custody (CoC) system, Rwanda's CoC systems and how it involves private CoC service providers and DRC's harmonisation of laws to adopt the changes in the RCM manual (blue status) were presented.

3.2.3.7 Mineral sector Development promotion

- A) A team from the DGSM lead by Hon. Peter Lokeris participated in the Mining Indaba conference (9th-12th May 2022); The conference brings together Ministers, Mining CEOs, governments and industry stakeholders to promote investments, share information, understand trends and challenges in the ministry industry.
- B) Provided information on legal regulatory framework and investment opportunities to investors from Democratic Republic of Congo

interested to set up an integrated smelter for 3Ts in south western Uganda.

- C) Participated in Ministerial stakeholder’s engagement meetings, on 6th June, 2022, with MPs, the local leaders and affected community on the operation of Ruwenzori Rare Metals (RRM)Ltd, at Bugweri Town Council, Bugweri District; Continuous engagement required and Public disclosure planned for Mid-July for ESIA.
- D) Provided technical advice to RRM on the commencement of the process for application of a Mining Lease after approval of ESIA by NEMA.
- E) NEMA continued with the review of the Makuutu ESIA report and is calling for a public hearing as part of the ESIA review process. The DGSM in collaboration with developer is undertaking dissemination of ESIA report to fast track the public hearing for the Makuutu.
- F) Continued with maintenance of online Mining Cadastre and registry system; 4 Mineral Dealers licenses granted.
- G) Noted the increase in number of forged MDLs.

3.2.4 Health and Safety

DGSM in collaboration with PSFU and Ministry of Trade, Industries and Corporation distributed Personal Protective Equipment to the women led mining groups in Kasese district. Among the Items distributed included: Hammers to enhance production, reflector jackets, helmets, boots among others.



Figure 8: MS. Naomi Nangok, Senior Mineral Dresser distributing PPE to Women Miners in Kasese District

3.3 GEOTHERMAL RESOURCES DEPARTMENT

3.3.1 Policy Formulation and Regulation

The Mining and Minerals Bill 2021 was passed by Parliament on 17th February 2022, and it was forwarded to the President for assent. The Bill was however, returned to Parliament for further scrutiny. Among the key highlights in the Bill is the regulation of geothermal resources for direct use. Production of electricity shall be regulated by the Electricity Act. The Geothermal Resources Department (GRD) also continued to revise its structure to accommodate regulation for use of geothermal heat in industry, agriculture and tourism.

GRD has also started benchmarking geothermal laws in the region and formulating regulations for geothermal direct heat uses in industry, agriculture and tourism.

3.3.2 Institutional Capacity

3.3.2.1 Infrastructure Development

Portable Hammer drill

A portable hammer drill was acquired to be used in shallow temperature surveys particularly in areas with hard rock environment. The equipment was field tested (Figure 9) in Kibiro area and found adequate for the intended end-use.



Figure 9: A portable hammer drill being tested

Personal Protection Equipment procured

PPE including mapping coats, camping tents and gazebo tents procured.

3.3.2.2 Human Capacity Development

Short term training

- i) Two staff participated in the pre-retirement workshop at the National Farmers Leadership Centre (NFLC) in Kampiringisa, Mpigi District from 31st May to 2nd June 2022.
- ii) Two staff attend the first and second Organizing committee meeting of the Ninth African Rift Geothermal Conference (ARGeo-C9) on 31st May, 2022 and 23rd June 2022 respectively. The ARGeo-9 is to be held in Djibouti from 1st to 7th November 2022.
- i) On 2nd July 2021, staff attended a training session covering tools and methods for geothermal resource assessments for direct use applications sponsored by Climate Technology Centre Network (CTCN) and United Nations Industrial Development Organization (UNIDO) through Technical Assistance for the development of Geothermal Direct Use in East Africa.
- ii) On 27th to 29th September 2021, staff attended a Geothermal Direct Use (GDU) workshop co-hosted by the Energy Sector Management Assistance Program (ESMAP) of the World Bank, International Geothermal Association (IGA) and the Global Geothermal Alliance (GGA).
- iii) **Africa Climate Week 2021:** On September 28, 2021, Staff attended a virtual workshop with the theme “Accelerating collaboration and integrating climate action into global pandemic recovery”. The workshop was organized by CTCN. The discussion centered on private sector needs and expectations in developing countries, and financing for transformative climate technologies.
- iv) **Geothermal webinar:** On 11th August 2021, a staff attended a virtual geothermal event / webinar Scaling-up geothermal direct use for industrial applications in Latin America.
- v) **Geothermal District Heating and Cooling:** On 23rd September 2021, staff attended a virtual event organized by the International Renewable Energy Agency (IRENA), under the umbrella of the Global Geothermal Alliance (GGA).
- vi) **Stakeholder forum on the use of coiled tubing in geothermal development:** On 20th August 2021, Staff attended a virtual event on

“Coiled tubing in geothermal development” organized and hosted by the Geothermal Association of Kenya (GAK).

Long-term training

- iii) One staff (Mr. Fred Ssemuyaba, Geophysicist) is completed a six months geothermal training in Iceland which started in May and end in November 2021.
- iv) Mr. Brian Aijuka, Reservoir Engineer is pursuing a three (3) year course in Earth Resources Engineering at Kyushu University in Japan which started in October 2021.
- vii) GRD staff participated in online series of webinars on geothermal energy. The courses are intended to reach a range of professionals across all the geothermal technical disciplines. The staff participated in six (6) webinars namely: webinar 7 - Sources of funding-grants, equity, and debt on 31st May 2022; webinar 8 - Owners engineer role-overview of specifications EPC tenders, managing contracts on 2nd June 2022; webinar 9 - Wellhead power plants, 10 - Inside a binary plant – processes and machinery, 11 - Direct use; and 12 - Physical controls on hydrothermal fluid flow in East Africa.

3.3.3 Mineral exploration, promotion, production and value addition

3.3.3.1 Geothermal Resources Exploration

A) Geological structural mapping in Panyigoro:

Detailed surface geological and structural mapping was conducted in the surrounding areas to the east of the Panyimur prospect in Panyigoro area. The results suggest a geothermal potential in the Panyigoro area.

B) GeoTourism

A report accruing from field work conducted by MEMD, MFPED and MTWA. The report was to inform MFPED decision is approving MTWA project concepts. MTWA is planning to develop a number of geothermal areas for spas and swimming pools to promote tourism.

C) Kibiro Geothermal Prospect Temperature measurements

GRD continued with temperature measurement for the TGHs drilled in 2020 at Kibiro, Temperature gradient calculated was between 70 and 350°C (Figure 10,11& Table 4) which is above the global average of 30°C/km. This implies presence of heat in the subsurface at Kibiro.

Further temperature measurements and investigations shall continue to update the conceptual models for Kibiro prospect.

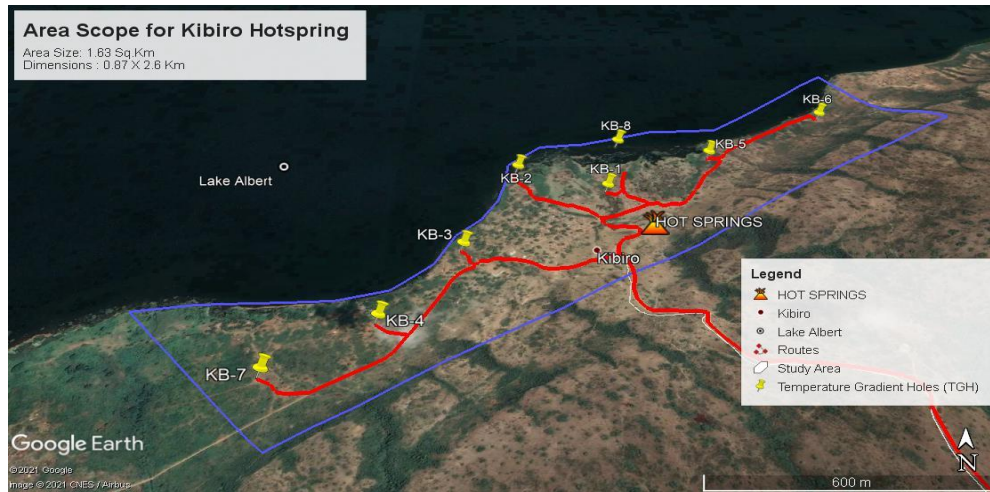


Figure 10: Locations of Temperature Gradient Holes

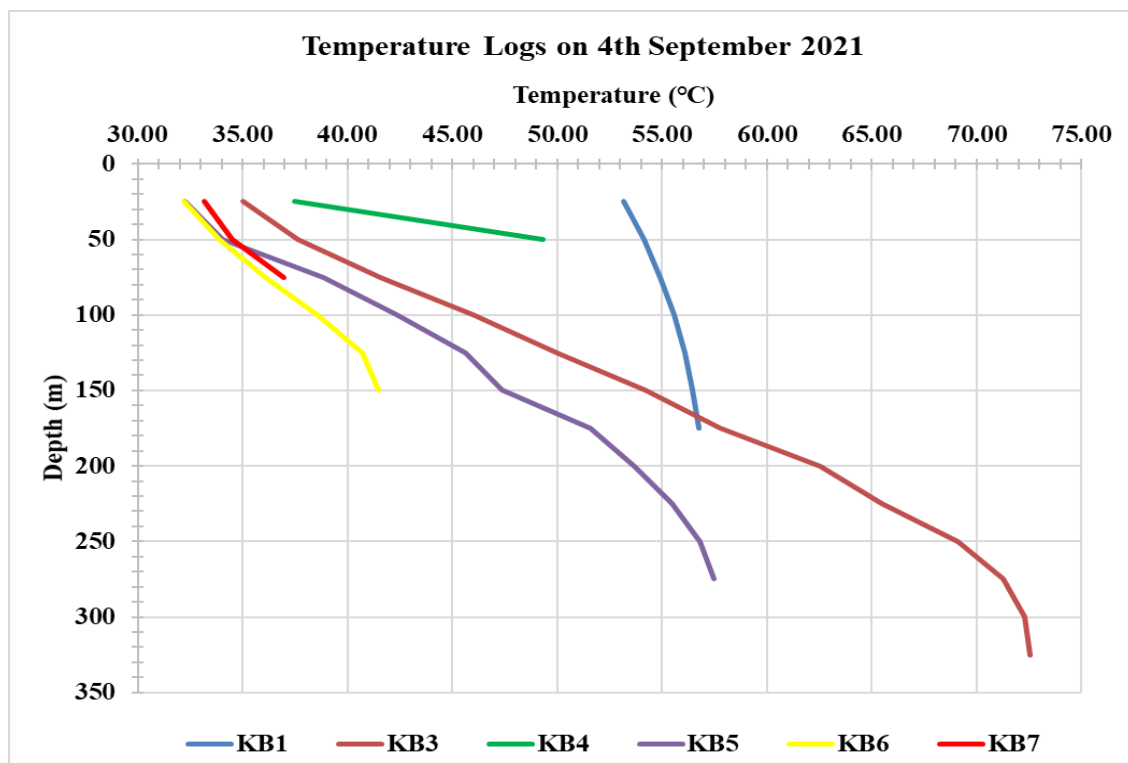


Figure 11: Plot of Temperature Gradient (TG) measurements at Kibiro

Table 5: Results of Temperature Gradients (TG) measurements at Kibiro

TGH	Group 1			Group 2			Inundated	
	KB-3	KB-4	KB-7	KB-1	KB-5	KB-6	KB-2	KB-8
TG (°C/Km)	140.0	344.0	70.6	69.6	100	74.6	-	-

D) African Union Commission-Geothermal Risk Mitigation Fund (AUC-GRMF)

The MEMD applied for the AUC-GRMF for drilling of four (4) Temperature Gradient Holes at Panyimur and Kibiro in 2018. The Grants of USD 316,600 and USD 332,200 were approved in October 2018 for Panyimur and Kibiro respectively. A draft Grant Contract has been drafted and submitted to the AUC-GRMF for funding a four (4) Temperature Gradient Holes (TGH) drilling programme at Panyimur. The draft Grant Contract is being reviewed by the AUC. The grant for Kibiro is pending approval of and ESIA by NEMA.

E) Follow up surveys on other geothermal areas

Follow up surveys on six (6) geothermal areas in Rukungiri and Kanungu districts to update their potential for detailed studies. The areas include Kiruruma in Kanungu district, and Ihimbo, Kanyinabarongo, Minera, Rubabo and Birara in Rukugiri district. The data collected includes status of electricity connection networks, current direct uses of geothermal, change in physical parameters of the hot springs (temperatures, conductivity, TDS, flow rates etc.). Water and rock samples were also collected for chemical analysis in the DGSM laboratory. The results shall be interpreted and two (2) areas selected for further detailed investigation.

F) Reconnaissance survey of the Kanangorok geothermal area

The GRD staff undertook a reconnaissance survey of the Kanangorok geothermal area in Karenga District, Karamoja region was undertaken. The prospect is believed to be a fault controlled deep-circulation system. The area has been proposed for detailed surface studies under the Karamoja Airborne geophysical survey project.

G) Panyimur Geothermal prospect model Improvement

The two staff (Eriya Kahwa and Jacinta Achieng) who completed their MSc., studies in Earth Resources Engineering at Kyushu University in Japan presented their results on Panyimur Geothermal prospect. Their studies

improved, up-dated and refined the geothermal conceptual model of Panyimur that has been used to locate Temperature Gradient Holes (TGH).

H) Collaboration with Ministry of Tourism, Wildlife and Antiquities (MTWA)

The GRD reviewed the Terms of Reference (TOR) for procurement of consultancy services to conduct pre-feasibility and feasibility studies for the proposed Development of Water based Eco Adventure Parks (Geothermal Spas and Resorts) by the Ministry of Tourism Wildlife and Antiquities (MTWA). The study is to recommend the development of geothermal spas and resorts to promote medical and wellness tourism in Uganda. The study will assess a number of geothermal areas (hot springs) across the country and select the based options for development.

I) Drilling of Temperature Gradient Holes (TGH) at Panyimur

In preparation for drilling eight (8) Temperature Gradient Holes (TGH) at Panyimur geothermal prospect, the GRD sensitized the Pakwach District official who included the Chief Administrative Officer (CAO), Resident District Commissioner (RDC), Chairman LC5, District Security Officer (DISO) and District Police Commander (DPC). The land owners and the cultural institution were compensated for the crops on the drilling sites and the temporally roads where the drilling trucks would pass. The drilling programme on 22nd June 2022 (Figure 12). The first hole (PAN-7) was completed to a depth of 300 meters on 25th June 2022. The hole intercepted an aquifer at close to 300 meters discharging warm water at a temperature of 40°C, confirming the presence of heat in the subsurface. The second hole was drilled to 215 meters and completed on 30th June 2022. The rest of the six (6) shall be drilled in the FY 2022/23.



Figure 12: Drilling the first Temperature Gradient Holes at Panyimur.

3.3.3.2 Promotions

On 15th March 2022, Staff gave a talk about geothermal energy development in Uganda to fifteen (15) staff of African Center of Media Excellence at Bunga in Kampala. This was meant to enhance understanding of benefits of geothermal energy development in Uganda.

3.3.3.3 Licensing and Inspections

Two companies are currently licensed to explore for geothermal resources at Buranga and Panyigoro geothermal areas in Bundibugyo and Pakwach districts respectively.

GIDS Consult (U) Ltd is operating a Retention License (RL 1745) at Buranga geothermal prospect in Bundibugyo District. GIDS Consult (U) Ltd has carried out Environmental and Social Impact Assessment (ESIA) for TGH and Deep Exploratory Drilling in RL1745 and submitted the report to NEMA for approval and grant of a certificate. The Company is finalizing a Grant contract with the African Union Commission – Geothermal Risk Mitigation Fund (AUC-GRMF) for completion of surface studies and drilling of TGH to a tune of USD 885,072.

Bantu Energy (U) Ltd is operating an Exploration License (EL 1651) at Panyigoro geothermal area in Pakwach District. Bantu Energy (U) Ltd., was granted a Generation Permit by the Electricity Regulatory Authority (ERA) in 2020 to carry out a Feasibility Study for a 20 MW geothermal power plant. Bantu Energy completed a Feasibility Study and has applied for a Generation License which is yet to be granted by ERA. The Generation Licence is a requirement by the company's financiers before reaching a financial clause. This will lead to drilling of deep exploration wells and installing a pilot power plant at Panyigoro.

3.3.4 Health and Safety

A) ESIA for Panyimur approved by NEMA.

Final Environmental and Social Impact Assessment (ESIA) Reports for Kibiro and Panyimur submitted to NEMA in June 2021 were reviewed and a Certificate of approval for ESIA for Panyimur granted to the MEMD

B) Report on Inter Agency site visit to Kibiro

The MEMD, NEMA and Local Government of Hoima District undertook a joint inspection of the incident site at Kibiro to determine the current status compared to the status immediately after the incident of 29th March 2020

which was caused by high pressure discharge of drilling fluids leading to environmental concerns. The team found out that despite the physical environmental disturbance during the discharge, the land has re-vegetated and rehabilitated naturally over time with no sign of environmental stress (Figure 13).



Figure 13: Team members at the incident site (TGH KB-4) at Kibiro. In the background is Lake Albert.

Reinstatement of disturbed site has been accomplished naturally. The team agreed that another round of environmental sampling and analysis (monitoring results) be conducted by the Developer (MEMD) to inform NEMA's next decision-making process. Decision will be based on sound scientific and technical information.

C) Environmental monitoring at Kibiro

The GRD carried out environmental monitoring at Kibiro. It was found out that the water levels of Lake Albert are retreating with one of the Temperature Gradient Holes (TGH) (KB-2) that had been submerged reappearing on shore (Figure 14). The remaining TGH (KB-8) is still submerged. Monitoring of gases did not detect any dangerous gases around the TGH indicating that the environment is free of toxic gases.



Figure 14: TGH (KB-2) reappearing on surface after the Lake waters retreated.

4 PROJECTS

DGSM has two (2) government funded projects being implemented. These included:

- (i) **Mineral Wealth and Mining Infrastructure Development MWAMID**
The Project supports most of the Directorate activities that cannot be met using recurrent budget, such as: Policy formulation and regulation, Mineral Exploration activities and institution capacity development
- (ii) **Airborne Geophysical Survey of Karamoja Project**, to complete the remaining 20% of Uganda (mainly Karamoja, parts of Elgon and Lamwo) that has not been flown. The project will also cater for ground geological mapping and mineral resources assessment to reduce on uncertainty in search for a particular mineral in those areas.

DGSM is also pleased to be an associate of the European Union (EU) and the United Nations Development Programme (UNDP) Project in Development Minerals. The project is in 40 countries in Africa, the Caribbean and the Pacific. The Programme is implemented in partnership with the Ministry of Energy and Mineral Development in Uganda.

During the FY2021/22, the project trained new staff in application of GIS to resource estimation in Development Minerals in Uganda (Clay, sand, dimension stone etc).

5 CHALLENGES AND RECOMMENDATIONS

5.1 CHALLENGES

- (i) Ban on export of raw minerals discourages exploration, mining, mineral trade and inflow of new investors,
- (ii) Withdrawal of DGSM's licensing administration role during the FY2021/22 by attorney General's Office after the Bill was passed,
- (iii) Insecurity in Karamoja Region which has discouraged exploration and Mining activities,
- (iv) Limited funding to undertake planned activities and recruitment of staff in unfilled positions in the Directorate,

5.2 RECOMMENDATIONS

- i) To intensify mineral sector development promotions globally so as to attract investment in Uganda, since it is government policy to promote value addition and no more export of unprocessed ores,
- ii) DGSM should continue with its Licensing administration role till the Passed Mining and Minerals Bill is assented to into law,
- iii) Government should improve the security situation in Karamoja region so as to provide a conducive investment environment,
- iv) The vacant posts especially those already catered for in the wage Bill and are filled on replacement basis should be filled as soon as possible to lessen the gap;
- v) Increase budgetary allocation to DGSM to allow for financial facilitation of the planned activities and recruitment of staff in positions for newly approved Directorate structure.

6 Appendices

6.1 TABLE OF EARTHQUAKE EVENTS IN UGANDA AND SURROUNDING AREAS DURING FY2021/22

<i>Event Ser. No.</i>	<i>Date (Day/Month/Year)</i>	<i>Event Time UTC (HH:MM:SS)</i>	<i>Latitude (deg)</i>	<i>Longitude (deg)</i>	<i>Body Wave Magnitude (mb)</i>	<i>Focal Depth (km)</i>	<i>Geographical Region of Location (Place, Country)</i>
1	31/08/2021	02:35:17	-3.359	32.3119	4.8	10	Masumbwe, Tanzania
2	07/09/2021	01:48:21	-2.1446	28.8862	4.5	10	Cyangugu, Rwanda
3	18/09/2021	12:56:30	-6.6807	26.9858	4.8	10	Kabalo, DR Congo
4	08/10/2021	17:35:48	-4.911	35.017	4.4	10	Mungaa, Tanzania
5	15/10/2021	05:49:29	-8.5332	32.1593	4.7	10	Laela, Tanzania
6	16/10/2021	00:23:26	-0.3396	29.7956	4.7	10	Rukungiri, Uganda
7	16/10/2021	04:46:05	-0.3636	29.9453	4.5	10	Rukungiri, Uganda
8	15/11/2021	01:38:54	-4.0251	30.1834	4.1	10	Rutana, Burundi
9	09/12/2021	08:18:20	-5.3583	35.7289	4.4	10	Kondoa, Tanzania
10	01/01/2022	21:14:38	-4.8137	34.9883	4.3	10	Mungaa, Tanzania

11	14/01/2022	09:08:52	-9.8939	34.2464	4.4	10	Mlangali, Tanzania
12	26/01/2022	02:06:10	-7.2607	27.9722	5.0	10	Kabalo, DR Congo
13	13/02/2022	16:28:35	0.5647	30.2209	4.7	10	Fort Portal, Uganda
14	14/02/2022	04:04:51	-4.3271	29.3112	4.7	10	Rumonge, Burundi
15	14/02/2022	05:28:00	0.5716	30.2373	4.9	10	Fort Portal, Uganda
16	16/02/2022	18:02:11	1.6196	30.8097	4.3	10	Kigorobya, Uganda
17	17/02/2022	15:18:37	-4.4828	35.0514	4.0	10	Basotu, Tanzania
18	18/02/2022	04:18:40	-5.1231	35.0834	4.2	29.8	Mungaa, Tanzania
19	18/02/2022	11:35:21	-5.2365	34.9381	4.2	15.3	Ikungi, Tanzania
20	18/02/2022	13:22:17	-5.2919	35.02	4.3	14.6	Ikungi, Tanzania
21	18/02/2022	13:24:44	-5.2356	34.8124	4.3	14.6	Ikungi, Tanzania
22	18/02/2022	17:11:33	-6.288	31.0658	4.6	10	Mpanda, Tanzania
23	24/02/2022	18:59:52	-7.3408	28.1712	4.5	10	Kalemie, DR Congo
24	25/02/2022	01:51:17	5.0833	32.2789	4.5	10	Torit, South Sudan
25	03/03/2022	20:32:49	-5.8054	27.4571	4.3	10	Kabalo, DR Congo
26	06/03/2022	08:59:49	-0.1512	29.8224	4.6	10	Kilembe, Uganda
27	02/04/2022	02:20:22	-7.4509	30.3992	4.3	10	L. Tanganyika Region
28	02/04/2022	20:02:10	-3.6971	37.7571	4.2	10	United Rep.Tanzania

29	03/05/2022	16:27:20	0.9073	25.9994	4.4	10	Dem. Rep. of Congo
30	10/05/2022	12:22:30	-6.5616	35.1294	4.3	10	United Rep.Tanzania
31	07/06/2022	06:20:56	-6.5179	31.1057	4.3	10	L. Tanganyika Region
32	07/06/2022	06:21:59	-6.4812	30.898	4.5	10	L. Tanganyika Region
33	24/06/2022	20:14:11	-2.6433	28.7183	4.4	10	L. Tanganyika Region