



## **DIRECTORATE OF GEOLOGICAL SURVEY AND MINES 2017**



*Sukulu polymetallic Mine under development by Guangzhou Dong song Energy Group Co. Ltd*

# **ANNUAL PERFORMANCE REPORT 2017/ 2018**

### **MANDATE:**

*To establish, promote the development, strategically manage and safeguard the rational and sustainable exploitation and utilisation of mineral resources for social and economic development.*



**AG. DIRECTOR/ DGSM**



**AG. COMMISSIONER/GSD**



**COMMISSIONER/MD**



**AG. COMMISSIONER/GRD**

## **EXECUTIVE SUMMARY**

The Directorate of Geological Survey and Mines has three Department. That is Geological Survey Department, Mines Department and Geothermal Department.

Its mission is to develop and regulate the mineral sector of Uganda for socio-economic development in line with vision 2040 and NDP II. This was realized on by continued review of the Mineral and geothermal policy in order to strengthen the legal framework.

The Mineral Policy was approved and review of the Mining Regulations and Geothermal policy is underway. A Minerals Laboratory Policy was developed and the Regulatory Impact Assessment (RIA) for the Mining and Mineral Bill 2018 was also prepared.

Under the funding of MWAMID project, geological and geochemical investigations carried include; gold exploration in Zeu, Zombo District showed zones of Zn (94-137ppm), Cu (82-137ppm), Cr (361-3119ppm) and Ni (248-300ppm) anomalies. The anomalies are associated with Kibale-Arusa complex with mafic metavolcanics, fuchsite quartzite

Interpretation of the Airborne Radiometric data confirmed Uranium targets of about 100ppm in the ground worth exploration. 2D Resistivity and Induced Polarisation (IP) survey conducted gave high resistivity zones (>1000 ohm.m) to the east of the of the mine, trending NNW and these zones strongly correlate to the wolfram bearing rock units ( 700m length x 150m wide zone). Electrical Resistivity Imaging Investigations with Gradient array conducted in Rutenga, Kabale District confirmed the presence of Iron ore.

Uganda Geothermal Resources Development Project funded a drone aided thermal anomaly mapping (surface thermal features) at Buranga and report is yet to be delivered.

DCIUNIN project has focused on the infrasound infrastructure development, and awareness in response to lightning risk in the country. The project has undertaken lightning vulnerability assessment, public awareness and education; training on Lightning risk in Western, Central, Eastern and part of Northern Uganda so that communities can install adaptation and mitigation technologies in their dwellings. The field findings have revealed that lightning is a serious issue and more attention should paid to it since 80% of the schools have no

lightning safe guards. The designs and configuration of Infrasound network has been completed to enable construction of the network. More work is being done to develop a strategy on lightning for monitoring and early warning system.

ACP-EU-Development minerals project has finalized Baseline Assessment and Value Chain Analysis Report for the sector. Trainings in GIS, ore modelling, environment, community, health and safety, and value addition were done.

DGSM continued to monitor earthquake from the five set-up stations at Entebbe (ENTD/TEBE, Hoima (HOID), Nakauka (NAKD), Kilembe (KILD) and Mbarara-Kyahi. Twenty-two earthquakes were recorded during the year and the highest was at 5.3 magnitude with epicentre at the Northern tip of Lake Edward, Western Rift. Annual earthquake bulletin and annual seismicity map for Uganda and the neighbouring region was produced for informed advisory services.

1345 samples were analysed for REE, base metals, Gold and as forensic minerals using gravimetric, X-ray fluorescence (XRF) spectrophotometry, Ultra-violet (UV) spectroscopy, titration, and mineralogy examination techniques.

(68) Publications, 5 unpublished reports and (239 newspaper articles were captured as information disseminated to staff and visitors. Mineral Occurrence map was updated with new discoveries and shared as promotion material. The Geodata division is now designing an integrated information system to merge all existing information systems into one platform in order to facilitate acquisition, processing and dissemination of geo-scientific information to staff and the general public.

During F/Y 2017/18, a total of 671 were operational as of 30<sup>th</sup> June 2018. 221 Licenses were granted of which 181 were for Prospecting Licenses (PL), 86 for Exploration License (EL), 1 for Retention License (RL), 2 for Mining Leases (ML), 17 for Location Licenses (LL) and 115 for Mineral Dealers' License (MDL). 15 Exploration Licenses and 6 Location Licenses were renewed while 260 licenses were not renewed. 2 Mining Lease was revoked. Minerals worth UGX158,754,410 were produced in Uganda and revenues amounting to UGX14,230,860,561 were generated from export of produced minerals while revenues amounting to UGX1,468,932 were generated from import of minerals. NTRs totaled to UGX16,702,115,814 from licensing, import and export permits.

The Directorate participated in various promotion workshops, conferences and exhibitions. Five members are on long term training while five members attended short term training.

In conclusion, the DGSM's annual performance for FY 2017/18 is commendable visa-vis the challenges of insufficient Human and Financial resources to efficiently execute its mandate. Filling the vacant positions in DGSM and increase in budgetary allocation to facilitate the planned activities is recommended to further improve and enhance the performance of DGSM's.

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## **LIST OF ABBREVIATIONS (ACRONYMS)**

AAS	Atomic Absorptions Spectrophotometer
ACP	African Caribbean Pacific
AGR	African Gold Refinery
ASM	Artisanal Small-scale Miners
BGR	Bundesanstalt für Geowissenschaften und Rohstoffe (BGR)
DCIUNIN	Design, Construction and Installation of Uganda National Infrasound Network
DGSM	Directorate of Geological Survey and Mines
EAGER	East African Geothermal Energy Resource
ERA	Energy Regulation Authority
EU	European Union
GRD	Geothermal Resources Department
GSD	Geological Survey Department
ICGLR	International Conference of the Great Lakes Region
IDEP	International Development and Economic Planning for Africa
Ltd	Limited
MD	Mines Department
MLA	Minerals Liberation Analysis
MW	Mega Watts
MWAMID	Mineral Wealth and Mineral Infrastructure Development
NEMA	National Environment Management Authority
PEPD	Petroleum Exploration and Production Directorate
REE	Rare Earth Elements
RINR	Regional Initiative on Fight against the illegal exploitation of Natural Resources
SMMRP	Sustainable Management of Mineral Resources Project

TORs	Terms of Reference
UETCL	Uganda Electricity Transmission Company Limited
UGRD	Uganda Geothermal Resource Development
UNDP	United Nations Development Program
XRF	X-ray Fluorescence

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## **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 in line with the NDP II and VISION 2040.

## **2 INSITUITIONAL FRAMEWORK**

The Directorate of Geological Surveys and Mines is composed of three Departments namely: Department of Geological Surveys; Mines Department; and Geothermal Resources.

Geological Survey Department (GSD): Is in charge of mapping and confirmation of mineral targets in Uganda as well as attracting investment into the sector by designing information systems that facilitate information sharing with staff and the general public. GSD is made of Geological Division, Laboratory Division, Geodata Division, Geophysics and Seismic Division.

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

The Geothermal Resource Department: Focuses on exploration, promotion and development of the country's geothermal resources whose potential stands at 1,500MW (Uganda Vision, 2040).

DGSM works very closely with other MDAs like MFPED, NFA, UWA, PEPD, Uganda Police Force and other to achieve its mission.

## **3 POLICY, LEGAL AND REGULATORY FRAMEWORK**

Along with the Constitution of Uganda 2006, DGSM is governed by the Mineral Policy 2001, the Mining Act 2003 and Mining Regulations 2004.

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### **3.1 Review of the Mining and Mineral Policy**

DGSM conducted the review of the Mineral Policy 2001, and finalised the draft Mining and Mineral Policy, of Uganda to strengthen the legal framework governing the mineral sector. The Mining and Mineral Policy was approved by Cabinet on 7<sup>th</sup> May 2018 and is now operational.

Subsequently, the directorate identified key principles for the Mining Act 2003 amendment and prepared Cabinet Memo on the principles to be embodied in the Mining Act, amendment bill, 2018. The DSGM also reviewed the Mining Regulations, 2004 to accommodate online applications and e-government system of mineral licensing system.

### **3.2 Mineral Laboratory Policy**

The project supported the formulation of Mineral Laboratory Service Policy that led to draft Mineral Laboratory Policy. The Policy goal is to strengthen the mineral laboratory that support research and provide services of international standards.

### **3.3 Geothermal Policy Formulation and Regulation**

The goal of the Geothermal Policy is to provide a framework that facilitates effective and sustainable exploration, development and utilisation of Uganda's geothermal resources for social and economic transformation.

A draft geothermal policy was reviewed with inputs from the Senior State Attorney, Cabinet Secretariat, and the East African Geothermal Facility (EAGER). The GRD is working with Cabinet Secretariat to develop a Regulatory Impact Assessment (RIA) and to realign the document in a format that is acceptable by Cabinet. The final document will be discussed at a final workshop in October 2018 before it is submitted to Cabinet for consideration.

## **4 PROJECT PERFORMANCE REPORT FOR FY 2017/18**

Active projects include: MWAMID, DCIUNIN, UGRD, MLESD, and ACP-Development Minerals Project.

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#### **4.1 Mineral Wealth and Mining Infrastructure Development MWAMID – Project (1353)**

MWAMID project is aimed at strengthening the mineral sub-sector in the areas of mining legislation, mineral assessment, analytical laboratories, Human Resource Development, procurement of specialised equipment and tools for acquisition and management of geo-scientific data and mining infrastructure Development. During the year 2017/2018, the following activities were achieved under MWAMID project.

**Policy Formulation and Regulation:** The project sponsored the process of review of the Mineral Policy, 2001, Review of the Mining Act, 2003 and drafting of the key principles for Mining Act Ammendment Bill, 2018, Formulation of the draft mineral laboratory policy, preparation of Regulatory Impact Assessment for the Policy and Law as well as finalization of Mining and Mineral Policy, 2018. The Mining and Mineral Policy was approved on 7<sup>th</sup> May 2018.

**Mineral Assessment:** The project funded the Mineral Exploration, Development, Production and Value addition at; Zeu Gold Anomaly field, Busumbu REE Prospect investigations, Geochemical investigations of Kyambogo Uranium anomaly, Ground Geophysical investigation of Rutenga Iron ore prospect, Geophysical Interpretation and Evaluation of Airborne Radiometric data, Ground Geophysical investigation of Katara Uranium Anomaly, geological and geochemical exploration of Kabale Iron Ore anomaly.

**Analytical laboratories:** One of the key objectives of the project is to strengthen the mineral laboratory, for it to research and provide services of international services. The project supported acquisition of equipment and capacity building of the Key staff of laboratory. One staff enrolled for Master of Science in analytical chemistry.

**Acquisition and management of geo-scientific data:** In order to facilitate centralised information access, MEMD and M/S Beak Consultants GmbH in association with Sunshine Project Ltd signed a contract on 30<sup>th</sup> October 2018 for maintenance, upgrade, integration of LIBERO, UDIS and GMIS systems at the Directorate of Geological Survey and Mines, Entebbe, for a period of three years. Phase 1 and 2 of the implementation plans were completed.

The project has empowered Cartography staff to update and maintain MWAMID Geo-data base with mineral assessment data from previous mineral surveys.

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The project has empowered Documentation Centre staff in the design, construction and maintenance of DGSM website which was first run on 24<sup>th</sup> November 2017 under the domain name [www.dgsm.go.ug](http://www.dgsm.go.ug). The webpage is continuously populated with new information.

**Mining Cadastre and Registry System:** MEMD signed a contract with Spatial dimensions on the 22<sup>nd</sup> February 2018 for the upgrade and maintenance of the mining cadaster and registry system to an e-government system for a period of three (3) years under the funding of MWAMID project. The cadaster system can now allow online application of all mineral rights through the e-government portal.

**Monitoring and inspection:** In order to enforce compliance, with health and safety standards of mining, MWAMID project facilitated over 40 inspections per quarter that included: 3 flagship projects (Sukulu Phosphate project, Kilembe Mines and Iron ore exploration and Development), 41 mining leases, 20 location licenses, over 50 Exploration Licenses and 50 ASM sites country wide: Notable ones included: Greenstone Resources, Kisita gold Mine, AUC gold Mine, Kigezi Steel, Sino Investment iron ore mines, Berkley reef, Nyamuliro Mines, Kirwa Mine, Mutolere Wolfram Mine, Bahati Wolfram mine, Kikagati Tin Mine by African Panther, Ntungamo tin mine by Zanack, Great Lakes, Namekara Vermiculite, Kakanena Coltan mine, Hima Cement Ltd. Mines, National Cement, Wagagai Resources, SIPA exploration Company and assessment of landslides in Bundibugyo. Findings are reported in the Mines Department report.

Project facilitated activities and deployment of Police Mineral Protection Unit (PMPU) to enforce compliance to the Mining Legislation. (Figure 1 ~~Figure 1~~: Police Mineral Protection Officers have been deployed at active ASM mining sites in Mubende, Busia, Kirwa, Nyamuliro and in all custom borders in South Western Uganda for curb mineral smuggling.



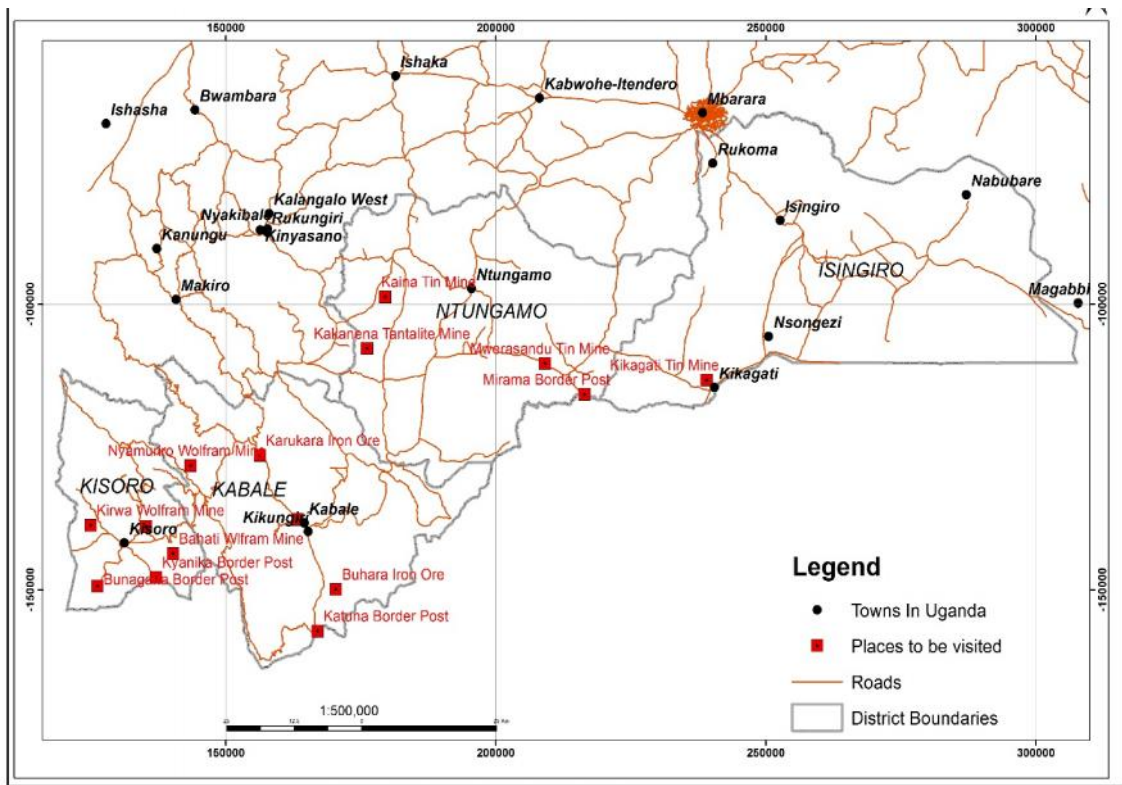


Figure 1: Police Mineral Protection Unit (PMPU) deployment to enforce compliance to the Mining Legislation

**Regulation of ASM:** DGSM continued sensitization and formalization of ASM activities in the Country: The activity was fully supported by the MWAMID project as under the Mines department.

**Infrastructure development:** MWAMID project has constructed a regional office that will training centres for transfer of skills to ASMs. The Directorate of geological survey and mines commissioned a regional office for Karamoja sub region based in Moroto (Figure 2).



Figure 2: Commissioned of New Karamoja Regional Office

**Human Resource Development:** The project sponsored a number of staff to conferences, workshops, exhibitions and also short and long term trainings during the year as mentioned in the Human capacity section. Henry Onyeye is undertaking MSc. In analytical Chemistry in the United Kingdom

**Gender Mainstreaming in Mining:** Gender mainstreaming in the mineral sector during the year was carried in the Districts of Amudat, Moroto, Abim, Buhweju and Mubende (Figure 3)



*Figure 3: Women participation in Artisanal and Small Scale mining*

**Mineral Sector Promotion:** MWAMID project promoted the mineral sector at Mining Indaba mineral promotional conference in South Africa , InterGovernmental forum on Metals and Minerals in Geneva, Mineral Wealth Conference in Kampala as well as Health and safety awareness at various mining sites country wide.

Key procurements under MWAMID Project include:

The Directorate procured the following equipment and services under MWAMID project:

- i.* Procured consultancy services of M/S Beak Consultants GmbH for designing an integrated Information system to facilitate a centralised information
- ii.* Consultancy services to develop a national mineral laboratory services policy
- iii.* Consultancy services to develop a national mineral laboratory services policy
- iv.* The installation of shelves in the laboratories was finalized and has improved quality, control, health and safety in the laboratories since there is now secure storage for laboratory samples and equipment.
- v.* One (1) table mounted and one (1) portable gold drilling machine and accessories and vacuum quartz tubes for sampling gold melt during smelting were supplied under supply contract for the supply of laboratory sampling equipment and accessories for gold bars and bullion assessment for royalties for the Directorate.
- vi.* A bond mill, standard steel ball charge, and tachometer; heavy duty compressor; pressure plate filter; two (2) accessory swing mill pots; and a smelting furnace were procured and supplied. These equipments constitute equipment for fire assay analytical technique

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- for precious metals, sample preparation and mineral beneficiation testwork.
- vii.* With the technical support of the Ministry's Energy Efficiency and Conservation Department (EECD), undertook an assessment of electrical works at the Directorate for purposes of rectifying electrical problems and came up with electrical wiring and installations drawings for the rewiring of the office and laboratory blocks at the Directorate, including bills of quantities and procurement documents.
  - viii.* Engineering drawings for the remodelling of laboratory building at the Directorate to house the Fire Assay Unit, including bills of quantities and procurement documents, were prepared. This was undertaken so as to install recently acquired equipment and those whose procurement is underway with the required health, safety and environment provisions in place.
  - ix.* Procurement of an individual consultant for the design of a dust extraction system for the sample crushing unit and secure venting system for the Chemical Store at the Mineral Dressing Laboratory of the Directorate in Entebbe was initiated and request for quotations issued
  - x.* Chemicals and reagents for analyses to support mineral evaluation studies and assessment of royalties were supplied.
  - xi.* Contract was put in place for three (3) years and service and maintenance of five (5) laboratory fume hoods and four (4) scrubbers is being undertaken bi-annually.
  - xii.* Payment for the repair and servicing of the Atomic Absorption Spectrophotometer (AAS) has been cleared and clears the way to finally have the equipment worked on and put it back into operation.
  - xiii.* The X-Supreme 8000 X-ray Fluorescence (XRF) Spectrometer was shipped to the United Kingdom for repair and shipped back to the Directorate after successfully being repaired.
  - xiv.* Procured services to reprint of publications from Uganda Printing and Publishing Corporation (UPPC) for information sharing with potential investors.
  - xv.* Procurement of assorted mineral certification equipment and computers.
  - xvi.* Procurement of a Real Time Global Positioning System (GPS).
  - xvii.* Supply and installation of a multifunctional production printer/digital press for the Directorate of Geological Survey And Mines-Entebbe
  - xviii.* Procurement of three (03) Double Cabin Pickups for Mineral Wealth and Mining Infrastructure Development (MWAMID) and one station wagon
  - xix.* Reconstruction of a Boundary Wall at The Geological Survey and Mines Offices in Entebbe and minor civil works.

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- xx. Completed Construction of Karamoja Regional Office. The procurement of contractor for Ntungamo Mineral Beneficiation Centre is underway while land in Mbarara, Fort Portal and Tororo have been secured.

Details of the project activities are reported in the project performance report 2017/2018.

#### **4.2 Uganda Geothermal Resources Development Project (Program 1199)**

The Uganda Geothermal Resources Development Project (UGRDP) commenced in FY 2011/2012 with an objective of carrying out a pre-feasibility study of Katwe, Buranga, Kibiro and Panyimur geothermal prospects and a feasibility study of one selected prospect for purposes of identifying another source of energy to complement the existing hydro and other sources of power. The project achievements in the FY 2017/18 include:

**Geothermal Policy formulation review:** The review process took place from 25th to 26th October 2017 at Silver Spring Hotel Bugolobi and other subsequent workshops and meetings. A final draft and Regulatory Impact Assessment are being discussed with Cabinet Secretariat before submission for consideration.

**Geothermal Association of Uganda:** A draft constitution was made for the Geothermal Association of Uganda. It is undergoing internal peer review before it is adopted.

**Institutional Capacity development:** The GRD project funded the following trainings;

- Soil gas and gas flux measurements at the DGSM and in the field at Kibiro geothermal prospect.
- Database Management at the DGSM.
- UNU-GTP/KenGen/ GDC Short course: on exploration and development of geothermal resources at Naivasha, Kenya.
- Zambia Study Tour to Kalahari Geothermal Energy.
- African Geothermal Center of Excellence in Naivasha and Nakuru, Kenya.
- African Center for Media Excellence (ACME).
- Atomic Spectroscopy Seminar.
- International Geothermal Forum.

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**Breathing and gas detection workshop:** Two project staff attended a one-day workshop on breathing and gas flame detection equipment workshop at Protea Hotel Kampala.

**International correspondences (EAGER Technical assistance):** The Project staff worked with EAGER Consultants in the following areas: (i) Development of Protocols for geophysics work in inaccessible areas with thermal surface manifestations, (ii) structural geology mapping at Katwe, Kibiro, Buranga and Panyimur, (iii) Mentoring support on geophysical exploration and data interpretation, (iv) Development of exploration plans for Katwe, Buranga and Panyimur (v) Brief on external drilling consultant, (vi) Up-dated exploration plans for Panyimur and Buranga, (vii) Data synthesis, interpretations, and modeling was also conducted.

**Geothermal explorations conducted:** The project funded geological investigations at Ihimbo Geothermal Site, Micro-seismic survey at Kibiro and surroundings, Drone aided thermal anomaly mapping at Buranga MT Survey [Figure 4](#)~~Figure 4~~, Buranga and Panyimur Structural mapping, Dutch Consortium data review for Panyimur, Panyimur MT/TDEM Survey, Database development and Management, Reflective Seismic data collection, Reconnaissance field survey of Heritage thermal spring in Mwoya district.

**Geothermal Direct-use applications:** From 25<sup>th</sup> to 29<sup>th</sup> June 2018, a preliminary study was undertaken by EAGER experts and local project counterparts. The results of the study will inform and guide developing the business and financial model (business decision tool) of direct use application of geothermal in Uganda. Field tasks included stakeholder engagements at Kibiro and Panyimur with focus on agricultural drying, dairy processing, industrial drying, timber drying, grain and vegetable dehydration, aquaculture, farm animals, green houses, swimming pools, spas, and agri-business. A technical report is being compiled.



*Figure 4: Drone being prepared for take-off at Buranga.*

**Nyamwamba Fault Hotspots:** Geological studies indicated that this is a tectonically active fault zone (Rwenzori bounding/border fault) with geothermal surface indicators like hot springs, warm springs, gaseous emissions and travertine deposits. The normal fault is dipping east and the system is predicted to be a conventional extensional type geothermal system which typifies other extensional type geothermal systems which rely on deep circulation of meteoric waters. Heat is ascribed to high geothermal gradient due to extended and thinned crust. The resulting high thermal gradient facilitate the heating of meteoric waters circulating through deep faults. This is a favorable exploration terrain in terms of geologic and tectonic frameworks. Data needs were identified for next phase of exploration.

**Rwimi-wasa fault zone:** Reconnaissance level exploration was conducted along Rwimi-Wasa fault and a linear map was prepared for this fault zone (Rwenzori bounding zone) (Figure 6). Faults have been delineated. According to micro-seismic study (BGR, 2004), the normal fault is seismically active. The pattern of earthquake focal centers is mainly associated with active Rwimi-Wasa fault (Twesigomwe; 1996, Upcotte et al, 1996). Earthquake focal mechanism in the

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area show almost pure normal faulting with nodal planes striking NS to NE-SW direction. It is a potential area for geothermal resources due to deep penetrating Rwenzori bounding normal fault. Active extensional tectonics is likely to permit the deep circulation of meteoric fluids and elevated heat flow (high thermal gradient) that rises the temperature of fluids.

**Acquisition and management of geo-scientific data:** The project facilitate the design and finalization of Kibiro UNEP-ARGeo report titled ***“Integrated Geo-scientific report on the Kibiro Geothermal Prospect” in Uganda*** prepared by UNEP-ARGeo, GDC and DGSM. The report is being prepared for publication by UN Environment in Nairobi, Kenya.

**Health, Safety and Social awareness:** In order to mitigate the anticipated challenges of mining, the project initiated the procurement of health and safety equipment.

**Monitoring and Inspection:** The project funded inspections at Micro-Seismic monitoring around Kibiro geothermal prospect.

**Environmental baseline survey:** Baseline determinations were conducted in Kibiro and Ihimbo to document the current state of the physical, social and economic environment prior to beginning the drilling projects.

**ToRs for ESIA:** ToRs for Environmental and Social Impact Assessment (ESIA) for Panyimur and Kibiro were drafted and submitted to HPDU to initiate procurement of consultancy services.

**Waiver of exemption:** Conservation areas are exempt from exploration activities until a waiver of exemption is obtained from relevant authorities. The Ministry obtained a waiver from UWA to undertake geothermal resources investigations in protected areas. Licensing and Inspection: MS Moto Geothermal Project Ltd and Bantu Energy Uganda Limited were granted geothermal exploration licenses in Rukungiri and Pakwach Districts respectively. The Exploration License (EL) held by Gids Consult Ltd over Buranga prospect expired and a Retention License was granted to the same operator for three years.

**Procurement:** The following goods and services were procured.

- i. Field Vehicles: One (1) field vehicle was procured and procurement of two others initiated.



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- ii. M/s Beautiful Engineering and Equipment: Radon and soil flux meter were procured.
  - iii. Geophysical data processing software: Procurement of Empower and Geotools was initiated.
  - iv. Repair of TEM Equipment: Geonics TEM 67 equipment (Geonics Protem receiver and TEM 67 system) for geophysical exploration was repaired in South Africa.
  - v. Land Acquisition: The Project is working with District authority in Pakwach and Hoima to identify suitable land for base camps.
  - vi. IGA-African Regional Branch: Staff attended ARGeo meeting where members were nominated to International Geothermal Association (IGA), African Regional Branch at Enasipai, Naivasha, Kenya.

**Sector Promotion:** Promotional materials were submitted to African Minerals Limited which exhibited during Mining Indaba Conference in Cape Town, South Africa. Promotional DVD and brochures were produced and these are routinely given out to the public to enhance public knowledge about geothermal energy.

#### **4.3 Design, Construction and Installation of Uganda National Infrasound Network Project (program 1392)**

The project is aimed at Design Construction and Installation of Uganda National Infrasound Network (DCIUNIN). DCIUNIN will further Establish Infrasound Network Infrastructure in line with the Uganda Vision 2040, Build capacity in infrasound research for social economic development and population's security, Enable vulnerable communities install corrective measure against lightning strikes and Advise government on a comprehensive national strategy for adaptation and mitigation systems. The project commenced in FY 2016/17) and has completed now two years with good performance on the development of infrastructure and public awareness about geohazards.

The project has focused on the infrasound infrastructure development, vulnerability assessment, public education and awareness in response to geo-hazards especially seismic and lightning risk in the country. The project also procured necessary inputs and other procurements of specialized equipment for infrasound infrastructure are ongoing.

The project findings indicate that about 80% is highly vulnerable to lightning risk. Lightning and geo-hazards vulnerability studies revealed that at least 23% of the schools had lightning arrestors and 77% of the schools did have installations.

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Field investigations indicate that lightning is very common and mostly associated with the first rains after a dry spell. In Central and Western Uganda these are communities and schools in Wakiso, Mpigi, Rakai, Masaka, Kiruhura, Mbarara, Isingiro, Ssembabule, Mubende, and Kiboga. Field investigations further indicate that some of the deaths were reported especially among school children, and trees that were being struck. This observation indicates that pine forests in the country are most likely to catch fire triggered by lightning.

In the Eastern region the project investigated Mbale, Sironko, Budaka, Busembatya, Namutumba, Kibuku and Iganga and Jinja. The inspections were carried out on Communities and found out that communities needed more sensitization and awareness on dangers of lightning and safety measures. Investigations and media reports too revealed that lightning has continued to negatively impact on population's security.

During the year, evaluation, and selection of the contractor to put in place the infrasound network infrastructure ~~Figure 5~~ was completed. The Uganda National Infrasound Network Infrastructure has been stationed in Entebbe.

On mapping of vulnerability of communities to lightning risk, the project findings indicate that Butambala, Mpigi and Gomba zone is highly vulnerable to lightning strikes. During the project stakeholder consultations the data collected and analyzed identified vulnerable communities to lightning in Kalungu, Masaka, Lwengo Mpigi, Butambala, Bukomansimbi, Gomba, Mityana and Kiboga in need of adaptation and mitigation systems against lightning strikes.

Thirty-three (33) communities in Kalungu, Masaka, Lwengo and Bukomansimbi were sensitized and mapped and only 57 % of the community had lightning arresters installed. The project has developed specification for design of effective adaptation and mitigation system for the country. In collaboration with Office of the Prime Minister and consultants the project has provided data and participation in the development of a National Disaster Risk Atlas. Global lightning risk map by NASA shows Lightning flash per Square Kilometre per year. Note that lower cut off for Uganda is 8 flashes per Square Kilometre per year ~~Figure 6~~. Uganda is prone to tropical lightning and thunderstorms, being one with the highest rates of lightning strike deaths among the countries in the world and its capital Kampala has more days of lightning per year than any other city, according to the World Meteorological Organization (~~Figure 6~~**Error! Reference source not**

**found.**) These two phenomena present a natural geophysical laboratory for research in Uganda.

The project will continue to investigate geological relationship of rock formation and lightning risk to public institutions in the country. The project has established that there is a strong correlation of Geological structures such as faults, dykes and sills geometrically arranged like ground capacitors which are points of cloud ground electrostatic discharges contacts. The lightning data are being applied in mineral exploration by integrating with other data set of aeromagnetic surveys and radiometric measurements.

DCIUNIN Project Coverage on the infrasound infrastructure development, vulnerability assessment, public education and awareness in response to geohazards especially seismic and lightning risk in the country is shown in [Figure 7](#)

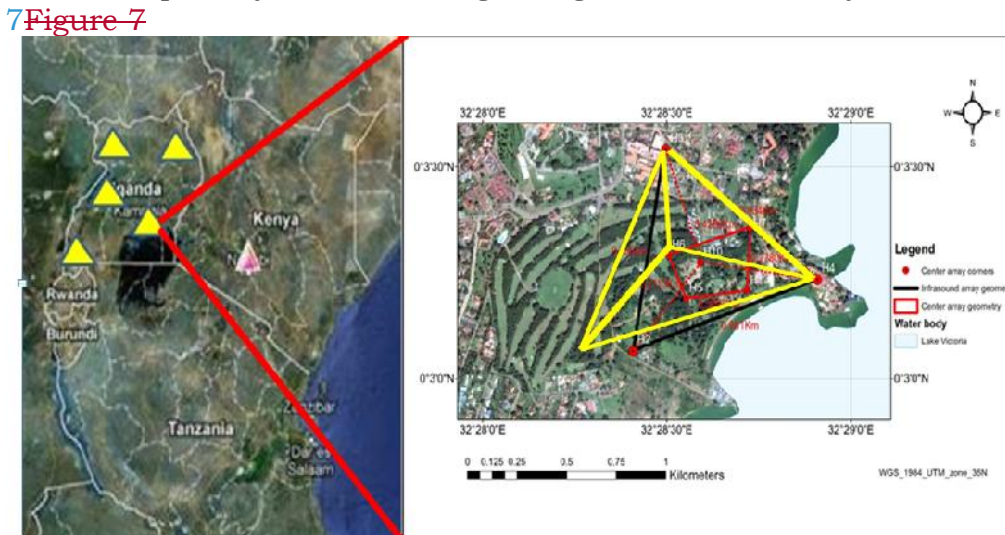


Figure 5: Uganda National Infrasound Network Infrastructure Plan

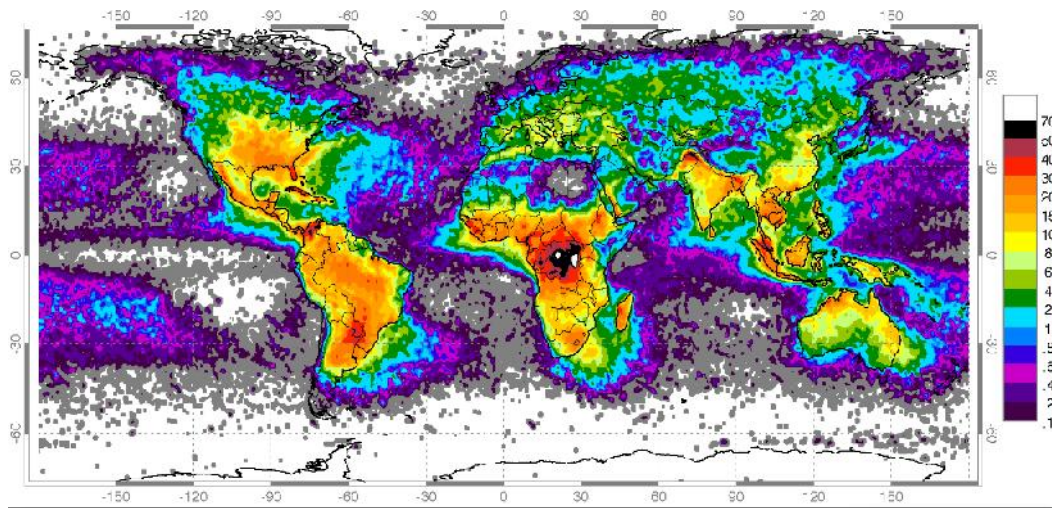


Figure 6: Global lightning risk map by NASA

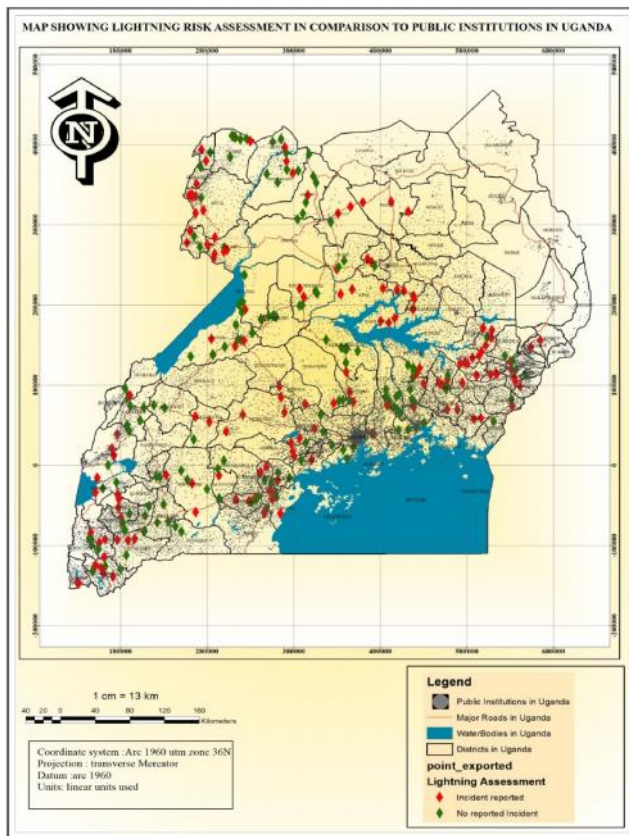


Figure 7: DCIUNIN coverage on response to geo-hazards

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#### **4.4 Mineral Laboratory Equipping and Systems Development (MLESD 1505)**

MLESD project commenced in July 2017 and so far, the following activities were undertaken:

Six (6) laboratories within Uganda were benchmarked to inform the Directorate of analytical and mineral beneficiation techniques and systems available and can be acquired for the Directorate's laboratories. These include laboratories of Uganda Industrial Research Institute (UIRI), African Gold Refinery (AGR), Directorate of Government Analytical Laboratory, Uganda National Bureau of Standards (UNBS), Ministry of Works and Transport's Construction Standards and Quality Assurance Department Central Materials Laboratory, and Hima Cement Plant.

Three (3) technical staff of the laboratories also undertook a bench-marking of laboratories of the African Minerals and Geosciences Center (AMGC) and the Geological Survey of Tanzania (GST) in Dar es Salaam and Dodoma, respectively in Tanzania, from 4<sup>th</sup> to 8<sup>th</sup> June, 2018.

Procurement for the supply and installation of five (5) higher capacity and low detection limit analytical equipment for analysis of samples from mineral exploration at the Directorate was initiated and the implementation of the contract is underway. The equipment to be supplied and installed under this contract include: An Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES), Cupellation furnace, planetary ball mill, Large sample drying oven, and bench top oven.

Procurement of an individual consultant for the design, implementation, maintenance and support services of a Laboratory Information Management System (LIMS) for the DGSM Laboratories was initiated and bids successfully evaluated. The LIMS shall be the platform through which laboratory testwork is to be assigned to staff and in so doing is expected to improve performance as it shall provide a platform to monitor performance. The system shall also facilitate easier access and compilation of statistics concerning laboratory analyses and related information.

As part of building technical and managerial capacity of laboratory staff and putting in place mechanisms for the Directorate's laboratories to meet international standards (ISO Accreditation) and requirements for analytical laboratory testing thirteen (13) of the Directorate's technical staff, one (1) technical staff from the Petroleum Exploration, Development and Exploitation Department (PEDPD), and five (5) university students on industrial training at the Directorate were trained on the implementation of ISO/IEC 17025:2017

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and Internal Audit based on ISO/IEC 17025:2017 by Kenya Accreditation Services (KENAS) at the Directorate, from 18<sup>th</sup> to 22<sup>nd</sup> June 2018.

#### **4.5 ACP-EU Development Minerals Project:**

The African, Caribbean, Pacific (ACP) Group of States, the European Union (EU) and the United Nations Development Programme (UNDP) are implementing the Development Minerals Programme, a three-year, €13.1m capacity building programme to promote the sustainable development of the Development Minerals (industrial minerals; construction materials; dimension stones; and semi-precious stones) sector 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.

The achievements so far include: Baseline Assessment and Value Chain Analysis Reports finalized; trainings on environment, community, health and safety finalized; trainings on enterprise skills, value addition, investment promotion and market analyses finalized; training on GIS and ore modelling finalized; sensitization of media and Members of Parliament finalized; among others.

## **5 PERFORMANCE OF DEPARTMENTS DURING FY 2017/2018**

### **5.1 Geological Survey Department**

#### ***Mineral Exploration, Development, production and Value addition***

The following geological surveys were carried out:

#### ***Zeus Gold Anomaly field investigation***

DGSM undertook geological and geochemical field investigation of the Zeus gold anomaly which was identified in West-Nile - Nebbi, Arua and Zombo Districts between 2004 and 2010, during the Sustainable Management of Mineral Resources Project (SMMRP) (Figure 8 ~~Figure-8~~).



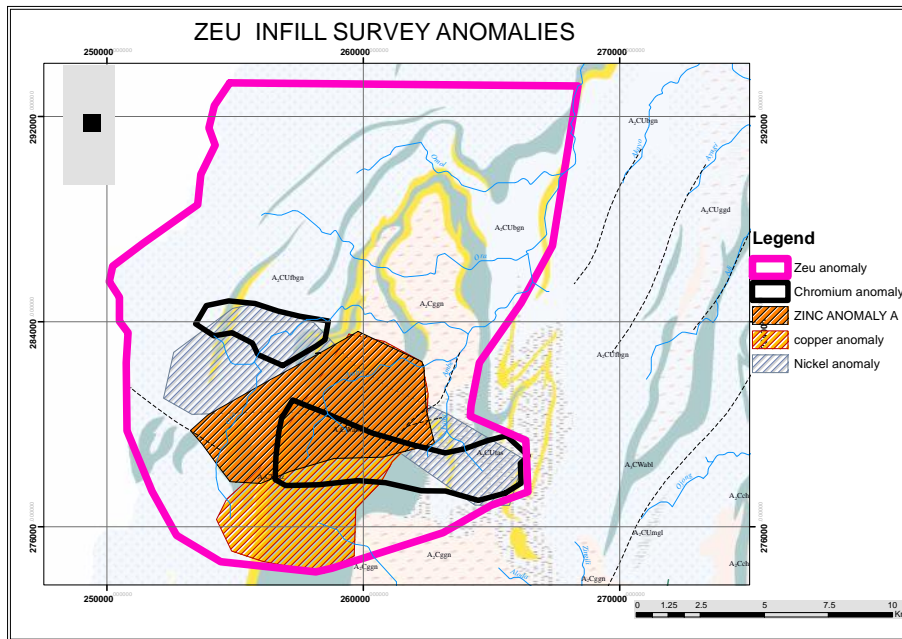


Figure 9: Zinc, copper, nickel and chromium anomalies in zeu gold

The survey reduced the 186km<sup>2</sup> gold anomaly to 86 km<sup>2</sup> further investigations shall be conducted in the approved zone.

### **Busumbu REE Prospect investigations**

DGSM undertook reconnaissance geological and geochemical investigations for Rare earth elements (REE) at Busumbu REE prospect in Manafwa, Eastern Uganda.

The follow- up geological and geochemical investigations for Rare earth elements (REE) at Busumbu REE prospect (Figure 10) were carried out from 2<sup>nd</sup> to 11<sup>th</sup> July 2017 to refine the REE anomaly in the area. The geochemical team collected One hundred and seventy three (173) soil samples, twelve (12) alluvial samples and seven rock samples. Results from the collected samples point to a potential REE prospect although the preliminary results will be amplified by detailed laboratory analyses which will also guide in delineation of the potential targets in the area. Figure 11 shows soil sample sites taken in Bukusu



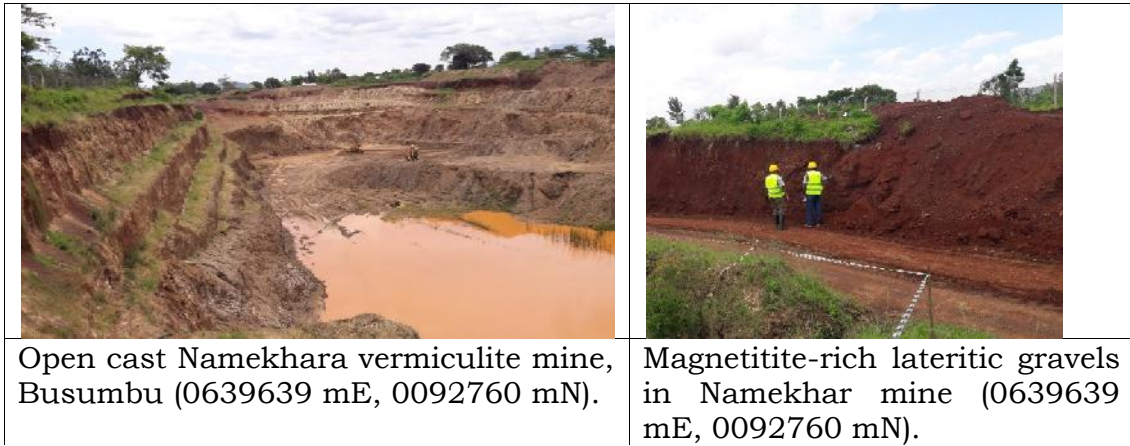


Figure 10: Field investigation at Busumbu REE prospect

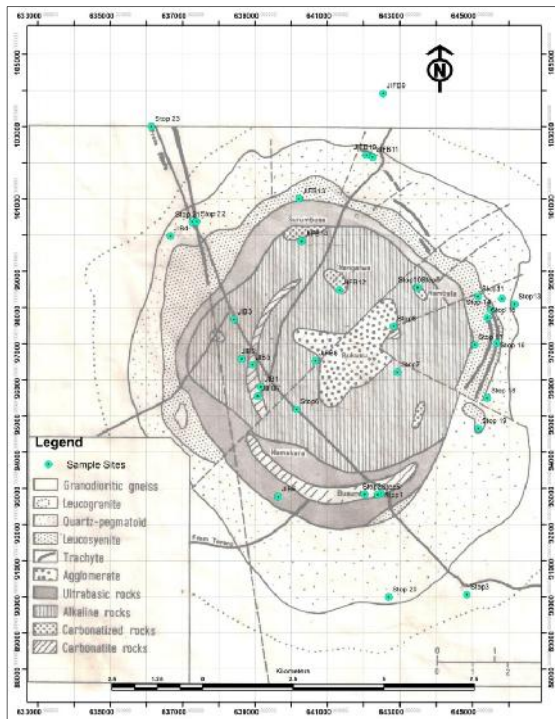


Figure 11: Soil sample sites in the Bukusu REE anomaly

## Geophysics and seismic division

### **Re-Interpretation of Uganda's Airborne radiometric data for Uranium targets/anomalies**

Interpretation and Evaluation of Uganda's Airborne Radiometric data together with IAEA experts generated 53 First and Second priority Uranium anomaly targets. 34 targets were ground truthed and Nine (9) first and second priority targets (> 100 ppm U) have been confirmed on the ground and are worth detailed exploration and evaluation in FY 2018/19. Details are shown in [Figure 12](#) ~~Figure 12~~ and Appendix 0.

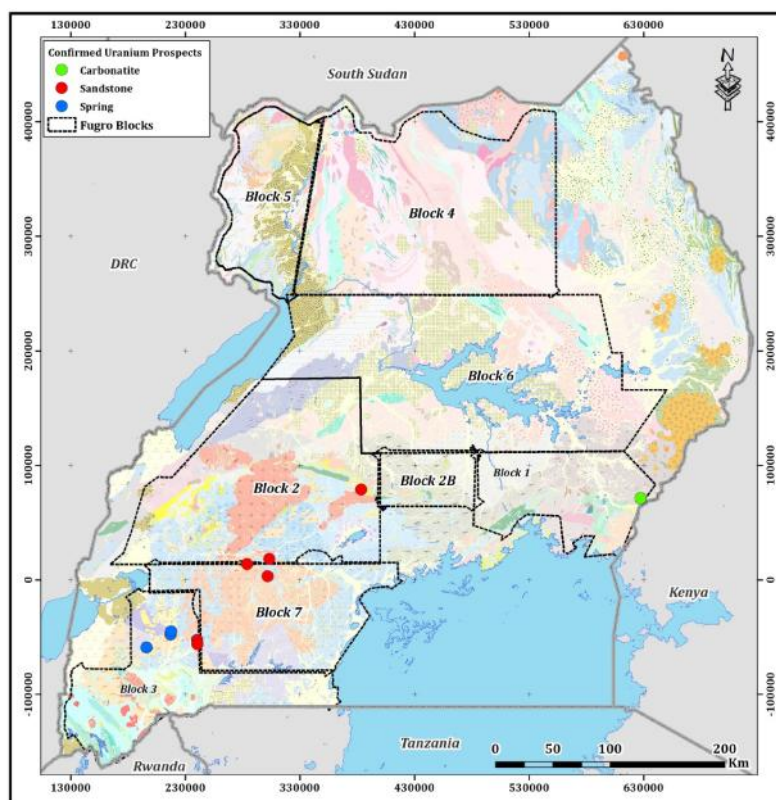


Figure 12: Confirmed Uranium Prospects

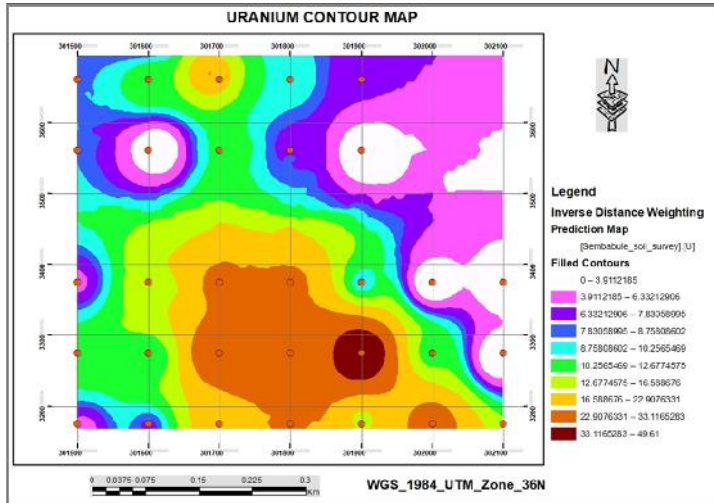


Figure 13: Uranium Contour map showing Uranium anomaly (Brown Zones)

### **Resistivity Investigations of Kirwa Wolfram Mine, Kisoro**

2D Resistivity and Induced Polarisation (IP) survey was conducted to delineate the presence of wolfram bearing quartz veins in Kirwa wolfram mine, Kisoro. The high resistivity zones (>1000 ohm.m) are mapped to the east of the of the mine, trending NNW and these zones strongly correlate to the wolfram bearing rock units ( 700m length x 150m wide zone). Induced Polarisation (IP) does not show any significant signature related to the mineralization. Details are shown in [Figure 14](#) ~~Figure-14~~ below.

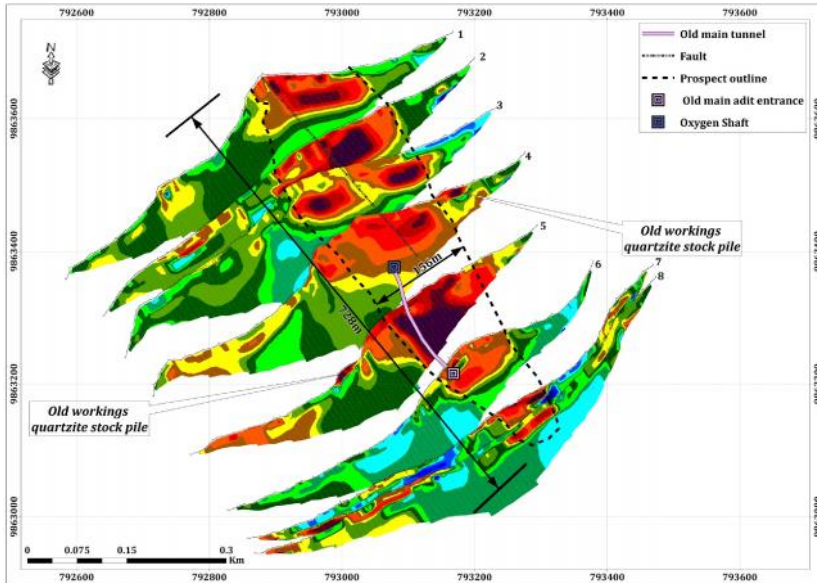


Figure 14: 2D resistivity sections in the surveyed area outlining the quartz vein bearing Wolfram bearing prospective

### Ground Geophysical investigation of Rutenga Iron ore prospect

Electrical Resistivity Imaging Investigations with Gradient array was conducted within the iron ore prospect area in Rutenga, Kabale District. Results showed presence of Iron ore. [Figure 15](#)

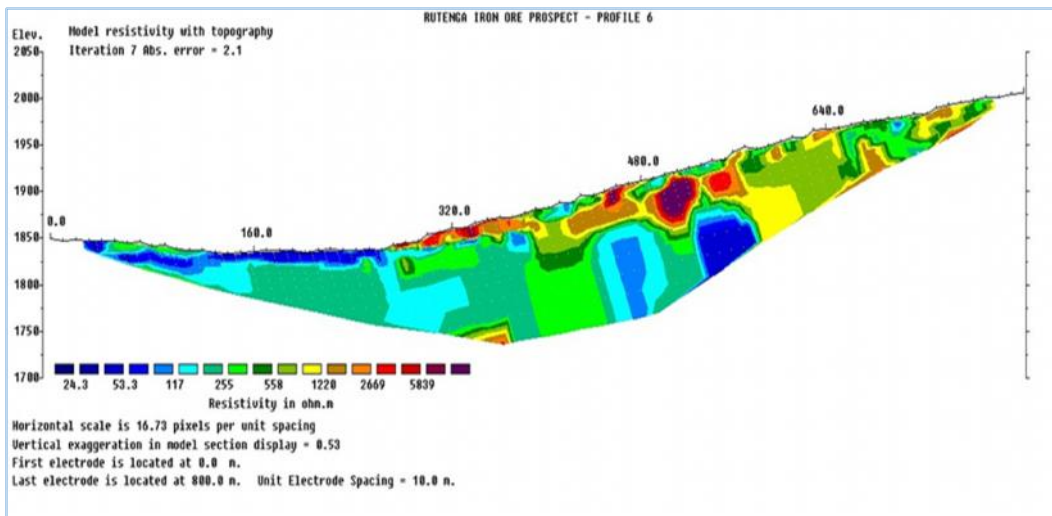


Figure 15: 2D electrical resistivity imaging section along profile 6; indicates the presence of iron ore

## **Ground Geophysical investigations of Katara Uranium Anomaly**

High-resolution gamma ray spectrometry was exploited to locate the potential radioactive targets at Katara Uranium Anomaly in Buhweju District, Result revealed presence of radioactive anomalies trending northwest-southeast. The anomaly exhibits a sharp increase in the eU concentrations reaching 4500 ppm resulting in a high U2/Th ratio (Figure 16 Figure 16).

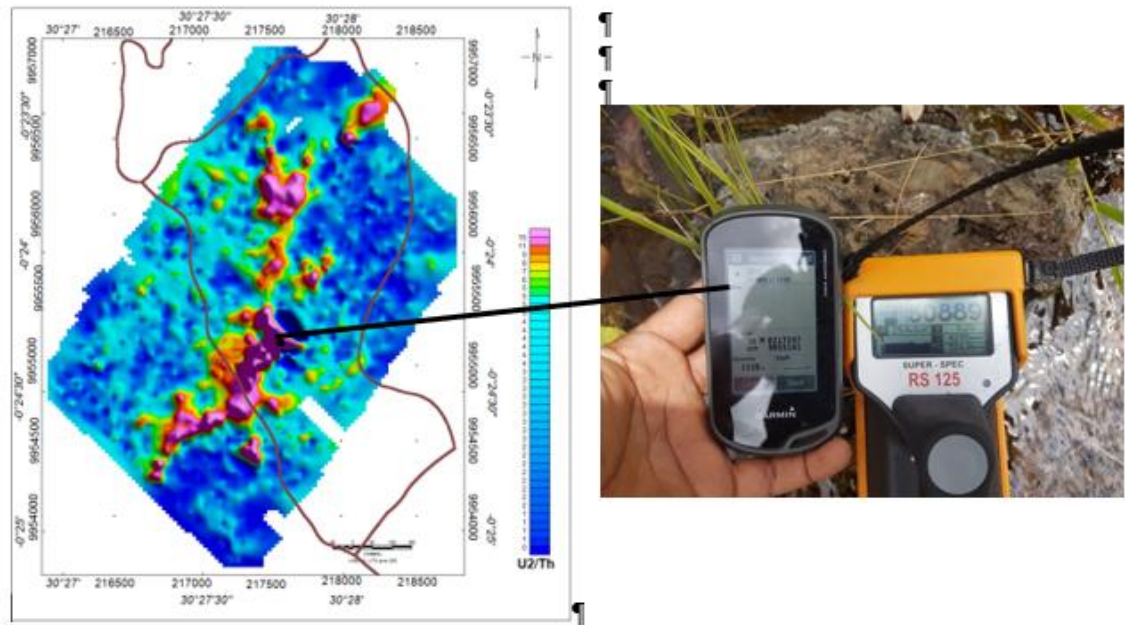


Figure 16: U2/Th Radioelement distribution map of Katara Uranium Prospect.

## **Earthquake Research and advisory services**

The Seismological Unit continued to monitor and maintain established earthquake research stations and install temporary ones in other areas to guide in hazard risk mapping and infrastructure development.

Seismological Network comprising five (5) seismic stations located at Entebbe (ENTD/TEBE, Hoima (HOID), Nakauka (NAKD), Kilembe (KILD) and Mbarara-Kyahi (MBAR) recorded Twenty two earthquakes in the FY 2017/18 with the highest recorded on 30<sup>th</sup> July 2017 at 5.3 magnitude. Details are shown in Table 1 Table 1.

Table 1: Earthquake Events Occurrences in Uganda and surrounding region

Event No.	Day	Month	Year	HH:MM:SECS (GMT or UTC+03:00)	Latitude (deg.)	Longitude (deg.)	Depth (km)	Magnitude {Body Wave (mb)}
1.	30	Jul	2017	02:29.0	-0.13	29.7	23.4	5.3
2.	1	Aug	2017	02:19.7	0.097	29.769	12	3.2
3.	10	Aug	2017	00:12.8	0.406	30.281	0	3.1
4.	15	Aug	2017	41:56.8	0.677	29.821	10	3.6
5.	30	Aug	2017	45:06.0	0.478	30	10	2.7
6.	15	Sept	2017	45:50.0	-2.48	28.62	19.3	5
7.	10	Oct	2017	56:27.5	0.539	29.907	0	3.5
8.	26	Oct	2017	35:20.4	0.475	30.012	10	2.9
9.	16	Nov	2017	01:30.9	0.544	29.629	0	2.7
10.	30	Nov	2017	48:37.5	-2.55	28.25	18.2	5
11.	2	Dec	2017	20:29.4	-2.43	28.49	17.5	4.8
12.	8	Dec	2017	00:44.7	0.397	29.864	0	2.8
13.	18	Dec	2017	17:10.4	1.096	30.241	10	3.3
14.	20	Dec	2017	16:05.1	1.528	30.902	0	3.6
15.	29	Dec	2017	20:27.6	0.245	33.239	32	3.3
16.	29	Dec	2017	16:16.5	1.525	30.902	10	3.6
17.	18	Jan	2018	55:09.1	3.41	32.602	15	3.2
18.	19	Feb	2018	33:00.0	1.72	30.65	10	4
19.	2	Apr	2018	52:22.0	-0.525	29.482	10	3.8
20.	27	Apr	2018	18:09.1	0.46	29.98	0	3.5
21.	29	May	2018	30:15.0	0.21	29.96	15	4.3
22.	15	Jun	2018	49:05.2	1.75	30.71	9.5	3.9

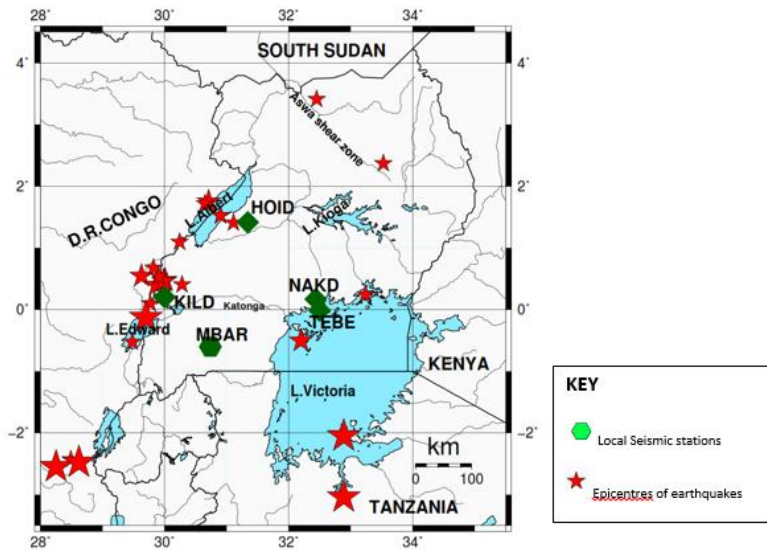


Figure 17: showing annual seismicity of Uganda and the surrounding region

Directorate initiated procurement of consultant to design Earthquake Research Facility in Entebbe and to construct regional offices and mineral beneficiation centres.

### Geoheritage Management

DGSM under the funding of MWAMID project embarked on the geosite identification exercise involving GPS tracking and area marking (demarcation) in the Western Region Geoparks. The areas demarcated are shown in [Table 2](#).

Table 2: Geosite GPS tracking and area marking

Geosite	Location, GPS reading	Area Description
Nsongezi, Isingiro District	0249665, 9890555N	Archeological shelter believed to have exhumed stone age dated tools relating to legendary Batembuzi and Bachwezi historical dynasties. Bachwezi were believed to be half human gods practicing teleportation and telekinesis.
Kibenge Hotsprings	0172018E, 0021035N	Is at temperature 45°C with beautiful scenery

Kitagata hot springs	0183883E, 9925032N	Hot springs of temperature 65°C-69°C used as curative pools for bones and skin diseases.
Kyambura Gorge observation point	017725E, 0021035N	Gorge found within the Queen Elizabeth National Park
Ndale Volcanic field Craters	0190765E, 0048324N	Bowl shaped empty forming caldera

### **Laboratory Services**

The Directorate's laboratories continued to offer geological materials sample preparation, chemical analysis, ore test work, and technical advisory services and training as part of geological data collection and inspection, monitoring and regulation of mineral exploration, mining and mineral trade activities in the Mining and Mineral Sub-sector by the Directorate.

In Establishment of Uganda's Mineral Potential, the laboratory division carried out the following activities:

- a) The Laboratories undertook sample preparation for chemical analysis of a total of one thousand three hundred forty-five (1345) geological samples. Six hundred six (606) of which were from Rare Earth Elements (REE) follow-up exploration activities in the Bukusu Complex by the Geology Division under the MWAMID project. Sixty (60) were from base metal exploration activities in Hoima District, and four (4) were from the Geothermal Resources Department (GRD).
- b) The Laboratories also analysed a total of fifty one (51) gold samples for gold content; fifty five (55) other geological samples such as rocks, soil, coltan, copper scrap metal, beryl, lead, wolfram, and amblygonite for niobium, tantalite, manganese, tin, beryllium, copper, cobalt, zinc, aluminium oxide, iron, titanium dioxide, chromium, vanadium dioxide, nickel, arsenic, strontium, silicon dioxide, sulphur, magnesium, lead, phosphorus, potassium, barium, and calcium content; and five hundred forty two (542) police exhibit samples for verification and determination of mineralogy and elemental content. The analytical techniques used were gravimetric, X-ray fluorescence (XRF) spectrophotometry, Ultra-violet (UV) spectroscopy, titration, and mineralogy examination techniques. The purpose of these analyses was for mineral prospecting, mineral exploration, mineral trade, c royalty computation and to facilitate police investigations.



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## ***Geodata Services***

The Geodata aims at designing tools that facilitate acquisition, processing and dissemination of geo-scientific information to staff and the general public. The following systems are under development.

### ***Integrated information system (New GMIS)***

The Directorate contracted M/S Beak Consultants GmbH to upgrade the current information systems and establish an integrated Information system to facilitate access to information. The consultant has completed phase 1 and 2 of data collection and recovery into the new GMIS. The first prototype of the GMIS web portal can be accessed via <http://94.100.75.105/uganda>. Login details: Name: gmis and Password: test!

### ***Website prototype***

The Documentation Centre generated specifications for the Directorate's website to be used to share information with both local and international users. The first built website design was run on 24<sup>th</sup> November 2017 under the domain name [www.dgsm.go.ug](http://www.dgsm.go.ug) for user testing to identify errors on the webpage and also to attract more content.

### ***Updating of Geological and Mineral database***

The Cartography staff updated and maintained geological and Mineral database with the Manafwa-Busumbu REE, Zeu gold, Kyambogo Uranium geochemical investigation data collected and ground Geophysical data from Kabale and Buhweju.

### ***Geo information acquisition, processing and storage***

#### ***Cartography work***

- Prepared Mineral Occurrence - Geological superimpose map of Uganda for promotion of the mineral potential of Uganda.
- Prepared a Geological - mineral occurrence superimposed map of Karamoja region.
- Prepared three (3) - (geological, geochemical and topographic) base-maps for the geological and geochemical field investigations of the Busumbu/Bukusu Rare Earth Elements (REE).
- Updated the Mineral occurrence map of Ugandan.

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### ***Documentation Section work***

- The Documentation Centre acquired and reviewed sixty-eight (68) publications, five (5) unpublished reports and captured two hundred thirty-nine (239) newspaper articles of geoscientific interest to Uganda. The main themes of the articles were: mineral taxation, opportunities in the mineral sector and risks in mining. The articles were catalogued into the existing database.
- GSD paid Seven million Two hundred sixty-two thousand five hundred shillings (UGX7, 262,000) as subscription to Mining Journals combined services.
- The Documentation Centre continued with data cleaning/ Quality control in both the library and the archive center in order to identify missing documents in order to track them down. Details of the exercise are recorded in the report and also the missing reports were recorded. Report on activity is available.
- Updated staff technical files, the brochure for technical reports, brochure for publications received and the economic Mineral databases with mineral occurrences

### ***Geo-information dissemination to staff, visitors and the general public***

- Fifty-four (54) GSMD staff members and sixty-one (61) Visitors visited the Documentation center to make inquiries on; minerals like; Gold, Iron ore, Kaolin, tin, tungsten, rare earth elements etc. and also for academic research. Details are provided in the monthly reports at the Centre.
- The Documentation Centre prepared promotion material for display and advertising both locally and internationally at the Station, workshops, conferences and exhibitions. Material designed included: Pull- Up banners, tear- drop banners, PowerPoint presentations for display on the promotion screens (list of presentations available in the Documentation Centre), designed customized Christmas cards for staff and investors, printed a book on Investment Opportunities in Uganda's Mining Sector by Kedi Vincent, and technical staff business cards.
- A total of eight hundred seventy-eight thousand shillings (UGX 878,000) was realised from sale of publications.

### ***Local and international geosciences organizations on geoinformation exchange and sharing.***

The following publications were given out on complimentary basis

108 copies of Mining Act, 142 copies of Mining Regulations, 49 copies of Mineral Policy, 4 copies of Small-Scale Mining Hand, 1 copy of Mineral Resources of Uganda and 11 copies of Opportunity for Mining Investment. Distribution

## 5.2 Mines Department

The following outputs were achieved through the Mines Department

### ***Licensing***

During the Financial Year, FY 2017/18:181 Prospecting Licenses (PL), 86 Exploration License (EL), 1 Retention License (RL), 2 Mining Leases (ML), 17 Location Licenses (LL) and 115 Mineral Dealers' License (MDL) were granted. 15 Exploration Licenses and 6 Location Licenses were renewed. 1 Mining Lease was revoked and another surrendered. The details are shown in [Table 3](#)

Table 3: Licensing status of FY 2017/18

Type of License	Status as at 01/07/2017	Granted	Renewed	Expired	Revoked	Current as at 30/06/2018
Prospecting License	150	181	N/A	192	0	139
Exploration License	374	86	15	136	0	325
Retention License	4	1	0	0	0	5
Location License	70	17	6	22	0	71
Mining Lease	39	2	0	0	2	39
Mineral Dealers*	79	115	N/A	102	0	92
<b>Total</b>	<b>695</b>	<b>221</b>	<b>21</b>	<b>260</b>	<b>2</b>	<b>671</b>

\*Mineral Dealers License expires on the 31<sup>st</sup> day of December of the year of issue

### ***Mineral Production Statistics***

Minerals worth UGX158,754,410 were produced in Uganda in the FY 2017/2018 compared to FY 2016/17 where minerals worth 155,383,767.1 were produced. Details are shown in [Table 4](#)

Table 4: Mineral Production table for the FY 2017/2018 in comparison to the last 2 years

Mineral	Average Price per Tonne in 10 <sup>3</sup> UGX, 2012	Production in Tonnes 2017/18				Quantity in Tonnes		Average Value in 10 <sup>3</sup> UGX	
		July-Sept	Oct- Dec	Jan-Mar	Apr- Jun	FY2016/17	FY2017/18	FY 2016/17	FY 2017/18
		Q1	Q2	Q3	Q4				
Limestone	120	281336	302895.840	233266.28	210512.7	1,073,018.72	<b>1,028,010.81</b>	128,762,246	<b>123,361,297</b>
Pozollana	21	176361.22	204975.040	283027.69	245871.7	741,623.81	<b>910,235.67</b>	15,574,100	<b>19,114,949</b>
Gold	117,291	0.0008021	0.0007	0.0003521	0.001227	0.0023	<b>0.00</b>	268	<b>361</b>
Vermiculite	579	1919.3	1656.6000	2113.1	1497.1	2901.71	<b>7,186.10</b>	1,680,090	<b>4,160,752</b>
Cobalt**	80,429	0	0.0000	0	0	0.00	<b>0.00</b>	0	<b>0</b>
Crude cobalt carbonate	1,408	0	0.0000	0	0	0.00	<b>0.00</b>	0	<b>0</b>
Wolfram	34,575	10.212	0.0390	19.902	79.346	52.25	<b>109.50</b>	1,806,544	<b>3,785,928</b>
Syenitic Aggregate	1.5	24976.02	17703.8700	11784.88	29749.06	90,414.09	<b>84,213.83</b>	135,621	<b>126,321</b>
Kaolin	100	13268.83	0.0000	10082.1	7199.1	57,075.52	<b>30,550.03</b>	5,707,552	<b>3,055,003</b>
Iron Ore	271.29264	59	2010.0000	1520	3000	2,089.00	<b>6,589.00</b>	566,730	<b>1,787,547</b>
Granite	922.7625	0	0.0000	20	64	-	-	0	<b>0</b>
Lead	5000	0	0.0000	0	0	-	-	0	<b>0</b>
Coltan (30% Purity)	28,413	0.9	0.0000	0	0	0.405	<b>0.90</b>	11,507	<b>25,572</b>
Tin (75% Purity)	34,034	27.334	31.3200	21.9802	17.4054	33.4697	<b>98.04</b>	1,139,108	<b>3,336,680</b>
Beryl (1% Beryllium)	8,715	0	0.0000	0	0	-	-	0	<b>0</b>
Manganese (Above 46% Mn)	3,037	0		0	0	0	<b>0.00</b>	0	<b>0</b>
<b>Grand Total</b>								<b>155,383,767.1</b>	<b>158,754,410</b>

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### **Mineral imports statistics**

The value of mineral imports mainly gold was worth Uganda Shillings One billion four hundred sixty eight thousand, nine hundred and thirty two (UGX1,468,932)

### **Mineral Exports**

The value of mineral export from export of Gold, Wolfram, Iron Ore, Tantalite and Beryl was worth Fourteen billions two hundred thirty million eight hundred sixty thousand and five hundred and sixty one (UGX14,230,860,561). Details are shown in [Table 5](#)

Table 5: Value of exports as per export permits issued in FY 2017/2018

<b>Mineral/ Commodity</b>	<b>Quantity (KG)</b>	<b>Gross Value (UGX)</b>
Beryl	72000	17547913
Gold	57.4108	8374699688
Iron ore	9000000	675000000
Tantalite	13150	833841597.3
Wolfram	212000	4329771363
<b>TOTAL</b>		<b>14,230,860,561</b>

### **Non-Tax-Revenue (NTR)**

A total of UGX **16,702,115,814** of NTR was assessed and collected during the FY 2017/18 as presented below [Table 6](#)

Table 6: NTR Assessed and Collected in FY 2017/2018

Item No.	Details of NTR	Amount in UGX				Total Amount UGX
		QUARTER 1	QUARTER 2	QUARTER 3	QUARTER 4	
1	Prospecting license fees	20,000,000	22,000,000	32,000,000	46,000,000	120,000,000
2	EL fees and Rents	485,545,000	224,010,000	549,545,000	245,080,000	1,504,180,000
3	Location fees and rents	8,900,000	15,300,000	28,000,000	25,000,000	77,200,000
4	ML/SML fees and rents	5,000,000	73,700,000	420,000,000	536,400,000	1,035,100,000
5	Mineral Dealers license fees	30,000,000	64,000,000	34,400,000	52,000,000	180,400,000
6	Retention license fees	7,000,000	4,900,000	20000000	12,960,000	44,860,000
7	Royalties	4,604,307,744	3,218,269,071	3,972,295,312	1,932,226,347	13,727,098,474
8	Import Permit fees		2,468,932		500,000	2,968,932
9	Goldsmith License			4,000,000	2,000,000	6,000,000
10	Blasting Certificate fees		2,000,000		500,000	2,500,000
11	Tender documents			1,808,408		1,808,408
	<b>Grand Total</b>	<b>5,160,752,744</b>	<b>3,626,648,003</b>	<b>5,924,859,985</b>	<b>2,852,666,347</b>	<b>16,702,115,814</b>

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**Flagship projects:**

**Sukulu Phosphate and steel project**

Findings showed that M/S Guangzhou Dongsong Energy Group Co. Ltd is set to develop the Sukulu polymetallic resources into phosphates, steel, niobium, Rare Earth Elements, Glass, Cement and Bricks. Construction of the staff housing, administrations block and dining is complete (Figure 18)



Figure 18: Administration and some staff housing blocks Guangzhou Dongsong Energy Group Co. Ltd has setup.

The phosphate dressing plant has been fabricated in China and shall be put into operation in next financial year 2018/2019.

Other plants including the steel mill are expected to in operation by December 2018.

**Tibet Hima Mining Company limited (THMCO) – Kilembe Mines Concessionaire:**

The Concessionaire Agreement (C.A) between Tibet (“the Concessionaire”) and Government was terminated on 18<sup>th</sup> April 2018 due to default on key its key obligations under the C.A and underperformance.

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Government has put in place a committee to come up with the best option and ToR's for selection of a new operator to revamp and develop Kilembe Mines. The committee has analysed the various options and developed TOR and roadmap for the revamping of Kilembe Mines

***Audit of mineral processors***

***African Gold Refinery Limited (AGR)***

The directorate continued to engage URA and AGR on the progress of operations of AGR bonded warehouse (manufacture under bond) facility in order to synchronize and reconcile mineral import and export data. During the compliance monitoring meeting, the following were observed;

- a) Failure by AGR to formally share relevant information on returns for purposes of data reconciliation, assessment of non-tax revenue due to government and harmonization of records.
- b) The Customs Department at Uganda Revenue Authority (URA) availed the DGSM with information showing that AGR exported 16,614.63 Kg of gold valued at UGX 2,139,500,817,669 between October 14, 2015 and September 30, 2017. Part of this quantity - 2,121 Kg valued at 275,185,120,876 were exported by February 15, 2017. However, the Customs Department cannot differentiate whether the source of the gold is local or imported.

Therefore, AGR was strongly advised to rectify any violations immediately and in furtherance to conclusions reached during the meeting partly to aid the assessment of non-tax revenue due to government and also provide information of:

- a) All purchases (or imports) and sales (or exports) of gold and associated minerals made by AGR (or Clients - Mineral Dealers and/or Local Producers) from 2014 to date and the nature (% purity) and weight of the raw gold (brought to the refinery), share with DGSM any relevant gold export information (air way bills, quantities, destinations, buyers, etc.);
- b) The price paid or received for the minerals and the date of each purchase or sale;
- c) The name and address of the vendor (Mineral Dealers and/or Local Producers) and his or her right to be in possession of such minerals – Mineral dealer's License, Import Permit and Certificate of Origin, Export Permit from Country of Origin, etc.;



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- d) the name and address of the purchaser or consignee to whom the minerals are sold or consigned.

### ***Inspections and Monitoring of other key exploration and mining operations***

The inspection and monitoring were carried out in different parts of the country. The status of all the forty-one (41) Mining Leases and 5 Retention Licenses were appraised as well as exploration activities. Over 20 Mining Leases were issued with notices of noncompliance, issues raised included health and safety of miners, illegal mining within exploration license areas, lack of production records on site, conflict on surface rights, unsafe mining practices, lack of updated mine plans among others; Non-compliant license holders were informed and require to conform to the provisions of the Mining Act,2003. Details of inspections is as follows:

#### **Karamoja region**

- Inspected and monitored operations of 10 Mining Leases including: Tororo Cement, DAO Marble, Hima Cement Limited, Jan Mangal operations in Rupa and Nakapiripirit districts. M/s Jan Mangal was found non-operational and defaulted in its statutory obligations, the license was recommended for cancellation while DAO Marble is under receivership.
- A total of 10 Exploration Licenses And 5 location Licenses were inspected. The affected ELs and Location Licenses were notified to comply with conditions of grant of ELs and Location Licenses.
- Over 20 sites were mapped and inspected in Karamoja region namely: Chepkararat, Moruita/ Ututu gold mine site , Acherer/ Lopini gold Mine site , Nabilatuk/ R. Nakoit in Nakapiripirt., lolung and Nakabat Alerek, Kacheri, Morulem, Katikekile, loyoro, Morulem as well as six sites in Karita. Issues recorded included dangerous pits, child labour and mining along river banks.
- Illegal Marble flow from Moroto was traced upto Jinja factories. The operations were suspended and required to be legalized.

#### **Eastern Region**

- 10 Mining Leases were inspected and monitored included: Tiira gold Mine by Greenstone Resources, Tororo cement Ltd, Hima Cement Ltd, Kampala Cement, Namekhara vermiculite Mine, National Cement Ltd, Eastern Mining and Sukulu Phosphate Mine by Dong Song Energy group of Company Ltd. Greenstone Resources is not performing as per

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conditions of grant of the Lease, the company has been notified and required to comply with the condition of grant.

- Over 10 ASM gold mining sites in Bugiri, Namayingo and Busia were inspected and 7 associations were licensed and monitored; Issues of environment degradation and uncontrolled use of cyanide. Miners were sensitized and required to adhere requirements of the mining Act, 2003 and Regulation.

### **Western Region (Mbarara region)**

- Inspected and monitored operations of 7 Mining Lease, BNT Mining Ltd, Zarnack tin Mining, Sun and Sand Minerals Ltd for tin, African Panther Resource Limited for tin, Marubeg Columbite Tantalite mine, VEK Global Columbite Tantalite mine and Euro Minerals for tin. There was no sign of any development and /or mining operations at BNT Mining Ltd, Marubeg Columbite tantalite, VEK Gobar Ltd. and Sun and Sand Minerals Ltd. Notices of noncompliance have been issued to noncompliance licensees.
- In addition, 3 Exploration License and 3 Location Licenses were monitored. Notices of noncompliance issued appropriately.
- 4 ASM gold mining sites Bisya ,Katenga, Muti , Nyakitaraka in Buhweju district were inspected. Use of mercury was recorded at Katenga gold mining site in Buhweju district. operations suspended until proper extraction method is put in place. other issues included gender imbalance, dangerous pits and lack of protective ware for miners. Miners were sensitized and trained on proper mining methods and health and safety protection of miners.

### **South Western Uganda (Kabale Region)**

- Operations of 10 MLs including : Nyamuliro Wolfram Mine , Sino Minerals Investment for iron ore, Berkley reef for iron ore, Kigezi Steel for Iron ore, Great Lakes for iron ore, Uganda International Mine for iron ore and Kirwa wolfram mine were monitored. Nyamuliro Wolfram Mines was affected by court case but issue is not resolve. The Mining Lease holder is yet to update feasibility study and conduct mining operations in accordance to approved plan. Operations of Kigezi Steel, Berkley reef, Great Lakes and Sino Minerals Ltd. is currently affected by ban on export of unprocessed minerals. Sino Mines has updated its feasibility study and intend to commence production in May 2019. Kigezi steel, Great lakes and Berkley reef have been served with notices of noncompliance.

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- 15 Exploration Licenses inspected. Issues identified included illegal mining operations within an exploration license. The affected licensees have been penalized.
  - 5 ASM gold mining sites at Kabahinde, Rushaga, Musezero, Kapata and Kashasha inspected. No use of mercury recorded but serious issues of environment, gender imbalance, lack of protective were and child labour.
  - illegal mining operations at Kirwa Wolfram and various iron ore mining sites in Kabala and Rubanda districts were stopped and Police Mineral Protection deployed for protection. The operations were suspended and miners advised to form association and acquire a location license. A location license was granted to locals for mining of iron ore.

### **Mubende District**

Mining Leases monitored included Kisita gold mine and Anglo Ugandan Corporation (AUC) (in Mubende District. Kisita gold mine is under suspension of working obligation because of court case while AUC is expected to recommence the development of the mine and exploration in its 4 exploration licenses in Mubende district after the eviction of ASMs.

Continued to monitor the operations of Kitumbi Kayonza miners Associations under 3 Location Licenses. The miners are operating under association umbrella and are more organized. The Directorate opened the boundary of the location licenses. However, issues of environment management still remain a big challenge. Miners sensitized to employ sustainable mining methods.

### **5.3 Kyegegwa District**

Mapped and recorded emerging remote gold mining site in Kyegegwa district issues of poor environmental management and poor design of the mining pits documented. Miners sensitized to legalize operation and undertake sustainable mining method.

### **Northern Uganda**

Inspections was conducted on 20 Exploration licenses in Kitgum, Lamwo, Pader and Gulu. it was noted that a number of exploration licenses are not performing as per approved work programme. Inspection notices were notified and required to addressed default and issues of noncompliance.

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### ***Mineral Traceability and Certification***

The Department continued technical collaboration with Partnership Africa Canada (Now called IMPACT) in the implementation of the Regional Initiative on Fight against the Illegal Exploitation of Natural Resources (RINR). RINR is one of the Protocols of the Pact on Security, Stability and Development in the Great Lakes Region under the International Conference of the Great Lakes Region (ICGLR).

The International Conference on the Great Lakes Region (the implementation of the Pact on Security, Stability and Development in the Great Lakes Region) Bill No.16 was assented in November 2017 and awaits gazetting by Ministry of Foreign affairs.

The department has so far trained inspectors and developed RCM inspection manual, RCM inspection template, export procedure and is now developing regulations to enforce the Act.

### ***Formulation of ASM and Health Safety and Social Awareness of miners***

The following activities were carried out in the process to formalize Artisanal Miners.

1. Profiling and registration of ASM was continued in Mubende, Ntungamo and Karamoja region where over 4,000 miners were registered in Mubende, 830 in Ntungamo, 600 in Morulem, 4000 in Rupa, 1,000 in Karita; 1614 miners in Busia, Bugiri and Namayingo ; 40 miners in Moroto; 1015 miners in Tapac; 25 salt miners in Kasese; 61 Pozzolana miners in Kabarole.
2. The number of registered ASM associations has increased. The following groups have been registered: 68 groups in Karamoja; 24 groups in Mubende; 20 groups in Ntungamo;
3. Ongoing sensitization and training of ASM communities especially in Morulem, Abim, Karita, Namayingo, Mubende, Busia, Buhweju, Rubanda, Ntungamo, Kabale, and Kisoro to address environmental, social, gender, child labour and best mining practices
4. Police Mineral Protection Officers have been deployed at active ASM mining sites in Mubende, Busia, Kirwa, Nyamuliro and in all custom borders in South Western Uganda for curb mineral smuggling.
5. Construction of training centres for transfer of skills to ASMs. The Directorate of geological survey and mines commissioned a regional office

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for Karamoja sub region based in Moroto to bring services closer to the people.

***Sensitization and registration of ASMs countrywide.***

The following associations were registered:

- (i) **Mubende:** To date 24 associations have been formed under the Federation of Artisanal and Small Scale Miners (U) Limited and Mubende United Miner’s Assembly. Two technical officers have been deployed alternately to undertake sensitization and monitoring of mining operations. Negotiations are ongoing between the mining company (AUC) and artisans in Mubende so as to agree on operating areas for ASM in order to establish order and peaceful co-existence between ASM and Mining Companies in Mubende.
- (ii) **Busia:** Miners are being organized into associations so that they acquire licenses and commit to environmental, best mining practices and social safeguards. The Police Mineral Protection Unit has been deployed in the area to ensure compliance and ensure that artisanal miners declare what they mine and export their products through formal channels.
- (iii) **Namayingo:** Miners are being organized into associations so that they acquire licenses and commit to environmental, best mining practices and social safeguards. The Police Mineral Protection Unit has been deployed in the area to ensure compliance and ensure that artisanal miners declare what they mine and export their products through formal channels.
- (iv) **Buhweju:** ASMs have been operating under Exploration License held by a Chinese company (Hubei Jiu Zhou Geological Exploration Co. Limited). The Company has dragged government and ASMs to Court. Any further action on ASMs in Buhweju shall await the conclusion of the processes in the courts of law. The Ministry has continued to sensitize the miners about best mining practices and safety operations as well as Mining Act and Regulation.

***Geoscience information management and Administration***

- **Mining Cadastre and Registry System (MCRS):** The Department continued to update the Mining Cadastre and registry system to facilitate the licensing process and promote investment in the sector. All applications, quarterly returns and production were captured, scanned and uploaded onto the system further reviewed for compliance to technical and legal requirements.

Mines Department launched the registration for online e-mineral licensing system on 12th July, 2018 (Figure 19~~Figure—19~~). The department in

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collaboration with NITA-U is now hosting the cadastre MCRS in the cloud, and is in the process of securing an MoU with URA to develop an online payment transaction portal.



Figure 19: Launching of the e-licensing portal on 12<sup>th</sup> July 2018.

## **5.4 Geothermal Resources Department**

### ***Geothermal Association of Uganda (GAU)***

A draft constitution was made for the Geothermal Association of Uganda. It is undergoing internal peer review before it is adopted and forwarded to International Geothermal Association (IGA) for approval.

### ***Institutional Capacity Development***

#### ***Database development***

Under the MoU between the East African Geothermal Energy Facility (EAGER) and the Government of Uganda, EAGER conducted workshop on “Designing a database for Geothermal Resources Department and mentorship for data custodians”. The aim of the workshops was to equip and train data custodians with skills that will help them build and maintain their own database. Other activities accomplished in 2017: (i) a security certificate for the proposed

database was secured, (ii) GRD staff were trained on how to obtain and register a domain (geothermal.go.ug) ~~Figure 20~~Figure 20, resolved the domain name to a specific IP address (154.72.197.62) and then set up a webserver to provide content for requests corresponding to the web address and a web page which is to be populated alongside the development of the database; (iii) A skills matrix was drawn and GRD staff assigned roles to spearhead various roles in development of the Database, and (iv) A schema of the database was developed. It was agreed that the database would contain the following data types: geophysics, geochemistry, geology, wells, licensing information.

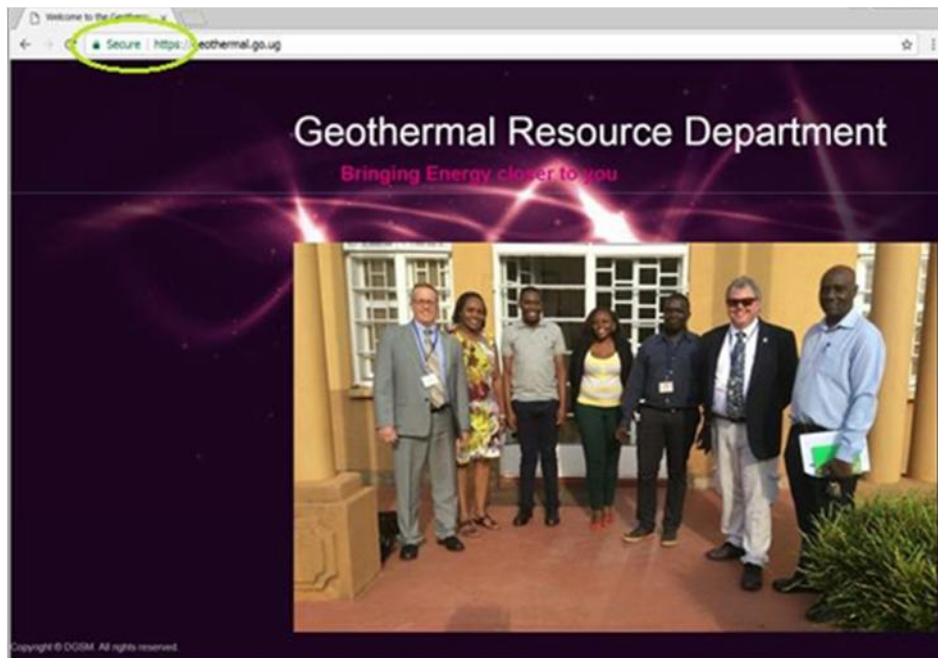


Figure 20: Front page of the GRD's website (<https://geothermal.go.ug>), after the security certificate was installed.

### **Geothermal Conceptual Model Development**

From 11<sup>th</sup> to 15<sup>th</sup> December 2017, EAGER conducted a workshop on conceptual model development and TGW drilling preparations. Conceptual models for Panyimur and Buranga geothermal prospects were updated.

### **Sustainable Development Goals (SDG II)**

Four Ugandans attended an annual Sustainable Development Goals (SDG) Short course II on exploration and development of geothermal resources from 9<sup>th</sup> to 29<sup>th</sup> November 2017 in Naivasha, Kenya. The course is organized

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annually by the United Nations University in Iceland (UNU-GTP), Kenya Generation Company (Ken-Gen) and Kenya Geothermal Development Company (GDC). The aim of the course is train participants from African Rift Countries in basic geothermal knowledge in exploration for geothermal resources.

### ***Zambia Study Tour***

From 5<sup>th</sup> to 11<sup>th</sup> November 2017, three (3) staff members undertook a study tour to Karahari GeoEnergy Ltd in Zambia to benchmark their experience in drilling of thermal gradient holes in fault controlled geothermal systems. Thermal Gradient studies were successful in Zambia and their experience will be used in exploration for geothermal resources in Uganda.

### ***African Geothermal Centre of Excellence***

On 27<sup>th</sup> October 2017, two (2) staff members attended a workshop on implementing the African Geothermal Centre of Excellence in Djibouti. The Centre is to be hosted by the Government of Kenya at Nakuru, Kenya and its first intake of trainees was in February 2018 in which Uganda was represented by two geologists.

### ***Structural geology***

The staff of DGSM and GRD with the EAGER Experts carried out detailed structural mapping at Buranga, Kibiro, Panyimur and Katwe. During the exercise, the capacity of GRD geologists to undertake geological structure recognition, classification, measurement, data analysis and interpretation was greatly enhanced.

### ***Training on Radon meter and Soil- gas flux meter***

Geochemical survey equipment and analysis equipment Radon meter and Soil- gas flux meter were procured and DGSM Geoscientists trained on the use and operation of the equipment.

### ***International Summer School of Geothermics***

A member of staff attended a one-month geothermal exploration skills development at the International Summer School of geothermic, Pisa, Italy.



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### ***Development of business and financial models***

Under a MoU between the Government of Uganda and EAGER the following activities were accomplished:

- a) Business models for Geothermal Development in Uganda were developed and presented to the GRD for Uganda to choose the most appropriate.
- b) A financial model was developed and finalised.
- c) Mentoring staff of the DGSM and GRD in collection of geophysical data, interpretation and reporting.

### ***Mineral Exploration, development, production and value addition***

#### ***Geothermal water flow measurement at Ihimbo, Kibiro and Buranga geothermal prospects***

The activity was undertaken at Ihimbo, Kibiro and Buranga Geothermal prospects. The November 2017 flow rates for the main hot springs were as follows: (i) Ihimbo was is 10 litres/second, while the combined flow rate for the area is 13 litres/second, (ii) The flow rate for the main hot spring - Mukabiga at Kibiro is 12 litres/second while the combined flow rate for the area was 16 litres/second, (iii) The combined flow rate for Buranga was approximately 40 litres/second, with Mumbuga was estimated at 15 litres/second, Nyansimbe at 20 litres/second and Kagoro at 5 litres/second.

#### ***Ihimbo MT Field Survey***

Project staff undertook focused MT survey at Ihimbo Geothermal area in Rukungiri. Data is being processed to identify key data gaps. The team recommended Time Domain Electromagnetics (TDEM) survey in the same area to correct static shift of MT data. The resistivity data is aimed at delineating low resistivity zones (high permeability zones/fluid flow) presumed to be geothermal reservoirs. Thermal Gradient studies were recommended.

#### ***Ihimbo, Katwe, Buranga and Panyimur soil gas and gas flux survey***

Project staff conducted soil gas and gas flux measurements at Ihimbo, Katwe, Buranga and Panyimur geothermal prospects. The aim was to identify areas of weakness (Faults) that could be conduits for the rising geothermal waters from the reservoir to the surface (hot springs). Soil gas and CO<sub>2</sub> – flux values in the area were found to be low possibly due to the thick forest cover, intense farming activities exacerbated by the wet soils. Few locations with high flux

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may hypothetically be related to diffuse degassing. There are some indications of a fault-controlled moderate temperature geothermal system resulting from deep circulation of water in active fault zones at Ihimbo. The results from Katwe, Buranga and Panyimur are being analyzed.

### ***Panyimur MT Field Survey***

A progress report was produced by project staff accruing from in-fill MT Survey undertaken at Panyimur. TDEM was carried out using the Geonics equipment which is more superior to the Phoenix equipment which has low penetration. Other activities carried out included soil gas and gas flux measurements, focused structural mapping, and one-meter depth temperature measurement. This will aid in constraining the conceptual model. Data processing is being undertaken by EAGER experts who are developing a conceptual model of the Panyimur geothermal prospect.

### ***Buranga MT Survey***

From 11<sup>th</sup> to 19<sup>th</sup> October 2017, GRD staff undertook MT field survey at Buranga. Data is being processed. TDEM survey using Geonics equipment was recommended in addition to soil gas and gas flux measurements. Buranga MT survey map was produced.

### ***Buranga and Panyimur Structural mapping***

GRD staff together with an EAGER expert conducted focused structural mapping at Panyimur and Buranga geothermal prospects. Data is being processed with supervision of EAGER Experts to develop structural models of these prospects by incorporating all available geoscientific information. The following are the preliminary findings: (i) At Buranga, the field mapping exercise allowed for the spatial locations of the majority of the thermal manifestations in the prospect to be fixed for the very first time, a topographic map of the prospect was produced in 1994 when the GPS technology was not in place and had never been updated; (ii) The actual dip of the Bwamba Fault was ascertained for the very first time and found to be at an average of 297°/53° compared to the dip on the fault estimated to range from 60 – 70° in previous studies, and will be used to optimize locations of Temperature Gradient Wells (TGWs) and production wells; (iii) Panyimur, a textbook example of fault geometry and kinematics is accorded at the Got Awinja road borrow pit on the Panyimur – Parombo road, which exposes the main Panyimur (Lower) Fault to display all the elements of fault geometry and kinematics namely: Striations (slickensides), Riedel shear, Corrugations and Grooves. Recent structural mapping confirmed the above previous findings.

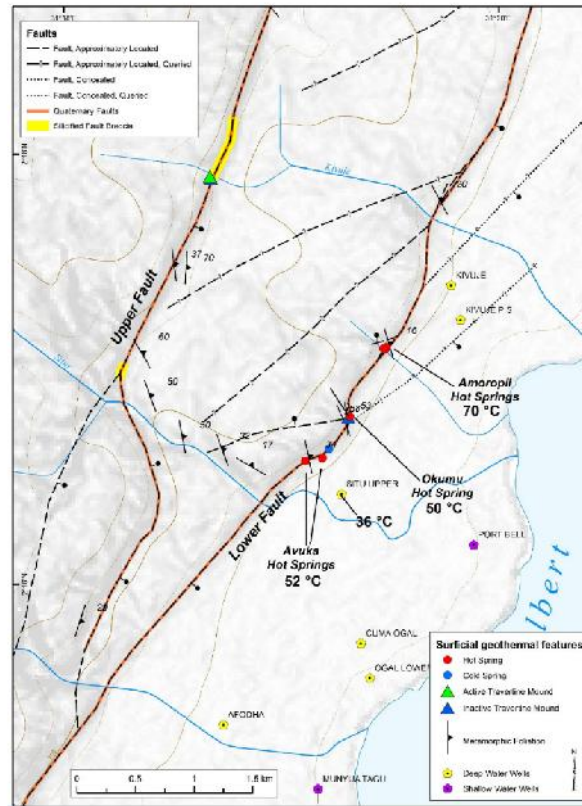


Figure 21: Structural Geology Map of the Panyimur Geothermal Prospect with active and inactive surficial geothermal features

### **Micro-seismic survey**

The GRD staff undertook an inspection and service visit to micro-seismic stations installed around Kibiro Geothermal area to check on operational status. It was recommended that the network coverage be extended regionally to include Panyimur and Ntoroko areas. The survey is aimed at locating active faults and fracture zones presumed to control geothermal activity in these fault-controlled geothermal systems (permeable pathways).

### **EAGER Technical Support**

The GRD staff together with the consultants continued to process, interpret and model data from Panyimur and Buranga Geothermal Prospects. The following are the outputs: (i) Conceptual geothermal models, (ii) Geothermal database management system, (iii) Implementation plan for a geothermal database management system, (iv) Specifications for drilling Temperature

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Gradient Wells, (v) Progress Report on geoscience/geophysicist support on concession monitoring, (vi) Report on technical reviews of Uganda geothermal projects, and (vii) A Uganda geothermal prospect summary status sheet was also developed by EAGER and will be continuously updated by the GRD. Other outputs included : (i) Protocols for geophysics work in wetlands with geothermal manifestations outlining best practices when conducting geophysical surveys in boggy and swampy areas which are inaccessible, (ii) Reviewed structural geology at Katwe and Kibiro, (iii) Mentoring support on geophysics, (iv) Structural Geology at Panyimur and Buranga carried out.

### ***Heritage thermal spring***

A new hot spring, Heritage spring, was documented near Heritage Hotel along River Nile in Nwoya District just before Pakwach Bridge. Further investigation on the geology and geochemistry of the hot spring is needed before the geophysical programme is recommended.

### ***Health, Safety, Environment and Social Awareness***

The GRD supervised and monitored the creation of awareness on health, safety and social impacts to communities at Kibiro, Buranga and Panyimur geothermal prospects.

### ***Micro-Seismic monitoring***

Micro-seismic monitoring is being undertaken around Kibiro Geothermal area as part of baseline surveys. This data will be used in future to assess the impact of geothermal development on the environment.



Figure 22: Installation of a micro seismic station near Kibiro.

### ***Environmental and Social Impact Assessment (ESIA)***

Environment Baseline Survey was undertaken by project staff at Kibiro. Description of natural, social and economic environment included; local community, land-use, proximity to infrastructure and housing, amenity, noise, dust, air quality, topography, landscape, climate, geo-hazards, hydrology, groundwater, vegetation, fauna, soils, cultural heritage, proximity to conservation areas, pre-existing site contamination and disturbance. The procurement of a contractor to carry out Environmental and Social Impact Assessment (ESIA) at Kibiro and Panyimur has been initiated.

### ***Licencing***

Two geothermal areas were licensed to the private sector as follows:

- a) Ihimbo geothermal area located in Rukungiri district was licensed to Moto Geothermal Projekt Limited on 28<sup>th</sup> April 2017 to carry out geothermal exploration for three (3) years.
- b) Panyigoro geothermal area located in Pakwach district was licensed to Bantu Energy (U) Limited on 3<sup>rd</sup> May 2017 to carry out geothermal exploration for three (3) years.

The current licensing status (Table 10) stands at 3 licences, two exploration (EL) and the third one is a Retention License (RL). The following activities were carried out on the two exploration licences:

### ***Moto Geothermal Projekt Limited.***

From 19<sup>th</sup> to 31<sup>st</sup> October 2017, the licensee undertook MT survey, soil gas and gas flux measurements, shallow temperature measurements, transmission and distribution line design. MT data is being processed and modelled and progress report is yet to be submitted to the GRD. The licensee also undertook a field infrastructure assessment of using surface hot water to generate power using a secondary working fluid. This is a green sustainable technology, Organic Rankine Cycle (ORC), by Schiffer Geo Services of Germany. The technology can utilize low temperature small resources. The technology is yet to be tested at Ihimbo.

### ***Gids Consult Limited***

The licensee conducted MT geophysical surveys to fill-in gaps around the hot springs at Buranga. The Licensee has also conducted a two (2) meter soil temperature survey to improve on the current conceptual model of the area.

*Table 7: Licensed geothermal areas of Uganda as of June 2018*

<b>S/No</b>	<b>Area</b>	<b>License Holder</b>	<b>EL</b>	<b>Date of Issue</b>	<b>Date of Expiry</b>	<b>Comment</b>
1	Buranga	Gids Consult Ltd.	RL1745	23/04/2018	22/04/2021	Active
2	Ihimbo	Moto geothermal projekt limited	EL 1652	25/04/2017	24/04/2020	Active
3	Panyigoro	Bantu Energy (U) Limited	EL 1651	3/ 05/ 2017	2/05/2020	Active

### ***Monitoring and Inspection***

Inspection and monitoring of geothermal activities was undertaken at Ihimbo, Buranga, and Kibiro.

### ***Ihimbo geothermal area***

The activity was done on 10<sup>th</sup> to 13<sup>th</sup> December 2017. According to the people found at the site, the Ihimbo hot springs were first discovered by hunters in

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1957. Thereafter, they started attracting visitors from all walks of life with some coming from as far as the DRC.



*Figure 23: Direct use of geothermal water in a spa at Ihimbo.*

The highest temperature of the major spring is still 70°C, with a flow rate of 10 litres/sec and the combined flow rate for the area is 13 litres /second.

On environmental issues, the visitors have no shelter for accommodation except a makeshift house which doubles as a kitchen and living house. The only latrine facility was built by the Bwambara Sub-county five years ago and is almost full posing a danger of causing diseases like cholera and etc.

The area of approximately 28 km<sup>2</sup> at and around the hot springs has been licensed to the private sector, Moto Geothermal Projekt Limited, to explore for geothermal and produce electricity and other direct heat uses. According to the investor, the project is expected to produce 10MW in the first three years of exploration i.e., by 2019.

In conclusion, the current status and the entry of the private sector is encouraging and could lead to the installation of the first pilot power plant in the country. Government should support the private sector by providing technical advice to the project and incentives.

The author recommends that Government should modernise the swimming pools and provide decent accommodation and sanitary facilities to the

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visitors. The access roads need to be built to make the place easily accessible. The tourism industry needs to promote and market the geothermal area in local and international media and website to attract tourist who would then be charged a fee for maintenance of this important site.

### ***Inspection at Buranga and Kibito***

Inspection was carried out together with the geothermal water flow measurements.

### ***Subscription to International Organizations***

GRD contributed of Four Million Uganda Shillings (UGX 4,000,000) to the Africa Minerals and Geoscience Centre (AMGC) formally known as SEAMIC. The centre is based in Dar es Salaam, Tanzania.

## **6 OTHER ACTIVITIES**

The Directorate participated in other Energy and Mineral Development Sector activities related to and contributing to advancement of the development of the mineral sub-sector such as the following:

- i) Review of procurement submissions for consideration and attendance of weekly Contracts Committee meetings to consider the submissions at the Ministry Headquarters, in Amber House, Kampala.
- ii) Preparation of quarterly progress reports on agreed actions from the last review meeting of the implementation of the recommendations of the Fifth Phase of the Presidential Investors' Round Table (PIRT V) on the Thematic Area of Minerals Value Addition that was held on 24<sup>th</sup> November, 2017 at State House, Entebbe.
- iii) Together with the Mid-stream Petroleum Department (MPD), Uganda National Oil Company (UNOC) and Petroleum Authority of Uganda (PAU) reviewed the Draft Terms of Reference for a Feasibility Study for the Development of a Gas Pipeline along the Uganda-Tanzania Infrastructure Value Corridor at MPD in Entebbe, on 3<sup>rd</sup> May, 2018.
- iv) Reviewed and submitted Policy Document on exploitation of minerals used in improved technologies for manufacturing batteries such as lithium, cobalt, manganese, and graphite which are available in Uganda. This followed His Excellency the Presidents directive on the same having projected that within twenty (20) years electric cars would be on high demand given that the technology for batteries is improving and becoming cheaper, and since Uganda has the minerals required for the manufacture of batteries such as lithium yet it spends United States



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- Dollars Three Hundred Million (USD. 300 M) on vehicle importation annually.
- v) Participated at a meeting at the Ministry of Finance, Planning and Economic Development (MFPED) in Kampala on Developing Uganda's Iron and Steel Industry – Value Chain Approach, in which National Planning Authority (NPA) was putting forward its case for government to harness available low hanging fruits by providing incentives to selected players in iron and steel rolling so as to invest in iron making.
  - vi) As part of a Technical Working Group (TWG) for preparing a comprehensive feasibility study for establishing a comprehensive iron and steel industry, which constitutes of multiple stakeholders with National Planning Authority (NPA) as the Secretariat, generated the first draft Project Document to Inform the Feasibility Study for Establishing a Comprehensive Iron and Steel Industry in Uganda.
  - vii) As part of the Ministry's Contracts Committee undertook a fieldtrip to Namayingo District, Tororo Municipality, Napak District, and Moroto Municipality. In Namayingo the team assessed the performance of a trial hybrid wind turbine and solar PV the Ministry installed; in Tororo Municipality the team visited and assessed land DGSM has acquired for its regional office; in Napak the team assessed the performance of anemometers the Ministry installed to measure wind speeds to assess the potential of generating electricity from Wind; and in Moroto the team assessed the progress of construction works of structures to house DGSM Regional Office.

## **7 CHALLENGES AND RECOMMENDATIONS**

### **7.1 Challenges**

Lack of Human and Financial resources to efficiently execute its mandate of establishing, promoting 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.

### **7.2 Recommendations**

- i.* The vacant posts especially those filled on replacement basis should be filled as soon as possible.
- ii.* Increase budgetary allocation to DGSM to allow for financial facilitation of the planned activities to gone on.

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## **8 INSTITUTIONAL CAPACITY DEVELOPMENT**

### **8.1 Training, Workshops and Conferences**

Capacity building in form of long-term training. Short-term training, workshops and conferences is shown in appendix

### **8.2 Staff Promotions**

The following members were promoted during the year or reporting

- 1) Ms. Sylvia Grace Nassaka was promoted to Principal Documentation Officer
- 2) Mr. Isa Lugaizi was promoted to Senior Geologist/ Industrial Minerals
- 3) Mr. Deus Muhwezi was promoted to Senior Geochemist
- 4) Mr. Edwards Marimira was promoted to Senior Geologist/ Mapping

## **9 CHALLENGES AND RECOMMENDATIONS**

### **9.1 Challenges**

Lack of Human and Financial resources to efficiently execute its mandate of establishing, promoting 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.

### **9.2 Recommendations**

- iii.* The vacant posts especially those filled on replacement basis should be filled as soon as possible lessen the gap
- iv.* Increase budgetary allocation to DGSM to allow for financial facilitation of the planned activities.

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## 10 APPENDICES

### 10.1 Value of mineral exports as per permits issued FY 2017/2018

Date	Company	Mineral	Origin	Destination	Permit No.	Quantity (KG)	Price Per KG (UGX)	Royalties Value (UGX)
July 06 2017	Adamawa Investments (U) Ltd	Gold	Buhweju	America	02269	10000		67737516
July 12 2017	KI3R Minerals Limited	Wolfram	Kabale	Toronto	02271	18000		14270793
July 28 2017	Kamuntu Investments Limited	Iron ore	Kabale	Kenya	02251	3000000		11250000
September 12 2017	Consolidated Services Limited	Gold	Buhweju	Dubai	02274	2		15159545
September 12 2017	Kamuntu Investments Limited	Iron ore	Rubanda	Kenya	02275	3000000		11250000

September 21 2017	Kukasi Investments (U) Ltd	Gold	Busia & Mubende	Dubai	02276	2	14413374
October 06 2017	Island Gold Minerals Limited	Gold	Busia	Hongkong	02277	25	1.73E+08
October 16 2017	Zlato Limited	Gold	Amudat & Nakapiripirit	Russia	02280	0.4978	34497393
October 23 2017	Morah International Company Ltd	Wolfram	Kabale	Singapore	02282	10000	9896058
October 24 2017	Crown Victoria Ltd	Gold			02283	0.413	1768474
November 08 2017	Kukasi Investments (U) Ltd	Gold	Kibale	Dubai	02284	3	20970961
November 17 2017	Environmental Women in Action for Development	Gold	Busia	UK	02285	1	6039108
November 20 2017	Nambajimana Alex	Wolfram	Kisoro	Donaster	02286	18000	26345131
November 20 2017	Nambajimana Alex	Wolfram	Kisoro	Donaster	02286	18000	26345131
November 20 2017	Island Gold Minerals Limited	Gold	DR Congo		02288	1	1468932

November 23 2017	3T Mining Limited	Tantalite	Wakiso	China	02289	6000		13116991
December 18 2017	Ronel Group Limited	Gold	Busia	Dubai	02290	3		20600587
December 19 2017	FookMoon Agency Ltd	Gold	Buhweju	Doha	02291	0.1		698181
43115	Environmental Women in Action Development	Gold	Busia	UK	02294	1	7243348	7243348
43130	Adamawa Investments (U) Ltd	Gold	Buhweju	Hongkong	02295	1	7516348	7516046
43151	Ys Goldstone (U) Ltd	Gold	Busia	South Korea	02296	0.4	293945	293945
43171	Trading Services Logistics (TSL) Ltd	Berryl	Bushenyi and Rukungiri	China	02297	24000	19.186	460467
43195	KI3R Minerals Limited	Wolfram	Rubanda	Toronto	02298	18000	1301	23419200
43195	KI3R Minerals Limited	Wolfram	Rubanda	Toronto	02299	18000	1277.4	22993395
43201	Kamuntu Investments Limited	Iron ore	Kabale	Kenya	02300	3000000	3.75	11250000
43217	Trading Services Logistics (TSL) Ltd	Berryl	Ntungamo	China	03701	24000	27.07	649775
43220	3T Mining Limited	Tantalite	Wakiso	China	03702	7150	3996.5	28575089
43223	KI3R Minerals Limited	Wolfram	Rubanda	Toronto	03703	18000	826.6	14878820

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43223	KI3R Minerals Limited	Wolfram	Rubanda	Toronto	03704	18000	819.938	14758886
43230	Environmental Women in Action Development	Gold	Busia	France	03705	0.75	72800	54600
43245	KI3R Minerals Limited	Wolfram	Rubanda	China	03708	20000	833.38	16667674
43245	KI3R Minerals Limited	Wolfram	Rubanda	China	03709	20000	750.04	15000908
43245	Zlato Limited	Gold	Busia & Bugiri	Turkey	03710	5	6931962	34659810
43252	Trading Services Logistics (TSL) Ltd	Beryll	Ntungamo	China	03712	24000	26.85	644550
43270	KI3R Minerals Limited	Wolfram	Rubanda	China	03713	18000	878.32	15809905
43270	KI3R Minerals Limited	Wolfram	Rubanda	China	03714	18000	878.32	15809905
43279	Sky Eagle International Investments Ltd	Gold	Busia	Dubai	03717	2	6187304	12374607

## 10.2 Mineral Dealers' Licences and Holders as of 31/12/2018

S/N	MDL No.	Holder	Date of Grant	Address	Commodity
1	0511	Alis Trading (U) Ltd	2 January 2017	Plot No.5 William Street Kampala	Precious Metals
2	0512	African Gold Refinery Ltd	2 January 2017	Plot M103-M106 Sebugwawo road Entebbe	Precious Metals
3	0512	African Gold Refinery Ltd	2 January 2017	Plot M103-M106 Sebugwawo road Entebbe	Precious Metals
4	0513	Mazoori Trading Company Ltd	6 January 2017	Kamwokya Mawanda Road	Precious Metals
5	0515	Aawings Investments Company Ltd	6 January 2017	Bugolobi Spring Roads Village Mall	Precious Metals
6	0516	Kipande Investments Ltd	9 January 2017	Shop 2 Maluku Round About Mbale	Precious Metals
7	0517	Mubende Gold Traders and Miners Co-operative Society Ltd	10 January 2017	Lujinji Kitumbi Mubende District	Precious Metals
8	0518	Ewamu Holdings Limited	13 January 2017	Plot 12 Luwum Street City Center Complex 3rd Floor	Precious Metals
9	0519	Nikki Rush Mining Group Ltd	13 January 2017	Plot 2026 Kabalagala (A) House No.1 Ssenyonga Rd	Precious Metals
10	0520	Nikki Rush Mining Group Ltd	13 January 2017	Plot 2026 Kabalagala (A) House No.1 Ssenyonga Rd	Base Metals
11	0522	Africas Underground Resources Limited	16 January 2017	Plot 55/5 Rubaga Road Kampala	Precious Metals

12	0525	YS GoldStone (U) Limited	20 January 2017	Plot 3 Lubowa Estate House No 1C	Precious Metals
13	0277	SAY WORLD WIDE (U) LTD	30 January 2017	P.O BOX, 56808 KAMPALA	Precious Metals
14	0278	TREASUR E HIGHLAN DD CAVES LIMITED	30 January 2017	P.O BOX, 7845 KAMPALA	Precious Metals
15	0523	Euro Group Africa Ltd	2 February 2017	Plot 66A Kira Road Kampala, P.O BOX, 23525 KAMPALA	Precious Metals
16	0286	EWAKU WILLIAM KIBOKO	7 February 2017	P.O BOX, 51 KABERAMAIDO	Industrial Minerals
17	0287	TRANS-EQUATOR MINERS (U) LTD	7 February 2017	NAJJA SHOPPING CENTRE	Precious Metals
18	0288	ABASI BALINDA TRANSPORTERS LTD	7 February 2017	P.O BOX, 804 FORT-PORTAL	Industrial Minerals
19	0289	METAL TESTING AND SMELTING COMPANY LTD	7 February 2017	P.O BOX, 3503 KAMPALA	Precious Metals
20	0290	CROWN VICTORIA LTD	7 February 2017	P.O BOX, 4015 KAMPALA	Precious Metals
21	0291	CROWN VICTORIA LTD	7 February 2017	P.O BOX, 4015 KAMPALA	Precious Stones
22	0292	BYARUHANGA WILLIAM AND FAMILY INVESTMENT LIMITED	9 February 2017	P.O BOX, 299 KABALE	Base Metals
23	0293	STRATEGIC ACQUISITIONS LTD	15 February 2017	P.O BOX, 30330 KAMPALA	Base Metals



24	0295	HERAEUS SMELTING AGENCY LIMITED	17 February 2017	P.O BOX, 21747 KAMPALA	Precious Metals
25	0296	MOTALE RESOURCES LIMITED	21 February 2017	P.O BOX, 11189 KAMPALA	Precious Metals
26	0297	SUN DISK LTD	21 February 2017	Serena Hotel Conference centre Room 246 Kampala	Precious Metals
27	0298	SAPPHIRE EDITIONS LIMITED	21 February 2017	P.O BOX, 28209 KAMPALA	Precious Metals
28	0299	EL SAMU GOLD TRADE COOPERATION (U) LTD	21 February 2017	PLOT 3 DUNDAS ROAD KOLOL COURTS	Precious Metals
29	0299	EL SAMU GOLD TRADE COOPERATION (U) LTD	21 February 2017	PLOT 3 DUNDAS ROAD KOLOL COURTS	Precious Metals
30	0300	BEDROCK MOLDING UGANDA LIMITED	22 February 2017	Nkkiazi Courts, Plot 1 Acacia Avenue	Precious Metals
31	0351	Star Jewellers Limited	23 February 2017	Plot 27 William Street Centre Point Building Kampala	Precious Metals
32	0352	Atinbah Metals Uganda Ltd	23 February 2017	Plot 57 Kira Road Kampala	Base Metals
33	0353	Adamawa Investments (U) Ltd	24 February 2017	Kabawo Zone Mutundwe Kampala	Precious Metals
34	0354	Bridgestone Minerals Ltd	24 February 2017	Plot 41 Kasanga Kiwafu	Precious Metals
35	0355	Core Minerals Geologists Ltd	3 March 2017	Plot 26 Binayomba Road Bugolobi, P.O BOX, 35605 KAMPALA	Precious Metals
36	0356	Gold Rush Global Company Limited	6 March 2017	Plot 106 Bukoto Street Kamwokya	Precious Metals
37	0357	Ginorex Minerals	7 March 2017	Plot 3 Pilkington Road NIC Building Suite A04	Precious Metals

		International Ltd			
38	0358	Labu Minerals and Consulting Ltd	7 March 2017	Plot 34/42 Buziga-Munyonyo	Precious Metals
39	0359	Moriah International Company Ltd	9 March 2017	Nyabikoni Kabale	Base Metals
40	0360	Imagine Gold and Minerals Company Ltd	10 March 2017	Plot 41B Luthuli Avenue Bugolobi	Precious Metals
41	0361	Kaida Import and Export Ltd	13 March 2017	Plot 296 Jinja Road, P.O BOX, 4268 KAMPALA	Base Metals
42	0362	Roberto maurizio Calamai	14 March 2017	Plot 449 Middle Income Estate Seeta, P.O BOX, 2427 KAMPALA	Precious Metals
43	0363	Tororo Cement Limited	14 March 2017	P.O Box 74 Tororo	Industrial Minerals
44	0365	Mubende Trust Buyers and Traders Association Ltd	15 March 2017	Lujinji Kassanda Mubende District	Precious Metals
45	0366	David Okiro and Edward Muloosi	22 March 2017	Plot 11 Buzalabuza close Bugolobi, P.O BOX, 4365 KAMPALA	Precious Metals
46	0369	Quantum Satis Revival Ltd	28 March 2017	Plot 642 Shrine Drive Road Naalya Estate	Precious Metals
47	0370	Mafabi Joseph	29 March 2017	Rubaga Kabuusu Market Parking	Industrial Minerals
48	0371	Laclarz Investment Ltd	31 March 2017	Plot 12Mackenzi Road Naguru Kampala	Precious Metals
49	0372	KLATA (U) LIMITED	4 April 2017	4 JINJA ROAD, P.O.BOX 71985 Kampala	Precious Metals
50	0373	HIMA CEMENT LIMITED	10 April 2017	P.O BOX, 70630 KAMPALA	Base Metals
51	0374	HIMA CEMENT LIMITED	10 April 2017	TWED TOWERS 6TH FLOOR	Industrial Minerals

52	0726	ARRM INVESTMENTS LTD	13 April 2017	PLOT 4 JINJA ROAD, 5TH FLOOR SOCIAL SECURITY HSE	Base Metals
53	0735	KIBWE UGANDA LIMITED	15 April 2017	P.O.BOX 28251 KAMPALA	Precious Metals
54	0728	TRICON MINERAL DEVELOPERS Co. LTD	20 April 2017	PLOT 2 VALE RD NAGURU	Base Metals
55	0729	RAHIM MINERS AND GOLD DEALERS LTD	24 April 2017	PLOT 20 BANDARI RISE BUGOLOBI	Precious Metals
56	0730	CONSOLIDATED SERVICES LTD	26 April 2017	PLOT 30 JINJA ROAD, P.O.BOX 11515 KAMPALA	Precious Metals
57	0731	DAM GEMSTONES EXPORTS LTD	26 April 2017	PLOT 41 BUZIGA ROAD, P.O.BOX 5643 KAMPALA	Precious Metals
58	0743	SOUTHERN MINERAL LIMITED	1 May 2017	PLOT 18 KAR DRIVE, KOLOLO	Precious Metals
59	0732	ISLAND GOLD MINERALS LIMITED	3 May 2017	PLOT 24 NAKASERO ROAD	Precious Metals
60	0733	PIERRE MONDE (U) LIMITED	3 May 2017	PLOT 374 BUKASA ROAD MUYENGA	Precious Metals
61	0732	ISLAND GOLD MINERALS LIMITED	3 May 2017	PLOT 24 NAKASERO ROAD	Precious Metals
62	0734	VICTORIA BEST LIMITED	4 May 2017	BUGOLOBI COFFE SPRING ROAD	Precious Metals
63	0737	KAYIWA RONALD	18 May 2017	NAJJANANKUMBI CENTRAL ZONE, P.O.BOX 9246 KAMPALA	Precious Metals
64	0738	GASEN PETROLEUM COMPANY LIMITED	18 May 2017	PLOT 3 PILKINGTON ROAD, NIC ROAD	Precious Metals

65	0740	ALTALEB HOLDINGS LTD	19 May 2017	KAMPALA KING FAHAD	Precious Metals
66	0741	EYAT INVESTMENTS LIMITED	29 May 2017	PLOT 10 BUKOTO STREET, KAMWOKYA	Precious Metals
67	0742	EAST AFRICA GOLD SMITH LTD	30 May 2017	PLOT 200 SPRING ROAD	Precious Metals
68	0736	SOLID PRECIOUS ARMS LIMITED	5 June 2017	GUARDIAN GEORGE BUILDING PLOT 67 SPRING RD BUGOLOBI, P.O.BOX 31386 KAMPALA	Precious Metals
69	0744	MWENYI JAMADA	8 June 2017	KAMUSWAHILI, MOROTO, P.O.BOX 34, MBALE	Industrial Minerals
70	0745	UNITED INVESTMENTS AND TRADING LIMITED	8 June 2017	AKAMWESI COMPLEX NAKAWA RM 3B BUYONYI DRIVE	Precious Metals
71	0753	MEGHA MINERALS AND MINES LIMITED	10 June 2017	PLOT 33/35/37 KYAMBOGO ROAD	Base Metals
72	0746	CUSTOM MINERAL LOGISTICS INTERNATIONAL	12 June 2017	MPONDWE LUBIRILWA, P.O.BOX 484 KASESE	Precious Metals
73	0747	ZHONG QUAN LIMITED	20 June 2017	P. O. BOX 37021, KAMPALA	Precious Metals
74	0748	MADINI INVESTMENTS LTD	21 June 2017	PLOT NO.-45 KANJOKYA STREET KAMPALA	Precious Metals
75	0749	PREC MET SERVICES LIMITED	26 June 2017	PLOT 59 KIIRA RD,NGAR DTB KAMWOKYA	Precious Metals
76	0750	WAKO TECHNICAL SERVICES LTD	26 June 2017	PLOT 4008 SEBWATO RD, UPPER KONGE HILL	Industrial Minerals
77	0751	KETSIA TRADING INVESTMENT (U) LTD	27 June 2017	NTINDA KIMERA RD	Precious Metals

78	0752	K & D GREAT LAKES LTD	30 June 2017	PLOT 8A, YORK TERRACE RD KOLOLO	Precious Metals
79		SHRI RAM JEWELLERS	11 July 2017	SHOP NO. 11, KISEMENTI MARKET KOLOLO UGANDA	PRECIOUS METALS
80	0755	Nasseri Said	12 July 2017	Ruhama Road, Ntungamo District	Base Metals
81	0756	Canary Whafr Limited	14 July 2017	Maguziriwaza Mall, Level 2, Room 2	Precious Metals
82	0758	Haki Yako Limited	17 July 2017	Arua Municipality	Precious Metals
83	0759	Zlato Limited	19 July 2017	3rd Floor Unicalo House, Plot 11 Archer Road Kololo	Precious Metals
84	0763	Rwenzori Agro Company Limited	21 September 2017	Plot 72, Kasese Municipal Council	Industrial Minerals
85	0764	Nashr Trading and Investments Ltd	29 September 2017	Plot 156 Najanankumbi, Entebbe Road. P.O.Box 6034 Kampala	Precious metals
86	0765	Nyabushenyi Twimukye Association Co.Ltd	16 October 2017	Isingiro district. P.O.Box 308 Kampala	Base Metals
87	0767	X8 Africa Uganda Limited	17 October 2017	Plot 33 Clemet Hill, Road.P.O.Box 10946 Kampala	Precious Metals
88	0768	Trading Services Logistics(TSL) Ltd	19 October 2017	Annex Building, Kisozi Complex Kampala Uganda. P.O.Box 7898 Kampala	Industrail Metals
89	0770	M/S Golden Nest (U) Ltd	23 October 2017	Plot 298, Block 257 Buziga. P.O.Box 10017 Buziga	Precious metals
90	0771	M/S Goodwill (U) Ceramics Co. Ltd	23 October 2017	No.1 LiaoshenIndustrial Park,Kapeka Nakaseke.P.O.Box 27933 Kampala	Industrail Minerals
91	0770	M/S Golden Nest (U) Ltd	23 October 2017	Plot 298, Block 257 Buziga. P.O.Box 10017 Buziga	Precious metals
92	0776	M/S Simba Gold	17 November ,2017	Plot 6 Acacia Avenue, 3rd Floor Acacia Plaza	Precious Metals

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		Refinery Limited			
93	0766	Goldstar precious stones(U) Ltd	17 October,2017	HOUSE 24, TANK HILL ROAD, MUYENGA KAMPALA	Precious Metals
94	0514	Sultan Imports and Exports Ltd	6 Janaury 2017	Plot 141 Wampewo Gayaza Road	Base Metals

## Uranium airborne radiometric anomalies identified

Table 8: Uranium airborne radiometric anomalies identified.

Anomaly Number	Geological Environment	Field Results	Pre-Field Priority	Post-Field Priority
Anomaly BLK2-7	Buganda Orthoquartzite, conglomerate	Anomaly located 800m from Muwanga Primary School, Kiboga district. Located within quartzitic sandstone on a gentle slope in reddish-brown soils. Background was 420 to 510 cps with elevated radiometric (840 to 950), 0.6% K, <b>51.5 ppm U</b> and 19.8 ppm Th. Location Coordinates : 0383546, 79006 (1381 m)	2	2
Anomaly BLK2-10	Mica schist with quartzitic interbeds	Located 500 m away from Ntusi – Lwemiyaga – Boma road. Entire area elevated radiometric with average background of 850 to 920 cps. At centre of anomaly are dense highly altered quartzitic breccias that yielded 2215 cps (TC), 2.0% K, <b>129 ppm U</b> and 24 ppm Th. Location Coordinates : 303208, 18394 (1228 m)	2	2
Anomaly BLK2-13	Quartzofeldspathic gneiss	Located 600m away from the Ntusi – Lwemiyaga – Lwessankala road. The anomaly is within cattle farmland. Entire area elevated radiometric with average background 800 to 980 cps (TC). At centre of anomaly found dense felsic and highly sheared quartzite that yielded 3140 cps (TC), 0% K, <b>265 ppm U</b> and 45 ppm Th. Location Coordinates : 284001, 13771 (1220 m)	1	2
Anomaly BLK3-3	Porphyritic granite gneiss	Located in Nyamabale village along the Mbarara-Ishaka-Kasese road. Anomaly located in cattle grazing farmland, dominated by massive Porphyritic granite-gneiss outcrops. Background radiometric 230 to 310 cps TC. Identified localized spring with elevated radiometric in swampy environment; 1200 to 1460 cps (TC); 0.24% K, <b>71.3 ppm U</b> and 28.9 ppm Th. (U approximately 2 time Th)  Location Coordinates : 196117, 9940814 (1544 m)	1	2
Anomaly BLK3-4	Quartzite, conglomerate, with algal fossils in places	Located on Mbarara-Ntare-Bwizibwera road, Lubawa village. Generally 280 to 300 cps over entire area; area covered with quartzite breccias. Area in centre close to anomaly pick has elevated radiometric 600 to 720cps (TC); 0.6% K, <b>52 ppm U</b> and 8.6 ppm Th.  UTM Coordinates : 0240226, 9947794; 456m	1	3
Anomaly BLK3-5	Mudstone, shale, phyllite, oncolite and stromatolite in places	Anomaly along Mbarara-Kakiika-Lubaya road. On a gentle slope overlain by dense quartzite breccia with elevated radioactivity ranging from 1,300 to 2,000 cps (TC); 0.7% K, <b>141 ppm U</b> and 22.2 ppm Th.  Location Coordinates : 240524, 9943760 (1438 m)	2	2
Anomaly BLK3-7	Alluvium ; sand, silt, gravel	Anomaly located on edge of swamp/wetland demarcating Mbarara-Sheema district. There is a radioactive spring with values ranging from 740 to 820 cps (TC); 1.1% K, <b>39 ppm U</b> and 4.9 ppm Th. The topographic highs are overlain by granite-gneisses with very low counts. UTM Coordinates: 0217312, 9952180; (1451 m)	3	3

### 10.3 Capacity Building for DGSM staff

#### Long- term training

- i. Ms. Grace Lajwe, (Ag. Senior Chemist) completed a Master's of Science Degree in chemistry at Makerere University, Kampala.

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- ii. Henry Ngada – (Ag. Assistant Commissioner - Geodata) completed a Postgraduate Diploma in Business Administration at Uganda Management Institute (UMI), Kampala.
  - iii. Mr. Julius Kwezi (Laboratory Attendant) Completed a Bachelor of Science Degree in Chemistry at Makerere University, Kampala.
  - iv. Ms. Erios Naiga (Documentation Officer) is pursuing a Msc. Degree in Informatics at Gyeongsang National University, South Korea, starting from 21<sup>st</sup> August 2017 and ending on 31<sup>st</sup> August 2020.
  - v. Mr. Henry Onyege enrolled for one year Master of Science in Analytical Chemistry at Kingstone University, UK effective October, 2017.

### ***Short- term Training***

Ms. Grace Nassuna (AC/ Geoscience), Ms. Sylvia Grace Nassaka (PDO), Mr. Isa Lugaizi (SG/ Mapping), Ms. Stella Pule (AG. Senior Geoscientist) and Ms. Annet Nambojera participated in a regional and country level training workshops on Geodata digitization and Mapping of Development minerals held in Dar-Es-Salam from October 30<sup>th</sup> to 10<sup>th</sup> November 2017.

### ***Workshops and conferences***

- i. The Mineral sector was promoted internationally and locally at: Mining Indaba promotional conference in South Africa (4<sup>th</sup> -9<sup>th</sup> February 2018); Intergovernmental Forum on metals and minerals (16-21<sup>st</sup> October, 2017); the Mineral Wealth Conference (October 3-4<sup>th</sup>, 2017), Joint Sector Review and the Kampala Capital City Authority GIS day.
- ii. Ms. Sylvia G. Nassaka participated in an international conference ‘Geology, Mining, Mineral and Groundwater Resources of Sub-Saharan Africa: Opportunities and Challenges Ahead from 11 to 13 July 2017 at Chrismar Hotel in Livingstone, Zambia.
- iii. Dr. Tugume Fred, Ag. Commissioner/ Geology, Mr. Isaiah Tumwikirize, Ag. Principal Geophysicist and Mr. Joseph Nyago participated in the 13<sup>th</sup> Annual AfricaArray Workshop in Johannesburg, South Africa from 24<sup>th</sup> June- 27<sup>th</sup> July 2018.



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