Investing in Uganda's Mineral Sector

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1.0 OVERVIEW OF THE MINING INDUSTRY

The mining industry in Uganda reached peak levels in the 1950s and '60s when the sector accounted for up to 30% of Uganda's export earnings. However, political and economic instability experienced in the country in the '70s led the sector to decline to its present level of contributing only about 1% of the Growth Domestic Product (GDP). It is noted therefore that the decline is not a result of resource depletion but is rather due to the bad government policies of the past.

The period after 1986 has been marked by a favorable business climate in Uganda and a number of mining companies have taken up licences in the mining sector - the mining and quarrying industry is now growing at a rate of about 11% per annum. For example, in 1990 there were under 50 licences issued in the exploration and mining licence categories combined; by the end of 2000 there was a total of 221 licences including, *136 Exclusive Prospecting Licences, 95 Location Licences, and 15 Mining Leases.* These licences cover the entire country but are generally concentrated in the more prospective areas in southwest and southeast Uganda. This is due to the fact that because of thick soils and deep weathering, parts of north central Uganda have limited geological data.

The investment that Government undertook with the French Government (1989 - 1990) and with United Nations Development Programme (1992 - 1996), in which a number of mineral occurrences were appraised, resulted into the discovery of mineral targets that are now being developed for mining and/or processing. These include the following:

- Kasese cobalt processing,
- Tira gold mine near Busia,
- Bjordal wolfram mine at Nyamuliro, Kabale,
- Wampewo tantalite mine, Wakiso,
- Kisita gold mine near Kyakidu, Mubende, and
- Namekhara vermiculite mine in Bukusu, Mbale.

Nonetheless, current mineral production is still too low to meet local industrial demand. Limestone mined for the production of cement and lime is consumed largely in the local market. Aggregate, gravel and small quantities of gold, tin and tungsten concentrates are currently produced largely for export. There are many high mineral potential areas in Uganda, which remain inadequately explored despite the country's long history of production.

2.0 DEVELOPMENTS IN THE INDUSTRY

2.1 MINERAL INDUSTRY POLICY

The **Mineral Policy Objectives** are:

(a) To stimulate mining sector development by promoting private sector participation;
(b) To ensure that mineral wealth supports national economic and social development;
(c) To regularise and improve artisanal and small scale mining;
(d) To minimise and mitigate the adverse social and environmental impacts of mineral exploitation;
(e) To remove restrictive practices on women participation in the mineral sector and protect children against mining hazards;
(f) To develop and strengthen local capacity for mineral development; and
(g) To add value to mineral ores and increase mineral trade.

Under the policy framework, Government shall carry out geological, geochemical and geophysical surveys of the entire country at various scales; process, analyze and interpret the geoscientific data; archive, package and disseminate the data to potential users through print and electronic media; oblige private operators in the sector to provide acquired geoscientific data at appropriate stages of exploration for enhancing the National Geoscientific Data Bank; and avail mineral prospects to investors.

The Government will encourage artisanal and small-scale miners to form associations and other organizations in order to improve capacity to produce and market their mineral commodities. Government will apply light-handed regulations in small-scale mining, maintain a continuous dialogue with miners' organizations to address matters of small-scale mining and carry out awareness campaigns targeting artisanal and small-scale miners.

In order to stimulate investment in the mineral sector, Government shall put in place an investor-friendly and competitive legal and fiscal frameworks, with well-defined parameters for the sector.

Legal Framework

All minerals in Uganda are owned by Government, which gives rights to individuals and companies to explore, develop and exploit mineral resources under the Mining Act (1964).

At the moment, the licensing regime consists of Prospecting License – valid for one year; Exclusive Prospecting License limited to 20 sq. km, and Special Exclusive Prospecting License with area greater than 20 sq. km – both licenses are valid for one year and are renewable; Mining Lease to enable mining operations and granted for

duration ranging from 5 to 21 years; and Location License limited to 40 acres and is granted to small-scale operators for a period of 2 years, renewable.

Strategies for Development of the Mineral Sector

Mineral Policy formulation: Through the new policy, Government intends to maximize the economic benefits of mineral exploitation, and promote private sector participation by putting in place an internationally competitive legal and fiscal regime for the sector.

Accordingly the Mining Act of 1964 is being revised and the new Act is expected to be in place before end of 2003. Some of the new elements in the law being introduced are:

- Exploration Licence: to be granted for 3 years and renewable for another two terms of 2 years each, in order to give an investor sufficient time for exploration,
- Retention License: to be granted for 2 years and renewable for another 2 years in a situation where a deposit has been delineated and feasibility study completed, but due to external factors to the project e.g. low metal prices, natural catastrophe, development cannot be carried out.
- Mining Agreements: An option for an investor to sign agreement with Government in order to stabilize the legal and fiscal terms of the investment over the life of the project.
- Environmental provisions: Mineral exploration and development will be carried out in accordance with environmental guidelines.

Formulation of a Mineral Sector Development Programme: the program aims at massive acquisition of geological data and establishing an environment which is competitive for attracting investors to develop the mineral resources of Uganda in an efficient, sustainable and environmentally sound manner, that can contribute substantially to foreign exchange earnings, fiscal revenues, employment and improvement of rural living conditions.

The work to be carried out under the Mineral Sector Development Programme will include the following areas: institutional and regulatory reform, capacity building, mining cadastre and registry system, investment promotion, improvement of laboratories; development of geological infrastructure through geophysical airborne surveys, geological and geochemical mapping; environment management system and sustainability of small-scale and artisanal mining.

Provision of funding for the programme: the programme is estimated to cost US$ 25 million over a 5 year period during which it will be implemented. Discussions on the programme design and funding are taking place with the World Bank, and the other funding agencies with which consultations have been made are the Nordic Development Fund and the African Development Bank.

2.2 INDUSTRY PERFORMANCE

The implementation of the above policies has resulted into an increase in mineral production and mineral exports. This has provided a significant contribution to foreign exchange reserves as well as revenue accruing from royalty. For instance the royalties paid were Ush. 77.6 million in 1997, Ush.20.3 million in 1998, Ush.11.2 million in 1999, Ush. 307.2 million in 2000, Ush. 299.6 million in 2001 and Ush. 2.05 billion in 2002. The value of mineral exports shows an increase from US $ 50 million in 1995 to US $ 53.4 million in 1996, US $ 81.3 million in 1997 and U$120 milion in 2000. Table 1 below shows the trends in mineral production.

Table 1: Mineral production statistics 1995 - 2002

Mineral	1995	1996	1997	1998	1999	2000	2001	2002
Gold (grams)	1,507	3,000	6,400	8,150	4,730	55,980	14,200	25,650
Tin Ore (tons)	4.29	0.38	1.81	1.10	-	-	-	-
Wolfram (tons)	17.31	-	1.76	7.83	0.32	0.12	26.69	24.82
Tantalite/ Columbite (t)	1.82	-	-	-	256.3	2.71	11.09	6.46
Iron Ore (tons)	7.0	200	2,432	785	-	2,400	1,236	-
Vermiculite (t)	-	-	-	-	-	-	220	664
Cobalt (t)	-	-	-	-	76.74	410.75	511.99	-
Limestone (tons)	209,512	159,479	919,353	140,235	121,521	253,032	229,972	140,022
Gypsum (tons)	5,467	2,281	-	143.35	256.6	-	-	5.12

Source: Department of Geological Survey and Mines
"Nil" - means no returns have been received by the Department of Geological Survey and Mines

2.3 MINERAL OCCURRENCES OF UGANDA

Known Mineral Deposits of Uganda

The principal minerals that have been mined in the past, or are being mined at present or are known to occur are discussed below, and the mineral occurrence map (appendix 1) shows their locations. In broad terms they can be divided into metallic and non-metallic minerals.

A. Metallic Minerals

Beryllium (beryl): Beryl is the main mineral from which the metal beryllium is extracted. It is associated with pegmatites, mainly in Ntungamo, Bushenyi, Kanungu and Rukungiri districts, but also at Mbale Estate and Lunya in Mubende and Mukono respectively.

At one time in the early 1960's Uganda's beryl production accounted for 10% of World production. Production came mainly from Mutaka in Bushenyi district, Kazumu in Ntungamo and Bulema and Ishasha in Kanungu district. The deposits at Ishasha have the largest known potential. No reserves and grade have been estimated in each of the locations.

Uses: Beryllium metal is used in making lightweight metal alloys for aircraft and in nuclear reactors. The colored (green) variety of beryl known as emerald is a precious stone. This variety is not yet discovered in Uganda.

Bismuth (bismutite): Bismuth is a metal obtained from the mineral bismutite. In southwest Uganda it occurs in association with native bismuth, gold and wolframite at Rwanzu, Kitahurira and Kitwa in Kisoro, Kabale and Kanungu districts respectively. Only the Rwanzu deposit was has been mined. Bismutite also occurs in pegmatite deposits at Muramba, Kyambeya and Rwenkuba in Kanungu district.

Uses: Bismuth is used in making special alloy steel.

Chromium (chromite): Chromite mineral is the source for chromium metal. Chromite deposits are found at Nakiloro and Lolung in a belt 6 km long north of Moroto town. The chromite here is associated with platinum, a precious metal. There has been no chromite production to date in Uganda.

Uses: Chromium is used in making special alloy steels and for chrome coating. Chromite as an industrial mineral is used in metallurgical processing and in furnaces as a refractory.

Copper-Cobalt: Copper has been found at several localities in Uganda but the only significant deposit discovered to date has been at Kilembe, where copper-cobalt sulphide mineralization occurs. The other areas where copper mineralization has been noted are Bobong, Lokapeliethe and Loyolo in Karamoja region, and Kampono and Kitaka in Mbarara district.

Although copper was first reported at Kilembe in 1908, the deposit was not brought into production until 1956 on completion of the railway line to Kasese. Between 1957 and 1979 a total of 16.29 million tons ore averaging 1.95% Cu and 0.18% Co were mined and treated to yield 217,000 tons of blister copper which was exported, plus 1.1 million tons of cobaltiferous pyrite (iron sulphide) which was stockpiled. The Kasese Cobalt Company has installed a 1,000-tons per year cobalt plant and is processing the stockpile.

The mine ceased its production in 1982 and has since been on care and maintenance. Proven reserves of copper at closure were 4.17 million tons with a copper content of 1.77%, with opportunities to discover additional resources in the vicinity of the mine.

In addition to copper still in the ground, there is 5.5 million tons of cobalt in tailings (dumped material from previous mining) at an average grade 0.114%Co.

Uses: Copper is mainly used in making electrical conductors. Cobalt is used in making special alloys for the aerospace industry, electronics and high-tech industry. Cobalt salts are used in the chemical industry and in tinting glass to give a blue colour.

Gold: Gold is widely distributed in Uganda but has been worked in only a few areas: Buhweju and Kyamuhunga in Bushenyi district, many localities in Kabale, Kisoro and Kanungu districts, Tira and Amonikakine in Busia district, and more recently in Kamalenge, Mubende district and many localities in Karamoja region. With the exception of Tira and Amonikakine where gold was recovered from reefs (hard rock), most of the gold was recovered from alluvial material.

Most gold production has been by small producers who include licensed miners and illegal miners or artisans. Production statistics from this class of miners is only indicative given the fact that most operators are not licensed and even the licensed ones tend to under-declare hence most of the gold is transacted through dubious channels. This not withstanding, the recorded production between 1931 and 2001 was approximately 6.5 tons of which the largest proportion came from Buhweju, followed by Tira.

Uses: The commonest use of gold is in gold bullion, followed by jewelry and electronics especially in the computer industry.

Iron Ore: Iron ore occurs as two types of minerals: hematite and magnetite. Hematite of high quality (90 - 98% Fe_2O_3) occurs in Muko area in Kabale and Kisoro districts with total resources in excess of 50 million tons, which contains negligible sulphur, phosphorus and titanium. Similar hematite iron ore with a resource of 2 million tons occurs at Mugabuzi in Mbarara district.

Magnetite is associated with the carbonatite complexes (aborted volcanoes) at Sukulu and Bukusu in Tororo and Mbale districts respectively. At Sukulu, magnetite occurs in residual soils with apatite (phosphate). A resource of 45 million tons averaging 62% Fe, 2.6% P_2O_5 and 0.9% TiO_2 has been estimated.

Within Bukusu, a number of lenses of massive magnetite occur in igneous rocks (syenite) and as residual soils with vermiculite. 23 million tons has been estimated at Nakhupa, Nangalwe and Surumbusa sites, while Namekhara contains an estimated resource of 18 million tons with 13% TiO_2. Other carbonatites whose iron ore potential has not been tested are Napak and Toror in Moroto and Kotido districts respectively.

There has been very limited production of iron ore in Uganda to date mainly for use as an additive in the steel scrap smelting in Jinja and for special cement by Hima Cement.

Uses: The principal use of iron ore is in making of steel.

Lead: Galena, a mineral containing lead (with minor zinc and gold), occurs in quartz veins at Kampono, Kanyambogo and Kitaka in Kitomi Forest, Mbarara district. It also occurs associated with tin (cassiterite) at Kikagati. These deposits are all very small. Galena was mined only at Kitaka and production totaled only 750 tons over a 13- year period to 1960 when mining stopped.

Uses: Lead is used in making motor vehicle batteries and heavy metal shield for nuclear radiation protection.

Lithium: Lithium minerals occur in pegmatites in Mubende, Mukono, Ntungamo, Kabale, Kanungu and Rukungiri districts, but have been exploited only from the Nyabushenyi (Ntungamo) and Mbale Estate (Mubende) pegmatites. Production of amblygonite for 20 years to 1969 was only 777 tons. Most of the pegmatites are small and of irregular bodies, which mitigates against large-scale exploitation, but is well suited to small-scale production by locals entrepreneurs.

Uses: amblygonite the ore of lithium is used mainly as a non-metallic mineral, especially in chemicals.

Niobium-Tantalum (columbite-tantalite): The metals niobium (or columbium as it is sometimes called) and tantalum are derived from the minerals columbite and tantalite respectively. The two minerals usually occur together in association, in varying proportions. Columbite-tantalite occurs in pegmatites, mainly in southwest Uganda and has been produced in small quantities.

The main occurrences are Kakanena, Nyanga, Rwakirenzi, Nyabushenyi, Rwenkanga and Dwata (Ntungamo), Jemubi, Kabira (Bushenyi), Bulema (Kanungu) and Kihimbi (Kisoro). Others are Wampewo (Wakiso) and Lunya (Mukono). They are generally of small size with irregular metal distribution.

Pyrochlore is potentially the most important niobium mineral in Uganda. It occurs in carbonatites at Sukulu and Bukusu, and at Napak and Toror in Karamoja. The Sukulu phospahate deposit is potentially the most important source with a resource of over 300 million tons of which 130 million tons average 0.2% Nb_2O_5.

Uses: Niobium is used in making carbon steels, super alloys, high strength low-alloy steels, stainless and heat-resistant steels. The major end-use of tantalum is in production of electronic components and batteries for cellular phones, and in alloys.

Tin (cassiterite): Several tin deposits occur throughout southwest Uganda, and the tin-field extends southwest into Rwanda and Congo and northern Tanzania. The deposits are mainly of quartz-mica-cassiterite vein type in shales and sandstone host rocks (of the Karagwe-Ankolean System) closely associated with granitic bodies. The individual veins are thin (rarely more than a metre in width) irregular and of small tonnage potential. Stockworks and sheeted vein swarms occur at Rwaminyinya (Kisoro) and Kitezo (Mbarara) and these may have large tonnage potential.

Uganda's tin concentrate production 1927 to 2001 totalled about 13,000 tons. The bulk of this production came from hard rock deposits, with minor eluvial production

and no alluvial production. The largest deposit was Mwerasandu (Ntungamo) and substantial production also came from Kikagati (Mbarara). Other producers were Rwaminyinya, Burama ridge (Kabale/Ntungamo), Ndaniyankoko (Mbarara), Kaina and Nyinamaherere (Ntungamo).

Uses: Tin is used mainly for coating iron/steel to minimized rusting and also making cans for the food industry.

Titanium (ilmenite/rutile): Titanium minerals occur in the magnetite-rich carbonatites at Bukusu and Sukulu, which contain significant titanium (approx. 13% TiO_2), while those at Surumbusa contain higher values (22% TiO_2) locked up within the magnetite.

Uses: The main use of titanium is currently as a non-metallic mineral, especially as titanium oxide pigment in paint, paper, rubber, etc. rather than as a metal. The metal is used in the manufacture of corrosive resistant steel.

Tungsten (wolframite/scheelite): Numerous tungsten deposits of quartz vein type occur in several places in southwest Uganda and in Mubende. The southwest deposits occur as vein swarms in graphitic sediments of the Karagwe-Ankolean System, closely associated with granitoid intrusions. They extend southwards into Rwanda and Congo.

The main deposits that have been mined are Nyamuliro (also called Bjordal Mine), Kirwa, Ruhija, Mutolere, Rwamanyinya and Bahati in Kabale and Kisoro districts. Others are Kyasampawo and Mbale Estate in Mubende and Buyaga in Rakai district.

Uganda's wolframite concentrate production from 1935 to 2001 has totalled over 5,000 tons and this has come from the various low-grade deposits. The Bjordal mine which has produced over 2,500 tons of concentrate, has a resource estimated at 10 million tons averaging 0.5%WO_3, whereas Kirwa mine which was another large producer from late 1940's to 1979, has a resource estimated at 1.25 million tons averaging 0.19% WO_3. Bjordal mine is currently being re-developed by M/S Krone Uganda Ltd. and production is up to 15 tons/month.

Uses: Tungsten is mainly used in making armour plate in military equipment, manufacture of filaments for electric bulbs and in making tungsten-carbide for drilling bits.

B. Non-Metallic Minerals

Aggregate, Crushed and Dimension Stone: Stone suitable for crushing is available in most parts of the country. Granite, gneiss, quartzite and sandstone are widely distributed throughout the areas of Precambrian basement. Dolerite and amphibolite also occur in central and eastern Uganda though they tend to be badly weathered. Volcanic lavas, and agglomerates occur extensively in the southwest and east of the country. Marble occurs extensively in Moroto district.

Uses: Stone is used in various forms in construction - as aggregate, hardcore, as building blocks and wall cladding and the beautiful colored rocks mostly granite, gnesiss, marble and gabbro are used in the dimension stone industry as decorative tiles and blocks.

Clays: Clay deposits suitable for the manufacture of bricks, tiles, pottery, etc. are widely distributed throughout Uganda. No detailed systematic investigation has been carried out throughout the country except around a few major urban areas of Kampala, Jinja, Entebbe, Mbarara and Masaka. They are of variable quality, in terms of iron and quartz content and therefore also show a highly variable reaction to firing. Careful and detailed investigation could show potential for better quality clays, including refractory material and china clay.

Uses: Clay is a major raw material for various bricks and tiles in the building industry and pottery. High aluminous clays with low iron content are used in making refractory bricks for lining furnaces, in making porcelain and in fine ceramics such as china ware (plates, cups), sanitary ware (toilet pans, basins, etc.) and pipes.

Diatomite: Diatomite deposits are located at Panyango, Alui and Atar near Packwach and also farther north on the Amboso River within the Rift Valley sediments. The diatomite occurs in horizons within clay beds and no detailed evaluation has been carried out. The Packwach diatomite is very white and contains a large proportion of (> 60%) of diatoms in a kaolin matrix. It has a good potential for the commercial production of both high-grade diatomite and kaolin by hydro-cycloning or oil classification.

Uses: The main uses of diatomite are: as a filtering medium for beer and the food industry, as well as a carrier in insecticides.

Feldspar: Feldspar (microcline) is commonly associated with pegmatites found in the Precambrian basement. It occurs at Bulema (Kanungu), Bugangari (Rukungiri), Mutaka (Bushenyi), Nyabakweri (Ntungamo), and Lunya (Mukono). It varies from a high quality, white variety at Nyabakweri through to a lower quality, pale green variety at Lunya.

There has been negligible production of microcline to date in Uganda due to little demand at present, but significant potential demand for the manufacture of ceramic products exists in the country and throughout East Africa.

Uses: Feldspar is used in ceramics as a flux and glaze, as well as in the glass industry in the melting process.

Glass/silica Sand: Glass is made by fusing silica with soda and lime to produce a transparent, colourless soda-lime silicate. Glass sands that form the main primary source of the silica need to be free of impurities such as iron oxides, alumina and heavy minerals.

Narrow beaches along the shores of Lake Victoria and some islands contain deposits of glass sand at several locations like Diimu (Rakai), Bukakata and Lwera (Masaka),

Nalumuli Bay and Nyimu Bay (Mukono) and Kome Island (Buvuma). The highest quality (99.95%SiO_2) glass sands have been mined from Kome Islands and exported to Kenya. At Diimu and Bukakata beaches, over 2 million tons of good quality sands (99.93% SiO_2 and 0.05%Fe_2O_3) have been delineated. The Madhvani Group mined and used glass sands from Bukakata for making glass in the 1960's.

Uses: Silica sand is the main ingredient in making glass.

Gypsum: Gypsum (selenite) occurs as float and in clay beds with Rift Valley sediments near Kibuku (Bundibugyo). Resources have been estimated at 2 million tons of gypsum. There has been only limited artisan production to date and all was sold to Hima Cement, but was stopped due to poor production methods. Gypsum also occurs at Lake Mburo (Mbarara) and Lake George in lake sediments.

Uses: Gypsum is mainly used in the cement industry as an additive (4% content) to retard the setting process while building; it is also used as Plaster of Paris in medical applications, and also in making molds.

Kaolin: Kaolin is associated with Tertiary lateritisation over extensive areas of Precambrian terrain. Deposits suitable for industrial use occur in a number of localities around Kampala (e.g. Namasera and Migadde), also in Bushenyi (e.g. Mutaka). Other deposits are at Buwambo (Wakiso), Koki (Rakai) and Kilembe.

Mutaka kaolin is by far the best quality and can be upgraded to a product averaging 87% kaolinite with 54% of the particles less than 2 microns in size and having a brightness (80% unfired; 87% fired).

Uses: It has potential use in paints, paper, pesticides and ceramics.

Limestone and Marble: Secondary limestones derived from lime leached from calcareous tufa and from carbonate springs occur around an ancient shoreline of Lake George. They vary in type from calcrete, tufa and sinter at Muhokya and Dura, to true limestone at Hima.

At Muhokya the tufa deposit is of a high quality but is small in size; it is being mined for production of lime. At Dura thick bands of almost pure aragonite occur in calcareous sinters in a narrow valley. The deposit has been partially eroded away and there is approximately 2 million tons.

The Hima limestones are far more extensive and a resource of 20 million tons of variable quality has been delineated. The deposit has a maximum thickness of 7.5 m and covers an area of approximately 500 hectares. Out of 20 million tons, 6 million is suitable for Portland cement manufacture.

Calcium carbonate occurs in carbonatite ring complexes at Sukulu and Tororo in Tororo district, at Napak in Moroto district and Toror in Kotido district. They are variable in composition and may be high in phosphorous, due to associated apatite, and magnetite. Magnesium is generally low, but rises to >8% at Napak. Marbles,

usually high in magnesia occur extensively in Moroto and Moyo districts. The marble has a range of shades from pure white to a pink mable.

The major limestone deposits at Hima and Tororo have provided the major raw material for Uganda's Portland cement industry. The old plant at Tororo set up in 1953 is currently under rehabilitation and expansion to produce 1,000 tons of cement per day. However, the company has adopted the international standard ISO 9002, for which the limestone at Tororo is not considered suitable to make cement except after intensive selective mining. Production of cement is based on clinker being imported from Japan and India. At the same time, Tororo Cement Industries Ltd. is exploring for good quality limestone (marble) in Moroto district, with encouraging results at Katikekile, for mining and trucking to the plant at Tororo. The new plant is expected to commence production in July 2002. Hima's current production is 900 tons per day.

Uses: Limestone is used for making cement and lime both of which are important inputs in the construction industry. Lime is also used as soil conditioner in agriculture (to reduce soil acidity). The main use of marble is as a raw material for marble tiles, but if low in magnesia is also used in making Portland cement, and the white varieties are used to make calcium carbonate powder used in paint, paint and detergents.

Phosphates: Apatite is the main commercial ore of phosphate known in Uganda. The most important occurrences are associated with carbonatites, the two largest being at Sukulu and Bukusu. Weathering of the carbonatites has resulted in the residual concentration of apatite, magnetite, vermiculite, pyrochlore, barite, zircon and rare earth elements.

The total resource in three valleys at Sukulu is estimated at over 220 million tons, with still further large resources under the laterite mantle. The apatite content is variable, averaging 13.1% P_2O_5 and can be beneficiated to yield a product containing 40-42% P_2O_5. The deposit was mined by the Sukulu Mines Ltd. with a 25,000 tons/year single super-phosphate fertilizer plant at Tororo from 1964 to 1978.

Busumbu ridge though a smaller deposit contains the richest concentration of phosphates in Bukusu. The bulk of the deposit consists of soft apatite-bearing soil, varying from 3 - 25% P_2O_5. A resource of 2.5 million tons averaging 12.8% P_2O_5 has been estimated. Busumbu Mining Company mined the deposit until 1956, with the concentrate exported to Kenya for conversion to soda phosphate. It was not suitable for conversion to super-phosphate owing to its high alumina and iron contents. Its high citric solubility however makes it useful as a low priced fertilizer.

Nilefos Limited, a local company, has been an exclusive prospecting licence for the Sukulu deposit. The company is looking for joint venture partners to develop the mines and manufacture phosphate fertilizers and other by-products.

Uses: The major use of apatite is in making of fertilizers. Other uses include making of detergents and chemicals.

Salt: Salt includes salt for human and animal consumption as well as various salts for industrial uses. Salt for human and animal consumption has been extracted on a small-scale from hot springs at Kibiro (Hoima) and on a larger scale from the floor of crater lakes at Katwe and Kasenyi in Kasese district for many centuries. The salt is a mixture of sodium and potassium chlorides with lesser amounts of sulphate. The current method of production is based on solar evaporation in ponds and the product is crude due to mixing of the salts during fractionation and crystallization as well as with mud at the lake bottom.

Trona (sodium carbonate) occurs in the three areas, but on a larger scale at Katwe and Kasenyi. It is associated with mixed salts (sodium and potassium chlorides) and gypsum (calcium sulphate). At Katwe there is a resource of approximately 10 million tons of trona with mixed salts.

Uses: Sodium chloride is for making of common salt for human consumption, and industrial chemicals; potassium chloride is used making of potassium-based fertilizers; trona is used in glass manufacturing.

Vermiculite: Vermiculite is known to occur at Bukusu and Sukulu. The main occurrence is on a 10 km long semi-circular ridge (Namekhara, Nakhupa, Surumbusa and Sikusi) at Bukusu, where vermiculite flakes occur in residual concentrations (from the leaching of phlogopite in carbonatite) below a surface cover of 4-5 m magnetite rubble.

Recent exploration at Namekhara has delineated a resource of approximately 4 million tons of high quality vermiculite, which is probably one of the best known at present in the world. M/s Canmin Resources Limited (a Canadian company) has commenced mining and processing of vermiculite with a planned output of 40,000 tons/year. The company is exporting to the USA market under the Africa Growth and Opportunity Act (AGOA).

Uses: Vermiculite is used as an insulator, in making fireproof boards, as a replacement of asbestos in brake linings, packaging materials, and lightweight concrete in construction. The poorer grades of vermiculite are used in horticulture (flowers), tea nurseries and golf courses, due to its ability to retain water over long period.

Additional Mineral Potential of Uganda

Besides the known mineral occurrences and deposits described above, Uganda has potential to produce a variety of other important minerals, which are being produced in the neighboring countries with similar geologic environments. Such mineral commodities include: platinum, nickel, diamond and rare earth elements.

Platinum Group Minerals - Potential exists for platinum group metals (platinum, palladium and rhodium) in layered intrusives in the Archaean greenstone belts and areas with ultrabasic rocks. The high platinum assays of the Nakiloro chromite are indicative of this potential. Values as high as 3.0 - 7.5 grams per ton have been obtained on samples. The geology of the area is similar to the layered intrusives in

South Africa, which have large deposits of platinum-group-metals (PGM). Exploration for the metals by a company is ongoing at Nakiloro and Lolung.

Nickel (±Co, Cu): Potential exists for both primary volcanogenic massive Ni-Cu sulphide and secondary nickeliferous laterite deposits in/over ultramafics within Precambrian greenstone belts, and Lower-Middle Proterozoic sediments, but this has not been fully investigated.

An airborne geophysical survey carried out in 1980 over southern Uganda, and later followed by another similar survey of lower altitude and ground surveys identified magnetic bodies that are favorable for hosting nickel and cobalt in Kafunjo, Ntungamo district and Rugaga in Mbarara district, close to the border with Tanzania. Similar bodies in the same geological environment in Tanzania have been found to contain nickel mineralization.

Diamond: Potential for diamond exists in a number of areas in Uganda. Discovery of the diamonds in gravels occurred during prospecting for gold in Buhweju and a few small diamonds were found at Kibale in 1938 and Butale in 1956.

There has been no exploration for diamonds in recent years except that carried out in the period 1965 - 1974. Although no economic deposits were discovered, small diamonds and indicator minerals were discovered in many areas like southern Karamoja, and Katakwi. The basic volcanics in Bushenyi, Kabale and Kisoro districts have potential to diamonds.

Rare Earth Elements - Good potential exists for small, irregular deposits of limited tonnage in pegmatites, but this has not been quantified. Potential exists for major deposits - the Sukulu carbonatite contains some rare earth elements, but this has not been fully investigated.

3.0 INVESTMENT OPPORTUNITIES

There are many high mineral potential areas in Uganda, which remain inadequately explored despite the country's long history of mineral exploration and production. Traditional targets have been vein-hosted gold deposits and base metals. In recent decades, the focus has also been placed on the search for industrial minerals with over 100 documented occurrences of gold, base metals and Industrial minerals.

Seven target areas of high prospectivity, where the next mines will be developed have been selected based on current available geological and mineral commodity information. The eighth area has no data available, as it has never been geologically surveyed. The target areas are:

Busia goldfield - it covers approximately 1,500 sq. km in southeastern Uganda and is part of the prolific Lake Victoria goldfield, for which it forms the northern extension. The Tira mine has a history of gold production and is again being re-developed.

Kilembe mine and its environs - there are opportunities to discover new copper-cobalt deposits in addition to finding extensions of the Kilembe deposits.

Mubende - Bunyoro - the area has gold occurrences and artisanal mining has been taking place in a few areas over the last 10 years. There are indications that a large potential exists. In addition to gold, cassiterite, wolframite, columbite-tantalite, beryl and lithium mineralization occur associated with Singo and Mubende batholiths.

Buhweju goldfield - this is the largest known goldfield in Uganda and historically has produced the most gold. Although most production came from alluvial material, artisanal miners have recently been discovering reef (hard rock) gold. The area has very high-grade tantalite along Jemubi River and is prospective for alluvial diamonds.

Kigezi goldfield and Ankole tinfield - gold occurrence in this area appears to be part of the larger Kivu gold-tin-tantalum mineral province. This goldfield has contributed about 10% of the country's gold production in the past, with most gold won by artisans from alluvial material. Gold potential lies in the identification of primary gold.

Besides gold, beryl, cassiterite, wolframite and columbite-tantalite occur and have been worked. Bismutite, zircon, and chalcopyrite have been reported to occur in the area. From airborne geophysical survey results, magnetic bodies that could host nickel similar to the Kabanga and Musongati deposits in Tanzania and Burundi respectively are likely to be present in the area.

Karamoja region- several gold occurrences are known in many parts of Karamoja. There are also showings of copper and zinc, chromite with platinum occurrences and large resources of marble. There are indications of gemstone occurrences.

West Nile region- traces of gold have been found in a number of streams, but the area has not been explored to see if there may be a relationship with the gold deposits of Kilo Moto in northeastern D. R. Congo.

Central-Northern Uganda - this belt constitutes about 40% of the country's land area but has never been geologically mapped. Initially reconnaissance airborne survey at a wide line spacing needs to be carried out along with interpretation of remote sensing data, and ground truthing to make geology maps of the areas. The airborne survey and remote sensing may identify geologic structures favorable for hosting mineral deposits.

4.0 UGANDA'S COMPETITIVE ADVANTAGE

STRATEGIC LOCATION AND FAVOURABLE INVESTMENT CLIMATE

Uganda occupies a strategic position in East Africa, which gives it an advantage for the eventual development of exports of mineral products of Sudan, the Democratic Republic of Congo, Rwanda, Burundi, Kenya and Tanzania and the COMESA region as a whole. The Government of Uganda is committed to economic growth through liberal economic policies, low inflation, and political and financial stability.

IMPROVED FISCAL INCENTIVES

Other measures being taken include the revision of the ***Mining Act;*** a special fiscal regime for the sector has already been put in place under the ***Income tax Act of 1997;*** encouragement of small scale mining and sector associations. Some of these include:

- Investment protection guarantees
- Full expensing of all exploration expenses
- No import duties on mining equipment
- Up to 100% foreign equity allowed in business
- Low inflation
- Low corporate tax: currently at 30% - A special fiscal regime for the mining sector was put in place under ***Income Tax Act of 1997***; accordingly a **variable rate Income tax (VRIT)** is applicable as in the formula below:

  R = 70 - 1500/x, where "x" equals to the ratio of taxable income to gross mine revenues in the year.

SKILLS AVAILABILITY

The Department of Geological Survey and mines is being funded to undertake surveys aimed at providing the needed database to encourage investment in the sector, as well as the training of relevant personnel. The Department of Geological Survey and Mines has a cross section of professional staff that may be seconded on request, to companies wishing to commence new exploration programmes. Makerere University in Kampala offers degree courses in geology and various disciplines of engineering while a number of technicians are trained locally at Uganda Polytechnic Kyambogo and other Technical Institutes.

SUPPORTIVE INFRASTRUCTURE

Uganda is served by 30,000 km of maintained road network, of which approximately 2,600 km is tarmac. The general condition of the road system is good and covers the country in a uniform manner. More than 3,000 kilometers of new tarmac are to be constructed in the next 10 years. Uganda's trunk roads also form an essential link to the neighboring countries of Rwanda, Burundi, Sudan and the Democratic Republic of Congo (Figure 2).

Uganda depends on road and rail links through Kenya and Tanzania for much of its exports and imports. A railway line connects Uganda to the Indian Ocean port of Mombasa A rail ferry route on Lake Victoria was established in 1993 to connect the Uganda rail system at Port Bell with the Tanzania system at Mwanza 310 km and onwards to the Indian ocean port of Dar es salaam.

Uganda possesses a vast hydro-electricity potential and the current production is 260 MW from the Owen Falls Dam near Jinja in eastern Uganda. The energy sector is being expanded and by the year 2005 there may be a generating capacity providing an additional volume of over 1,000 MW. Two new hydropower stations are planned at Bujagali Falls and Karuma Falls (250MW and 200MW respectively)

5.0 THE INCENTIVE REGIME

Uganda's fiscal incentive package provides for generous capital recovery terms, particularly for investors whose projects entail significant investment in plant and machinery and whose investments are medium or long term. The incentive package includes: -

Category 1 – Initial Investment Allowances which are deductible once from the company's income. Initial allowances are based on the value of plant and machinery: -

Kampala, Entebbe, Namanve, Jinja & Njeru areas	50%
Outside Kampala, Entebbe, Namanve & Jinja area	75%
Start-up costs	25%
Scientific Research expenditure	100%
Training expenditure	100%
Industrial buildings	20%

Category 2 – Deductible Annual Allowances

Depreciable assets specified in 4 classes under declining balance method: -

Class 1	Computers & Data handling equipment 45%
Class 2	Automobiles, Construction and Earth moving equipment 35%
Class 3	Buses, Goods Vehicles, Tractors, Trailers, Plant & Machinery for farming, manufacturing and mining 30%
Class 4	Cars, Locomotives, Vessels, Office furniture, fixtures etc. 20%

Category 3 – Other Annual Depreciation Allowances

Industrial Buildings, Hotels & Hospitals 5%

Assessed losses arising out of company operations including the loss from the investment allowances can be carried forward indefinitely. In addition, Uganda's corporation tax rate of 30% is one of the lowest in Africa. All plant and machinery is imported duty and tax-free. Investors who register as VAT Traders are allowed VAT refunds on all construction materials used on their projects within a period not exceeding 4 years of project implementation. Further more, there are no taxes on all exports from Uganda. Exporters are also allowed duty draw back facilities on all taxes paid on raw materials used for the manufacture of exports. Uganda also has a fully liberalized foreign exchange regime with no restrictions on the movement of capital. 100% ownership of projects by foreign investors is allowed.

6.0 PROCEDURES FOR INVESTING IN UGANDA'S MINERAL SECTOR

Apart from the procedures and licensing requirements outlined in the ***Investment Code***, investors in the mining sector are required to have additional licences regulated by the ***Mining Act*** (chapter 248). Accordingly, all mineral rights are vested in the Government and the exploration and exploitation and dealing in minerals can only be carried out by grant of a licence. The following licences are applicable:

- **Prospecting Licence (PL)** - this is a prerequisite for mineral exploration to be carried out and is issued by the Commissioner, Department of Geological Survey and Mines on payment of a prescribed fee. The licence is offered to an individual or as an agent of a company or body of persons. Validity is one year and the licence is neither area specific nor mineral specific.

- **Exclusive Prospecting Licence (EPL)** - with the authority of a PL an area may be pegged and an EPL granted by the Commissioner for an area up to 20.8 km^2 (8 sq. miles). However, the Minister responsible for minerals may grant a Special Exclusive Prospecting Licence (SEPL) for an area not less than 76.8km^2 (30 sq. miles). The EPL/SEPL is both area and mineral specific, valid for one year and renewable on application and subject performance appraisal.

- **Mining Licence** - a developer may peg an area and apply for a mining licence either as a **Location** or **Mining Lease**. The location is a licence granted by the Commissioner mainly for small-scale operators and is limited to a maximum area of 16 Ha (40 acres). Validity is one year subject to renewal. The Minister for Energy and Mineral Development grants the Mining leases for area not exceeding 256 Ha (640 acres). Its validity may go up to 21 years and is renewable for such other period as the programme warrants.

In all these cases, adequate compensation to surface rights holders is a requirement should there be any developments on the land.

- **Mineral Dealers Licence** - it is granted by the Commissioner and expires on the 31st December of the year in which it is issued. It allows one to buy, process and/ or trade in a specific mineral(s).

Under the current mining law, a **permit** is required for the use of natural water for mining purposes and the shape/nature of the landscape should be restored to its former nature after the mining. With the exception of gold, **royalty** shall be paid for all minerals. Either the holder of a prospecting mining right or a licensed mineral dealer pays a royalty. Royalty paid on tin, wolfram, copper and all associated minerals and metals shall be 15% of the profits or 5% on gross value. For industrial minerals such as limestone, the royalty is prescribed, based on quantity produced.

7.0 PROJECTS IN THE INDUSTRY

Companies with significant exploration/mining activities in Uganda

Project	Commodity	Location by district	Contact Person	Mail Box	Phone	Fax No.
Branch Energy (U) Ltd.	Gold, Base metals	Kotido Moroto	Brian Westwood	23051 Kampala	267662	267920
Anglo-Uganda Corporation	Gold	Mubende	Moses Masagazi	10130 Kampala	200743	345580
Madhvani/Forsfor	Phosphate	Tororo	Madhvani			241588
Kasese Cobalt Co. Ltd.	Cobalt	Kasese	Adrian Gale	2086 Kla	251175	251136
Kilembe Mines Ltd.	Copper, Cobalt	Kasese	A.G.M. Basaza	1 Kilembe	234909	245687
Roraima Mining Co. Ltd.	Gold	Busia, Bugiri, Bushenyi, Mbarara	Woldage Abebe	23201 Kla	269667/8	266497
Hima Cement (1994) Ltd.	Limestone, Cement	Kasese		37 Kasese 7230 Kla	241552 245898	245901
Tororo Cement Industries	Limestone, Cement	Tororo	-	74 Tororo	045-44851 4485213	045-44854
Rwenzori Exploration Ltd. (Avmin)	Base metals	Kabarole Kasese Ntungamo	John Murphy	873 Ebb.	042-321236	042-21236
Muhindo Enterprises Ltd.	Kaolin	Bushenyi	Jamal Muhindo	92 Kla	231154	231327
Gold Empire	Gold	Bushenyi, Mbarara	John M. Muyambi	8898 Kla	233829	233829
Kitara Mining Company	Gold	Hoima	H.H.Solomon Iguru	1 Hoima	0465-40159	-
Glencar Exploration Plc.	Gold	Busia, Bugiri	J. Kagule-Magambo	9091 Kla	211216	321359
Busitema Mining Co. Ltd.	Gold	Busia	Mumtaz Kassam	182 Kla	236490	236486
Cluff Mining Ltd.	Gold	Kabale, Rukungiri	Agaba-Maguru	24353 Kla	343083	
Canmin Resources	Vermiculite	Mbale				

8.0 USEFUL CONTACTS

Name	Address	Tel	Fax	E-mail
Commissioner, Department of Geological Survey & Mines	P.O. Box 9 Entebbe	320559/320656	320364	gsurvey@starcom.co.ug
Godfrey Zaribwende Rockman International Limited	P.O. Box 2100 Kampala	255011/348714		
Brian Westwood, President of Uganda Chamber of Mines & Managing Director of Heritage Oil and Gas Company	P. O. Box 23051,Kampala			
Uganda Metal Industries Association (UMIDA)	P.O. Box 8752 Kampala	531048/ 075694567	5302777	
COMESAMIA - CCOMESA Metallurgical Industries Association	P.O. 8752, Kampala	531048 075-694567	5302777	
Uganda Non-Metallic and Products Industries Association (UNMPA)	P.O. Box 92, Kampala	075-629802		
International Mineral exporters	P.O. Box 5812 Kampala, Plot 2A Nkrumah Rd.	Tel: 243526	Fax: 243526	
Korne (U) LTD. Mineral Exports	Plot 87, Kampala Rd. P.O. box 9816 Kampala	Tel; 236638	Fax: 259201	
Continental Exporters Gold Exports	Parliament Avenue P.O. box 6995 Kampala	Tel: 259202		

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Appendix I: Map of Uganda showing mineral occurrences