

## LIST OF TERMS AND ABBREVIATIONS

Africo	Africo Resources Limited
AIDS	Acquired Immune Deficiency Syndrome
Al	Aluminium
AMC	African Mining Consultants
BFS	Bankable Feasibility Study
CCD	Counter Current Decantation
Dbh	Diameter at Breast Height
DPME	Department for the Protection of the Mining Environment
D.R.C	Democratic Republic of Congo
EAP	Environmental Adjustment Plan
EC	Electrical Conductivity
EIS	Environmental Impact Study
EMP	Environmental Management Plan
ERP	Emergency Response Plan
EW	Electro-Winning
Fe	Iron
H <sub>2</sub> SO <sub>4</sub>	Sulphuric Acid
IUCN	International Union for the Conservation of Nature
km	Kilometre
kW	Kilowatt
Mn	Manganese
NGO	Non Government Organisation
NTU	Nephelometer Turbidity Unit
OHS	Occupational Health and Safety
PE	Exploitation Permit
pH	Acidity or Alkaline
PPY	Pre-Production Year
PBC	Pinned Bed Clarifier
RBP	Rapid Bio-assessment Protocol
SDP	Sustainable Development Plan
SE	Southeast
SHE	Safety Health and Environment
SO <sub>4</sub>	Sulphur Dioxide
Swanmines	Swanmines sprl
SX	Solvent Extraction
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
USDA	United States Department of Agriculture
USEPA	United States Environment Protection Agency
WHO	World Health Organisation
Zn	Zinc
°C	Degrees Celsius
dB	decibels
g/l	grams per litre
ha	hectare
kg/m <sup>3</sup>	kilograms per cubic metre
LTPD	Local Technical Team of Power Division
L <sub>A90,T</sub> Index	The A weighted noise level exceeded for 90% of the period.
m	metre
masl	metres above sea level
m/s <sup>2</sup>	metres per squared second
m/sec	metres per second
m <sup>2</sup>	squared metre
m <sup>3</sup>	cubic metre
m <sup>3</sup> /h	cubic metres per hour
mg/kg	milligrams per kilogram
mg/l	milligrams per litre

mm  
Nm<sup>3</sup>/h  
µm

millimetres  
Normal cubic metres per hour  
micron

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## EXECUTIVE SUMMARY

This Environmental Adjustment Plan (EAP) has been carried out by African Mining Consultants Limited (AMC) for Africo Resources Limited and Swanmines sprl. It relates to the Kalukundi Copper-Cobalt Project in the Democratic Republic of Congo and was undertaken between October 2004 and May 2006. The report was prepared in accordance with the requirements of the Congolese Mining Code 'Law 007/2002, of 11 July 2002'.

On the 11<sup>th</sup> of October 2001, an exploitation permit PE 591 was granted to Swanmines sprl by the DRC Ministry of Mines. Swanmines sprl ("Swanmines") was established on 5<sup>th</sup> of March, 2001, with designated shareholders being GECAMINES and H & J Swanepoel Famille Trust S.P.R.L ("H&J"). Gecamines and H&J entered into an agreement ("Contrat de Création de Société"), herein referred to as the Swanmines Joint Venture (JV), on the 3<sup>rd</sup> of March 2001 for the exploitation of the Kalukundi orebodies.

By way of an option agreement, between Africo Resources Ltd ("Africo"), a private British Columbian (B.C.) Corporation, and H&J, dated February 12<sup>th</sup> 2004, Africo can acquire 100% of the share capital of H&J by way of cash payments over 4 years and by expending a minimum of US\$3million in exploration costs on the property. As of the date of this report, Africo has earned a 36% interest in H&J and had met its minimum work expenditure requirements. To date Africo has been privately funded by its shareholders.

The Kalukundi orebody is located in PE 591 which is located 50km east of Kolwezi, in the Ville de Kolwezi, in the Mutshatsha Territory of the Katanga Province. The permit covers an area of approximately 19.5km<sup>2</sup>. The railway from Kolwezi passes by the site to Pompe and onwards to Tenke and Likasi. The Nzilo High Tension power line passes through the permit area and will be used as a power source for the project.

Swanmines sprl could commence operations by 2008 after the securing of funds and the approval of the EIS. The Kalukundi Project will involve the mining of four ore body fragments (Kii, Anticline, Principal and Kalukundi) through open pit techniques, the construction of a process plant to carry out solvent extraction and electro-winning, mine village, development of waste rock dumps and tailings storage facility and relocation of Kisankala Village to a new area on the permit.

In December, 2004 Africo Resources/Swanmines sprl signed a contract with African Mining Consultants to carry out an environmental impact study and development of management plans. These were incorporated into the EAP which was completed in November 2006.

The Kalukundi Copper-Cobalt Project is located in the Mutshatsha Territory (Ville de Kolwezi) in the Katanga Province of the Democratic Republic of Congo (DRC). Exploitation permit, PE 591, is located 50km east of Kolwezi and 220km west north-west of Lubumbashi, the provincial capital of the Katanga Province. The permit covers an area of 19.5km<sup>2</sup>. Its southern boundary is located 2.5km north of Kisanfu Village and the Likasi-Kolwezi railway line and 2km north of the main Likasi-Kolwezi road along the turnoff to Kisankala Village. The permit lies in the administrative boundaries of the Kazembe Grouping, under Chief Makonga Kazembe, which forms part of the Luilu Sector. The territorial administrator is Mr Ndjungu Itunda. The chief of Kisankala Village is Chief Timothe Semba Kapaya Lubwe. The Chief lives in Kisankala Village, located in the centre of the permit area, and at the time of the baseline (January 2005), a census indicated that the population was 1,064 people. This was updated in January 2006 to 2,361 people. The villages of Kibenzebenze and Samba are located 10km northwest and 6km west north-west of the north-western corner of PE 591 respectively.

Swanmines sprl acquired Kalukundi Mining Concession No. 23 in 2001 and pre-feasibility work was completed in 2002. Work carried out in the Pre-Feasibility Study included a review of the resources at Kalukundi, a review of the transport network, verification of historic drilling and modelling carried out by Gecamines and an initial metallurgical report. The project moved into a Bankable Feasibility Study (BFS) stage in 2004 and the BFS was completed in April 2006. Optimisation studies were carried out, mine scheduling, mine designing of process plant and mine camp, further resource drilling, metallurgical studies and design, tailings dam designing and geotechnical studies summarises some of the work that was carried out.

The mine production life of the Project will be 10 years, with an initial construction/Pre-Production Year (PPY) and Year 11 will be scheduled for mine decommissioning and closure. In the PPY, the initial 6 months will undergo a pre-strip of the Principal and Kii open pits followed by 6 months of mining from these pits to remove a total of 2.6Mt (2.55Mt of waste and 0.057Mt of ore). This will provide a 3 week supply stockpile of ore to the process plant, prior to commissioning, and waste material to construct the run of mine (ROM) pad. The establishment of haul roads to and from the open pits, ROM pad and waste rock dumps will be conducted in the PPY, as well as construction of operating ramps and initial benches.

The Kii and Principal pits supply ore to the process plant up to the 4<sup>th</sup> quarter of Year 2 and then the Anticline and Kalukundi open pits will be commissioned.

The BFS indicates that the Kalukundi Project will require US\$166.6 millions of capital investment. This capital cost is mainly associated with the development of the open pits, purchasing of the mine fleet, construction of the tailings storage facility (TSF), waste rock dumps (WRD), workshops and the process plant, and ancillary infrastructure such as housing etc. The project will be financed by Africo Resources Ltd. Initial capital expenditure will commence 6 months prior to the PPY.

The Project is estimated to employ between 500 and 600 people either directly or indirectly through contractors during the 12-month PPY. During the mine operations, approximately 460 Congolese nationals and 72 expatriates will be employed directly by Swanmines sprl and Africo. Additional jobs will be generated in the service sector in Lubumbashi, Likasi and Kolwezi.

The Kalukundi deposit will be mined by open pit mining methods using bulk blasting with excavation and truck extraction. There will be four open pits, (the Principal, the Kii, the Kisankala and the Anticline open pits). The mined depth below surface will be 40-60m in the Kalukundi fragment (the shallowest pit) and 100-130m for the Kii, Anticline and Principal fragments. Backhoe excavators and rigid frame dump trucks will be used to selectively mine and haul ore from the open pits.

A multiple pits, multiple cut back mining philosophy will be employed with timely and correct scheduling of mining to ensure continuity of a blended ore feed, timely pre-stripping of future ore releasing areas and other factors e.g. geotechnical stability; infrastructure provision; environmental constraints; production costs and cash flow. The process plant throughput is 801,000t/yr.

The concentration of copper and cobalt increases with depth in the Kii and Principal open pits and so to maintain feed grade a steadily decreasing approach to mining extraction rate was employed. The mining extraction rate of material in Year 1 is 7.3Mt/a, in Year 2 is 6.3Mt/a, which steadily decreases until end of mining in Year 10. Approximately 39.3Mt of material will be removed during the Kalukundi project, 31.5Mt of waste and 7.8Mt of ore, giving an average stripping ratio (overburden/ore) of 4:1.

The total amount of waste rock that will be removed from the open pits is 31.5Mt. The waste rock dumps have been designed according to best industry practice with an overall slope angle of 18°. They will be constructed in 20m lifts with 10m wide berms and will have an inter-berm slope angle of 20°. The maximum height of the waste rock dumps will be 25m.

The proposed process plant is based on leaching, contaminant removal, solvent extraction and electro-winning (SX-EW) of copper and cobalt oxide ores to produce copper and cobalt cathodes. The process plant will comprise a crushing and milling circuit, a thickening and filtration process, an acid leach, a counter current decantation (CCD) and clarification circuit, copper solvent extraction (SX), cobalt feed clarification, cobalt solvent extraction (SX) and finally copper and cobalt electro-winning (EW). Tailings removal and effluent treatment will also be carried out in the process plant.

The Project will contribute significantly to the development of the area around Kalukundi. The project will consist of four open pits, four waste rock dumps, a process plant, offices and a mine camp. The requirement for local supplies and employees for the mine will lead to development of the business sector in Kolwezi and the Mutshatsha Territory, as well as Katanga Province and the DRC.

An assessment of baseline environmental conditions was carried out between October 2004 and April 2006. The Kii River and the Kisankala Stream control the topography of the permit. The source of the Kisankala Stream is located in the permit and flows north-westerly into the Kii River. The undulating topography is punctuated by rocky outcrops vegetated with Miombo woodland.

There are several orebody fragments exposed at the surface at Kalukundi. Four of the fragments will be mined, these being the Principal, Anticline (located 300m northeast of the Principal fragment), Kalukundi (located 2.7km north north-east of the Anticline fragment) and the Kii (located 400m north of the Kalukundi Fragment).

Relatively undisturbed Miombo woodland covers the permit with little agricultural activities undertaken. Main crops grown are maize and cassava. Kisankala Village is located at the centre of the permit (of 0.75 km<sup>2</sup>). Kisanfu is the nearest village to Kisankala and is located 7km to the south with more permanent housing and infrastructure.

A census was carried out in January 2005 and the population of Kisankala Village was 1,064 people. The census was updated in January 2006 and there were 2,361 people living in Kisankala Village. Most of the housing in the village is temporary wooden structures.

The Kisankala Stream provides the water source for Kisankala Village and sampling of this stream and the Kii River indicated that the water quality was generally good, however small concentrations of bacterial coliform and lead do not comply with World Health Organisation (WHO) Drinking Water Guidelines. Aluminium levels do not comply with DRC final effluent standards of 0.05-0.2mg/l.

Groundwater quality was sampled from the springs feeding the Kii and Kisankala watercourses and is generally good, however aluminium and lead concentrations exceed WHO Drinking Water Quality Standards.

There is a clinic in Kisanfu (7km) and hospitals can be found in Kolwezi (50km) and Likasi (100km). There are 3 primary schools in Kisanfu. The disused railway station is the location of the third school. Secondary and tertiary education facilities can be accessed in Kolwezi, Likasi or Lubumbashi. The electrified SNCC Kolwezi-Likasi railway passes 2km south of the southern boundary of PE 591. The nearest station is Kisanfu (7km). The railway line is in use and is currently in good condition. Three major regional power lines pass through the southern part of PE 591. The Kolwezi-Likasi road is in a state of disrepair and travel time to Kolwezi can be at least 2 hours (50km).

The major potential environmental impacts that could occur:-

- The mining of four open pits and the consequent waste rock dumps will have a large visual impact on the landscape. The topography and Miombo woodland will mitigate this impact. The open pits will provide new sources of water for irrigation, consumption and sustainable economic developments;
- The locations of the open pits may potentially induce a wide sphere of influence on the groundwater through dewatering. The relatively shallow pits will minimise the depth of drawdown of the water table but pit locations in the northeast and southwest of the permit will mean that water will be lowered over a wider area. The groundwater levels will return to baseline conditions after the stoppage of dewatering activities;

- Impacts on the surface & groundwater from spillages of process water, tailings supernatant, oils, greases and untreated mine effluent. These may occur in the process plant, the tailings storage facility, the light and heavy vehicle workshops and from water storage dams. Swanmines will construct perimeter drains and install oil traps to minimise impacts. Surfacing with concrete and impervious layers in the plant and workshop areas will prevent groundwater contamination;
- Contamination of surface water and safety impacts from the tailings storage facility (TSF). Swanmines has consulted Golder Associates Africa (Pty) Ltd to design a TSF which will be done according to best industrial practices. Regular inspections will be carried out by a specialist to ensure stability and the tailings slurry pumped to the TSF will be neutralised before pumping from the process plant;
- Dust blow may be generated from the tailings storage facility (TSF) during the dry season. The prevalent wind direction is from the east and dust will be deposited on the vegetation downwind. The scale of this impact will be monitored visually and the exposure of the tailings surface will be limited by maintaining a wetted surface on the facility;
- Relocation of Kisankala Village will require clearance of Miombo vegetation in the south of PE 591. Swanmines will carry out a Resettlement Action Plan that will follow World Bank Guidelines on Involuntary Relocation and will document all proceedings with respect to relocation. Villagers will be compensated at 150% of their present assets. Swanmines will provide a school and small clinic to the relocated village;
- The mine will provide a source of development for Kisanfu, Kolwezi, Likasi and the Mutshatsha Territory as a whole, through economic investment from Swanmines into the Project. Swanmines will aim to aid small scale social projects focusing on sustainable development of education, health and agriculture in the area;
- The provision of jobs and the demand for services will create economic expansion. The use of local contractors will develop the skills in the area; and
- General improvement in the health of the local population will be achieved through the provision of health facilities on the mine for mine workers and their families and the clinic in the relocated Kisankala Village. HIV/AIDS awareness programs and malaria rollback campaigns will be developed.

Environmental Management Plans (EMP) for all the identified positive and negative impacts of the Kalukundi Project have been developed and are discussed within this report. These plans are based on the social/environmental policies of Swanmines sprl/Africo Resources Ltd, DRC Environmental Regulations (Mine Code 2003), and other relevant international guidelines.

An Environmental Monitoring Plan will be implemented by Swanmines sprl and will focus on the monitoring of air, surface water, groundwater and soil. The monitoring plan will be initiated during the construction phase and will be used to assess the mine compliance with DRC Environmental Regulations (Mine Code 2003) and other relevant guidelines.

Internationally accepted standards for occupational health and safety will be implemented by Swanmines sprl to ensure a safe working environment and the prevention of illness and accidents.

The Mine Reclamation Plan will be implemented by Swanmines sprl and aims to return the land affected by mine activities to its former land use or other sustainable use and prevent adverse impacts on the surrounding watercourses (Kisankala Stream). Provisional costs for mine reclamation and post-closure environmental monitoring have been included. The total mine reclamation cost is US\$965,201.25. The total cost of post-closure environmental monitoring and reporting is US\$43,700.

Public consultation has been initiated and carried out throughout the development of the Kalukundi Project. Opinions gained through discussions with the local population and villagers of Kisankala Village are positive towards the project and a Public Consultation Meeting will be carried out by Swanmines sprl / Africo Resources Ltd prior to proceeding with the Kalukundi Project. A report will be developed and submitted to the Department for the Protection of the Mining Environment (DPME).

Swanmines sprl will implement a Sustainable Development Plan that will focus on the local employment of employees and contractors and social development of the region through education and health improvement. Swanmines sprl will aim to provide aid for commercial enterprises and increase the skills levels of the surrounding population through provision of training and literacy classes. The SDP will also focus on public safety, through regular consultation of mine activities with the local population, and responsible environmental management. The SDP will be carried out once the Project is generating revenue from metal sales.