

APPENDIX No. 3

Proposed programme for mining operations, forecast of capital investment, estimated recovery rate of ore and mineral products, and the proposed treatment and disposal of ore and mineral recovered.

Program for mining operations including forecast of capital investment, estimated recovery rate of ore and mineral products and proposed treatment and disposal of ore and minerals recovered.

Mining Programme

Mining of the quartzite will depend on the need by smelter(s).

Forecast of capital investment

US \$1 million. The investment will mainly go towards the purchase of a loader, a dump truck, and a compressor and drilling machine.

Estimated recovery

Metallurgical Recovery 100%. The material will be recovered in its raw state and transported to the consumer.

Mining Method

Mining of all the Muva Hill Quartzite will be by conventional open pit methods. Drilling, blasting and loading will be used on benches to mine the silica.

Proposed treatment and disposal of ore and minerals recovered

The mined silica will be sold in its raw form to the consumer.

Details of expected infrastructure requirement as required under Section 25 (3f)

Infrastructure requirement will be typical for normal open pit mining operations.

APPENDIX No.4

Environmental Management Plan

An environmental Management Plan was not done by the previous owners, Luanshya Copper Mines Plc. The New company CNMC Luanshya Copper Mines intends to do an environmental management plan within this year (2010). ↗



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4.2 PROJECT DESCRIPTION

The Muva Hill is one of the Muva System containing thick formation of quartzites that outcrops more abundantly than any other formation on the Copperbelt. The Muva Hill quartzites form a pyramidal hill adjacent to Baluba Mine. It is devoid of any base metals and hence has attracted no interest over the years. In the 1990's about 500,000 tonnes was mined out and transported to Nkana smelter where it was used as flux in the smelting process.

Exploration, Sampling and Assaying

There is no history of drilling of the Muva outcrop. The outcrop is estimated to be 5.5 million tones of mainly silica and minor iron.

Mineralisation

There is no known base metal mineralisation at Muva Hill other than silica which grades about 80% silica with minor iron and gang minerals.

The establishment and operations of the Silica Quarry at Muva hill is meant to provide an economical source of Silica for lining the leaching pads which will be used during electrowinning mineral extraction processes at Muliashi Open Pit Mine.

4.3 PROJECT LIFE CYCLE ACTIVITIES

The following activities shall be undertaken during the construction and subsequent operation of the quarry plant at Muva Hill. However, Arrangements of all permits and authorisation works relating to the project implementation shall be sought prior to commencement. Notable authorities include Luanshya Municipal Council, ECZ and Mine Safety Department (MSD).



4.3.1 Construction Phase

There will be no clearing of vegetation growth or any significant displacement of noticeable fauna during the construction period. This is because the earmarked site of crusher/processing facility installation extends on an outcrop of quartzite rocks, associating it to scanty biological diversity. However, a number of small terrestrial ecosystem organisms which thrive in rock crevices would be affected by the presence of heavy duty machinery on site. Moreover, the area is already opened up due to previous historical small-scale quarry activities by former owners of the Mine. The access road to and from the earmarked plant site already exists in a stable condition. However, soil disturbance will be inevitable along the heavy duty equipment traverses. Appropriate fire fighting equipment such powder and liquid extinguishers shall be installed on site.

CNMC Luanshya Copper Mines Plc is expected to spend a projected initial investment cost of US\$ 210,000.00 on the following cost areas;

- Purchase of Explosives,
- Purchase of Fuels and lubricants, and
- Purchase of Compressor and Drilling Machine.

4.3.2 Operation Phase

During the operational phase an access bench will be developed to mark the boundary, so as to orient subsequent Silica extractions downhill on the western part of Muva Hill. Breaking of the silica outcrop will be done using Drillers and excavators. Mild blasting will also be done where other means do not produce the required result.



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To ensure the safety of everybody, Residents living near the Mine licensed area shall be alerted by the sound of the siren that will be fitted on a Pick-up Vehicle which will be going round before planned blasting is executed always. Drilling will be done in the process of extracting silica from the quartzite outcrop. A segregation plant with screens for sieving the material to obtain desired particle size of the Silica product will be in use at Muliashi Construction site. The peak of the outcrop conspicuously contains an important geographical landmark (beacon) which shall be preserved in the interest of the State. Routine and non-routine maintenance works will be carried out as a safety precaution, mostly as scheduled. Fire fighting equipment shall be monitored and kept in good conditions. The operation phase will include environmental monitoring such as fugitive dust emissions, noise levels and monitoring of effluents that may arise.

Mining Methods, Ore and waste Handling

Mining of the Muva Hill Quartzite will be by conventional open pit methods. The Silica will be mined and transported to the Muliashi Open Pit Mine for lining the leach-pads and subsequent operational mineral processing. Excess Silica may be sold to other consumers as demand arises. CLM targets to extract about 350,000 m³ of silica under this project.

4.3.3 Decommissioning and Closure Phase

The life of Muva Hill silica extraction project will depend on the demands at Muliashi Open Pit Mine and other consuming processes within CLM.

CNMC Luanshya Mine intends to run the quartzite extraction for about 3 years before decommissioning it.

However, assuming mining at the rate of 500,000 tonnes per year, the Muva hill Quartzite deposits are estimated to have a lifespan of 11 years.



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At the time of decommissioning of the Silica quarry at Muva Hill, all mobile equipment and removable installations shall be taken to Baluba Mine warehouse for storage and maintenance. All electrical installations shall be isolated for safety.

Top soils around the loading bay and major access roads shall be ripped to allow natural colonization by the native Miombo woodlands. Hydrocarbon contaminated top soils shall be dug and piled for bioremediation through service out-sourcing. Minimal hydrocarbon contamination of the effluent receiving environment is expected. However, soils that will be found to have been contaminated will be dug, collected and isolated for bioremediation.

4.4 Project Inputs and Outputs

The following materials and services shall be required for Muva Hill Quarrying Facility;

A power generator shall be installed. This will be the main source of power to operate Drillers, Crushing unit and other accessories, and general lighting of operational areas.

Blasting Explosives will be supplied and transported to sight by Orica Limited Company. Process water for dust abatement and cooling shall be piped from Baluba Shaft. Front-end Loaders transporting trucks shall refuel at the nearby Baluba Diesel Filling Station.

Mostly the output in this project will be Crushed Silica particles which will be transported from Muva Hill through an existing road network. Other outputs may take the form of operational effluents, such as process water/storm water in drains, dust and noise. However, this will be contained effectively as outlined in this report.



4.5 Material Consumption

Silica quarrying operations will demand substantial quantities of explosives for blasting activities. Due to wear and tear drill rods and other equipments would also require to be replaced at intervals. Transport trucks will need diesel for their power. Ultimately, the Quarry is expected to produce about 1,000 tonnes of crushed silica per year.

4.6 PROJECT ALTERNATIVES

CNMC Luanshya Copper Mines considered a few options in deciding plant location and the methods of extracting the Silica to arrive at suitable alternatives. In determining various options, the Cost Benefit Analysis (CBA), economic advantage, environmental impacts and, environmentally best practice, were employed in the analysis. The following were some of the alternatives that were considered:

- CLM Mining Silica as opposed to Outsourcing,
- Construction site,
- The "Without project alternative" approach.

4.6.1 CLM Mining Silica as opposed to Outsourcing

CLM analysed the possibility of buying Silica from other commercial houses. But the only nearest source lay outside Luanshya Town. This would have triggered enormous expenditure in terms of acquisition of transport truck, cost of daily fuel for covering a stretch of over 60 Km to and fro Kitwe Town and, other variable costs.

Going by the aforementioned, it was decided to re-open the Silica quarry at Muva Hill as it lay within our mining license, with only about 2 Km to Muliashi Project. Furthermore, it was observed that CLM already possessed



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Going by the aforementioned, it was decided to re-open the Silica quarry at Muva Hill as it lay within our mining license, with only about 2 Km to Muliashi Project. Furthermore, it was observed that CLM already possessed substantial mining equipment at the adjacent Baluba Mines. Therefore, CLM opted to pursue the quarry establishment option.

4.6.2 Construction Site

Due to its natural characteristic of being a wide spread quartzite outcrop, Muva Hill presented the best site for Silica extraction. Its closer proximity to Baluba Mine and the Muliashi project, with a standard gravel road network was seen as additional attribute. The other alternative entailed taking advantage of the existing infrastructure at No.28 Shaft. This would have meant mining and extracting quartzite rock at Muva Hill, then transport these large pebbles for crushing (particle size reduction) at No.28 Shaft Crushing Unit.

4.6.3 Without Project Alternative approach

The no project alternative may create a significant economic disadvantage as far as the realization of the Muliashi Project is concerned. The presence of quartzite outcrop within the CNMC Luanshya Copper Mines Plc Mining licensed area is an added advantage as it provides the source of silica at reasonable distance from the Muliashi operations.



5. DESCRIPTION OF THE BASELINE ENVIRONMENT

5.0 PHYSICAL ENVIRONMENT

5.1 Climate

The average annual rainfall for the area is 1,200 mm and the maximum and minimum temperatures of 27.2 °C and 13.4 °C occur in October and July respectively. The predominant wind direction is from north east to southwest and the maximum gusts range from 30m/second to 22m/second in the summer months and winter months respectively.

5.2 Humidity

The monthly humidity average varies between 85% in the summer (December, January and February), before gradually decreasing towards the 50% mark in August, September and October.

5.3 Wind

The wind shifts somewhat between day-time and night time, with a higher frequency of winds from the south-western quarter by night. Wind speeds are generally low, with an average speed of only 1.9 m/s. The presence of seasonally higher wind speeds from the northeast during summer should especially be taken note of as wind erosion from tailings dams requires a wind speed threshold. The result is that dust plumes from wind erosion tend to have the highest impact to the south-west.

5.4 Rainfall

Rainfall occurs mostly in the summer months (October - March) in the form of thunderstorms. The 30 year maximum average 24 hour precipitation was