POSSIBLE ECOLOGICAL IMPACTS OF PROPOSED LIMESTONE MINING IN MUTHA DIVISION, MUTOMO DISTRICT

Basic geology informs us that both internal and external pressures sustain the earth as a whole. The earth crust consists of rocks in great variety of different degree of hardness. A rock is an aggregate of minerals. A mineral is a naturally formed inorganic substance, which has a defined chemical composition and definite atomic structure. About 2000 minerals are known as rock constituents and about 59% of the crust rocks are made up of silica as a mineral.

There are three classes of rocks: the igneous rocks, the metamorphic rocks and sedimentary rocks, which have different formation processes and conditions. Limestone, which is calcium carbonate, is a typical example of a sedimentary rock formed basically through uninterrupted deposition under certain pressures and temperatures. Limestone is a key element in cement manufacturing and actually a rare mineral in terms of quantity for economical mining. Its mining can only be through open pit mining process.

Having the knowledge on the processes involved in sedimentary rock formation it clearly drives us to the conclusion that areas with sedimentary rock formations were once floodplains, low lands where major rivers emptied their waters for such deposition to occur. The continued deposition and subsequent rising of the land caused these rivers to change their course either due to the rising of the land or reduction in the amount of discharge in respect to continued low rainfall.

The sedimentary rock (limestone) in KItui south must be playing a key role in the hydrology of the district. With continued mining of the limestone, we must expect pressure instability within the locality depending on the magnitude of the mining. At large scale we predict the water tables in the area to go lower and subsequent drying of rivers and wells leading to reduction in biodiversity.

The earth is maintained by both external (atmospheric pressure) and internal pressures (a pull from the centre of the earth) these pressures must balance and their imbalance results in land disturbances such as land subsidence, earthquakes, tsunamis and rising sea levels. Mining of this mineral deposit will trigger several impacts. The atmospheric pressure on the excavated areas will increase and the internal pressures of the earth decrease. Since the pressures must balance, we

expect the water table to rise in the excavated areas to respond to the increased atmospheric pressure and dewatering in the neighboring regions and at large scale drying of the rivers, wells and change of river channels. If the excavation falls across an aquifer, then all wells/ boreholes getting their supply from the aquifer will definitely dry and adjacent areas will be dewatered. The low rains experienced in the area will not provide enough water to quench the thirsty land surface.

Mining has a wide range of environmental impacts at every stage of operation ranging from the pedological impacts to the hydrological impacts in addition to atmospheric pollution. Dust from the working of the open pits and by the crushing and grinding operations has a significant impact on the climate of the area, damage to vegetation, soil and water contamination. Since sedimentary rocks are all about deposition and decay, we cannot rule out that there is methane gas trapped by the rocks as a result of the deoxygenated decay. During the mining process it will be released into the atmosphere at levels we cannot t speculate on now. Methane is poisonous and an active green house gas.

The most obvious impact of mining is surface disturbance. The visual environment has several elements that can be altered by mining. These include the landform, vegetation, adjacent scenery and surface water. Mining results in total destruction of the soil pattern in terms of the ph, electrical conductivity, base-saturation percentage, exchangeable sodium percentage, texture, cation exchange capacity and organic mater content. Mining will significantly disrupt the natural drainage system since it intercepts, concentrates and diverts the local waters. With mining, some rivers will no longer flow in their usual direction. The Muvuko River might not have enough water to get to Tsavo plains since its catchments will totally be destroyed. This will negatively impact on the Tsavo Park.

The combination of acids and metals produced by ores containing sulphur and nitrogen can have severe effects on the ecology of local water courses and the heavy metals can enter the food chain and cause serious biological contamination. Mining limestone by excavation will mean that much more minerals will be exposed to the surface and pilled on the land as tailings and thus pose a great danger to the people and the environment in general. The runoff water that will flow through the tailing will dissolve the minerals and wash them to the rivers resulting to chain of ecological pollution. The exposed minerals might include radioactive elements that can trigger

outbreaks of diseases such as skin diseases and even change the ecological gene pool of the affected populations.

These are just some of the impacts that might occur and surface just immediately after the beginning of the mining process although there are more synergistic effects that might arise late in the process and will require time and finance to research their link them to the mining processes. Although the companies concerned will set up the mitigation measures to these impacts it is not clear that these measures are incorporated into a mitigation plan. Therefore full compensation and resettlement of the populations in the mining area should be undertaken. Post closure use of the land should be incorporated into the mitigation plan before commissioning the mining operations. SASOL