SAND MINING OPERATIONS OF COLMON MINING CC, WINDHOEK

ENVIRONMENTAL MANAGEMENT PLAN

Assessed by:

Assessed for:

Colmon Mining CC

August 2015

Project:	**ENVIRONMENTAL MANAGEMENT PLAN FOR THE SAND MINING ACTIVITIES OF COLMON MINING CC IN THE USIP RIVER, FARM ARIS NO. 29**	
Report Version/Date	September 2020 Update	
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Cite this document as:	**Faul A, Botha P, Brews L; 2015 August; Environmental Management Plan for the Sand Mining Activities of Colmon Mining CC in the Usip River, Farm Aris No. 29**	

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1 OBJECTIVES OF THE EMP

The Environmental Management Plan (EMP) provides management options to ensure impacts of the sand mining operations are minimised. An EMP is a tool used to take pro-active action by addressing potential problems before they occur. This should limit the corrective measures needed, although additional mitigation measures might be included if necessary. The EMP acts as a stand-alone document, which can be used during the various phases (operational and decommissioning) of the sand mine. All employees, contractors and sub-contractors taking part in the operational phases should be made aware of the contents of the EMP, so as to plan the relevant activities accordingly in an environmentally sound manner.

The objectives of the EMP are:

- to include all components of the sand mining operations;
- to prescribe the best practicable control methods to lessen the environmental impacts associated with the operations of the sand mine;
- to monitor and audit the performance of operational personnel in applying such controls; and
- to ensure that appropriate environmental training is provided to all operational personnel.

Colmon Mining could implement an Environmental Management System (EMS) similar to for example ISO 14001. An EMS is an internationally recognized and certified management system that will ensure ongoing incorporation of environmental constraints. At the heart of an EMS is the concept of continual improvement of environmental performance with resulting increases in operational efficiency, financial savings and reduction in environmental, health and safety risks. An effective EMS would need to include the following elements:

- A stated environmental policy which sets the desired level of environmental performance;
- An environmental legal register;
- An institutional structure which sets out the responsibility, authority, lines of communication and resources needed to implement the EMS;
- Identification of environmental, safety and health training needs;
- An environmental program(s) stipulating environmental objectives and targets to be met, and work instructions and controls to be applied in order to achieve compliance with the environmental policy; and
- Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS.

2 THE EMP

The following general guidance for the EMP is based on the findings of the EIA and Risk Assessment carried out by Geo Pollution Technologies.

2.1 Land Use, Planning, Development and Operation – Identified Impacts

The following is the summary of the identified impacts:

- The risk of groundwater and soil pollution exists as a result of fuel and oil spills from servicing heavy machinery on site.
- The risk of poaching or illegal collection of wood and plant material exists.
- Fire, noise, dust and traffic impacts may occur during mining operations.
- Safety risks exist due to open quarries with steep sides and the presence of heavy machinary.

2.2 Land Use, Planning, Construction and Operation – Mitigating Measures

The following is a summary of the proposed Management Plan, which will make the sand mining site safe taking into consideration all the risk perceptions raised by all stakeholders:

- Unnecessary clearing of vegetation, illegal poaching or illegal harvesting of vegetation or wood must be prohibited in the surrounding areas.
- Educational programs, training, work procedures and safety wear are essential in minimizing negative socio-economic impacts and safety risks.

- Education and creation of environmental awareness among personnel is key in minimizing the threat of poaching and illegal harvesting of plants products.
- Noise, dust and traffic impacts can successfully be mitigated and the risk of fire minimized by good working practices and a fire fighting plan.
- Warning signs and compulsory PPE can mitigate safety risks.

3 THE IMPLEMENTATION OF THE EMP

Table 1 and Table 2 outline the management of the environmental elements during the planning and operational phases. Section 4 provides a brief summary of the management of the mine closure phase.

Contents of these tables could be incorporated into a HSEQ Management System. The proponent would be responsible to assign the responsibilities and to ensure that the tasks are executed.

Table 1. Planning for Operations and Future Decommissioning of the Project

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
Compliance	To comply with all legal requirements for the operations of the mine in Namibia.	Apply for the necessary permits from the various ministries, local authorities and any other bodies that governs the operations of the mines. Finalise negotiations and resolve any outstanding issues, if any, over the allocation of user rights and zoning of the property on which the mines are located.	Prior to commencement of operations	All contracts, permits, certificates and other legal documents on file.	Proponent
Appointments	To appoint reputable contractors and operational personnel and establish the EMP, a legal requirement that forms part of the contract with the contractor and employees.	Appoint a contractor and employees and enter into an agreement which includes the EMP. Ensure that the contents of the EMP are understood by the contractor, sub-contractors, employees and all personnel who will be present on site.	Prior to commencement of operations	Contracts on file	Proponent; Contractor
Management	Establish a management system to implement and monitor Health, Safety and Environment.	Make provisions to have a Health, Safety and Environmental Coordinator to implement the EMP and oversee occupational health and safety as well as general environmental related compliance at the site. Have the following emergency plans, equipment and personnel in place to deal with all emergencies: Risk Management / Mitigation / Environmental Management Plan/ Emergency Response Plan and HSE Manuals Adequate protection and indemnity insurance cover for incidents; Comply with the provisions of all relevant	Prior to commencement of and during operations	Documentation on file Personal Protection Equipment (PPE) on site Signage related to restricted areas, dangerous areas, and PPE requirements on site Emergency response material on site	Proponent; Contractor

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
		safety standards; Procedures, equipment and materials required for emergencies.			
Restoration Fund/Insurance	To establish a fund/insurance for future environmental restoration or pollution remediation if ever required.	To establish a fund for future ecological restoration of the project site should project activities cease and the site is decommissioned and environmental restoration or pollution remediation is required. Any mined out areas must be rehabilitated immediately.	Prior to commencement of and during operations	Financial statements of restoration fund/insurance	Proponent; Independent Specialist Consultant
Reporting	To establish a reporting system to report on monitoring aspects of operations and decommissioning as outlined in the EMP.	Establish a reporting system to report on aspects of operations and decommissioning as outlined in the EMP. Keep monitoring reports on file for submission with Environmental Clearance Certificate renewal applications where needed.	During operations as well as possible future decommissioning of the development	Monitoring Reports	Proponent; Contractor
Environmental Clearance Renewal	To renew the Environmental Clearance Certificate every three years.	Appoint a specialist environmental consultant to update the EIA and EMP and apply for renewal of the Environmental Clearance Certificate.	Prior to expiry of Environmental Clearance Certificate	Renewed Environmental Clearance Certificate	Proponent; Independent Specialist Consultant

Table 2. The Operational Phase

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Traffic	Increased possibility of accidents at the main road junction due to tipper trucks.	The turnoff from B1 Main Road should be placed at the highest elevation to ensure maximum visibility of oncoming traffic and turning trucks. Signs to be placed at the junctions with the B1 main road to warn oncoming traffic of trucks.	A **daily** register of the number of tipper trucks visiting the mine must be kept. Any complaints received or incidents reported regarding traffic issues should be recorded in a report. A report should be compiled every **6 months** of all incidents reported, complaints received and a summary of all heavy motor vehicles handled.	Proponent
Fire	Outbreak of an uncontrolled fire. Manmade fires from open fires used for cooking.	Open fires should not be allowed at the mine except at designated sites. **Firefighting and Fire Prevention:** Fire precautions and fire control must be present at the site. In addition to this, all personnel have to be sensitised about responsible fire protection measures. A holistic fire protection and prevention plan is needed. This plan must include an emergency response plan and firefighting plan. Experience has shown that the best chance to rapidly put out a major fire is in the first 5 minutes. It is important to recognise that a responsive fire prevention plan does not solely include the availability of firefighting equipment, but more importantly, it involves premeditated measures and activities to timeously prevent, curb and avoid conditions that may result in fires.	A report should be compiled every **6 months** of all incidents reported. The report should contain dates when fire drills were conducted and when fire equipment was tested.	Proponent
Noise	Noise as a result of operations of trucks and heavy machinery may lead to	Follow World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise,	Any complaints received regarding excessive noise	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	hearing loss in operators of such machinery.	1999) to prevent hearing impairment and nuisances at nearby residences. The WHO limits noise levels to an average of 70 dB over a 24 hour period with maximum noise levels not exceeding 110 dB during the period in order to prevent hearing loss. Personnel working in noisy environments must be issued with hearing protectors. Make use of broadband white noise' audible warning systems on excavators instead of normal audible warning systems. All vehicles and power screens to be maintained and serviced regularly to reduce noise impacts.	should be recorded with notes on action taken. If required a noise monitoring programme should be commenced. All data to be compiled in a report every **6 months**.	
Dust	Excessive dust generated from the movement of heavy vehicles to and from the site, as well as the excavation of sand. This will be aggravated during periods of strong winds.	Personnel must be issued with dust masks if required. Dust suppression must be performed if required.	Regular visual inspection. A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon. If required a dust monitoring programme should be commenced. All information and reporting to be included in a **final** report.	Proponent
Waste Production	Any waste which can include hazardous waste, such as hydrocarbons, or domestic waste.	All waste produced on site must be removed and disposed of at a recognised disposal facility. Temporary ablution facilities should be erected on site.	Any complaints received regarding waste should be recorded with notes on action taken. All data to be compiled in a **6 month** report.	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Groundwater, Surface Water and Soil Contamination	Leakages from earthmoving vehicles and accidental fuel, oil or hydraulic fluid spills. Salinization of soil and ground water as a result of stagnant water where quarries reach the water table.	Adhere to the following procedures: • All vehicles must be serviced and maintained regularly. • Vehicles may not be serviced at the quarry. • Spill control by making use of drip trays if there is a need to repair machinery on site. All hydrocarbon based waste must be removed from site and disposed of at a recognised hazardous waste disposal facility. • Any polluted soil or water to be treated as a hazardous waste. • Mined out quarries with stagnant water must be rehabilitated and overburden returned immediately after mining to prevent exposed, stagnant water. • Ablution facilities must be provided for employees mining on the site Groundwater pollution is very difficult to remediate and remediation will depend on the pollutant released. Specialists must be employed to determine the best remediation procedures relevant to the problem if a large amount of pollution is recorded.	A report should be compiled every **6 months** of all spills or leakages reported. The report should contain the following information: • Date and duration of spill • Product spilled • Volume of spill • Remedial action taken • Copy of documentation in which spill was reported to Ministry of Mines and Energy or other relevant authorities.	Proponent
Poaching, Hunting or Removal of Plant Material	Personnel staying and working on site may use the opportunity to illegally hunt or trap animals. Plant material may also be collected such as wood for fire making purposes.	Education is key to prevention. All employees must be informed of the value of biodiversity. Rules and regulations regarding the illegal harvesting of natural resources from the surroundings must be made clear and the disciplinary steps that will be followed against perpetrators must be issued in writing and form part of the employee's contracts.	A report of any incidents reported should be complied every **6 months**.	Proponent
Ecosystem and Biodiversity Impact	The impact on the ecological environment from sand mining processes.	Mining in the sand quarry must be limited to the riverbed and sandbanks outside of the tree line. A buffer outside of the tree line must be maintained where no mining may be allowed. This will protect tree root systems and prevent collapse of the river bank and trees. The buffer should be calculated as the distance away from the tree trunk equal to 1.5 times the radius of each individual tree's canopy. Where protected tree species have to be removed, this action should be justified and the necessary permits from	Permits and restoration plan on file and restoration plan to be executed within the first **3 years** of operation. **Monthly** inspection for any signs erosion during the rainy season. A report should be compiled every **6 months** of all restoration performed.	Independent Specialist Consultant (Restoration Ecologists); Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		the Ministry of Agriculture, Water and Forestry must be obtained. A permit as prescribed by the Water Act of 1956 is required in all instances where the flow of a river is altered or interfered with. Erosion damage to existing roads and adjacent land as a result of sand mining activities should be prevented. Overburden must be stored in such a way as to prevent the unnecessary destruction of the environment surrounding the river (i.e. either in mined out areas or in areas still to be mined). The return of overburden to the mined out areas is essential in restoration of the areas and should be stored in such a way as to prevent washing or blowing away or being covered with other sand. All mined out areas must immediately be rehabilitated and restored as close as possible to its original state.		
Visual Impact	This is an impact that affects the aesthetic appearance of the site being mined.	No dumping of waste should be allowed on site. Ensure rehabilitation of mined out areas in order to improve aesthetic appearance.	A report should be compiled every **6 months** of all complaints reported.	Proponent
Employment	The mines provide much needed employment to locals in the Khomas Region.	Local Namibian's must be employed. Deviations from this must be justified.	Profiling of employees on their job responsibilities and achievements and reporting on these will portray the company as a people centred organisation.	Proponent
Heritage	The discovery of archaeologically or culturally important sites.	If such a site or any other archaeologically important artefact is found during the development phase any work in that area must be halted and the relevant authorities must be informed. Firstly, the Namibian Police must be informed. Secondly, the National Monuments Council dealing with heritage should be informed. Mining may only continue at that location once permission has been granted.	Record of any discoveries and proof of notifications to authorities on file. All information and reporting to be included in a **final** report.	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Skills, technology and development	Enhanced skills to the Khomas Region.	Colmon Mining must employ local Namibian's where possible. Deviations from this practice should be justified appropriately.	**Annual** summary report based on actual training and the enhancement of skills and transfer of technology should be compiled.	The Proponent
Cumulative Impacts	These are impacts on the environment, which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. In relation to an activity, it means the impact of an activity that in itself may not be significant, may become significant when added to the existing and potential impacts resulting from similar or diverse activities or undertakings in the area. Based on the fact that not only one company is making use of the quarries, a cumulative impact on the river can be expected should no mitigation measures be implemented. This can lead to increased erosion or biodiversity impacts. Similarly, traffic, waste, and pollution impacts may have a cumulative nature.	Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact at least from the Proponents side. Reviewing biannual and annual reports for any new or re-occurring impacts or problems would aid in identifying cumulative impacts and help in planning if the existing mitigations are insufficient.	**Annual** summary report based on all other impacts must be created to give an overall assessment of the impact of the Operational Phase.	Proponent
Restoration/Rehabilitation	Mined out areas must be rehabilitated as soon as possible to reduce safety impacts and restore vegetation to the area.	A restoration ecologist to develop a restoration plan for the respective quarries. This plan must be executed during operations on mined out areas.	Restoration plan on file. A report should be compiled every **6 months** of all restoration performed.	Independent Specialist Consultant (Restoration Ecologists); Proponent

4 DECOMMISSIONING PHASE

Decommissioning of the sand mines is an ongoing process during the operations of the mines and not only an activity that should start at the time of mine closure. Rehabilitation/restoration of the mined out areas must be completed immediately and not be left for mine closure. This would decrease safety risks and allow the environment to recover more rapidly. All management actions as provided for the operational phase are valid up to decommissioning. At the time of mine closure Colmon Mining must ensure that the area has been successfully rehabilitated and that all waste, including polluted soil or water, has been removed and disposed of at an approved dumping site. No form of waste may be buried.

5 POST MINING REHABILITATION

Restoration of mined out areas is an ongoing process that occurs throughout the life of the mine. As sections of river is mined out, rehabilitation of those sections must be performed. Since sand is removed from the mining site which constitutes a riverbed, rehabilitation will involve landscaping and return of topsoil rather than complete restoration of the mining sites. The aims of rehabilitation will be to:

- Prevent pooling or damming of water during rain events or when the river flows and ensure free flow of water to downstream users.
- Eliminate steep slopes which can present a risk to humans and wildlife.
- Ensure erosion of river banks are minimized.
- Reduce turbulence of water when the river flows and subsequently reduce turbidity.
- To return top soil to river banks and higher lying areas for the re-establishment of vegetation that will further prevent erosion.

5.1 Prior to Mining

Rehabilitation will be a relatively simple exercise which will start with the removal of topsoil prior to mining. Topsoil must be stored in piles in areas where it will not wash or blow away. It should also not be stored in areas where its storage will increase the amount of damage on the environment (for example within tree line on river bank). Topsoil may not be stored in such a way as to cause river diversion.

5.2 During Mining

Rehabilitation will continue throughout mining and the mining procedure will form part of the rehabilitation process. Pocket mining must be avoided and an approach of systematic strip mining should rather be followed. This will prevent the pooling or damming of water, prevent steep slopes and reduce erosion during river flow events. It will also reduce the amount of post mining rehabilitation needed.

5.3 Post Mining

Once an area has been mined out sloping of the area using earthmoving equipment should be performed. Any remaining steep slopes must be landscaped to gentle slopes and any pockets must be filled. Stored topsoil should be returned to area where vegetation is likely to establish (i.e. areas with limited water flow). Once the mining site is mined out, all roads that will not be functioning as part of the future use of the land must be ripped to loosen soil and allow vegetation to re-establish. All waste must be removed from site and any polluted soil must be disposed of at an appropriate disposal facility or be remediated.

Rehabilitated areas must be monitored continuously in order to ensure erosion does not occur. Any instances of erosion as a result of mining activities must be stopped and remediated with

anti-erosion measures such as planting of vegetation or using rocks or other suitable material as scour protection.

5.4 Responsibility

The responsibility of rehabilitation lies entirely with the proponent, although a specialist restoration ecologist can be appointed to prepare and regularly update a complete restoration plan as well as monitor restoration progress. For rehabilitation, earthmoving equipment operators must be instructed on correct rehabilitation measures.

5.5 Monitoring

A report must be compiled every six months of all areas mined and rehabilitated. This should include the surface area of such rehabilitated portions, rehabilitation methods as well as photographs of areas prior to mining, post mining and post rehabilitation.

6 CONCLUSIONS

The above Environmental Management Plan, if properly implemented will help minimise adverse impacts on the environment. Where impacts occur, immediate action must be taken to reduce the escalation of effects associated with these impacts. To ensure the relevance of this document it must be reviewed on a regular basis.

The Environmental Management Plan should be used as an on-site reference document during all phases of the proposed project, and auditing should take place in order to determine compliance with the EMP for the proposed site, and Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken.

Monitoring reports and rehabilitation plans and results must be kept available for submission with future renewal applications for environmental clearance certificates. It is advised that an environmental consultant be involved in the monitoring and compilation of the monitoring reports and rehabilitation plans.