Environmental Management Plan

Mining Licenses ML83AB&C – Cape Cross

October 2016

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ABREVIATIONS

DWA	Department of Water Affairs
EA	Environmental Audit
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
ECP	Environmental Control Procedure
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ERA	Environmental Risk Assessment
ERP	Emergency Response Plan
HSE	Health Safety Environment Officer
MD	Managing Director
MET	Ministry of Environment & Tourism
MLs	Mining Licenses
MME	Ministry of Mines & Energy
MSDS	Materials Safety Data Sheet
PM	Project Manager
RA	Roads Authority
RO	Research Officer
SEA	Strategic Environmental Assessment

1. Introduction

1.1 Environmental Management Plan (EMP) Objectives

The main purpose of the Environmental Management Plan (EMP) is to provide a strategy for environmental protection for the guano harvesting activities associated with Seabird's (proponent) operations on MLs 83AB&C.

This is to ensure that time and national resources are not wasted and that problems occurring during all of the Seabird's operations are identified and rectified to prevent damage to the environment.

The present EMP addresses specific impacts identified in the EIA Report and the actions required to mitigate negative impacts or enhance positive effects. If any issues were overlooked, the plan must be amended in consultation with the proponent and regulatory authorities. The EMP therefore aims to ensure that:

- the Seabird's operations are managed efficiently and effectively to reduce or avoid negative impacts and enhance positive impacts of the operations;
- the affected communities are better off due to the continued operations of Seabird;
- precautions against environmental damage are considered timeously and claims are put into action speedily;
- information flow between all responsible persons is optimised to ensure all are aware of their particular responsibilities;
- involve the local community by employing unskilled and/or skilled labour;
- maintain the integrity of the MLs 83AB&C areas

The EMP will be effectively implemented, if:

- mitigation measures are successively implemented during operations, expansion and decommissioning;
- the responsibilities are assigned to skilled individuals, groups, and government agencies;
- EMP guidelines are properly communicated to all responsible parties;
- training for implementing mitigation measures is carried out when personnel require such training;
- the monitoring programmes are adhered to;
- progress, training and monitoring reports are submitted to management and relevant government authorities

The Environmental Management Act and Regulations require that an environmental management plan for MLs 83AB&C be developed (see Legal Section of EIA Report).

Eco-tourism related activities could benefit from gaining access to the lagoon areas for bird watching. The company may only allow tourist access by appointment and with a company escort. No access to the roosting platforms by tourists is allowed for public safety sake.

The proponent recognises the attempts of the SEA to provide guidelines for the conservation of Namibia's natural heritage and has integrated measures into the EMP for conservation of various biodiversity aspects. Accepted mitigation measures concerned with the management of Seabird's activities are to:

- delineate no-go areas that conserve biodiversity;
- remove solid waste and dispose at the Henties Bay landfill;
- reduce risk of damage to platforms and equipment during the extraction, processing and transport of guano;
- maintain sustainable operating practices e.g. decommissioned site rehabilitation, waste recycling

2. Environmental Impacts

The key environmental impacts identified and discussed in the MLs 83AB&C EIA Report for operations were identified by site visits, consultation with the proponent and a scoping assessment.

2.1 Key Positive Environmental impacts

The following key issues and potential positive impacts associated with the MLs 83AB&C operations are:

- the operations help to create jobs and long term employment;
- increase in exports for the Namibian economy;
- improve the standard of living of Seabird's and contractor's employees;
- the local economy benefits;
- continued and expanded project will create improved services and infrastructure for MLs 83AB&C areas;
- potential tourist attraction and creation of an integrated industry e.g. educational aspects of guano harvesting, lagoon bird watching, creation of a walking trail;
- implementation of environmental management measures to mitigate negative impacts;
- global carbon emission savings through sustained guano harvesting operations;
- environmental awareness created for all operational personnel through training

2.2 Key Negative Environmental Impacts

- potential decrease in aesthetic value of natural areas within MLs 83AB&C as they are prepared and used for guano harvesting ;
  ecology of the lagoon areas would be adversely affected and altered if guano harvesting activities extended far into the boundaries of this habitat within the MLs;
- potential increases in personnel resulting in increased water usage, waste and sewerage generation;
- potential decrease in the road surface integrity due to increased haulage frequency could incur more frequent spending on road repairs;
- heritage aspects at risk due to expansion plans

2.3 Assessment of Significant Environmental Impacts

The potential impacts resulting from the operations within the MLs 83AB&C areas were evaluated during the EIA. The suggested mitigations, if implemented, for potentially negative impacts will reduce the impacts on the biophysical and socio-economic environment so that their significance is negligible. The mitigation measures are included in the EMP implementation guidelines later.

3. Responsibilities, Capacity Building and Training Requirements

3.1 Responsibilities

The main stakeholders that are responsible for specific aspects of the EMP's implementation or to whom the responsibility reports:

Officer Bearers

- The **Proponent**- Seabird Guano (Pty) Ltd;
- **Project Manager (PM);**
- The **Environmental Assessment Practitioner (EAP)**
- The **Environmental Control Officer (ECO)**

Competent Authorities

- Environmental authority - Ministry of Environment & Tourism (**MET**)
- Ministry of Mines & Energy (**MME**)

The roles and responsibilities of each individual / party are summarised in **Table 1**.

3.2 ECO - Detailed Responsibilities

- responsible for maintaining compliance to the EMP;
- implementation of the Environmental Management System (EMS);
- coordination, monitoring and consultation with stakeholders and personnel, including the promotion of environmental management competence and providing risk assessment expertise;
- undertake Environmental Risk Assessments (ERAs);
- set environmental objectives and targets;
- monitoring of systems to ensure compliance to legislation and company policies;
- to facilitate updating of the environmental management process and ascertaining the state of environmental risk and performance;
- compile annual reports for MET;
- ensuring that all personnel undergo environmental awareness training as per company environmental standards;
- coordinate internal and external environmental audits

3.3 Capacity Building and Training Requirements

The proponent is responsible to ensure all personnel are trained on all the company Health, Safety and Environment (HSE) policies relevant to the site. The plant equipment technical team must be trained to maintain the plant. Equipment manuals must be supplied and the supplier data sheets. HSE manuals must be available on site at all times. Material Safety Data Sheets (MSDS) are to be available for quick reference.

Where the capacity of the personnel is insufficient the proponent must take up the responsibility to build capacity especially where compliance to HSE issues are lacking. For this EMP to be successful, compliance monitoring is essential. Reporting the data from the monitoring to the environmental authority will be necessary in order to show that capacity building and training has been carried out.

Table 1. Roles and responsibilities of each individual and/or party for the implementation of the MLS 83AB&C EMP

PARTY	ROLE	RESPONSIBILITY & ACCOUNTABILITY
Proponent – Swakopmund Guano Company (Pty) Ltd	The proponent bears the ultimate responsibility for guano harvesting operations, and is thus responsible for environmental performance.	Must be informed of environmental issues and impacts of all operations (existing and future) and the resultant effect that such activities have on the environment;
EAP	Undertake Environmental Impact Assessment and generate a draft Environmental Management Plan	To complete EIA and EMP reports; Ensure overall compliance of the EMP; Undertake periodic external environmental audits.
ECO	Monitor the implementation of the EMP as well as to identify potentially detrimental impacts not identified in the EMP so that it can be reviewed and updated.	Brief the contractor about the requirements of the EMP; Provide technical advice relating to environmental issues to the company's **Project Manager (PM)**; Undertake periodic audits of the effectiveness of the environmental specifications on the site; Keep a record of activities on site with a site diary and site photographs; Receive the site monitoring results of the MLs 83AB&C ecology and water chemistry and quality; Ensure that heritage sites are cordoned off from all activities with appropriate barriers.
MET	National Environmental Enforcing Agents	Enforcement of Environmental Regulations; Enforcing EMP compliance
MME	Issuing authority for mining licenses.	Responsible for the regulatory stipulations pertaining to the Minerals Act.

4. Environmental Management System

The EMP guidelines provide a framework for creating a process and document control system. This system is commonly referred to as an Environmental Management System (EMS). This system includes the aspects of monitoring and reporting which are outlined in the EMP guidelines. Some of the EMS documentation elements are described below. The detailed documentation for every environmental aspect needs to be developed by the various officers. There may be considerable overlap between the health, safety and environment fields and it is advised that these three management systems be integrated especially where human and material resources are limited. The ECO can fulfil all three roles.

The ECO must take up the training, monitoring and reporting responsibility. It is important that the monitoring of the necessary environmental aspects of Seabird's operations is undertaken. The main purpose of monitoring is to ensure that the prescribed mitigation measures / actions in the EMP are complied with. The ECO officer should write up a monitoring report on a monthly basis. This can be compiled from the environmental control data sheet records. The environmental control data sheets need to be compiled in conjunction with the Environmental Control Procedure (ECP). The specialist health, safety and environment personnel should write up the ECPs for the various measures, controls and processes. Thereafter the environmental control data sheets can be drafted and used on a daily, weekly or ad hoc basis depending on the need. This data is used to write up the monthly environmental report.

Compliance with the EMP can be measured by means of periodic internal environmental audits. It is recommended that an internal environmental audit be undertaken every year. The first audit can take place 1 year after the receipt of the environmental clearance certificate. An annual environmental audit (EA) report can be compiled from the monthly monitoring reports. The proponent's supervisor will assess if the contractor is compliant with the EMP's guidelines and contract.

The Environmental Assessment Practitioner (EAP) should be approached to undertake an independent EA. Every 3 years the EAP should integrate the environmental audits into the application to renew the environmental clearance certificate. The updated EIA report should include an assessment of the impacts based on the internal EA reports and compliance to the EMP. This is to be submitted to the Ministry of Environment & Tourism.

Whilst many of the anticipated environmental impacts have been identified in the EIA, there are possibly other impacts that arise from Seabird's operations. These should be assessed during the annual review process and included in any EIA updates.

5. EMP IMPLEMENTATION GUIDELINES

The following section (**Tables 2 to 12**) describes the main potential impacts as well as necessary measures to mitigate and/or enhance the potentially significant environmental and socio-economic impacts during implementation of each aspect of all guano harvesting operations.

This document may need to be periodically reviewed and updated due to new insights or operational changes to ensure that all the environmental impact aspects are included. Upon re-application for the environmental clearance certificate every three years the updated EMP can be submitted for approval.

The mitigations and monitoring actions for each of the environmental impact aspects of each activity in the MLS 83AB&C areas have been subdivided for each aspect of the operations. This operational EMP categorises aspects into loosely defined phases of planning, operational, expansion and decommissioning phases. These phases are applicable in the following ways:

- current activities place all operations within the **operational phase**;
- elements of the **planning phase** apply to the current baseline EIA report preparation, the review process, permit and certificate renewal periods;
- the establishment of new activities on site and the upgrading of infrastructure or equipment is covered under the **expansion phase**;
- should any of the activities discussed ever draw to a close then the **decommissioning phase** section will be applicable in particular the application of the fund to the rehabilitation of the MLs 83AB&C areas.

Table 2. Potential Noise Impacts of Guano Harvesting MLs 83AB&C during Planning, Expansion, Operational and Decommissioning phases. (Authority refers to the responsible person / party)

NOISE MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
PLANNING PHASE				
Birds have increased sensitivity to noise and they can be disturbed by prolonged exposure which can lead to hearing damage	Ensure noise levels do not exceed 60dBA for birds, workers on site should not be exposed to more than 110 dBA during a 24 hour period.	Noise monitoring plan is on file. Occupational health policy is on file	PROPONENT / EAP	MET / MME
Noise impact during the harvesting of guano.is very unlikely as MLs 83AB&C is remote with no residential areas within a 10 km radius. Impacts are negligible or insignificant.	Mitigations need to be planned. Maintenance plans for all equipment will ensure that noise impacts for personnel and tourists with result in negligible health and nuisance effects.	Noise monitoring plan is on file. Occupational health policy is on file.	PROPONENT / EAP	MET
The truck traffic that often accompanies activity to and from the site can be a significant noise source.	Noisy operations can be scheduled or limited to certain times of the day.	Noise monitoring plan is on file. Occupational health policy is on file.	PROPONENT / EAP	MET

NOISE MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
EXPANSION PHASE				
Noise impact of expansion activities at the platforms are expected to be negligible provided industry standards are maintained.	No noise measurements as part of a monitoring programme are deemed necessary. If complaints regarding noise are received: ➢ Measure noise levels in surrounding areas attributable to the site under various operating conditions and at various times; ➢ Investigate and, if required, implement further noise reduction measures. Maintain all sound proofing, silencers and other equipment in good working order to minimise excess noise.	**Monitoring:** ➢ Keep a register of all complaints received and remediation action taken. ➢ Compile all information in an annual report. **Performance Indicator:** Number of registered complaints	ECO	PROPONENT / Ministry of Labour

NOISE MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
OPERATIONAL PHASE				
There is a possibility that noise generated during the maintenance of platforms will disrupt the roosting patterns of birds which will reduce the production rate of guano over 18 months.	Ensure that any maintenance of platforms is done when birds are not present in large numbers	Compile all information in an annual report.	ECO	PROPONENT / Ministry of Labour
Potential noise creation from industrial activities occurring near the lagoon areas with roosting birds	Any operations occurring within or near MLs 83AB&C should not occur near the guano platforms so as to not disturb roosting birds, sufficient buffer distance should be created to allow the area to remain as much as a natural environment as possible.	Compile all information in an annual report.	ECO	PROPONENT / Ministry of Labour
DECOMMISSIONING PHASE				
Machinery used during this phase could create excessive noise. The impact significance associated with the decommissioning phase will be less depending on potential changes to the ambient noise levels over the life of the projects.	No machinery should be allowed to harvest guano to ensure no excessive noise is created.	A register of complaints should be kept on file. A summary of the issues should be included in the annual report.	PROPONENT	MET / MME

Table 3. Potential Visual Impacts of Guano Harvesting at MLs 83AB&C, during Planning, Expansion, Operational and Decommissioning Phases. (Authority refers to the responsible person / party)

VISUAL MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
PLANNING PHASE				
Location of access road to platforms resulting in negative impact on the environment.	The current site access road was established decades earlier and is fully operational.	Maintain existing access road.	PROPONENT	Roads Authority
Visual impact of inappropriate siting of platforms within MLs 83AB&C. Impacts are negligible or insignificant.	Mitigations need to be planned. The infrastructure should not be very visible to the general public making use of any nearby main roads.	Visual baseline in the form of a photo survey should be undertaken.	PROPONENT / EAP	MET
New guano platforms that are planned should blend into the background and be inconspicuous	The platforms should be made of wood and not painted with bright colours.	Visual baseline in the form of a photo survey should be undertaken.	PROPONENT / EAP	MET
EXPANSION PHASE				
Visual impact of increasing the number of platforms could affect tourism. Additional platforms would attract more birdlife which would benefit tourism	Restricted access for public safety reduces exposure of the birds to potential disturbances by tourists; access by visitors for a tour of the operations must be by appointment;	Carry out audits and report findings; Keep a visitors' log	PM / ECO	PROPONENT
OPERATIONAL PHASE				
Visual impact of increasing the number of platforms could affect tourism. Additional platforms would attract more birdlife which would benefit tourism	Restricted access for public safety reduces exposure of the birds to potential disturbances by tourists; access by visitors for a tour of the operations must be by appointment;; access to actual expansion area sites is prohibited. Bird watching from the perimeter of the pans within the mining licence area is permissible.	Carry out audits and report findings; Keep a visitors log	PM / ECO	PROPONENT

VISUAL MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
	Access roads to popular fishing spots allow for this bird watching activity.			
Birds can be sensitive to light especially bright light at night that can cause distress, lights should be used at a minimum. Do not shine directly onto the platforms when birds are present.	Lighting should be planned and designed to avoid the spillage of light into the surrounding areas, especially in the direction of the sensitive area around the plant. Lights should face down and should only be used to illuminate specific areas.	Keep all site plans on file	PROPONENT/ CONTRACTOR	PROPONENT
DECOMMISSIONING PHASE				
Access roads to and haulage roads within the MLs 83AB&C area could leave tracks that persist in the environment for decades.	Confirm requirements of competent authority; Place signage prohibiting access and possibly barricade access roads to abandoned areas. Ensure no new access roads are created and only existing tracks should be utilised.	Requirements for restricting or prohibiting access to the abandoned mine are on file. Required mitigations are actioned and proof filed in EMS filing system.	PROPONENT	MME / MET

Table 4. Potential Socio-Economic Impacts of Guano Harvesting at MLs 83AB&C. during Planning, Expansion, Operational And Decommissioning Phases. (Authority refers to the responsible person / party)

SOCIO-ECONOMIC MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
PLANNING PHASE				
Inadequate planning and design of guano platforms.	Platforms in the lagoon must be planned and designed with minimal impact on the environment and pressure on natural resources e.g. pollution of surface water; communicate plans to the competent authorities.	Plans and amended plans are to be filed.	PROPONENT / EAP	MET / MME
No employees are permanently accommodated within MLs 83AB&C area.	Plans to accommodate personnel seasonally during the harvesting period at an accommodation camp should be drawn up according to the requirements of the competent authority. Locate and design staff housing with minimal impact.	Plan on file	PROPONENT	MET
During expansion and operation, traffic volumes on the public roads to and from the site are likely to increase with the transport of; workers, construction material, and equipment to site.	Erect appropriate road hazard / information signage to warn road users of the turning of heavy vehicles. Ensure that construction vehicles switch their headlights on, at all times.	Plan on file	PROPONENT	MET

SOCIO-ECONMIC IMPACTS				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
EXPANSION PHASE				
No known development are planned for the establishment of industrial activities within MLs 83AB&C	There are no current plans to expand the areas for other activities in MLs 83AB&C	Record any changes to the Municipal structure plans.	PROPONENT	MET
OPERATONAL PHASE				
Positive impact of short and long term employment for locals	Maximise employment of local labour where possible Careful attention to the recruitment of workers to ensure it is fair and also does not generate conflict.	Include the employee statistics in the annual audit showing long term trends.	PROPONENT	Ministry of Labour
Development of the lagoon restricting access and potentially limiting tourism opportunities.	Ensure that potential tourist sites can be easily accessed in the future even if expansion plans are to be implemented. Access to the platforms and for bird watching would have to be arranged beforehand so that public safety is maintained. Access near to the platforms where tourists can learn about the process could potentially be allowed but only by appointment. A visitor's centre would need to be developed. Minimal disturbances to birds would have to be prioritised for such tours and some areas would be off limits.	A public relations report should document the site visits and the use of the access road to the lagoons.	ECO	PROPONENT
Export of processed guano across the world	If guano harvesting can be maximised and done sustainably where possible, exports will be beneficial for the economy	Record trends in sales, export and employment figures.	PROPONENT	MET

SOCIO-ECONMIC IMPACTS				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
OPERATIONAL PHASE				
During operations, the volume of traffic will be slightly more as employees are anticipated,	Keep a record of the truck traffic volumes transporting guano from the mining site	Keep a complaints register and incident register on file.	PROPONENT	MET
DECOMMISSIONING PHASE				
Negative impact of short term employed locals losing their jobs once a phase / the project draws to an end.	Maximise employment of local labour for long term periods where possible Careful attention to the recruitment of workers to ensure it is fair and also does not generate conflict.	Include the employee statistics in the annual audit showing long term trends.	PROPONENT	Ministry of Labour

Table 5. Potential Biodiversity Impacts of Guano Harvesting at MLs 83AB&C. During Planning, Expansion, Operational And Decommissioning Phases. (Authority refers to the responsible person / party)

BIODIVERSITY MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
PLANNING PHASE				
Potential damage to the natural environment of MLs 83AB&C resulting in loss of biodiversity.	➢ Undertake EIA study; ➢ Write up EIA Report; ➢ Draft an EMP; ➢ Plan an EMS; ➢ Renewal or Update EIA Report	Record of Decision / EMP approved – documents filed. Schedule to develop EMS documentation on file.	PROPONENT / EAP	MET/ MME
Awareness of public and government departments regarding Seabird's operations and routine expansion/ maintenance plans for guano harvesting operations. Operations have existed for decades and all neighbours and stakeholders are aware of the operations.	Public consultation with all key stakeholders was deemed unnecessary for the Baseline EIA Report because of the sustainable nature of the harvesting process and the fact that operations have gone on for decades and all stakeholders are aware of the extent of guano harvesting at Cape Cross.	Environmental Clearance Certificate should be filed.	PROPONENT / EAP	MET
EXPANSION PHASE				
The harvesting of guano may be expanded through the increase in the number of bird roosting platforms. Expansions that occur beyond the boundaries of the lagoon area may potentially affect ecosystem services negatively.	Plans to develop more bird platforms must leave sufficient buffer distances. See the location map provided in the EIA report.	Check that actual layout of the bird platforms match the maps provided. This should be done before the start of any expansions. Check list updated weekly and filed.	PM	PROPONENT
Loss and/or destruction of natural areas	Confine expansion activities to the demarcated maintenance/staff building area.	Monitor compliance and file report	PM / ECO	PROPONENT

BIODIVERSITY MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
OPERATIONAL PHASE				
The impact on biodiversity is thought to be minimal as no heavy machinery is allowed near and on the platforms	Biodiverse habitats should be avoided. The harvesting must take into account the seasonality of the site, suitable opportunities for low-impact activities and extraction quotas agreed upon by the proponent and other competent authorities involved in the sustainable management of the platforms.	The harvesting area that is being affected is not a high biodiversity habitat.	ECO	PROPONENT / EAP / MET
Introduction of alien species to the marine environment could affect biodiversity..	Note any changes to the habitat and/ or differences in species of roosting birds.	Keep all records and findings on file	PM / ECO	PROPONENT / EAP / MET
Impact on breeding birds on the platforms	Reduce the harvesting times where bird species spend the entire year on the platforms and undertake harvesting when birds are not breeding or have migrated to other areas.	A baseline population estimate of each species of birds can be established, to determine whether their numbers are affected by guano harvesting.	PM / ECO	PROPONENT / EAP / MET
DECOMMISSIONING PHASE				
A closure plan should include this aspect in planning. That the birds that nest on the platforms will need to use this habitat continually.	The artificially created environment must be sustained and managed beyond to ensure that the biodiversity is maintained.	The mitigation should be included if guano harvesting operations cease the plan is on file.	ECO	PROPONENT / MET

Table 6. Potential Health and Safety Impacts of Guano Harvesting at MLs 83AB&C during Planning, Expansion, Operational and Decommissioning Phases. (Authority refers to the responsible person / party)

HEALTH AND SAFETY MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
PLANNING PHASE				
The potential impacts on human health and safety resulting from operations could include occupational accidents and injuries, vehicle accidents, exposure to weather extremes, trips and fall on uneven terrain, adverse health effects from dust generation and emissions, and contact with hazardous materials.	➢ Draw up operational procedure manuals ➢ Provide health and safety awareness training ➢ Establish practical standard housekeeping rules	A register of all incidents must be maintained on a daily basis. This should include measures taken to ensure that incidents do not repeat themselves.	PM / ECO	Ministry of Labour / PROPONENT
EXPANSION PHASE				
Increased risk for road accidents with increased vehicle movements.	Install road traffic signs warning public of construction vehicles in the area. This is only necessary where the public road and the access road meet. Construct new intersection with turning and acceleration lanes	Intersection is fully functional	ECO	PROPONENT
OPERATIONAL PHASE				
Road safety for road users.	➢ Maintain vehicles ➢ Obey traffic rules ➢ No over loading ➢ Ensure licenses are valid (vehicles and operators)	Monitoring reports on file Non-compliances reported and on file	PM / ECO	Roads Authority / Traffic Police
Movement and presence of vehicles around the site presents risks of accidents due to collisions or	➢ Coordinate movement of operational vehicles; ➢ Operational distances to be maintained; ➢ Maintain the integrity of roads; ➢ Training of personnel.	Operators certificates on file; File any incident reports; Schedule of road maintenance on file	PM / ECO	PROPONENT

HEALTH AND SAFETY MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
unstable substrate. This poses risks to personnel safety and asset security.				
Risk to health and safety of employees	Maintain "good housekeeping". Hazardous substances, compressed gas cylinders and chemical products must be properly labelled and securely stored in locked containers or areas to prevent mixing or water contamination that would result in noxious gases, explosions or other worker hazards. Ensure that all operators and or maintenance crews on-site are familiar with the company's ERP or equivalent (Emergency Response Guide 2008). Ensure all employees wear protective clothing, footwear, gloves and belts; safety goggles and shields; dust masks and respirators; whilst harvesting and ensure the correct handling of materials and the safe use of all equipment. Potential fire starters i.e; lighters or cigarettes should not be carried onto the bird platforms as the guano can catch fire and may burn for months. First aid treatment, emergency treatment and medical assistance must be available immediately. Regular inspections must be carried out to inspect and test fire-fighting equipment. Fire-fighting equipment must be readily accessible. Fire prevention considerations include fire doors, fire pumps, and emergency fuel-flow stopping devices. Escape routes must be protected during fire outbreaks. Provide medical assistance where needed.	A register must be maintained of all training provided to staff. A register must be maintained for all safety equipment and medical supplies kept on site. This should include date of purchase and date of service/replacement for items that can expire or deteriorate with age. A register of all incidents must be maintained on a daily basis. This should include measures taken to ensure that incidents do not repeat themselves. Compile all monitoring information in an annual report.	PM / ECO	Ministry of Labour / PROPONENT

HEALTH AND SAFETY MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
DECOMISSIONING PHASE				
Abandonment of the MLS 83AB&C area potentially exposes public and wildlife to hazards. When a mine is abandoned the infrastructure and altered landscape can affect the safe access of wildlife and general public if not rehabilitated	➢ All movable assets to be removed off site ➢ All waste to be removed from site ➢ All buildings to be demolished and removed from site (unless permission is granted from MME/MET to allow the buildings to be used for next license holder or other land use stakeholder) ➢ All immovable machinery to be dismantled and removed from site ➢ All plant concrete structures to be demolished and removed off site	At the time of mine closure and abandonment the contractor must rehabilitate the site to the state agreed upon at the start of the agreement. Comparisons with the baseline report drafted at the start of the relationship must be made. ➢ Removal of **contractor's** movable assets i.e. plant equipment ➢ Demolishment of **contractor's** fixed immovable assets ➢ Removal of this demolished plant and building rubble by **contractor** ➢ **contractor** to fill in dangerously deep pits or holes in the ground that poses a threat to the public safety ➢ If such pits or holes are too large to fill the **contractor** must barricade such hazards to prevent any accidents	PROPONENT / CONTRACTOR	MET / MME

Table 7. Potential Dust Impacts of Guano Harvesting at MLs 83AB&C during Planning, Expansion, Operational and Decommissioning Phases. (Authority refers to the responsible person / party)

DUST MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
PLANNING PHASE				
Dust may be generated during the planning phase but this dust is expected to be insignificant compared to the ambient conditions.	It is recommended that regular dust suppression be included during, when dust becomes an issue. Personnel are to be issued with dust masks for health reasons when needed.	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.	PM / ECO	Ministry of Labour / PROPONENT
EXPANSION PHASE				
Dust may be generated during the expansion phase but this dust is expected to be insignificant compared to the ambient conditions.	It is recommended that regular dust suppression be included during expansion, when dust becomes an issue. Personnel are to be issued with dust masks for health reasons when needed.	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. Report on each expansion period	PM / ECO	Ministry of Labour / PROPONENT
OPERATIONAL PHASE				
Generation of dust from high traffic volumes on haul road is expected to be negligible.	The C34 is a salt road and well maintained. Very little dust is created from driving on these roads. High vehicle speed increases the amount of dust stirred up from unpaved roads. Lowering the speed of the vehicle can reduce emissions significantly. The	Register of complaints on file.	PM / ECO	Roads Authority / Traffic Police

DUST MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
	trucks will not travel above the speed limit as per the trucks payload type and the permit stipulations.			
DECOMISSIONING PHASE				
Dust may be generated during the decommissioning phase but this dust is expected to be insignificant compared to the ambient conditions.	It is recommended that regular dust suppression be included during, when dust becomes an issue. Personnel are to be issued with dust masks for health reasons when needed. If a site is decommissioned affected area could be wet daily for a period of at least one week, to encourage the formation of biological (and or mineral salt) soil crust (depending on the conditions at the time, it is possible that wetting may not be required as the coastal fog would be adequate to fulfil this role,)	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.	PM / ECO	Ministry of Labour / PROPONENT

Table 8. Potential Waste Impacts of Guano Harvesting at MLs 83AB&C during planning, expansion, operational and decommissioning phases. (Authority refers to the responsible person / party)

WASTE MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
PLANNING PHASE				
Waste disposal sites	Weekly removal of waste to Henties Bay refuse dump. Materials that could be incinerated should be burnt on site. A maintenance plan of the incineration pit should be drawn up if necessary.	Waste Management Plan on file	PROPONENT	MET
Sewerage facilities are currently portable facilities.	Plan for more permanent structures to deal with sewerage and devise a programme for regular removal of waste to Swakopmund sewerage treatment facility.	Waste Management Plan on file	PROPONENT	Swakopmund Municipality
Sewerage facilities for an accommodation camp are not needed at present as no personnel stay on site permanently.	Plan for the expansion of septic tanks or French drains in the event an accommodation camp is required in the future.	Waste Management Plan on file Application for effluent discharge submitted to competent authority and receipt on file	PROPONENT	DWAF
EXPANSION PHASE				
Sanitation	Ensure adequate sewage and sanitation management for expansion workers. The contractor must provide suitable sanitary arrangements for the expansion personnel. A minimum of 1 toilet will be provided per 15 persons at each working area. The contractor must maintain, keep clean, neat and hygienic all site sanitation facilities.	Monitor compliance and file report	PM / ECO	PROPONENT
Solid waste disposal	Manage solid waste disposal.	Monitor compliance and file report	PM / ECO	PROPONENT

WASTE MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
Hazardous waste disposal	Ensure spillage does not occur.	Hazardous waste certificate from hazardous waste dump in Walvis Bay on file.	PM / ECO	PROPONENT
OPERATIONAL PHASE				
Pollution from solid waste	Develop a **Waste Management Plan**, outlining: ➢ Expected type and amount of waste; ➢ Measures to reduce waste; ➢ Type and expected volume of recyclable waste; ➢ Recycling facilities that will collect/receive waste; ➢ Type of storage for different waste types; ➢ Collection and transport of waste; and ➢ Monitoring procedures to ensure the waste management plan is implemented. The following actions should enable the effective management of waste, preventing pollution within the ML: ➢ Ensure that no material used at the site enters the surrounding environment; ➢ Aim to minimise waste through reducing and re-using (e.g. packaging, metal scrap) material; ➢ Collect recyclables separately and deliver these to suitable facilities or arrange for collection; ➢ Prevent littering by staff at work sites by providing bins or waste bags in sufficient manner; ➢ Provide separate bins for hazardous / polluting materials and mark these clearly; Store hazardous / polluting materials on impermeable ground until it is disposed of / collected.	**Monitoring:** ➢ **Regular** inspection of waste collection and disposal areas. ➢ Check and file waste disposal slips. ➢ Compile all monitoring information in an **annual** report and audit this report against the waste management plan. **Performance Indicators:** ➢ Availability of plan ➢ Extent to which plan is complied with ➢ Presence of litter within the area and surrounding land ➢ Availability of rubbish bins and skips ➢ Total volume of general and hazardous waste storage capacity ➢ Total volume of general and hazardous waste stored on site ➢ Degree to which different waste is separated Frequency of waste collection	PM / ECO	PROPONENT
Servicing of vehicles outside the vehicle maintenance building. Oils	All vehicles must be serviced in a designated area inside the maintenance building. Catch trays must be installed.	Monitor maintenance workshop and wash bays for compliance and file reports.	PM / ECO	PROPONENT

WASTE MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
and lubricants penetrating soil surface.				
Oil or diesel spills	In the event of an oil/fuel spill, the spill must be cleaned up immediately and deposited at a registered hazardous waste landfill site in Walvis Bay.	Emergency Response Plan on file. Hazardous waste disposal certificate on file.	PM / ECO	PROPONENT
Inappropriate disposal of waste around accommodation camp site.	Designate restricted places for eating in working areas, and provide adequate refuse bins. Implement a Waste Management Plan	Monitor compliancy and report on file.	PM / ECO	PROPONENT
DECOMMISIONING PHASE				
When all activities come to an end, no waste or litter should be present on site.	All waste to be removed from site	Monitor compliancy and report on file.	PM / ECO	PROPONENT

Table 9. Potential Impacts on Guano Harvesting at MLs 83AB&C, during Planning, Expansion, Operational and Decommissioning Phases. (Authority refers to the responsible person / party

WATER QUALITY MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
PLANNING PHASE				
Possible impacts to marine water quality and sediments through hydrocarbon pollution by construction infrastructure and discharge	Plan for structures to deal with possible pollution of water in rare instances. .	Waste Management Plan on file Application for effluent discharge submitted to competent authority and receipt on file	PROPONENT	DWAF
EXPANSION PHASE				
Potential contamination of marine waters and sediments by inappropriate disposal of used lubricating oils from marine machinery maintenance and human wastes, which could in turn lead to impacts upon marine flora, fauna and habitat.	Ensure adequate disposal, sewage and sanitation management for expansion workers.	Monitor compliance and file report	PM / ECO	PROPONENT
OPERATIONAL PHASE				
Groundwater (salt pan brine) **contamination** by oil, grease, fuel, sewerage.	**Prevention:** ➢ Control storage, collection, disposal and recycling of potential pollutants; ➢ Maintain bunds, concrete surfaces and sealed containers; ➢ Ensure vehicles and equipment are well maintained **Mitigation:** ➢ Devise safe handling procedures.	**Administration of EMS documentation:** ➢ All certificates for hazardous waste disposal filed; ➢ Checklists and schedule for auditing compliance to the EMP are filed ➢ Reports are filed; ➢ Awareness training attendance lists signed and filed.	ECO	PROPONENT / DWAF

WATER QUALITY MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
	➢ Communicate response procedures for accidental spills; ➢ Ensure all equipment is available for dealing with accidental spills; ➢ Create an Emergency Response Plan (ERP); ➢ File MSDS in ERP; ➢ Monitor water quality from test holes (if relevant); ➢ Provide awareness training			
Pollution of groundwater supplies	Specific ground sealing and drainage is required around fuel depots and ablution blocks to prevent runoff affecting groundwater. See section above.	Monitor oil water separators, oil sumps, bunds and assess compliance and file reports.	PM / ECO	PROPONENT
Pressure on local water resources. Water for drinking purposes must be imported to the site.	Implement water saving strategies.	Monitor water use and report on file.	PM / ECO	PROPONENT
DECOMISSIONING PHASE				
Waste water should be collected in sump, should not be reused or disposed of in water bodies to avoid water pollution	Public health shouldn't be affected as the water used should not be made available for human consumption	Monitor water use and report on file.	PM / ECO	PROPONENT / DWAF

Table 10. Potential Impacts on Guano Harvesting at MLs 83AB&C during Planning, Expansion, Operational and Decommissioning Phases. (Authority refers to the responsible person / party)

MARINE ECOLOGY IMPACTS				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
PLANNING PHASE				
Appropriate siting of the bird platforms is critical to avoiding and reducing many potential adverse ecological effects, and may also result in enhancing the positive effects of the activity	Proposed sites should be researched on first to avoid sensitive, diverse or non-tolerant habitats and species especially to human activities	Planning reports and the mitigation action check list on file.	PM / ECO	PROPONENT
EXPANSION PHASE				
The construction and maintenance on the platforms and poses consequent disturbance of intertidal and subtidal biota).	The proponent should ensure all expansion processes are carried out as they are stated on file.	Monitoring reports and the mitigation action check list on file.	PM / ECO	PROPONENT
OPERATIONAL PHASE				
Any release of liquid hydrocarbons has the potential for direct, indirect, and cumulative effects on the marine environment through contamination of the water and/or sediments. These effects include physical oiling and toxicity impacts to marine fauna and	The ECO should conduct a comprehensive environmental awareness programme amongst contracted construction personnel. Only equipment and vehicles actively involved in operational activities should be permitted near the lagoon areas. When not in use, and overnight, all equipment must be withdrawn;	Monitoring reports and the mitigation action check list on file.	PM / ECO	PROPONENT

MARINE ECOLOGY IMPACTS				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
flora, localised mortality of plankton, pelagic eggs and fish larvae, and habitat loss or contamination	Refueling of equipment from a bowser should take place away from the beach and wet works areas;			
Litter can enter the marine environment. Inputs can be either direct by discarding garbage into the sea, or indirectly from the land when litter is blown into the water by wind.	➢ Regularly clean up any spills during. ➢ No dumping of materials into the environment ➢ Ensure regular collection and removal of refuse and litter from intertidal areas. ➢ Have good house-keeping practices in place during construction.	Monitoring reports and the mitigation action check list on file.	PM / ECO	PROPONENT
Disturbance and destruction of marine biota through alteration and disruption of the coastal zone during harvesting, the disturbance of and possible injury to shore birds and marine biota. Impact is considered negligible.	Harvesting should be carried out during times when birds have migrated north for the winter.	Monitoring reports and the mitigation action check list on file.	PM / ECO	PROPONENT
DECOMISSIONING PHASE				
The potential impacts during the decommissioning phase are thus expected to be minimal, and no key issues related to the marine environment are identified at this stage, since cessation in the operation of all activities.	The proponent should ensure all decommissioning processes are carried out as they are stated on file	Monitoring reports and the mitigation action check list on file.	PM / ECO	PROPONENT

Table 10. Potential Archaeological and Heritage Impacts of Guano Harvesting at MLs 83AB&C. (Authority refers to the responsible person / party)

ARCHAEOLOGICAL / HERITAGE MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
PLANNING PHASE				
Any archaeological or historical remains as relevant to the National Heritage Act 27 of 2004, that can potentially occur in the MLS 83AB&C areas should be documented.	A photographic record of the MLs 83AB&C should be taken. The proponent should be made aware of the provisions of Section 55 (4) of the National Heritage Act setting out the requirement that any sites or remains found in the course of planning and related work should be reported to the authorities as soon as possible.	This assessment is based on the presence or absence of visible surface indications, on inference from other parts of the Namib coast and it is suggested that the project area is sensitive archaeologically.	PROPONENT / ECO	National Heritage Council / Ministry of Education Arts and Culture
EXPANSION PHASE				
Risk to important **heritage aspects** situated on the pans. The remains of the first railway in Namibia transverses the Cape Cross salt pan. Some old dilapidated structures, rusting railways tracks, refuse areas and whale bone remains still exist in some areas. Significant artefacts have been preserved at the Cape Cross Lodge Museum.	Protect and maintain the significant remnants of the historical activities on the pan. The baseline EIA report refers to the sites of significance.	Monitor and record the changes in the state of the protected heritage areas.	PROPONENT / ECO	National Heritage Council / Ministry of Education Arts and Culture
OPERATIONAL PHASE				
Risk to important **heritage aspects** situated on the pans. The remains of the first railway in Namibia transverses the Cape Cross salt pan. Some old dilapidated structures, rusting railways tracks, refuse areas and whale bone remains still exist in some areas. Significant artefacts have been preserved at the Cape Cross Lodge Museum.	Protect and maintain the significant remnants of the historical activities on the pan. The baseline EIA report refers to the sites of significance.	If operating machinery or equipment stop work ➢ Identify the site with flag tape ➢ Determine GPS position if possible Report findings to the Proponent who should ➢ Visit site and determine whether work can proceed without damage to findings ➢ Determine and mark exclusion boundary	PROPONENT / ECO	National Heritage Council / Ministry of Education Arts and Culture

		➢ Site location and details to be added to project GIS for field confirmation by archaeologist <u>The archaeologist will then</u> ➢ Inspect site and confirm addition to project GIS ➢ Advise NHC and request written permission to remove findings from work area. ➢ Recovery, packaging and labelling of findings for transfer to National Museum		
DECOMISIONING PHASE				
Risk to important **heritage aspects** situated on the pans after the abandonment of the MLs 83AB&C areas.	Protect and maintain the significant remnants of the historical activities by ensuring these sites are barricaded from the public so as not to disturb these areas and maintain their historical importance.	Monitor and record the changes in the state of the protected heritage areas.	PROPONENT / ECO	National Heritage Council / Ministry of Education Arts and Culture

Table 11. General Decommissioning Requirements as Stipulated in the Minerals Act

DECOMMISSIONING MANAGEMENT PLAN				
Nature of Environmental Impact / Aspect / Risk	**Mitigation / Enhancement Measure**	**Monitoring Measure / Control / Tool / Performance Indicator**	**Responsible / Implementing Authority**	**Monitoring / Competent Authority**
Risks associated with abandoning a mine without rehabilitating according to an approved plan: **Minerals Act: Section 54** Any person who contravenes or fails to comply with the provisions of subsection (2) shall be guilty of an offence and on conviction be liable to a fine not exceeding R8 000 or to imprisonment for a period not exceeding 12 months or to both such fine and such imprisonment. **Contractual Agreements** The Contractor's failure to meet the obligations as stipulated in the contractual agreement with regards to rehabilitation will incur penalties to the value of the cost of rehabilitating the MLs 83AB&C areas to a state agreed upon by the Contractor and Proponent at the start of the contractual agreement.	**Minerals Act:** **Section 54** **Abandonment of mining areas** The holder of a mineral licence may abandon the mining area by notice in writing addressed and delivered to the Commissioner who in turn will notify the license holder that the mine has been abandoned as from the date of the cancellation notice. (2) The holder of the mineral licence to which such area relates shall: ➢ demolish any accessory works erected or constructed by such person in such area, except in so far as the owner of the land retains such accessory works on such conditions as may mutually be agreed upon between such owner and person and remove from such land all debris and any other object brought onto such land; ➢ take all such steps as may be necessary to remedy to the reasonable satisfaction of the Minister any damage caused by any mining operations carried on by such holder to the surface of, and the environment on, the land in the area in question. The abandonment of a mining area shall not affect any legal proceedings instituted against such holder or any obligation or liability of such holder in terms of the provisions of the Act.	At the time of mine closure and abandonment the contractor must rehabilitate the mine site to the state agreed upon at the start of the agreement. Comparisons with the baseline report drafted at the start of the relationship must be made. ➢ Removal of movable assets i.e. plant equipment ➢ Demolishment of fixed immovable assets ➢ Removal of this demolished plant and building rubble ➢ Fill in dangerously deep pits or holes in the ground that poses a threat to the public safety ➢ If such pits or holes are too large to fill, barricade such hazards to prevent any accidents ➢ The proponent is to fulfil the same rehabilitation tasks as above for all the accessory works area, including infrastructure, tailings, pits and holes etc. which they created before the contractor began works within the MLs 83AB&C areas. ➢ It is understood that the abandoned MLs 83AB&C areas could be started up again by another license holder and solar salt operations are started on the pans provided the brine infiltration process continues as it has until now and for the duration of the current and future mining. In this case no rehabilitation of the crystallizing ground will be required.	PROPONENT	MET / MME