



Environmental Management Plan

Mining License ML11 - Cape Cross



June 2015

Authors	Philip Hooks & Chitalu Shikaputo	
Version	01	
Reviewer	Oliver Krappmann	
Date	06.05.2015	
Version	02	
Reviewer	Oliver Krappmann	
Date	26.05.2015	
Reference	Hooks, P. & Shikaputo, C., 2015. Environmental Management Plan for Mining License 11 at the Cape Cross Salt Pans. Assessed for Salt Company (Pty) Ltd.	

ABBREVIATIONS

DWAF	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
ML	Mining License
MME	Ministry of Mines & Energy
MSDS	Materials Safety Data Sheet
NACOMA	Namibian Coast Conservation and Management Project
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 whereby all the activities associated with the Salt Co's (proponent) operation on ML11 from crystalliser establishment, harvesting and hauling, loading, crushing, washing and packaging, storage, distribution and export, are controlled and monitored. This is to ensure that time and national resources are not wasted and that problems occurring during the salt 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:

- solar salt 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 continued solar salt operations;
- precautions against 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 ML11 area

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 ML11 be developed (see Legal Section of EIA Report). The Strategic Environmental Assessment (SEA) for coastal management written by Namibian Coast Conservation and Management Project (NACOMA) in 2012, lists recommendations that tourism related activities, nature conservation and mining in the Dorob National Park be in accordance with the Park's Management Plan. Though, this management plan is not available yet, the SEA also recommends that the solar salt operations on the Cape Cross salt pans integrate a multi land-use approach. High priority (>2) conservation areas are to consider eco-tourism only. The salt pans have been included within this high priority conservation area category. It is assumed that by high priority conservation status NACOMA means an area of higher biodiversity. As was stated in the EIA Baseline Report the areas on the salt pans that have been earmarked for solar salt operations fall within areas of low biodiversity.

Eco-tourism related activities could benefit from gaining access to the lagoon areas for bird watching. The hills to the east of the C34 road that fall within ML11 provide high biodiversity and potential to develop eco-tourism opportunities. Access to the main solar salt operational area must

be restricted for public safety sake and may only allow tourist access by appointment and with a company escort.

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. National heritage aspects have also been considered in the layout of the crystalliser ponds. Accepted mitigation measures concerned with the management of solar salt operations activities are to:

- delineate no-go areas that conserve biodiversity;
- establish a plan layout for crystalliser ponds which allows for sustainable use of the resource;
- delineate no-go areas for the conservation of heritage sites;
- at the employee's work and accommodation area supply enough water, treat used water if applicable, and remove solid waste;
- reduce risk of damage to infrastructure and equipment during the salt extraction, processing and transport;
- maintain sustainable operating practices e.g. decommissioned site rehabilitation, waste recycling, rehabilitate contaminated soil

2. Environmental Impacts

The key environmental impacts identified and discussed in the ML11 EIA Report for solar salt 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 ML11 solar salt 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 the Salt Co's and contractor's employees;
- the local economy benefits;
- continued and expanded project will create improved services and infrastructure for ML11 area;
- potential tourist attraction and creation of an integrated industry e.g. educational aspect of salt production, lagoon bird watching, creation of walking trail;
- implementation of environmental management measures to mitigate negative impacts;
- global carbon emission savings through sustained solar salt production;
- environmental awareness created for all solar salt operational personnel through training

2.2 Key Negative Environmental Impacts

- potential dissolution of rock salt reserves;
- potential decrease in aesthetic value of natural pans as areas within ML11 are prepared for salt crystallisation and harvesting;
- ecology of the higher biodiversity areas would be adversely affected if mining or accessory work activities extended beyond the salt pans east of the C34 road;
- potential increases in personnel resulting in increased waste and sewerage generation;
- the natural pan environment within ML11 is altered to create artificial crystalliser ponds;
- potential nuisance factor from noise creation may increase as a result of 24 hour operations;
- increased salt production potentially increasing risks to vehicle safety as frequency of salt haulage increases;

- 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 solar salt operations within the ML11 area 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**- Salt Co (Pty) Ltd;
- **Project Manager (PM)**;
- The **Environmental Assessment Practitioner (EAP)**
- The **Environmental Control Officer (ECO)**

Competent Authorities

- Environmental authority - Ministry of Environment & Tourism (**MET**) / Namibian Coast Conservation and Management Project (**NACOMA**)
- Department of Water Affairs & Forestry (**DWAF**)
- 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 monthly reports;
- 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 ML11 EMP

PARTY	ROLE	RESPONSIBILITY & ACCOUNTABILITY
Proponent - Salt Co (Pty) Ltd	The proponent bears the ultimate responsibility for ML11 solar salt operations, and is thus responsible for environmental performance.	Must be informed of environmental issues and impacts of the solar salt 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 monitoring results of the salt pond's biology and chemistry; Ensure that heritage sites are cordoned off from solar salt activities with appropriate barriers.
MET& NACOMA	National Environmental Enforcing Agents	Enforcement of Environmental Regulations; Enforcing EMP compliance
DWAF	Permitting authority for sea water and groundwater abstraction and effluent discharges into the sea or on land	Water Affairs is in charge of prevention and prohibition of all violations of national legislation concerning natural water bodies; They issue permits for abstraction and discharge.
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 the solar salt 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.

The Department of Water Affairs requires monitoring reports to be submitted as per the permits that are issued for water abstraction and effluent discharge.

Whilst many of the anticipated environmental impacts have been identified in the EIA, there are possibly other impacts that arise from solar salt 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 5**) describes the main activities necessary to mitigate and/or enhance the potentially significant environmental and socio-economic impacts during implementation of each aspect of solar salt operations within the ML11 area. 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 solar salt operations in the ML11 area have been subdivided for each aspect of the solar salt operations. This solar salt 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 the solar salt 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 crystallisers and the upgrading of the salt processing plant and equipment is covered under the **expansion phase**;
- should the solar salt operations 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 crystallisers and accessory works area

Table 2. Implementation guidelines for crystallisers, wash water dam and channels, salt processing plant, rock salt, accessory works associated with solar salt operations within the ML11 area during planning, expansion, operational and decommissioning phases. (Authority refers to the responsible person / party)

ML11 OPERATIONS (crystalliser establishment, salt harvesting, wash water dams and channels, salt processing plant, rock salt extraction, accessory works, haulage and transport)				
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 ML11 resulting in loss of biodiversity.	<ul style="list-style-type: none"> ➤ Undertake EIA study; ➤ Write up EIA Report; ➤ Draft an EMP; ➤ Plan an EMS; ➤ Renewal or Update EIA Report 	Record of Decision / Environmental Clearance Certificate / EMP approved – documents filed. Schedule to develop EMS documentation on file.	PROPONENT / EAP	MET/ MME
Awareness of public and government departments regarding the Salt Co’s operations and routine expansion plans for ML11 solar salt operations. Operations existed for decades and all neighbours and stakeholders are aware of the solar salt operations at Cape Cross.	Public consultation with all key stakeholders was deemed unnecessary for the Baseline EIA Report because of the sustainable nature of the solar salt operations and the fact that operations have gone on for decades and all stakeholders are aware of the extent of solar salt operations at Cape Cross.	Environmental Clearance Certificate received and filed.	PROPONENT / EAP	MET
Inadequate planning and design of salt operations at the pans.	Solar salt operations at the pan must be planned and designed with minimal impact on the environment and pressure on natural resources e.g. use of ground water; communicate plans to the competent authorities.	Plans and amended plans are to be filed.	PROPONENT / EAP	MET / MME
Visual and noise impact of inappropriate siting of crystallisers, wash dams and channels, salt processing plant, rock salt extraction, accessory works. Mine processing plant is very remote with no residential areas within a 10km radius. Impacts are negligible or insignificant.	Mitigations need to be planned. The infrastructure should not be very visible to tourists passing along the C34 road. Maintenance plans for all equipment will ensure that noise impacts for personnel and tourists with result in negligible health and nuisance effects.	Visual baseline in the form of a photo survey should be undertaken. Noise monitoring plan is on file. Occupational health policy is on file.	PROPONENT / EAP	MET
The creation of accessory works areas outside of ML11. Definition:	According to Section 90 of the Minerals Act (33 of 1992) the creation of accessory works or the obtaining of ancillary rights by holders of mineral licences needs to be	The record of decision is on file	PROPONENT	MME

ML11 OPERATIONS (crystalliser establishment, salt harvesting, wash water dams and channels, salt processing plant, rock salt extraction, accessory works, haulage and transport)				
Nature of Environmental Impact / Aspect / Risk	Mitigation / Enhancement Measure	Monitoring Measure / Control / Tool / Performance Indicator	Responsible / Implementing Authority	Monitoring / Competent Authority
PLANNING PHASE				
<p>According to the Minerals Act 'accessory works' means any, building, plant or other structure required for purposes of mining operations or for the disposal of any mineral or group of minerals won or mined in the course of any such operations, or is connected with such operations or disposal, including -</p> <ul style="list-style-type: none"> ➤ any power plant, transmission line or substation; ➤ any water borehole, well, pipe-line, drilling rig, pump station, tank or dam; ➤ any airfield, helicopter landing-pad, road, gate, rail or railway siding; ➤ any workshop, hangar, store or office; ➤ any explosives magazine; ➤ any sampling plant, processing plant, smelter or refinery, whether erected on land or constructed on any vehicle or vessel; ➤ any waste disposal site; or ➤ any camp site or temporary or permanent residential area 	<p>done through an application to MME. If the land to be developed for accessory works is not owned by the proponent (mining license holder) permission must be ascertained from that owner.</p>			

ML11 OPERATIONS (crystalliser establishment, wash water dams and channels, salt processing plant, rock salt extraction, accessory works)				
Nature of Environmental Impact / Aspect / Risk	Mitigation / Enhancement Measure	Monitoring Measure / Control / Tool / Performance Indicator	Responsible / Implementing Authority	Monitoring / Competent Authority
EXPANSION PHASE				
Solar salt operations are occasionally expanded through the increase in the number of crystallisers. Expansions beyond the boundaries of the ML11 area may potentially affect ecosystem services negatively. The plans for expanding current crystallisers do not extend beyond borders of the ML11 boundary.	Plans to develop more crystallisers within ML11 have left sufficient buffer distances between the proposed ponds and the lagoons. See the map provided in the EIA report.	Check that actual crystalliser pond layout matches map. This should be done before the start of any expansions. Check list updated weekly and filed.	PM	PROPONENT
Movement and presence of vehicles (bulldozers, front-end loaders, trucks) on and around the pan presents risks of accidents due to collisions or unstable substrate. This poses risks to personnel safety and asset security.	Coordinate movement of expansion 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
Visual impact of increasing the number of crystallisers at the pan on tourism. Unlikely to affect tourism activities due to remoteness of the ML11 area. The C34 road is far from the planned crystalliser areas. The boundaries of each crystalliser will not exceed 5m above the pan surface.	Ensure site area is organised and clear of solid wastes; Restricted access for public safety reduces exposure of the solar salt operations to tourists; access by visitors for a tour of the operations must be by appointment; access to actual expansion area sites is prohibited.	Carry out audits and report findings; Keep a visitors' log	PM / ECO	PROPONENT
Noise impact of expansion activities at the salt pan is 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 plant 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

ML11 OPERATIONS (crystalliser establishment, wash water dams and channels, salt processing plant, rock salt extraction, accessory works)				
Nature of Environmental Impact / Aspect / Risk	Mitigation / Enhancement Measure	Monitoring Measure / Control / Tool / Performance Indicator	Responsible / Implementing Authority	Monitoring / Competent Authority
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
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

ML11 OPERATIONS (crystalliser establishment, wash water dams and channels, salt processing plant, rock salt extraction, accessory works)

Nature of Environmental Impact / Aspect / Risk	Mitigation / Enhancement Measure	Monitoring Measure / Control / Tool / Performance Indicator	Responsible / Implementing Authority	Monitoring / Competent Authority
OPERATIONAL PHASE				
<p>Groundwater (salt pan brine) contamination by oil, grease, fuel, sewerage.</p>	<p>Prevention:</p> <ul style="list-style-type: none"> ➤ Control storage, collection, disposal and recycling of potential pollutants; ➤ Maintain bunds, concrete surfaces and sealed containers; ➤ Ensure vehicles and equipment are well maintained <p>Mitigation:</p> <ul style="list-style-type: none"> ➤ Devise safe handling procedures. ➤ 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; ➤ Provide awareness training 	<p>Administration of EMS documentation:</p> <ul style="list-style-type: none"> ➤ 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
<p>Pollution from solid waste</p>	<p>Develop a Waste Management Plan, outlining:</p> <ul style="list-style-type: none"> ➤ 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. <p>The following actions should enable the effective management of waste, preventing pollution within the ML:</p> <ul style="list-style-type: none"> ➤ Ensure that no material used at the site enters the surrounding environment; 	<p>Monitoring:</p> <ul style="list-style-type: none"> ➤ 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. <p>Performance Indicators:</p> <ul style="list-style-type: none"> ➤ Availability of plan ➤ Extent to which plan is complied with 	PM / ECO	PROPONENT

ML11 OPERATIONS (crystalliser establishment, wash water dams and channels, salt processing plant, rock salt extraction, accessory works)				
Nature of Environmental Impact / Aspect / Risk	Mitigation / Enhancement Measure	Monitoring Measure / Control / Tool / Performance Indicator	Responsible / Implementing Authority	Monitoring / Competent Authority
OPERATIONAL PHASE				
	<ul style="list-style-type: none"> ➤ 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. 	<ul style="list-style-type: none"> ➤ 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 		
Movement and presence of vehicles (bulldozers, front-end loaders, trucks) on and around the pan presents risks of accidents due to collisions or unstable substrate. This poses risks to personnel safety and asset security.	<p>Coordinate movement of operational vehicles;</p> <p>Operational distances to be maintained;</p> <p>Maintain the integrity of roads;</p> <p>Training of personnel.</p>	<p>Operators certificates on file;</p> <p>File any incident reports;</p> <p>Schedule of road maintenance on file</p>	PM / ECO	PROPONENT
Visual impact of increasing the number of crystallisers at the pan on tourism. Unlikely to affect tourism activities due to remoteness of the ML11 area. The C34 road is far from the planned crystalliser areas. The boundaries of each crystalliser will not exceed 5m above the pan.	<p>Ensure site area is organised and clear of solid wastes;</p> <p>Restricted access for public safety reduces exposure of the solar salt operations to tourists; access by visitors for a tour of the operations must be by appointment; access to actual expansion area sites is prohibited.</p>	<p>Carry out audits and report findings;</p> <p>Keep a visitors log</p>	PM / ECO	PROPONENT
Noise impact of operational activities at the salt pan is expected to be negligible.	<p>No noise measurements as part of a monitoring programme are deemed necessary.</p> <p>If complaints regarding noise are received:</p> <ul style="list-style-type: none"> ➤ Measure noise levels in surrounding areas attributable to the plant under various operating conditions and at various times; 	<p>Monitoring:</p> <ul style="list-style-type: none"> ➤ Keep a register of all complaints received and remediation action taken. ➤ Compile all information in an annual report. <p>Performance Indicator:</p>	ECO	PROPONENT / Ministry of Labour

ML11 OPERATIONS (crystalliser establishment, wash water dams and channels, salt processing plant, rock salt extraction, accessory works)

Nature of Environmental Impact / Aspect / Risk	Mitigation / Enhancement Measure	Monitoring Measure / Control / Tool / Performance Indicator	Responsible / Implementing Authority	Monitoring / Competent Authority
--	----------------------------------	---	--------------------------------------	----------------------------------

OPERATIONAL PHASE

	<p>➤ Investigate and, if required, implement further noise reduction measures.</p> <p>Maintain all sound proofing, silencers and other equipment in good working order to minimise excess noise.</p>	<p>➤ Number of registered complaints</p>		
--	--	--	--	--

<p>Dust generated during the expansion phase is expected to be negligible.</p>	<p>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.</p>	<p>Regular visual inspection.</p> <p>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.</p> <p>Report on each expansion period</p>	<p>PM / ECO</p>	<p>Ministry of Labour / PROPONENT</p>
--	---	---	-----------------	---------------------------------------

<p>Risk to health and safety of employees</p>	<p>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.</p> <p>Ensure that all operators and or maintenance crews on-site are familiar with the company’s ERP or equivalent (Emergency Response Guide 2008).</p> <p>Conduct thorough safety training to personnel about the use of protective clothing, footwear, gloves and belts; safety goggles and shields; dust masks and respirators; the correct handling of materials and the safe use of all equipment.</p> <p>First aid treatment, emergency treatment and medical assistance must be available immediately.</p>	<p>A register must be maintained of all training provided to staff.</p> <p>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.</p> <p>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.</p> <p>Compile all monitoring information in an annual report.</p>	<p>PM / ECO</p>	<p>Ministry of Labour / PROPONENT</p>
---	---	---	-----------------	---------------------------------------

ML11 OPERATIONS (crystalliser establishment, wash water dams and channels, salt processing plant, rock salt extraction, accessory works)				
Nature of Environmental Impact / Aspect / Risk	Mitigation / Enhancement Measure	Monitoring Measure / Control / Tool / Performance Indicator	Responsible / Implementing Authority	Monitoring / Competent Authority
OPERATIONAL PHASE				
	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.			
Reduction in brine availability due to over utilisation of the salt pans. This is unlikely to occur due to the continuous infiltration of the sea water through the beach.	Monitor the concentration of brine at strategically placed test holes. Reduce the rate at which crystalliser ponds are harvested depending on the changes to the brine concentration, flow rates and distributional pattern of dilute brine streams.	Monitoring reports and the mitigation action check list on file.	PM / ECO	PROPONENT
Creation of sink holes due to infiltration of fresher waters into the brine reserve causing dissolving of the rock salt (i.e. leaching process).	Create a system of channels with sluice gates to manage the infiltration of diluted brines along preferred flow paths. Attempt to homogenise the inflow of brine across the salt pans. Possibly create evaporator ponds for pre concentration prior to the crystallisation stage.	Monitor brine concentrations at predetermined places. Monitoring report and check list on file.	PM / ECO	PROPONENT
Wash water slurry tailings generation at the wash plant could potentially affect the brine quality.	Removal of tailings to accessory works area. Maintenance of tailings must ensure its integrity.	Maintenance of accessory works area to be checked. Non-compliances to be reported. Permits for discharge and reports on monitoring groundwater quality to be submitted to authorities.	PM / ECO	PROPONENT / DWAF / MME
Development of the salt pans 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 lagoon sites would have to be arranged beforehand so that public safety is maintained. Access to the ML11 area where tourists can learn about the process could potentially be allowed but only by	A public relations report should document the mine site visits and the use of the access road to the lagoons. Minutes of meetings with MET / NACOMA / tour operators re	ECO	PROPONENT

ML11 OPERATIONS (crystalliser establishment, wash water dams and channels, salt processing plant, rock salt extraction, accessory works)				
Nature of Environmental Impact / Aspect / Risk	Mitigation / Enhancement Measure	Monitoring Measure / Control / Tool / Performance Indicator	Responsible / Implementing Authority	Monitoring / Competent Authority
OPERATIONAL PHASE				
	<p>appointment. A visitor's centre would need to be developed. Public safety would have to be prioritised for such tours and some areas would be off limits.</p> <p>The development of a walking trail to an elevated viewing point and for the appreciation of the flora could potentially be developed in conjunction with the plans of the Dorob National Park Management.</p>	access the hills to the east of the C34 road.		
Positive impact of short and long term employment for locals	<p>Maximise employment of local labour where possible</p> <p>Careful attention to the recruitment of workers to ensure it is fair and also does not generate conflict.</p>	Include the employee statistics in the annual audit showing long term trends.	PROPONENT	Ministry of Labour
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 dumps 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 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

ML11 OPERATIONS (crystalliser establishment, wash water dams and channels, salt processing plant, rock salt extraction, accessory works)				
Nature of Environmental Impact / Aspect / Risk	Mitigation / Enhancement Measure	Monitoring Measure / Control / Tool / Performance Indicator	Responsible / Implementing Authority	Monitoring / Competent Authority
DECOMMISSIONING PHASE				
<p>Risks associated with abandoning a mine without rehabilitating according to an approved plan:</p> <p>Minerals Act: Section 54</p> <p>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.</p> <p>Contractual Agreements</p> <p>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 ML11 area to a state agreed upon by the Contractor and Proponent at the start of the contractual agreement.</p>	<p>Minerals Act:</p> <p>Section 54</p> <p>Abandonment of mining areas</p> <p>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.</p> <p>(2) The holder of the mineral licence to which such area relates shall:</p> <ul style="list-style-type: none"> ➤ 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. <p>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.</p>	<p>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.</p> <ul style="list-style-type: none"> ➤ 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 ML11 area. ➤ It is understood that the overburden removed for the creation of the crystalliser ponds would remain in the disposal area and that the crystalliser ponds and roads would remain in place. It will not be required to have the pan levelled (tailings and roads replaced within the created ponds) by either the proponent or contractor. ➤ It is understood that the abandoned ML11 area 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. 	<p>PROPONENT</p>	<p>MET / MME</p>

Table 3. Implementation guidelines for *haulage of salt and rock salt* during planning, expansion, operational and decommissioning phases. (Authority refers to the responsible person / party)

SALT / ROCK SALT TRANSPORT (107km to Swakopmund / 140km to Walvis Bay)				
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 resulting in negative impact on the environment.	The current site access road was established decades earlier and is fully operational. Signage indicates the turn of to the solar salt operations.	Maintain existing access road.	PROPONENT	Roads Authority
Use of C34 road for haulage to Swakopmund / road behind dunes between Swakopmund and Walvis Bay	Apply for permits as per vehicle type.	Permits on file.	PROPONENT	Roads Authority
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 C34 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 users of C34 road for haulage to Swakopmund and the road behind dunes between Swakopmund and Walvis Bay.	<ul style="list-style-type: none"> ➤ 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

SALT / ROCK SALT TRANSPORT (107km to Swakopmund / 140km to Walvis Bay)				
Nature of Environmental Impact / Aspect / Risk	Mitigation / Enhancement Measure	Monitoring Measure / Control / Tool / Performance Indicator	Responsible / Implementing Authority	Monitoring / Competent Authority
Generation of dust from high traffic volumes on haul road is expected to be negligible.	<p>The C34 is a salt road and well maintained. Very little dust is created from driving on these roads.</p> <p>High vehicle speed increases the amount of dust stirred up from unpaved roads. Lowering the speed of the vehicle can reduce emissions significantly. The trucks will not travel above the speed limit as per the trucks payload type and the permit stipulations.</p>	Register of complaints on file.	PM / ECO	Roads Authority / Traffic Police
DECOMMISSIONING PHASE				
Access roads to and haulage roads within the ML11 area could pose risk to public.	<p>Confirm requirements of competent authority.</p> <p>Place signage prohibiting access and possibly barricade access roads to abandoned ML11 area.</p>	<p>Requirements for restricting or prohibiting access to the abandoned mine are on file.</p> <p>Required mitigations are actioned and proof filed in EMS system.</p>	PROPONENT	MME / MET

Table 4. Implementation guidelines for the maintenance of equipment (vehicular and stationary) and staff accommodation camp during planning, expansion, operational and decommissioning phases. (Authority refers to the responsible person / party)

MAINTENANCE AND STAFF ACCOMMODATION (equipment, vehicle and machinery maintenance, staff housing)				
Nature of Environmental Impact / Aspect / Risk	Mitigation / Enhancement Measure	Monitoring Measure / Control / Tool / Performance Indicator	Responsible / Implementing Authority	Monitoring / Competent Authority
PLANNING PHASE				
Servicing of vehicles within ML11 area.	Plans to service vehicles within ML11 should be drawn up according to industry standards.	Plan on file	PROPONENT	MET
No employees are accommodated within ML11 area.	Plans to accommodate personnel at a permanent 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
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
Machinery maintenance poses risks of pollution.	Accessory works application drawn up as per plan in the EIA and submitted Locate equipment and buildings appropriately and plan installation of structures to avoid localised pollution (e.g. workshop with oil water separators or sumps for safe removal to hazardous waste sites and bund structures below stationery machinery where necessary).	Accessory works application submitted and receipt kept on file Plan on file	PROPONENT	MME
Sewerage facilities are currently portable facilities at the processing plant.	Plan for more permanent structures to deal with sewerage and devise a programme for regular removal of waste to Henties Bay sewerage treatment facility.	Waste Management Plan on file	PROPONENT	Henties Bay Municipality
Sewerage facilities for an accommodation camp are not needed at present as no personnel stay at the mine	Plan for the expansion of septic tanks or French drains in the event an accommodation camp is required in the future. Position of camp to be determined possibly outside the ML11 area where historical activities of a similar nature took place.	Waste Management Plan on file Application for effluent discharge submitted to competent authority and receipt on file	PROPONENT	DWAF

MAINTENANCE AND STAFF HOUSING (equipment, vehicle and machinery maintenance, staff housing)				
Nature of Environmental Impact / Aspect / Risk	Mitigation / Enhancement Measure	Monitoring Measure / Control / Tool / Performance Indicator	Responsible / Implementing Authority	Monitoring / Competent Authority
EXPANSION PHASE				
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
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
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 of groundwater supplies	Specific ground sealing and drainage is required around fuel depots and ablution blocks to prevent runoff affecting groundwater. See sections above.	Monitor oil water separators, oil sumps, bunds and assess compliance and file reports.	PM / ECO	PROPONENT
Servicing of vehicles outside the vehicle maintenance building. Oils and lubricants penetrating soil surface.	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
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. Refer to ERP.	Emergency Response Plan on file. Hazardous waste disposal certificate on file.	PM / ECO	PROPONENT

MAINTENANCE AND STAFF HOUSING (equipment, vehicle and machinery maintenance, staff housing)				
Nature of Environmental Impact / Aspect / Risk	Mitigation / Enhancement Measure	Monitoring Measure / Control / Tool / Performance Indicator	Responsible / Implementing Authority	Monitoring / Competent Authority
Inappropriate disposal of waste around accommodation camp site.	Designate restricted places for eating in working areas, and provide adequate refuse bins. Implement Waste Management Plan	Monitor compliancy and report on file.	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
DECOMMISSIONING PHASE				
Contamination of the ML11 area if accessory works are abandoned.	Remove all sources of contamination from the mine site. Follow the ML11 area rehabilitation plan.	Monitor compliancy to rehabilitation plan and file reports. Submit final environmental audit report to competent authorities.	PROPONENT	MME / MET

Table 5. Implementation guidelines for the stockpiling and export of salt from the port of Walvis Bay outlining planning, expansion, operational and decommissioning phases. (Authority refers to the responsible person / party)

SALT STORAGE AND SHIP LOADING / BERTH SITE				
Nature of Environmental Impact / Aspect / Risk	Mitigation / Enhancement Measure	Monitoring Measure / Control / Tool / Performance Indicator	Responsible / Implementing Authority	Monitoring / Competent Authority
PLANNING PHASE				
Currently no export terminal for the Salt Co exists at the port of Walvis Bay.	Plan for establishment of an export terminal at the port of Walvis Bay.	Plan on file	PROPONENT	NAMPORT / Ministry of Finance
Damage and pollution to the marine environment by salt is expected to be negligible and site specific.	Plan ship loading facility with minimal impact on the marine environment.	Plan on file	PROPONENT	NAMPORT / MFMR / Maritime Affairs
Statutory requirements	Undertake an EIA for the establishment of an export salt terminal at Walvis Bay Port.	EIA Report and EMP submitted and on file. Record of Decision / Environmental Clearance Certificate on file	PROPONENT	MET
EXPANSION PHASE				
Construction of terminal causing noise, dust, traffic congestion, pollution, health and safety hazards, security risks.	Comply with bulk terminal EMP	Monitoring reports on file	PROPONENT	MET / NAMPORT

SALT STORAGE AND SHIP LOADING / BERTH SITE				
Nature of Environmental Impact / Aspect / Risk	Mitigation / Enhancement Measure	Monitoring Measure / Control / Tool / Performance Indicator	Responsible / Implementing Authority	Monitoring / Competent Authority
OPERATIONAL PHASE				
Identified risks for terminal operations.	Comply with bulk terminal EMP	Monitoring reports on file	PROPONENT	MET / NAMPORT
DECOMMISSIONING PHASE				
Identified risks for decommissioning the terminal.	Comply with bulk terminal EMP	Monitoring reports on file	PROPONENT	NAMPORT