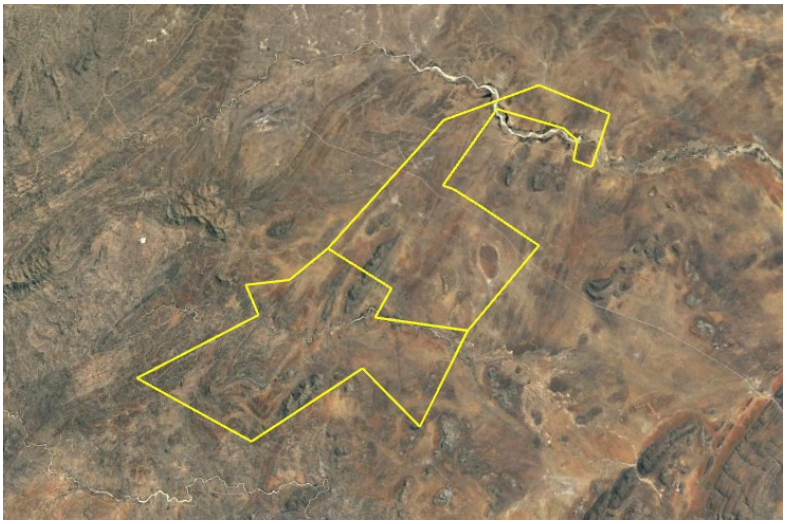
EXPLORATION ACTIVITIES ON EXCLUSIVE PROSPECTING LICENSES 4194 AND 4013

UPDATED ENVIRONMENTAL MANAGEMENT PLAN



Assessed by:

GEO Pollution Technologies Namibia

Assessed for:

Jindal Mining Namibia (Pty) Ltd

June 2021

Project:	**UPDATED ENVIRONMENTAL MANAGEMENT PLAN FOR THE EXPLORATION ACTIVITIES ON EXCLUSIVE PROSPECTING LICENSES 4194 AND 4013**
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Report Approval	 André Faul Environmental Assessment Practitioner

I NIRAV THAKER acting as a representative of Jindal Mining Namibia (Pty) Ltd hereby confirm that the project description contained in this report is a true reflection of the information which the Proponent provided to Geo Pollution Technologies. All material information in the possession of the proponent that reasonably has or may have the potential of influencing any decision or the objectivity of this assessment is fairly represented in this report and the report is hereby approved.

Signed at WINDHOEK on the 7th day of JUNE 2021.

Jindal Mining Namibia (Pty) Ltd

2012/0954
Business Registration/ID Number

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1 INTRODUCTION

Jindal Mining Namibia (Pty) Ltd (Proponent) requested Geo Pollution Technologies (Pty) Ltd to update their existing environmental management plan (EMP) in order to renew their existing environmental clearance certificate (ECC) that was issued on 20 September 2017. The renewed ECC is required for the continued exploration activities on Exclusive Prospecting License (EPL) areas 4013 and 4194, east of Windhoek (Figure 1).

The EPLs are held by Brake Trading (Pty) Ltd while the exploration activities for base metals (mainly copper and iron) are managed by Jindal. The exploration programme was initiated in 2013 with the majority of the exploration activities completed by 2017 / 2018. The project is currently in a feasibility and planning phase with the aim of applying for a mining license. An ECC was issued in 2013 and again in 2017 to Jindal Mining Namibia (Pty) Ltd for the exploration on EPL 4194 and EPL 4013, but at that stage the ECC also included EPL 4525 and 4513. Based on scope changes in the project, it is the Proponent's intention to renew the ECC only for EPLs 4013 and 4194. The updated EMP will thus be for the continued operations of the exploration programme on EPLs 4013 and 4194 only. Such operations mainly consist of planning for the mining licence application and mining activities, but may include some additional exploration drilling and shallow depth trenching activities.

1.1 EXPLORATION ACTIVITIES

Exploration related activities are discussed in short in the sections below.

1.1.1 Geophysics

Geophysical surveys were conducted in order to identify target areas for detailed exploration activities. Surveys included analysing existing magnetics data, conducting airborne surveys and conducting detailed ground surveys.

1.1.2 Drilling activities

Drilling locations are based on data obtained from the geophysical surveys. Drilling is conducted to collect rock samples from targeted ore bodies. The following drilling techniques are / were implemented; open percussion drilling, reverse circulation drilling and diamond-core drilling. To date, a combined length of 24.75 km was drilled throughout EPLs 4013 and 4194.

1.1.3 Geochemical analysis of samples

Samples collected during exploration, either in drill core, rock or soil form, are sent to a laboratory for analysis of mineral composition, in order to determine base metal concentrations (copper and iron) within the samples.

1.1.4 Pitting / Trenching

Pitting and trenching usually involves the final phase of exploration activities. This allows for identification of soil profiles and bulk samples to be collected of the potentially feasible ore bodies identified. Pits, if required, will be manually or mechanically dug to a depth of 3 m and surface area of 5 x 5 m.

Trenching is the preferred method of bulk sampling based on current exploration data. This requires a shallow depth trench to be dug along the ore body. The average size of the proposed trenches are expected to be 500 m in length, 2 m deep and 1 m wide. Bulk samples will be collected from excavated materials, and processed to determine the extractable iron and copper concentrations.

1.1.5 Employment and accommodation

Reputable contractors are appointed to conduct exploration activities. Appointed contractors are qualified and registered to conduct the appointed tasks and are overseen by the

Proponent. Suitable accommodation and ablution facilities and sanitary requirements are provided to all field teams. This may be in the form of existing accommodation and ablution facilities on the farms or mobile units, based on consent from the land owners.

1.1.6 Waste management

Waste management requirements are regulated by a developed waste management strategy as well as through agreements made with landowners. All sites have suitable waste receptacles available for various waste streams to ensure waste is stored in a way that prevents contamination of the environment. Contaminated materials, including contaminated soil and water, are treated as hazardous waste if bioremediation is not practical / environmentally safe.

1.1.7 Power Supply

Where required, generators are provided to for lighting and domestic purposes. Machinery are diesel powered or accompanied by separate generators

1.1.8 Water Supply

Water required for exploration activities is obtained either from existing boreholes, newly developed boreholes, or supplied by truck from the nearest water source. Consent is obtained from landowners for water supply purposes. To reduce the risk of possible impacts on groundwater quality, it is preferred that water from nearby sources with similar quality be used for drilling activities.

1.1.9 Site Access

Existing access routes from the B6 main road are used where possible to access the various exploration sites. Where access cannot be gained from existing routes, new routes are developed. Routes are planned in a manner to minimise environmental impacts.

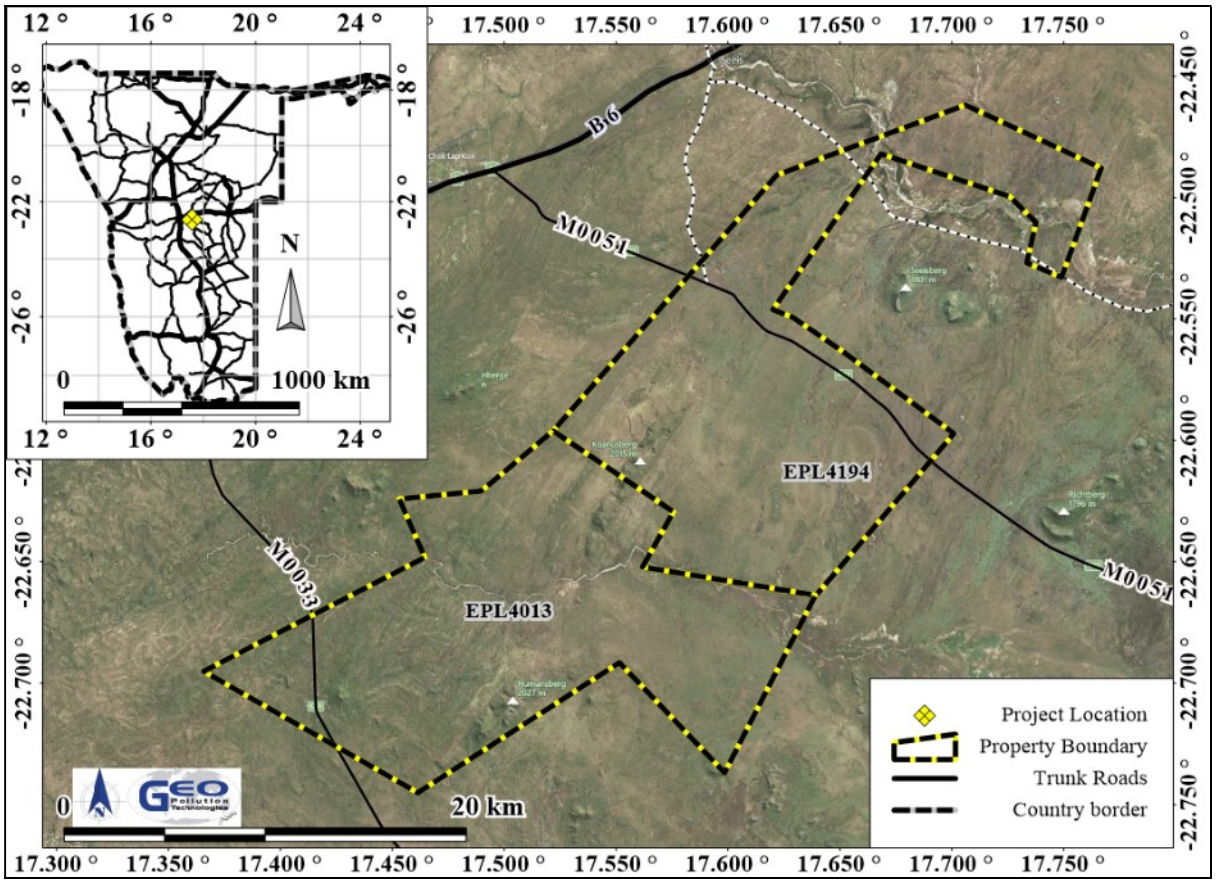

Figure 1. Project area

2 OBJECTIVES OF THE ENVIRONMENTAL MANAGEMENT PLAN

The EMP provides management options to ensure impacts related to the exploration activities are minimised. An EMP is a tool used to take pro-active action by addressing potential problems before they occur. This should limit the corrective measures needed, although additional mitigation measures might be included if necessary. The EMP acts as a stand-alone document, which can be used during the various phases of any proposed activity or development. All contractors and sub-contractors taking part in the project should be made aware of the contents of the EMP, so as to plan the relevant activities accordingly in an environmentally sound manner.

The objectives of the EMP are:

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

Jindal may choose to implement an environmental management system. At the heart of an environmental management system is the concept of continual improvement of environmental performance with resulting increases in operational efficiency, financial savings and reduction in environmental, health and safety risks. An effective environmental management system would need to include the following elements:

- A stated environmental policy which sets the desired level of environmental performance;
- An environmental legal register;
- An institutional structure which sets out the responsibility, authority, lines of communication and resources needed to implement the environmental management system;
- Identification of environmental, safety and health training needs;

- An environmental program(s) stipulating environmental objectives and targets to be met, and work instructions and controls to be applied in order to achieve compliance with the environmental policy; and
- Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the environmental management system.
- The EMP.

3 THE ENVIRONMENTAL MANAGEMENT PLAN

The following general guidance for the EMP is based on the findings of the initial EIA and risk assessment carried out by SLR Environmental Consulting (Petrick & Christians, 2013).

3.1 IDENTIFIED IMPACTS

The following is the summary of the identified impacts:

- Air quality impacts as a result of dust from vehicles and drilling activities.
- Environmental and biodiversity impacts.
- Soil, surface and groundwater impacts.
- Land use impacts
- Noise impacts.
- Socio-economic impacts / contributions
- Waste generation

3.2 MITIGATING MEASURES

The following provides a summary of key responsibilities to ensure compliance with the EMP and aid in mitigating / preventing possible risks related to the project and related activities. The measures provided have taken into consideration all the risk perceptions raised by all stakeholders during the initial EIA:

- Regular performance auditing, including bi-annual monitoring reports, to ensure compliance with EMP and legal requirements (permits, contractual agreements, ECC requirements, etc.)
- Induction should be provided to all new employees and contractors, which include environmental awareness and EMP requirements.
- Responsibilities and specific target dates should be set for all EMP requirements. This should be reflected through design requirements, tender documents, contracts and an EMS.
- Implement security measures at exploration sites to ensure compliance by contactors and employees on site.
- Ensure appropriate ablution facilities and sanitary requirements, which adheres to relevant health regulations, are available to exploration teams.
- All hazardous substances should be handled and stored according to material safety data sheet requirements and in a way that prevents contamination of the environment.
- Vehicles and machinery should be regularly inspected and maintained to mitigate noise impacts and risk of soil, surface water and groundwater contamination.
- Measures should be in place to identify excessive dust, noise and biodiversity losses and ensure mitigation measures are implemented where required.
- A waste management strategy should be developed and implemented, with waste management requirements included in site-access contracts.
- Traffic control measures and road maintenance should be implemented if and where impacts are expected.
- Surface runoff management should be implemented at the sites to ensure erosion is minimised and water resources are protected.
- All relevant personal protective equipment should be a compulsory requirement.
- Fire prevention and firefighting plans must be in place.

4 IMPLEMENTATION OF THE EMP

Table 1 and Table 2 outline the environmental elements that may be affected by the different activities, grouped in each phase of development, and provides management actions to minimise negative impacts and enhance positive impacts. These groups are as follows:

- Planning Phase
- Construction and Operational Phase
- Decommissioning Phase

The EMP is a living document that must be prepared in detail, and regularly updated, by the proponent as the project progress and evolve. The tables below act as a guideline for the EMP to be established by the proponent. Impacts addressed and mitigation measures proposed are seen as minimum requirements which have to be elaborated on. Delegation of mitigation and reporting activities should be determined by the proponent and included in the EMP.

All monitoring results must be reported on as indicated. These are important for any future renewals of the environmental clearance certificate and must be submitted to the Ministry of Environment, Forestry and Tourism on a bi-annual basis. This is a requirement by the Ministry.

The following responsibilities were set forth in the initial EMP (Petrick & Christians, 2013) for the various parties involved and remains valid to ensure effective implementation of the EMP.

4.1 HEAD OF EXPLORATION

The head of exploration has the overarching responsibility to ensure effective implementation of the EMP for all exploration related activities, and to ensure that all parties involved with the project is aware of and adhere to the requirements of the EMP. The head of exploration is further responsible for the management of all environmental related aspect of the activities, and to ensure appropriate monitoring measures are in place. It is the responsibility of the respective site supervisors / senior geologists to assist the head of exploration to ensure that environmental issues are addressed and EMP requirements are adhered to at each specific site.

4.2 CONTRACTORS

Adherence to EMP requirements and commitments should from part of contractual agreement between the contractors and proponent. Daily site inspections will be conducted by supervisors to ensure compliance with EMP requirements, and non-compliances will be reported on with remedial actions implemented.

A formal audit should be conducted by the proponent on a monthly basis to ensure compliance with EMP requirements, and corrective measures should be implemented for any non-compliance.

Table 1. Planning for Operations

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
Compliance	To comply with all legal requirements for the project in Namibia.	Apply for the necessary permits from the various ministries, local authorities and any other bodies that governs the proposed activity. Consult with landowners and have contracts in place stipulating access agreements, proposed activities and rehabilitation requirements. Finalise negotiations and resolve any outstanding issues, if any, with land owners regarding site access and exploration activities.	Prior to commencement and during the course of operations	All contracts, permits, certificates and other legal documents on file.	Proponent
Appointments	To appoint reputable contractors and operational personnel and establish the EMP, a legal requirement that forms part of the contract with the contractor and employees.	Appoint contractors and employees and enter into an agreement which includes the EMP. Ensure that the contents of the EMP are understood by the contractor, sub-contractors, employees and all personnel who will be present on site.	Prior to commencement and during the course of operations	Contracts on file	Proponent; Contractor
Management	Establish a management system to implement and monitor health, safety and environment (HSE).	Make provisions to have a health, safety and environmental coordinator to implement the EMP and oversee occupational health and safety as well as general environmental related compliance during operations. Have the following emergency plans, equipment and personnel in place to deal with all emergencies: EMP, risk management plans, emergency response plans and HSE manuals Adequate protection and indemnity insurance cover for incidents;	Prior to commencement and during the course of operations	Documentation on file Personal protective equipment (PPE) available Signage related to restricted areas, dangerous areas, and PPE requirements on site Emergency response material on site	Proponent; Contractor

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
		Comply with the provisions of all relevant safety standards; Procedures, equipment and materials required for emergencies.			
Restoration Fund/Insurance	To establish a fund/insurance for future environmental restoration or pollution remediation if ever required.	Establish a fund for ecological restoration should environmental damage result from project activities or exploration activities are ceased.	Prior to commencement and during the course of operations	Financial statements of restoration fund/proof of insurance	Proponent; Independent Specialist Consultant
Reporting	To establish a reporting system to report on monitoring and compliance aspects of operations as outlined in the EMP.	Establish a reporting system to report on aspects operations as outlined in the environmental management plan. Keep monitoring reports on file for bi-annual submission to the Ministry of Environment, Forestry and Tourism in support of ECC renewal applications. This is a requirement by the Ministry.	During operations	Bi-annual monitoring reports	Proponent; Contractor
Environmental Clearance Renewal	To renew the ECC every three years.	Submit bi-annual reports to the MEFT to allow for environmental clearance certificate renewal after three years. This is a requirement by MEFT Appoint a specialist environmental consultant to update the environmental impact assessment (if required) and EMP and apply for renewal of the ECC.	Bi-annual summary report. Prior to expiry of ECC.	Renewed ECC	Proponent; Independent Specialist Consultant

Table 2. The Construction and Operational Phase (geophysics, drill site establishment and drilling activities, shallow depth trenching)

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Skills, technology and development	People need skills to perform their jobs. The technology to do something is often not found locally. Exploration activities will lead to increased knowledge of the geological aspect of the area and may lead to future development, which may result in significant social and economic input to the region and Namibia. Development of people and technology are key to economic development.	The proponent must employ local Namibians where possible. If the skills exist locally, employees must first be sourced from the town, then the region and then nationally. Deviations from this practice must be justified.	Copies of training certification or managerial references on file. Bi-annual summary report based on actual training and the enhancement of skills and transfer of technology should be compiled.	Proponent
Socio-economic	Exploration activities will require exploration teams to access and conduct operations on various farms. This may inconvenience landowners. Impacts include increased risk of criminal activities, possible impacts on biodiversity and farm animals, aesthetic impacts and a negative economic effect on professional hunting activities. The project relies on labour for exploration activities. Exposure to factors such as communicable disease like HIV/AIDS as well as alcoholism/drug abuse possibly associated with foreign employees on the farms may impact the local community.	Adhere to agreements made in site-access contracts. Appoint a designated person for liaison purposes between landowners and exploration teams / proponent and provide the contact details to all affected landowners. Continually consult with landowners regarding site access and exploration progress and activities on site. Maintain a site access log and ensure gates remain closed at all time or as per agreements with landowners. Ensure appropriate ablution facilities and sanitary requirements are available to exploration teams. Restricted employment for local people only should be practiced. Deviations from this practice should be justified appropriately. Educational programs on HIV/AIDs should be provided to employees.	Site access logs available on file. Bi-annual reports on any complaints received and remedial actions implemented / breach of contract Bi-annual summary report based on educational programmes and training conducted. Bi-annual report and review of employee demographics.	Proponent
Land use impacts	Exploration activities will require the setup of temporary exploration sites and access routes, this will require land clearing which may negatively impact on the future farming and professional hunting activities.	The footprint area of exploration sites and access routes should be limited to as small as practically possible. Compacted areas should be ripped to encourage the regrowth of vegetation. Agreements should be made and form part of site-access	Contractual agreements with land owners available on file and proof of adherence to requirements. Bi-annual report of any complaints received related	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	Shallow trenching may further impact on land use.	contracts regarding land use impacts and compensation for any possible loss in revenue.	to land use impacts and remedial actions implemented.	
Employment	The project will provide employment and possibly result in many indirect employment opportunities.	If skills exist locally Namibians must be employed. Alternatively training must be provided to Namibians to ultimately employ a predominantly Namibian workforce. Deviations from this practice should be justified appropriately.	Bi-annual summary report based on employee records.	Proponent
Traffic	Increased traffic to exploration sites and use of heavy machinery may result in accidents and increased deterioration of roads.	Adhere to all local, regional and national regulations pertaining to road usage. Prior agreements should be made with landowners and adhered to relating to road maintenance, especially where heavy vehicles will be required to access the site, such as during shallow depth trenching and bulk sampling.	Any complaints received regarding traffic issues should be recorded and remedial action implemented. A bi-annual report should be compiled of all incidents reported, complaints received, remedial action taken and cargo transported.	Proponent / contractor
Fire	The risk of uncontrolled veld fires exist as a result of exploration teams and activities at sites.	No open fires may be permitted at the sites. Firefighting measures should be available at all exploration sited during operations. Vehicles should be regularly maintained and diesel powered vehicle should be used at exploration sites as far as practical.	A bi-annual report should be compiled of all incidents reported. The report should contain dates firefighting equipment available and when firefighting equipment was tested.	Proponent / contractor
Health, Safety and Security	Risks include work related injuries or exposures to harmful products, theft and sabotage.	Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool. Comply with all health and safety standards as specified in the Labour Act and related legislation. Clearly label dangerous and restricted areas as well as dangerous equipment and products. Lock away or store all equipment and goods in a manner	A bi-annual report should be compiled of all incidents reported. The report should contain dates when training was conducted and when safety equipment were inspected and maintained.	Proponent / contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		suitable to discourage criminal activities (e.g. theft). Provide all employees with required and adequate personal protective equipment (PPE) where required. Fence off trenching / erect appropriate warning signage during operations to prevent accidents. Ensure that all personnel receive adequate training on the operational procedures and the handling of hazardous substances. Train selected personnel in first aid and ensure first aid kits are available. The contact details of all emergency services must be readily available. Treat all minor work related injuries immediately and obtain professional medical treatment if required. Assess any health and safety problems and implement corrective action to prevent future occurrences.		
Noise	Noise will be produced during drill site establishment (developing access routes, site clearing etc.), drilling activities and as a result of vehicles travelling to and from the site. The may result in nuisance to nearby residents (farm houses) and possible hearing loss for on-site employees. Noise impacts will however be temporary.	Follow World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment. The nuisance created by audible warning signals on trucks and vehicles at night can be prevented by switching to a flashing light or 'broadband white noise' system instead of the normal audible warning signals. During daytime the audible warnings may be used. All trucks and machinery must be regularly serviced to ensure minimal noise production. Where noise impacts are expected on nearby residents, drilling / trenching activities should only be conducted during daytime. A speed limit of 30 km/h should be maintained when travelling near houses or settlements on farms.	Any complaints received regarding excessive noise should be recorded with notes on remedial action taken. All complaints, remedial action taken and additional data, if available, to be compiled in a bi-annual report.	Proponent / contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Waste Production	Waste is produced during the various phases of the project. This may include "green waste" (leaves, branches etc.) generated during land clearing, general / domestic waste produced during operations and possible hazardous waste (contaminated materials, including soils and water). Waste presents a contamination risk and when not removed regularly may become a fire hazard.	Waste management should from part of the site-access contracts, this should include a waste management procedure. Appropriate on-site waste receptacles should be available for various waste streams, and should be clearly marked. On site waste storage facilities should be designed in a way to prevent scavenging by animals and waste being blown away by wind. Waste should be disposed of regularly and at appropriate disposal facilities as per agreements made with landowners. Products that can be re-used or re-cycled should be kept separate and treated as such. Any hazardous / contaminated materials should be disposed of according to Material Data Safety Sheet requirements. The spill catchment traps / drip trays should be cleaned regularly and contaminated waste disposed of as hazardous waste. Employees and contractors should coached on the importance of proper waste management.	A register of hazardous waste disposal should be kept. This should include type of waste, volume as well as disposal method/facility. Any complaints received regarding waste should be recorded with notes on action taken. All data to be compiled in a bi-annual report.	Proponent / contractor
Groundwater, Surface Water and Soil Contamination	Risk of groundwater, surface water and soil contamination exists as a result of the storage and handling of hazardous substances (hydrocarbons) at the sites. Breakdowns and leakages from vehicles and machinery may also pose a contamination risk.	All hazardous substances should be store in bunded areas with a capacity of 110 % the stored volume. Refuelling and any maintenance of vehicles and machinery should be conducted on impermeable surfaces with the use of drip trays where required. Contamination of groundwater, surface water and soil should be prevented through proper infrastructure design and maintenance requirements. Spill containment and clean-up kits should be readily available at the sites and employees and contractors should be educated on the proper use of the kits.	A report should be compiled every 6 months of all spills or leakages reported. The report should contain the following information: ♦ date and duration of spill ♦ product spilled ♦ volume of spill ♦ remedial action taken ♦ copy of documentation in which spill was reported	Proponent / contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		If spills occur clean-up should be initiated immediately. Use of reputable and well trained contractors are essential. Use of spill control measures where appropriate (e.g. plastic sheeting) Regular inspection and maintenance of all equipment. Where possible, boreholes should be drilled using water from the source, drilling water should be contained in a sump to settle and allow for collection of oils and silt. Non-toxic biodegradable drilling oils should be used to prevent groundwater degradation.		
Ecological / Biodiversity Impact	Establishment of drill sites will require the development of access routes and site clearing. This may require stripping of vegetation and topsoil, storage of topsoil and setup of various equipment. Further risks to the biodiversity of the area is related to illegal poaching activities and pollution of the environment.	The entering of chemicals into the environment must be prevented at all costs. Adhere to requirement stipulated in the site-access contracts. Established laydown and operational areas should be set out at all sites, the footprint of these areas should be as small as possible, and all activities should be contained within this area. Topsoil of laydown areas (20 m x 20 m) should be stripped and stockpiled for rehabilitation purposes. Where possible, removal of trees, especially protected species and large trees, must be avoided. The necessary permits from the Directorate of Forestry, Ministry of Agriculture, Water and Forestry, must be obtained for removal of all protected species. Educate all contractors and employees on the value of biodiversity. Zero tolerance conditions prohibiting harvesting and poaching of fauna and flora should be part of employment contracts. This includes prohibitions or regulations on the collection of firewood	A record should be kept of any extraordinary fauna sightings or encounters on site. All data to be compiled in a bi-annual report.	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		Report any extraordinary animal sightings to the Ministry of Environment, Forestry and Tourism. The establishment of habitats and nesting sites at the sites should be avoided where possible. Mitigation measures related to fire prevention, waste handling and the prevention of groundwater, surface water and soil contamination should limit ecosystem and biodiversity impacts. Speed limits should be adhered to, to prevent noise impacts on animals and possible accidents involving animals. Exploration trenches / pits should be fenced off or sloped to prevent animals from falling in, based on agreements reached with landowners. Use of reputable contractors is essential.		
Dust/Air Quality	Vehicles travelling on gravel roads, site clearing activities as well as drilling and trenching activities may result in increased dust levels. Emissions from machinery and vehicles will be minimal.	Speed limits on access route and farm routes should be limited to 40 km/h and 30 km/h near homes and settlements and on site. Vehicles and machinery should be regularly maintained to reduce emissions. Where dust impacts are expected on farm residents near community roads, dust suppression methods should be implemented. Where dust impacts are expected on nearby residents, as a result of drilling and trenching activities, dust suppression should be implemented. This includes the use of water sprays on stockpiles, around laydown areas and at excavation activities.	A bi-annual report should be compiled of all complaints reported and actions taken.	Proponent
Heritage, Archaeological and Paleontological Resources	Establishing of exploration sites and drilling and trenching activities may result in the accidental damage to heritage, palaeontological or archeologically significant sites.	All contractors and employees to be made aware of chance-find-procedures during the discovery of any related resources. If such a site or any other archaeologically important artefact is found during the operational phase any work in	Record kept of all, if any, known cultural or archaeological. Record of any discoveries and proof of notifications to	Proponent, Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		that area must be halted and the relevant authorities must be informed. Firstly, the Namibian Police must be informed. Secondly, the National Monuments Council dealing with heritage should be informed. A heritage specialist should be appointed to evaluate the find and advise on requirements. Activities at the site may only continue at that location once permission has been granted.	authorities on file. All information and reporting to be included in a bi-annual report.	
Cumulative Impact	Possible cumulative impacts associated with the operational phase include increase in traffic frequenting the area and air quality (dust) impacts. Wear and tear on the roads and increased risks of road traffic incidences could increase. Exploration activities are however temporary, and as a result, the majority of the possible cumulative impacts will be as well.	Addressing each of the individual impacts as discussed and recommended in the environmental management plan would reduce the cumulative impact. Reviewing biannual and annual reports for any new or re-occurring impacts or problems would aid in identifying cumulative impacts and help in planning if the existing mitigations are insufficient..	**Bi-annual** summary report based on all other impacts must be created to give an overall assessment of the impact of the construction and operational phase.	Proponent

Table 3. The Decommissioning Phase

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Land use / ecological impacts	All infrastructure at exploration sites will be removed leaving behind barren sites where activities took place and access routes were constructed. This may negatively impact on the future farming and professional hunting activities. Barren areas may further result in excessive erosion, reducing land use capacity. Shallow trenching may further impact on land use and pose safety risks.	All infrastructure should be removed from the site, including drill core trays, water bowsers, stores, etc. Compacted areas should be ripped and topsoil replaced where stripped to encourage the regrowth of vegetation. Drilling sump should be dried out and backfilled (with a dome) to compensate for the depression from compaction. Boreholes should be marked and plugged, based on agreements with land owners. Agreements should be made and form part of site-access contracts regarding land use impacts and compensation for any possible loss in revenue. Exploration trenches should be backfilled / sloped based on agreements made with land owners. Implement a monitoring program to monitor the re-establishment of natural vegetation at exploration sites, and eradicate alien or invasive species. Consult with stakeholders and land owners regarding the decommissioning activities and the termination of site-access contracts.	Contractual agreements with land owners available on file and proof of adherence to requirements. Bi-annual report of any complaints received related to land use impacts and remedial actions implemented.	Proponent
Health, Safety and Security	Risks include work related injuries or exposures to harmful products, theft and sabotage.	Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool. Comply with all health and safety standards as specified in the Labour Act and related legislation. Clearly label dangerous and restricted areas as well as dangerous equipment and products. Lock away or store all equipment and goods in a manner suitable to discourage criminal activities (e.g. theft). Provide all employees with required and adequate	A bi-annual report should be compiled of all incidents reported. The report should contain dates when training was conducted and when safety equipment were inspected and maintained.	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		personal protective equipment (PPE) where required. Maintain fences and warning signage at trenches until the trenches are rehabilitated. Ensure that all personnel receive adequate training on the operational procedures and the handling of hazardous substances. Train selected personnel in first aid and ensure first aid kits are available. The contact details of all emergency services must be readily available. Treat all minor work related injuries immediately and obtain professional medical treatment if required. Assess any health and safety problems and implement corrective action to prevent future occurrences.		
Noise	Noise will be produced during the decommissioning and rehabilitation of exploration sites. This will mostly be related to vehicle travelling along access routes. This may result in nuisance to nearby residents (farm houses, settlements) and possible hearing loss for on-site employees. Noise impacts will however be temporary.	Follow World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment. All trucks and machinery must be regularly serviced to ensure minimal noise production. A speed limit of 30 km/h should be maintained when travelling near houses or settlements on farms.	Any complaints received regarding excessive noise should be recorded with notes on remedial action taken. All complaints, remedial action taken and additional data, if available, to be compiled in a bi-annual report.	Proponent
Waste Production	Waste is produced during the decommissioning phase of the project. This may include biological waste from the ablution facilities, general / domestic waste produced during operations and possible hazardous waste (contaminated materials, including soils and water). Waste presents a contamination risk and fire	All ablution facilities should be safely removed, and biological waste should be disposed of at a registered disposal facility. All waste generated during operations, including contaminated soils (hazardous waste) should be removed from the site and disposed of at and appropriately registered facility. No waste may be dumped at the site or surrounding areas.	A register of hazardous waste disposal should be kept. This should include type of waste, volume as well as disposal method/facility. Any complaints received regarding waste should be recorded with notes on	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	hazard if not completely removed.	Drip trays should be emptied and contaminated water, oils and silt stored in an appropriate manner until disposed as hazardous waste. Decommissioning of sites should from part of the site-access contracts, this should include a waste management procedure and closure inspection Products that can be re-used or re-cycled should be kept separate and treated as such. Employees and contractors should be coached on the importance of proper waste management.	action taken. All data to be compiled in a bi-annual report.	
Groundwater, Surface Water and Soil Contamination	Risk of groundwater, surface water and soil contamination exists as a result of the storage and handling of hazardous substances (hydrocarbons) at the sites. Breakdowns and leakages from vehicles and machinery may also pose a contamination risk.	All hazardous substances should be store in bunded areas with a capacity of 110 % the stored volume. Refuelling and any maintenance of vehicles and machinery should be conducted on impermeable surfaces with the use of drip trays where required. Contamination of groundwater, surface water and soil should be prevented through proper infrastructure design and maintenance requirements. Spill containment and clean-up kits should be readily available at the sites and employees and contractors should be educated on the proper use of the kits. If spills occur clean-up should be initiated immediately. Use of reputable and well trained contractors are essential. Use of spill control measures where appropriate (e.g. plastic sheeting) Regular inspection and maintenance of all equipment. Once all infrastructure is removed from the site, a visual assessment should be conducted to identify any contamination at the site and remedial actions implemented.	A report should be compiled every 6 months of all spills or leakages reported. The report should contain the following information: ♦ date and duration of spill ♦ product spilled ♦ volume of spill ♦ remedial action taken ♦ copy of documentation in which spill was reported	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Ecological / Biodiversity Impact	Decommissioning will require the removal of all infrastructure at exploration sites, where nesting / habitats may have formed. Further risks to the biodiversity of the area is related to illegal poaching activities and pollution of the environment.	The entering of chemicals into the environment must be prevented at all costs. Adhere to requirement stipulated in the site-access contracts. All decommissioning activities should be contained within the established site areas and access routes. Educate all contracted and permanent employees on the value of biodiversity. Zero tolerance conditions prohibiting harvesting and poaching of fauna and flora should be part of employment contracts. This includes prohibitions or regulations on the collection of firewood Report any extraordinary animal sightings to the Ministry of Environment, Forestry and Tourism. Where habitats or nesting sites has established, which may require removal, the Ministry of Environment, Forestry and Tourism should be consulted on procedures to be followed. Mitigation measures related to fire prevention, waste handling and the prevention of groundwater, surface water and soil contamination should limit ecosystem and biodiversity impacts. Speed limits should be adhered to, to prevent noise impacts on animals and possible accidents involving animals. Exploration trenches / pits should be fenced off or sloped to prevent animals from falling in, based on agreements reached with landowners. Use of reputable contractors is essential.	A record should be kept of any extraordinary fauna sightings or encounters on site. All data to be compiled in a bi-annual report.	Proponent
Dust/Air Quality	Vehicles travelling on gravel roads, as well as site decommissioning activities such as ripping and topsoil replacement may result increased dust levels. Emissions from machinery and vehicles	Speed limits on access route and farm routes should be limited to 40 km/h and 30 km/h near homes and settlements and on site. Vehicles and machinery should be regularly maintained to	A bi-annual report should be compiled of all complaints reported and actions taken.	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	will be minimal.	reduce emissions. Where dust impacts are expected on farm residents near community roads dust suppression methods should be implemented. Where dust impacts are expected on nearby residents as a result of decommissioning activities, dust suppression should be implemented. This includes the use of water sprays on stockpiles, around laydown areas and at ripping, backfilling and topsoil activities.		

5 CONCLUSIONS

The above EMP, if properly implemented will continue to help minimise adverse impacts on the environment. Where impacts occur, immediate action must be taken to reduce the escalation of effects associated with these impacts. To ensure the relevance of this document to the specific stage of project, it needs to be reviewed throughout all phases.

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

Monitoring reports must be submitted to the Ministry of Environment, Forestry and Tourism every six months to allow for the future renewal of the ECC.

6 REFERENCES

Petrick W, Christians R. 2013. Scoping Report for Jindal's Exploration Activities on EPLs 4525, 4513, 4194 and 4013, Project No.: 734.10005.00001.

Petrick W, Christians R. 2013. Environmental Management Plan for Jindal's Exploration Activities on EPLs 4525, 4513, 4013 and 4194 Project No.: 734.10005.00001