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Environmental & Social Impact Assessment: The Proposed Mineral Exploration Activities on EPL 7297, Trekopje, Erongo Region -Namibia

Environmental and Social Management Plan (ESMP)

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TERMS	DEFINITION
BID	Background Information Document
DR	District Road
EAP	Environmental Assessment Practitioners
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA (R)	Environmental Impact Assessment (Report)
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EPL	Exclusive Prospecting license
GHGs	Greenhouse Gasses
HAIA	Heritage and Archaeological impact Assessment
ISO	International Organization for Standardization
I&Aps	Interested and Affected Parties
MEFT: DEAF	Ministry of Environment, Forestry and Tourism's Directorate of Environmental Affairs and Forestry
NHC	National Heritage Council
NEMA	Namibia Environmental Management Act
RA	Roads Authority
ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change
TERMS	**DEFINITION**
BID	Background Information Document
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MAWF	Ministry of Agriculture Water and Forestry
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RA	Roads Authority
ToR	Terms of Reference

UNFCCC	United Nations Framework Convention on Climate Change

DEFINITION OF TERMS

The **'Consultant'** – this refers to the team that is conducting the ESIA and the preparation of the EMP for the development

The **'Proponent** – this refers to the institutions/departments that are directly involved in the implementation of the project, i.e. MAWF.

The **'Stakeholders'** – this refers to the people, organisations, NGOs that are directly or indirectly affected and interested by the project.

The **'Environment'** – this refers to the ecology, economy, society and politics.

1. CHAPTER ONE: BACKGROUND

1.1. Overview

The proponent, **Aron Lungameni Haludilu** has identified the economic potential of mineral deposits found in the Erongo Region. The proponent is a holder of a licence to explore a land area of 3145 hectares (ha). The area covered by the Exclusive Prospecting Licence (EPL 7297), falls within state land. Namibia Uranium (NU) (PTY) LTD currently holds access to the mineral rights on EPL 7297, In this respect, NU and the proponent plans to undertake mineral exploration activities, primarily targeting uranium ore deposits.

As per the requirements of the Namibian environmental legislation (Environmental Management Act (No. 7 of 2007 and the Environmental Impact Assessment Regulations of 2012), an EIA is required to obtain an Environmental Clearance Certificate from the Ministry of Environment and Tourism (MET) before the project can proceed. This is because under the 2012 Environmental Impact Assessment (EIA) Regulations of the Environmental Management Act (EMA) No. 7 of 2007, mineral exploration is a listed activity that may not be undertaken without an Environmental Clearance Certificate (ECC). This activity is listed under the following relevant sections:

Table 1: Listed Activities -Environmental Management Act No. of 2007

ACTIVITY	RELEVANT SECTIONS
MINING AND QUARRYING ACTIVITIES	- 3.1 The Exploration of facilities for any process or activities which requires a licence, right or other form of authorisation, and the renewal of a licence, right or other form of authorisation, in terms of the Minerals (Prospecting and Mining Act), 1992. -3.2 Other forms of mining or extraction of any natural resources whether regulated by law or not. -3.3 Resource extraction, manipulation, conservation and related activities.

1.2. The Environmental Consultant

Namibia Uranium has appointed EnviroPlan Consulting cc as the appointed Environmental Consultant to conduct an Environmental Impact Assessment (EIA) and develop an Environmental Management Plan (EMP) for the undertaking of mineral exploration activities and to apply for an Environmental Clearance Certificate with the Directorate of Environmental Affairs.

1.3. Project Location

EPL 7297 block is located in western Namibia, Erongo Region Swakopmund-Arandis, Erongo mining district (Fig 1).

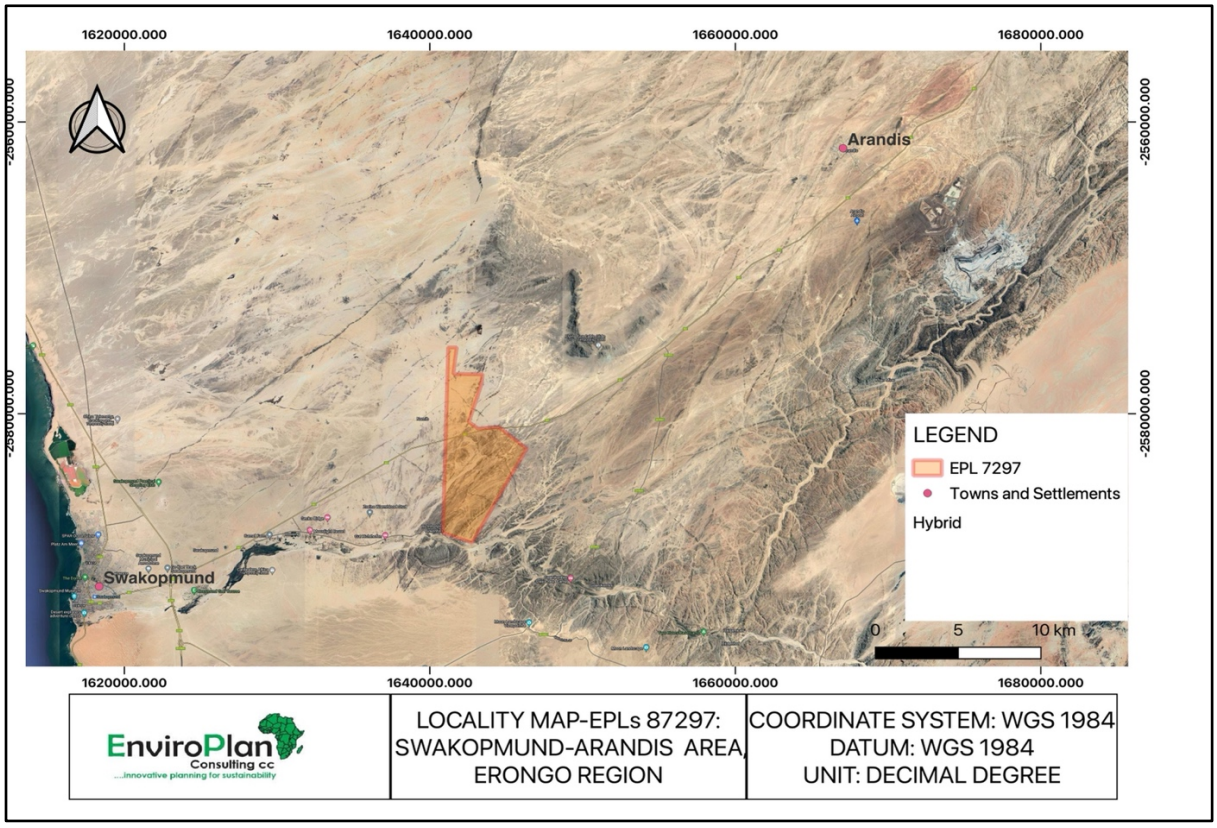

Figure 1: EPL 7297 Locality.

1.4. Scope of Work

This scoping study was carried out in accordance with the Environmental Management Act (EMA) (7 of 2007) and its 2012 EIA Regulations (GG No. 4878 GN No. 30).

This Environmental and Social Management plan (ESMP) was developed as a working document for the proponent ensure that there is environmental conservation, social acceptance and sustainability in their operation. The ESMP only covers mineral exploration, should the project be feasible for mining, a detailed ESIA should be commissioned.

1.5. PROJECT DESCRIPTION

Explorations comprise various phases. For this EIA, the phase-based activities were categorized to enable impact assessment and analysis. The different project sections are as follows:

1.5.1. Exploration Phase (Site Preparation)

Access agreements will guide the working relationship between landowners and exploration team. The exploration team will undertake initial site visits to identify appropriate sites for the establishment of field camps. The field camps are for the safe keep of exploration equipment and vehicles before use.

No employees will be housed in the EPLs. Site preparation activities will begin once surface drainage and ground water conditions are understood by. Exploration will only commence after ecological sensitive areas are known and agreed jointly with landowners.

Land clearing: Small land parcels will be cleared for the establishment of base or field camps and staging areas. Proponent shall ensure that areas identified are those that present minimal disturbance to the natural environment and wildlife.

Creation of access routes and haul tracks: Apart from the existing farm roads network leading to target areas, additional tracks (extensions from farm roads) may be created. Additional roadways may be considered for the purposes of accessing target sites. Where deemed necessary, graveling, and compaction of vehicle track's surfaces may be considered to allow for less track maintenance and seam less flow of traffic. No roads of bitumen standard exist in the EPL area. No permanent structures will be built for exploration works.

Fencing: Where deemed feasible, fences will be erected around field camps and target areas. Fencing will serve to keep out livestock from target sites

1.5.2. Operational Phase

The phase typifies an advance level of exploration. Sampling will serve to validate prior exploration results of the mineral deposits. The appropriateness of bulk sample will be related to the deposit morphology. neral exploration drilling methods – auger, air-core and diamond core drilling.

Drilling is used to obtain detailed information about rock types, mineral content, rock fabric and the relationship between the rock layers close to the surface and at depth. The following exploration methods will be considered:

Air-core drilling is a specialized reverse circulation drilling where a small, annular bit is used to cut a solid core of rock from relatively soft or easily broken material. The bit produces short sections of core which are recovered, along with broken rock chips, up the centre of the drill stem in the manner of a standard reverse circulation rig. The system is often capable of penetrating and coring soft sticky clays with might bind a normal blade bit.

Diamond core drilling uses an annular, diamond-impregnated bit mounted on the end of a rotating string of rods. Interestingly, these diamonds are not useful as jewellery but are used in the drill bits for their hardness and the bit is suitable for the hardest rocks. The rod cuts a solid core which passes up inside the drill rods as the bit advances. The bit is lubricated with water and drilling fluid or water/mud mixture which is pumped to the cutting face down the inside of the rods. It then returns to the surface between the rods and the sides of the hole. At the surface, the return water is collected in a sump where fine suspended ground rock material can settle. n.

***Site Rehabilitation*:** Dug out trenches will be back filled with waste rock (gangue). Stockpiled top soil will be returned to the backfilled areas. Sites will also be PM-vegetated and returned to a pre-exploration state. Boreholes will be sealed and rehabilitation will be done concurrently with exploration (ore removal etc).

***Water requirements**:* Water will be sourced from existing boreholes. About 80,000 litres (80 m^3) per day would be required. This amount of water is aimed at suppressing dust around tipping areas and vehicle tracks. Approximately 200 *liters* of domestic water will be needed per day.

Waste management: Waste material generated will be in the form of rock material (non-mineral) and derived from trenching activities. Insignificant amounts of domestic waste will be generated by the exploration team. Domestic or general waste will be transported out of the EPL area on a daily basis and disposed at an approved land fill site. There are no licenced waste disposal sites in the project area.

Sewage Management: During exploration, sufficient portable chemical toilets will be provided for workers and appropriately emptied according to their manufacturer's operational standards and legislated occupational sanitary provisions. Licenced waste contractors will provide sewage removal services.

Exploration equipment, Materials and Services:

Exploration equipment will be sourced from contractors proximate to the project site. Were deemed essential, equipment will need to be sourced from elsewhere in the country and/or abroad as per the required and approved operating standards.

Labour sourcing: Temporary employment opportunities will be created during the duration of exploration activities.

Housing: Personnel will be accommodated at an identified exploration camp area. Before use of a camp, an environmental risk assessment will be conducted and submitted together with the biannual report of the exploration activities.

1.5.3. Decommissioning/Closure Phase

This phase will involve the removal of equipment and dismantling of facilities and safe closure. All trenches will be backfilled. The surface affected by exploration will be rehabilitated and PM-vegetated in accordance with applicable standards

1.5.4. Environmentally sensitive areas identified

The proposed exploration activities are not in any sensitive protected areas such as community forests, conservancies, and areas with memorial sites. A Specialist Heritage and Archaeological impact Assessment was commissioned for the project area.

2. CHAPTER TWO: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1. Introduction

An important part of the ESMP is identifying and reviewing the administrative, policy and legislative situation concerning the proposed activity, to inform the proponent about the requirements to be fulfilled in the project development and implementation. This section looks at the legislative framework within which the proposed project will operate under. The focus is on compliance with the legislation during the planning, Exploration and operational phases. All relevant legislation, policies and international statutes applying to the project are highlighted in Table 2 below as specified in the Environmental Management Act, 2007 (Act No.7 of 2007) and the regulations for Environmental Impact Assessment as set out in the Schedule of Government Notice No. 30 (2012).

The pursuit of sustainability by an Organisation is operationalised by a sound policy and legislative framework that gives operating parameters within its sphere of operation. In this section, relevant legal instruments, as well as their relevant provisions, are identified and analysed on their relevance to the proposed project. A concise explanation is given of the applicability of each of the identified pieces of legislation as well as how the Roads Authority is supposed to implement environmental compliance to the project.

Table 2:Policies, legal and administrative regulations

Aspect	Legislation
The Constitution	Namibian Constitution First Amendment Act 34 of 1998
Archaeology	National Heritage Act 27 of 2004
	National Monuments Act of Namibia (No. 28 of 1969) as amended until 1979
Environmental	Environmental Management Act 7 of 2007
	EIA Regulations GN 57/2007 (GG 3812)
	National Solid Waste Management Strategy
	Pollution and Waste Management Bill (draft)
	National Waste Management Policy
	Soil Conservation Act 76 of 1969
	Hazardous Substance Ordinance (No. 15 of 1973)
	Atmospheric Pollution Prevention Ordinance, 1976
	National Policy on Climate Change for Namibia, 2010
	National Biodiversity Strategy and Action Plan (NBSAP2)
Forestry	Forest Act 12 of 2001
Water	Water Act 54 of 1956
	Water Resources Management Act, 2013 (Act No. 11 of 2013)
Health and Safety	Labour Act (No 11 of 2007) in conjunction with Regulation 156, 'Regulations Relating to the Health and Safety of Employees at work'.
	Public Health and Environmental Act, 2015
Services and Infrastructure	Road Ordinance 1972 (Ordinance 17 0f 1972)
Mining	Mineral Policy of Namibia Minerals (Prospecting and Mining) Act 33 of 1992

3. CHAPTER THREE: ENVIRONMENTAL MANAGEMENT PLAN (EMP)

3.1. EMP Organisation, Responsibility And Authority

This section describes the key functionaries in the planning, implementation and monitoring of the EMP. Copies of this EMP shall be kept at the site office and will be distributed to all senior contract personnel. All senior personnel shall be required to familiarise themselves with the contents of this document.

The implementation of this EMP requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during each phase.

3.1.1. Site instruction entries

The Site Instruction Book entries will be used for the recording of general site instructions as they relate to the works on site and EMP measures. It will also be used for the issuing of stop-work orders issued by the ECO for the purposes of immediately halting any particular activities of the Contractor in lieu of the environmental risk that they may pose.

3.1.2. ECO diary entries

The purpose of these entries will be to record the comments of the ECO as they relate to activities on the site including infringements, possible changes to the EMP or work stop orders.

3.1.3. Method statements

Method statements from the Contractor will be required for specific sensitive actions on request of the authorities or ESM. A method statement forms the baseline information on which sensitive area work takes place and is thus considered a “live document” in that modifications can be negotiated between the Contractor and EC if or as required. The Contractor (and, where relevant, any subcontractors) must also sign the Method Statement, thereby indicating that the works will be carried out according to the approved methodology. Changes in the methodology must be reflected by amendments to the original approved Method Statement. Amendments must be signed by both the EC and PM, denoting that the change is environmentally acceptable. The Contractor must also sign the amended Method Statement.

All method statements will form part of the EMP documentation and are subject to all terms and conditions contained within the EMP main document. The Method Statement shall cover applicable details with regard to:

- Exploration procedures;
- Materials and equipment to be used;
- How and where materials will be stored;
- The containment of accidental leaks or spills;
- Timing and location of activities; and
- Any other information deemed necessary by the ESM.

The Contractor must submit the method statement two weeks before any particular Exploration activity is due to start, especially with respect to impacts on sensitive ecosystems. Work may not commence until the method statement has been accepted by the Geologist and ECO, and clearly communicated to the workforce. The Contractor shall, except in the case of emergency activities, allow 14 days for consideration and approval of the Method Statement. The Geologist and the ECO may require changes to a Method Statement if the proposal does not comply with the specifications or if, in the reasonable opinion of the ECO, the proposal may result in damage to the environment in excess of that permitted by the specifications. Approved Method Statements shall be communicated to all relevant personnel.

All Method Statements listed below, shall be provided by the Contractor before the activity commences:

(i) *Bunding*

Method of bunding for static plant and bulk fuel storage.

(ii) *Camp establishment and fencing*

- *Location and layout of the Contractor's Camp.*
- *Method of installing fences required for working areas and Contractor's Camp.*

(iii) *Drilling*

Location and layout of target exploration areas and camp site areas.

(iv) *Demolition*

Proposed method of demolition, including handling and disposal of materials.

(v) *Dust*

Dust control protocol.

(vi) *Fire and hazardous substances*

- *Handling and storage of hazardous wastes.*
- *Emergency spillage procedures and compounds to be used.*
- *Emergency procedures for accidental fire.*
- *Methods for the disposal of hazardous materials.*

(vii) *Fuels and fuel spills*

- *Methods of refuelling vehicles.*
- *Details of methods for fuel spills and clean-up operations.*

(viii) *Protection of archaeological resources*

Methods for dealing with archaeological resources in the event that any are found.

(ix) *Protection of environmentally sensitive resources (fauna and flora)*

- *Methods for dealing with conservation areas or areas identified as environmentally sensitive requiring protection.*
- *Locality and preparation of onsite nursery to house vegetation relocated from Exploration areas or propagated locally for replanting purposes.*

- *Details of methods dealing with the identification, transportation and transplanting of flora species of conservation value.*
- *Details of methods dealing with the identification, capture and relocation of fauna species of conservation value.*

(x) *Rehabilitation*

Rehabilitation of disturbed areas after exploration is complete.

(xi) *Solid waste management*

Solid waste control and removal of waste from Site.

(xii) *Topsoil handling and stockpiling*

Details on stripping, handling and stockpiling of topsoil.

(xiii) *Wash areas*

Location, layout, preparation and operation of all wash areas.

(xiv) *Storm water management*

Details of how storm water is to be handled on Site.

3.2. Environmental Education

Before any work is commenced on the Site, the entire Contractor's staff including foremen shall attend an environmental education talk, presented by the EC with. The Contractor shall liaise with the EC prior to the commencement date to fix a date and venue for the talk. The Contractor shall ensure that all the employees attend the talk.

Follow-up education talks shall be held for any new employee/s coming onto Site from time to time. The EC shall ensure that all attendees sign an attendance register, and shall provide the ECO with a copy of the attendance register.

3.3. Record Keeping

All records related to the implementation of this management plan (e.g. site instruction book, ECO diary, induction records, method statements) must be kept together in an office where it is safe and can be retrieved easily. All relevant records should be kept for a minimum of two years after Exploration and should at any time be available for scrutiny by any relevant authority or stakeholder.

It is recommended that photographs (fixed-point photographs for better comparisons before/during/after) are taken of the site prior to, during and immediately after Exploration as a visual reference. These photographs should be stored with related documents and other records related to this EMP.

3.4. Environmental Completion Statement

An Environmental Completion Statement will be prepared by the EC for submission to the Department of Environmental Affairs (Ministry of Environment and Tourism) indicating completion of the project

and compliance with the EMP and conditions. This statement will be prepared after the final audit after the rehabilitation phase.

3.5. Roles And Responsibilities

3.5.1. Duties and Powers of the Environmental Consultant (EC)

The Environmental Consultant is ultimately responsible for:

- The environmental and social consultant will be responsible for the periodic monitoring and evaluation of EMP implementation.
- Assisting the Contractor in finding environmentally responsible solutions to problems.
- Monitoring the undertaking by the Contractor of environmental awareness training for all new personnel coming onto site.
- Advising on the removal of person(s) and/or equipment not complying with the specifications via the PM.
- Auditing the implementation of the EMP and EMP compliance on a monthly basis.
- Undertaking a continual review of the EMP and recommending additions and/or changes to the document.
- The management and continuous monitoring of the implementation of the EMP on a daily basis will be the responsibility of the Resident Engineer.

3.5.2. Duties and Powers of the Project Manager

The Geologist is ultimately responsible for:

- The Project Manager (PM) of the proponent will act with restricted powers and responsibilities as delegated by the proponent in writing.
- For this project it is envisioned that the function of the Environmental Control Officer (ECO) will only require part time inputs. The PM may fulfil the function of the ECO thereby taking responsibility of the ECO's duties (see below) on this project.
- Any on-site decisions regarding environmental management are ultimately the responsibility of the PM with consultation with the environmental Consultant. Therefore, the PM must assign the role of ECO to a competent member of its site supervising team. The PM shall assist the ECO where necessary and will have the following responsibilities in terms of the implementation of this EMP:
    - Ensuring that the necessary environmental authorisations and permits have been obtained by the Contractor.
    - Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO where necessary.
    - Ordering the removal of person(s) and/or equipment not complying with the EMP specifications.
    - Issuing fines for transgressions of site rules and penalties for contravention of the EMP.

3.5.3. Duties and Powers of the Environmental Control Officer

The Environmental Control Officer (ECO) will be a competent person determined by the PM and EC to fulfil the role as the Employer's representative to monitor and review the on-site environmental management and implementation of this EMP by the Contractor.

The ECO's duties will include the following:

- Assisting the PM in ensuring that the necessary environmental authorisations and permits have been obtained.
- Maintaining open and direct lines of communication between the PM, Employer, Contractor, and interested and affected parties with regard to environmental matters.
- Facilitating all communication between the local community and the contractor.
- Regular site inspections of all Exploration areas with regard to compliance with the EMP.
- Monitoring and verifying adherence to the EMP by verifying that environmental impacts are kept to a minimum.
- Taking appropriate action if the specifications are not followed.
- Recommending the issuing of fines for transgressions of site rules and penalties for contraventions of the EMP via the PM.

3.5.4. Duties of the Contractor

The contractor shall be responsible for the implementation of the EMP and the action plan, onsite monitoring and evaluation of the EMP through the following;
On the on-set of the project, the contractor through an Environmental Officer shall:

- Develop a Hazard Identification and Risk Assessment report on the on-set of the project to be approved by the environmental Consultant.
- Developing a waste and contractors camp management plan to be approved by the environmental consultant
- Submit a monthly Environmental Performance report to the Environmental Consultant.

In addition, the Contractor shall furthermore ensure that adequate environmental awareness training of senior site personnel takes place and that all Exploration workers receive an induction presentation on the importance and implications of the EMP.

The presentation shall be conducted, as far as is possible, in the employees' language of choice.

As a minimum, training should include:

- Explanation of the importance of complying with the EMP.
- Discussion of the potential environmental impacts of Exploration activities.
- The benefits of improved personal performance.
- Employees' roles and responsibilities, including emergency preparedness.
- Explanation of the specifics of this EMP and its specification (no-go areas, etc.) and of the mitigation measures that must be implemented when carrying out their activities.

- Explanation of the management structure of individuals responsible for matters pertaining to the EMP.
- The contractor shall keep records of all environmental training sessions, including names, dates and the information presented.

The induction programme should be developed and submitted to the PM and environmental consultant for approval.

NB: The Contractor shall clearly describe the overall methodology proposed for the task specific related activities in particular method statements.

All method statements must take environmental requirements into account.

3.6. Financing Of Environmental Control

Financing of the environmental requirements as outlined in this document, apart from the appointment of the ESM and specialists, is the sole responsibility of the Proponent and the exploration contractor.

3.7. Amendments Of The EMP

Any party involved with the project can suggest changes to the EMP via the EC or PM. Such suggestions will be discussed with the Environmental Forum. Approved changes will be minute and drafted into the existing EMP in the form of an appendix or amendments.

3.8. Procedures for non-compliance

The Contractor shall comply with the environmental specifications and requirements on an ongoing basis and any failure on his part to do so will entitle the PM to impose a penalty. This applies to the Environmental Management Plan (EMP).

In the event of non-compliance, the following recommended process shall be followed:

- The PM shall consult the environmental consultant and if agreed, issue a notice of non-compliance to the Contractor, stating the nature and magnitude of the contravention. A copy shall be provided to the ECO.
- The Contractor shall act to correct the non-conformance within 24 hours of receipt of the notice, or within a period that may be specified within the notice.
- The Contractor shall provide the PM with a written statement describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions. A copy shall be provided to the ECO.
- In the case of the Contractor failing to remedy the situation within the predetermined time frame, the PM shall impose a monetary penalty based on the conditions of contract.

- In the case of the Contractor being unable to remedy the situation due to permanent environmental damage already incurred, the PM shall impose a monetary penalty based on the conditions of contract.
- In the case of non-compliance giving rise to physical environmental damage or destruction, the PM shall be entitled to undertake or to cause to be undertaken such remedial works as may be required to make good such damage and to recover from the Contractor the full costs incurred in doing so.
- In the event of a dispute, difference of opinion etc, between any parties in regard to or arising out of interpretation of the conditions of the EMP, disagreement regarding the implementation or method of implementation of conditions of the EMP etc., any party shall be entitled to require that the issue be referred to independent specialists for determination.
- The PM shall at all times have the right to stop work and/or certain activities on site in the case of safety and EMP non-compliance or failure to implement remediation measures.

4. CHAPTER FOUR: ENVIRONMENTAL MANAGEMENT PLAN

4.1. Exploration phase

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
Conflict.	• Communities dissatisfied with the activities • Nuisances caused by the building contractor	• Clear communication between contractor and community and farmers, on the schedule/timeframe for operations and the duration of the Exploration phase. This should be provided for in the form of a Public Consultation Plan (PCP) which should include at least: o One meeting for site-handover and to introduce the local community and farmers to the Contractor o A system for the on-going management of the communication between the Contractor and local community and farmers, which should include: ▪ A means for lodging a complaint concerning Exploration activity ▪ Provision of feedback to the plaintiff from the Contractor stating how the issue is being addressed ▪ Report back on issues raised and how addressed from the Contractor to the PM and client	• Minutes of meetings • Draw up PCP	PM, EC and Contractor

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
		• PM and contractor should present detailed Exploration programme during a meeting with the local community and farm owners.		
		• Ensure that relevant stakeholders are adequately informed throughout Exploration and that there is effective communication with and feedback to the PM and client. • The contractor shall appoint a person from the Exploration team to take responsibility for the implementation of all provisions of this EMP.	Meetings and communication.	PM, EC and Contractor.
	Poaching and trapping	No poaching or trapping will be allowed and is a criminal offence.	PM , EC and Contractor to monitor	Contractor.
Dangerous work area	Existence of dangerous/hazardous work areas	• The work areas must be set out and isolated and demarcated by means of danger tape on a daily basis. The demarcated work area may only contain materials, equipment, and personnel required to execute the work. • Once the work for the day is completed, the demarcated area must be cleaned of any spilled materials and waste products. This must be disposed of in the allocated containers. • If the work area is dangerous or sensitive, the danger tape should stay in place until work is complete or not sensitive anymore.	• Inspections for approval. • Record excavation/backfill schedule in the site instruction records.	PM and Contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
Threats to the health and safety of Exploration workers.	• Insufficient provision of safety equipment • Negligent behaviour	• The contractor must adhere to the regulations pertaining to health and safety, including the provision of protective clothing, failing which the contract may be suspended with immediate effect. • Failure to remedy such lack of provision may result in the immediate cancellation of the contract according to the clauses stipulated in the Specific and General Conditions of Contract. • The contractor should comply with all relevant labour laws as stipulated by the Labour Act. • First aid kits to be readily available in case of injuries	Regular visual inspection and records kept of safety equipment and materials issued.	PM and Contractor.
		Dust protection masks shall be provided to staff members if they complain about dust.	Regular inspections and attendance to work complains.	PM, EC and Contractor.
		Workers in the vicinity of sources of high noise should wear necessary protection gear.	Regular Inspection	PM, EC and Contractor.
		NO person is allowed to smoke close to fuel storage facilities and in portable toilets at the Exploration site since the chemicals used in chemical toilets are highly flammable.	Regular Inspection.	PM, EC and Contractor.
		Workers should not be allowed to make use of the existing neighbourhood facilities. Potable water must be provided to workers to avoid dehydration.	Regular Inspection.	PM, EC and Contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
		Portable toilets should be available at the Exploration site in the following ratio: 2 toilets for every 50 females and one toilet for every 50 males.	Regular Inspection.	PM, EC and Contractor.
	Low productivity and increase health risk of workforce due to high temperatures.	• Provide hats, ample drinking water • Provide regular breaks.	Daily checking of weather forecast.	PM, EC and Contractor.
	Fire incident.	• Foam fire extinguishers must be in close proximity to fuel kept on site • There should be trained personnel to handle this equipment • At least two extinguishers should be placed in the workshop.	Foam fire extinguisher should be available when work commences.	PM, EC and Contractor.
Health and social pathology.	• Increase prostitution and associated social pathologies and health risks • Sex workers are hired from the local communities by the Exploration team.	• Prohibit unauthorized people on site and secure Exploration area, while monitoring entrance and exits. Contract penalties. Workers are not allowed to reside on the Exploration site.	Daily monitoring by contractor. Record visitors in a site-visit book	Contractor
	• Health and safety risks to the workers and public due to uncontrolled access to	Specify health and safety risk avoidance measures.	Daily monitoring by contractor	Contractor

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
	the public during Exploration • Unsafe traffic conditions, the lack of personal protective clothing, etc.			
Alcohol abuse.	Use of alcohol on Exploration site.	At no stage may a Exploration worker be allowed on site under the influence of alcohol.	• Daily monitoring by contractor. • Spot checks.	PM and Contractor
Lack of privacy.	Intrude on neighbouring properties.	Under no circumstance are workers allowed to intrude on neighbouring properties.	Regular monitoring by PM.	PM and Contractor
EXPLORATION AREA				
Disorderly and unwanted settlement in the road reserve	Informal market stalls providing services to Exploration workers	• In consultation with the regional council and traditional authorities, to determine the conditions for of market stalls next to the road and at lay-byes. • No settlement will be allowed.	Set conditions for market stalls Regular inspection of site	Contractor
Eploration site	Visual nuisance of the Exploration activities.	• The boundaries of the exploration area shall be demarcated prior to any work commencing on the site • The exploration area should be clearly marked.	PM and Contractor should agree on demarcation lines.	PM, EC and Contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
	Improper conduct on Exploration site.	• The exploration area should adhere to the following requirements: • Access should be controlled and only workers allowed within the boundaries of the campsite: ○ Records should be kept and all visitors should sign in and sign out of a visitors logbook • The contractor should in no way permit or allow prostitution to take place at the Exploration area.	Regular visual and record inspection by the PM.	PM, EC and Contractor.
Campsite Establishment				
Negative impact on the social and ecological environment.	Establishment of campsite.	• One campsite should be established for all exploration activities • The contractor must negotiate the use of existing facilities before considering entering new terrain. • The contractor must receive approval to use a facility or land in writing. This approval must state the remuneration and conditions of use. • Devise a layout for the site so that internal circulation of workers and vehicles in relation to the various Exploration functions is optimised.	Contractor and PM should agree on a satisfactory area.	Contractor with approval of the Client, EC and PM
	Conduct on campsite.	• No one is allowed to reside on the campsite, save for exploration personnel.	Daily monitoring by contractor.	Contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
		• The campsite may act as a facility for the storage of exploration material, temporary stockpile sites, and fuel installations etc, required by the Contractor or subcontractors and suppliers. • Materials must be stored in a separate closed-off premise that is sufficiently prepared to protect the environment for pollution, such as impermeable floors, closed containers and a security fence.		
	Stockpiling materials on site.	• Stockpile materials such as bricks, sand, and stones in neat piles store sensitive materials such cement, hazardous materials, and consumables separately in a demarcated area on site. • Store only small amounts of materials on site to avoid unsupervised use that may lead to accidents and spills.	• Daily monitoring by contractor. • Regular visual and records inspection by the PM.	PM and Contractor.
		• Stockpiles must be of a safe height of less than 2m high and 45° slope angle. Cement stacks must not be higher than 1.5m. • Protect all fluids containers from low temperatures to avoid leaks and pollution.	Regular visual and records inspection by the PM.	PM and Contractor.
BIOPHYSICAL ENVIRONMENT				
Drainage issues.	Surface run-off.	Surface protection work is recommended on the river bed.	Daily inspection of the surface protection work.	EC, Contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
Soil pollution	Garbage, cement, concrete, sewage, chemicals, fuels, oils or any other objectionable or undesirable material.	• Hazardous waste should be disposed of in the prescribed manner in order to prevent contamination of soils (see waste management heading). • In case of accidental spills, the contaminated soil must be suitably disposed of in a container for hazardous waste.	Daily monitoring and regular visual inspection by contractor.	EC, Contractor
	Soil pollution by fuel leaks	If fuel is stored at the Exploration camp, fuel tanks must be properly bunded. The volume of the bunded area must be sufficient to hold 1.5 times the capacity of the storage tanks. The floor of the bunded area must be impermeable and the sides high enough to achieve the 1.5 times holding capacity.	Daily monitoring by Contractor and regular visual inspection by PM	EC, Contractor
		Drip trays should be available for all equipment that is intended to be used during Exploration. These trays should be placed underneath each vehicle while the vehicles are parked. The drip trays should be cleaned every morning and the spillage handled as hazardous waste.	Daily monitoring and regular visual inspection by contractor.	EC, Contractor
	Soil pollution by cement mixed on the ground.	Under no circumstances should cement be mixed on open soil. A designated metal container should be made available for this purpose.	Daily monitoring by Contractor and regular visual inspection by PM	EC, Contractor
	Cleaning of equipment.	All cleaning of equipment should take place within the Exploration site and the water from washing operation should be collected in a tank and disposed of in agreed manner.	Daily monitoring by Contractor.	EC, Contractor
	Heavy vehicles/ movement of vehicles across site.	The movement of vehicles to and across the site should be controlled. Exploration material required should be moved to where it is needed	Daily visual inspection and	EC, Contractor

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
		by means of wheelbarrows (when possible) instead of trucks thereby minimizing the impact on the soil.	monitoring by Contractor.	
EXPLORATION BOREHOLES/TRENCHES/PITS	Exploration activities	• The contractor in consultation with the environmental consultant and/or PM shall visit all potential exploration sites prior to excavation. The engineers and surveyors must then draft a plan for approval before commencement of excavations. This plan must indicate the required resources and sensitive areas that may not be mined (indication of the mature trees). • No removal of trees with a stem diameter of 200mm or more. Protect clusters of trees and individual trees with a space buffer of at least 5m. • The top 150mm of topsoil must be stored separately for use to rehabilitate the borrow pit. • The removal of material at excavation sites shall be focused where the least significant vegetation exists. • The contractor shall liaise with the applicable local residents regarding the location of excavation sites. • No drilling may be done on any sensitive or open space areas.	Contractor and environmental consultant to visit all potential excavation sites.	EC, Contractor
WATER CONSERVATION				

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
Irresponsible use of water.	Water wastage due to careless practices during Exploration.	• Establish a water plan which, should include at least the following: o A description of: ▪ The source of the water ▪ Where and how the water will be stored ▪ How the water will be distributed/utilised o Describe measures that will be taken to conserve water at each of the above-mentioned phases • Educate the work force on sustainable and effective use of water, e.g. clean equipment in containers. • No member of the exploration team is allowed to wash clothes OR vehicles on the Exploration site.	Daily inspections and condition reports.	PM, EC and contractor.
	Leaks from tanks and taps.	Water should be used sparingly throughout the Exploration of the development. It is the responsibility of the site coordinator to ensure that water conservation is strictly enforced.	Daily inspections and condition reports.	PM, EC and contractor.
		Water tanks / taps must be fixed. The water tank or taps must have water meters and be accessible to visual inspection. All faulty and leaking taps and pipes shall be immediately repaired.	Daily inspections and condition reports.	PM, EC and contractor.
Groundwater contamination.	Refuse, garbage, cement, concrete, chemicals, fuels, oils or any other	• Accidental spills must be cleaned immediately to avoid the pollution of the wetland, and ground water, since the soil around the site is highly permeable.	Inspection daily, reporting, and regular clean up.	PM, EC and contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
	objectionable or undesirable material.	• No member of the Exploration team is allowed to wash clothes OR vehicles on the Exploration site.		
CONSERVATION OF VEGETATION				
Loss of biodiversity	Clearing of vegetation (removal of trees etc).	• The area to be constructed on the site, as well as lay-down areas, access routes, etc should be clearly demarcated. The workforce must be instructed to operate within these boundaries. Any activity resulting in the chopping down of trees or removal of vegetation without the required authorisation is strictly prohibited. • All protected tree species will be tagged so that they are visible during Exploration works.	Regular review of photographic records. Take photographs before Exploration starts as a record. Monitoring by the EC	PM, EC and contractor.
	Planting of alien vegetation.	• No alien vegetation may be introduced to the site in the form of seeds or plants, for beautification or any other reason. • At the end of Exploration all alien vegetation that has established should be eradicated.	Regular inspection of site vegetation by the EC.	PM, EC and contractor.
WASTE MANAGEMENT:				
Exploration waste.	Incorrect or infrequent disposal of building rubble.	Exploration waste should be stored in skips and should regularly be removed off the site for disposal at an applicable municipal waste disposal site.	Regular inspection on site.	PM, EC and contractor.
	Exploration waste blown by wind (e.g., cement bags).	Empty cement bags, plastics, wrapping waste, strapping, etc. to be secured in containers for general waste to prevent wind-blown waste.	Daily inspection and clean up.	PM, EC and contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
Increased general waste.	Domestic waste from Exploration team.	• Waste shall be separated according to cardboard/paper materials, plastic, bottles and tins. • The various waste types shall be disposed of at appropriate municipal and recycling facilities. • Appropriate containers shall be placed on site for waste separation and the workforce trained sensitised accordingly. • Only the general waste, which cannot be recycled shall be disposed of at the municipal waste disposal facility.	Daily inspection and clean up.	PM, EC and contractor.
Domestic waste.	Domestic waste from Exploration team.	• The workforce must be sensitised to dispose of waste in a responsible manner and not to litter, not at the Exploration site and not at the campsite. • Sufficient waste bins should be supplied.	Daily inspection and clean up.	PM, EC and contractor.
		Domestic waste which cannot be recycled should be stored in a skip and removed via truck once a week.	Regular inspection.	PM, EC and contractor.
Hazardous waste.	Accidental / negligent spillages from equipment working on site.	• Spillages of any potentially toxic materials, whether by accident or through negligence, must be scooped up immediately into drums. • Contact Wesco Group to salvage the spilled materials (see Appendix A for the contact details).	Daily inspection and clean up.	PM, EC and contractor.
	Storage of hazardous materials.	Hydrocarbon products waste, oil sludge, oily rags, contaminated spill clean-up materials, contaminated soils and other hazardous materials waste must be kept off-site or in a dedicated separate container on	Daily inspection and clean up.	PM, EC and contractor.

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
SOCIAL ENVIRONMENT				
		site. These containers must be locked and only accessible by the site foreman. Wesco Group should be approached to collect these wastes periodically or as needed.		
Ablution waste.	Exploration team.	• Only portable chemical toilets will be used on site and at the campsite. Under no circumstances may the waste from these toilets be dumped in the veld. The waste should be removed at least once a week to the nearest municipal sewage site. Alternatively, it may be pumped out into sealable containers and stored until it can be removed by truck. If stored, the containers should be kept out of direct sunlight and should not be stored for longer than a month. People responsible for cleaning these toilets should be provided with latex gloves and masks. • Spillage or leakage to be cleaned-up and fixed immediately.	Daily inspections and clean-up.	PM, EC and contractor.
DUST CONTROL:				
Dust generation.	Dust proliferation due to fines content of soil.	• Soil stacks should be placed downwind from the main activity areas and from the road detour. • All Exploration areas and soil stacks should be regularly wetted.	Visual monitoring for dust nuisance and safety	PM, EC and contractor.
NOISE CONTROL:				
Noise generation.	Noise from vehicles and Exploration activities.	• All machinery should be calibrated and maintained regularly. • Exploration activities should be discontinued during night-time hours (18h00 to 07h00) and over week-ends.	• Daily monitoring. • Complaints from neighbours. • Records of how these have been addressed.	PM, EC and contractor.

4.2. Post-Exploration Phase

ENVIRONMENTAL MANAGEMENT IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITY FOR IMPLEMENTATION
Hazardous unattended Exploration site	Temporary structures, equipment, materials, waste and facilities used for Exploration activities.	Clear and clean the Exploration site to the satisfaction of the PM.	Inspection of the site by the PM	PM, EC
Unsightly exploration wells and areas	• Unrehabilitated exploration areas	Rip the terrain and access routes and replace the stored topsoil evenly over the terrain. Securely seal exploration boreholes	Inspection by PM , EC after rehabilitation.	Contractor, EC and Engineer.

5. CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

Arising from the analysis by the consultants, the proposed project has land cover/use impacts on the proposed project site. Because land must develop, but with land development, there should not be environmental degradation, thus the EMP provides for the sustainable land development of the energy generating facility.

5.2. Recommendations

In order to alleviate any negative impacts that may emanate from the proposed project, the contractor and proponent should follow recommendations as follows:

5.2.1. Environment Management Plan Recommendations

In order to ensure a healthy and safe environment in the proposed site and its environs, a plan for environmental management has to be instituted through monitoring. This involves the collection and analysis of relevant environmental data as well as periodic documentation and reporting.

5.3. External Auditing

The key to a successful ESMP is appropriate monitoring and review to ensure effective functioning of the ESMP and to identify and implement corrective measures in a timely manner. In the event that discrepancies are identified, the problem must be investigated and attended to. All the results obtained during environmental monitoring must be documented for audit purposes.

An audit of the environmental management actions undertaken is essential to ensure that it is effective in operation, is meeting specified goals, and performs in accordance with relevant regulations and standards. Audits should be conducted during the operational phase of the facility to ensure adherence to the management measures contained in the EMP.

5.4. Recommendation to MEFT

Having looked at the potential impacts of the proposed project development, the risks associated with the development and the mitigation measures contained in this EMP, EnviroPlan Consulting cc hereby recommends that the Ministry of Environment, Forestry and Tourism: Department of Environmental Affairs (MEFT:DEA) approve the proposed mineral exploration activities and issue an Environmental Clearance Certificate (ECC) on condition that the proponent will ensure complete compliance to the developed Environmental and Social Management Plan (ESMP).

6. ENVIRONMENTAL MONITORING AND REPORTING

EC: ENVIRONMENTAL MONITORING REPORT

Report No:…… Date:……

Method Statements	**Contractor:**	**Date received:**

Issue	Observation	Remedial action	Compliance
1 Exploration			
1.1 All plant, personnel, etc. restricted to works area?			
1.2 Contractor's Camp located in area of low environmental sensitivity as indicated by the Engineer?			
1.3 Where needed, sensitive areas adequately fenced off?			
1.4 Fencing well maintained?			
1.5 No unauthorised entry, stockpiling, etc. outside work areas?			
1.6 All vehicles and plant remain on designated routes?			
1.7 Information posters put up and maintained where needed?			
1.8 No smoking in hazardous areas?			
1.9 Basic fire fighting equipment available on Site?			

Issue	Observation	Remedial action	Compliance
1.10 No burning of wastes as a means of disposal?			
1.11 Staff aware of procedures in the event of spills/leaks?			
1.12 Materials for dealing with spills/leaks available?			
1.13 Emergency contact numbers displayed at Contractor's office?			
1.14 Complaints Register up to date?			
1.15 Archaeological material found on Site mitigated?			
1.16 No animals trapped or harmed?			
1.17 No flora removed or damaged outside work areas?			
1.18 Adequate drainage and retaining works in place to control erosion/siltation?			
1.19 Restricted traffic over stabilised areas?			

Issue	Observation	Remedial action	Compliance
1.20 No concrete mixing on bare ground?			
1.21 Concrete batching restricted to area of low environmental sensitivity?			
1.22 All wastewater from concrete mixing area disposed of via wastewater management system?			
1.23 Concrete mixing area kept neat and clean?			
1.24 Suitable screening and containment of cement silos?			
1.25 All visible remains of excess concrete removed on completion of concrete work?			
1.26 No pollution from drilling operations?			
1.27 Location and rescue of plants undertaken by suitably qualified contractor?			
1.28 Rescued plants moved to nursery if direct transplantation not possible?			

Issue	Observation	Remedial action	Compliance
1.29 After vegetation clearance, all unstable areas are properly stabilised?			
1.30 Cleared vegetation properly disposed of?			
1.31 All wastes removed from cleared area and disposed of?			
1.32 Mulched vegetation stored in bags?			
1.33 Fertilisers containing phosphates not used?			
1.34 No planting undertaken where Exploration works have not yet been finished?			
1.35 No unauthorised traffic on revegetated areas?			
2 Materials			
2.1 Exploration materials adequately secured to ensure safe deliveries?			

Issue	Observation	Remedial action	Compliance
2.2 All materials being stored inside Contractor's Camp?			
2.3 All imported materials free of weeds, litter, etc.?			
2.4 Stockpile areas approved?			
2.5 Topsoil stripped and stockpiled at a suitable site prior to earthworks?			
2.6 No spoil stockpiled outside agreed areas?			
2.7 Spoil stockpiles correctly shaped and protected?			
2.8 All plants used for landscaping/rehabilitation are local and indigenous?			
2.9 Plants adequately protected during transit and at storage facilities?			
2.10 Plants healthy and free from diseases and pests?			
3 Plant			

Issue	Observation	Remedial action	Compliance
3.1 Fuel/oil storage facilities adequately secured and protected against leakage?			
3.2 Safety signage provided at fuel storage areas?			
3.3 All electrical/petrol pumps suitably equipped and placed not cause any danger of ignition?			
3.4 Fuel storage areas comply with fire safety regulations?			
3.5 Necessary authorisations obtained for temporary above ground fuel tanks?			
3.6 Capacity of a fuel tank does not exceed 9000 ℓ?			
3.7 Fuel tanks erected at least 3.5 m away from buildings, boundaries or other flammable materials?			
3.8 Adequate toilet facilities provided for staff (min. 1 toilet per 30 workers)?			

Issue	Observation	Remedial action	Compliance
3.9 Toilets adequately maintained?			
3.10 All workers use toilets?			
3.11 Scavenger-proof bins with lids provided at eating areas?			
3.12 Waste temporarily stored inside Contractor's Camp in weather- and scavenger-proof bins?			
3.13 No burying or dumping of wastes on site?			
3.14 Waste management system in place?			
3.15 Refuse disposed of at licensed landfill?			
3.16 Adequate waste-water management system in place?			
3.17 Approval for discharge of contaminated water into municipal sewer system?			

Issue	Observation	Remedial action	Compliance
3.18 Runoff from workshops, fuel depots, etc. directed into conservancy tanks for disposal at approved site?			
3.19 Wash areas placed and built in such a way that does not cause any pollution?			
3.20 All maintenance of plant and equipment takes place in workshop?			
3.21 All plant is well maintained (no leaking)?			
3.22 Workshop has a bunded, impermeable floor sloping towards oil trap?			
3.23 Contractor's Camp tidy?			
3.24 All plant and machinery have drip trays, which are checked and emptied daily?			
3.25 All repairs on machinery using fuels or lubricants done over a drip tray?			
3.26 Static plant located within a			

Issue	Observation	Remedial action	Compliance
bunded area?			
3.27 Measures in place to minimise dust generation?			
3.28 No handling/transport of erodible materials under high wind conditions?			