

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Proposed Prospecting and Exploration Activities on EPL 8829, //Kharas Region



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TABLE OF CONTENTS

1.	INTRODUCTION AND BACKGROUND	3
2.	LEGISLATIVE FRAMEWORK.....	4
3.	ENVIRONMENTAL MANAGEMENT STRUCTURES.....	7
	3.1.1. <i>Responsibility Parties</i>	7
	3.1.2. <i>Roles of the Environmental Manager (EM)</i>	8
	3.1.3. <i>Roles of the Environmental Control officer (ECO).....</i>	8
	3.1.4. <i>Roles of the Environmental Site Officer (ESO).....</i>	9
	3.1.5. <i>Roles of the Contractor.....</i>	10
4.	IMPLEMENTATION AND MONITORING.....	11
4.1.	OPERATIONAL / DECOMMISSIONING ACTIVITIES.....	11
	4.1.1. <i>Environmental Awareness Training.....</i>	11
	4.1.2. <i>Contractor's Method Statements.....</i>	12
4.2.	SITE ESTABLISHMENT AND CONSTRUCTION.....	13
	4.2.1. <i>Demarcation of the Project Site.....</i>	13
	4.2.2. <i>Movement of Construction Personnel and Equipment.....</i>	14
	4.2.3. <i>Location of Construction Camp.....</i>	14
	4.2.4. <i>Ablution Facilities.....</i>	14
	4.2.5. <i>Stockpiling, Handling, and Storage of Building Materials.....</i>	14
	4.2.6. <i>Excavation, Backfilling and Trenching.....</i>	15
	4.2.7. <i>Erosion Control.....</i>	15
	4.2.8. <i>Noise.....</i>	15
	4.2.9. <i>Dust.....</i>	15
4.3.	MATERIAL HANDLING AND STORAGE.....	15
	4.3.1. <i>Servicing and Re-fuelling of Exploration Equipment.....</i>	15
	4.3.2. <i>Chemical, Harmful and Hazardous Materials.....</i>	16
4.4.	WASTE MANAGEMENT.....	16
4.5.	CEMENT AND CONCRETE OPERATIONS.....	17
4.6.	WASTE WATER TREATMENT.....	18
	4.6.1. <i>Discharge of Construction Water.....</i>	18
	4.6.2. <i>Prevention of Soil, Surface-and Groundwater Pollution.....</i>	18
4.7.	SITE CLEAN UP AND REHABILITATION.....	19
	4.7.1. <i>Site Clean Up.....</i>	19
	4.7.2. <i>Rehabilitation.....</i>	19
4.8.	EMERGENCY PROCEDURES.....	19
	4.8.1. <i>Fire and Safety Management.....</i>	19
	4.8.2. <i>Accidents at Exploration Site.....</i>	20
	4.8.3. <i>Emergency Advisory Procedures.....</i>	20
4.9.	COMPLIANCE MONITORING.....	20
	4.9.1. <i>Procedures.....</i>	20
	4.9.2. <i>Environmental Monitoring.....</i>	20
	4.9.3. <i>EMP Administration.....</i>	21
	4.9.4. <i>EMP Amendments.....</i>	21
	4.9.5. <i>Non-Compliance.....</i>	21
	4.9.6. <i>Environmental Register.....</i>	21
	4.9.7. <i>Site Management.....</i>	21
	4.9.8. <i>Access Routes and Work Sites.....</i>	22
	4.9.9. <i>Staff Management.....</i>	22
5.	MANAGEMENT OF ENVIRONMENTAL ASPECTS PRE-DEVELOPMENT PHASE.....	23
6.	MANAGEMENT OF ENVIRONMENTAL ASPECTS DURING OPERATIONAL PHASE.....	24
	6.1.1. <i>Dust Pollution and Air Quality.....</i>	24
	6.1.2. <i>Noise Impact.....</i>	24
	6.1.3. <i>Safety & Security.....</i>	25
	6.1.4. <i>Traffic.....</i>	26
	6.1.5. <i>Groundwater.....</i>	26
	6.1.6. <i>Surface Water.....</i>	27
	6.1.7. <i>Generation of Waste.....</i>	27
	6.1.8. <i>Heritage Impacts.....</i>	28
	6.1.9. <i>Ecological Impacts.....</i>	28
	6.1.10. <i>Socio-Economic Aspects.....</i>	29
6.2.	10.4 DECOMMISSIONING PHASE.....	29
7.	CONCLUSIONS	29

1. INTRODUCTION AND BACKGROUND

An Environmental Management Plan (EMP) has been commissioned by JCN Oil & Energy Cc. for the planned prospecting and exploration activities in the EPL 8829, //Kharas Region. This EMP serves as a managing tool for the prospecting and exploration activities at the project site.

The EMP is developed to outline measures to be implemented in order to minimise adverse environmental degradation associated with this development. The document serves as a guiding tool for the contractors and workforce on their roles and responsibilities concerning environmental management on site, and also provides an environmental monitoring framework for all project phases of the development. This environmental management plan aims to take a pro-active route by addressing potential problems before they occur. The EMP acts as a stand-alone document, which can be used during the various phases of the development.

In this report,

- a) the **Contractor** (its sub-contractors) refers to the personnel responsible for the *prospecting and exploration activities* at the project site.
- b) the **Project Personnel** refers to the proponent, employees, staff and suppliers responsible for the *operations activities* at the project site.

The purpose of the EMP is to:

- ✓ Train employees and contractors with regard to environmental obligations.
- ✓ Promote and encourage good environmental management practices.
- ✓ Outline responsibilities and roles of the proponent and the contractor in managing the environment.
- ✓ Describe all monitoring procedures required to identify environmental impacts.
- ✓ Minimise disturbance of the natural environment.
- ✓ Develop waste management practices.
- ✓ Prevent all forms of pollution.
- ✓ Protect the natural environment.
- ✓ Prevent soil and water erosion.
- ✓ Comply with all applicable laws, regulations and standards for environmental protection.

2. LEGISLATIVE FRAMEWORK

The ESA process is undertaken in terms of Namibia’s Environmental Management act no. 7 of 2007 and the Environmental Assessment Policy of 1995, which stipulates activities that may have significant impacts on the environment. Listed activities require the authorisation from the Ministry of Environment and Tourism (DEA). Section 32 of the Environmental Management Act requires that an application for an environmental clearance certificate be made for the listed activities. The following environmental legislation is relevant to this project:

Table 1. Relevant Legal Framework

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
The Constitution of the Republic of Namibia as Amended	Article 91 (c) provides for duty to guard against “the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia.” Article 95(l) deals with the “maintenance of ecosystems, essential ecological processes and biological diversity” and sustainable use of the country’s natural resources.	Sustainable development should be at the forefront of this development.
Environmental Management Act No. 7 of 2007 (EMA)	Section 2 outlines the objective of the Act and the means to achieve that. Section 3 details the principle of Environmental Management	The development should be informed by the EMA.
EIA Regulations GN 28, 29, and 30 of EMA (2012)	GN 29 Identifies and lists certain activities that cannot be undertaken without an environmental clearance certificate. GN 30 provides the regulations governing the environmental assessment (EA) process.	Activity 3.1 The construction 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

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
		<p>(Prospecting and Mining Act), 1992.</p> <p>Activity 3.2 Other forms of mining or extraction of any natural resources whether regulated by law or not.</p> <p>Activity 3.3 Resource extraction, manipulation, conservation and related activities.</p>
Convention on Biological Diversity (1992)	Article 1 lists the conservation of biological diversity amongst the objectives of the convention.	The project should consider the impact it will have on the biodiversity of the area.
Draft Procedures and Guidelines for conducting EIAs and compiling EMPs (2008)	Part 1, Stage 8 of the guidelines states that if a proposal is likely to affect people, certain guidelines should be considered by the proponent in the scoping process.	The EA process should incorporate the aspects outlined in the guidelines.
Namibia Vision 2030	Vision 2030 states that the solitude, silence and natural beauty that many areas in Namibia provide are becoming sought after commodities and must be regarded as valuable natural assets.	Care should be taken that the development does not lead to the degradation of the natural beauty of the area.
Water Act No. 54 of 1956	Section 23(1) deals with the prohibition of pollution of underground and surface water bodies.	The pollution of water resources should be avoided during construction and operation of the development.
The Ministry of Environment and Tourism (MET) Policy on HIV & AIDS	MET has recently developed a policy on HIV and AIDS. In addition it has also	The proponent and its contractor have to adhere to the guidelines provided to manage

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
	initiated a programme aimed at mainstreaming HIV and gender issues into environmental impact assessments.	the aspects of HIV/AIDS. Experience with construction projects has shown that a significant risk is created when construction workers interact with local communities.
Minerals (Prospecting and Mining) Act 33 of 1992	This Act deals with the granting of access to mineral resources.	Compliance to this instrument is critical.
Labour Act no 11 of 2007	Chapter 2 details the fundamental rights and protections. Chapter 3 deals with the basic conditions of employment.	Given the employment opportunities presented by the development, compliance with the labour law is essential.
Public Health Act no 36 of 1919	Section 119 prohibits persons from causing nuisance.	Owner, contractors and employees have to comply with these legal requirements.
Nature Conservation Ordinance no 4 of 1975	Chapter 6 provides for legislation regarding the protection of indigenous plants	Indigenous and protected plants have to be managed within the legal confines.
Atmospheric Pollution Prevention Ordinance (No. 11 of 1976).	The Ordinance objective is to provide for the prevention of the pollution of the atmosphere, and for matters incidental thereto.	All activities on the site will have to take due consideration of the provisions of this legislation.
Roads Ordinance 17 of 1972	This Ordinance consolidates the laws relating to roads.	The provisions of this legislation have to be taken into consideration in as far as access to the development site is concerned.
Roads Authority Act, 1999	Section 16(5) of this Act places a duty on the Roads Authority to ensure a safe road system.	Some functions of the Roads Ordinance 17 of 1972 have been assigned to the Roads Authority.
Petroleum Products and Energy Act	This Act regulates the on-site	The storage of fuel for the use

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
of 1990	storage of fuel amongst others	of machinery should adhere to the relevant legislation.

3. ENVIRONMENTAL MANAGEMENT STRUCTURES

The Proponent and its contractor(s) will be responsible for environmental management on site during the site upgrade and operational period.

A pre-construction meeting is recommended before work commences, in order to reach agreement on specific roles of the various parties and penalties for non-compliances with the EMP. In addition surrounding land owners must be notified in advance of any potentially disturbing activities.

An independent environmental consultant will be appointed to act as the ECO; and conduct inspections of the upgrade activities; and EMP implementation throughout the duration of site upgrade. After each inspection, the ECO will produce a monitoring report that will be submitted to the environmental manager (and Ministry of Environment and Tourism (Department of Environmental Affairs) if required). Relevant sections of the minutes of site meetings will be attached to the monitoring report.

Roles, responsibility and authority shall be defined, documented and communicated in order to facilitate effective environmental management through implementation of the EMP.

3.1.1. Responsibility Parties

The responsibility matrix table below will be assigned and completed before any work commences at the project site.

Table 2. Responsibility Matrix

Function	Name / Mobile Number	Responsibility
Environmental Manager (EM)	JCN Oil & Energy Cc	<ul style="list-style-type: none"> Overall management of project and EMP implementation. Oversees site works, liaison with Contractor, ESO and ECO.
Environmental Control Officer (ECO)	FIN Hydro Environmental Technologies	<ul style="list-style-type: none"> Implementation of EMP and liaison between JCN Oil & Energy, Department of Environmental Affairs (MET), local authorities, Contractor and Landowners/stakeholders.
Environmental Site Officer (ESO)	To be appointed	<ul style="list-style-type: none"> Interaction with ECO, landowners and labourers. ESO must understand the content of the EMP.
Contractor	To be appointed	<ul style="list-style-type: none"> Implementation and compliance with recommendations and conditions of the EMP, Appoints dedicated person (ESO) to work with ECO

Management shall provide resources essential to the implementation and control of the EMP including: human resources, technology, and financial resources. The general roles and responsibilities of various parties during the prospecting and exploration phase of the project are outlined below.

3.1.2. Roles of the Environmental Manager (EM)

The EM (proponent's representative) will act as the employer's on-site implementing agent and has the responsibility to ensure that the Client's responsibilities are executed in compliance with the relevant legislations. Any on-site decisions regarding environmental management are ultimately the responsibility of the EM. The on-site EM shall assist the ECO where necessary and will have the following responsibilities in terms of the implementation of this EMP:

- ✓ Be fully knowledgeable with the contents of the Construction EMP;
- ✓ Review and authorise updates to the EMP.
- ✓ Ensure resource allocation for implementation of the EMP requirements.
- ✓ Ensure that environmental requirements are integrated into project plans, work method statements, tender and contract documents.
- ✓ Ensure necessary support to the ESO for implementation of the EMP.
- ✓ Undertake environmental system reviews, site inspections, audits and other verification activities to assure that the EMP implementation is at an optimal level.
- ✓ Participate in environmental performance verification activities to verify the level of compliance with the EMP in delivering the legal and environmental obligations.
- ✓ Assess the efficacy of the EMP and identify possible areas of improvement or amendment required within the EMP.
- ✓ Participate in incident investigations (as required).
- ✓ Initiate external audits (as required).

3.1.3. Roles of the Environmental Control officer (ECO)

The ECO for the site is an independent environmental consultant appointed by VIVO Energy Namibia Ltd to monitor and review the on-site environmental management and implementation of this EMP on the construction site.

The duties of the ECO:

- ✓ Ensure that all prospecting, exploration and/or decommissioning activities at the project site are undertaken in accordance with the EMP;
- ✓ Undertake compliance audits against the EMP and conditions of the Environmental Authorisation (where required).

- ✓ Provide support and advice to the project team, contractor and all subcontractors in the implementation of environmental management procedures and corrective actions.
- ✓ Ensure that monitoring programs, which assess the performance of the EMP, are implemented.
- ✓ The ECO officer will submit all written instructions and verbal requests to the contractor and forward a copy to the proponent.
- ✓ Assist in the investigation of incidents and non-conformances and confirm in conjunction with the ESO that corrective and preventive action is taken and is effective.
- ✓ Assess the efficiency of the EMP and identify possible areas of improvement or amendment required within the EMP.
- ✓ Facilitate the amendment of the EMP in conjunction with the Environmental Manager (as required).
- ✓ Provide environmental training for key project personnel (in communication with Environmental Manager).
- ✓ Reviewing and approving method statements in consultation with the Environmental Manager.
- ✓ Prepare audit reports (and submit reports to the relevant authority as required).

3.1.4. Roles of the Environmental Site Officer (ESO)

The ESO is expected to administer and control all environmental matters relating to the prospecting and exploration activities in EPL 8829. The ESO will conduct the following:

- ✓ Ensure that the latest EMP documents are on site and readily accessible as required.
- ✓ Monitor the contractor's activities for compliance with the various environmental requirements contained in this EMP.
- ✓ Identify areas of non-compliance and recommend measures to rectify them in consultation with the ECO and the EM as required.
- ✓ Ensure communication of EMP requirements to relevant project, contractor and sub-contractor personnel as required for EMP implementation.
- ✓ Perform ongoing environmental awareness training of the Contractor's site personnel.
- ✓ Ensure that environmental problems are remedied timeously and to the satisfaction of the ECO and the EM as required.

- ✓ Request the removal of people and/or equipment not complying with the specifications of EMP.
- ✓ Facilitate environmental induction of all project staff and either deliver or coordinate delivery of all such training that would be required for the effective implementation of the EMP.
- ✓ Set up activity based method statements prior to the start of relevant construction activities and submit these to the EM and the ECO as required.
- ✓ Maintain environmental incidents and stakeholder complaints register.
- ✓ Undertake environmental system reviews, site inspections, audits and other verification activities to assure that the EMP implementation is at an optimal level.
- ✓ Report significant incidents internally and externally as required by law and the conditions of authorisation.
- ✓ Investigate incidents and recommend corrective and preventative actions.

3.1.5. Roles of the Contractor

The contractor shall ensure that all construction staff, sub-contractors, suppliers, etc. are familiar with, understand and adhere to the EMP. Failure by any Contractor, Sub-contractor, Suppliers etc. to show adequate consideration to the environmental aspects of this contract shall be considered sufficient cause for the ECO to instruct the EM to have the employee removed from the site. The EM will also order the removal of equipment from the site that is causing continual environmental damage (e.g. leaking oils and grease, diesel and petrol fuels, and any other hazardous substance). Such measures will not replace any legal proceedings the Client may institute against the Contractor.

The EM shall order the contractor to suspend part or all of the works if the contractor and/or any sub-contractor, suppliers, etc., fail to comply with both the EMP and the construction procedures supplied by the Contractor. The suspension will be enforced until such time as the offending procedure or equipment is corrected and/or if required remedial measures are put in place.

By virtue of the environmental obligations delegated to the Contractor through the Contract Document, all workers (including subcontractors, suppliers, and service providers) appointed for the project would be responsible for:

- ✓ Ensuring adherence by providing adequate staff and provisions to meet the requirements of the EMP;

- ✓ Ensuring that Method Statements are submitted to the Environmental Manager for approval before any work is undertaken, and monitor compliance with the EMP and approved Environmental Method Statements;
- ✓ Ensuring that any instructions issued by the ESO and/or EM are adhered to;
- ✓ Ensuring the representation of a report at each site meeting, documenting all incidents that have occurred during the period before the site meeting;
- ✓ Undertake daily, weekly and monthly inspections of the work area(s);
- ✓ Ensuring that a register of all the transgressions issued by the ESO is kept in the site office;
- ✓ Ensuring that a register of all public complaints is maintained; and
- ✓ Ensure that all employees, including those of sub-contractors receive training before the commencement of construction in order that they can constructively contribute towards the success full implementation of the environmental requirements of the Contract;
- ✓ Report and record any environmental incidents caused by the Contractor or due to the Contractor's activities;
- ✓ obtain required corrective action within specified time frames and close out of environmental incidents;
- ✓ Provide weekly checklists to the EM and ESO.

4. IMPLEMENTATION AND MONITORING

4.1. Operational / Decommissioning Activities

4.1.1. Environmental Awareness Training

JCN Oil & Energy Cc. have the responsibility to ensure that all persons involved in the project are aware of, and are familiar with, the environmental requirements for the project. All project personnel, including contractors and sub-contractors are required to receive training of a type and level of detail that is appropriate for the environmental aspects of their work.

Training shall be held during normal working hours, preferably on site. A copy of the register shall be handed to the ECO. As a minimum, all personnel are required to complete the training requirements stipulated in Table 3 below.

Table 3. Environmental Awareness Requirements

Environmental Awareness Training and Induction Requirements											
Awareness Requirement	Frequency										
<p>Site Induction - the purpose of the induction is to ensure that, as a minimum, all on-site personnel understand the EMP in terms of:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Key issues relating to the project.</td></tr> <tr><td>Relevant conditions of the Environmental Authorisation.</td></tr> <tr><td>Location and protection of environmentally sensitive areas (if any).</td></tr> <tr><td>Waste management and minimisation.</td></tr> <tr><td>Minimising potential impacts to air, noise and water quality.</td></tr> <tr><td>Surface and groundwater contamination.</td></tr> <tr><td>Spill control measures.</td></tr> <tr><td>Environmental Emergency Plan.</td></tr> <tr><td>Incident reporting procedures.</td></tr> <tr><td>Roles and responsibility relating to environmental management.</td></tr> </table>	Key issues relating to the project.	Relevant conditions of the Environmental Authorisation.	Location and protection of environmentally sensitive areas (if any).	Waste management and minimisation.	Minimising potential impacts to air, noise and water quality.	Surface and groundwater contamination.	Spill control measures.	Environmental Emergency Plan.	Incident reporting procedures.	Roles and responsibility relating to environmental management.	<p>Operational (Prospecting and Exploration) Activities: prior to commencement of work by staff and / or contractors.</p>
Key issues relating to the project.											
Relevant conditions of the Environmental Authorisation.											
Location and protection of environmentally sensitive areas (if any).											
Waste management and minimisation.											
Minimising potential impacts to air, noise and water quality.											
Surface and groundwater contamination.											
Spill control measures.											
Environmental Emergency Plan.											
Incident reporting procedures.											
Roles and responsibility relating to environmental management.											
<p>Pre-Start Meeting – Pre-start meetings should be undertaken prior to commencement of a new activity in order to discuss the planned work and operational aspects of the tasks. Health, safety and environmental issues and controls should be discussed and understood.</p>											

All senior and supervisory staff members shall familiarise themselves with the full contents of the EMP. They shall know and understand the specifications of the EMP and be able to assist other staff members in matters relating to the EMP.

4.1.2. Contractor’s Method Statements

The EMP provides the overall project strategy for management of environmental issues; however the Contractor’s Method Statement (CMS) will address environmental management issues at the site level. This shall also address environmental issues that are specific to an activity and/or site. CMS’s should be produced for all major operations at the exploration site, and must typically provide detailed descriptions of items including, but not necessarily limited to:

- ✓ Nature, timing and location of activities;
- ✓ Procedural requirements and steps;
- ✓ Management responsibilities;
- ✓ Material and equipment requirements;

- ✓ Transportation of equipment to and from site;
- ✓ Develop methods for moving equipment/material while on site;
- ✓ How and where material will be stored;
- ✓ Emergency response approaches, particularly related to spill containment and clean-up;
- ✓ Response to compliance/non-conformance with the requirements of the EMP; and;
- ✓ Any other information deemed necessary by the EM/ECO.

The contractor shall not commence the activity until the Method Statement has been approved and shall, except in the case of emergency activities, allow an agreed period of time for approval of the Method Statement by the ECO and EM.

The ECO and EM may require changes to a Method Statement if the proposal does not comply with the specification or if, in the reasonable opinion of the ECO and EM, the proposal may result in, or carries a greater than reasonable risk of, damage to the environment in excess of that permitted specifications.

Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel. The contractor shall carry out works in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the contract.

Based on the specifications in this EMP, the following Method Statements are required as a minimum (but not limited to these):

- ✓ Site clearing;
- ✓ Site layout and establishment;
- ✓ Hazardous substances;
- ✓ Cement and concrete batching (for each operation)
- ✓ Traffic accommodation;
- ✓ Solid waste control system;
- ✓ Wastewater control system;
- ✓ Fire control and emergency procedures.

4.2. Site Establishment and Construction

4.2.1. Demarcation of the Project Site

The site will be properly demarcated and/or temporarily fenced off as agreed with the EM. The method of demarcation shall be determined by the contractor and agreed to by the EM prior to any work being undertaken. The contractor shall maintain the

demarcation line and ensure that materials used during prospecting and exploration do not blow on or move outside the site and environs, or pose a threat to people. The boundaries of the site shall be demarcated prior to any work commencing on the site. The site boundary demarcation fence shall be removed when all construction work is completed.

The contractor shall ensure that all his plant, labour and materials remain within the boundaries of the site, unless otherwise agreed in writing with EM. Failure to do so may result in the EM requiring the contractor to fence the boundaries of the site with wire mesh at his own expense to the satisfaction of the EM and the local town council. It will be the responsibility of the contractor to decide on an appropriate system of protective fencing for the site.

The contractor shall be responsible to ensure that building materials such as sand is not blown away and take the necessary precautions to prevent sand from being blown by the wind.

4.2.2. Movement of Construction Personnel and Equipment

The contractor shall ensure that all construction personnel and equipment remain within the demarcated construction site at all times. Where construction personnel and/or equipment wish to move outside the boundaries of the site other than normal access to the road for loading and access purposes, the contractor shall obtain written permission from the EM and/or ESO.

4.2.3. Location of Construction Camp

The construction camp including temporary stockpile sites, storage and work areas required by the contractor, sub-contractors and suppliers shall be positioned in demarcated areas as approved by the EM.

4.2.4. Ablution Facilities

The contractor shall provide the necessary portable toilets for its personnel. The sitting of these toilets shall be agreed with the EM. The toilets shall be secured to prevent them from blowing over, and the doors shall be properly lockable to prevent toilet paper from being blown out. Toilets shall be properly cleaned, emptied and serviced regularly.

The contractor shall ensure that any waste from the toilets is not spilled on the ground at any time. Should there be spillage of chemicals and/or waste, the EM shall require the contractor to place the toilets on solid base or containment structures with sumps. Abluting anywhere other than in the toilets shall not be permitted. The contractor shall be responsible for cleaning up any waste deposited by personnel.

4.2.5. Stockpiling, Handling, and Storage of Building Materials

The Contractor shall ensure that stockpiles and storage yards are demarcated in areas that are already disturbed or where they will cause minimal disturbance. The Contractor

/ ESO shall indicate which activities are to take place in which areas within the site (e.g. mixing of cement, stockpiling of materials etc). These activities must be limited to single sites only. All the necessary handling and safety equipment required for the safe use of petrochemicals and oils shall be provided by the Contractor to, and used or worn by the staff whose duty it is to manage and maintain the Contractor's and his subcontractor's and supplier's plant, machinery and equipment.

4.2.6. Excavation, Backfilling and Trenching

The contractor shall ensure that all excavations and trenches are not to be left open for more than 5 days, thus it is recommended that excavations should be opened and closed the same day. Warning signs should be erected around the excavated areas to clearly demarcate the area against access. In addition, soil that was/has been removed shall be used to backfill areas where required and excavated material shall be stockpiled along the trench within the working servitude.

4.2.7. Erosion Control

The Contractor shall protect all areas susceptible to erosion and shall take measures, to the approval of the ECO. The Contractor shall not allow erosion to develop on a large scale before effecting repairs and all erosion damage shall be repaired as soon as possible.

4.2.8. Noise

The Contractor shall ensure that neighbouring properties / adjacent land is kept informed of the need and extent of noisy disruptive processes. The use of radios and other such equipment by workers must be controlled and noise levels kept to a level that does not disturb neighbouring land.

4.2.9. Dust

The Contractor shall take precautions to limit the production of dust and damage caused by dust. Dust suppression measures shall be agreed upon in consultation with the ECO. The following measures must be implemented to minimise dust impacts:

- ✓ During high wind conditions the Contractor must make the decision to cease works until the wind has calmed down; and
- ✓ Cover any stockpiles with a suitable material, such as plastic or shade-cloth, to minimise windblown dust.

4.3. Material Handling and Storage

4.3.1. Servicing and Re-fuelling of Exploration Equipment

All maintenance and repair works shall be conducted in areas designated for this purpose (i.e. spill containment structures). The ground under the servicing and refuelling

areas must be protected against pollution caused by spills or leakages from any point source.

The Contractor may only change oil or lubricant at agreed and designated locations, except if there is a breakdown or emergency repair, and then any accidental spillages must be cleaned up / removed immediately. Construction vehicles are to be maintained in an acceptable state of repair.

No vehicles or equipment with leaks or causing spills will be permitted to operate at any of the site. These shall be ordered off-site for maintenance or repairs.

4.3.2. Chemical, Harmful and Hazardous Materials

All project personnel and contractors shall comply with all relevant national and local legislation with regard to storage, transport, use and disposal of chemical, harmful and hazardous substances and materials. The contractor shall obtain the advice of the manufacturer with regard to the safe handling of such substances and materials.

The contractor shall provide the ESO and EM with a list of all chemical, harmful and hazardous substances and materials on site, together with storage, handling and disposal procedures for these materials.

The contractor shall ensure that information on all chemical, harmful and hazardous substances are available to all personnel on site. The contractor shall furthermore be responsible for the training and education of all its personnel on site who will be handling the material about its proper use, handling and disposal. A dangerous material datasheet should be available on site. The contractor shall submit method statements detailing the substances / materials to be used, together with the storage, handling and disposal procedures of the materials.

4.4. Waste Management

Waste will be generated in the form of rubble, cement bags, pipe and electrical wire cuttings. Contaminated soil due to oil leakages, lubricants and grease from the construction equipment and machinery shall also be generated during the prospecting and exploration activities. All

hazardous waste generated at the site shall be stored in enclosed, banded areas, the location of which shall be determined on site in conjunction with the EM. The banded areas shall be clearly marked. Such waste shall be disposed offsite at an appropriate waste disposal site.

Proponent / Contractor shall institute a waste control and removal system for the site. The Contractor shall not dispose of any waste or construction debris by burning, or by burying. All waste shall be disposed off site at an approved landfill site. Consultation with the Karasburg Town Council should be conducted in this regard.

Where necessary, the Contractor shall supply waste bins/skips at the site. The bins shall be secured in such a manner as to prevent their contents blowing out. The Contractor shall ensure that all personnel immediately deposit all waste in the waste bins for removal by the Contractor. Waste shall be properly contained in a scavenger, water and wind-proof containers until disposed of at an approved landfill. Bins shall be emptied and waste removed at least once a week from the site. The bins shall not be used for any purposes other than waste collection.

All contaminated soils must be removed from the exploration site and disposed off or treated at a suitable disposal facility. Unfortunately, no hazardous waste disposal facility exists in the Karasburg Constituency, or the region at large, therefore a controlled bioremediation facility should be developed to remediate any contaminated soil produced.

4.5. Cement and Concrete Operations

The contractor is advised that cement and concrete are regarded as materials that are potentially damaging to the natural environment on account of the very high pH of the material, and the chemicals contained therein. The contractor shall ensure that all operations that involve the use of cement and concrete are carefully controlled. Concrete mixing shall only take place in agreed specific areas on site.

Water and slurry from concrete mixing operations shall be contained to prevent pollution of the ground surrounding the mixing points. Old cement bags shall be placed in wind and spill proof containers as soon as they are empty. The contractor shall not allow closed, open or empty bags to lie around the site.

Where exposed aggregate finishes are specified the contractor shall collect all cement-laden water and store it in conservancy tanks for disposal off site at an approved disposal site.

All visible remains of excess concrete shall be physically removed immediately and disposed of as waste. Washing the visible signs into the ground is not acceptable. All excess aggregate shall also be removed.

All excess concrete shall be removed from site on completion of concrete works and disposed of. Washing of the excess into the ground is not allowed. No cement or concrete laden water will be permitted to be drained directly into any surface water source.

4.6. Waste Water Treatment

4.6.1. Discharge of Construction Water

Construction water in this report, refers to all water affected by construction activities. The Contractor shall construct and operate the necessary collection facilities to prevent pollution. The Contractor shall dispose of collected waste water in a manner agreed with the ECO.

No washing of plant, equipment, concreting equipment etc. shall be permitted on site unless approved by the EM. Should it be necessary to dispose of contaminated water into the municipal sewer or storm water system, written permission is required from the Karasburg Town Council.

4.6.2. Prevention of Soil, Surface-and Groundwater Pollution

The Contractor shall take all reasonable precautions to prevent the pollution of the surface and groundwater resources in the area, as a result of his activities. Such pollution could result from the release, accidental or otherwise, of chemicals, oils, fuels, sewage and waste products, etc.

The Contractor shall obtain oil absorbent pads, booms and spill kits, or similar products or materials to soak up oil, petrol and diesel. These materials shall be readily available for use wherever construction equipment is working. This should also be available at work stations where fuel and lubricants is handled, stored, equipment is filled and serviced. The Contractor shall ensure that he is familiar with the correct use and disposal of any materials designed to soak up petroleum products. Environmental friendly methods will be used during construction e.g.

- ✓ cement batching on boards, no wash water allowed to run off,
- ✓ paint washing in containers to be removed to licensed site,
- ✓ use of environmental friendly paints with low toxicity,
- ✓ use sand filters for paint brush washing and contain cement bags,
- ✓ waste water from paints with potential high environmental impact must be disposed of in accordance with an agreed method with the EM.

The Contractor shall ensure that no oil, petrol, diesel, etc. is discharged onto the ground. Pumps and other machinery requiring oil, diesel, etc. that is to remain in one position for longer than two days shall be placed on drip trays or other similar suitable containment structures. These containment structures shall be watertight and shall be emptied regularly and the contaminated water disposed off-site at a facility capable of handling such waste liquid. Drip trays shall be cleaned before any possible rain events that may result in the drip trays overflowing and before long weekends and holidays.

The Contractor shall remove all oil, petrol, diesel-soaked soil immediately and shall dispose of it as hazardous waste.

4.7. Site Clean Up and Rehabilitation

4.7.1. Site Clean Up

The Contractor shall ensure that all waste, temporary structures, equipment, materials and facilities used during prospecting and exploration activities are removed upon completion of the project. The Contractor shall clear and clean the construction site to the satisfaction of the ECO and EM upon completion of the project.

4.7.2. Rehabilitation

The Contractor must ensure that all temporary structures, materials, waste and facilities used for construction activities are removed upon completion of the project. The project site should be fully rehabilitated (i.e. clear and clean area) including all disturbed areas and protect them from erosion.

Due to the urban setting of the project location, very little vegetation is present in the area. However, if deemed necessary, revegetation of disturbed construction areas shall take place as soon as possible after the planned prospecting and exploration is completed.

4.8. Emergency Procedures

4.8.1. Fire and Safety Management

Proper handling, storage, use and disposal of any hazardous waste (e.g. hydrocarbons, paint, batteries, radioactive waste etc) should be done. Hydrocarbons are volatile under certain conditions and their vapours in specific concentrations are flammable. If precautions are not taken to prevent their ignition, fire and subsequent safety risks may arise.

No uncontrolled fire, whether for cooking, heating or any other purpose, is to be made at the site during all phases. The proponent and contractor shall take all reasonable measures and active steps to avoid increasing the risk of fire through activities on site and prevent the accidental occurrence or spread of fire; and shall ensure that there is sufficient fire-fighting equipment on site at all times. This equipment shall include fire extinguishers. The Contractor should be prepared for such events.

The following measures will be followed to reduce the intensity of fires during the prospecting and exploration phase:

- ✓ Restrict smoking to designated areas,
- ✓ Provide fire extinguishers,
- ✓ Restrict fires to designated areas,
- ✓ Ensure an emergency response plan is available,
- ✓ Emergency fire plan for visitors and staff.

4.8.2. Accidents at Exploration Site

The Contractor shall comply with the Occupational Health and Safety Act and any other national, regional or local regulations with regard to safety on site. The Contractor shall ensure that contact details of the local medical services are available to the relevant construction personnel prior to commencing work.

4.8.3. Emergency Advisory Procedures

The Contractor shall ensure that there is an emergency advisory procedure on site before commencing any operations that may cause damage to the environment. The Contractor shall also ensure that site staffs are familiar with all emergency procedures to be followed.

The Contractor shall ensure that lists of all emergency telephone numbers/contact people are kept up to date, and that all numbers and names are posted at the construction site at all times.

4.9. Compliance Monitoring

4.9.1. Procedures

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 ESO and to impose a penalty. In the event of non-compliance the following recommended process shall be followed:

- ✓ The ESO shall issue a notice of non-compliance to the Contractor, stating the nature and magnitude of the contravention. A copy shall be provided to the EM.
- ✓ 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 ESO 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 EM.
- ✓ In the case of non-compliance giving rise to physical environmental damage or destruction, the ESO 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.
- ✓ The EM shall at all times have the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remediation measures.

4.9.2. Environmental Monitoring

Periodic inspections of the project site will be performed by the ECO. These will consist of formal reviews of conformance against policies and procedures stated in this

document. Inspections will occur as required. Supervisors in all work areas will conduct performance and compliance reviews, using the EMP as guideline to ensure compliance.

4.9.3. EMP Administration

Copies of this EMP shall be kept at the project site and should be distributed to all senior staff members, including those of the contractors.

4.9.4. EMP Amendments

The EMP amendments can only be made with the approval of the EM and ECO, and if required ultimately by the DEA. Amendments to the EMP should be liaised to all employees and contractors.

4.9.5. Non-Compliance

Problems may occur in carrying out mitigation measures or monitoring procedures that could result in non-compliance of the EMP. The responsible personnel should encourage staff to comply with the EMP, and address acts of non-compliance and penalties.

The ESO is responsible for reporting non-conformance with the EMP, to the ECO. The ESO, in consultation with the ECO must, thereafter, undertake the following activities:

- ✓ Investigate and identify the cause of non-conformance.
- ✓ Implement suitable corrective action as well as prevent recurrence of the incident.
- ✓ Assign responsibility for corrective and preventative action.
- ✓ Any corrective action taken to eliminate the causes of non-conformance shall be appropriate to the magnitude of the problems and commensurate with the environmental impact encountered.

4.9.6. Environmental Register

An environmental register should be kept on site in which incidents related to actual impacts are recorded. This will include information related to incidents as spillages, dust generation and complaints from adjacent properties. It should also contain information relating to actions taken. Any party on site may complete the register, however, it is envisaged that the ECO, ESO and the contractor(s) will be the main contributors, and who will also be the main parties involved in suggesting mitigation measures.

4.9.7. Site Management

Areas outside the designated working zone shall be considered “no go” areas. The offloading zones must be clearly demarcated when offloading goods to enhance safety around the project location.

4.9.8. Access Routes and Work Sites

Vehicular movement, construction vehicles and equipment will access the construction site from the B3 road. Work sites shall be clearly demarcated and road signs erected where needed. The general public should not have unauthorised or uncontrolled access to the project site.

Vehicle access will be limited to a single entrance (where necessary) to facilitate control. The entrance will be manned during the operation hours, but will be locked during non-operational hours to prevent unauthorised entry.

A notice board, in two languages or more, must be erected at the entrance and must state the most pertinent site health and safety issues, the operator/responsible person and emergency telephone numbers. Suitable signs must also be erected on the approach roads and on-site, to direct drivers and to control speed.

Furthermore, on-going controls, such as fencing and policing, must be implemented.

4.9.9. Staff Management

The Contractor must ensure that their employees have suitable personal protective equipment and properly trained in fire fighting and first aid. Training records must be kept for future references.

5. MANAGEMENT OF ENVIRONMENTAL ASPECTS PRE-DEVELOPMENT PHASE

Pre-construction phase	
Description	<ul style="list-style-type: none"> ▪ Compliance Requirements ▪ Public Consultation ▪ Environmental Awareness ▪ Health and safety Aspects
Proposed Mitigation Measures	<ul style="list-style-type: none"> ✚ Conduct an environmental impact assessment (EIA) to comply with the requirements of the Environmental Management Act (2007) and its regulations of 2012. ✚ Identify and address all environmental and social issues. ✚ Ensure that all persons involved in the project are aware of, and are familiar with, the environmental requirements for the project. ✚ Ensure that all contractors, sub-contractors, suppliers, etc. are familiar with, understand and adhere to the EMP. ✚ A pre-construction meeting is recommended in order to reach agreement on specific roles of the various parties and penalties for non-compliances with the EMP. ✚ Inform I&APs and key stakeholders about the proposed development and identify issues and concerns of key I&APs with regards to the proposed development. ✚ Develop and implement environmental emergency preparedness procedures. ✚ Establish personnel protection standards and mandatory safety practices and procedures for the development. ✚ Establish the lines of communication among contractors and subcontractors involved in work operations for safety and health matters. ✚ Conduct HIV/AIDS Awareness Programme for all operations of the development for not less than 90% of workers. ✚ Provide and maintain condom dispenser and maintain HIV/AIDS awareness posters. ✚ Provide information regarding the voluntary testing of construction workers and counselling, support and care.
Proposed Monitoring	<p>Record of environmental compliance (ECC). Record of approved site-specific EMP for project site. Record of awareness training and attendance register. Record of health and safety plan.</p>
Responsible Party	Proponent / ECO

6. MANAGEMENT OF ENVIRONMENTAL ASPECTS DURING OPERATIONAL PHASE

This section will look at the potential environmental impacts, which may arise during the operational phase (i.e. prospecting and exploration) in the EPL.

6.1.1. Dust Pollution and Air Quality

Dust will be generated during the prospecting and exploration phase and might be worse during the winter months when strong winds occur. Dust problems are expected to be site specific and may pose a slight nuisance to the neighbouring farms and the D0208 road users. Dust is regarded as a nuisance as it reduces visibility and affects the human health. Excessive air pollution in the form of emissions from prospecting and exploration vehicles and equipment may also deteriorate air quality in the area.

Proposed Mitigation Measures

- ✚ Use appropriate dust suppression measures when dust generation is unavoidable, e.g. dampening with water, particularly during prolonged periods of dry weather.
- ✚ Prospecting and exploration vehicles to only use designated roads.
- ✚ During high wind conditions the exploration contractor must make the decision to cease works until the wind has calmed down.
- ✚ Cover any stockpiles with plastic to minimise windblown dust.
- ✚ Provide workers with dust masks.
- ✚ Ensure construction vehicles are well maintained to prevent excessive emission of smoke.
- ✚ Ensure all vehicle, plant and equipment are in good condition.
- ✚ Encourage reduction of engine idling.

Responsible Party

- ✚ JCN Oil & Energy Cc / Contractor(s)

6.1.2. Noise Impact

Noise pollution due to exploration vehicles, equipment and machinery will be generated. An increase of ambient noise levels at the exploration site is expected. Noise generated may impact neighbouring communities and fauna.

Proposed Mitigation Measures

- ✚ Inform neighbouring farms and communities of prospecting and exploration activities to commence and provide for continuous communication between the farmers and communities; and contractor(s).
- ✚ Limit construction times to acceptable daylight hours.
- ✚ Install technology such as silencers on construction machinery.

- ✚ Do not allow the use of horns as a general communication tool, but use it only where necessary as a safety measure.
- ✚ Ensure proper maintenance is conducted on vehicles to ensure the reduction of noise emission.
- ✚ The workers should be equipped with ear protection equipment.
- ✚ Audio equipment (if any) should not be played at levels considered intrusive by others.

Responsible Party

- ✚ JCN Oil & Energy Cc / Contractor(s)

6.1.3. Safety & Security

Safety issues could arise from the prospecting and exploration vehicles, earthmoving equipment and tools that will be used at the project site. This increases the possibility of injuries and the contractor must ensure that all staff members are made aware of the potential risks of injuries on site. Exploration and camp sites usually house material and equipment which may attract criminal activities.

Proposed Mitigation Measures

- ✚ Provide suitable emergency and safety signage on site (manufactured of durable, weatherproof material). The signage signs should be placed at strategic locations to ensure awareness.
- ✚ Demarcate and barricade any areas which may pose a safety risk (including hazardous substances, deep excavations etc). These notices must be worded in English and the local language.
- ✚ Enforce the use of appropriate Personal Protective Equipment (PPE) for the right task or duties at all times.
- ✚ Prevent illegal access to the exploration sites by implementing appropriate security measures.
- ✚ Equipment housed at the project site must be placed in a way that does not encourage criminal activities.
- ✚ Sensitize operators of exploration earthmoving, machinery equipment and tools to switch off engines of vehicles or machinery not being used.
- ✚ The contractor is advised to ensure that the team is equipped with first aid kits and that they are available on site, at all times.
- ✚ Adequate lighting within and around the exploration site should be erected, when visibility becomes an issue.

Responsible Party

- ✚ JCN Oil & Energy Cc / Contractor(s)

6.1.4. Traffic

Prospecting and exploration vehicles will access the project site from the D0208 road. A slight nuisance might be experienced by motorists using this road. This will most likely be caused by slow moving vehicles frequenting the exploration site.

Proposed Mitigation Measures

- ✚ Install and maintain official traffic signalling (where necessary) along the D0208 road.
- ✚ Speed limit must be adhered to, to minimise accidents.
- ✚ Prospecting and exploration vehicles and machinery must be tagged with reflective signs or tapes to maximise visibility and avoid accidents.
- ✚ Exploration vehicles should not be allowed to obstruct the road, hence no stopping in the road, wholly or partially, but rather pull off the road or park on the roadside.

Responsible Party

- ✚ JCN Oil & Energy Cc / Contractor(s)

6.1.5. Groundwater

Groundwater quality could be impacted through leachate of petroleum, chemical, harmful and hazardous substances. In particular, oil leakages, diesel, lubricants and grease from vehicles, equipment and machinery utilised during the prospecting and exploration phase may occur. Care must be taken to avoid contamination of soil and groundwater.

Proposed Mitigation Measures

- ✚ Prevent spillages of any chemicals and petroleum products (i.e. oils, lubricants, petrol and diesel). Use drip trays, linings or concrete floors when evidence of leaks are observed on vehicles or equipment.
- ✚ All fuelling, storage and chemical handling should be conducted on surfaces provided for this purpose. Drip trays, linings or concrete floors must be used when removing oil from machinery.
- ✚ Spillage control procedures must be in place according to relevant SANS standards or better. Waste water collection systems should be connected to these systems.
- ✚ Portable ablution facilities will be installed, hence adequate containment systems should be erected for these facilities.
- ✚ Waste should properly be contained to avoid any leakages and/or spillages, and should regularly be disposed off at a suitable sewage disposal site. Run-off from these toilets due to overflows should be avoided at all cost.
- ✚ Proper environmental awareness and remedial response training of operators must be conducted on a regular basis.

Responsible Party

 JCN Oil & Energy Cc / Contractor









6.1.6. Surface Water

Local drainage is well developed and run-off takes place to the south. The relief of significant small dry river courses (streams) running in the area remain relevant, and contribute well to the drainage of surface run-off in the area. Contaminants in the form of oil leakages, diesel, lubricants and grease from equipment and machinery may occur during the prospecting and exploration phase.

Responsible Party

 JCN Oil & Energy Cc / Contractor

Proposed Mitigation Measures

-  Use drip trays, linings or concrete floors when evidence of leaks are observed on exploration vehicles or equipment.
-  Any spillage of hazardous substances including fuel, oil, paint or cleaning solvent must be cleaned up immediately, stored and disposed off at a designated disposal facility.
-  Prevent discharge of any pollutants, such as chemicals, and hydrocarbons into the nearby water ways and courses.
-  Properly secure all portable toilets (if any) to the ground to prevent them toppling due to wind or any other cause.
-  Ensure that no spillages occur when the toilets are cleaned or emptied. Prohibit urination on site, other than at designated facilities.
-  Stabilise cleared areas as soon as possible to prevent and control surface erosion.
-  Proper environmental awareness and remedial response training of operators must be conducted on a regular basis.
-  An emergency plan should be in place on how to deal with spillages and leakages during this phase.


Responsible Party

 JCN Oil & Energy Cc / Contractor

6.1.7. Generation of Waste

Waste material will be generated during the prospecting and exploration activities. Waste in the form of rock cuttings, pipe cuttings, electrical cuttings, oil spills or leakages of petroleum products might occur during the exploration phase.

Proposed Mitigation Measures

-  Ensure that sufficient weather- and vermin- proof bins / containers are present on site for the disposal of solid waste. Waste and litter generated during this phase must be placed in these disposal bins.

- ✚ The Contractor shall institute a waste control and removal system for the site.
- ✚ No disposal of /or burying of waste on site should be conducted. No waste should be burned on site.
- ✚ Hazardous waste storage is to be clearly marked to indicate the presence of hazardous substances, and the protocols associated with handling of such hazardous wastes shall be known by all relevant staff members.
- ✚ Regular inspection and housekeeping procedure monitoring should be maintained at all times.
- ✚ Awareness of the hazardous nature of various types of waste should be enforced.

Responsible Party

- ✚ JCN Oil & Energy Cc / Contractor

6.1.8. Heritage Impacts

There are no known heritage areas envisaged to be impacted by the development; however the contractor might come across archaeological features or objects that possess cultural values during exploration activities.

Proposed Mitigation Measures

- ✚ If such remains or objects with cultural values (e.g. bones, weapons, ancient cutlery, graves etc) are uncovered at the project location or surrounding, it should be barricaded off, and
- ✚ The relevant authorities (i.e. the local police and National Heritage Council of Namibia) should be contacted immediately.

Responsible Party

- ✚ JCN Oil & Energy Cc / Contractor

6.1.9. Ecological Impacts

The project area is free of sensitive flora and fauna. While some of the vegetation (mainly weedy species and bushes) may have to be cleared or removed for exploration activities.

Proposed Mitigation Measures

- ✚ Where feasible, trees found at the project area should be kept and maintained as far as possible.
- ✚ Disturbance of areas outside the designated working zone is not allowed.
- ✚ No vegetation should be removed outside the designated project area.

Responsible Party

- ✚ JCN Oil & Energy Cc / Contractor

6.1.10. Socio-Economic Aspects

Employment opportunities are anticipated to be created during the exploration, both directly through employment of workers and indirectly through suppliers and service providers to the project site.

Proposed Mitigation Measures

- ✚ The exploration contractor should be sourced from the area, or region at large (where feasible).
- ✚ The exploration workers should be sourced from the area, or region at large (where feasible).
- ✚ Suppliers of exploration materials should be sourced from the area, or region at large (where feasible).
- ✚ Locally source services required during the exploration process, such as securities, rental of portable toilets, plant hire, etc.

Responsible Party

- ✚ JCN Oil & Energy Cc / Contractor

Summary of all potential impacts during the prospecting and exploration phase:

In general, impacts are expected to be low to medium, mostly short lived and site specific. Mitigation options recommended in the Environmental Management Plan (EMP) will guide and ensure that the impacts of the prospecting and exploration activities are minimised.

The appointed contractor should be made aware of the content and environmental

6.2. 10.4 Decommissioning Phase

Develop a closure plan within first 12 months of operation. Closure plan to address issues as per the Namibian Mine Closure Framework. The Environmental Management Plan for this phase will have to be reviewed at the time of decommissioning to cater for changes made to the project.

7. CONCLUSIONS

If the above-mentioned management recommendations are properly implemented, it is anticipated that most of the adverse impacts on the environment can be mitigated. An appointed environmental control officer will need to monitor or audit the site throughout the site upgrade and operations to ensure that the EMP is fully implemented and complied with.

The EMP should be used as an on-site tool during all phases of the project. Regular environmental audits should be carried out to ensure compliance of the EMP and

environmental regulations of Namibia. Parties responsible for non-conformances of the EMP will be held responsible for any rehabilitation that may need to be undertaken.

The environmental clearance is valid for 3 years only, as per the environmental management act No.7 of 2007, thus it is the responsibility of the proponent to commission an application for renewal of the permit by submitting an updated EIA/EMP document before it expires.