Guidelines For Emergency Procedures

BASIC PRECAUTIONS:

1. Approach the fire or gas leak from upwind direction.
2. Evacuate area in the part of the vapour cloud, eliminate all ignition sources immediately.
3. Barricade the area. Keep all people at the premises area completely out of the area and create a distance from the storage area.

The condition when there is a gas leak without fire:

1. Shut down the emergency shut off valve, ball valve and raise the alarm.
2. Close any valves available that can stop the gas flow.
3. Keep all bystanders far away.
4. No fire sources shall be available. E.g.: smoking / naked light / engine to be started & other possible sources.
5. Call the fire brigade of the local fire station.
6. Call gas supplier / gas contractor representative.
7. Use water spray to disperse LPG vapour to safe location. Avoid entering the vapour cloud area and keep low behind the spray so that one will be somewhat protected from radiant heat if the vapour should be ignited unexpectedly
8. For cylinders, remove them to a safe area where they can leak safely away from ignition sources. Cylinders should be moved carefully to avoid damage to valves and never drag the cylinders.
9. For cylinders, if leakage is at bottom of cylinder, turn the cylinder upright to allow vapour to escape.

THE CONDITION WHEN THERE IS A GAS LEAK WITH FIRE:

- Shut down the emergency shut off valve, ball valve and raise the alarm.
- Close any valves available that can stop the flow of gas.
- Keep all bystanders far away.
- Call the fire brigade of the local fire station.

- Call gas supplier / gas contractor representative.
- Isolate power at main switchboard.
- Follow the firefighting instructions.
- Apply large quantity of water to all surfaces exposed to heat. Approach the sides. Stopping the flow of gas should be the first consideration after water cooling is established.
- Use the fire extinguisher to stop the fire where possible and ventilate the area.

1. **Get to know your installation**

Make an effort to locate the different parts of your installation. In particular, locate precisely where you can shut off the gas in the event of an incident.

For apartment units, mark your gas meter (with a unit label for example). This will also prevent you from accidentally cutting off your neighbour's gas.

2. **Keep access to your installation clear**

Make sure you can access your meter and related equipment effortlessly at any time. Do not hang anything on the valve that can block the access and identification.

3. **Shut off the gas if you are away for a long time**

For gas systems with no operation for long periods, it is highly recommended to shut off at the incoming supply (at LPG cylinder or shut off the main valve to stop the gas supply). For systems with pressure indicators installed (Pressure Gauge), check and mark the reading and confirm tightness before continuing the operation. If the reading shows a pressure drop, it means thereis a leakage on the system whether on the piping, connection or accessories installed. Identify the leak through a soap test, snoop test and rectify accordingly prior to continuing the operation. Before operation, check the gas equipment and make sure it is properly switched off before reopening the main valve at incoming supply.

4. **Inspect The Complete System**

Check the physical condition of the gas pipe, accessories, valve or hose to make sure it is free from damage. The flexible hose shall be free from crack and it shall be replaced every 2 years. The hose shall be of an approved type and suitable for gas use (Comply to SANS or any local standards). For commercial and industrial piping systems, it shall be inspected at least once every 2 years while for domestic installation it shall be inspected at least once every 3 years. This inspection must be carried out by a qualified competence person.

5. **Maintain the installation properly**

The gas system shall be properly maintained to avoid any potential hazard such explosion or fire. This shall be carried out by a qualified person. It must be ensured that the system is free from leakage, in good condition, safe to use and can work properly. The failed accessories, fittings and burners shall be replaced accordingly.

6. **Check the condition of your gas cooker / furnace.**

The gas burner shall be serviced regularly to avoid gas blockage. The sediment trap installed shall be cleaned to avoid gas blockage and interruption for firing. The increase of the supply pressure does not help on the burner performance unless it shall service the nozzle and clear the blockage accordingly. If your gas cooker is an old model not equipped with a safety system which cuts off the gas supply when the flame goes out, seriously consider replacing it as soon as possible.

7. **Check the condition of the gas flue**

Regularly check the gas flue and that it is not blocked with foreign bodies. It shall be serviced regularly.

8. **Ventilate your furnace / burner area**

Proper ventilation will increase the efficiency of the combustion and will avoid the formation of carbon monoxide (CO). The cooking area / furnace area must be permanently ventilated. This can be done by providing fresh air intake, exhaust fan or ventilation fan.

9. **Install the CO & LEL gas detectors**

Carbon monoxide is invisible and odourless and causes too many deaths every year. By installing CO detectors nearby your boiler or water heater installations, the user will be alerted in case CO is high. The usage of LEL detectors is also important to detect the concentration of any gas leakage. The accumulated gas leak in the area will cause explosion when it meets the combustion triangle. The gas detector for natural gas must be installed at the highest level and close to the ceiling while for detector for LPG shall be installed close to the floor. The gas detector shall carry out a functional test or be calibrated every six months. Few detectors are designed to be replaced within 2-3 years' based on the sensor lifespan.

10. **Do you smell gas?**

The gas, either LPG or Natural Gas, has been added with ethyl- mercaptan for smell detection. This is a strong smell which you can easily detect for a gas leak by human smell. Whenever you smell a gas leak, kindly take serious action to stop the gas and identify the leakage area. Contact the nearest gas contractor for further checking and rectification.

LPG (Liquefied Petroleum Gas)

First Aid and Emergency Response

LPG is a flammable colourless gas, which is heavier than air by nature. Under prolonged exposure to heat the LPG containers may rupture violently.

FIRST AID:

Inhalation:

Move to fresh air. If breathing is irregular or stopped, administer artificial respiration. Give oxygen. Seek medical attention immediately.

Skin contact:

For exposure to liquid, immediately warm frostbite area with warm water. In case of massive exposure, remove contaminated clothing while showering with warm water.

Eye contact:

Immediately flush eyes thoroughly with warm water for at least 15 minutes. Remove contact lenses. Rinse with water. Take victim immediately to hospital. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. If eye irritation persists, seek medical attention.

Suitable extinguishing media:

Water spray, Dry chemical, Foam, Carbon dioxide (CO_2), Fire should not be extinguished unless flow of gas can be immediately stopped.

EMERGENCY RESPONSE:

- Move people away and upwind from spill.
- Shut off supply of gas if it is safe to do so. Eliminate sources of ignition e.g. power supply, matches, non-intrinsically safe communication equipment.
- Ventilate area. Avoid breathing vapour and contact with liquid or vapour. Disperse vapour with water spray.

Note:

Vapour is heavier than air and will settle at the lowest point e.g. ditches, drains and water courses.

Environmental Management Plan (EMP)

For the construction and operational phase

PROPOSED LPG BULK FACILITY WINDHOEK, ON PORTION C (345/65/45) OF FARM BRAKWATER NO.48, WINDHOEK

August 2024

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GLOSSARY

ENVIRONMENT	an interconnected system of natural and human-made elements such as land, water and air; all living organisms and matter arising from nature, cultural, historical, artistic, economic and social heritage and values.
ENVIRONMENTAL MANAGEMENT	A management process which seeks to ensure, as far as possible, that no avoidable impact is caused to the environment and that when this is unavoidable that the consequences are understood prior to the impact being caused and that the impact is then mitigated as far as possible.
GROUNDWATER	Water located beneath the earth's surface in soil pore spaces and in the fractures of rock formations
HAZARDOUS WASTE	Waste that poses substantial or potential threats to public health or the environment.
LPG	Liquefied petroleum gas
MITIGATION	The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts.
NO-GO AREA	Areas where all construction activities and related matters are prohibited.
POLLUTION	Any change in the environment caused by substances, radioactive or other waves; or noise, odours, dust or heat, emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.
REHABILITATION	Restoring the disturbed area to more or less the natural set up.
SITE	An area of ground where the LPG Bulk Facility will be developed.

1. INTRODUCTION and BACKGROUND

The aim of an operational EMP is to ensure that the proposed LPG Bulk Facility is conducted in an environmentally acceptable and safe manner. This Environmental Management Plan (EMP) serves as a managing tool for all construction and operational activities during the development of the LPG Bulk Facility, in Windhoek. The EMP is developed to outline measures to be implemented in order to minimise adverse environmental degradation associated with this development.

The EMP 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, the Contractor refers to ECO-SENSE TRADING ENTERPRISES CC and its sub-contractors.

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 ECO-SENSE TRADING ENTERPRISES CC and its contractors 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.

Phases covered by the EMP:
Construction Phase
Operational Phase

The construction phase of the LPG Bulk Facility entails:

- ✓ Land clearance
- ✓ Transporting relevant building material and equipment.
- ✓ Installation of associated electrical supply cables.
- ✓ Installation of associated water pipelines.

- ✓ Installation of associated sewer lines.
- ✓ Installation of Tanks
- ✓ Installation of storm water management system; and
- ✓ Roads construction

The operational phase will entail:

- ✓ Operation and maintenance of the LPG Bulk Facility and all associated bulk services.

2. LEGISLATIVE FRAMEWORK

➢ *National Legislative Requirements*

The EIA 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 legislations are relevant to this project:

➢ *The Namibian Constitution*

The Namibian Constitution has a section on principles of state policy. These principles cannot be enforced by the courts in the same way as other sections of the Constitution. But they are intended to guide the Government in making laws which can be enforced.

The Constitution clearly indicates that the state shall actively promote and maintain the welfare of the people by adopting policies aimed at management of ecosystems, essential ecological processes and biological diversity of Namibia for the benefit of all Namibians, both present and future.

➢ *Environmental Management Act No.7 of 2007*

This Act provides a list of projects requiring an Environmental Assessment. It aims to promote the sustainable management of the environment and the use of natural resources and to provide for a process of assessment and control of activities which may have significant effects on the environment; and to provide for incidental matters.

The Act defines the term "*environment*" as an interconnected system of natural and human-made elements such as land, water and air; all living organisms and matter arising from nature, cultural, historical, artistic, economic and social heritage and values.

The Environmental Management Act has three main purposes:

(a) to make sure that people consider the impact of activities on the environment carefully and in good time.

(b) to make sure that all interested or affected people have a chance to participate in environmental assessments

(c) to make sure that the findings of environmental assessments are considered before any decisions are made about activities which might affect the environment

The manufacturing of, storage, handling or processing of a hazardous substance are *'listed activity'* as per the *List of Activities requiring Environmental Clearance* (Government Notice 29 of 6 February 2012) and accordingly requires an Environmental Impact Assessment (EIA) to be conducted.

Line Ministry: Ministry of Environment and Tourism

- ***Atmosphere Pollution Prevention Ordinance (1976)***

This Ordinance generally provides for the prevention of the pollution of the atmosphere. Part IV of this ordinance deals with dust control. The Ordinance is clear in requiring that any person carrying out an industrial process which is liable to cause a nuisance to persons residing in the vicinity or to cause dust pollution to the atmosphere, shall take the prescribed steps or, where no steps have been prescribed, to adopt the best practicable means for preventing such dust from becoming dispersed and causing a nuisance.

Line Ministry: Ministry of Environment and Tourism

- ***Water Resources Management Act of Namibia (2004)***

This act repealed the existing South African Water Act No.54 of 1956 which was used by Namibia. This Act ensures that Namibia's water resources are managed, developed, protected, conserved and used in ways which are consistent with fundamental principles depicted in section 3 of this Act. Part IX regulates the control and protection of groundwater resources. Part XI, titled Water Pollution Control, regulates discharge of effluent by permit. Thus developers are required to efficiently plan for sewage disposal.

Line Ministry: Ministry of Agriculture, Water Affairs and Forestry

- ***Water Act No.54 of 1956***

This Act provides for Constitutional demands including pollution prevention, ecological and resource conservation and sustainable utilisation. In terms of this Act, all water resources are the property of the State and the EIA process is used as a fundamental management tool.

A water resource includes a watercourse, surface water, estuary or aquifer, and, where relevant, its bed and banks. A watercourse means a river or spring; a natural channel in which water flows regularly or intermittently; a wetland lake or dam, into

which or from which water flows; and any collection of water that the Minister may declare to be a watercourse. Permits are required in terms of the Act for the undertaking of the following activities relevant to the proposed project:

- ✓ Discharge of waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit in terms of Section 21 (f); and
- ✓ Disposal of waste in a manner that may detrimentally impact on a water resource in terms of Section 21 (g).

Line Ministry: Ministry of Agriculture, Water Affairs and Forestry

- ***The Draft Wetland Policy (1993)***

Requires that any wetlands and its associated hydrological functions form a part, to be managed in such a way that their biodiversity, vital ecological functions and life support systems are protected for the benefit of present and future generations.

Line Ministry: Ministry of Environment and Tourism

- ***Environmental Assessment Policy of Namibia (1995)***

Environmental Assessments (EA's) seek to ensure that the environmental consequences of development projects and policies are considered, understood and incorporated into the planning process, and that the term ENVIRONMENT (in the context of IEM and EA's) is broadly interpreted to include biophysical, social, economic, cultural, historical and political components.

All listed policies, programmes and projects, whether initiated by the government or the private sector, should be subjected to the established EA procedure as set out in Figure 2.

Line Ministry: Ministry of Environment and Tourism

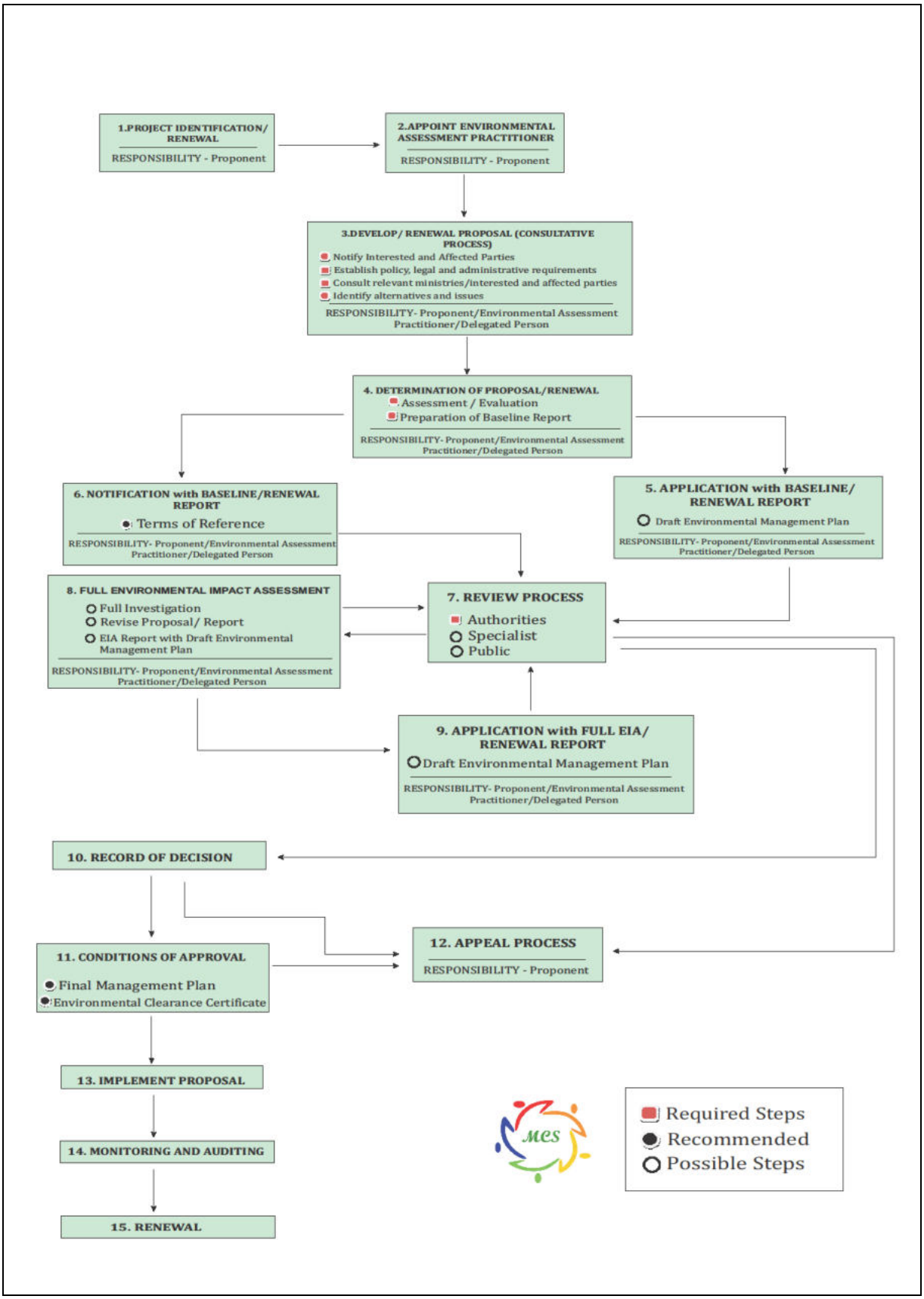

Figure 1. Environmental Assessment Procedure of Namibia *(Adapted from the Environmental Assessment Policy of 1995)*

- ***Forestry Act (No.12 of 2001)***

This Act makes provision for the protection various plant species. Harvesting permits are required from the Directorate of Forestry to clear certain protected vegetation species from the site.

Line Ministry: Ministry of Agriculture, Water Affairs and Forestry

- ***Townships and Division of Land Amendment Act (No.28 of 1992***

Article (l) of this Act stipulates that "Whenever any area of land constitutes, by reason of its situation, a portion of an approved township, or adjoins an approved township, the Executive Committee may, by proclamation notice in the Gazette and after consultation with the Board, extend the boundaries of the township to include such an area". Thus the new township needs to be approved by the Namibian Planning Advisory Board and the Townships Board.

Line Ministry: Ministry of Regional and Local Government, Housing and Rural Development

(Contact: Tel: 061-297 2911)

- ***Sewerage and Drainage Regulations(amendments)Local auothorities act, section 23 (1992).***

The regulations makes provision for proper construction of pipelines in drainage lines. The regulations also stipulate the prevention of pollution and environmental damage caused by improper construction of sewerage and water pipelines in drainage lines.

Line Ministry: Ministry of Regional and Local Government, Housing and Rural Development

- ***Soil Conservation Act (No.76 of 1969).***

The Act advocates for the Prevention and combating of soil erosion, conservation, improvement and manner of use of soil and vegetation, and protection of water resources.

- ***Draft Pollution Control and Waste Management Bill***

The proposed project of LPG Bulk Facility, only applies to Parts 2 and 7 of the Bill.

Part 2 stipulates that no person shall discharge or cause to be discharged any pollutant to the air from a process except under and in accordance with the provisions of an air pollution licence issued under section 23. It further provides for procedures to be followed in licence application, fees to be paid and required terms of conditions for air pollution licences.

Part 7 states that any person who sells, stores, transports or uses any hazardous substances or products containing hazardous substances shall notify the competent

authority, in accordance with sub-section (2), of the presence and quantity of those substances.

- ***Hazardous Substances Ordinance No. 14 of 1974***

The Ordinance applies to the manufacture, sale, use, disposal and dumping of hazardous substances, as well as their import and export and is administered by the Minister of Health and Social Welfare. Its primary purpose is to prevent hazardous substances from causing injury, ill-health or the death of human beings.

Line Ministry: Ministry of Health and Social Services

- ***Public Health Act 36 of 1919 and Subsequent Amendments***

The Act, with emphasis to Section 119 prohibits the presence of nuisance on any land occupied. The term nuisance for the purpose of this EIA is specifically relevant specified, where relevant in Section 122 as follows:

- ✓ any dwelling or premises which is or are of such construction as to be injurious or dangerous to health or which is or are liable to favour the spread of any infectious disease;
- ✓ any area of land kept or permitted to remain in such a state as to be offensive, or liable to cause any infectious, communicable or preventable disease or injury or danger to health; or
- ✓ any other condition whatever which is offensive, injurious or dangerous to health.

Potential impacts associated with the development of LPG Bulk Facility project are expected to include dust, air quality impacts, noise nuisance and smoke emissions.

Line Ministry: Ministry of Health and Social Services

- ***National Heritage Act (No.76 of 1969).***

The Act calls for the protection and conservation of heritage resources and artefacts. Should any archaeological material, e.g. old weapons, coins, bones found during the construction, work should stop immediately and the National Heritage Council of Namibia must informed as soon as possible. The Heritage Council will then decide to clear the area or decide to conserve the site or material.

2.1 International Conventions and Regulations

Article 144 of the Namibian Constitution states that "the general rules of public international law and international agreements binding upon Namibia form part of the law of Namibia." This means that all the international agreements that Namibia signed become part of the law of our country. These laws and/or agreements are:

- ✓ Convention on Biological Diversity, 1992;
- ✓ United Nations Framework Convention on Climate Change, 1992;
- ✓ Kyoto Protocol on the Framework Convention on Climate Change, 1998;
- ✓ Stockholm Convention of Persistent Organic Pollutants, 2001.

2.2 Municipal By-laws (City of Windhoek)

- ***Groundwater Protection Regulations***

The protection of the groundwater resource in a development scenario should be provided for, in a formally documented and legislated EIA process. The EIA process or procedure provides for the institutionalization of decision making regarding the potential impact development activities will have on the receiving natural, social and cultural environment. Further, the process makes provision for the identification and listing of types of activities that would be required to follow the process before any authorisation will be given.

- ***Environmental Structure Plan and Policy***

The Environmental Structural Plan & Policy provides sufficient information for those making decisions regarding a particular development so that proper environmental evaluation can be conducted, which is appropriate to the scale of the proposed project and the risks to the environment which it may pose.

It establishes where there are potential and real problem environmental areas, such as land degradation, pollution, indiscriminate resource use etc. The Environmental Structural Plan is the baseline upon which the policy is established.

- ***Windhoek Town Planning Scheme (2005)***

The Town Planning Scheme enables the comprehensive management of all property and related public sector functions across the city. The guidelines on the Conservation of Natural Resources should be addressed in this project.

- ***Policy for the Distribution and Future Usage of Public Open Spaces in Windhoek (2000)***

The policy provides guidelines for the establishment of open spaces and green corridors along drainage lines and sensitive environmental areas. The policy advocates for the provision of land for the explicit development of open spaces.

3. ENVIRONMENTAL MANAGEMENT PLAN

3.1 Responsibilities for environmental management

ECO-SENSE TRADING ENTERPRISES CC will be responsible for environmental control on site during the construction and operational phase. It is very important a pre-work briefing meeting be held at all times to reach an agreement on specific roles of various parties and penalties for non-compliance.

3.2 Training and induction

ECO-SENSE TRADING ENTERPRISES CC is bound to be responsible for ensuring that environmental awareness education of all employees and contractors is done satisfactorily. ECO-SENSE TRADING ENTERPRISES CC should ensure that employees and contractors are made aware of the environmental requirements of the project.

The EMP should form part of the Terms of Reference for all contractors, sub-contractors and suppliers. All contractors, sub-contractors and suppliers will have to sign an agreement to assure that they understood the EMP and that they will comply. All senior staff should familiarise themselves with the full contents of the EMP and its implications. Senior staffs (Foreman/Supervisor) are expected to train and assist the rest of the employees on the contents of the EMP.

3.3 Environmental incident reporting

All environmental incidents occurring at the proposed site will be recorded. The incident report will have to include time, date, location, and nature of the incident, extent of the incident, actions taken, and personnel involved.

All complaints received from the neighbouring community should be directed to the Technical Manager / Environmental Officer of ECO-SENSE TRADING ENTERPRISES CC and channelled to the appointed ECO officer. ECO-SENSE TRADING ENTERPRISES CC Management should be able to respond to the complainant within a week (even if pending further investigation). It is important that the issues raised are considered and that the complainant feels that their concerns have been addressed to and wherever possible actions taken to address these. All complaints should be entered in the environmental register and all responses and actions taken to address these should be recorded.

3.4 Environmental monitoring

Periodic environmental monitoring must be taken on a regular basis. Monitoring should be done in order to ensure compliance with all aspects of the EMP. Findings should be liaised with to all responsible officers as chain command.

3.5 EMP administration

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

3.6 EMP amendments

The EMP amendments can only be made with the approval of the ECO officer and ultimately the Office of the Environmental Commissioner. Amendments to the EMP should be liaised to all employees and contractors.

3.7 Non compliance of the EMP

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.

ECO-SENSE TRADING ENTERPRISES CC is responsible for reporting non-conformance with the EMP, to the ECO officer. The management of ECO-SENSE TRADING ENTERPRISES CC, in consultation with the ECO officer must, thereafter, undertake the following activities:

- ✓ Investigate and identify the cause of non-conformance.
- ✓ Report matters of non-conformance to City of Windhoek Environmental Department (depending on the severity of the incident).
- ✓ 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.

3.8 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 neighbours. It should also contain information relating to actions taken. Any party on site may complete the register, however, it is envisaged that the Technical Manager, the contractor and the ECO officer will be the main contributors, and who will also be the main parties involved in suggesting mitigation measures.

3.9 Environmental Control Officer

The Environmental Control Officer for the site is an independent environmental officer appointed by ECO-SENSE TRADING ENTERPRISES CC to monitor and review the on-site environmental management and implementation of this EMP.

Duties of the ECO officer:

- ✓ The identification of potential environmental impacts, prior to the onset of decommissioning. A site visit may also be required prior to site development. This would be carried out in consultation with the Technical Manager.

- ✓ Providing of an environmental register at the site to be filled in by any person reporting an environmental incident, issue or concern and inspected by the ECO officer on a regular basis to check for issues raised and actions taken.
- ✓ Ensuring that the EMP conditions are adhered to at all times and taking action.
- ✓ Ensuring that environmental impacts are kept to a minimum.
- ✓ Reviewing and approving method statements in consultation with the Technical Manager.
- ✓ Reporting to ECO-SENSE TRADING ENTERPRISES CC and the Technical Manager on a regular basis and advising of any major environmental impacts. Attending the site meetings (when necessary)
- ✓ Inspecting the site and surrounding areas regularly, and monitoring an ongoing environmental awareness program in conjunction with the Technical Manager.
- ✓ Requesting the removal of people and/or equipment not complying with the specifications of EMP.
- ✓ Keeping both a written and photographic record of progress on site from an environmental perspective, and an ad hoc record of all environmental incidents
- ✓ Undertaking continual review of the EMP and submitting a report to the relevant stakeholders.
- ✓ The ECO officer will submit all written instructions and verbal requests to ECO-SENSE TRADING ENTERPRISES CC via the Technical Manager and Project Engineer.

3.10 Site Management

Areas outside this 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.

3.10.1.1 Access routes and work sites

During the construction phase, road transport trucks will access the project location via D1473 Road. No new tracks/roads shall be established and only existing roads may be used. Work sites shall be clearly demarcated and road signs erected were needed. The general public should not have unauthorised/uncontrolled access to the project location during this phase.

Vehicle access will be limited to one or two entrances to facilitate control. Access must be of a high standard to prevent unauthorised access from entering the site.

The entrance will be manned during the operation hours; and access routes will be closed to prevent unauthorised entry. A notice board, in two languages, must be erected at the entrance and must state entrance requirements and operating hours of the site, 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.

Road access to the working face of the township development must be maintained at all times in a manner suitable to accommodate vehicles normally expected to use the facility. Roads must be regularly graded and wetted to control dust, where necessary.

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

3.10.1.2 Fire and safety management

All electrical installations, wiring and systems at the project location, must be approved by a qualified electrician who will issue a Certificate of Compliance.

Proper handling, storage, use and disposal of any hazardous waste (e.g. hydrocarbons, paint, acid, batteries, radioactive waste e.t.c) should be conducted. 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.

Fire and explosion hazards do exist due to the storage of flammable gas. It is thus recommended that the LPG tank be covered with 620mm steel woven mesh screen as a precautionary measure to prevent any sparks from getting to the tank. The site must be installed with fixed fire protection systems which addresses prevention, early hazard detection, fire fighting and response systems.

No uncontrolled fire, whether for cooking or any other purpose, is to be made at the project location during both the construction and operation phases. The 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.

3.10.1.3 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.

3.10.1.4 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 contruction equipment and machinery may also be generated during the construction phase.

The oil leakages, lubricants and grease must be addressed. Contaminated soil must be removed and disposed off at the hazardous waste cell at Kupferberg Landfill. The contractor must provide containers on-site, to store any hazardous waste produced. Regular inspection and housekeeping procedure monitoring should be maintained by the contractor.

Waste in the form of solid waste from the plant will also be generated during the operational phase. Waste will be removed and disposed off at Kupferberg Landfill by City of Windhoek Waste Removal Contractors e.g. Rent-a-Drum, Kleen Tek etc.

3.10.1.5 Cement and concrete batching

Concrete mixing directly on the ground shall not be allowed and shall take place on an impermeable surface. All run-off from batching areas shall be strictly controlled, and cement contaminated water shall be collected, stored and disposed of at a suitable waste disposal facility.

3.10.1.6 Hydrocarbons management

If any spillage occurs, contaminated soil shall be collected in a holding tray or drum and which will then disposed at a **hazardous waste disposal site**. Any spillage of more than 200 litres must be reported to the Ministry of Mines and Energy as per the Petroleum Products Act.

The Contractor shall take all reasonable measures to prevent surface or groundwater pollution from the release of oils and fuels.

3.10.1.7 Information board

The Contractor will be responsible for erecting information boards on site. The number and locations of these boards shall be agreed upon by the ECO officer.

The contents of the information board shall be provided by the Technical Manager and will essentially be to advise the public of the construction activity and the prohibition on entering certain areas. The information board shall also provide the contact number of the ECO, to ensure that the public can access relevant information and lodge any complaints during the construction phase of the LPG Bulk Facility.

3.10.1.8 Flood management

The LPG Bulk Facility will be designed in such a way that surface water run-off is well developed. Storm water management of the site should be a key aspect of flood management at the plant. All culverts should be kept clean to allow storm water to flow freely.

3.10.1.9 Progressive Rehabilitation

Rehabilitation must commence as soon as possible on areas where construction has taken place or no further development is to take place, i.e. on completed excavations, soil/rock cutting hips, slopes etc.

3.10.2 Management of environmental aspects during all phases of the project

Groundwater

Construction phase	
Description	Possible Groundwater quality could be impacted through leachate of oil leakages, diesel, lubricants and grease from the heavy-duty equipment, and machinery utilised during construction phase. Care must be taken to avoid contamination of soil and groundwater. Drip trays must be used when removing oil from machinery. Run-off from overflowing onsite sewage systems might transport the effluent to areas where geological structures are present. Inflow into these structures would cause a pollution thread. The presence of a north-south striking faults close to the project location should be noted and protected at all cost. There is a slight potential health impact on groundwater users in the area. Potential impact on the natural environment from the polluted groundwater also exits. In general, impact on groundwater due to the construction of the LPG Bulk Facility is considered to be minimal through proper management practices.
Proposed Mitigation Measures	Prevent spillages of any chemical or fuel. Use drip trays when doing maintenance on machinery. Maintenance should be done on dedicated areas with linings or concrete floor. No maintenance of machinery may be done at the project location. Implementation of sound and proper management practices.
Proposed Monitoring	Regular visual inspection.
Responsible Party	ECO-SENSE TRADING ENTERPRISES CC / Contractors

Operational phase	
Description	Spillages and/or leakages of various possible contaminants might occur due to failure of reticulation pipelines or storage tanks. Contaminated soil might pose a risk to surface water. Potential impact on the natural environment from possible polluted groundwater also exits. The area is subjected to north-south structures, which might act as preferential pathways for any contaminants entering the saturated zone.
Proposed Mitigation Measures	The risk can be lowered further through the use of suitable and adequate SANS approved piping material; and installation should be done by certified installers/technicians. All surface spillages and leakages must be cleaned up immediately. Proper containment structures should be constructed to avoid any possible leakages. The presence of an emergency response plan and suitable equipment is advised, so as to react to any spillage or leakages properly and efficiently.
Proposed Monitoring	Groundwater monitoring sampling for pollution.
Responsible Party	ECO-SENSE TRADING ENTERPRISES CC

Surface Water

Construction phase	
Description	Contamination of surface water might occur through oil leakages, diesel, lubricants and grease from the heavy-duty equipment and machinery during the construction phase. Surface runoff emanating from overflowing and/or leakages from chemical and sewage storage and reticulation pipeline systems might ultimately reach surface water bodies like the Aretaragas River (8km West). Potential health impact on surface water users and on the natural environment associated with the nearby streams and rivers. Surface runoff from the site is expected in a north-westerly direction.
Proposed Mitigation Measures	Machinery should not be serviced on site to avoid spills. All spills should be cleaned up as soon as possible. Hydrocarbon/chemical contaminated soil; clothing or equipments should not be washed within 25m of any surface water.
Proposed Monitoring	Regular visual inspection. Surface water quality monitoring in cases of evident pollution.
Responsible Party	ECO-SENSE TRADING ENTERPRISES CC / Contractors

Operational phase	
Description	Spillages and/or leakages of various possible contaminants might occur due to failure of reticulation pipelines or storage tanks. Contaminated soil might pose a risk to surface water. All spills should be cleaned up as soon as possible. An emergency plan should be in place on how to deal with spillages and leakages during this phase. Potential health impact on surface water users and on the natural environment associated with the river channels in the area do exist. This may result in socio-economic impacts on surface water users.
Proposed Mitigation Measures	Drip trays and/or plastic sheeting should be used to contain any leaks emanating from the heavy-duty machinery and fleet. All spills should be cleaned up as soon as possible. The presence of an emergency response plan and suitable equipment is advised, so as to react to any spillage or leakages properly and efficiently.
Proposed Monitoring	Regular visual inspection.
Responsible Party	ECO-SENSE TRADING ENTERPRISES CC

Air Quality (Dust Pollution)

Construction phase	
Description	Dust will be generated during the construction phase, and problems thereof are expected to be site specific. Dust is expected to be worse during the winter months when strong winds occur. Release of various particulates from the site during the construction phase and exhaust fumes from vehicles and machinery related to the construction of bulk services are also expected to take place. Dust is regarded as a nuisance as it reduces visibility, affects the human health and retards plant growth.
Proposed Mitigation Measures	It is recommended that regular dust suppression be included in the construction activities, when dust becomes an issue. No unnecessary revving of engines or operation of vehicles is allowed. In general, the construction of the LPG Facility is envisaged to have minimal impacts on the surrounding air quality.
Proposed Monitoring	Regular visual inspection.
Responsible Party	ECO-SENSE TRADING ENTERPRISES CC / Contractors

Operational phase	
Description	The plant and vehicles that will be accessing LPG Bulk Facility and D1473 Road will contribute to the release of hydrocarbon vapours, carbon monoxide and sulphur oxides into the air. The facility will have to be designed to enable environmental protection.
Proposed Mitigation Measures	Vehicle idling time shall be minimised by putting up educative signs. The developer is advised to reduce all harmful emissions.
Proposed Monitoring	Regular visual inspection.
Responsible Body	ECO-SENSE TRADING ENTERPRISES CC

Health and Safety

Construction phase	
Description	Safety issues could arise from the earthmoving equipment and tools that will be used on site during the construction phase. 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. The presence of equipment lying around on site may also encourage criminal activities (theft). No open flames, smoking or any potential sources of ignition should be allowed at the project location. Signs such as 'NO SMOKING' must be prominently displayed in parts where inflammable materials are stored on the premises.
Proposed Mitigation Measures	Equipment and machinery operators should be equipped with ear protection equipment. Operations should be strictly between 07H00 to 19H00. First aid and safety awareness training for contractors. Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the premises. The staff must be properly trained on safety and health issues of the project. Workers should be fully equipped with personal protective equipment gear.
Proposed Monitoring	Safety procedures evaluation. Health and safety incident monitoring.
Responsible Party	ECO-SENSE TRADING ENTERPRISES CC /Contractors

Operational phase	
Description	The number of health and safety threats exist during operational activities of LPG Facility. Individuals in the community can suffer from noise from maintenance activities around the plant. Accidents on roads as a result of increased traffic and deterioration. The contractors are advised to ensure that proper personal protective gear and first aid kits are available, at all times. Workers should also be properly trained in first aid and safety awareness.
Proposed Mitigation Measures	Operators and maintenance contactors must be properly trained on safety and health issues. Workers should be fully equipped with personal protective equipment gear.
Proposed Monitoring	Regular inspection and incident monitoring report evaluation.
Responsible Body	ECO-SENSE TRADING ENTERPRISES CC

Noise Impact

Construction phase	
Description	An increase of ambient noise levels at the LPG Facility is expected due to the construction activities. Noise pollution due to heavy-duty equipment and machinery will be generated. It is not expected that the noise generated during construction will impact any third parties.
Proposed Mitigation Measures	Sensitive construction vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used. Ensure engines of machinery are fitted with mufflers. Equipment and machinery operators should be equipped with ear protection equipment. Operations should be strictly between 07H00 to 19H00.
Proposed Monitoring	Strict operational times. Regular inspection.
Responsible Party	ECO-SENSE TRADING ENTERPRISES CC /Contractors

Operational phase	
Description	Noise pollution already exists around the site in the form of noise generated from vehicles frequenting the existing D1473 Road. Noise pollution due to this projecting the operational phase is expected to be mainly from generators or pumps, road maintenance machinery during maintenance.
Proposed Mitigation Measures	Ensure that generator engines are fitted with mufflers. Operators working in close proximity to the generators should be equipped with ear protection equipment, when noise becomes an issue. Observation of on-site noise levels by the Manager or Supervisor of Bulk Services Maintenance Department.
Proposed Monitoring	Observation of on-site noise levels.
Responsible Body	ECO-SENSE TRADING ENTERPRISES CC

Waste Generation

Construction phase	
Description	This can be in a form of rubble, cement bags, pipe and electrical wire cuttings. Contaminated soil due to oil leakages, lubricants and grease from the contruction equipment and machinery may also be generated during the construction phase.
Proposed Mitigation Measures	The oil leakages, lubricants and grease must be addressed. Contaminated soil must be removed and disposed off at the hazardous waste cell at Kupferberg Landfill. The contractor must provide containers on-site, to store any hazardous waste produced. Ensure that no excavated soil, refuse or building rubble generated on site are not placed, dumped or deposited on adjacent/surrounding properties or land.
Proposed Monitoring	Regular inspection and housekeeping procedure monitoring. Observation of site appearance by the manager.
Responsible Party	ECO-SENSE TRADING ENTERPRISES CC /Contractors

Operational phase	
Description	Waste in the form of contaminated soil, rubble and domestic waste. Littering along access roads may also be produced during the operational phase.
Proposed Mitigation Measures	Waste must be removed and disposed off at Kupferberg Landfill by City of Windhoek Waste Removal Contractors e.g. Rent-a-Drum, Kleen Tek etc.
Proposed Monitoring	Regular visual inspection.
Responsible Body	ECO-SENSE TRADING ENTERPRISES CC

Traffic

Construction phase	
Description	Construction activities of the LPG Facility are expected to have a minor impact on the movement of traffic along D1473 Road, could have an impact on traffic around the area. No diversion of traffic or closure of roads is expected. Speed limit warning signs must be erected to minimise accidents. Heavy-duty vehicles and machinery must be tagged with reflective signs or tapes to maximise visibility and avoid accidents.
Proposed Mitigation Measures	It is recommended that if the need arises for traffic diversion or road closure, ECO-SENSE TRADING ENTERPRISES CC should liaise with the City of Windhoek. Speed limit and site warning signs must be erected to minimise accidents. Construction vehicles must be tagged with reflective signs or tapes to maximise visibility of the vehicles and avoid accidents.
Proposed Monitoring	Observations of the traffic flow on D1473 Road.
Responsible Party	ECO-SENSE TRADING ENTERPRISES CC /Contractors

Operational phase	
Description	Traffic around the LPG Facility should be monitored, to avoid traffic congestion in the area. Speed limits and road signs as set out by City of Windhoek Traffic Department should be adhered to in order to minimise accidents.
Proposed Mitigation Measures	It is advisable that speed humps must be installed when too many accidents occur around the area..
Proposed Monitoring	Observations of the traffic flow on D1473 Road.
Responsible Body	ECO-SENSE TRADING ENTERPRISES CC

Ecological impacts

Construction phase	
Description	The vegetation at the area is typically re-growth of invasive plants after disturbances. No red-listed species were encountered during the survey.
Proposed Mitigation Measures	Disturbance of areas outside the designated working zone is not allowed. Caution must be exercised to minimise damage to protected trees. It is strongly recommended that these indigenous trees be plant for shade and can contribute positively to the general aesthetics of the proposed development. In addition, indigenous tree species are incredibly hardy and well adapted to Namibia's harsh and often unpredictable climatic conditions; and require significantly low amounts of water to grow & survive.
Proposed Monitoring	Regular site inspection by the Site Manager or Supervisor.
Responsible Party	ECO-SENSE TRADING ENTERPRISES CC /Contractors

Operational phase	
Description	No impacts are expected as the proposed LPG Facility is in the operational phase.
Proposed Mitigation Measures	Minimise the area of disturbance by restricting movement to the designated working areas during maintenance.
Proposed Monitoring	Regular site inspection by the Site Manager or Supervisor.
Responsible Body	ECO-SENSE TRADING ENTERPRISES CC

Erosion and sedimentation

Construction phase	
Description	Vegetation clearance and creation of impermeable surfaces could result in erosion in areas across the site. The site is already cleared of vegetation and thus decreasing infiltration, and increasing both the quantity and velocity of surface water runoff. The particles in suspension will be transported towards the north and could increase the sedimentation in the Aretaragas river tributaries flowing in the northern direction. The proposed development will increase the amount of impermeable surfaces and therefore decrease the amount of groundwater infiltration. As a result, the amount of storm water during rainfall events could increase.
Proposed Mitigation Measures	Implementation of proper storm water management measures should be conducted as to prevent negative impact on the water courses in the area.
Proposed Monitoring	Regular visual site inspection.
Responsible Party	ECO-SENSE TRADING ENTERPRISES CC /Contractors

Failure of reticulation pipelines

Operational phase	
Description	Potential release of sewage, chemicals, storm-water, water, into the environment due to pipeline/system failure. As a result, the spillage could be released into the environment and could potentially be a health hazard to surface and groundwater.
Proposed Mitigation Measures	Proper reticulation pipelines and drainage systems should be installed. Regular infrastructure and system inspection should be conducted.
Proposed Monitoring	Regular visual site inspection.
Responsible Body	ECO-SENSE TRADING ENTERPRISES CC

Nuisance Pollution

Construction phase	
Description	Aesthetics and inconvenience caused to persons using D1473 Road road and surrounding areas.
Proposed Mitigation Measures	The Technical Manager or Supervisor should maintain tidiness on site at all times. Take cognition when parking vehicles and placing equipment.
Proposed Monitoring	Regular visual inspection.
Responsible Party	ECO-SENSE TRADING ENTERPRISES CC /Contractors

4. 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 officer/consultant will need to monitor or audit the site throughout construction and operation phase to ensure that the EMP is fully implemented and complied with. The EMP caters for all project phases, but will need to be reviewed during all phases of project, especially when revisions are made to the project development plans.

The Environmental Management Plan should be used as an on-site tool during all phases of the proposed project. Parties responsible for contravention of the EMP should be held responsible for any rehabilitation that may need to be undertaken.

Clearance certificates issued on EMPs are only valid for 3 years and will need to be reviewed and submitted to the Department of Environmental Affairs again for approval.

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