

APP- 003237

# **BULK FUEL STORAGE FACILITY OF VIVO ENERGY IN TSUMEB**

## **UPDATED ENVIRONMENTAL MANAGEMENT PLAN**



Assessed by:




Assessed for:



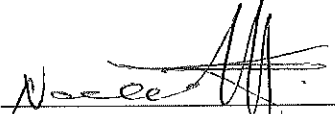
November 2021



<b>Project</b>	<b>UPDATED ENVIRONMENTAL MANAGEMENT PLAN FOR THE BULK FUEL STORAGE FACILITY OF VIVO ENERGY IN TSUMEB</b>	
<b>Report Date</b>	November 2021	
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<b>Report Approval</b>	 André Faul Conservation Ecology	

I NESTOR HAINANA acting as the representative of Vivo Energy Namibia, hereby confirm that we approve the Environmental Management Plan as presented in this document. All material information in the possession of the proponent that reasonably has or may have the potential of influencing the Environmental Management Plan was provided to the consultant.

Signed at WINDHOEK on the 07 day of DECEMBER 2021.

  
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 Vivo Energy Namibia (Pty) Ltd

\_\_\_\_\_ Company Registration Number / ID



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## **LIST OF ABBREVIATIONS**

<b>AIDS</b>	Acquired Immune Deficiency Syndrome
<b>EIA</b>	Environmental Impact Assessment
<b>EMP</b>	Environmental Management Plan
<b>EMS</b>	Environmental Management System
<b>HIV</b>	Human Immunodeficiency Virus
<b>LNAPL</b>	Light Non-Aqueous Phase Liquids
<b>MEFT</b>	Ministry of Environment, Forestry and Tourism
<b>MSDS</b>	Material Safety Data Sheet
<b>PPE</b>	Personal Protective Equipment
<b>SANS</b>	South African National Standards
<b>WHO</b>	World Health Organization

## **GLOSSARY OF TERMS**

**Assessment** - The process of collecting, organising, analysing, interpreting and communicating information relevant to decision making.

**Competent Authority** - means a body or person empowered under the local authorities act or Environmental Management Act to enforce the rule of law.

**Construction** - means the building, erection or modification of a facility, structure or infrastructure that is necessary for the undertaking of an activity, including the modification, alteration, upgrading or decommissioning of such facility, structure or infrastructure.

**Cumulative Impacts** - in relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

**Environment** - As defined in the Environmental Assessment Policy and Environmental Management Act - "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, palaeontological or social values".

**Environmental Impact Assessment (EIA)** - process of assessment of the effects of a development on the environment.

**Environmental Management Plan (EMP)** - A working document on environmental and socio-economic mitigation measures, which must be implemented by several responsible parties during all the phases of the proposed project.

**Environmental Management System (EMS)** - An Environment Management System, or EMS, is a comprehensive approach to managing environmental issues, integrating environment-oriented thinking into every aspect of business management. An EMS ensures environmental considerations are a priority, along with other concerns such as costs, product quality, investments, PR productivity and strategic planning. An EMS generally makes a positive impact on a company's bottom line. It increases efficiency and focuses on customer needs and marketplace conditions, improving both the company's financial and environmental performance. By using an EMS to convert environmental problems into commercial opportunities, companies usually become more competitive.

**Evaluation** – means the process of ascertaining the relative importance or significance of information, the light of people's values, preference and judgements in order to make a decision.

**Hazard** - Anything that has the potential to cause damage to life, property and/or the environment. The hazard of a particular material or installation is constant; that is, it would present the same hazard wherever it was present.

**Mitigate** - The implementation of practical measures to reduce adverse impacts.

**Proponent (Applicant)** - Any person who has submitted or intends to submit an application for an authorisation, as legislated by the Environmental Management Act no. 7 of 2007, to undertake an activity or activities identified as a listed activity or listed activities; or in any other notice published by the Minister or Ministry of Environment, Forestry and Tourism.

**Public** - Citizens who have diverse cultural, educational, political and socio-economic characteristics. The public is not a homogeneous and unified group of people with a set of agreed common interests and aims. There is no single public. There are a number of publics, some of whom may emerge at any time during the process depending on their particular concerns and the issues involved.

**Significant Effect/Impact** - means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

## 1 OBJECTIVES OF THE EMP

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Vivo Energy Namibia (Pty) Ltd (the Proponent) requested Geo Pollution Technologies (Pty) Ltd to update the existing environmental management plan (EMP) for the Vivo Energy bulk fuel storage facility (depot) for petroleum products in Tsumeb. The updated EMP will be submitted to the Ministry of Environment, Forestry and Tourism (MEFT) to renew the existing environmental clearance certificate (ECC) of the facility. The renewed ECC is required for operations and construction (care and maintenance) of their bulk fuel storage facility situated at the corner of the B1 and M75 roads in the industrial area of Tsumeb. The property is currently zoned for industrial purposes. Operations of the bulk fuel storage facility include receipt of fuel by rail and road and its storage in bulk storage tanks. Fuel is pumped into road transport tankers for nationwide distribution to fuel retail facilities and other clients. A customer own collection point is also present on site for wholesale customers. Day to day activities include general operational activities and maintenance procedures associated with a bulk fuel storage facility.

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

The objectives of the EMP are:

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

## 2 THE EMP

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The following general guidance for the EMP is based on the findings of the EIA and risk assessment carried out by Geo Pollution Technologies (Faul et al., 2014).

### 2.1 Land Use, Planning, Design, Operations – Identified Impacts

The following is the summary of the assessment of impacts:

- ◆ The existing facility adheres to Namibian laws and the codes regulating the use of hazardous material.
- ◆ The current zoning designates the area as suitable for the continued operation of the facility;
- ◆ The immediate neighbours constitute like industry;
- ◆ The risk of an accident/incident causing fires or explosions is considered to be high. Human factors have been considered and the best engineering has gone in to the creation of a very safe facility. If a fire or explosion was to occur and the necessary engineered structures were not in place there would be a significant possible impact on the adjoining industrial properties.

### 2.2 Land Use, Planning, Design, Operations – Mitigating Measures

The following is a summary of the proposed EMP, which will aim at reducing risk associated with the facility, taking into consideration all the risk perceptions raised by all stakeholders:

- ◆ To prevent product loss where rupture of pipeline or hose might occur during the offloading operation, all nozzles on the road tankers tanks are fitted with excess flow check valves. These are designed to allow only specific flow rates and the moment it exceeds this, the process is stopped. Small quantities lying in the hose that could leak will be captured by spill containment structures.

- ◆ Fire and explosion events are eliminated through the existence firefighting equipment and an emergency reservoir.
- ◆ The existing firefighting equipment is more than adequate to meet with possible emergencies.
- ◆ Training of personnel and regular firefighting exercises should be carried out pertaining to the location and use of existing firefighting equipment and safety controls, like emergency shut down switches, extinguishers etc. This would reduce the risk of fire and its spread to neighbouring properties.
- ◆ The bulk fuel storage facility does not pose any substantial ecological threat to the environment in the vicinity of Tsumeb. Contamination of soils or groundwater is prevented through safe work practices, engineered safety devices and spill containment structures.

### **3 THE IMPLEMENTATION OF THE EMP**

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Table 1 to Table 3 outline the management of the environmental elements that may be affected by the different activities, grouped in each phase of development. These groups are as follows:

- ◆ Planning Phase
- ◆ Operational Phase
- ◆ Maintenance and Decommissioning Phases

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

All monitoring results must be reported on as indicated. Reporting is important for any future renewals of the ECC and must be submitted to the Ministry of Environment, Forestry and Tourism. Renewal of ECC will require bi-annual reports based on the monitoring prescribed in this EMP.

Various potential and definite impacts will emanate from the operations, construction and decommissioning phases. The majority of these impacts can be mitigated or prevented. The impacts as well as prevention and mitigation measures are listed below.



Table 1. Planning for Operations, Maintenance and Future Decommissioning of the Project

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
<b>Compliance</b>	To comply with all legal requirements for the operations of the facility in Namibia.	Apply for / renew the necessary permits from the various ministries, local authorities and any other bodies that governs the operations of the proposed activity. Have environmental clearance certificate and petroleum products licence available on site. Finalise negotiations and resolve any outstanding issues, if any, over the allocation of user rights and zoning of the property on which the proposed activity will be located.	During operations as well as possible future maintenance or decommissioning of the development	All contracts, permits, certificates and other legal documents on file.	Proponent
<b>Appointments</b>	To appoint reputable contractors and operational personnel and establish the EMP, a legal requirement that forms part of the contract with the contractor and employees.	Appoint a contractor and employees and enter into an agreement which includes the EMP. Ensure that the contents of the EMP are understood by the contractor, sub-contractors, employees and all personnel who will be present on site.	During operations as well as possible future maintenance or decommissioning of the development	Contracts on file	Proponent and Contractor
<b>Management</b>	Establish a management system to implement and monitor Health, Safety and Environment.	Make provisions to have a Health, Safety and Environmental Coordinator to implement the EMP and oversee occupational health and safety as well as general environmental related compliance at the site. Allocate the responsibility of liaison officer to a dedicated staff member who will be responsible for dealing with complaints and communication with neighbours and other potentially impacted parties (when required). Have the following emergency plans, equipment and personnel in place to deal	During operations as well as possible future maintenance or decommissioning of the development	Documentation on file Personal Protection Equipment (PPE) on site Signage related to restricted areas, dangerous areas, and PPE requirements on site Emergency response material on site	Proponent and Contractor

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
		<p>with all emergencies: Risk Management / Mitigation / Environmental Management Plan/ Emergency Response Plan and HSE Manuals</p> <p>Adequate protection and indemnity insurance cover for incidents;</p> <p>Comply with the provisions of all relevant safety standards;</p> <p>Procedures, equipment and materials required for emergencies.</p>			
<b>Restoration Fund/Insurance</b>	To establish a fund/insurance for future environmental restoration or pollution remediation if ever required.	To establish a fund for future ecological restoration of the project site should project activities cease and the site is decommissioned and/or when environmental restoration or pollution remediation is required.	Throughout operations	Financial statements/proof of restoration fund/insurance	Proponent
<b>Reporting</b>	To establish a reporting system to report on monitoring aspects of operations, maintenance and decommissioning as outlined in the EMP.	Establish a bi-annual reporting system to report on aspects of operations, maintenance and decommissioning as outlined in the EMP. Submit bi-annual monitoring reports to MEFT in support of future environmental clearance certificate renewal.	During operations as well as possible future maintenance or decommissioning of the development	Bi-annual monitoring reports	Proponent and Contractor
<b>Environmental Clearance Renewal</b>	To renew the environmental clearance certificate every three years.	Appoint a specialist environmental consultant to update the EIA and/or EMP and apply for renewal of the environmental clearance certificate.	Prior to expiry of environmental clearance certificate	Renewed environmental clearance certificate	Proponent; Independent Specialist Consultant

Table 2. The Operational Phase

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Enhanced skills and technology transfer to Tsumeb and subsequent promotion of economic development	People need skills to perform their jobs. The technology to do something is often not found locally. Development of people and technology are key to economic development.	Source local employees or contractors where possible. Skills development and improvement programs to be made available as identified during performance assessments. Employees to be informed about parameters and requirements for references upon employment. The proponent must employ Namibians where possible. Deviations from this practise should be justified appropriately.	Bi-annual summary report based on actual training and the enhancement of skills and transfer of technology should be compiled.	Proponent
Demographic and Community Health	New developments attract people who seek work. This in turn can increase the extent of informal settlements and its associated problems. The increased trucking and distribution of goods to and via could contribute to the spread of HIV / AIDS.	The implementation of an educational program on HIV / AIDS for all the staff of Vivo Energy in particular the truck drivers are imperative. Restricted employment for locals only should be practiced. Deviations from this practice should be justified appropriately. Training of local people should be considered from the start. These measures will reduce the influx of newcomers to the town and thereby reduce growth in the informal settlement.	Bi-annual summary report based on demographics, employee educational programmes and training conducted.	Proponent and Contractor
Employment & Secure Fuel Supply	The continued operation aid in securing the supply of fuel to the region and northern Namibia The facility provides employment to the inhabitants of Tsumeb.	Ensure compliance to the petroleum regulations of Namibia. Proper fuel management to ensure constant supply. Record supply problems and take corrective actions.	Profiling of employees on their job responsibilities and achievements and reporting on these will portray the company as a people centred organisation.	Proponent.
Traffic	The site is located in at the corner of the B1 and M75 roads in Tsumeb. Impact from traffic to and from the site is assessed. Trucks must enter and leave the site for every on loading event. Access to the facility is off the B1 road.	Erect clear signage regarding access and exit points at the facility. Tanker trucks delivering fuel should not be allowed to obstruct any traffic in surrounding streets. If any traffic impacts are expected, traffic management should be performed to prevent these. The placement of signs to warn and direct traffic will	A register of trucks arriving and leaving the premises and length of stay will be kept. Bi-annual report on any complaints received regarding traffic issues.	Proponent and Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
<p>Fire and Explosion Hazard</p>	<p>Volatile hydrocarbons are extremely flammable and pose a high risk. These hydrocarbons can release considerable vapour at temperatures even below ambient, which readily form flammable mixtures. Vapours settle to ground level and may reach ignition sources remote from the point of escape via drains and other underground passages.</p> <p>Hydrocarbons can accumulate a static charge, which may cause a fire or explosion. Refer to the relevant material safety data sheets (MSDS).</p> <p>Exposure of the product to the air or ground where it can be ignited could be as a result of the following incidents or actions:-</p> <ul style="list-style-type: none"> <li>● Breakage of offloading pipe</li> <li>● Overfilling of tank</li> <li>● Valve malfunction</li> <li>● Gasket or valves plus pump seal - leaks</li> <li>● Driving off with offloading pipe and earth cable connected.</li> <li>● Pipe coupling/nozzle jumping off of tank nozzle</li> <li>● Drain back facility coupling/nozzle jumping out of tank inlet.</li> <li>● Not following procedures.</li> <li>● Working on under pressurised pipelines</li> <li>● Overfilling of vehicle tank results in fire</li> <li>● Cell phones and open flames</li> </ul>	<p>mitigate traffic impacts.</p> <p>A holistic fire protection and prevention plan is needed. This plan must include an emergency response plan, firefighting plan and spill recovery plan and should be done in conjunction with neighbouring fuel storage facilities.</p> <p>Maintain firefighting equipment, good housekeeping and personnel training (firefighting, fire prevention and responsible housekeeping practices).</p> <p>Ensure all chemicals are stored according to MSDS and SANS instructions.</p> <p>Maintain regular site, mechanical and electrical inspections and maintenance.</p> <p>Clean all spills / leaks.</p> <p>Special note must be taken of the regulations stipulated in sections 47 and 48 of the Petroleum Products and Energy Act, 1990 (Act No. 13 of 1990).</p> <p>Follow SANS standards for operation and maintenance of the facility.</p> <p>All dispensers must be equipped with devices that cut fuel supply during fires.</p> <p>Ensure all gantry attendants are trained on the importance of correct filling procedures such as earthing when filling with hydrocarbons which can accumulate static electricity.</p> <p>Correct storage methods should be followed for hydrocarbons, including grounding of containers and storage in banded areas.</p> <p>Train locomotives may not enter the yard / gantry area.</p> <p>In case of a fire, the firefighting plan must be initiated immediately and all emergency procedures must be performed as practiced during training. This includes emergency sirens, notifying the fire brigade and</p>	<p>A register of all incidents must be maintained on a daily basis. This should include measures taken to ensure that such incidents do not repeat themselves.</p> <p>A bi-annual report should be compiled of all incidents reported. The report should contain dates when fire drills were conducted and when fire equipment was tested and training given</p>	<p>Proponent and Contractor</p>

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	<ul style="list-style-type: none"> <li>● Spilled product from leaking valves and nozzles.</li> <li>● Housekeeping.</li> <li>● Leaking tanks</li> <li>● Leaking pipelines</li> <li>● Bonding cable defective.</li> <li>● Running of vehicle engines at the site.</li> <li>● Spilled product from leaking valves and nozzles.</li> <li>● Opening electrical equipment.</li> </ul>	neighbouring depot, engaging emergency stops, using firefighting infrastructure, evacuation, etc.		
Health, Safety and Security	<p>Every activity associated with the operational phase is reliant on human labour and therefore exposes them to health and safety risks. Activities such as the operation of machinery and handling of hazardous chemicals (inhalation and carcinogenic effect of some petroleum products), poses the main risks to employees. Security risks are related to unauthorized entry, theft and sabotage.</p>	<p>Clearly label dangerous and restricted areas as well as dangerous equipment and products.</p> <p>Equipment that will be locked away on site must be placed in a way that does not encourage criminal activities (e.g. theft).</p> <p>Provide all employees with required and adequate personal protective equipment (PPE) and ensure that all personnel receive adequate training on operation of equipment / handling of hazardous substances.</p> <p>All Health and Safety standards specified in the Labour Act should be complied with.</p> <p>Implementation of maintenance register for all equipment and fuel/hazardous substance storage areas.</p> <p>Selected personnel should be trained in first aid and a first aid kit must be available on site. The contact details of all emergency services must be readily available.</p> <p>Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool, which includes: colour coding of pipes, operational, safe work and medical procedures, permits to work, emergency response plans, housekeeping rules, MSDS's and signage requirements (PPE, flammable etc.).</p>	<p>Any incidents must be recorded with action taken to prevent future occurrences.</p> <p>A bi-annual report should be compiled of all incidents reported. The report should contain dates when training were conducted and when safety equipment and structures were inspected and maintained.</p>	Proponent Contractor and

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Air Quality	Fuel vapours are released into the air during refuelling of bulk storage tanks as well as at filling points. Prolonged exposure may have carcinogenic effects. Dust may be generated should any construction take place.	Security procedures and proper security measures must be in place to protect workers and clients. Strict security that prevents unauthorised entry. Personnel issued with appropriate masks where excessive dust or vapours are present. A complaints register should be kept for any dust related issues and mitigation steps taken to address complaints where necessary e.g. dust suppression. Employees should be coached on the dangers of fuel vapours.	Testing of air at various points around the storage tanks, pipelines, immediate vicinity of the property and selected distances further away from outside of the property should be conducted on a bi-annual basis or sooner if an increase in released gasses is suspected. A bi-annual report of complaints received and remediation taken should be compiled.	Proponent
Noise	Noise pollution will exist due to vehicles accessing the site for filling and fuel tankers delivering fuel.	The World Health Organization (WHO) guideline on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment in commercial areas should be considered. This limits noise levels to an average of 70 dB over a 24 hour period with maximum noise levels not exceeding 110 dB during the period. All machinery must be regularly serviced to ensure minimal noise production. Hearing protectors as standard PPE for workers in situations with elevated noise levels.	Any complaints received regarding excessive noise should be recorded with notes on action taken. All data to be compiled in a bi-annual report.	Proponent
Waste Production	Various waste streams are produced during the operational phase. Waste may include hazardous waste associated with the handling of hydrocarbon products. Domestic waste	Waste reduction measures should be implemented and all waste that can be re-used / recycled must be kept separate. Ensure adequate waste storage facilities are available. Ensure waste cannot be blown away by wind.	A register of hazardous waste disposal should be kept. This should include type of waste, volume as well as disposal	Proponent and Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	<p>is generated by the facility and related operations. Waste presents a contamination risk and when not removed regularly may become a fire hazard. Construction waste may include building rubble and discarded equipment contaminated by hydrocarbon products. Contaminated soil and water is considered as a hazardous waste.</p>	<p>Prevent scavenging (human and non-human) of stored waste.</p> <p>Waste should be disposed of regularly and at appropriately classified disposal facilities, this includes hazardous material (empty chemical containers, contaminated rugs, paper water and soil).</p> <p>The spill catchment traps and oil water separator should be cleaned regularly and waste disposed of appropriately. Surfactants (soap) may not be allowed to enter the oil water separator.</p> <p>See the material safety data sheets available from suppliers for disposal of contaminated products and empty containers.</p> <p>Liaise with the municipality regarding waste and handling of hazardous waste.</p>	<p>method/facility.</p> <p>Any complaints received regarding waste should be recorded with notes on action taken.</p> <p>All data to be compiled in a bi-annual report.</p>	
<p>Groundwater, Surface Water and Soil Contamination</p>	<p>Porous surface substrate can allow unwanted hazardous and ecologically detrimental substances to seep down to the water table. The surface substrate is a porous.</p> <p>Surface runoff from the site is expected in a northern direction. Runoff of pollutants from the site is not expected to reach any nearby river due to the spill control structures in place and the design of the facility. It is unlikely that a release of fuel would cause an impact on any nearby surface water.</p> <p>Groundwater is utilized in the immediate and should be protected at all costs. Nearby geological structures may provide preferential pathways to sensitive groundwater sources and this</p>	<p>The following measures must be employed to prevent spillage into surface water drainage channels and groundwater sources:-</p> <ul style="list-style-type: none"> <li>● Spill control structures and procedures must be in place according to SANS 10089 standards or better, including impounding around the loading areas by bunding with appropriate slopes of 1:100.</li> <li>● All fuelling should be conducted on surfaces provided for this purpose. E.g. Concrete slabs with regularly maintained seals between slabs.</li> <li>● The procedures followed to prevent environmental damage during service and maintenance, and compliance with these procedures, including the correct use of sumps and regular reporting of spillages must be audited and corrections made where necessary.</li> <li>● Proper training of operators must be conducted on a regular basis.</li> <li>● Any spillage of more than 200 l must be reported to the relevant authorities and remediation instituted.</li> </ul>	<p>A bi-annual report should be compiled of all spills or leakages reported. The report should contain the following information:</p> <ul style="list-style-type: none"> <li>● Date and duration of spill</li> <li>● Product spilled</li> <li>● Volume of spill</li> <li>● Remedial action taken</li> <li>● Comparison of pre-exposure baseline data with post remediation data (e.g. soil hydrocarbon concentrations)</li> <li>● Copy of documentation in which spill was reported to Ministry of</li> </ul>	<p>Proponent and Contractor</p>

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	<p>should be prevented at all cost.</p> <p>Proper containment mechanisms installed should contain any release that might take place from spillages during operation of the facility.</p>	<ul style="list-style-type: none"> <li>● Spill clean-up means must be available on site as per the relevant Material Safety Data Sheets</li> <li>● Extension of the bund area at the rail gantry right up to the exit gate will ensure that any product leaked on the premises is collected. Even though TransNamib is responsible to ensure that their rail tankers are fit for transporting fuel, the land is ultimately Vivo Energy's responsibility.</li> <li>● Contingencies for the changes in pressure and temperature between Walvis Bay and Tsumeb must be in place when filling rail tankers in Walvis Bay. Overfilling of the tanks in Walvis Bay can cause product loss on route as release valves compensate for volume changes due to lower pressure and higher temperatures in Tsumeb. Rail tankers arriving in the morning could release liquid fuel as temperatures rise. If these tankers are not positioned over bunded areas soil contamination will occur. During the rainy season this fuel can be carried away to nearby drainage systems or infiltration towards the water table can ensue.</li> </ul>	<p>Mines and Energy</p>	
<p>Ecological Impact</p>	<p>The effect of operational activities on the ecosystem functioning and biodiversity.</p> <p>The facility has occupied the land for many years and due to the nature of the operations no vegetation whether alive or dead may grow or accumulate.</p>	<p>The nesting of birds should be discouraged. Changes to buildings should take into account the habitats that can be created inadvertently by certain architectural or engineering designs.</p> <p>Staff should be informed of the value of biodiversity. Contact details of responsible organizations or people who can remove problem or injured animals should be kept on site.</p> <p>The continued operations will have little impact on the surrounding ecosystems. No significant impact on the biodiversity of the area is predicted as a result of the facility's continued functioning.</p>	<p>A record should be kept of any extraordinary sightings or encounters on fauna site.</p> <p>All data to be compiled in a bi-annual report.</p>	<p>Proponent and Contractor</p>
<p>Visual Impact</p>	<p>This is an impact that affects the</p>	<p>No specific measures need to be implemented to maintain a similar visual impact to other buildings. Routine</p>	<p>A bi-annual report should be compiled of all</p>	<p>Proponent and</p>



Criteria	Nature	Mitigation	Monitoring	Responsible Body
	<p>aesthetic appearance.</p> <p>The infrastructure will not have a significant effect on the visual horizon.</p>	<p>maintenance on infrastructure will ensure that the longevity of structures is maximised. However, it is important that the real integrity of the structures is considered in the long term and not just appearances.</p>	<p>complaints reported.</p>	<p>Contractor</p>
<p>Cumulative Impact</p>	<p>Possible cumulative impacts associated with the operational phase include increase in traffic frequenting the site and along the section of road near the fuel depot due to increased demand for fuel in the region. Therefore increase in emissions from these vehicles, decreasing the air quality around the proposed establishment. Wear and tear on the road and increased risk of road traffic incidences could increase. Other companies are using the roads to access the industrial area. Trucks parked at The Facility and the use of the facilities overnight stays could have health implications through lack of well-maintained garbage removal and ablation amenities.</p> <p>Accumulated lack of maintenance on bund walls and tanks could reduce the integrity and safety of the whole depot and affect many of the impacts discussed.</p>	<p>Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact.</p> <p>Reviewing biannual reports for any new or re-occurring impacts or problems would aid in identifying cumulative impacts and help in planning if the existing mitigations are insufficient..</p>	<p>Bi-annual summary reports based on all other impacts will give an overall assessment of the impact of the Operational Phase.</p>	<p>Proponent Contractor</p> <p>and</p>

Table 3. Maintenance and Decommissioning Phases

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Waste Production	Upon decommissioning waste will be produced in the form of building rubble, obsolete equipment and structures, obsolete or residual products and equipment or structures that can be used elsewhere or sold as scrap.	To reduce the amount of waste all re-usable pipelines, pumps, tanks, valves and other equipment must be removed to another site owned by Vivo Energy or sold. Storage tanks may not be sold to anyone other than to a scrap metal dealer for recycling purposes. Those items that cannot be used again must be scrapped in the appropriate manner. Upon demolition of the buildings and concrete the rubble must be removed from the property and taken to an approved designated dumpsite. Rehabilitations if necessary are to be done using funds designated for the purpose.	Regular visual inspection. A register of waste produced and disposal methods should be maintained.	Proponent and Contractor
Ecological Impact	Operations spanning many years may create new habitat for fauna and flora. Upon decommissioning these habitats will be destroyed.	Vivo Energy would have to ensure that no new habitat is created for flora and fauna. Before decommissioning the HSE would need to inspect every structural facility to ensure that the dismantling and removal of any structure would not affect any organism that has become dependent on those structures for survival, shelter or breeding. Where new habitats were created, that is now occupied by fauna or flora, Vivo Energy must contact MEFT or other appropriate organizations to establish the conservation status of it. The possibility of relocating the fauna or flora must be investigated and executed. Should the species be listed as vulnerable to extinction, or worse, a meeting should be held with MEFT in order to determine the appropriate handling of the situation.	A report should be compiled of any fauna and flora that established itself on the premises. The report should include all actions taken to relocate or deal with the situation.	Proponent and Contractor
Employment & Secure Supply	Decommissioning of the facility may lead to retrenchments or re-location of staff no longer required. Fuel supply to the town may be	Plan in advance for meeting the Labour Acts requirements for retrenching of staff if required. Where possible staff can be relocated to another facility or town where business continues in the same way.	During normal operations of the facility, planning should include handling of employees should the facility be decommissioned.	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	negatively influenced if alternative depots cannot handle demand.	Alternative fuel companies must be informed of the decommissioning plans to allow them to adequately plan for increased demand of fuel in area.	The plans should include budgeting for retrenchments and possible alternative positions elsewhere. An annual report should be compiled with total volumes of fuel handled in order to appropriately cater for the increase in demand for fuel at alternative depots.	
Dust	Dust will be generated during the Decommissioning Phase and might be aggravated during periods of strong winds.	It is recommended that regular dust suppression be included in the Decommissioning Phase, when dust becomes an issue. Personnel should be issued with dust masks for health and safety reasons. Accumulation of rubble should not be allowed and must be taken to the dumpsite within reasonable time.	Regular visual inspection. A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon.	Proponent and Contractor
Noise	Noise pollution will exist due to heavy vehicles accessing the site to collect rubble from demolished building materials. Cranes may be used for removing the storage tanks. Hammers, diggers and drills will be used.	The World Health Organization (WHO) guideline on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment can be followed during the decommissioning phase. This limits noise levels to an average of 70 dB over a 24 hour period with maximum noise levels not exceeding 110 dB during the period.	A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon.	Proponent and Contractor
Visual Impact	This is an impact that affects the aesthetic appearance	Visual impact could pose one of the most significant impacts. Visual impacts could be limited through keeping all decommissioned areas clean and orderly at all times. Good housekeeping also reduces the risk of injuries. Notice of the start of the decommissioning should be given to the local authorities with an invitation to give feedback at any time with regards the visual impact.	A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon.	Proponent and Contractor
Groundwater, Surface Water	Porous substrate can allow unwanted hazardous and ecologically	All precautions are to be taken to prevent contamination of the soil as this could enter the ecosystem. Leverages from	Report form for all spills or leaks is to be completed by	Proponent and Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Soil Contamination	detrimental substances to seep down to the water table.	<p>vehicles might occur especially if they are serviced on site. Care must be taken to avoid contamination of soil and groundwater. Groundwater might spread pollutants to neighbouring receptors and may create an impact on underground utilities (i.e. fresh water supply to buildings, sewerage system). Pollutants in the soil and building rubble must be transported away from the site to an approved, appropriately classified waste disposal site.</p> <p>Confirm MSDS information for any remaining fuels, oils or lubricants that must be discarded.</p> <p>Regulations on sewerage discharge and the chemicals that may and may not be put into the sewerage system must be followed.</p>	<p>Contractor for Vivo Energy and submitted to the HSE.</p> <p>A baseline study must be carried out after the decommissioning. This is to assess the condition of soil substrate and any groundwater present. Comparisons with pre-construction baseline data is to be made and any discrepancies must be addressed before the site can be signed over.</p>	
Health, Safety and Security	During the Decommissioning Phase similar risks to human beings as with previous phases will be present. Once the tanks and pipelines have been emptied completely of their contents residual amounts of fuel might exist. All other risks associated with demolitions must be considered.	<p>The decommissioning of a depot can cause serious health and safety risks to workers on site. Occupational exposures are normally related to dermal contact with fuels and inhalation of fuel vapours during handling of such products. For this reason adequate measures must be brought in place to ensure safety of staff on site, and includes: (Provide forms for all end users who monitor)</p> <ul style="list-style-type: none"> <li>● Proper training of operators;</li> <li>● First aid treatment;</li> <li>● Medical assistance;</li> <li>● Emergency treatment;</li> <li>● Prevention of inhalation of fumes (fuel);</li> <li>● Protective clothing, footwear, gloves and belts; safety goggles and shields;</li> <li>● Manuals and training regarding the correct handling of materials and packages should be in place and updated as new or updated material safety data sheets become available; Risks might be lower but still exist especially if tanks must be entered for inspections. Confined Space Training will be required.</li> <li>● 24-hour security surveillance in case of opportunistic activities.</li> </ul>	<p>A register of all incidents must be maintained on a daily basis. This should include measures taken to ensure that such incidents do not repeat itself.</p>	Proponent and Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Fire and Explosion Hazard	Residual hydrocarbons could be present and might pose a risk to the teams dismantling the various structures. Fire and/or explosion events are still possible.	Various international occupational health and safety performances should be consulted for specific regulations regarding the decommissioning of the facility to ensure all risks are mitigated. All relevant regulations and precautions should be in place as it was during the Operational Phase. In addition, all personnel have to be sensitised about responsible fire protection measures and good housekeeping such as removal of flammable materials including rubbish, dry vegetation, and hydrocarbon-soaked soil from the vicinity of the facility. Regular inspections should still be carried out to inspect and test firefighting equipment and pollution control materials at the facility. All fire precautions and fire control must be in accordance with SANS, or better. The holistic fire protection and prevention plan should still be utilised. Experience has shown that the best chance to rapidly put out a major fire is in the first 5 minutes. It is important to recognise that a responsive fire prevention plan does not solely include the availability of firefighting equipment, but more importantly, it involves premeditated measures and activities to timeously prevent, curb and avoid conditions that may result in fires.	A register of all incidents must be maintained on a daily basis. This should include measures taken to ensure that such incidents do not repeat itself.	Proponent and Contractor

### 3.1 Environmental Management System

The proponent could implement an Environmental Management System (EMS) for their operations. An EMS is an internationally recognized and certified management system that will ensure ongoing incorporation of environmental constraints. At the heart of an EMS is the concept of continual improvement of environmental performance with resulting increases in operational efficiency, financial savings and reduction in environmental, health and safety risks. An effective EMS would need to include the following elements:

- ◆ A stated environmental policy which sets the desired level of environmental performance;
- ◆ An environmental legal register;
- ◆ An institutional structure which sets out the responsibility, authority, lines of communication and resources needed to implement the EMS;
- ◆ Identification of environmental, safety and health training needs;
- ◆ An environmental program(s) stipulating environmental objectives and targets to be met, and work instructions and controls to be applied in order to achieve compliance with the environmental policy; and
- ◆ Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS.
- ◆ The EMP

## 4 CONCLUSIONS

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

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

Monitoring reports must be submitted to the Ministry of Environment, Forestry and Tourism on a bi-annual basis to allow for the future renewal of the Environmental Clearance Certificate. This is a requirement by the MEFT.

## 5 REFERENCES

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Faul A, Botha P, Short S; 2014 June; Environmental Impact Assessment for the Bulk Fuel Storage Facility of Vivo Energy in Tsumeb.