

**APP-0010313**

**EXISTING NAMDEB TOWN DEPOT, ORANJEMUND  
ENVIRONMENTAL MANAGEMENT PLAN**



**Prepared by:**




**Prepared for:**




March 2022



<b>Project:</b>	<b>EXISTING NAMDEB TOWN DEPOT, ORANJEMUND: ENVIRONMENTAL MANAGEMENT PLAN</b>	
<b>Report: Version/Date:</b>	Final March 2022	
<b>Prepared for: (Proponent)</b>	Vivo Energy Namibia Limited P.O. Box 110 Windhoek Namibia.	
<b>Lead Consultant</b>	Geo Pollution Technologies (Pty) Ltd PO Box 11073 Windhoek Namibia	TEL.: (+264-61) 257411 FAX.: (+264) 88626368
<b>Main Project Team:</b>	<b>André Faul</b> (B.Sc. Zoology/Biochemistry); (B.Sc. (Hons) Zoology); (M.Sc. Conservation Ecology); (Ph.D. Medical Bioscience) <b>Wikus Coetzer</b> (B.Sc. Environmental and Biological Sciences); (B.Sc. (Hons) Environmental Sciences)	
<b>Cite this document as:</b>	Faul A, Coetzer W., 2022 March; Existing Namdeb Town Depot, Oranjemund: Environmental Management Plan	
<b>Copyright</b>	Copyright on this document is reserved. No part of this document may be utilised without the written permission of Geo Pollution Technologies (Pty) Ltd.	
<b>Report Approval</b>	 <b>André Faul</b> Conservation Ecologist	

I Amon !Gauseb acting as a representative of Vivo Energy Namibia, hereby confirm that the project description contained in this report is a true reflection of the information which the Proponent provided to Geo Pollution Technologies. All material information in the possession of the proponent that reasonably has or may have the potential of influencing any decision or the objectivity of this assessment is fairly represented in this report and the report is hereby approved.

Signed at Windhoek on the 14th day of June 2022.

  
Vivo Energy Namibia Limited

FOR/1975/0014  
Business Registration/ID Number



## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION.....</b>	<b>1</b>
<b>2</b>	<b>SCOPE .....</b>	<b>1</b>
<b>3</b>	<b>METHODOLOGY.....</b>	<b>2</b>
<b>4</b>	<b>FACILITY OPERATIONS AND RELATED ACTIVITIES.....</b>	<b>2</b>
<b>5</b>	<b>ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS .....</b>	<b>3</b>
<b>6</b>	<b>ENVIRONMENTAL CHARACTERISTICS.....</b>	<b>5</b>
6.1	LOCALITY AND SURROUNDING LAND USE .....	5
6.2	CLIMATE .....	5
6.3	TOPOGRAPHY AND DRAINAGE .....	6
6.4	GEOLOGY AND HYDROGEOLOGY .....	6
6.5	PUBLIC WATER SUPPLY .....	7
6.6	FAUNA AND FLORA .....	7
6.7	DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS.....	7
<b>7</b>	<b>ENVIRONMENTAL MANAGEMENT PLAN.....</b>	<b>8</b>
7.1	OBJECTIVES OF THE EMP.....	8
7.2	IMPLEMENTATION OF THE EMP .....	8
7.3	MANAGEMENT OF IMPACTS: OPERATIONS AND CONSTRUCTION.....	9
7.3.1	<i>Planning.....</i>	9
7.3.2	<i>Skills, Technology and Development .....</i>	10
7.3.3	<i>Revenue Generation and Employment.....</i>	11
7.3.4	<i>Demographic Profile and Community Health .....</i>	12
7.3.5	<i>Fuel Supply.....</i>	13
7.3.6	<i>Traffic .....</i>	14
7.3.7	<i>Health, Safety and Security.....</i>	15
7.3.8	<i>Fire .....</i>	16
7.3.9	<i>Air Quality.....</i>	17
7.3.10	<i>Noise .....</i>	18
7.3.11	<i>Waste Production.....</i>	19
7.3.12	<i>Ecosystem and Biodiversity Impact .....</i>	20
7.3.13	<i>Groundwater, Surface Water and Soil Contamination .....</i>	21
7.3.14	<i>Visual Impact.....</i>	22
7.3.15	<i>Cumulative Impact.....</i>	23
7.4	DECOMMISSIONING AND REHABILITATION .....	24
7.5	ENVIRONMENTAL MANAGEMENT SYSTEM.....	24
<b>8</b>	<b>CONCLUSION.....</b>	<b>24</b>
<b>9</b>	<b>REFERENCES.....</b>	<b>25</b>

## **LIST OF FIGURES**

FIGURE 2-1 PROJECT LOCATION .....	2
FIGURE 6-1 DAILY AND SEASONAL RAINFALL FROM CHIRPS-2 DATA (FUNK ET AL., 2015) .....	6

## **LIST OF TABLES**

TABLE 5-1. NAMIBIAN LAW APPLICABLE TO THE FUEL STORAGE FACILITY .....	3
TABLE 5-2. STANDARDS OR CODES OF PRACTISE .....	4
TABLE 5-3. RELEVANT MULTILATERAL ENVIRONMENTAL AGREEMENTS FOR NAMIBIA AND THE DEVELOPMENT .....	5
TABLE 6-1. RAINFALL STATISTICS BASED ON CHIRPS-2 DATA (FUNK ET AL., 2015).....	6
TABLE 6-2. SUMMARY OF CLIMATE DATA FOR THE PROJECT AREA (ATLAS OF NAMIBIA PROJECT, 2002) 6	
TABLE 6-3. GENERAL FLORA DATA (ATLAS OF NAMIBIA PROJECT, 2002).....	7
TABLE 6-4. GENERAL FAUNA DATA (ATLAS OF NAMIBIA PROJECT, 2002) .....	7
TABLE 6-5. DEMOGRAPHIC CHARACTERISTICS OF ORANJEMUND CONSTITUENCY, THE //KARAS REGION AND NATIONALLY (NAMIBIA STATISTICS AGENCY, 2011) .....	8

## **LIST OF ABBREVIATIONS**

<b>AIDS</b>	Acquired Immune Deficiency Syndrome
<b>DWA</b>	Department of Water Affairs
<b>DEA</b>	Directorate of Environmental Affairs
<b>EA</b>	Environmental Assessment
<b>EIA</b>	Environmental Impact Assessment
<b>EMA</b>	Environmental Management Act No 7 of 2007
<b>EMP</b>	Environmental Management Plan
<b>EMS</b>	Environmental Management System
<b>GPT</b>	Geo Pollution Technologies
<b>HIV</b>	Human Immunodeficiency Virus
<b>IAPs</b>	Interested and Affected Parties
<b>IUCN</b>	International Union for Conservation of Nature
<b>m/s</b>	Meter per second
<b>mbs</b>	Meters below surface
<b>MEFT</b>	Ministry of Environment, Forestry and Tourism
<b>mm/a</b>	Millimetres per annum
<b>MSDS</b>	Material Safety Data Sheet
<b>PPE</b>	Personal Protective Equipment
<b>ppm</b>	Parts per million
<b>SANS</b>	South African National Standards
<b>UNCCD</b>	United Nations Convention to Combat Desertification
<b>WHO</b>	World Health Organization





## **GLOSSARY OF TERMS**

**Alternatives** - A possible course of action, in place of another, that would meet the same purpose and need but which would avoid or minimize negative impacts or enhance project benefits. These can include alternative locations/sites, routes, layouts, processes, designs, schedules and/or inputs. The “no-go” alternative constitutes the ‘without project’ option and provides a benchmark against which to evaluate changes; development should result in net benefit to society and should avoid undesirable negative impacts.

**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.

**Interested and Affected Party (IAP)** - any person, group of persons or organisation interested in, or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.

**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 & 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.

**Scoping Process** - process of identifying: issues that will be relevant for consideration of the application; the potential environmental impacts of the proposed activity; and alternatives to the proposed activity that are feasible and reasonable.

**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.

**Stakeholder Engagement** - The process of engagement between stakeholders (the proponent, authorities and IAPs) during the planning, assessment, implementation and/or management of proposals or activities. The level of stakeholder engagement varies depending on the nature of the proposal or activity as well as the level of commitment by stakeholders to the process. Stakeholder engagement can therefore be described by a spectrum or continuum of increasing levels of engagement in the decision-making process. The term is considered to be more appropriate than the term “public participation”.

**Stakeholders** - A sub-group of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term therefore includes the proponent, authorities (both the lead authority and other authorities) and all interested and affected parties (IAPs). The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

**Sustainable Development** - “Development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs and aspirations” – the definition of the World Commission on Environment and Development (1987). “Improving the quality of human life while living within the carrying capacity of supporting ecosystems” – the definition given in a publication called “Caring for the Earth: A Strategy for Sustainable Living” by the International Union for Conservation of Nature (IUCN), the United Nations Environment Programme and the World Wide Fund for Nature (1991).

## 1 INTRODUCTION

---

Vivo Energy Namibia Limited (the Proponent) requested Geo Pollution Technologies (Pty) Ltd to prepare an environmental management plan (EMP) for the **existing** Namdeb Town Depot situated close to Oranjemund Town, within Mining Licence 43. The bulk fuel storage facility consists of ten 83 m<sup>3</sup> aboveground diesel storage tanks, two 83 m<sup>3</sup> aboveground unleaded petrol tanks and three 46 m<sup>3</sup> bulk lubricant tanks. All tanks are situated within bunded areas surrounded by spill control surfaces, connected to an oil water separator. The facility is used to supply the Namdeb mine operations with fuel and lubricants. The facility is constructed and operated according to South African National Standards (SANS) as prescribed by Namibian legislation.

In order to comply with Namibian legislation, and to adhere to all codes and standards applied in their operations, the Proponent wishes to apply for an environmental clearance certificate (ECC) for the bulk fuel storage facility. In support of the ECC application, the EMP will be submitted to the Ministry of Environment, Forestry and Tourism. The EMP provides management options to ensure environmental impacts of the facility are minimised. The environment being defined in the Environmental Assessment Policy and Environmental Management Act as “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, paleontological or social values”.

The EMP is a tool used to take pro-active action by addressing potential problems before they occur. This limits potential future corrective measures that may need to be implemented and allows for application of mitigation measures for unavoidable impacts. This document should be used as an on-site reference document during all phases (planning, construction (care and maintenance), operations and decommissioning) of the facility. All monitoring and records kept should be included in a report to ensure compliance with the EMP. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken. A Health, Safety, Environment and Quality policy as well as Environmental Policy could be used in conjunction with the EMP. Operators and responsible personnel must be taught the contents of these documents. Municipal or national regulations and guidelines must be adhered to and monitored regularly as outlined in the EMP.

The EMP will be used to apply for an ECC in compliance with Namibia’s Environmental Management Act (Act No 7 of 2007).

## 2 SCOPE

---

The scope of the EMP is to:-

- ◆ Provide a brief overview of all components and related operations of the facility.
- ◆ Summarise the legal and regulatory framework within which the fuel storage facility operates.
- ◆ Provide a brief overview of the environment, i.e. the physical, biological, social and economic conditions, potentially impacted by the facility.
- ◆ Identify potential impacts of the facility on the environment.
- ◆ Identify a range of management actions which could mitigate the potential adverse impacts to acceptable levels.
- ◆ Provide sufficient information to the relevant competent authorities and the Ministry of Environment, Forestry and Tourism to make informed decisions regarding the development.

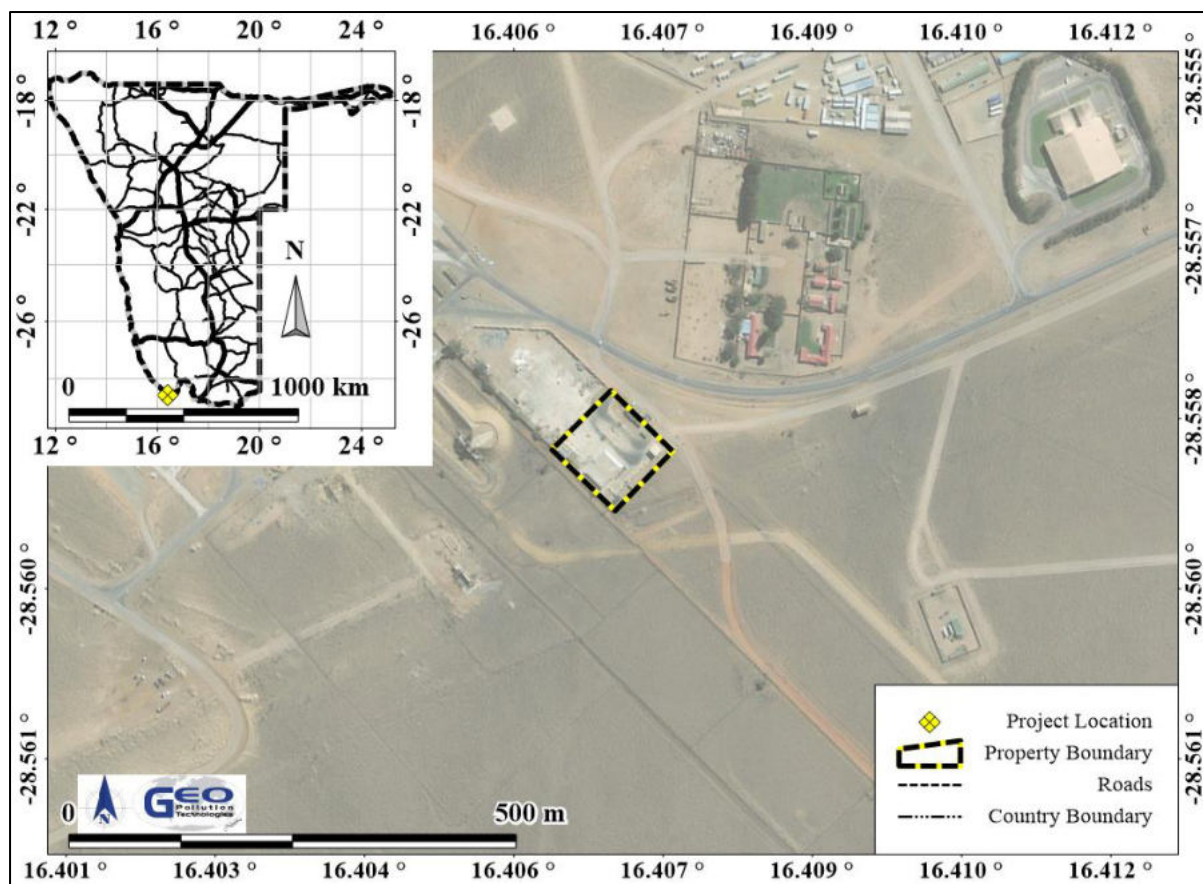


Figure 2-1 Project location

### 3 METHODOLOGY

The following methods were used to prepare the EMP:

1. Baseline information about the site and its surroundings was obtained from primary information and existing secondary information.
2. Potential environmental impacts emanating from the operations, construction / maintenance and decommissioning of the facility were considered and possible enhancement measures were listed for positive impacts while mitigation / preventative measures were provided for negative impacts as part of the EMP.

### 4 FACILITY OPERATIONS AND RELATED ACTIVITIES

The bulk fuel storage facility is situated on the eastern outskirts of Oranjemund, near the main entrance of the Namdeb Mine (Figure 2-1). The facility hosts ten 83 m<sup>3</sup> aboveground diesel storage tanks, two 83 m<sup>3</sup> aboveground unleaded petroleum tanks and three 46 m<sup>3</sup> bulk lubricant tanks. The diesel and unleaded petrol tanks are situated inside a covered concrete bunded area while the bulk lubricant tanks are situated within a separate open bunded area. All surfaces where fuel and lubricants are handled or stored are covered with spill control surfaces with catchment pits draining to an oil water separator, to protect the environment from any leaks or spills. Operations associated with a bulk fuel storage facility continue at the site on a daily basis. Fuel and lubricants are received by road tankers and offloaded at the road gantry, from where the product is pumped to the respective tanks via the reticulation network consisting of pumps, manifolds and pipelines. From there, fuel and lubricants are dispensed to the Namdeb Mine via an 18 km pipeline.

Regular tank dips and fuel reconciliations are performed to ensure there are no product losses and that fuel deliveries are scheduled on time. Maintenance continues on a daily basis. When required, the liquid collected in the oil water separator is removed by truck and pump by an independent contractor.

Maintenance include minor construction activities and repairs and general upkeep of the fuel storage facility and associated infrastructure as well as general upgrade activities. This may include painting, servicing and/or replacement of equipment.

Regular firefighting drills are performed and equipment is serviced and tested to ensure their optimum performance. All persons entering the site undergo induction and must adhere to all health and safety requirements. The site is constructed and operated according to SANS 10131-2004 standards, as required by Namibian legislation.

## 5 ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS

To protect the environment and achieve sustainable development, all projects, plans, programmes and policies deemed to have adverse impacts on the environment require an environmental assessment, as per the Namibian legislation. The legislation and standards provided in Table 5-1 to Table 5-3 govern the environmental assessment process in Namibia and/or are relevant to the facility.

**Table 5-1. Namibian law applicable to the fuel storage facility**

Law	Key Aspects
<b>The Namibian Constitution</b>	<ul style="list-style-type: none"> <li>◆ Promote the welfare of people.</li> <li>◆ Incorporates a high level of environmental protection.</li> <li>◆ Incorporates international agreements as part of Namibian law.</li> </ul>
<b>Environmental Management Act</b> Act No. 7 of 2007, Government Notice No. 232 of 2007	<ul style="list-style-type: none"> <li>◆ Defines the environment.</li> <li>◆ Promote sustainable management of the environment and the use of natural resources.</li> <li>◆ Provide a process of assessment and control of activities with possible significant effects on the environment.</li> </ul>
<b>Environmental Management Act Regulations</b> Government Notice No. 28-30 of 2012	<ul style="list-style-type: none"> <li>◆ Commencement of the Environmental Management Act.</li> <li>◆ List activities that requires an environmental clearance certificate.</li> <li>◆ Provide Environmental Impact Assessment Regulations.</li> </ul>
<b>Petroleum Products and Energy Act</b> Act No. 13 of 1990, Government Notice No. 45 of 1990	<ul style="list-style-type: none"> <li>◆ Regulates petroleum industry.</li> <li>◆ Makes provision for impact assessment.</li> <li>◆ Petroleum Products Regulations (Government Notice No. 155 of 2000). <ul style="list-style-type: none"> <li>○ Prescribes South African National Standards (SANS) or equivalents for construction, operation and decommissioning of petroleum facilities (refer to Government Notice No. 21 of 2002).</li> </ul> </li> </ul>
<b>The Water Act</b> Act No. 54 of 1956	<ul style="list-style-type: none"> <li>◆ Remains in force until the new Water Resources Management Act comes into force.</li> <li>◆ Defines the interests of the state in protecting water resources.</li> <li>◆ Controls the disposal of effluent.</li> <li>◆ Numerous amendments.</li> </ul>
<b>Water Resources Management Act</b> Act No. 11 of 2013	<ul style="list-style-type: none"> <li>◆ Provide for management, protection, development, use and conservation of water resources.</li> <li>◆ Prevention of water pollution and assignment of liability.</li> <li>◆ Not in force yet.</li> </ul>

<b>Law</b>	<b>Key Aspects</b>
<b>Local Authorities Act</b> Act No. 23 of 1992, Government Notice No. 116 of 1992	<ul style="list-style-type: none"> <li>◆ Define the powers, duties and functions of local authority councils.</li> <li>◆ Regulates discharges into sewers.</li> </ul>
<b>Public Health Act</b> Act No. 36 of 1919	<ul style="list-style-type: none"> <li>◆ Provides for the protection of health of all people.</li> </ul>
<b>Public and Environmental Health Act</b> Act No. 1 of 2015, Government Notice No. 86 of 2015	<ul style="list-style-type: none"> <li>◆ Provides a framework for a structured more uniform public and environmental health system, and for incidental matters.</li> <li>◆ Deals with Integrated Waste Management including waste collection disposal and recycling; waste generation and storage; and sanitation.</li> </ul>
<b>Labour Act</b> Act No 11 of 2007, Government Notice No. 236 of 2007	<ul style="list-style-type: none"> <li>◆ Provides for Labour Law and the protection and safety of employees.</li> <li>◆ Labour Act, 1992: Regulations relating to the health and safety of employees at work (Government Notice No. 156 of 1997).</li> </ul>
<b>Atmospheric Pollution Prevention Ordinance</b> Ordinance No. 11 of 1976	<ul style="list-style-type: none"> <li>◆ Governs the control of noxious or offensive gases</li> <li>◆ Prohibits scheduled process without a registration certificate in a controlled area.</li> <li>◆ Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process.</li> </ul>
<b>Hazardous Substances Ordinance</b> Ordinance No. 14 of 1974	<ul style="list-style-type: none"> <li>◆ Applies to the manufacture, sale, use, disposal and dumping of hazardous substances as well as their import and export.</li> <li>◆ Aims to prevent hazardous substances from causing injury, ill-health or the death of human beings.</li> </ul>
<b>Pollution Control and Waste Management Bill (draft document)</b>	<ul style="list-style-type: none"> <li>◆ Not in force yet.</li> <li>◆ Provides for prevention and control of pollution and waste.</li> <li>◆ Provides for procedures to be followed for licence applications.</li> </ul>

**Table 5-2. Standards or codes of practise**

<b>Standard or Code</b>	<b>Key Aspects</b>
<b>South African National Standards (SANS)</b>	<ul style="list-style-type: none"> <li>◆ The Petroleum Products and Energy Act prescribes SANS standards for the construction, operations and demolition of petroleum facilities.</li> <li>◆ SANS 10131 is specifically aimed at storage and distribution of petroleum products in aboveground storage tanks.</li> <li>◆ SANS 10089-1 is specifically aimed at the storage and distribution of petroleum products in above-ground bulk installations.               <ul style="list-style-type: none"> <li>○ Provide requirements for spill control infrastructure, handling procedures etc..</li> </ul> </li> </ul>

**Table 5-3. Relevant multilateral environmental agreements for Namibia and the development**

Agreement	Key Aspects
<b>Stockholm Declaration on the Human Environment, Stockholm 1972.</b>	<ul style="list-style-type: none"> <li>◆ Recognizes the need for a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment.</li> </ul>
<b>1985 Vienna Convention for the Protection of the Ozone Layer</b>	<ul style="list-style-type: none"> <li>◆ Aims to protect human health and the environment against adverse effects from modification of the Ozone Layer are considered.</li> <li>◆ Adopted to regulate levels of greenhouse gas concentration in the atmosphere.</li> </ul>
<b>United Nations Framework Convention on Climate Change (UNFCCC)</b>	<ul style="list-style-type: none"> <li>◆ The Convention recognises that developing countries should be accorded appropriate assistance to enable them to fulfil the terms of the Convention.</li> </ul>
<b>Convention on Biological Diversity, Rio de Janeiro, 1992</b>	<ul style="list-style-type: none"> <li>◆ Under article 14 of The Convention, EIAs must be conducted for projects that may negatively affect biological diversity.</li> </ul>

The project is listed as an activity requiring an ECC as per the following points from Section 9 of Government Notice No. 29 of 2012:

- ◆ 9.1 “The manufacturing, storage, handling or processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974.”
- ◆ 9.2 “Any process or activity which requires a permit, licence or other form of authorisation, or the modification of or changes to existing facilities for any process or activity which requires an amendment of an existing permit, licence or authorisation or which requires a new permit, licence or authorisation in terms of a law governing the generation or release of emissions, pollution, effluent or waste.”
- ◆ 9.4 “The storage and handling of a dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic meters at any one location.”
- ◆ 9.5 “Construction of filling stations or any other facility for the underground and aboveground storage of dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin.”

## **6 ENVIRONMENTAL CHARACTERISTICS**

This section lists pertinent environmental characteristics of the study area and provides a statement on the potential environmental impacts on each.

### **6.1 LOCALITY AND SURROUNDING LAND USE**

The facility is located on the western outskirts of Oranjemund Town, outside of the jurisdiction of the Oranjemund Town Council. The facility is located close to the main entrance of the Namdeb Mine, within Namdeb’s Mining License area 43 and therefore falls under the jurisdiction of the mining license holder (28.55898°S, 16.40638°E) (Figure 2-1).

### **6.2 CLIMATE**

The general lack of functioning weather stations in Namibia, in especially rural areas, limits the availability of long term, true weather data. As a best possible workaround, long term climate data was obtained from the Atlas of Namibia Project (2002) and the CHIRPS-2 database (Funk et al., 2015), see Table 6 1, Table 6 2 and Figure 6 1.

Atlas of Namibia Project data was compiled from almost 300 weather stations across Namibia. The data was contoured in 50 mm intervals prior to 1999 for variable length data sets. The CHIRPS-2 dataset (Climate Hazards Group Infra-Red Precipitation with Station data version 2) consist of long term rainfall data (1981 to near-present) obtained from satellite imagery and in-situ station data. The resultant dataset provides a reasonably well represented overview of the

rainfall conditions of a general area. True values for single, site specific meteorological events may however differ to some degree.

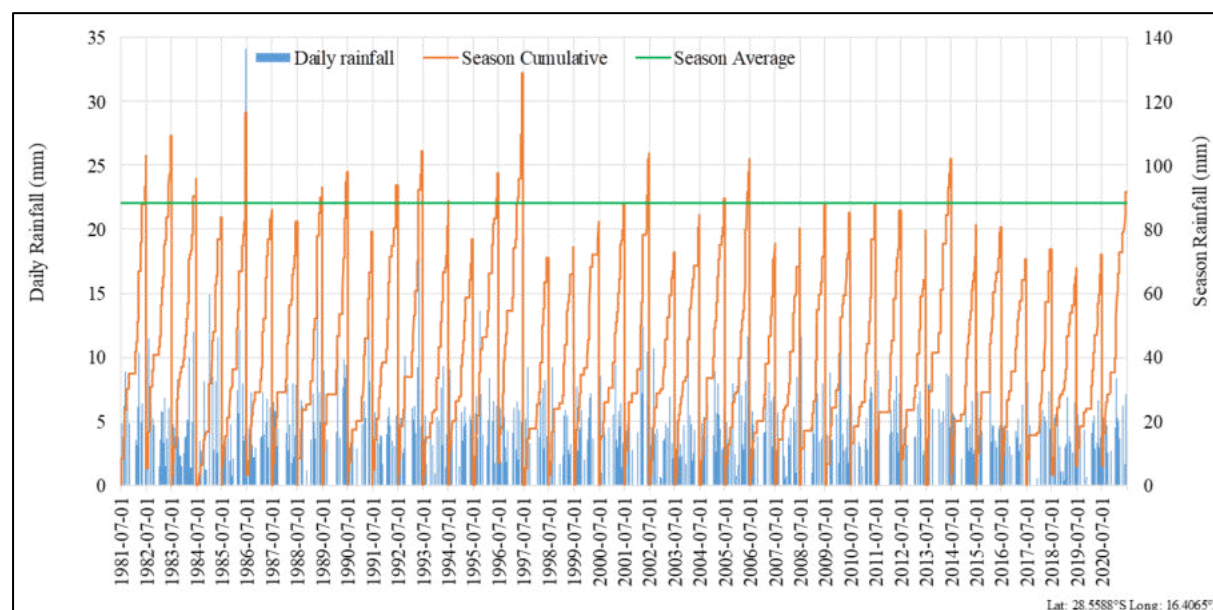
The project location is part of a coastal desert region with the average annual rainfall being less than 48mm (Table 6-1). Rainfall is mostly spread out throughout the year, with highest rainfall common between January and August, peaking mostly in February and June, whilst November and December have little or no rainfall. Variability in rainfall is low at about 15%, with high evaporation rates, see Table 6-1, Table 6-2 and Figure 6-1. The aridity of the region causes water resources to be a scarce commodity that has to be conserved and protected from pollution.

**Table 6-1. Rainfall statistics based on CHIRPS-2 data (Funk et al., 2015)**

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Minimum (mm)	6.12	8.00	5.35	0.00	0.00	5.15	0.00	5.08	0.00	0.00	0.00	0.00
Maximum (mm)	14.99	21.21	15.99	25.64	18.18	34.15	16.73	22.68	13.59	12.60	7.05	4.11
Average (mm)	8.3	11.0	9.3	9.4	7.8	11.3	9.4	9.2	4.9	4.0	1.6	0.6
Variability (%)	30.0	29.0	36.0	61.0	53.0	47.0	35.0	35.0	76.0	86.0	125.0	163.0
Daily maximum (mm)	14.9	13.8	12.2	15.4	17.7	34.1	11.6	10.7	13.6	10.1	5.5	2.6
Average rain days	2	2	2	2	2	2	2	2	1	1	1	1
Season July - June average: 88 mm						Season coefficient of variation: 15 %						
Data range	1981-Jul-01 to 2021-Jun-30						Lat: 28.5588°S Long: 16.4065°E					

**Table 6-2. Summary of climate data for the project area (Atlas of Namibia Project, 2002)**

Average annual rainfall (mm/a)	50-100
Average annual evaporation (mm/a)	2,600-2,800
Water deficit (mm/a)	1,701-1,900
Average annual temperatures (°C)	<16



**Figure 6-1 Daily and seasonal rainfall from CHIRPS-2 data (Funk et al., 2015)**

### 6.3 TOPOGRAPHY AND DRAINAGE

The topography at the site is generally flat. The landscape is classified as being in the Namib Plain region, an area with sand-drifts and prominent inselbergs largely of mid-Palaeozoic Age. The site is located within the catchment of the Orange River, a perennial river, draining in a western direction. Local drainage is well developed and runoff takes place towards the south.

### 6.4 GEOLOGY AND HYDROGEOLOGY

The subsurface geology of the area consists of alluvium and sand of the Namib Desert from the Quaternary Age. Geology found onsite is dune sand, clay and gravel. Local groundwater flow



from the site can be expected in a south-westerly direction. According to the Department of Water Affairs (DWA) database, no boreholes exist within a 5 km radius from the site. Boreholes supplying Oranjemund are however present along the Orange River, but well upstream of the bulk fuel storage facility (>9 km east).

### 6.5 PUBLIC WATER SUPPLY

Public water supply to the town is through a series of boreholes situated within the Orange River Alluvium Aquifer approximately 9 km from the project area.

### 6.6 FAUNA AND FLORA

The project area is located within the Succulent Karoo biome, with a succulent steppe vegetation type. The vegetation structure type is classified as dwarf shrubland, with a medium diversity, but high level of endemism, of higher plants.

No vegetation (i.e. trees, bushes, weeds and grass) exists at the site, as it is an existing facility and all vegetation has previously been removed.

**Table 6-3. General flora data (Atlas of Namibia Project, 2002)**

<b>Biome</b>	Succulent Karoo
<b>Vegetation type</b>	Succulent steppe
<b>Vegetation structure type</b>	Dwarf shrubland
<b>Diversity of higher plants</b>	Low (Diversity rank = 6 [1 to 7 representing highest to lowest diversity])
<b>Number of plant species</b>	50 - 100
<b>Percentage tree cover</b>	< 0.1
<b>Tree height (m)</b>	2-5
<b>Percentage shrub cover</b>	< 0.1
<b>Shrub height (m)</b>	1-2
<b>Percentage dwarf shrub cover</b>	0.1-1
<b>Dwarf shrub height (m)</b>	< 0.5
<b>Percentage grass cover</b>	< 0.1
<b>Grass height (m)</b>	< 0.5
<b>Dominant plant species</b>	<i>Zygophyllum decumbens</i> , <i>Rhigozum trichotomum</i> , <i>Euphorbia gummifera</i> , <i>Ruschia species</i> .

**Table 6-4. General fauna data (Atlas of Namibia Project, 2002)**

<b>Mammal Diversity</b>	31 - 45 Species
<b>Rodent Diversity</b>	8 - 11 Species
<b>Bird Diversity</b>	81 - 110 Species
<b>Reptile Diversity</b>	51 - 60 Species
<b>Snake Diversity</b>	15 - 19 Species
<b>Lizard Diversity</b>	28 - 31 Species
<b>Frog Diversity</b>	4 - 7 Species
<b>Termite Diversity</b>	1 - 6 Genera
<b>Scorpion Diversity</b>	10 - 11 Species

### 6.7 DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS

The project area falls within the //Karas Region with a population of 77,421 (Namibia Statistics Agency, 2011). This increased from the 69,329 in 2001, resulting in an annual population increase of 1.1%. Unemployment in the region is 22.6%.

At local scale the project area falls in the Oranjemund Constituency which has a population of 7,839.

**Table 6-5. Demographic characteristics of Oranjemund Constituency, the //Karas Region and Nationally (Namibia Statistics Agency, 2011)**

	Oranjemund Constituency	//Karas Region	Namibia
<b>Population (Males)</b>	5,377	39,407	1,021,912
<b>Population (Females)</b>	4,460	38,014	1,091,165
<b>Population (Total)</b>	7,839	77,421	2,113,077
<b>Unemployment (15+ years)</b>	25%	32%	33.8%
<b>Literacy (15+ years)</b>	100%	97%	87.7%

## 7 ENVIRONMENTAL MANAGEMENT PLAN

The purpose of this section is to list the most pertinent environmental impacts that are expected from the operational, construction (upgrades, maintenance, etc.) and potential decommissioning activities of the facility.

### 7.1 OBJECTIVES OF THE EMP

The EMP provides management options to ensure impacts of the facility 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 environmental management measures are provided in the tables and descriptions below. These management measures should be adhered to during the various phases of the operation of the facility. This EMP act as a stand-alone document. All personnel taking part in the operations of the facility should be made aware of the contents in this report, so as to plan the operations accordingly and in an environmentally sound manner.

The objectives of the EMP are:

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

### 7.2 IMPLEMENTATION OF THE EMP

Section 7.3 outline the management of the environmental elements that may be affected by the different activities. 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. The EMP is a living document that must be prepared in detail, and regularly updated, by the Proponent as the project progress and evolve.

The EMP and ECC must be communicated to the site managers. A copy of the ECC and EMP should be kept on site. 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 six monthly 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 prevention and mitigation measures are listed below.

### 7.3 MANAGEMENT OF IMPACTS: OPERATIONS AND CONSTRUCTION

The following section provides management measures for both the operational phase as well as construction activities related to facility.

#### 7.3.1 Planning

During the phases of planning for operations, construction and decommissioning of the facility, it is the responsibility of the Proponent to ensure they are and remain compliant with all legal requirements. The Proponent must also ensure that all required management measures are in place prior to and during all phases, to ensure potential impacts and risks are minimised. The following actions are recommended for the planning phase and should continue during various other phases of the project:

- ◆ Ensure that all necessary permits from the various ministries, local authorities and any other bodies that governs the construction activities and operations of the project are in place and remains valid. This includes the petroleum products licence.
- ◆ Ensure that design parameters, where required, are approved by relevant authorities prior to any construction activities at the facility.
- ◆ Ensure all appointed contractors and employees enter into an agreement which includes the EMP. Ensure that the contents of the EMP are understood by the contractors, sub-contractors, employees and all personnel present or who will be present on site.
- ◆ 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.
- ◆ Have the following emergency plans, equipment and personnel on site where reasonable to deal with all potential emergencies:
  - Risk management / mitigation / EMP/ Emergency Response Plan and HSE Manuals
  - Adequate protection and indemnity insurance cover for incidents;
  - Comply with the provisions of all relevant safety standards;
  - Procedures, equipment and materials required for emergencies.
- ◆ Establish and maintain a fund for future ecological restoration of the project site should project activities cease and the site is decommissioned and environmental restoration or pollution remediation is required.
- ◆ Establish and / or maintain a reporting system to report on aspects of construction activities, operations and decommissioning as outlined in the EMP.
- ◆ Submit bi-annual reports to the MEFT to allow for environmental clearance certificate renewal after three years. This is a requirement by MEFT.
- ◆ Appoint a specialist environmental consultant to update the EMP and apply for renewal of the environmental clearance certificate prior to expiry.

### **7.3.2 Skills, Technology and Development**

During various phases of the facility, training is provided to a portion of the workforce to be able to operate and maintain various features of the fuel storage facility according to the required standards. Skills are transferred to an unskilled workforce for general tasks. Development of people and technology are key to economic development of the town, region and nationally.

**Desired Outcome:** To see an increase in skills of local Namibians, as well as development and technology advancements in the fuel industry.

#### **Actions**

##### **Mitigation:**

- ◆ If the skills exist locally, contractors must first be sourced from the town, then the region and then nationally. Deviations from this practice must be justified.
- ◆ 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.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ Record should be kept of training provided.
- ◆ Ensure that all training is certified or managerial reference provided (proof provided to the employees) inclusive of training attendance, completion and implementation.
- ◆ Bi-annual summary report based on employee training.

### **7.3.3 Revenue Generation and Employment**

Operational and construction activities of the facility rely on employment. Skilled and unskilled labourers are employed or contracted for various tasks of construction (upgrade and maintenance) and operations. Unskilled labour may be sourced locally while it is expected that skilled contractors within Namibia will be used for specialised work. The presence of the facility therefore contributes to employment creation in the skilled and unskilled labour sector.

**Desired Outcome:** Contribution to national treasury and provision of employment to local Namibians.

#### **Actions**

##### **Mitigation:**

- ◆ The Proponent must employ local Namibians where possible.
- ◆ If the skills exist locally, employees must first be sourced from the town, then the region and then nationally.
- ◆ Deviations from this practice must be justified.

##### **Responsible Body:**

- ◆ Proponent

##### **Data Sources and Monitoring:**

- ◆ Bi-annual summary report based on employee records.

#### **7.3.4 Demographic Profile and Community Health**

The project relies on labour for operations and construction activities. The facility is an existing facility and the scale of the project itself is limited and it is not foreseen that it has / will result in changes in the demographic profile of the local community. Exposure to factors such as communicable disease like HIV/AIDS, often associated with the transport industry, as well as alcoholism/drug abuse may impact the local community.

**Desired Outcome:** To prevent the in-migration and growth in informal settlements, prevent the spread of communicable disease and prevent / discourage socially deviant behaviour.

#### **Actions:**

##### **Prevention:**

- ◆ Employ only local people from the area, deviations from this practice should be justified appropriately.
- ◆ Adhere to all municipal by-laws relating to environmental health which includes but is not limited to sand and grease traps for the various facilities and sanitation requirements.
- ◆ Prohibit illegal parking on and around the site.

##### **Mitigation:**

- ◆ Educational programmes for employees on HIV/AIDS and general upliftment of employees' social status.
- ◆ Appointment of reputable contractors.

##### **Responsible Body:**

- ◆ Proponent

##### **Data Sources and Monitoring:**

- ◆ Facility inspection sheet for all areas which may present environmental health risks, kept on file.
- ◆ Bi-annual summary report based on educational programmes and training conducted.

### **7.3.5 Fuel Supply**

The existing bulk fuel storage facility aid in securing fuel and lubricant supply to the operational vehicles and machinery of Namdeb mine. This increases operational efficiency of the mine, reduced security risks and traffic impacts and ensures a secure supply of fuel and lubricants remains available.

**Desired Outcome:** Ensure a secure fuel and lubricant supply remains available.

#### **Actions**

##### **Mitigation:**

- ◆ Ensure compliance to the petroleum regulations of Namibia.
- ◆ Proper management to ensure constant supply.
- ◆ Record supply problems and take corrective actions.

##### **Responsible Body:**

- ◆ Proponent

##### **Data Sources and Monitoring:**

- ◆ Record supply problems and corrective actions taken and compile a bi-annual summary report.

### **7.3.6 Traffic**

The bulk fuel storage facility may have resulted in an increase in traffic to the site as a result of tanker trucks delivering fuel and lubricants to the site. In turn, by providing diesel and petrol to the operational activities of the mine, traffic impacts are reduced in Oranjemund Town and on the road to and from the mine.

**Desired Outcome:** Minimum impact on traffic and no transport or traffic related incidents.

#### **Actions**

##### **Prevention:**

- ◆ Erect clear signage regarding access and exit points at the facility.

##### **Mitigation:**

- ◆ Tanker trucks delivering fuel should not be allowed park in streets in Oranjemund Town outside of designated parking areas, or to obstruct any traffic of entrances / exists of facilities 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 mitigate traffic impacts.

##### **Responsible Body:**

- ◆ Proponent

##### **Data Sources and Monitoring:**

- ◆ Any complaints received regarding traffic issues should be recorded together with action taken to prevent impacts from repeating itself.
- ◆ A bi-annual report should be compiled of all incidents reported, complaints received, and action taken.



### 7.3.7 Health, Safety and Security

Activities associated with the construction and operational phases are 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.

**Desired Outcome:** To prevent injury, health impacts and theft.

#### **Actions**

##### **Prevention:**

- ◆ Clearly label dangerous and restricted areas as well as dangerous equipment and products.
- ◆ Equipment that will be locked away on site must be placed in a way that does not encourage criminal activities (e.g. theft).
- ◆ Provide all employees with required and adequate personal protective equipment (PPE).
- ◆ Ensure that all personnel receive adequate training on operation of equipment / handling of hazardous substances.
- ◆ All Health and Safety standards specified in the Labour Act should be complied with.
- ◆ Implementation of maintenance register for all equipment and fuel/hazardous substance storage areas.
- ◆ 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.).
- ◆ Security procedures and proper security measures must be in place to protect workers and clients, especially during cash in transit activities.
- ◆ Strict security that prevents unauthorised entry.

##### **Mitigation:**

- ◆ 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.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ Any incidents must be recorded with action taken to prevent future occurrences.
- ◆ 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.

### 7.3.8 Fire

Operational and maintenance activities may increase the risk of the occurrence of fires. The site is located within the mine on a developed area cleared of all vegetation and no infrastructure within 50 m from the site. This reduced the risk fire poses to surrounding infrastructure and increases ease of accessibility for firefighting purposes. Fuel stored on site, especially unleaded petrol, presents a significant fire risk if the correct measures, as prescribed by Namibian legislation, is not adhered to.

**Desired Outcome:** To prevent property damage, possible injury and impacts caused by uncontrolled fires.

#### **Actions:**

##### **Prevention:**

- ◆ A holistic fire protection and prevention plan is needed. This plan must include an emergency response plan, firefighting plan and spill recovery plan.
- ◆ Maintain firefighting equipment, good housekeeping and personnel training (firefighting, fire prevention and responsible housekeeping practices).
- ◆ Ensure all chemicals are stored according to MSDS and SANS instructions.
- ◆ Maintain regular site, mechanical and electrical inspections and maintenance.
- ◆ Clean all spills / leaks.
- ◆ 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).
- ◆ Follow SANS standards for design, operation and maintenance of the facility, this includes refuelling locations and distances from boundaries.
- ◆ The Proponent should liaise with the local / mine fire brigade to ensure that all fire requirements are met. This includes, but is not limited to SANS 10400 T: 2011.

##### **Mitigation:**

- ◆ 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 notifying the fire brigade and neighbouring operators, engaging emergency stops, using firefighting equipment, etc.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ 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.
- ◆ 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.

### **7.3.9 Air Quality**

Fuel vapours are released into the air during refuelling of the storage tanks and as well as at the dispensing points. Prolonged exposure may have carcinogenic effects. Dust may be generated by vehicles accessing the site as well as during any construction activities.

**Desired Outcome:** To prevent health impacts and minimise the dust generated.

#### **Actions**

##### **Mitigation:**

- ◆ 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.
- ◆ Vent pipes must be properly placed as per SANS requirements.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ Any complaints received regarding dust or fuel vapours should be recorded with notes on action taken.
- ◆ All information and reporting to be included in a bi-annual report.

### **7.3.10 Noise**

Construction (maintenance and upgrades) may generate noise. During operations, noise pollution will exist due to vehicles accessing the site to offload fuel. The facility is however situated in an area utilised for industrial related activities with high ambient noise levels, thus noise impacts are not expected to negatively affect nearby receptors and is mostly related to hearing loss.

**Desired Outcome:** To prevent any nuisance and hearing loss due to noise generated.

#### **Actions**

##### **Prevention:**

- ◆ Follow World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment.
- ◆ All machinery must be regularly serviced to ensure minimal noise production.

##### **Mitigation:**

- ◆ Hearing protectors as standard PPE for workers in situations with elevated noise levels.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ WHO Guidelines.
- ◆ Maintain a complaints register.
- ◆ Bi-annual reporting on complaints and actions taken to address complaints and prevent future occurrences.

### **7.3.11 Waste Production**

Waste is produced during the operational phase. Waste may include hazardous waste associated with the handling of hydrocarbon products etc. Domestic waste may be generated by the facility and related operations. Waste presents a contamination risk and when not removed regularly may become a fire hazard. Construction (maintenance) waste will be generated during any maintenance activities, this may include building rubble and discarded equipment contaminated by hydrocarbon products such as removed bunding, reticulation and old storage tanks. Contaminated soil and water is considered as a hazardous waste.

**Desired Outcome:** To reduce the amount of waste produced, and prevent pollution and littering.

#### **Actions**

##### **Prevention:**

- ◆ Waste reduction measures should be implemented and all waste that can be re-used / recycled must be kept separate.
- ◆ Ensure adequate disposal storage facilities are available.
- ◆ Ensure waste cannot be blown away by wind.
- ◆ Prevent scavenging (human and non-human) of waste.
- ◆ All regulation and by-laws relating to environmental health should be adhered to.

##### **Mitigation:**

- ◆ 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).
- ◆ 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.
- ◆ See the material safety data sheets available from suppliers for disposal of contaminated products and empty containers.
- ◆ Liaise with the municipality regarding waste and handling of hazardous waste.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ A register of hazardous waste disposal should be kept. This should include type of waste, volume as well as disposal method/facility.
- ◆ Any complaints received regarding waste should be recorded with notes on action taken.
- ◆ The spill catchment areas and equipment must be regularly inspected and all hydrocarbons removed once detected.
- ◆ All information and reporting to be included in a bi-annual report.

### **7.3.12 Ecosystem and Biodiversity Impact**

The nature of the operational activities is such that the probability of creating a habitat for flora and fauna to establish is low. No significant impact on the biodiversity of the site is predicted as the site is currently void of natural fauna and flora. Impacts are therefore mostly related to pollution of the environment.

**Desired Outcome:** To avoid pollution of and impacts on the ecological environment.

#### **Actions.**

##### **Mitigation:**

- ◆ Report any extraordinary sightings to the Ministry of Environment, Forestry and Tourism.
- ◆ Mitigation measures related to waste handling and the prevention of groundwater, surface water and soil contamination should limit ecosystem and biodiversity impacts.
- ◆ Avoid scavenging of waste by fauna.
- ◆ Direct all lights down to working surfaces and use minimal lighting at night.
- ◆ The establishment of habitats and nesting sites at the facility should be avoided where possible.

##### **Responsible Body:**

- ◆ Proponent

##### **Data Sources and Monitoring:**

- ◆ All information and reporting to be included in a bi-annual report.

### **7.3.13 Groundwater, Surface Water and Soil Contamination**

Operations entail the storage and handling of hydrocarbons (unleaded petrol, diesel and lubricants) which present a contamination risk. Contamination may either result from failing storage facilities, or spills and leaks associated with fuel handling.

**Desired Outcome:** To prevent the contamination of water and soil.

#### **Actions**

##### **Prevention:**

- ◆ Spill control structures and procedures must be in place according to SANS standards or better on all areas where fuel is handled.
- ◆ All fuelling should be conducted on surfaces provided for this purpose. E.g. The use of drip trays / concrete slabs with regularly maintained seals between slabs connected to an oil water separator.
- ◆ The procedures followed to prevent environmental damage during service and maintenance, and compliance with these procedures, must be audited and corrections made where necessary.
- ◆ Proper training of operators must be conducted on a regular basis (Fuel handling, spill detection, spill control).

##### **Mitigation:**

- ◆ Any spillage of more than 200 litre must be reported to the Ministry of Mines and Energy.
- ◆ Spill clean-up means must be readily available on site as per the relevant MSDS.
- ◆ Any spill must be cleaned up immediately.
- ◆ The spill catchment traps, drip trays and oil water separator should be cleaned regularly and waste disposed of at a suitably classified hazardous waste disposal facility.
- ◆ Surfactants (soap) may not be allowed to enter the oil water separator e.g. no soap usage on spill control surfaces.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ A report should be compiled bi-annually of all spills or leakages reported. The report should contain the following information: date and duration of spill, product spilled, volume of spill, remedial action taken, comparison of pre-exposure baseline data (previous pollution conditions survey results) with post remediation data (e.g. soil/groundwater hydrocarbon concentrations) and a copy of documentation in which spill was reported to Ministry of Mines and Energy.

#### **7.3.14 Visual Impact**

This impact is not only associated with the aesthetics of the site, but also the structural integrity. The existing facility forms part of the industrial landscape associated with the mine. The site should be kept clean, tidy and maintained to ensure it remains aesthetically pleasing.

**Desired Outcome:** To minimise aesthetic impacts associated with the facility.

#### **Actions**

##### **Mitigation:**

- ◆ Regular waste disposal, good housekeeping and routine maintenance on infrastructure will ensure that the longevity of structures are maximised and a low visual impact is maintained.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ A maintenance record should be kept.
- ◆ A report should be compiled of all complaints received and actions taken.



### **7.3.15 Cumulative Impact**

Possible cumulative impacts associated with the operational phase include increased traffic in the area and possible hydrocarbon spills. The facility may have resulted in a negative cumulative impact on traffic flow to and from the bulk fuel storage facility, it is however less when compared to the traffic impacts associated with mine vehicles having to refuel in Oranjemund.

**Desired Outcome:** To minimise cumulative all impacts associated with the facility.

#### **Actions**

##### **Mitigation:**

- ◆ Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact.
- ◆ Reviewing biannual and annual reports for any new or re-occurring impacts or problems would aid in identifying cumulative impacts and help in planning if the existing mitigations are insufficient.

##### **Responsible Body:**

- ◆ Proponent

##### **Data Sources and Monitoring:**

- ◆ Bi-annual summary report based on all other impacts must be created to give an overall assessment of the impact of the operational phase.

#### **7.4 DECOMMISSIONING AND REHABILITATION**

Decommissioning is not foreseen during the validity of the ECC. Decommissioning was however assessed as construction activities include modification and decommissioning. Should decommissioning occur at any stage, rehabilitation of the area may be required. Decommissioning will entail the complete removal of all infrastructure including buildings and underground infrastructure, if any, not forming part of post decommissioning land use. Any pollution present on the site must be remediated. The impacts associated with this phase include noise and waste production as structures are dismantled. Noise must be kept within WHO standards and waste should be contained and disposed of at an appropriately classified and approved waste facility and not dumped in the surrounding areas. Future land use after decommissioning should be assessed prior to decommissioning and rehabilitation initiated if the land would not be used for future purposes. The EMP for the facility will have to be reviewed at the time of decommissioning to cater for changes made to the site and implement guidelines and mitigation measures.

#### **7.5 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.

## **8 CONCLUSION**

---

The fuel storage facility provides employment to people from the towns as well as generated revenue. In addition, the operations of Namdeb mine as a whole has a positive impact on Oranjemund as well as Namibia by generating revenue and contributing locally to skills transfer and training which in turn develops the local workforce during operations. The operations of the bulk fuel storage facility contribute positively toward Namdeb operations, by ensuring a safe and reliable supply of fuel and lubricants remains available to the operations of the mine.

Negative impacts can successfully be mitigated. SANS standards relating to the petroleum industry and prescribed by Namibian law must be followed during all operations of the fuel storage and handing facility. Spill control should be readily available at all times, and staff should be trained on spill control procedures. Noise pollution should at all times meet the prescribed WHO requirements to prevent hearing loss. Fire prevention should be adequate, and health and safety regulations should be adhered to in accordance with the regulations pertaining to relevant laws and internationally accepted standards of operation. Any waste produced must be removed from site and disposed of at an appropriate facility or re-used or recycled where possible. Hazardous waste must be disposed of at an approved hazardous waste disposal site.

The EMP should be used as an on-site reference document for the operations of the facility. Parties responsible for transgressing of the EMP should be held responsible for any rehabilitation that may need to be undertaken. The Proponent could use an in-house Health, Safety, Security and Environment

Management System in conjunction with the EMP. All operational personnel must be taught the contents of these documents.

## **9 REFERENCES**

---

Atlas of Namibia Project. 2002. Unpublished Report. Ministry of Environment & Tourism

Directorate of Environmental Affairs, 2008. Procedures and Guidelines for Environmental Impact Assessment (EIA) and Environmental Management Plans (EMP), Directorate of Environmental Affairs, Ministry of Environment and Tourism, Windhoek.

Funk, C., Peterson, P., Landsfeld, M., Pedreros, D., Verdin, J., Shukla, S., Husak, G., Rowland, J., Harrison, L., Hoell, A. and Michaelsen, J., (2015) The climate hazards group infrared precipitation with stations - A new environmental record for monitoring extremes. *Scientific Data*, 2, 150066. <https://doi.org/10.1038/sdata.2015.66>.

Namibia Statistics Agency. 2011. Namibia household Income and Expenditure Survey 2009/2010.

Namibia Statistics Agency. 2011. Namibia 2011 Population and Housing Census Main Report.

Pastakia, C.M.R.; 1998; The Rapid Impact Assessment Matrix (RIAM) – A new tool for Environmental Impact Assessment.



## **Appendix A: Petroleum Products Licence**







**MINISTRY OF MINES AND ENERGY**

**PETROLEUM PRODUCTS AND ENERGY ACT, 1990  
PETROLEUM PRODUCTS REGULATIONS (2000)**

**WHOLESALE LICENCE**

*[Regulation 12(4)]*

<b>WHOLESALE LICENCE</b>		<b>Licence No. W/5/2013</b>
<b>Name of licence-holder</b>	Vivo Energy Namibia Limited	
<b>Address of licence-holder</b>	<b>Physical Address</b>	<b>Postal address</b>
	202 Tacoma Street Suiderhoff Windhoek	P.O. Box 110 Windhoek Namibia
<b>Location of storage facilities (if necessary attach separate page)</b>	Attached Separately	
<b>Conditions applicable to licence</b> <i>See next page for general and special conditions applicable to licence.</i>		
<b>Date of issue of licence</b>	14 August 2013	
<p>Issued by the Minister of Mines and Energy in terms of regulation 12(4), on 14 August 2013</p> <p align="right"><b>Windhoek</b></p>		
 Minister: Mines and Energy		

## CONDITIONS APPLICABLE TO WHOLESALE LICENCE

### General Conditions

1. *The wholesale licence-holder must at all times comply with the Petroleum Products and Energy Act, the Petroleum Products Regulations (2000) and all other applicable laws, including laws relating to labour, safety, hazardous substances, security, health and environment.*
2. *The wholesale licence-holder may sell fuel only in bulk quantities.*
3. *If the wholesale licence-holder sells fuel to any person other than a retail licence-holder, certificate-holder, Government institution, local authority or regional council, the provisions of regulation 8 of the Petroleum Products Regulations (2000), apply with the necessary changes.*
4. *The sale of fuel to a person referred to in condition 3 may not be made from any other place than from a dispensing point situated at the relevant premises of the wholesaler.*
5. *All relevant import and export and wholesale sale, of fuel, approvals and permits as required under the Petroleum Products and Energy Act or any other applicable law must be obtained prior to any import into, export from or wholesale sale of fuel in Namibia.*
6. *The wholesale licence-holder must keep such records and must submit such information to the Minister as are required under the Petroleum Products Regulations (2000).*
7. *Petroleum products imported or distributed must comply with approved specifications as made applicable by or under the Petroleum Products Regulations (2000).*
8. *The wholesale licence-holder may not abandon storage facilities otherwise than in accordance with the Petroleum Products Regulations (2000).*
9. *All applicable duties, levies and taxes must be paid to the relevant authorities and bodies.*
10. *The wholesale licence-holder must inform the Minister in writing of any changes to be effected to storage facilities prior to effecting such changes.*
11. *The wholesale licence-holder must inform the Minister as soon as possible of any dangerous situation arising from the conduct of activities authorised under the licence, including the steps taken or proposed to be taken by the licence-holder to rectify such situation or to eliminate or minimise the danger arising from such situation.*
12. *The wholesale licence-holder must comply with all provisions of the Petroleum Products Regulations relating to petroleum product spills.*

### Special Conditions.

1. *This licence is granted for the importation of 100% of products required by the market until otherwise decided by the Minister.*
2. *This licence shall become effective as from 1<sup>st</sup> February 2011.*
3. *The Special Condition attached to the wholesale licence prior to 1<sup>st</sup> February 2011 is hereby revoked.*



## **Appendix B: Consultants' Curriculum Vitae**



**ENVIRONMENTAL SCIENTIST****André Faul**

André entered the environmental assessment profession at the beginning of 2013 and since then has worked on more than 150 Environmental Impact Assessments including assessments of the petroleum industry, harbour expansions, irrigation schemes, township establishment and power generation and transmission. André's post graduate studies focussed on zoological and ecological sciences and he holds a M.Sc. in Conservation Ecology and a Ph.D. in Medical Bioscience. His expertise is in ecotoxicological related studies focussing specifically on endocrine disrupting chemicals. His Ph.D. thesis title was The Assessment of Namibian Water Resources for Endocrine Disruptors. Before joining the environmental assessment profession he worked for 12 years in the Environmental Section of the Department of Biological Sciences at the University of Namibia, first as laboratory technician and then as lecturer in biological and ecological sciences.

**CURRICULUM VITAE ANDRÉ FAUL**

Name of Firm	:	Geo Pollution Technologies (Pty) Ltd.
Name of Staff	:	ANDRÉ FAUL
Profession	:	Environmental Scientist
Years' Experience	:	19
Nationality	:	Namibian
Position	:	Environmental Scientist
Specialisation	:	Environmental Toxicology
Languages	:	Afrikaans – speaking, reading, writing – excellent English – speaking, reading, writing – excellent

**EDUCATION AND PROFESSIONAL STATUS:**

B.Sc. Zoology	:	University of Stellenbosch, 1999
B.Sc. (Hons.) Zoology	:	University of Stellenbosch, 2000
M.Sc. (Conservation Ecology)	:	University of Stellenbosch, 2005
Ph.D. (Medical Bioscience)	:	University of the Western Cape, 2018

First Aid Class A	EMTSS, 2017
Basic Fire Fighting	EMTSS, 2017

**PROFESSIONAL SOCIETY AFFILIATION:**

Environmental Assessment Professionals of Namibia (Practitioner)

**AREAS OF EXPERTISE:**

Knowledge and expertise in:

- ◆ Water Sampling, Extractions and Analysis
- ◆ Biomonitoring and Bioassays
- ◆ Biodiversity Assessment
- ◆ Toxicology
- ◆ Restoration Ecology

**EMPLOYMENT:**

2013-Date	:	Geo Pollution Technologies – Environmental Scientist
2005-2012	:	Lecturer, University of Namibia
2001-2004	:	Laboratory Technician, University of Namibia

**PUBLICATIONS:**

Publications:	5
Contract Reports	+150
Research Reports & Manuals:	5
Conference Presentations:	1

**ENVIRONMENTAL GEOLOGIST****Wikus Coetzer**

Wikus has 6 years' experience in environmental science related fields with 4 years' experience in conducting environmental impact assessments and preparation of environmental management plans. He holds an honours degree in Environmental Sciences – Environmental Geology from the Northwest-University Potchefstroom (NWU) South Africa. He first completed a B.Sc. degree in Geology and Botany in the required time also from the Northwest University Potchefstroom, South Africa. His honours project focused on the rehabilitation and phytoremediation of various tailings types and soils.

He has working experience as an environmental monitor / assisting environmental officer at Petra Diamonds, Cullinan Diamond Mine (CDM) where he gained a proper understanding of environmental monitoring responsibilities as well as legislations, regulations and the implementation of EMS/ISO14001. He started working at Geo Pollution Technologies in 2017, and regularly conducts/assists and report on environmental impact assessments, environmental management plans and pollution surveys.

**CURRICULUM VITAE WIKUS COETZER**

Name of Firm	:	Geo Pollution Technologies (Pty) Ltd.
Name of Staff	:	WIKUS COETZER
Profession	:	Environmental Geologist
Nationality	:	South African
Position	:	Environmental Geologist
Specialisation	:	Environmental Geology/ Geochemistry
Languages	:	Afrikaans – speaking, reading, writing English – speaking, reading, writing

**EDUCATION AND PROFESSIONAL STATUS:**

B.Sc. Environmental and Biological Sciences – Geology & Botany	:	NWU Potchefstroom 2013
B.Sc. (Hons.) Environmental Sciences – Environmental Geology	:	NWU Potchefstroom 2014

First Aid Class A	EMTSS, 2017
Basic Fire Fighting	EMTSS, 2017

**AREAS OF EXPERTISE:**

Knowledge and expertise in:

- ◆ Phytoremediation
- ◆ Environmental Geology / Geochemistry
- ◆ Environmental Monitoring
- ◆ Environmental Compliance
- ◆ Environmental Impact Assessments
- ◆ Environmental Management Plans

**EMPLOYMENT:**

2017 - Date:	Geo Pollution Technologies
2015 - 2016:	Petra Diamonds CDM – Environmental monitor / Assisting environmental officer
2015:	Petra Diamonds CDM – Graduate program: Environmental Officer
2014:	NWU Potchefstroom department of Geo and Spatial Sciences – Research assistant

**PUBLICATIONS:**

Contract Reports: +50