

APP-00713

**QKR NAVACHAB MINE CONSUMER FUEL INSTALLATION
NEAR KARIBIB
UPDATED ENVIRONMENTAL MANAGEMENT PLAN**




Prepared by:



Prepared for:



December 2022

Project:	QKR NAVACHAB MINE CONSUMER FUEL INSTALLATION NEAR KARIBIB: UPDATED ENVIRONMENTAL MANAGEMENT PLAN	
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I, Amon !Gaoseb, acting as 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 10 day of January 2023



Vivo Energy Namibia Limited

Business Registration/ID No.

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LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
BE	Biological/Ecological
DWA	Department of Water Affairs
DEA	Directorate of Environmental Affairs
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMA	Environmental Management Act No 7 of 2007
EMP	Environmental Management Plan
EMS	Environmental Management System
EO	Economic/Operational
ES	Environmental Classification
GPT	Geo Pollution Technologies
HIV	Human Immunodeficiency Virus
IAPs	Interested and Affected Parties
IUCN	International Union for Conservation of Nature
m/s	Meter per second
mbs	Meters below surface
MEFT	Ministry of Environment, Forestry and Tourism
mm/a	Millimetres per annum
MSDS	Material Safety Data Sheet
PC	Physical/Chemical
PPE	Personal Protective Equipment
ppm	Parts per million
SANS	South African National Standards
SC	Sociological/Cultural
UNCCD	United Nations Convention to Combat Desertification
WHO	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) is contracted to operate a consumer fuel installation at QKR Navachab mine, situated 9 km south-west of Karibib, Erongo Region. In compliance with Namibian legislation, and to adhere to all codes and standards applied in their operations, the Proponent obtained an environmental clearance certificate (ECC) for the fuel installation in 2022. The Proponent now requested Geo Pollution Technologies (Pty) Ltd to prepare an updated environmental management plan (EMP) for the consumer fuel installations located at the QKR Navachab Mine. The update is required to include additional diesel storage tanks which will be used to supply fuel for their generators supplying electricity for part aspects of their mining operations. The existing consumer fuel installation consists of four 83 m³ aboveground diesel storage tanks, one 23 m³ below ground unleaded petrol tank, and one 23 m³ aboveground used oil tank. Aboveground tanks are located inside bunded areas and are surrounded by spill control, connected to an oil water separator. These are used for the daily operational activities of fleet vehicles of the mine. The additional tanks proposed for the generators are two 83 m³ aboveground tanks, also inside a concrete bunded area connected to an oil water separator. The existing and proposed infrastructure is constructed and operated according to South African National Standards (SANS) as prescribed by Namibian legislation.

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 subparagraphs, 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 updated EMP will be used to apply for an amended 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.

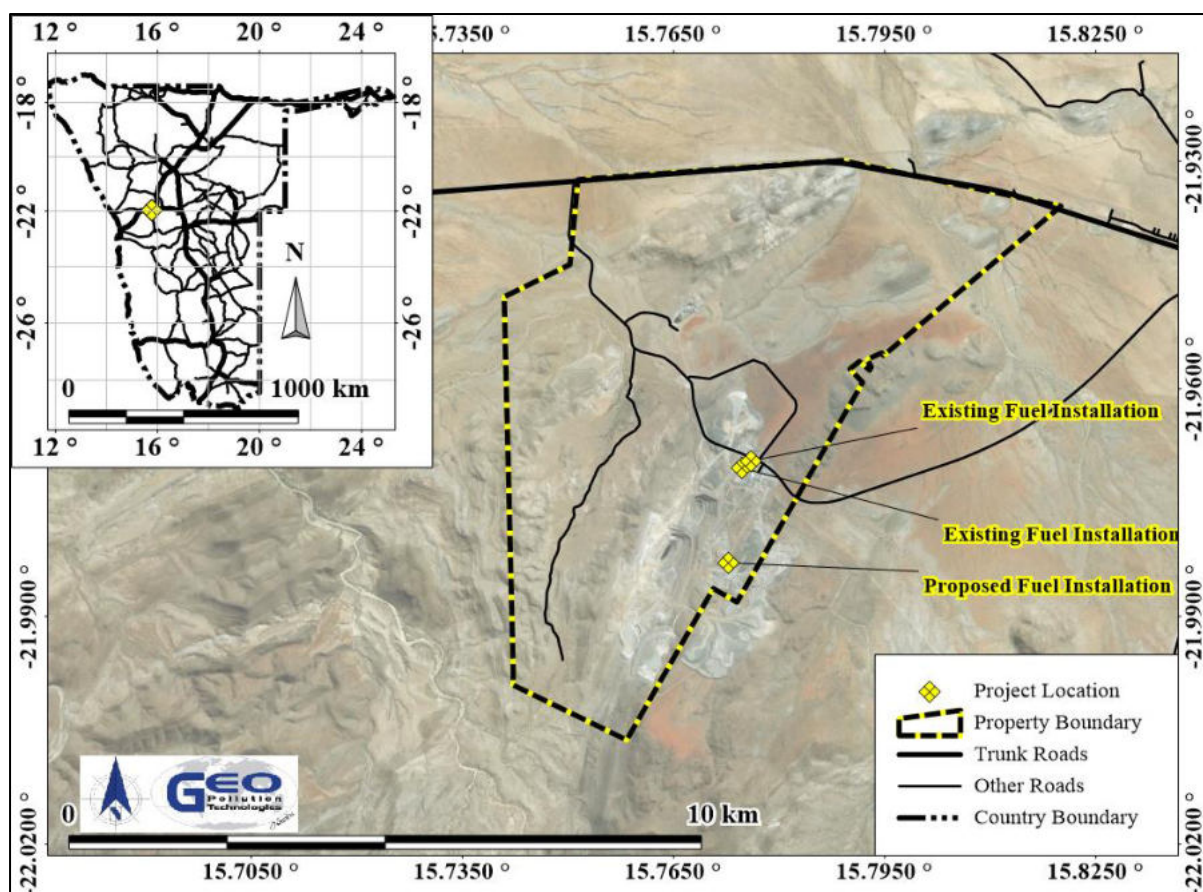


Figure 2-1 Project location

3 METHODOLOGY

The following methods were used to prepare the updated EMP:

1. Baseline information about the site and its surroundings was obtained from primary information, a site visit 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 consumer fuel installation is situated on the premises of QKR Navachab Mine near Karibib in the Erongo Region (Figure 2-1). The existing facility hosts four 83 m³ aboveground diesel storage tanks, one 23 m³ below ground unleaded petrol tank, and a 23 m³ aboveground used oil tank. The tanks are situated within concrete bund areas. All surfaces where fuel is 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.

The two new tanks will be 83 m³ each and also located within a concrete bund area (preliminary site layout indicated in Figure 4-1). The bund area will be connected to an oil water separator. Two offloading pumps will transfer diesel from road tankers to the tanks while to transfer pumps will supply diesel to five generators. To install the tanks and associated infrastructure, some earth- and cement/concrete works will be required. All construction activities will take place within the footprint of the mining licence area and on previously disturbed land.

Operations associated with a consumer fuel installations will continue at the site on a daily basis. This mainly involves the receipt of diesel and petrol from road tankers, storage of the fuel in the aboveground

storage tanks, and dispensing of fuel to operational vehicles and generators. Used oil generated by the operations of the mine is stored in the used oil tank and collected by external contractors for recycling purposes.

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 and may include cleaning of the oil water separators and some minor construction activities. Maintenance include minor repairs and general upkeep of the consumer fuel installation and associated infrastructure as well as general upgrade activities. This may include painting, servicing and/or replacement of equipment. The site is constructed and operated according to SANS 10131-2004 standards, as required by Namibian legislation.



Photo 1 Existing diesel storage tanks



Photo 2 Used oil tank and diesel storage tanks.

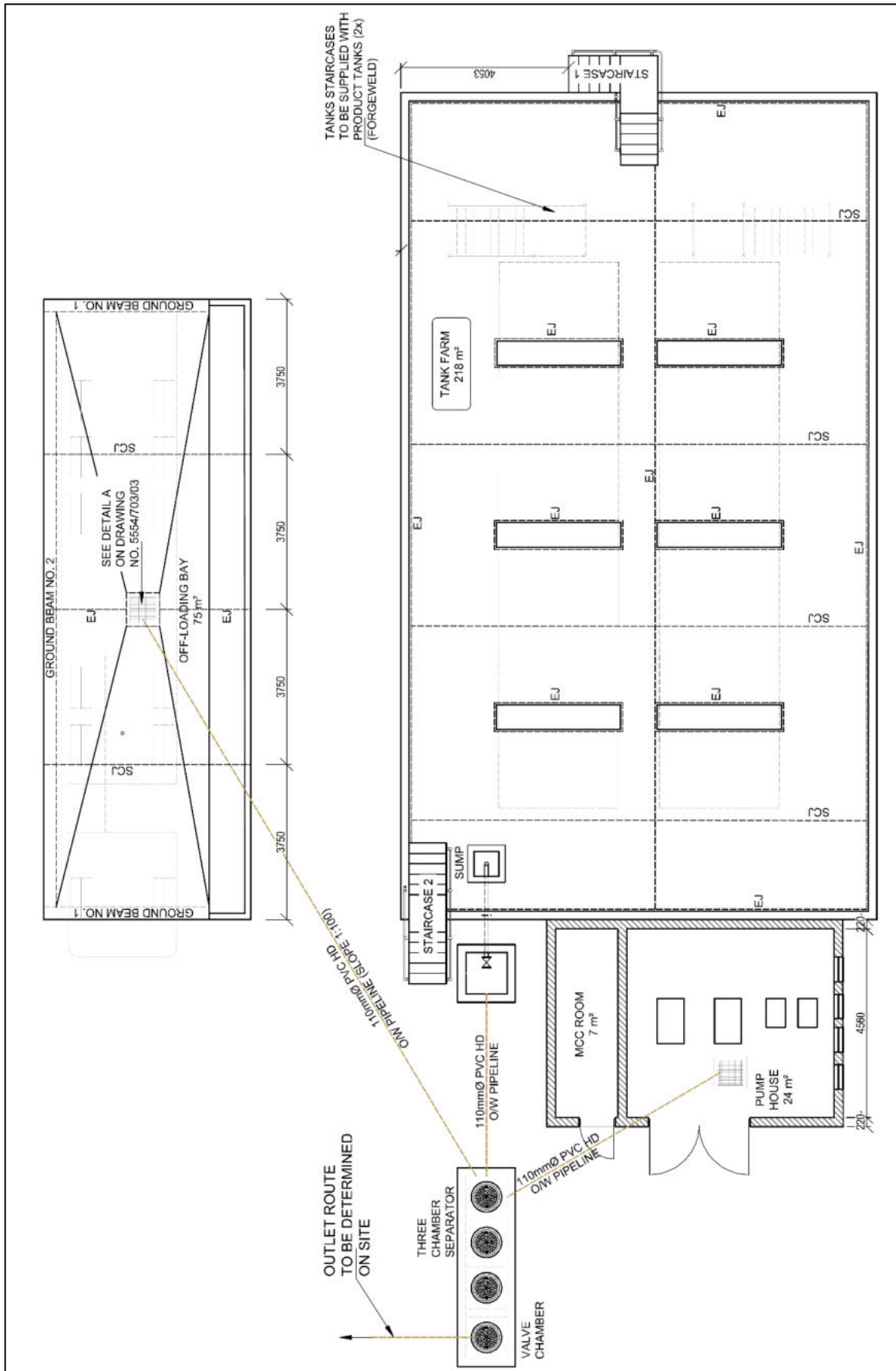


Figure 4-1 Preliminary site layout

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
The Namibian Constitution	<ul style="list-style-type: none"> ◆ Promote the welfare of people. ◆ Incorporates a high level of environmental protection. ◆ Incorporates international agreements as part of Namibian law.
Environmental Management Act Act No. 7 of 2007, Government Notice No. 232 of 2007	<ul style="list-style-type: none"> ◆ Defines the environment. ◆ Promote sustainable management of the environment and the use of natural resources. ◆ Provide a process of assessment and control of activities with possible significant effects on the environment.
Environmental Management Act Regulations Government Notice No. 28-30 of 2012	<ul style="list-style-type: none"> ◆ Commencement of the Environmental Management Act. ◆ List activities that requires an environmental clearance certificate. ◆ Provide Environmental Impact Assessment Regulations.
Petroleum Products and Energy Act Act No. 13 of 1990, Government Notice No. 45 of 1990	<ul style="list-style-type: none"> ◆ Regulates petroleum industry. ◆ Makes provision for impact assessment. ◆ Petroleum Products Regulations (Government Notice No. 155 of 2000). <ul style="list-style-type: none"> ○ Prescribes South African National Standards (SANS) or equivalents for construction, operation and decommissioning of petroleum facilities (refer to Government Notice No. 21 of 2002).
The Water Act Act No. 54 of 1956	<ul style="list-style-type: none"> ◆ Remains in force until the new Water Resources Management Act comes into force. ◆ Defines the interests of the state in protecting water resources. ◆ Controls the disposal of effluent. ◆ Numerous amendments.
Water Resources Management Act Act No. 11 of 2013	<ul style="list-style-type: none"> ◆ Provide for management, protection, development, use and conservation of water resources. ◆ Prevention of water pollution and assignment of liability. ◆ Not in force yet.
Local Authorities Act Act No. 23 of 1992, Government Notice No. 116 of 1992	<ul style="list-style-type: none"> ◆ Define the powers, duties and functions of local authority councils. ◆ Regulates discharges into sewers.
Public and Environmental Health Act Act No. 1 of 2015, Government Notice No. 86 of 2015	<ul style="list-style-type: none"> ◆ Provides a framework for a structured more uniform public and environmental health system, and for incidental matters. ◆ Deals with Integrated Waste Management including waste collection disposal and recycling; waste generation and storage; and sanitation.

Law	Key Aspects
Labour Act Act No 11 of 2007, Government Notice No. 236 of 2007	<ul style="list-style-type: none"> ◆ Provides for Labour Law and the protection and safety of employees. ◆ Labour Act, 1992: Regulations relating to the health and safety of employees at work (Government Notice No. 156 of 1997).
Atmospheric Pollution Prevention Ordinance Ordinance No. 11 of 1976	<ul style="list-style-type: none"> ◆ Governs the control of noxious or offensive gases ◆ Prohibits scheduled process without a registration certificate in a controlled area. ◆ Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process.
Hazardous Substances Ordinance Ordinance No. 14 of 1974	<ul style="list-style-type: none"> ◆ Applies to the manufacture, sale, use, disposal and dumping of hazardous substances as well as their import and export. ◆ Aims to prevent hazardous substances from causing injury, ill-health or the death of human beings.
Pollution Control and Waste Management Bill (draft document)	<ul style="list-style-type: none"> ◆ Not in force yet. ◆ Provides for prevention and control of pollution and waste. ◆ Provides for procedures to be followed for licence applications.

Table 5-2 Standards or codes of practise

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

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

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

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 premises of QKR Navachab mine, approximately 9 km south-west of Karibib, Erongo Region (21.97041°S, 15.77477°E) (Figure 2-1). Land use in the area is considered as commercial - industrial, within agriculture and tourism on freehold land.

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 area is classified as being arid with an average annual rainfall of 159 mm (Table 6-1). Rainfall in the area is below the Namibian average with rainfall peaking between January and March. Variability in rainfall is moderate to high at about 40% with high evaporation rates, see Table 6-1, Table 6-2 and Figure 6-1. Water thus remains a scarce and valuable resource.

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)	0.0	0.0	8.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum (mm)	6.5	43.8	51.7	4.0	2.3	0.2	0.0	0.0	1.0	7.6	1.6	23.7
Average (mm)	1.5	12.6	21.5	0.8	0.1	0.0	0.0	0.0	0.1	3.1	0.2	6.7
Variability (%)	88.0	75.0	58.0	153.0	438.0	436.0	624.0	0.0	270.0	93.0	220.0	81.0
Daily maximum (mm)	2.8	7.6	17.8	2.5	2.2	0.2	0.0	0.0	1.0	7.5	1.5	8.6
Average rain days	4	6	6	1	0	0	0	0	0	1	0	2
Season July - June average: 48 mm			Season coefficient of variation: 40 %									
Data range	1981-Jul-01 to				2021-Jun-30				Lat: -17.2140°S Long: 12.4259°E			

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

Average annual evaporation (mm/a)	2,600-2,800
Water deficit (mm/a)	1,701-1,900
Average annual temperatures (°C)	20-20

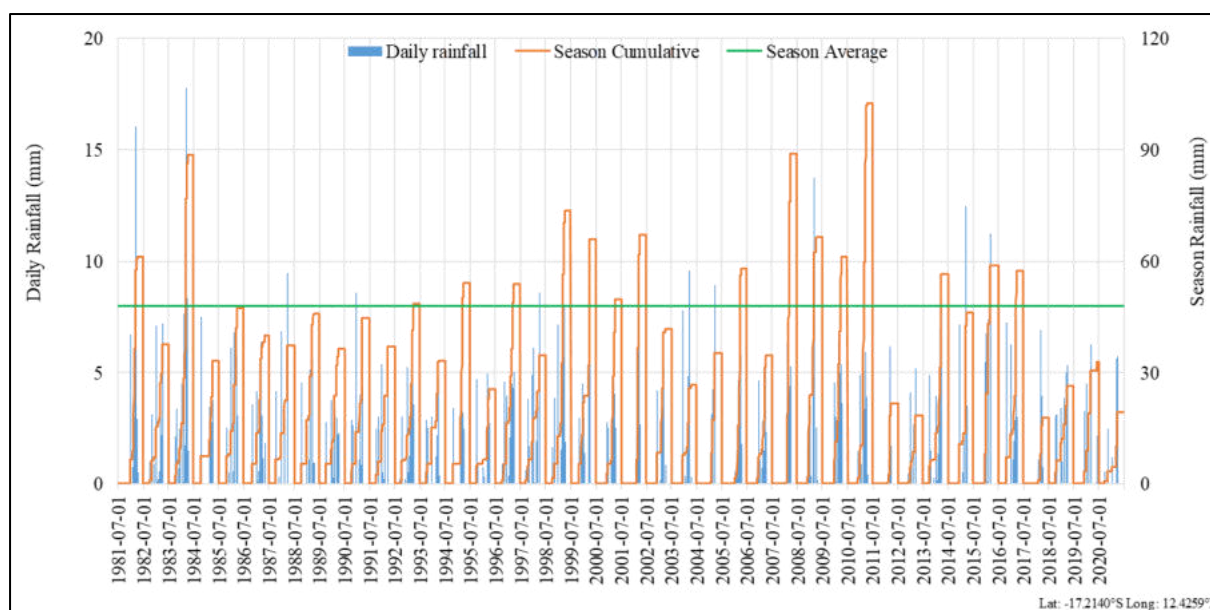


Figure 6-1 Daily and seasonal rainfall from CHIRPS-2 data (Funk et al., 2015)

6.3 TOPOGRAPHY AND DRAINAGE

The landscape is classified as an area of dissection and cutback, due to erosion. The project area is located within the catchment of the Swakop River, an ephemeral river, draining in a Western direction.

The immediate area of consumer installation is relatively flat and drains in a south-western direction.

6.4 GEOLOGY AND HYDROGEOLOGY


The geology in the area consists of quartzite, conglomerate, schist and marble of the Namibian Age, from the Damara Sequence. The formations underlying the area are the Kuiseb, the Karibib and the Spes Bona Formations. Tertiary to Recent surface cover is also present in the area.

Groundwater flow would be mostly through secondary porosity flow, along fractures, faults and other geological structures present within the formations.

Groundwater flow from the site can be expected in a northerly direction. Local flow patterns may vary due to groundwater abstraction, especially due to mine dewatering. Water is utilized in the area, with 14 boreholes known of within a 5 km radius. The local groundwater table is estimated to be more than 18 m below surface. This area does not fall within a Water Control Area, however groundwater remains the property of the Government of Namibia.

Table 6-3 provides groundwater statistics of boreholes contained in the DWA database. Note that this database is generally outdated and more boreholes might be present.

Table 6-3 Groundwater statistics

Query Centre: QKR Navachab Mine Consumer Installations; -21.9704°S; 15.7746°E		Query Box Radius: 5 km										
		NUMBER OF KNOWN BOREHOLES	LATITUDE	LONGITUDE	DEPTH (mbs)	YIELD (m ³ /h)	WATER LEVEL (mbs)	WATER STRIKE (mbs)	TDS (ppm)	SULPHATE (ppm)	NITRATE (ppm)	FLUORIDE (ppm)
Data points		14			9	5	3	3	5	5	5	5
Minimum			-21.925404	15.726080	38	0	18	6	833	71	14	0
Average					64	3	24	22	1286	113	44	1
Maximum			-22.015396	15.823120	91	8	35	40	1616	220	70	1
Group A					22.22%	0.00%	0.00%	33.33%	40.00%	80.00%	0.00%	100.00%
Limit					50	>10	10	10	1000	200	10	1.5
Group B					77.78%	20.00%	100.00%	66.67%	20.00%	20.00%	40.00%	0.00%
Limit					100	>5	50	50	1500	600	20	2.0
Group C					0.00%	40.00%	0.00%	0.00%	40.00%	0.00%	0.00%	0.00%
Limit					200	>0.5	100	100	2000	1200	40	3.0
Group D					0.00%	40.00%	0.00%	0.00%	0.00%	0.00%	60.00%	0.00%
Limit					>200	<0.5	>100	>100	>2000	>1200	>40	>3

Statistical grouping of parameters is for ease of interpretation, except for the grouping used for sulphate, nitrate and fluoride, which follow the Namibian guidelines for the evaluation of drinking-water quality for human consumption, with regard to chemical, physical and bacteriological quality. In this case the groupings has the following meaning:

Group A: Water with an excellent quality; Group B: Water with acceptable quality; Group C: Water with low health risk; Group D: Water with a high health risk, or water unsuitable for human consumption.

6.5 MINE WATER SUPPLY

Potable water supply to Navachab mine is supplied by NamWater from the Swakoppoort dam, via a pipeline.

6.6 FAUNA AND FLORA

The project area is located within the Savanna biome, with western highlands type vegetation. The vegetation structure type is classified as sparse shrubland, with a medium diversity of higher plants. No vegetation (i.e. trees, bushes, weeds and grass) exists at the sites, as they are either existing facilities or all vegetation has previously been removed during mining operations.

Table 6-4 General flora data (Atlas of Namibia Project, 2002)

Biome	Savanna
Vegetation type	Western highlands
Vegetation structure type	Sparse shrubland
Diversity of higher plants	Medium (Diversity rank = 4 [1 to 7 representing highest to lowest diversity])
Number of plant species	150 - 300
Percentage tree cover	2-10
Tree height (m)	2-5
Percentage shrub cover	11-25
Shrub height (m)	0.5-2
Percentage dwarf shrub cover	2-10
Dwarf shrub height (m)	< 0.5
Percentage grass cover	2-10
Grass height (m)	< 0.5
Dominant plant species	<i>Acacia reficiens</i> , <i>Acacia reficiens</i> , <i>Commiphora species</i> , <i>Euphorbia guerichiana</i> , <i>Colophospermum mopane</i> (N only), <i>Maerua schinzii</i> , <i>Adenolobus garipensis</i>

Table 6-5 General fauna data (Atlas of Namibia Project, 2002)

Mammal Diversity	61 - 75 Species
Rodent Diversity	16 - 19 Species
Bird Diversity	171 - 200 Species
Reptile Diversity	71 - 80 Species
Snake Diversity	30 - 34 Species
Lizard Diversity	32 - 35 Species
Frog Diversity	4 - 7 Species
Termite Diversity	7 - 9 Genera
Scorpion Diversity	16 - 17 Species

6.7 DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS

The project area falls within the Erongo Region with a population of 150,809 (Namibia Statistics Agency, 2011). This increased from the 107,663 in 2001, resulting in an annual population increase of 3.4%. Employment in the Erongo Region are mainly from the fishing and agriculture industry (11.5% regionally and 2% nationally), the mining industry (11.7%) and manufacturing (11.5%). Unemployment in the Erongo Region is 30%.

At local scale the project area falls in the Karibib Constituency which has a population of 13,320 and an unemployment rate of 41%.

Table 6-6 Demographic characteristics of Karibib Constituency, the Erongo Region and Nationally (Namibia Statistics Agency, 2011)

	Karibib Constituency	Erongo Region	Namibia
Population (Males)	6,412	79,823	1,021,912
Population (Females)	6,908	70,986	1,091,165
Population (Total)	13,320	150,809	2,113,077
Unemployment (15+ years)	41%	30%	33.8%
Literacy (15+ years)	92%	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 consumer fuel installation aid in securing fuel supply to the operational vehicles and machinery of QKR Navachab mine. This increases operational efficiency of the mine, reduces traffic impacts and ensures a secure supply of fuel remains available.

Desired Outcome: Ensure a secure fuel 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 consumer fuel installation may have resulted in a limited increase in traffic to the site, as a result of tanker trucks delivering fuel to the site. In turn, by providing fuel to the operational activities of the mine, traffic impacts are reduced in Karibib 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 to park outside of designated parking areas or to obstruct any traffic.
- ◆ 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 is present within 50 m from the sites. This reduces the risk fire poses to surrounding infrastructure and increases ease of accessibility for firefighting purposes.

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 or during refuelling activities. 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 oil is stored in an aboveground storage tank and collected by external contractors. 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 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 mine, it is however less when compared to the traffic impacts associated with mine vehicles refuelling in Karibib.

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 operations of QKR Navachab mine as a whole have a positive impact on Karibib 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 consumer fuel installations contribute positively toward QKR Navachab, by ensuring a safe and reliable supply of fuel 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

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Appendix A Petroleum Products Licence

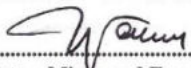


MINISTRY OF MINES AND ENERGY

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

CONSUMER INSTALLATION CERTIFICATE

[Regulation 18 (5)]

CONSUMER INSTALLATION CERTIFICATE		PERMANENT* X	PETROL* X	Certificate No.
		TEMPORARY*	DIESEL*	CI/1517/2002
Name of certificate-holder		AngloGold Namibia (Pty) Ltd		
Address of certificate-holder		Physical address	Postal address	
		Navachab Gold Mine Farm Navachab	Box 150 Karibib	
Nature of activity to which certificate relates*	Commercial/ Industrial Undertaking	Farming Operation	Mining Operation X	
If storage tank is to be permanently installed, location of site		N/A		
Conditions applicable to Certificate <i>See next page for general and special conditions applicable to licence.</i>				
Date of issue of certificate		02 January 2002		
In the case of a temporary licence, period of validity		N/A		
Issued by the Minister of Mines and Energy in terms of regulation 18(5), on 02 January 2002 at Windhoek				
 Minister: Mines and Energy				

* Mark the appropriate item

Namprint: 061-220095

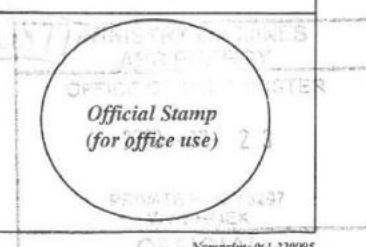


MINISTRY OF MINES AND ENERGY

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

CONSUMER INSTALLATION CERTIFICATE

[Regulation 18 (5)]

CONSUMER INSTALLATION CERTIFICATE		PERMANENT* X	PETROL* X	Certificate No.
		TEMPORARY*	DIESEL* X	CI/1517/2010
Name of certificate-holder		Anglogold Ashanti Namibia (Pty) Ltd		
Address of certificate-holder		Physical address	Postal address	
		Navachab Gold Mine Karibib Namibia	Box 150 Karibib	
Nature of activity to which certificate relates*	Commercial/ Industrial Undertaking	Farming Operation	Mining Operation X	
If storage tank is to be permanently installed, location of site		Navachab Gold Mine Karibib Namibia		
Conditions applicable to Certificate <i>See next page for general and special conditions applicable to licence.</i>				
Date of issue of certificate		23 July 2010		
In the case of a temporary licence, period of validity		N/A		
Issued by the Minister of Mines and Energy in terms of regulation 18(5), on 23 July 2010 at Windhoek				
 Minister: Mines and Energy				

* Mark the appropriate item

Appendix B Consultant's 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 160 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	:	21
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	OSH-Med, 2022
Basic Fire Fighting	OSH-Med, 2022

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	+160
Research Reports & Manuals:	5
Conference Presentations:	1