

APP-001499

**EXISTING BULK STORAGE FACILITY AND FILLING
OPERATIONS FOR LIQUEFIED PETROLEUM GAS IN OSHIFO**

ENVIRONMENTAL MANAGEMENT PLAN



Assessed by:



Assessed for:



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1 BACKGROUND AND INTRODUCTION

Geo Pollution Technologies (Pty) Ltd was appointed by Triple J Energies (Pty) Ltd (the Proponent) to prepare an environmental management plan (EMP) for the continued operations of their existing liquefied petroleum gas (LPG) bulk storage facility and filling operations on erf 727, Oshifo in the Omusati Region (Figure 1). The facility has been in operation (under the trade name GasIt) for many years and the Proponent intends to continue supplying LPG to customers. Together with daily operations, some maintenance and upgrades are performed on a regular basis to ensure that the facility remains compliant to industry standards, specifically South African National Standards (SANS) as prescribed by the Ministry of Mines and Energy. The facility has one bulk storage tank and operations of the facility include:

- ◆ Filling of the storage tank with LPG from road transport tankers.
- ◆ Dispensing of LPG to customers.
- ◆ General operational activities and maintenance procedures associated with the facility.

In order to comply with Namibian legislation, and to adhere to all codes and standards applied in their operations, the Proponent wishes to develop an EMP for the operations of the GasIt Depot in Oshifo. The EMP provides management options to ensure environmental impacts of the facility are minimised. The environment being defined in the 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 thus 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 bulk storage facility and its associated filling operations. 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 or similar could be used in conjunction with the EMP. Operators and responsible personnel must be taught the contents of these documents. Local authority 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 environmental clearance certificate (ECC) in compliance with Namibia’s Environmental Management Act (Act No 7 of 2007) (EMA).

Project Justification – Many local businesses and residents require LPG for their daily operations. GasIt thus plays an important role in Oshifo and the general area by ensuring the availability of a reliable supply of LPG.

Benefits of the bulk storage and filling facility include:

- ◆ Reliable supply of LPG.
- ◆ Employment, skills development and training.
- ◆ Increase in economic resilience in the area through support for diversified business activities and opportunities.

2 SCOPE

The scope of this EMP, in compliance with the requirements of EMA, is to:

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

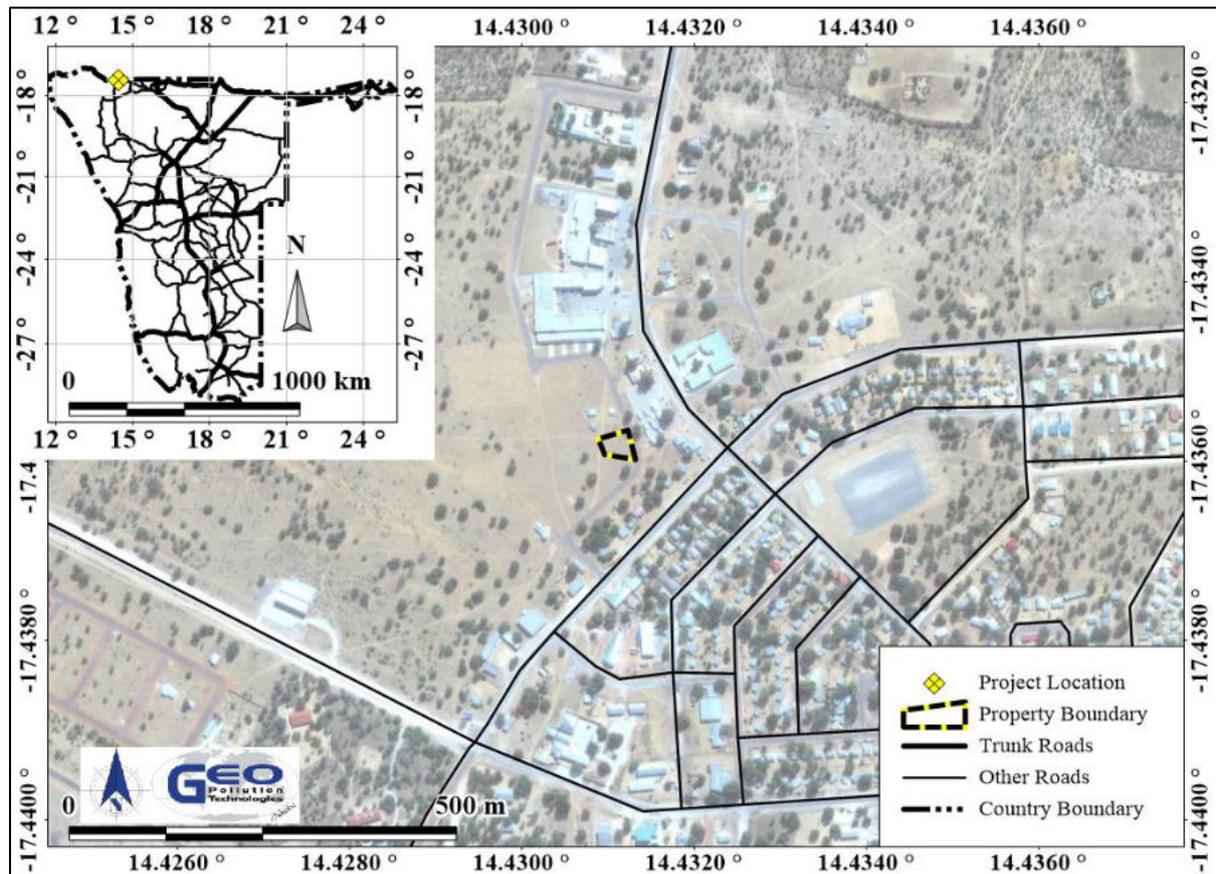


Figure 2-1 Project location

3 METHODOLOGY

The following methods were used to prepare the EMP:

1. Baseline information about the site and its surroundings was obtained from existing secondary information and a site visit.
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 PROJECT DESCRIPTION

The Oshifo GasIt depot is an existing site that has been in operation for many years. As part of its current operations, refurbishments occur on a regular basis, to ensure that the facility continues to meet the required industry standards for safety and environmental protection.

The facility hosts one functioning bulk LPG storage tank of 22 m³. All areas where LPG is handled and stored are enclosed with metal mesh guards which are locked when the business closes for the day. Firefighting equipment is present in the form of fire extinguishers strategically placed throughout the area.

Buildings and infrastructure on site includes a storage area, a LPG cylinder refill bay and ablution facilities. The premises is serviced with water from the Ruacana Town Council and electricity from Nored.

Operations of the facility entail receipt of LPG by means of tanker trucks, storage of such LPG in the above storage tank, and the dispensing of the LPG into smaller cylinders and sold to clients. Daily tasks include cleaning and maintenance of the site, administrative tasks, refill operations, LPG volume reconciliations to detect any product losses and to ensure timely LPG delivery requests.



Photo 4-1 LPG storage tank



Photo 4-2 LPG cylinder storage area



Photo 4-3 Fire extinguisher



Photo 4-4 Cylinder filling area

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 LPG bulk 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 water abstraction and 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
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)

Law	Key Aspects
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 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

Table 5.3 Standards or codes of practise

Standard or Code	Key Aspects
South African National Standards (SANS)	<ul style="list-style-type: none"> ◆ Defines rules to ensure save use of LPG ◆ Prevents risks to human health and the environment ◆ Provides a framework for storing LPG ◆ Guidelines for installation and operations

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

Hazardous Substance Treatment, Handling and Storage

- ◆ 9.1 “The manufacturing, storage, handling or processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974.” (The facility stores and handles hazardous substances in the form of LPG.)
- ◆ 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.” (The facility stores and handles hazardous substances in the form of LPG which is permitted by the Ministry of Mines and Energy.)

- ◆ 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.” (Total storage capacity for LPG is 22 m³).
- ◆ 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.” (The facility is a refill station that stores LPG above ground.)

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 situated on erf 727, Oshifo, an informal settlement in the Omusati Region (17.435740 °S; 14.431116 °E) (Figure 2-1). Access to the site is gained from Freedom Road.

6.2 CLIMATE

The project location is part of a hot semi-arid type climate. According to the Köppen-Geiger Climate Classification system the project is located in a hot semi-arid climate (BSh) (<http://koeppen-geiger.vu-wien.ac.at/present.htm>). This means that the area receives precipitation below potential evapotranspiration, but not as low as a desert climate and have a mean annual temperature of at least 18°C. See Table 6.1 for a summary of climate data.

Heavy rainfall in this region is mostly common between December and April, peaking mostly in January to March, whilst May to September have little or no rainfall. Long term precipitation data was obtained from the CHIRPS-2 database (Funk et al., 2015). 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 and therefore represents more recent data. Data is averaged over an area of roughly 5 km by 5 km. This averaging effect should be kept in mind during data analyses as high rainfall from single thunder storm cells would be averaged out, thereby providing a reduced daily maximum rainfall value.

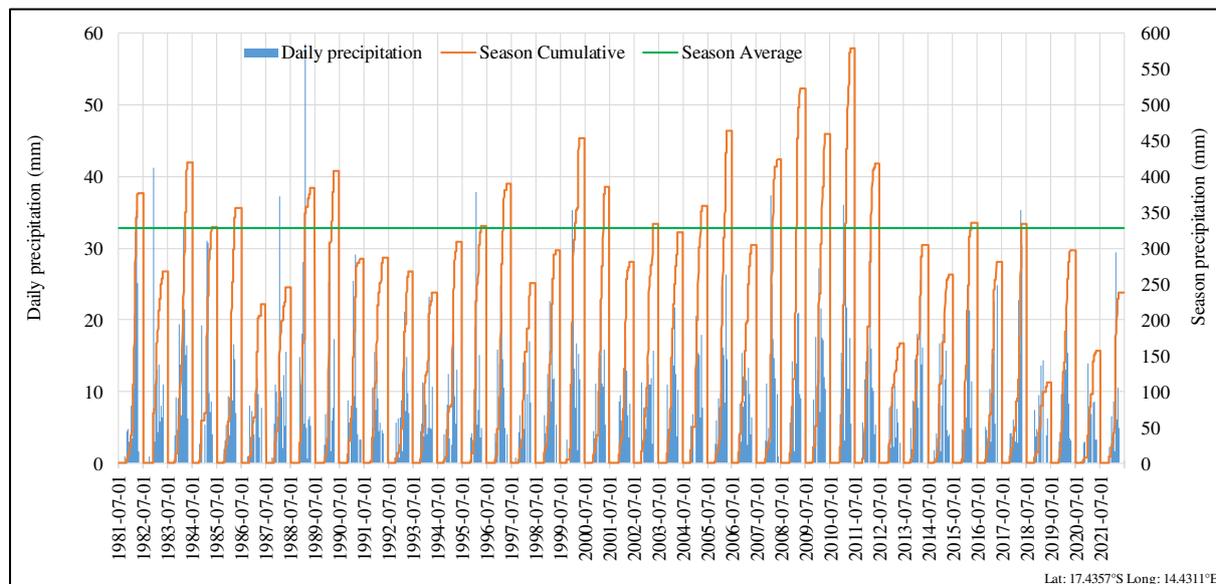
The average annual rainfall for the last 41 years was calculated as 328 mm/a, with a coefficient of variance of 28%. Heavier precipitation (single day events) occur between October and April, with a single event of 58.5 mm in January (last 41 years data) being the highest. Daily and seasonal precipitation data (Funk et al., 2015) is presented in Table 6.2 in Figure 6-1. Seasonal (July to June) total precipitation, centered on the average line for the last 41 years, is presented, with the daily total precipitation and the seasonal cumulative precipitation. From the Figure 6-1 it is clear that 7 out of the last 10 seasons were below the average.

Table 6.1 Summary of climate data for the area (Atlas of Namibia Project, 2002)

Average annual rainfall (mm/a)	350 – 400
Variation in annual rainfall (%)	40 – 50
Average annual evaporation (mm/a)	2,800 – 3,000
Water deficit (mm/a)	1,501 – 1,700
Average annual temperatures (°C)	>22

Table 6.2 Precipitation data based on remote sensing (Funk et al., 2015)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Minimum (mm/m)	12.15	9.98	11.06	5.77	0.00	0.00	0.00	0.00	0.00	0.00	5.80	9.44
Maximum (mm/m)	195.41	224.49	127.03	148.90	0.96	0.07	0.00	0.03	2.10	40.53	46.80	168.57
Average (mm/m)	80.2	89.1	58.0	23.8	0.0	0.0	0.0	0.0	0.3	7.2	21.8	47.2
Variability (%)	55.0	57.0	55.0	108.0	624.0	457.0	0.0	624.0	195.0	111.0	48.0	72.0
Daily maximum (mm)	58.5	46.5	35.3	35.3	1.0	0.1	0.0	0.0	2.0	11.3	19.3	41.3
Average rain days	10	10	10	3	0	0	0	0	0	2	5	8
Season July - June average: 328 mm						Season coefficient of variation: 29 %						
Data range	1981-Jul-01 to 2022-Jun-30						Lat: 17.4357°S Long: 14.4311°E					

**Figure 6-1 Daily rainfall, season total and season average rainfall based on remote sensing data (Funk et al., 2015)**

6.3 TOPOGRAPHY AND DRAINAGE

The regional topography of the area falls into the Kalahari Sandveld system. A low gradient anatomising to braided fluvial system, which periodically floods, is present in the area. The site is located within the Kunene North Basin which drains into the Etosha Pan. Local topography is flat with poor surface flow channel development. Rainwater would mostly pool and infiltrate into the sandy soils. There are strong developments of caves, dolines and sinkholes in the area. The site itself is relatively flat.

6.4 GEOLOGY AND HYDROGEOLOGY

The dominant surface soil cover in the area is Chromic Calcisols. Soil cover at the site is from the Kalahari Group (TK), consisting of sand, calcrete and/or gravel of Quaternary and Tertiary age. The Kalahari group consists mainly of unconsolidated formations, but some degree of consolidation may be present. The Kalahari Group formations is underlain by rocks from the Karoo Sequence, namely the Omingonde formation of the Ecca Group. The Omingonde formation consist of red mudstone, siltstone, sandstone, grit and conglomerate and occur as the subsurface geology of the project area.

Water is utilized in the area, with 10 boreholes known of within a 5 km radius. Table 6.3 presents groundwater statistics of boreholes contained in the Department of Water Affairs database. Note that this database is generally outdated and more boreholes might be present. The project area is located within the Kunene North Groundwater Basin. Groundwater flow at the site can be expected in a central direction. Local flow patterns may vary due to groundwater abstraction. The site does not fall within a water controlled area, however groundwater remains the property of the Government of the Republic of Namibia

Table 6.3 Groundwater statistics

Query Centre:	GASIT Bulk Storage and Handling Facility_Oshifo; -17.4357°S; 14.4311°E											Query Box Radius: 5.0km
		NUMBER OF KNOWN BOREHOLES	LATITUDE	LONGITUDE	DEPTH (mbs)	YIELD (m3/h)	WATER LEVEL (mbs)	WATER STRIKE (mbs)	TDS (ppm)	SULPHATE (ppm)	NITRATE (ppm)	FLUORIDE (ppm)
Data points		10			9	7	7	7	7	7	7	7
Minimum			-17.390704	14.383937	43	0	14	24	330	2	0	0
Average					108	2	28	33	495	20	4	1
Maximum			-17.480696	14.478263	229	7	58	58	710	79	20	3
Group A					33.33%	0.00%	0.00%	0.00%	100.00%	100.00%	85.71%	71.43%
<i>Limit</i>					50	>10	10	10	1000	200	10	1.5
Group B					11.11%	14.29%	85.71%	85.71%	0.00%	0.00%	14.29%	14.29%
<i>Limit</i>					100	>5	50	50	1500	600	20	2.0
Group C					44.44%	42.86%	14.29%	14.29%	0.00%	0.00%	0.00%	14.29%
<i>Limit</i>					200	>0.5	100	100	2000	1200	40	3.0
Group D					11.11%	42.86%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Limit</i>					>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 C: Water with low health risk

Group B: Water with acceptable quality

Group D: Water with a high health risk, or water unsuitable for human consumption

6.5 PUBLIC WATER SUPPLY

Public water supply is purified and provided by NamWater from the Olushandja Dam. The Olushandja- Ruacana bulk pipeline carries water to Oshifo.

6.6 FAUNA AND FLORA

The site lies in the Savanna Biome with a western Kalahari vegetation type. Trees such as *Commiphora*, *Combretum apiculatum*, *Pterocarpus rotundifolius*, *Mangetti*, *Acacia erioloba* and *Acacia fleckii* species and a variety of other trees are characteristic of this vegetation type.

The LPG storage facility is an existing site which has been cleared of most vegetation during the initial establishment of the site. Some vegetation remains, but none is expected to be of significant conservation importance.

6.7 DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS

The project is located within the Omusati Region, falls under the Ruacana Constituency and is located within the 1 division. The total population for this region is 249,885 of which 112,812 are male and 137,073 are female. The region also has a density of 9.2 people/km² and a literacy rate of 87.6%, while the constituency has a total population of 14,857 and a density of 2.7 people/km².

7 ENVIRONMENTAL MANAGEMENT PLAN

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 operations of the facility. All personnel taking part in the operations of the facility should be made aware of the contents in this section, so as to plan the operations accordingly and in an environmentally sound manner. The objectives of the EMP are:

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

7.1 IMPLEMENTATION OF THE EMP

The sections below 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 and decommissioning phases. The majority of these impacts can be mitigated or prevented. The prevention and mitigation measures are listed below.

7.1.1 Planning

During the phases of planning for construction (upgrades, maintenance etc.) continued operations and possible future decommissioning of the facility, it is the responsibility of 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 operations of the facility are in place and remains valid.
- ◆ 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 (HSE) 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:
 - EMP, risk management, mitigation, 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.
- ◆ If one has not already been established, establish and maintain a fund for future 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 bi-annual reporting system to report on aspects of operations, maintenance and decommissioning as outlined in the EMP.
- ◆ Submit bi-annual reports to the MEFT to allow for environmental ECC 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 ECC prior to expiry.

7.1.2 Revenue Generation and Employment

Continued operations and maintenance of the facility relies on employment. Skilled and unskilled labourers are employed or contracted for various tasks of operations and maintenance. 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. Retailing of LPG contributes to revenue generation which is paid to the national treasury while also contributing to the local economy in terms of increased spending power of employees as well as the sourcing of goods and services.

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

Actions

Enhancement:

- ◆ 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.

7.1.3 Skills, Technology and Development

During operations of the facility, training is provided to a portion of the workforce to be able to perform their duties 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 LPG industry.

Actions

Enhancement:

- ◆ If the skills exist locally, contractors and employees must first be sourced from the town, 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.

Responsible Body:

- ◆ Proponent

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 reports on all training conducted.

7.1.4 Demographic Profile and Community Health

The facility relies on labour for operations. The scale of the project is limited and it is not foreseen that it has or will in future create a change in the demographic profile of the local community. Exposure to factors such as communicable disease like HIV/AIDS as well as alcoholism / drug abuse are often associated with the trucking industry (i.e. LPG deliveries). Spills and leaks may present risks to members of the public especially if groundwater is polluted.

Desired Outcome: To prevent the in-migration and growth in informal settlements and to prevent the spread of diseases such as HIV/AIDS.

Actions:

Prevention:

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

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.
- ◆ Bi-annual report and review of employee demographics.

7.1.5 Traffic

The presence of the facility increase traffic flow in the area. This may increase the risk of incidents and accidents especially during the LPG deliveries. Construction activities (upgrades) may result in temporary traffic impacts as a result of larges vehicles accessing the site for delivery and collection of equipment and machinery.

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.
- ◆ Tanker trucks collecting and delivering LPG should not be allowed to obstruct any traffic.

Mitigation:

- ◆ If any traffic impacts are expected, traffic management should be performed.

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 report should be compiled bi-annually of all incidents reported, complaints received, and action taken.

7.1.6 Health, Safety and Security

Activities associated with the construction and operational phases relies on human labour and therefore will expose them to health and safety risks. LPG can rapidly result in asphyxiation when inhaled. Skin or eye contact with LPG leaking or escaping from high pressure vessels can result in frostbite or irritation. Lifting of heavy cylinders or equipment can result in injuries. Access to site by unauthorised persons with the intent of arson, theft or sabotage of product or equipment.

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

Actions

Prevention:

- ◆ Manuals and training regarding the correct handling of LPG should be in place and updated as new or updated material safety data sheets become available. Ensure that all personnel receive adequate training on operation of equipment/handling of hazardous substances.
- ◆ 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, safe work and medical procedures, permits to work, emergency response plans, housekeeping rules, MSDS's and signage requirements (PPE, flammable etc.).
- ◆ Develop emergency response plans for all possible health, safety and security impacts and appoint responsible personnel in key positions to activate and oversee such plans when required.
- ◆ 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.
- ◆ All health and safety standards specified in the Labour Act should be complied with.
- ◆ Clearly label dangerous and restricted areas as well as dangerous equipment and products, especially during the construction phase.
- ◆ Provide all employees with required and adequate personal protective equipment (PPE).
- ◆ Implementation of maintenance register for all equipment and gas / hazardous substance storage areas.
- ◆ Security procedures and proper security measures must be in place to protect workers and clients.
- ◆ Equipment on site must be locked away or placed in a way that does not encourage criminal activities (e.g. theft).

Mitigation:

- ◆ For all emergency situations, the appropriate emergency response plan must be implemented as soon as possible in order to minimize the magnitude of impacts or prevent such impacts from developing into more severe impacts.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Any incidents must be recorded with action taken to prevent future occurrences.
- ◆ A report should be compiled bi-annually of all incidents reported. The report should contain dates when training were conducted and when safety equipment and structures were inspected and maintained.

7.1.7 Fire

Construction and operational activities may increase the risk of the occurrence of fires. LPG are extremely flammable and a fire or boiling liquid expanding vapour explosion (BLEVE) risk exists. If precautions are not taken to prevent their ignition, fire and subsequent safety risks may arise.

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

Actions:

Prevention:

- ◆ Storage and handling of LPG and other gases must be according SANS 10087.
- ◆ All LPG storage and handling facilities in Namibia must comply with strict safety distances and fire precautions and control as prescribed by API Standards and/or SANS. SANS is adopted by the Ministry of Mines and Energy as the national standard.
- ◆ A holistic fire protection and prevention plan must be developed for the site and it should specifically take into account flammable products stored on site. This plan must include an emergency response plan, firefighting plan and a spill recovery plan and should have dedicated assigned personnel to oversee their development and implementation.
- ◆ Firefighting equipment must be maintained and regularly serviced.
- ◆ All pressure release valves should regularly be inspected and serviced.
- ◆ Regular personnel training (firefighting, fire prevention and responsible housekeeping practices).
- ◆ Ensure all chemicals are stored strictly according to MSDS and SANS instructions. This include segregation of incompatible products.
- ◆ Maintain regular site, mechanical and electrical inspections and perform regular maintenance.
- ◆ **Mitigation:**
 - ◆ For any fire related emergency situation, the appropriate emergency response plan must be implemented as soon as possible in order to minimize the magnitude of impacts or prevent such impacts from developing into more severe impacts.

Responsible Body:

- ◆ Proponent

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 report should be compiled bi-annually of all incidents reported. The report should contain dates when fire drills were conducted and when fire equipment was tested and training given.

7.1.8 Air Quality

The operational phase release LPG vapours into the air during refilling of bulk storage tanks as well as at dispensing points. LPG can have serious health effects and can lead to rapid asphyxiation. Construction and refurbishment activities may cause dust where soil surfaces are exposed.

Desired Outcome: To prevent health impacts related to reduced air quality.

Actions

Mitigation:

- ◆ Employees should be informed about the dangers of LPG vapours.
- ◆ All filling of cylinders should take place in a well ventilated area.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

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

7.1.9 Noise

Noise pollution may be generated due to heavy and light motor vehicles accessing the site to offload LPG or refill cylinders. Construction and refurbishment activities may result in a temporary increase in noise levels.

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

Actions

Prevention:

- ◆ Follow Labour Act Health and Safety Regulations on noise in the workplace and World Health Organisation (WHO) guidelines on community noise to prevent hearing impairment and a nuisance at nearby receptors.
- ◆ All machinery must be regularly serviced to ensure minimal noise production.
- ◆ Manage noise caused by clients including loud music.

Mitigation:

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

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Labour Act Health and Safety Regulations and WHO Guidelines.
- ◆ Maintain a complaints register.
- ◆ Bi-annual report on complaints and actions taken to address complaints and prevent future occurrences.

7.1.10 Waste production

Waste is produced during the operational phase. Waste may include hazardous waste and domestic waste. Waste presents a contamination risk and when not removed regularly may become a fire hazard.

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 waste storage facilities are available.
- ◆ Ensure waste cannot be blown away by wind.
- ◆ Prevent scavenging (human and non-human) of stored waste.

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).
- ◆ See the MSDS available from suppliers for disposal of contaminated products and empty containers.
- ◆ Liaise with the town council 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.
- ◆ All information and reporting to be included in a bi-annual report.

7.1.11 Ecosystem and Biodiversity Impact

The site has previously been developed and is mostly devoid of vegetation. The nature of the operational activities is such that the probability of creating a habitat for flora and fauna to establish is low. Ecosystem or biodiversity impacts are mostly associated with pollution of the environment.

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

Actions.

Prevention:

- ◆ Educate all contracted and permanent employees on the value of biodiversity.

Mitigation:

- ◆ Contain construction material and activities on site.
- ◆ Report any extraordinary animal sightings to the MEFT.
- ◆ Mitigation measures related to waste handling and the prevention of groundwater, surface water and soil contamination should limit ecosystem and biodiversity impacts.
- ◆ Prevent scavenging of waste by fauna.
- ◆ The establishment of habitats and nesting sites at the facility should be avoided where possible.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Any ecologically significant events or sightings to be included in a bi-annual report.

7.1.12 Groundwater, Surface Water and Soil Contamination

Leakages from vehicles and accidental fuel, oil or hydraulic fluid spills can result in groundwater, surface water and soil contamination in the area.

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

Actions

Prevention:

All construction and or maintenance machines should be maintained to be in a good working condition during operation.

Employ drip trays and spill kits during construction when onsite servicing/repairs of equipment are needed.

- ◆ 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 (gas handling, spill detection, spill control).

Mitigation:

- ◆ All hydrocarbon based fluids must be removed from site and disposed of at a recognised hazardous waste disposal facility.
- ◆ Spill clean-up means must be readily available on site as per the relevant MSDS and all spills must be cleaned up immediately.

Responsible Body:

- ◆ Proponent

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, volume of spill and remedial action taken.

7.1.13 Visual Impact

This is an impact that not only affects the aesthetic appearance, but also the integrity of the facility. The general upkeep and maintenance of the facility will not only reduce any negative visual impacts, but also ensure the longevity of the structures and buildings.

Desired Outcome: To minimise aesthetic impacts associated with the facility and prevent lighting from being a visual disturbance.

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.
- ◆ Lighting should be directed towards the facility and away from residents where possible.
- ◆ Minimum lighting necessary for operations to be used at night. The installation of auto-dimming lights when no movement is detected are desirable.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ A report should be compiled every bi-annually of all complaints received and actions taken.

7.1.14 Cumulative Impact

Possible cumulative impacts associated with the operational phase include increased traffic and noise in the area.

Desired Outcome: To minimise all cumulative 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 bi-annual 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:

- ◆ Review bi-annual reports to determine the overall impact of the operational phase..

7.2 DECOMMISSIONING AND REHABILITATION

Decommissioning is not foreseen during the validity of the ECC. Decommissioning was however assessed. 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. Any pollution present on the site must be remediated. A soil conditions survey should be conducted to detect any hydrocarbon pollution and to implement remediation measures. The impacts associated with this phase include noise and waste production as structures are dismantled. Noise must adhere Labour Act Health and Safety Regulations and WHO guidelines 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 will not be used for similar 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 to implement guidelines and mitigation measures.

7.3 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 bulk storage facility and filling operations has a positive impact on the various businesses operational in the town and on the surrounding community who uses LPG for cooking and heating. In addition to reliable and convenient LPG supply the facility contributes to employment, skills transfer and training which in turn develops the local workforce. Regular upgrades and refurbishment will ensure the operations remain compliant with legislative requirements, and aid in securing a constant and reliable supply of LPG.

Negative impacts can successfully be mitigated. SANS standards relating LPG storage and handling must be followed during all operations of the bulk storage facility and filling operations. Noise pollution should at all times meet Labour Act Health and Safety Regulations and WHO guidelines to prevent hearing loss and not to cause a nuisance. 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.

Should the Directorate of Environmental Affairs (DEA) of the MEFT find that the impacts and related mitigation measures, which have been proposed in this report, are acceptable, an ECC may be granted to the Proponent. The ECC issued, based on this document, will render it a legally binding document which should be adhered to.

9 REFERENCES

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Appendix A: 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 175 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/Biochemistry : 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 (Environmental Assessment 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, Department of Biological Sciences, University of Namibia
 2001-2004 : Laboratory Technician, Department of Biological, University of Namibia

PUBLICATIONS:

Publications: 5
 Contract Reports +175
 Research Reports & Manuals: 5
 Conference Presentations: 1