ENVIRONMENTAL MONITORING AND EVALUATION REPORT FOR THE OPERATIONS OF THE EXISTING NELSON MANDELA SERVICE STATION IN WINDHOEK, KHOMAS REGION

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1.INTRODUCTION

Environmental monitoring is a tool and technique to observe and assess on environmental performance. The aim of environmental monitoring is to manage and minimize the impact a project's activities have on the environment, either to ensure compliance with laws and regulations or to mitigate risks of harmful effects on the natural environment and protect the health and safety of human beings.

It is essential to note that Nelson Mandela service station was established before the Environmental Management Act No.7 of 2007 came into effect, hence it has been operating without an Environmental Clearance Certificate (ECC). Puma Energy Namibia therefore seeks to regularize the operation of the existing Nelson Mandela service station in accordance with Section 9 of the Environmental Management Act No. 7 of 2007.

Request for Environmental Clearance and Environmental Management Plan (this report) –

The following environmental monitoring and evaluation report was compiled by Nam Geo-Enviro Solutions (NGS) on behalf of Puma Energy Namibia to assess the current environmental conditions on site and to apply for an ECC for the continuous operations of the existing Nelson Mandela service station in Windhoek.

Nam Geo-Enviro Solutions has thus also compiled an Environmental Management Plan (EMP) for the service Station that will be used as a site-specific plan to manage adverse impacts of the project.

Detailing environmental impacts of the existing facilities, assessment of existing controls and recommendations for environmental management to ensure the project continues its operations in an environmentally sound manner.

2. OBJECTIVES

- Provide a detailed description of existing site infrastructure and activities.
- Conduct a comprehensive and all-encompassing legislative and other requirements assessment based on the proposed activities.
- Consider the potential environmental and social impacts of the operations and decommissioning of the existing fuel station.
- Identification of any mitigation action to be taken to minimize predicted adverse impacts and provide associated costs where applicable and practical. This will include the development of an environmental monitoring plan which will ensure that the mitigation measures are adhered to during the operation and decommissioning phases of the project in an Environmental Management Plan (EMP) to minimize and/or mitigate potentially negative impacts.
- Compile an Environmental Management Plan (EMP) to minimize and/or mitigate potentially negative impacts for the continuing operations of the service station.

3. PROJECT DESCRIPTION

The service station is located on Erf 108, along the Nelson Mandela Avenue Road in Klein Windhoek, Windhoek, Khomas region. The site falls in the following geographic coordinates: S 22.562350, E 17.098760.

The service station operates the following facilities on site:

- Operation of fuel retail facilities to general public.
- Selling of already bottled LPG gas to general public
- A mini grocer and fast-food shop (Puma Express shop)

3.1. Fuel storage tanks and installations details at Nelson Mandela service station

The installations at the service station constitutes of three (3) fuel underground storage tanks, of which two are 50ppm (diesel) are one ULP 95 (petrol). Table 1 below indicates the fuel storage tanks and installation details on site.

Table 1: fuel storage tanks and installation details on site

Tank no:	**T1**	**T2**	**T3**
Product (petrol/diesel)	Petrol	diesel	diesel
Capacity (L)	46000L	23000L	23000L
Type of material (AG-aboveground UG: underground)	UG	UG	UG
No. of islands	4		
No. of pumps	8		
No. of dispensers	24		
Oil & water interceptor on forecourt	Available		
Oil & water interceptor on filler points	Available		
Oil & water separator pit	Available		
Spill containment slab	Available		

4. POLICY AND LEGISLATORY COMPLIANCE

This section outlines the legislative compliant requirements that the service station is required to comply to in respect to acquiring an Environmental Clearance Certificate (ECC).

4.1 Environmental Management Act no.7 (2007) and its Regulations (2012)

According to the Environmental Management Act (2007) and its Regulations (2012) the existing development requires an Environmental Clearance Certificate as specified in the following sections of the Act shown in Table 2 below.

Table 2: Listed activities relevant to the project

ACTIVITY	RELEVANT SECTIONS
9. Hazardous substance treatment, handling, and storage	**9.2** Any process or activity which requires a permit, licence or other forms of authorization, or the modification of or changes to existing facility for any process or activities which requires and amendment of an existing permit, licence, or authorization or which requires a permit, licence, or authorization in term of a law governing the generation or release of emission, pollution, effluent, or waste. **9.4** The storage and handling of 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 or aboveground storage of dangerous goods including petrol, diesel, liquid, petroleum, gas, or paraffin.

4.2 Other relevant policies and standards

Table 3 below outlines other policies, standards and acts relevant to the project and compliance status of the project with relevant acts and regulations.

Table 3: Other requirements compliancy applicable

Aspect	Legislation	Type of Requirement	Compliance Status	Comments
Environmental	Namibian Constitution First Amendment Act 34 of 1998	The constitution requires sustainable utilisation of natural resources basis for the benefit of all Namibians, both present and future." (Article 95(l)).	**Compliant**	-Fuel sold at the service station is imported therefore natural resources are not affected. However, there is need for continuous monitoring, so as to prevent groundwater contamination.
	Environmental Management Act 7 of 2007	Requires that projects with significant environmental impacts are subject to an environmental assessment process (Section 27).	**Non-Compliant**	-The Service Station is operating without an Environmental Clearance Certificate (ECC) because the site was already existing before the EMA (2007) came into force, hence with this application, Puma Energy Namibia seeks to comply with the Act.
	Pollution and Waste Management Bill (draft)	All waste has to be handled by qualified waste handling contractors and disposed off on approved sites.	**Compliant**	-Rent a drum collects general waste on site. -A certified contractor handles hazardous waste.

Soil	Soil Conservation Act 76 of 1969	Section 3 (n) of the Act guards against erosion, denudation, and any forms of pollution to the soil. Accordingly, the operations of the service station should not result in the pollution or erosion or degradation of the soil around	**Compliant**	-The following has been implemented as a way to prevent soil pollution on site: spill containment slab, oil separator and paving of the surrounding area to avoid erosion.
Air	Atmospheric Pollution Prevention Ordinance 11 of 1976	The Act requires that there is need to register a controlled area with certificate to operate air polluting activities. The retail license covers all elements and requirements of this Act.	**Compliant**	-The Service station has obtained a retail license from Ministry of Mines and Energy.
Water	Water Act 54 of 1956	A discharge license for wastewater from the oil and separator pit has to be obtained. Section 21(2) stipulates that purified effluent is to be returned as close as possible to the point of abstraction of the original water.	**Compliant**	-Oil and water separator pit purifies water from hydrocarbons pollution. -A certified contractor is contracted to clean the oil/water separator pit
	Water Resources Management Act No 24 of 2004 (still to be enforced)	The act looks at protection of underground water resources and continuous monitoring of water quality in the presence	**compliant**	-There is need for periodic sampling/monitoring of water quality.

		of potentially polluting activities.		
Health and Safety	Labour Act (No 11 of 2007) in conjunction with Regulation 156, 'Regulations Relating to the Health and Safety of Employees at work'.	-As a requirement on site, a Safety and Health representative on site has to be appointed. -The employer shall report all incidents occurring on site to the Ministry and accordance to the regulations.	**Compliant**	-There are trained OHS representatives on site. -All accidents and incidents are investigated and recorded in the incident register.
	Public Health and Environmental Act, 2015	-(1) A person who intends to conduct on a premises activity which generate special, industrial, hazardous, or infectious waste must be registered for that purpose with the local authority concerned -(3) A person or local authority engaged in activities contemplated in subsection (1) or (2) must ensure that the waste generated on the premises concerned is kept and stored (a) under conditions that causes no harm to human	**Compliant**	-The Service station is registered with City of Windhoek and all waste is managed in accordance to the provisions of the City of Windhoek By-Laws

		health or damage to the environment; and (b) In accordance with applicable laws. (4) All waste contemplated in this section must be stored in approved containers and for the maximum period determined by the head of health services or the chief health officer		
Oil and Gas	Petroleum Products and Energy Act 13 of 1990	-The Act requires that for the operation of the Service station a retail license has to be obtained from the relevant ministry -Adding on the Act requires incident reporting of major spillages occurring on site for pollution control.	**Compliant**	-Nelson Mandela Service Station is authorised to sell petroleum products. -A spill register is kept in place to record and report all accidental spillages on site.
	Hazardous Substances Ordinance 14 of 1974 Sections 3 and 27	The Act requires that a license has to be obtained for the storage and distribution of a classified hazardous substance with the relevant Authority.	**Compliant**	-Labelling of all Hazardous containers and or facility at site with danger or warning signs.

SANS/SABS	South African National Standards (SANS) 10089-3 of 2010.	SANS 10089-3 highlights on the following: The installation, modification and decommissioning of underground storage tanks, pumps/dispensers and pipework at service stations and consumer installations. Additionally, the following items are also highlighted: fire precautions & fire control in bulk depots, protection & welfare of personnel, maintenance of & extension to the Service Station, pollution control and transportation of petroleum products by road & by rail.	**Compliant**	-Nelson Mandela service station is constructed, and it is operating according to SANS standards

5.ENVIRONMENTAL MONITORING AND EVALUATION METHODOLOGY

The methodology adopted for this monitoring was to assess environmental conditions on site and mitigation measures currently implemented and assess compliance with standard pollution mitigation measures associated with the project. A physical inspection of the site was conducted on 06th October 2022

6.ASSESSMENT OF ENVIRONMENTAL IMPACTS AND MEASURES CURRENTLY IMPLEMENTED ON SITE

This section outlines the impacts associated with fuel storage and handling on site and their current mitigation measures implemented on site.

6.1 on-site pollution management

Most pollutants and hazards associated with service stations are caused by hydrocarbon fuels that are stored and handled on site. Possible hydrocarbon pollution impacts on site are highlighted below:

Surface water and soil contamination

Fuel spillage and leakages are the highest risks of pollution sources of soils and surface water contaminations at service stations. This type of contamination usually occurs during dispensing fuel into customers vehicles and when fuel tanker trucks offload fuel into the underground storage tanks. Over-filling of tanks, leaking and pipe bursts are the cause of most surface spillages.

Surface spillages if not contained can contaminate the surface soils. Soils contaminated by petroleum contaminants can affect soil health and harm soil microorganisms, reducing their number and activity. Surface spills can also contaminate surface water bodies as they can be washed into rivers and streams by floods and rain, thus can result in further underground water contamination.

Current mitigation measures implemented on site

- A concrete containment slab covering the forecourt and off-loading areas where pumping activities occur to contain the spills and prevent them from penetrating to underground.
- The service station has a canopy to prevent rain from washing of spills into surface water bodies and prevent surface water contamination.
- Spill register to record major spills and leakages is kept on site.

See photos in figure 1 below of surface pollution control measures currently on site.

Image 1: A canopy installed on site

Image 2: A concrete slab for surface spills containment.

Figure 1: surface pollution control measures currently on site

Underground contamination

Underground fuel storage tanks and reticulation pipelines that carry fuel to the dispensing pumps have a risk of leaking, thereby polluting underground water. Oil spills and leakages may infiltrate underground, causing underground water contamination in the absence of a concrete containment slab.

Current mitigation measures implemented on site

- There is a concrete slab covering the surface where fuels are handled to prevent fuel from infiltrating underground and contaminating undergroundwater.
- Oil & water interceptors at filler points to collect wastewater and oil spills from the forecourt and offloading to the oil & water separator pits that are installed on site.
- The service station is surrounded by interlocks to prevent surface and underground contamination.

See photos in figure 2 below of underground pollution control measures currently on site

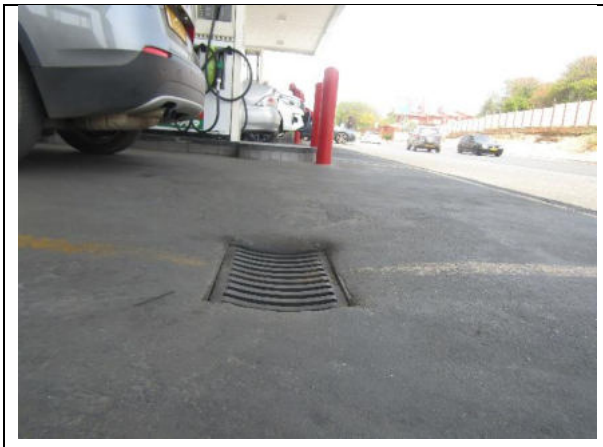

Image1: Oil and water interceptor at filler points to collect wastewater and oils from the forecourt to the water and oil separator pits

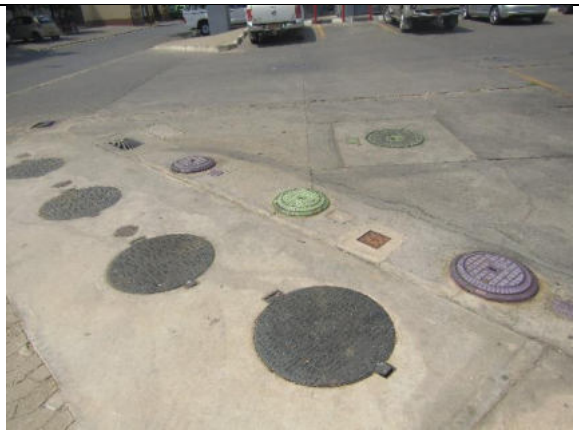

Image 2: Oil and water separator pits emptied regularly by certified contractors.

Image 3: Minor oil spills occurring on site, sand is used as an absorbent and remaining oils washed into the oil & water interceptor.

Image 4: Interlock surrounding the site

Figure 2: underground pollution control measures currently on site

Hydrocarbon vapours and odours

Hydrocarbon vapors can be released into the atmosphere when dispensing fuel into the customers vehicles and when tanker trucks are offloading fuel. Vapor contains elements such as benzene which is highly carcinogenic and may affect employees especially the fuel attendants due to prolonged exposure. Immediate atmospheric environment may be affected by fuel odors during refilling process.

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Current mitigation measures implemented on site

- Vent pipes have been installed on site (at least 3m high) to release vapors above the immediate atmosphere to enhance pollution attenuation.
- Two working shifts a day to prevent workers from prolonged exposure to hydrocarbon vapors.

See photos in figure 3 below of hydrocarbon vapours and odours pollution control measures currently on site

Image 1: Vent pipes have been installed on site (3m) to release vapors above the immediate atmosphere to enhance pollution attenuation.

Figure 3: hydrocarbon vapours and odours pollution control measures currently on site

6.2. On-site waste management

Waste management involves the regular collection, transportation as well as processing and disposal or recycling and monitoring of different types of waste materials. Different types of waste can be generated at the service station such as general waste and hazardous waste.

General waste

Nelson Mandela service station generates waste mainly from the mini shop and the kitchen, therefore most of the general waste produced on site is domestic waste. Waste is generally in form of food leftovers, plastics, cigarette butts, waste dumped on site by motorists fuelling up.

Current mitigation measures implemented on site

- General Waste is collected by Rent a Drum.
- Waste disposal bins are available.
- Good housekeeping is maintained.

See photos in figure 4 below of general waste pollution control measures currently on site

Image 1: waste bins on site

Image 2: Good housekeeping

Figure 4: general waste pollution control measures currently on site

Hazardous waste

Hazardous wastes on site are usually minor oil spills on the surface. Hazardous waste should be separated from general waste and kept in hazardous bins to be discarded at approved disposal or should be handled by certified contractors.

Current mitigation measures implemented on site

- Sand buckets on site. sand is used to clean up accidentals spills of fuel and lubricants during refilling and storage. Sand is poured on the oil spillages as an absorbent and then collected and disposed of into contaminated sand waste bins.

See photos in figure 5 below of hazardous waste management control measures currently on site

Image 1: sand buckets on site

Figure 5:hazardous waste management control measures currently on site

6.3 Fire and safety management

The monitoring and evaluation also focused on the health and safety of the workers.

Hydrocarbons are volatile under certain conditions and their vapours in specific concentrations are flammable. If precautions are not taken to prevent their ignition, fire and subsequent safety risks may arise.

No fire or any source of fire ignition is to be allowed at the service station during any of the two phases (operational and decommissioning). Puma Energy Namibia shall take all reasonable measures and active steps to avoid increasing the risk of fire through activities on site and prevent the accidental occurrence or spread of fire; and shall always ensure sufficient fire-fighting equipment on site.

Current mitigation measures implemented on site

- Firefighting equipment are present at the Service Station and in good working condition.
- Safety signs forbidding smoking, use of cell phones, use of explosives etc, are displayed.
- Water is available at the Service Station.
- A first aid kit is available on site
- Workers have personal protective clothing (PPE).
- Staff are trained on handling of fuel and firefighting.

See photos in figure 6 below of fire and safety control measures currently on site

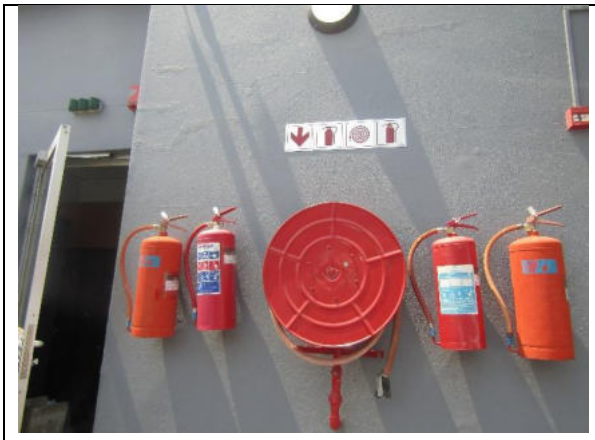

Image 1: some of the fire extinguishers and a hose pipe on site.

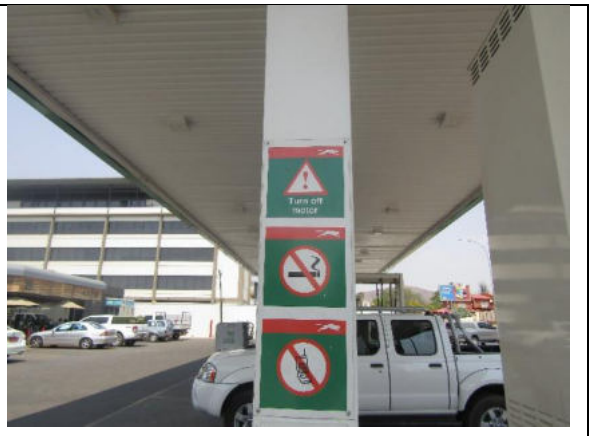

Image 2: safety signs forbidding smoking, switching off running engines and no cell phone usage during filling up.

Image 3: Personal protective equipment (safety boots, overall)

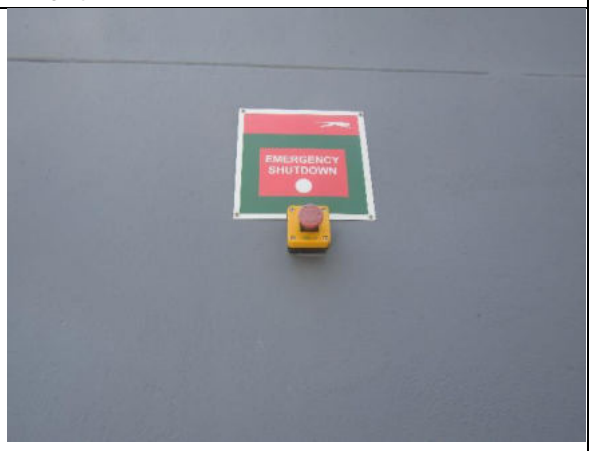

Image 4: emergency shutdown alarm

Figure 6: fire and safety control measures currently on site

7. MONITORING OUTCOMES AND RECOMMENDATIONS

Monitoring Outcomes

The focus of this monitoring and evaluation report is on key environmental and legislative compliance in respect to the service station's operations. Compliance was categorized as follows:

a. Non-Compliance (NC)
b. Partial compliance (PC)
c. Compliant(C)

Table 4:Monitoring outcomes

IMPACT	COMPLIANCE STATUS	COMMENTS
Surface soil and water contamination	**C**	-A canopy installed, concrete spill containment slab on site.
Underground contamination	**C**	-Oil and water separator pits available on site and cleaned by a certified contractor.
Risk of fire explosion	**C**	-Warning signs on use of explosives on site displayed, fire extinguishers, hose pipes.
Hydrocarbon vapours and odours	**C**	-Vent pipes installed on site.
Health and safety	**C**	-First aid kit and PPE.
Hazardous waste	**PC**	-Sand buckets are available on site. -There are no hazardous waste bins on site.
General waste	**C**	-Water proof waste bins available.

RECOMMENDATIONS

- Hazardous waste should be separated from general waste, the service station should have hazardous waste bins on site.
- Installation of monitoring wells to detect underground tank leakages.
- Adequate supply of absorbents (sand) on site.
- A clear and detailed fire emergency response plan should be implemented on site and known by all employees.

8. CONCLUSION

The overall monitoring and evaluation findings of the operations of Nelson Mandela service station are in accordance with the SABS/SANS and Ministry of Mines and Energy standards and guidelines which are in compliance with Namibia's National and international standards of storage facilities for petroleum products. However, the service station needs to acquire an ECC to comply with the EMA act No.7 (2007). The environmental monitoring focused on critical potential impacts of the project that include surface and underground contamination, hydrocarbon vapours and odours, risk of fire explosion, general waste, and hazardous waste.

The recent compiled Environmental Management Plan entails potential project impacts on the environment, mitigation measures, recommendations and decommissioning of the project, therefore it should be used as an on-site reference document to manage environmental impacts of the project. However, environmental monitoring and evaluations on environmental performance should be conducted biannually.

OCTOBER 2022

9. REFERENCES

I.Constitution of the Republic of Namibia (1990).

II.Environmental Management Act (2007).

III.Petroleum Products and Energy Act of Namibia (1990)

IV.South African National Standard 10089 (2010).

V.Water Resources Management Act 11 (2013).