ANNEXURE S

26 Albertyn Street
Northcliff
Hermanus 7200
RSA

Phone:
(+27) 079 524 0040
Email:
joeonfire@vodamail.co.za

Reg. No. 2019/227292/07

INTEGRITY and ETHICS – LEADING IN SAFETY

RISK MANAGEMENT PLAN FOR BULK LIQUIFIED PETROLEUM GAS (LPG) TANK STORAGE

For

BULK STORAGE FACILITY
Erf: 2740
ARGON STREET
SANDBAAI, HERMANUS
WESTERN CAPE

Compiled by: GSJ Schoeman

Dip. Fire Safety – CFPA (UK & EU)

L4 Dip. Fire Safety – Institution of Fire Engineers (IFE)

Cert. Fire Safety Engineering – CFPA (uk & EU)

SAMTRAC (NOSA)

Date: 1 March 2022

26 Albertyn Street
Northcliff
Hermanus 7200
RSA

Phone:
(+27) 079 524 0040
Email:
joeonfire@vodamail.co.za

Reg. No. 2019/227292/07

INTEGRITY and ETHICS – LEADING IN SAFETY

I. INTRODUCTION

Gas Hub (Pty) Ltd is an agency for Oryx selling and distributing LPG to clients in the Overstrand region.

Gas Hub will be storing LPG in an above ground bulk vessel and operating a refilling station of cylinders that will be collected for remote sale and distribution through its various distribution sites to the public.

This Risk Management Plan is compiled and initiated in accordance with the Major Hazard Installation Regulations and SANS 1461:2018 Major Hazard Installations-Risk Assessments & SANS1514:2018 Major Hazard Installations-Emergency Preparedness Plan.

The tank is an approved LPG pressure storage tank of 45 000kg capacity that is installed as a mounded tank facility in accordance with NFPA58 International Standards and SANS10087-3 National Regulations.

II. OBJECTIVE

The objective of this Risk Management Plan will serve to ensure:

i) Compliance with the Occupational Safety and Health and Safety Act 85 of 1993 (OSHA), SANS1514:2018 Major Hazard Installations-Emergency Preparedness Plan and SANS10089-3 Handling and Storage of Liquefied Petroleum Gas;

ii) That company resources are provided for training employees, procuring and maintaining necessary approved equipment, and assigning responsibilities;

iii) The preparedness for the control and dealing with unforeseen situations involving leakage, spillage accidents that may lead to injury and loss of human life are contained and summarily dealt with;

iv) That any potential danger and contamination of the surrounding area of the bulk tank storage facility will be limited to the best of the company's ability;

v) That a containment and preventative strategy is in place that can be enacted immediately in the event of a any unforeseen incident involving accidental leakage of LPG product;

vi) That a fire extinguishing/containment strategy is in place to prevent any danger to personnel, the public and damage to the surrounding environment.

26 Albertyn Street
Northcliff
Hermanus 7200
RSA

Phone:
(+27) 079 524 0040
Email:
joeonfire@vodamail.co.za

Reg. No. 2019/227292/07

This plan shall be incorporated into the company Health and Safety Policy and binds the owner of Gas Hub to apply the highest priority and safety standards to all associated emergencies that may reasonably be expected to occur at the storage facility.

III. RESPONSIBLE PERSONS

The Chief Executive Officer of Gas Hub (PTY) Ltd. is the designated responsible duty holder and shall at all times be responsible of ensuring that all safety and control measures are maintained as prescribed by Section 16(1) of the Occupational Health and Safety Act 85 of 1993.

The duty holder must, subject to all regulations and by-laws ensure that the provisions of the Act and all relative Regulations in relation to the Act are complied with, and may in writing designate a responsible person in a full-time capacity under his or her direct control in respect of every establishment as prescribed by section 16(2) pf the Act to manage the implementation of such strategies.

IV. PROPERTIES AND HAZARDS

a) Identification

Common name: Liquefied Petroleum Gas (LPG)

b) Physical and chemical properties

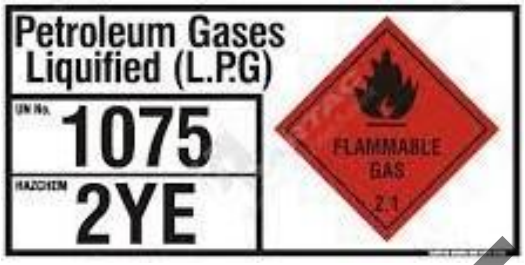
Form –	Gaseous
State of matter –	C_4H_{10}(Butane) & C_3H_8(Propane)
Colour –	Colourless
Odour -	Hydrogen Sulphide (Mercaptan)
Liquid Density/kg^3	509
Boiling point/boiling range	-42°C
Calorific value	46.34MJ/kg
Auto-ignition temperature	510°C
Stoichiometric Air/Fuel kg/kg	15.8

26 Albertyn Street
Northcliff
Hermanus 7200
RSA

Phone:
(+27) 079 524 0040
Email:
joeonfire@vodamail.co.za

Reg. No. 2019/227292/07

c) HAZCHEM Identification



d) NFPA Identification

e) Fire Hazard

LPG is classified as highly flammable. A LPG/Air mixture of 1% to 10% is easily ignited and any accumulation of LPG in catchment areas can result in a rate of combustion of near-explosive force.

f) Health Hazards

Short-term exposure can irritate your eyes, nose, throat and lungs; it can cause coughs, bronchitis, headaches, light-headedness and nausea.

LPG liquid, by its nature to rapidly vaporize and consequently significantly lower the temperature, can cause severe cold burns when it comes into contact with the skin

26 Albertyn Street
Northcliff
Hermanus 7200
RSA

Phone:
(+27) 079 524 0040
Email:
joeonfire@vodamail.co.za

Reg. No. 2019/227292/07

Lengthy exposure to LPG will result in loss of consciousness or even death by asphyxiation.

g) Environmental Hazard

LPG is non-toxic and will have little effect on the environment when well ventilated however it presents dangerous situations when accumulated in low lying spaces with little or no ventilation as it may become detrimental to the survival of a number of different groups of microorganisms, depending on the amount of exposure.

V. RISKS ASSOCIATED WITH THE USE AND STORAGE OF LPG.

LPG is a hydrocarbon gas that exists in a liquefied form. LPG boils at a very low temperature and to avoid the gas evaporating it is stored in pressurized steel vessels, such as bulk pressurised tanks and the commercial cylinders that we are all familiar with.

LPG is colourless, odourless and heavier than air, therefore if a container is defective and leaking, it could cause a volatile explosive atmosphere and a threat to life safety should no one become aware. It is therefore of utmost importance that persons working with LPG cylinders are trained in their safe use and know how to store correctly.

As with other flammable liquids, the main hazard will arise from ignition of leaking vapour. A fire involving LPG has very small potential to be divesting, given the nature of how bulk storage tanks and cylinders are manufactured.

VI. MITIGATION OF RISKS

Explosions

Leaking gas itself rarely causes a fire but will be easily ignited by electrical equipment or an open flame source. If a storage tank or cylinders are exposed to an external heat source and are heated sufficiently, they may rupture, commonly termed as a BLEVE meaning *Expanding Liquid Vapour Explosion* that may have a catastrophic effect resulting from the explosive nature of the sudden release.

However the chances for such an event to occur are extremely rare given the nature of this installation having the highest safety standards that are prescribed by the appropriate national regulations.

26 Albertyn Street
Northcliff
Hermanus 7200
RSA

Phone:
(+27) 079 524 0040
Email:
joeonfire@vodamail.co.za

Reg. No. 2019/227292/07

INTEGRITY and ETHICS – LEADING IN SAFETY

Mounded Tank

A mounded tank is considered to be the highest safety standard for LPG tank installations by eliminating the any external danger as the mound cover protects the vessels against, heat radiation from nearby fire, pressure wave originating from an explosion, impact by flying objects, sabotage

Safety features of a mounded tank:

- LPG Mounded Storage Tanks / Bullets / Vessels are completely covered with Soil and Only Manhole / Dome and other nozzles protrude outside.
- The Scenario of BLEVE (Boiling Liquid Expanding Vapour Explosion) is eliminated, since no fire possible below the tanks.
- Difficult for external agencies to identify the mound as a storage facility.
- Reduced fire case PSV loads as compared to above ground storage tanks and spheres.
- Fire water requirement for mounded storages is less.
- Vessels have slop of 1:200 minimum for drainage purpose.
- etc.
- Site area required less compared to above ground storage due to less stringent inter spacing requirement.

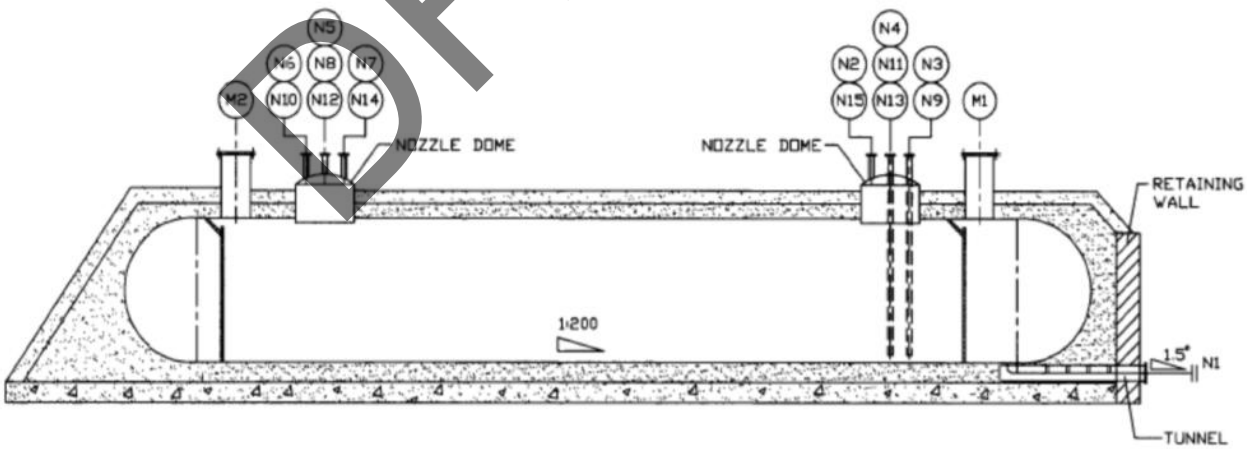


Diagram example of a construction of a mounded tank

26 Albertyn Street
Northcliff
Hermanus 7200
RSA

Phone:
(+27) 079 524 0040
Email:
joeonfire@vodamail.co.za

Reg. No. 2019/227292/07

Example of a mounded tank facility

Personal Precautions

i) Due to high vapor density, flammable/toxic vapors may accumulate in low lying areas such as gullies, pits, drains, or trenches.
ii) Vapors may accumulate in low lying areas and reach ignitable concentrations.
iii) Ventilate the area.
iv) The use of tools that can cause sparking should not be allowed in the area.
v) Use appropriate personal protective equipment to prevent eye/skin contact and absorption.
vi) Use approved respiratory protection, if warranted, to prevent inhalation of toxic fumes.
vii) All contaminated clothing should not be worn near sources of ignition.

Emergency Measures

i) As an immediate precautionary measure, isolate the spill or leak area for at least 50 meters in all directions.
ii) Consider wind direction.
iii) Isolate all ignition sources such as electrical equipment that is not intrinsivcally safe in proximity of the spill area.
iv) Evaluate the direction of product travel, and attempt to prevent any product from entering sewers, drains, water shed channels etc. to contain spill areas.
v) Do not enter or walk-through spillage areas. In the case of an extraordinary large spill, isolate initial action distance downwind to 300 m.

26 Albertyn Street
Northcliff
Hermanus 7200
RSA

Phone:
(+27) 079 524 0040
Email:
joeonfire@vodamail.co.za

Reg. No. 2019/227292/07

Evacuation (FEEP)

A fire emergency evacuation plan (FEEP) is a written document which includes the action to be taken by all staff in the event of a fire or associated emergency and the arrangements for calling the fire brigade. It can include any relevant information in relation to the FEEP. This plan is not necessarily restricted to fires but can include any type emergency.

Evacuation Strategy:

i) What type of event will trigger an evacuation?
ii) At what stage of an event should evacuation be considered?
iii) What is the safest route for an evacuation?
iv) How far do evacuees need to travel to relative safety?
v) Do you need to do horizontal or vertical evacuation e.g. Ground floor or stairways?
vi) Will the atmosphere in the evacuation routes provide tenable conditions for evacuees?
vii) Where is the designated assembly point for evacuees?

Progressive Evacuation:

i) The principle of total evacuation of a building in the event of fire may be initially inappropriate.
ii) Escaping from the immediate danger of fire, of all staff.
iii) The principle of progressive, staged evacuation of occupants with priority of evacuating from an area nearest to the origin of the occurrence of an emergency.
iv) Shelter in place is many times a better decision where occupants are remote from the immediate danger and are assured of their safety without disruption.
v) Progressive evacuation should always be planned to ensure that, if further stages of evacuation become necessary that ultimately a protected vertical escape route is reached. i.e stairway or escape lifts (where so designed

Simultaneous Evacuation:

In most scenarios, evacuation in an emergency will simply be by means of everyone reacting to the warning signal given when a fire is discovered, then making their way, by the means of designated escape routes , to a place of safety away from the premises. This is known as a simultaneous evacuation and will normally be initiated by the sounding of the general alarm over the fire warning system.

26 Albertyn Street
Northcliff
Hermanus 7200
RSA

Phone:
(+27) 079 524 0040
Email:
joeonfire@vodamail.co.za

Reg. No. 2019/227292/07

Advantages of 'Phased Evacuation':

i) Minimum disruption of the business continuity.
ii) Prevents log-jamming and panic in escape routes.
iii) Provide adequate measures to facilitate evacuation of surrounding premises.
iv) Provides a mechanism to lessen the burden and control responsibilities of management during the evacuation process.
v) Ensures that evacuees remain calm and focused by limiting the stress factors involved in emergency situations.

Evacuation stages:

i) Small fire or leak – No immediate need to evacuate the area.
ii) Medium size fire or larger leak – Evacuate all personnel to a designated safe area.
iii) Large fire or leak – Evacuate all personnel from site and warn all surrounding businesses of the event and inform them they should consider evacuation of their buildings.
iv) Catastrophic event – Evacuate the site immediately and inform all businesses in the area to immediately evacuate to a designated safe area.

Criteria that must be considered to assist during an evacuation include the following:

i) Be familiar with the safest evacuation route leading to a safe area
ii) How many people need to be evacuated at any given time and how they are supervised at a time.

Adequate warning of an occurrence of an emergency situation:

i) An audible and visual warning alarm system such as a 5 mile siren with a highly visual strobe light, should be provided in a prominent position to permit clear warning inn the area that an emergency has occurred on the site.
ii) It must be noted that this type of warning should only be used in the event of a large or a potentially catastrophic event.
iii) A smaller site alarm can be used that will not disrupt the surrounding area in the case of a small event.

26 Albertyn Street
Northcliff
Hermanus 7200
RSA

Phone:
(+27) 079 524 0040
Email:
joeonfire@vodamail.co.za

Reg. No. 2019/227292/07

INTEGRITY and ETHICS – LEADING IN SAFETY

The mounded design of the tank reduces the risk of fire or explosion significantly, while the risk of a boiling liquid expanding vapour explosion (BLEVE) is <u>negated,</u> as there can never be a fire below the tanks.

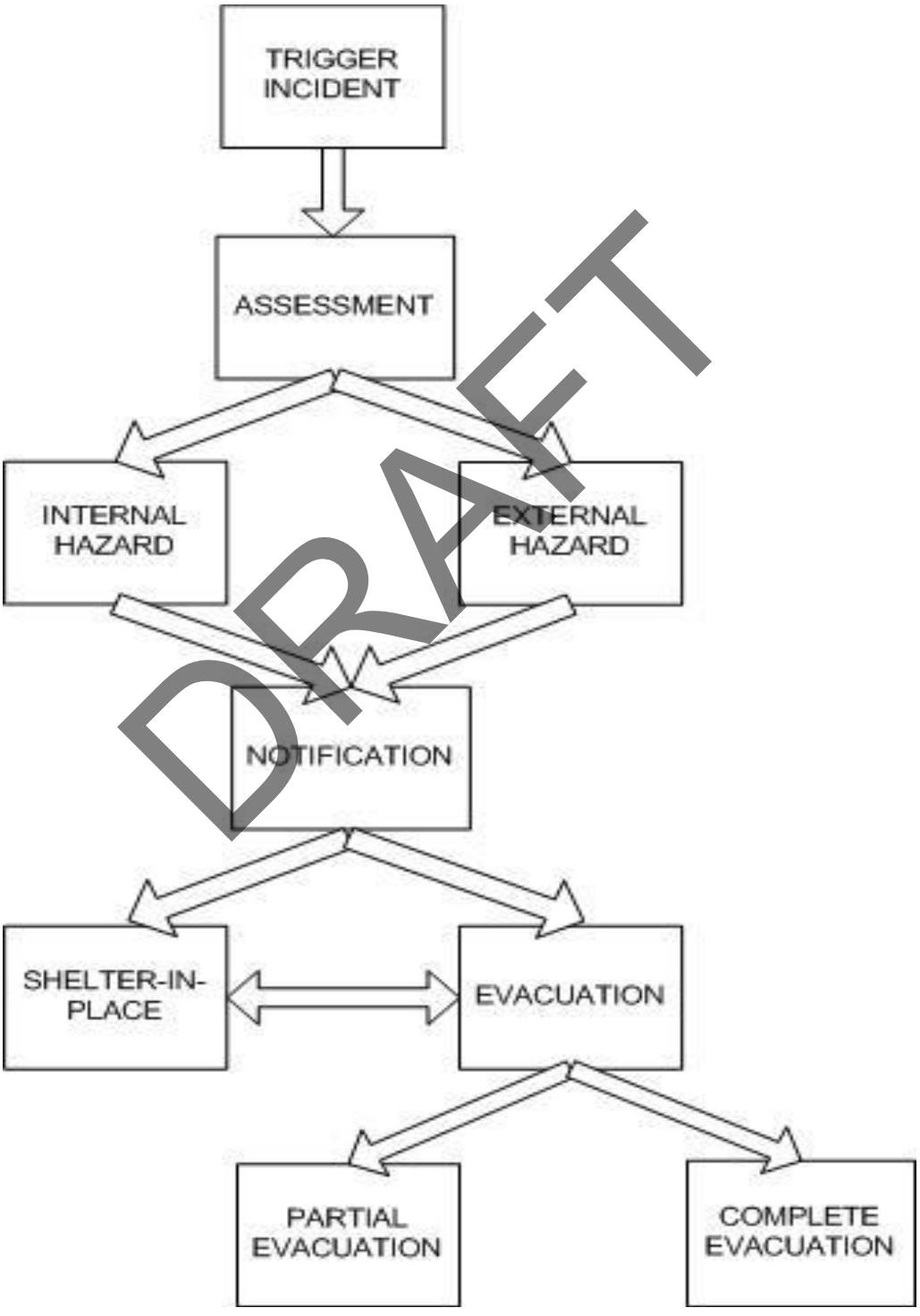
26 Albertyn Street
Northcliff
Hermanus 7200
RSA

Phone:
(+27) 079 524 0040
Email:
joeonfire@vodamail.co.za

Reg. No. 2019/227292/07

INTEGRITY and ETHICS – LEADING IN SAFETY

INCIDENT PROCESSING AND DECISION MAKING



26 Albertyn Street
Northcliff
Hermanus 7200
RSA

Phone:
(+27) 079 524 0040
Email:
joeonfire@vodamail.co.za

Reg. No. 2019/227292/07

Environmental Precautions

i) Attempt to stop the spillage flow of LPG within the prescribed containment areas as much as possible to prevent further contamination.
ii) LPG is heavier that atmospheric air therefore all attempts must be made to prevent spillage and voapour flowing into natural water courses, drains and any low lyng area.
iii) Take action to isolate environmental receptors including drains, storm sewers and natural water bodies by creating barriers in the form of sand filled bags or emergency sand levees.
iv) Attempt to contain spilled product on impervious surface of the concrete slabs if possible.
v) Use water to disperse the LPG in order to prevent product from spreading and to continuously cool down any wxposes piping.
vi) Follow national and local requirements for reporting environmental release where necessary.
vii) Contact the fire service for any leak to respond to the site for assistance.

Firefighting Procedure

i) Extinguish any small fires using the available 9kg DCP fire extinguishers.
ii) Isolate any LPG leakage by activating the emergency cut off mechanism immediately.
iii) Use the provided fire hoses and nozzles to cool down any piping or cylinders in proximity to the fire until the fire has been complete;y extiguished.
iv) If the fire cannot be extiguished by using a fire extiguisher contact the Overstrand Fire Service immediately for assistance.
v) If a fire occurs in any cylinder storage area use the available fire hose reels to continuosly cool down cylinders immediately affected by the fire. Attempt to remove the source of the LPG causing the fire by either removing the cylinder from thye area or close the valve if it is not damaged.
vi) If the fire is spread over a large area call the Overstrand Fire Service immedaitely for assitance.
vii) Attempt to prevent the fire from spreading by using the fire hose reels to comtinuosly wet the area down.
viii) Do not allow water to enter any drainage area or strom water drains. i.e. Attempt to contain the water within the perimeters of the site.

26 Albertyn Street
Northcliff
Hermanus 7200
RSA

Phone:
(+27) 079 524 0040
Email:
joeonfire@vodamail.co.za

Reg. No. 2019/227292/07

VII. SUPPLIER TANK FILLING PROCEDURE

DRIVER INSTRUCTION AND TRAINING:

The Driver;

i) Shall have a PrDP-D and shall carry it on his person, where required in terms of national legislation.
ii) Shall be fit to drive in terms of the "relevant national legislation
iii) Shall be able to interpret and implement the instructions on the transport emergency car
iv) Shall receive annual comprehensive theoretical and practical training relevant to the type of vehicle and to the dangerous goods which will be assigned to him, including training in the procedures
v) The annual training of both light and heavy vehicle drivers is to be conducted by accredited and approved providers specific to the cargo, for example flammable liquid or toxic corrosive liquid.

Loading and offloading procedures;

i) The driver must ensure the vehicle is correctly parked for loading or offloading, and wheel chocks (as specified in SANS 1518) are in place for heavy vehicles with GVM equal to or greater than 3500 kg and are placed appropriately under wheels on non-steering axles.
ii) Vehicle fire extinguishers (where required in terms of national legislation) to be placed where not provided by the loading/offloading point.
iii) Ensure that the area is safe, with barricades, where applicable, and the necessary warning signs are clearly displayed.
iv) The engine of the vehicle is switched off, except where the engine is required to drive pumps or hydraulic units for the purposes of loading or offloading.
v) The qualified person shall ensure that:
   a) the cargo is correct and undamaged and there is no obvious spillage,
   b) the load is refused if he/she is in doubt as to whether the goods can be offloaded without risk.
   c) the offloading operation does not proceed, if, for any reason, he/she considers it unsafe,
   d) in the case of bulk deliveries,
      1) there is sufficient space in the tank into which the cargo is to be unloaded and that it is in a fit condition to receive the load;
      2) the flow can be stopped immediately in case of leakage or any other emergency

3) after offloading, the vehicle is free from spillage and all valves are closed,
4) after offloading no residue remains on the vehicle and that the vehicle is free of contamination

VIII. FILLING OPERATOR REQUIREMENTS.

Qualifications, training and experience of operators

The employee carrying out the inspection, filling and handling of containers in terms of this part of SANS 10087, shall have had the appropriate technical and practical training for the type of work undertaken, the proof of which both employer and employee shall document (see 8.2) and which shall cover the following applicable topics:
a) the properties of LPG;
b) container inspection;
c) container filling procedures;
d) container storage and transportation;
e) emergency action plan; and
f) knowledge of the relevant standards and legal requirements

Site Safety:

i) No smoking or open lights are permitted on site.
ii) The filling of all cylinders shall be in accordance with the requirements of the SANS10087 Regulations.
iii) No filling may be done outside of the designated filling area.
iv) All vehicles and equipment must be switched off while being filled including any vehicle in close proximity waiting to be filled.
v) All filling of cylinders shall be done using the provided decanting pumps.
vi) If any filling pump it not working report it to the management.
vii) Should a gas leak occur within the filling area, immediate cease all filling operations and isolate the flow of gas until the area is made safe.
viii) Always make sure that there is at least 1 (one) DCP fire extinguisher readily available while filling operation is in progress.

IX. HOUSEKEEPING AND CLEARING OF BUND WALL AND LOW LEVEL SUMP.

i) The site shall be checked and cleared on a regular basis for any collection of combustible material.
ii) The area around and between cylinder storage shall be swept and cleared of all foreign material.

26 Albertyn Street
Northcliff
Hermanus 7200
RSA

Phone:
(+27) 079 524 0040
Email:
joeonfire@vodamail.co.za

Reg. No. 2019/227292/07

iii) All pipework shall be checked on a weekly basis for any leaks which must be reported for urgent repair.

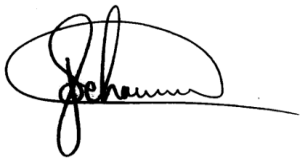
X. AWARENESS & TRAINING

i) The responsible duty holder should in all transparency inform employees of the situation and associated dangers of the storage site.
ii) All designated employees shall receive training in the appropriate filling procedures before being permitted to carry out associated work.
iii) All designated employees shall receive training regarding any spillage containment and management procedures.
iv) All designated employees shall receive basic firefighting training from a reputable organisation.

XI. PLAN EVALUATION

i) This Risk Management Plan shall be reviewed annually by the duty holder, or as needed in the case of any workplace changes are made.
ii) An emergency containment, evacuation and firefighting exercise shall be conducted on a six monthly basis.
iii) Following each fire drill, Duty Holder and Employee Representatives shall evaluate the drill for effectiveness and weaknesses in the plan, and shall implement changes to improve it.

Compiler:



Duty Holder:

GSJ Schoeman

Steve Rundle