DEPARTMENT OF PETROLEUM RESOURCES
....Petroleum Regulatory Agency Of Nigeria
DPR

GUIDE FOR THE ESTABLISHMENT AND OPERATIONS OF DOWNSTREAM GAS FACILITIES IN NIGERIA

(LPG, CNG, LNG)

ISSUED BY

DEPARTMENT OF PETROLEUM RESOURCES

2020

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DEPARTMENT OF PETROLEUM RESOURCES ....Petroleum Regulatory Agency Of Nigeria DPR	Applicable to all Oil & Gas Operators
GUIDE FOR THE ESTABLISHMENT AND OPERATIONS OF DOWNSTREAM GAS FACILITIES IN NIGERIA	

INTRODUCTION

This Guideline is issued pursuant to the Petroleum Act 1969, Mineral Oils (Safety) Regulations 1997 and the Petroleum Regulations 1967.

This document is a compilation of Guidelines that stipulates the minimum requirements, procedures and conditions to be fulfilled before the grant of approvals and/or licences for the construction, installation, modification, takeover, relocation and operations of Downstream Gas Facilities in Nigeria.

These Guidelines are developed to enhance gas penetration and utilisation in the country as well as ease of doing business in the Nigerian oil and gas industry.

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GUIDELINES FOR THE ESTABLISHMENT OF LPG REFILLING FACILITIES AND RETAILERS' OUTLETS IN NIGERIA

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1 INTRODUCTION

1.1 Purpose

This document describes the procedure and conditions for granting approval for the construction and operation of LPG Refilling Facility in Nigeria pursuant to Petroleum Regulations 1967. It provides the baseline requirement for the establishment of LPG Refilling Facility and Retailers' Outlets aimed at ensuring that the risk of LPG Refilling or retailing is minimised as far as is reasonably practicable. The objective is to ensure that the base line standard regarding HSE is achieved and maintained in all LPG Refilling in Nigeria.

1.2 Scope

These guidelines and requirements are applicable to the design, construction, operation and for obtaining the various approval and licenses necessary for the establishment and operations of LPG Refilling Facilities and Retailers' Outlets in the Nigeria.

1.3 Definition of Terms

I. LPG Refilling Facility

This refers to LPG facilities that can receive and store LPG in bulk at licensed locations for the purpose of sale to end-users or Retailers/Resellers "Category D". These facilities may have aboveground or underground storage tank configurations.

Note: Requirements for LPG Add on to an existing Retail Outlet are contained in the *Guidelines for the Establishment of Autogas Refuelling Station and Add-On in Nigeria*.

II. LPG Retailers "Category D"

This refers to exchange of refilled LPG cylinders to end-users via Shops and Micro Distribution Centres via Kiosk and Racks with minimum total capacity of 500Kg. **The Licence does not cover decantation of LPG products from cylinder to cylinder.**

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2 APPLICATION, APPROVAL AND LICENCE PROCEDURE FOR LPG REFILLING PLANT

2.1 Application Overview

Any company intending to establish an LPG Refilling Facility in the Nigerian Gas industry shall:

i. Apply through the Automated Gas System (AGS) portal on elps.dpr.gov.ng
ii. Pay the applicable Statutory and Processing fees
iii. Satisfy the requirement stipulated by the DPR and obtain the required and applicable approvals contained in the stages depicted below:
    a. Site Suitability Approval
    b. Approval to Construct (ATC)/ Approval to Install
    c. License to Operate

Note: The company shall comply with the minimum requirements stipulated for design, construction and installation (**Section 3**) to secure the approvals/licenses.

2.2 Site Suitability Approval (SSA)

Site Suitability Approval is a business enabling and advisory instrument set up to eliminate possible loss of investment that may result should the site be deemed unsuitable at Approval to Construct (ATC) phase. The company shall be required to upload the following documents and diagrams necessary for Site Suitability Approval on the portal.

i. Certificate of Incorporation and Memorandum and Article of Association of the company.
ii. A sketch of proposed site layout, showing the existing or proposed buildings on the site, adjoining properties, if any, and the respective distances of the tank(s) to critical facilities within the premises, roadways and adjoining fence with 3rd parties.
iii. A Survey Plan of the proposed plot of land.

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2.2.1 *Procedure for Site Suitability Inspection*

The applicant shall be issued the Site Suitability Approval following the satisfactory review of the uploaded documents and successful outcome of the site suitability inspection in line with **Section 3.2.** Upon receipt of the SSA, the proponent is required to display conspicuously a sign tagged 'DPR Gas Storage and Utilisation Facility Approved Site (Approval number).

2.2.2 *Validity of Site Suitability Approval*

The site suitability approval shall be valid for 18 months in the first instance. This approval, and any renewal thereof is subject to the following:

i. No development/encroachment of public and residential structures that was not considered during the suitability approval.
ii. No significant changes in the plot size capable of affecting the minimum safety distances for the proposed capacity.

2.3 Approval to Construct (ATC)/Approval to Install (ATI) for LPG Refilling Facility

Following receipt of Site Suitability Approval from the Department, the company shall commence actions towards obtaining Approval to Construct/Install for the proposed facility. The company shall pay the applicable fees, upload the required documents and satisfy the following requirements:

i. A letter/ approved building plan from the appropriate Town Planning Authority, authorizing the siting of the facility at the proposed site. The submission shall contain all relevant drawings such as:
    a. Piping and Instrumentation Diagram (P&ID),
    b. Electrical and mechanical specifications,
    c. Codes, Standards and Specification adopted in the design, construction and installation of ancillary equipment.
ii. A fire report by Chief Federal/State Fire officer or an officer authorized by him, that he is satisfied with the proposed arrangement for the prevention of fire.

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iii. Any of the following shall subsist - Current Tax clearance certificate, Evidence of Tax Payment, Tax Identification Number (TIN) or evidence of tax exemption.

iv. Health, Safety and Environment (HSE) policy for the proposed plant, if less than 10 MT or Environmental Impact Assessment (EIA) report, if above 10 MT.

2.3.1 *Review of Submitted Documents and Drawings*

The submissions shall be reviewed in line with specifications listed in section 3 of this document. The objective of DPR's review is to ensure safety-in-design and sustainable operation of LPG Refilling Facility. Site inspection shall follow the satisfactory review of the documents and design. The site inspection shall at the minimum revalidate the requirements of the SSA.

2.3.2 *Conditions on the Approval to Construct/Install*

The validity of Approval to Construct shall be 30 months (in the first instance) on the following conditions:

i. The facility shall commence meaningful development. The company shall update the nearest DPR office at six months intervals.

ii. Signpost shall be installed on site immediately after the Approval to Construct is granted. The signpost should indicate the name of the company and the reference number of the Approval letter.

iii. The construction and installation shall comply, at a minimum, to the requirements stated in **Section 3**.

iv. Companies involved in building of LPG Refilling facility, construction and fabrication of Storage tanks shall possess valid and appropriate DPR Oil and Gas Industry Service Permit(s).

2.4 License to Operate (LTO) for LPG Refilling Facility

Upon completion of construction works and leak test, the company shall apply for LTO. The company shall pay the applicable fees and upload all statutory/technical requirements on the portal as follows:

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i. Valid Calibration Certificates/Report of Measuring Equipment for LPG refilling Plants issued by DPR accredited companies and witnessed by DPR in line with relevant standards.

ii. Manufacturers' data sheet of the storage tank(s), where applicable.

iii. Ultrasonic Thickness Measurement (UTM) test certificates of the storage tank. This test shall be conducted on site for all tanks and done prior to burial for underground tanks. The UTM test shall be carried out by a company with applicable OGISP and witnessed by the DPR .

iv. Pressure test reports and certificate or any other DPR approved integrity test report for tanks and piping. The Pressure test shall be carried out by company with applicable OGISP and witnessed by the Department. The Pressure test should be carried out for a new tank at installation before operation and after every Five (5) years. After 20 years of service, pressure test on the LPG tank should be carried out every two (2) years.

v. Any of the following shall subsist - Current Tax clearance certificate, Evidence of Tax Payment, Tax Identification Number (TIN) or evidence of tax exemption.

vi. List and Evidence of trained staff by a consultant with applicable OGISP.

vii. Approved Standard Operating Procedure (SOP) for the Gas Storage and Utilisation Facility in line with the DPR SOP template.

viii. '8 x 10' size Photographs of Plant from different vantage points showing its amenities.

ix. As-built Layout drawing. This will be verified by DPR during pre-licence inspection.

2.5 Procedure for Pre-License Inspection

In order to issue an LTO, the DPR shall conduct a pre-license inspection of the facility, following the satisfactory review of documents submitted in the application. The inspection shall confirm the following amenities and equipment:

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i. Organogram, list of competent persons and evidence of Minimum Industry Safety Training for Downstream Operators (MISTDO) training of the relevant staff.
ii. Functional Automated/Manual leak tester.
iii. Functional Fire alarm system and mounted gas detectors at designated areas (Like pump and compressor room, discharge/offloading area and piping connector at the storage vessel, etc).
iv. Adequate fire water storage, deluge and sprinkler system in line with relevant codes and standards.
v. Reference scale provided at customer's waiting room.
vi. Safety warning notices and Personnel Protective Wears for the personnel.
vii. Emergency shut down system in at least two locations (At the Gate and operations area).
viii. Visible display of MOSR, Operating instructions, Emergency Telephone numbers of Fire Service, Police and DPR.
ix. Muster Point designated areas should be earmarked in the gas plant.
x. Car parking areas should be provided outside the gas plant. Only cars with spark arrestors should be allowed to drive into the facility. However, safety distance of 15m between the car and the storage tank/dispensing bay must be maintained.
xi. Clean and hygienic Public toilet with steady water supply at the facility.
xii. Demarcation of LPG Storage areas to unauthorized persons and limiting access to filling shed area to only trained personnel.
xiii. A perimeter fence of at least 2 metres high shall be provided around the LPG facility.
xiv. CCTV is highly encouraged

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2.5.1 *Renewal of LPG Refilling Facility License to Operate*

On the expiration of an existing operating licence, the company shall apply through the online portal for LTO. The company shall pay the applicable fee and upload relevant documents used for the LTO application. DPR officers shall conduct an inspection of the Gas Plant to confirm at the minimum, the status and integrity of all equipment and amenities in line with standards.

2.6 Lease/Takeover of LPG Refilling Facility

The company for Lease/Takeover of a Site Suitability Approval (SSA), ATC and LTO shall pay the prescribed application fee and submit the following documents.

i. Duly signed Sales Agreement by both parties.
ii. Letter of Release.

The requirements as applicable for SSA, ATC and LTO shall apply. Inspection may be carried out as part of the process.

2.7 Modification of LPG Refilling Facility

The company shall apply and submit the following documents and pay the applicable fees through the online portal.

i. Details of proposal for modification.
ii. The As-built layout drawing of the existing facility.
iii. Proposed layout sketch of the facility.
iv. Detailed Piping and Instrumentation Diagram (P&ID) of the facility.
v. Updated Standard Operating Procedure (SOP) consistent with this guide.
vi. Manufacturers' data sheet of the storage tank(s), where applicable.

Note: Facility Inspection shall apply.

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2.8 Decommissioning LPG Refilling Facility

All applications shall be forwarded to the DPR Operations Controller having jurisdiction over the Facility, giving full details of the proposal. Decommissioning shall be in line with relevant Nigerian Oil & Gas Regulations and Guidelines applicable to such facilities.

3 MINIMUM DESIGN, CONSTRUCTION AND INSTALLATION REQUIREMENTS

3.1 General Requirements

The design, construction, installation commissioning and operation shall comply with the provisions of Petroleum act 1969 as amended, MOSR 1997, other applicable Regulations, Standards and Guidelines. The design and construction of such facilities in LPG Refilling Facility must conform to acceptable design codes such as Standards Organization of Nigeria, American Society of Mechanical Engineers, National Fire Protection Association, American Welding Society – Structural Welding Code, British Standards (BS), and other codes and standards recognised by the Director of Petroleum Resources.

3.1.1 Design and Construction Standard

During the design, construction, installation, commissioning of a facility, all necessary measures and mitigations shall be applied to reduce risk associated with storage, transport, transfer, usage etc. to as low as reasonably practicable (ALARP). The storage tanks, fittings, pumps, manifolds, meters, hoses, valves, canopy and other equipment and accessories of the facility shall be designed for efficient and safe operations in line with applicable codes and standards. The installation and commissioning of the system shall only be undertaken by competent persons and company, in accordance with manufacturer's instructions and best practices. Written standard procedures in line with the DPR SOP template shall be drawn up and used for installation and/or commissioning. Further conditions governing the establishment of LPG Refilling Facility are as follows:

i. Participation of DPR representatives in the project and mandatory witnessing of milestone construction activities such the tank burial, pressure/leak test of the

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tanks and tank calibrations.

ii. All critical equipment and piping shall be commissioned after installation in accordance with manufacturer's instructions. Integrity tests and other applicable tests shall be conducted companies with relevant OGISP permits and witnessed by the Department.

3.2 Facility Layout & Site Selection

3.2.1 Site Selection Criteria

1. Any site chosen for an LPG Refilling Facility shall be sufficiently spacious to allow it to be designed to minimize the risks from LPG to any structure close to the facility and person likely to be at or near the facility.
2. The site shall meet the following requirements at the minimum:
   i. The site should be accessible from the roadside.
   ii. The site shall not be within, under, or close to known hazards such as pipeline, Right of Way (ROW), high voltage cable, railways, etc.
   iii. Minimum radius of 100 Meters to any existing 3rd party-LPG refilling plants.
   iv. The minimum horizontal distance between the shell of a pressurized LPG tank and the line of adjoining property that may be developed shall be as shown in Table 3-1 and Table 3-1. Where residences, public buildings, places of assembly, or industrial sites are located on adjacent property, greater distances or other supplemental protection (firewall/underground tank) as provided in Table 3-1 and Table 3-1 shall apply.
   v. The drainages to be constructed or existing ones shall not be channelled to a stream or waterway. Contaminated water should be contained and treated onsite.

3.2.2 Facility Layout for the LPG Refilling Facility

1. Proper Hazard Area Classification and Risk Assessment shall be considered for safe

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design, layout and operation of the facility to minimize, to as low as reasonably practicable, the releases of containments and to prevent the ignition and spread of any unavoidable or accidental releases.

2. The location of tanks, fill points, vent pipes, dispensers, road tanker delivery stands buildings, etc. shall be designed to ensure in the layout of the facility, that:
    i. Satisfactory means of escape are provided for persons in the event of a fire or other incident,
    ii. Hazardous areas are protected from sources of ignition,
    iii. Safe access, routing, parking and exit for service vehicles and road tankers are provided.
3. LPG Refilling Facility dangerous areas shall be in open air ventilation and clear of other buildings or obstructions that might otherwise adversely affect the ventilation.
4. Pipework, tanks to offset fill points, dispensers and vent pipes shall be routed and located to ensure protection of LPG Refilling Facility from external effects or interference and allow access if required.
5. The stand for delivering vehicle fuels into storage tanks shall be in the open, away from LPG Refilling Facility buildings, dispensing activities and emergency escape routes, and be large enough to allow a road tanker to be positioned wholly within it during delivery.
6. Electrical connections shall be made in accordance with the manufacturer's instructions and shall maintain the integrity of the explosion protection.

3.3 LPG Storage Vessel Specification and Requirements

The storage tank/vessel shall be designed, constructed and installed by DPR accredited/approved company in accordance with internationally recognised standards. It shall comply with the following:

i. The storage tank/vessel shall be located in a manner that allow safe access and subsequent removal if required, clear of any building foundations or underground

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features, such as drains and tunnels or allow any flammable concentrations or any releases not to reach potential ignition sources, accumulate where they might pose a danger.

ii. The fill points for Storage tank/vessel shall be positioned such that other vehicle movements does not pose risk to tanker discharge and any accidental releases does not pose an immediate threat to personnel.

iii. Tanks and piping must be constructed with materials that provide appropriate level of safety and environmental protection. e.g. carbon steel, reinforced fibre glass or others acceptable to DPR.

iv. All storage tank design specification detail shall be conspicuously displayed.

v. All storage tanks shall be fitted with pressure relief valves, pressure gauges, temperature gauges and important safety equipment.

vi. Water sprinkler system shall be provided at the top of the vessel. Access ladder to the top of the gas storage shall be provided for inspection and maintenance needs.

vii. Storage systems and vessels shall be fitted with over pressure protection devices to release excess pressure under normal operating conditions and in emergency situations.

viii. Manually operated valves shall also be fitted to release pressure during maintenance.

ix. The minimum separation distance within the facility are as follows:

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Table 3-1: Minimum Separation Distances for Above Ground LPG Storage Tanks

Capacity (Metric Tonnes)		Separation Distance (Meters) from tanks to the line of Adjoining Properties, Control buildings, or fixed source of ignition.				
Of any single tank	Of any group of tanks	From Adjoining Property that May be Developed/Non-Public & Non-Residential		From Public and Residential Boundaries		Between tanks
		A: No fire wall	B: With Fire wall	A: No fire wall	B: With Fire wall	
0.1 – 10	0.1– 10	7.5	5.0	30	20	1.0
10.1 – 60	10.1 – 100	15	7.5	50	30	1.5
60.1 - 150	100.1 – 150	22.5	11	50	30	¼ of sum of the diameter of 2 adjacent vessels
150.1 – 300	150.1 – 300	30	15	50	30	

Table 3-2: Minimum Separation Distances for Underground LPG Storage Tanks

Capacity (Metric Tonnes)	Separation Distance (Meters) from the relief valve to the line of Adjoining Properties, Control buildings, or fixed source of ignition.
0.1 - 10	3
>10.1	7.5

3.3.1 Additional Requirements for Underground LPG Tank Burial and Leak Test

Only LPG storage tanks may be buried. The requirements for tank burial include the following:

i. No tank or tanks shall be buried without DPR approval. Tank burial must be witnessed by DPR officials.

ii. All tanks to be buried shall meet all the specifications of the manufacturer, ASTM, and other internationally approved codes.

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iii. The excavation of the pit for the LPG storage tank shall permit allowance of not less than 70 centimetres when the tank has been set in its final position.

iv. The tank shall be set in a chamber of waterproof concrete of not less than 23 centimetres thick and the top a watertight detachable or removable concrete slab with a manhole at the centre.

v. The manhole of every tank installation shall be raised above the level of the surrounding ground to prevent the ingress of surface water.

vi. All piping below ground level, shall be protected against damage and corrosion.

vii. All individual tanks shall be provided with efficient electrical earth connections independent of pipe connections, having a current not exceeding 10 Ohms when measured by an earth resistance tester "Megger" or similar type.

viii. All fixed pipes shall be of metal or fiberglass coated and shall be in a position where they may not be liable to damage.

ix. Minimum separation distances from a building, boundary or fixed source of ignition to tank for the underground or mounded tanks of 10 Tons capacity or less shall be 3 meters and 7.5 meters for tanks above 10 tons capacity.

x. Separation distances for all underground and mounded storage tanks shall be measured from the pressure relief valve and the filling connection.

xi. The installation shall be accomplished with appropriate equipment that ensures the underground tanks are not dropped, dragged or handled with sharp objects.

xii. The installation of the underground tanks shall be in such a way that enables easy removal without jeopardising the safety or integrity of adjacent tanks or infrastructure.

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xiii. Where the soil may be corrosive, the tank shall be set on a clean shingle or sweet sand free of extraneous materials to avoid seepage of products to underground water courses or any drainage system.

xiv. Foundations and sub-soil shall be examined and prepared to support the tank to prevent movement, uneven settlement or concentrated loading in the tank shell.

3.3.1.1 Corrosion Protection for Buried Tanks

i. A suitable system of cathodic protection (typically sacrificial anode for small installations and impressed current for large installations) shall be provided.

ii. External surfaces of the tank should be suitably prepared and treated with coating manufactured and applied in accordance with a recognised standard, to both protect against chemical and mechanical damage and minimise cathodic protection current drain.

3.3.2 Requirements for Skid, Modularised and Containerized Facility

The following shall apply for standalone Containerized and Skid-mounted facilities:

i. They shall meet same requirements and safety distances in table 3-1.

ii. Additional safety measures for adequate ventilation, gas and fire detectors and fire-fighting equipment shall apply.

iii. Technical and functional specifications of the skids shall be made available to DPR, to ensure consistency and availability of the system.

iv. Relocation of the skids change in layout of the approved site and any other modification shall be promptly reported to the Department for concurrence and approval.

3.4 Pumps

Pumps, other than submersible types, should be adequately secured to a concrete foundation or bolted to a structural steel support. Where the drive unit is not integral with

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the pump, attention should be given to ensure correct alignment, and all moving parts should be suitably guarded.

3.5 Dispensers and Control Equipment

The Product dispenser shall be securely mounted, prevented from unauthorized access and protected against damage. The Dispensers shall be in the open air, adequately ventilated, such that cylinders are easily filled. In cases of containerised skids, additional safety measure shall be deployed, to enhance adequate ventilation, and subject to the Department's approval.

3.6 Protection against Static Electricity:

The installation should have electrical continuity, be effectively connected to earth and bonded to comply with the requirements of international recognised standards such as the Institute of Petroleum's Model Code of Safe Practice, Part 1, Electrical and BS 7671:2001 or equivalent international standard. All piping, tanks, valves and discharge & dispensing equipment must be bonded continuously so that all non-current carrying metal parts have the same potential to ground that can potentially result in a catastrophic fire or explosion. All dispensing equipment including pumps, hoses and nozzles must be properly rated for the intended usage

3.7 Cylinder Refilling Shed/Canopy

The requirements for refilling facility sheds are at minimum the following:

i. Buildings, canopies and other structures at LPG Refilling Facility shall be designed and in conformance with the requirements of Building Regulations and Standards.
ii. The refilling sheds including signages shall be constructed of materials that will not contribute to any fire occurring within the underside of the canopy area and the height shall be such that it does not obstruct appropriate ventilation
iii. Signage and lighting components shall be designed and installed by appropriate competent persons and comply with relevant standards.

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iv. Key areas such as electrical wiring/distribution systems, canopy luminaires, illuminated signs shall be properly controlled from potential ignition sources. The polarity, earth continuity, insulation resistance, adequacy of equipotential bonding, fuse rating shall be checked regularly.

v. Cylinders shall be filled with LPG only in a building designed for that purpose. Filling buildings shall be open-sided. The filling of cylinders shall not be done in cellars of upper floor in buildings.

vi. Piping shall be protected or painted in appropriate industrial colour.

vii. Fire extinguishers in quantities specified by fire service shall be provided at strategic places within the premises and the plant personnel shall have easy access to the extinguisher.

viii. Cylinders shall not be stored in the cylinder filling area. An area within the plant shall be designated for cylinders storage.

ix. Filling shed flooring shall be covered with spark-resistant material to prevent spark ignition due to any accidental cylinder drop.

3.7.1 LPG Refilling Facility Building

Building within the facility shall comply with proper risk assessment and the following at the minimum:

i. Customers should be adequately separated from being close to the refilling operations. Reference scale in separate location should be deployed.

ii. Provision of clearly marked routes and parking areas.

iii. Alternative means of escape for both staff and customers away from the LPG Refilling Facility in the event of an emergency.

3.8 Fire Protection

1. The fire protection system of a LPG Refilling Facility shall be required and designed to prevent or reduce the likelihood of a fire or explosion, to minimize its intensity should

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such an event occur and ensure timely emergency response and escape of all persons in the facility.

2. The fire protection measures shall cater and ensure that adequate controls are put in place, including special, technical and organizational measures taken for all work process, including receipt, storage and other activities in connection with the LPG Refilling Facility to prevent fire/explosion; deal with the incident should such an event occur; and ensure emergency response and escape of all persons in the facility.
3. Additionally, the LPG Refilling Facility shall provide for the following firefighting and emergency facilities at the minimum:
    i. Clean water reservoir of minimum size 15 cubic metres
    ii. Functional firefighting gadgets must be kept handy and at alert.
    iii. At least two dry chemical powder fire extinguishers less than 9kg each and suitable for gas fires with a test fire rating of at least 21A and 183B as defined in MSA EN 3-7:2004 should be readily available at strategic locations to deal with fires adjacent to the meter/vehicle being filled.

3.9 Fire/Blast Walls

When Fire walls are used, the walls shall be of the following features at the minimum:

i. Imperforated and substantially constructed from reinforced concrete or solid masonry and be capable of achieving at least 30 minutes fire resistance. Where the wall separates vulnerable populations from the dangerous substance, the fire resistance provided shall be for a minimum of 60 minutes.
ii. Shall not be less than the height of the vessel or the height of the vessel, whichever is greater.
iii. The thickness of the Firewall shall not be less than of 0.23m (9 inch)
iv. The separation distance between the vessel and the firewall shall not be less than 3 meters.

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v. The installation of the fire wall shall not significantly impair natural ventilation. The provision on one side is normally sufficient. However, it shall not be more than two sides.

NOTE: The specification and composition of materials for the Firewall shall be submitted to the appropriate DPR field/zonal office and the construction shall also be monitored by the assigned DPR representatives.

4 LPG RETAILERS/RESELLERS ("CATEGORY D")

4.1 Introduction

The purpose of these Guidelines is to regulate in an orderly and effective manner, all aspects relating to filled LPG 'cylinder exchange' Retailers outlets/locations, using the "Category D" licence. Micro distribution centres that may require skid mounted for refilling, please refer to **Section 3.3.2** for licensing containerized and skid-mounted for licensing. Any company or persons intending to be licensed as an LPG Retailer/Reseller in the Nigerian Oil and gas industry shall comply with the following:

i. Apply through the Automated Gas System (AGS) portal on elps.dpr.gov.ng
ii. Pay the applicable Statutory and Processing fees
iii. The following documents shall be uploaded:
    a. Endorsement letter from a licenced LPG refilling plant operator
    b. Business Registration/Certificate of Incorporation
    c. Fire safety certification issued by Federal or State Fire Department.
    d. Tax Identification Number (TIN), where applicable.
    e. Photographs of shop location showing its amenities
    f. Evidence of minimum safety training where applicable.

4.2 Pre-licence Inspection of LPG Retailers Outlets/Locations

When all the requirements listed above are satisfactorily met, DPR officers shall conduct pre-licence inspection to ensure that the applicable conditions are met.

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4.2.1 Applicable Conditions for LPG Retailers Outlets/Locations

The following shall apply at the minimum:

i. The shop or outlet should be situated in a fixed location and not be mobile operated.

ii. The shop should be at least 3m by 4m (minimum). The shop should be well-ventilated.

iii. Any intending retailer should have at least 40 cylinders of 12.5kg in size or a combination of 50kg, 25kg, 12.5kg, 6kg and 3kg cylinders totalling up to 500kg.

iv. The cylinders shall be stacked as follows:

   a. 6kg and 12.5kg cylinders shall be stacked not more than three levels high,

   b. 25kg cylinders shall be stacked not more than two levels high

   c. 50kg cylinders shall be stacked singly.

v. The shop should be adequately ventilated and should have a rack of dimension 6 by 2 by 7 feet of non-flammable material

vi. The shop or outlet shall not be in a residential building and should be at least 10 meters away from the road and 15m from any source of ignition.

vii. Fire extinguishers shall be strategically installed in the shop or outlet. Such equipment shall include a minimum of two 5kg (CO_2 and powder) fire extinguishers, a sand bucket painted red and other facilities as may be required by the relevant safety agencies.

viii. Emergency telephone numbers of firefighting agencies, DPR and the police shall be conspicuously displayed in the shop or location where gas is retailed.

ix. Retailers outlets should not be located near the following places: Motor parks, Mechanic workshops, Blacksmiths or Welder's workshops, Bars, Restaurants and other similar places that handle flammable materials.

x. LPG cylinder-to-cylinder rebottling, refilling and decanting is Prohibited.

xi. The layout of the cylinders should be such as to facilitate quick removal of the cylinders in case of emergency.

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xii. All stipulated setbacks by relevant Agencies (ERCN, NCC, Railways, Highways, Pipelines, etc.) should be met.

xiii. All electrical wiring in LPG retail outlets should be in conduit.

xiv. All LPG Retailers outlets shall be strictly for the sales of LPG only.

xv. All LPG Retailers shops shall have concrete roofing.

xvi. All LPG Retailers should keep a calibration certificates of weighing machines in their shops

5 SANCTIONS

These Guidelines provide the requirements for establishing LPG Refilling and Retailing in Nigeria. Non-compliance with the requirements of these guidelines shall be deemed as violations to relevant sections of the Petroleum Act 1969 as amended, Petroleum Regulations 1967 & subsequent amendments and Mineral Oils (Safety) Regulation, 1997. These violations may result in applicable consequence management, including but not limited to, fines, penalties and/or revocation of license

6 GLOSSARY

Abbreviations, terms and references used in this document are explained hereunder:

AGS	Automated Gas System
ATC	Approval to Construct
EIA	Environmental Impact Assessment
HSE	Health Safety and Environment
LPG	Liquefied Petroleum Gas
LTO	License to Operate
MISTDO	Minimum Industry Safety Training for Downstream Operators
MOSR	Mineral Oils (Safety) Regulation
MT	Metric Tonnes

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P&ID	Piping and Instrumentation Diagram
SOP	Standard Operating Procedure
UST	Underground Storage Tanks
SSA	Site Suitability Approval

Approved by		
Engr. Sarki Auwalu, ***MNSE*** **(Director/CEO, Department of Petroleum Resources)**		
	Date	**1st September 2020**

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GUIDELINES FOR THE STANDARD OPERATIONS OF LPG REFILLING FACILITY IN NIGERIA

ISSUED BY

DEPARTMENT OF PETROLEUM RESOURCES

2020

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1. INTRODUCTION

1.1 Purpose

This guideline is issued pursuant to the Petroleum Act, 1969, Mineral Oils (Safety) Regulations, 1997 and Part IV, Section 87 (2) of the Petroleum Regulations, 1967. This document stipulates the minimum requirement and procedures for the development of Standard Operating Procedure (SOP) for Operations in a Liquefied Petroleum Gas Refilling Plant in Nigeria. The objective is to ensure that the base line standard regarding HSE is achieved and maintained in all LPG Refilling Facility in Nigeria.

1.2 Scope

These guidelines apply to all operations in an LPG Refilling plant including; vehicular movements, road tanker off-loading, product transfers, gas cylinder refilling, pump house and related safety provisions.

2. GENERAL PROVISIONS

The general requirements are, at a minimum, the following:

i. No persons shall construct, modify, install and operate an LPG handling plant without an approval/ licence for such operations as provided in the '***Guidelines for the Establishment of LPG Refilling Facilities and Retailers' Outlets in Nigeria***' issued by the Department.

ii. All LPG refilling plants shall possess valid DPR licences at all times.

iii. All LPG refilling plants shall develop a detailed Standard Operating Procedure (SOP), which must be approved by the DPR in line with the provisions of these guidelines. The Standard Operating Procedures shall contain operating instructions for the safe, continuing and reliable operations of all installations in the plant.

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iv. All LPG refilling plants shall be operated within the hours of **6am to 6pm**.

v. All plants must be free of unauthorized person(s), unused/ disused equipment and demobilised vehicles.

vi. During LPG operations (loading, offloading, discharging and refilling activities); all exit points of the facility shall be free of obstructions and remain unlocked.

vii. Adequate and proper safety notices and warnings shall be strategically located and conspicuously displayed at all times.

viii. Weekly safety drills are mandatory. Each gas plant shall keep a log of safety drills, audits and assessments carried out periodically. This record shall be made available to an officer of the Department, on demand.

ix. All electrical wirings and cabling within the plant shall be in conduit. Naked wires are NOT permitted.

x. All LPG refilling plants must be manned by competent person(s). Name(s) of such officers shall be duly communicated to DPR.

xi. The contact details of the DPR Field Office in charge of the location shall be displayed conspicuously in the plant premises under the caption: **IN CASE OF COMPLAINT OR IF YOU REQUIRE TO REPORT AN UNSAFE ACT, CONDITION OR ILLEGAL OPERATIONS, PLEASE CONTACT:**

xii. Display of MOSR poster Conspicuously

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3. PLANT ACCESS CONTROL, SECURITY AND SAFETY CONSIDERATIONS

3.1 Plant Access and Security

At the minimum, the following applies:

i. All persons entering an LPG refilling plant must be duly registered & tagged.
ii. Movement of persons shall be restricted to authorised places only.
iii. All vehicular movements within an LPG plant are restricted unless otherwise authorised.
iv. All authorised vehicles must be duly checked for safety and security compliance.
v. Duly authorised vehicles must be fitted with spark arrestors.

3.2 Safety Considerations and Induction

At the minimum, the following shall apply:

i. All persons carrying out work / inspection in a plant must be given prior safety induction / briefing.
ii. Restricted areas shall be clearly marked and enforced by physical barriers.
iii. The general public shall not be allowed into filling shed area.
iv. All empty cylinder bottles for refilling must be stored at designated area, awaiting filling.
v. All empty cylinders must be properly inspected and checked for integrity before being passed on to the filling shed.
vi. All operators in the LPG plant must be appropriately kitted with PPE and Identification conspicuously displayed at all times.

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4. OPERATIONS

4.1 Operator Staff

At the minimum, all persons engaged in LPG operations shall:

i. Be provided with extensive training in their areas of specific responsibilities.
ii. Be thoroughly familiar with the characteristics and peculiarities of LPG.
iii. Have knowledge of the appropriate codes and procedures at all times.
iv. Have specific guidance on the instructions to be followed in an emergency.
~~v.~~ Be familiar with different fire-fighting and control equipment.
vi. Ensure that all fire extinguishers are properly identified for their types and expiry dates.
vii. Have basic safety orientation on the handling of LPG and emergency procedures.
viii. Possess evidence of Minimum Industry Safety Training for Downstream

4.2 Road Tanker (LPG Truck) Discharge Operations

At the minimum, the following shall apply:

i. The gas plant must be prepared in readiness for the arrival of an LPG road tanker for discharge.
ii. Bulk LPG plant equipment such as the LPG storage tank, pipework, compressors and pumps must be protected against damage by vehicles, including the road tanker.
iii. The operator shall suspend all other operations (cylinder refilling, hot works etc.) and third parties must evacuate the premises before the commencement of discharge operation.
iv. All LPG loaded road trucks earmarked for product discharge operation in a plant, shall be allowed to settle for a minimum of 2 hours before the commencement of the operation.

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v. Upon completion of discharge activities, a minimum of 1-hour freeze time is mandatory for the escape of hydrocarbons and stabilisation before the commencement of normal operations in the gas plant.

vi. The road tanker shall be positioned in a way that causes minimal disruptions, facing the direction of departure, if possible.

vii. Only competent and duly certified personnel shall man, monitor, and supervise the discharging operation.

viii. Off-loading of the truck shall be carried out by at least two competent operators.

ix. The storage capacity of the tank to be filled shall be monitored continuously by means of installed gauges during the filling operations, to avoid over-filling.

x. For installations that employ compressor during LPG transfer, greater vigilance shall be exercised by the operators to monitor the additional operational complexities

xi. The operator shall ensure that all transfer hoses, connectors, couplings and valves are periodically inspected and kept in good working conditions at all times.

xii. No truck repairs shall be undertaken inside the plant.

xiii. Road Tankers shall be positioned facing the direction of departure should there be a need to tow the vehicle out of the plant premises.

xiv. An operations manager shall be in attendance during discharge operations. Being in attendance means the operations manager shall maintain direct line of sight between the tanker and the filling point; and be ably ready and able to take physical possession of operations when required.

xv. Persons engaging in the truck discharge operations shall wear suitable protective clothing to avoid injury which can occur if LPG comes into contact with unprotected skin.

xvi. Product venting activity or operation shall not be allowed in a plant. Compressors should be used for vapour recovery.

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xvii. Detailed procedures and precautionary measures to be taken during discharge operations shall be enumerated in the plant SOP

4.3 Cylinder Refilling Operations

At the minimum, the following shall apply:

i. Only duly trained and certified operators shall perform the cylinder filling operations in the filling shed.
ii. The operators must receive proper training on the handling of LPG and be conversant with operations of fire-fighting equipment, emergency shut-down buttons and other emergency procedures.
iii. The filling shed is a restricted area and this provision shall be strictly enforced.
iv. The operator shall physically inspect the cylinder bottles before filling.
v. The operator shall provide a master scale (similar to that used at the filling shed) in a designated area accessible to the customer to enable the client to verify the quantity of LPG filled into the cylinder.

4.4 General Housekeeping Procedures

At the minimum, the following applies

i. Good housekeeping procedures shall be developed by the plant owner in accordance with the provisions of the Petroleum Regulations.
ii. A competent person shall be designated to implement the developed housekeeping procedures.
iii. The procedures shall include key activities that require daily attention and routine inspection.
iv. The competent person shall check the housekeeping records and ensure full implementation of established procedures.

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4.5 Emergency Procedures

At the minimum, the following shall apply:

i. LPG plant operator shall develop an Emergency Response Plan that all staff of the plant shall be conversant with. The plan shall contain instructions for emergency shut-down of the plant and safety notices to the public.
ii. The Emergency Response Plan shall be reviewed annually.
iii. The site plan shall be conspicuously displayed in appropriate areas of the premises for operations and emergency use.
iv. Measures to be taken to prevent escalation of unsafe conditions shall be clearly presented in the plan.
v. Emergency contact details of relevant local agencies such as the Police, Fire Service, and Hospitals etc. shall be conspicuously displayed.
vi. Regular drills on different scenarios of LPG emergency cases shall be carried out to familiarise staff with the procedures and ensure that the procedures are current, comprehensive, and effective.

4.5.1 Fire Precautions and System

1. Ensure all special, technical and organizational measures are in place in the LPG Refilling Facility to prevent or reduce the likelihood of a fire or explosion, prevent the rapid spread and to minimize its intensity should such an event occur in the premises in connection with the carrying on of any work process.
2. Fire extinguishers must be kept pressurized and should be shaken every month, spill clean-up kit, non-combustible drain plug and all other safety equipment shall be in good working order, all safety equipment in place and all safety precautions followed.

4.6 Waste Management

The LPG Refilling Facility shall have a comprehensive waste management system which

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shall ensure, at a minimum, that:

i. Proper waste segregation into its individual waste streams are adopted.
ii. Waste are properly contained in sealed drums or skips and labelled properly.
iii. Cradle to grave philosophy are adopted by the operator as it is the responsibility of an operator to ensure proper handling and management of all waste generated onsite. Proper record of all waste consignment notes should be kept;
iv. LPG Refilling Facility shall ensure that only DPR accredited waste managers are engaged.

5. PERIODIC INSPECTIONS AND MAINTENANCE PROCEDURES

At the minimum, the following shall apply:

i. The Standard Operating Procedures shall include a section detailing procedures for periodic inspections and plant maintenance activities.
ii. The operator shall ensure that the plant is maintained and operated in a safe manner as well as ensure asset integrity.
iii. Activities such as construction, repairs, maintenance, inspection, testing and revalidation shall be done by a competent company.
iv. Relevant tests on LPG storage tanks and associated pipework shall be supervised and certified by a competent company.
v. All Instruments (pressure gauges, level gauges, temperature gauges, scales and gas detectors) shall be duly calibrated annually and their reports made available to officials of the Department, on demand.
vi. All fire-fighting equipment and appliances shall be duly tagged to indicate the apparatus test due dates.

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vii. No unauthorised persons shall gain access to an LPG plant. A proper work permit system incorporating formal procedures shall be established for hot work, cold work and entry into bulk tanks etc.

viii. Records of major Inspections and maintenance shall be duly kept and made available to officials of the Department on demand.

ix. An annual report of the safety conditions and general housekeeping of the LPG plant shall be prepared by an accredited company and submitted to the Department by December 31st of each year.

6. DOCUMENTATION AND RECORD KEEPING

1. LPG Refilling Facility shall be required to put in place adequate Document control that ensure the easy retrieval and protection of records. Records of all activities pertaining to the facility should be kept on location, these documents should include but are not limited to

    i. License to Operate,
    ii. Emergency procedures,
    iii. Traffic management plan,
    iv. Security Plan,
    v. Spill Prevention Control and Countermeasure Plans,
    vi. Facility Response Plans,
    vii. Operation Manual,
    viii. Training records,
    ix. Operator Training Reports,
    x. Copies of Inspections reports carried out,
    xi. Maintenance Records,
    xii. Approved checklist for the facility,

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xiii. Fuel Inventory Records,

xiv. SOP for tanker discharge, fuel dispensing, vehicular management,

xv. Waste management plan,

xvi. Waste consignment note, etc.

7. TEMPLATE FOR LPG PLANT STANDARD OPERATING PROCEDURE

7.1 General

From the commencement of these guidelines, a plant-specific Standard Operating Procedure shall be developed and conspicuously displayed at strategic parts of the plant. Also, the operator shall make copies available in the form of handbook.

The SOP should take cognisance of the literacy level of staff of the plant. Accordingly, the document should be clear and understandable to all.

The primary language of the SOP shall be the English language. The document may however be translated to the local language or expressed in other forms that are locally understandable by the operators and the visiting public.

7.2 SOP Template

As a minimum, the SOP to be developed by all LPG plants shall consists of the following main chapters:

Chapter 1: Introduction – Purpose, Scope and Use etc.

This section shall state clearly the purpose and application of the company's Standard Operating Procedures.

Chapter 2: General Facility Information

This section shall contain basic information of the plant, management contact, DPR licence number/ expiry date, details of responsible person(s) and relevant local emergency numbers.

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Chapter 3: Emergency Response Plan

This section shall contain an updated site plan which shows the major areas of the plant consisting of office and retail store (if applicable), storage tanks, loading/unloading area, electrical room, cylinder refilling shed, cylinder stacking area, muster point etc.

Chapter 4: General Operations & Safety Requirements

The company's key operations and related safety requirements shall be outlined here.

Chapter 5: Plant Operations Procedures

Robust and comprehensive step-wise processes for each operational activity carried out in the plant shall be spelt out in this section. The procedures shall be clear and unambiguous.

Chapter 6: General House Keeping Procedures

Procedures for housekeeping, daily checks and inspection activities are to be documented in this section.

Chapter 7: General Maintenance and Inspection Requirements

Periodic Inspection and maintenance procedures and activities shall be outlined herein.

Chapter 8: Periodic reports, Incident Reporting and Investigation

This section shall detail the requirements and frequency of statutory reports, operational reports and incidents, be they minor or major. The modalities for effective record management shall be clearly stated e.g. relevant approvals, certificates of compliance, incident and accident reporting etc.

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8. OTHERS

8.1 Validity of Company's SOP

LPG Plant SOP shall remain valid unless major modifications, upgrade works and changes in operational mode/ philosophy have occurred in the plant. All licence renewal applications shall be accompanied with valid SOP for DPR revalidation.

8.2 Reporting of Accidents

LPG Refilling Facility shall establish procedure for reporting, documenting, follow-up and closing out near miss incidents and accidents. Whenever fire occurs at the LPG Refilling Facility or in case of serious injury or fatality in the LPG Refilling Facility, a report of the circumstances and probable cause of the fire shall be forwarded to the nearest DPR inspector or office within 24 hours and to the Director of Petroleum Resources within 48 hours of the occurrence in line with Part II, 41 (6) of the MOSR 1997.

8.3 Penalty for Contravention

Any operator who contravenes the provisions of these guidelines shall be sanctioned in accordance with the Petroleum Regulations, 1967 (as amended) and the Mineral Oils (Safety) Regulations, 1997 and other extant Regulations.

8.4 Basic Qualification Requirements for LPG Plant Personnel

All Personnel in a Refilling Facility are required to undergo applicable MISTDO Training and possess the MISTDO card.

i. <u>General / Administrative Manager</u>

Minimum qualification of HND in any relevant discipline

ii. <u>Plant Operations Staff</u>

- Plant Manager: Minimum qualification of HND in Science/ Engineering/ Technology with 5 years relevant experience

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- Plant Supervisor: Minimum qualification of OND with 3 years experience in relevant areas
- Technician: Minimum qualification of OND
- Cylinder Re-fillers: Minimum qualification of Secondary School Certificate with requisite training and/ or experience

iii. HSE

- HSE Supervisor: Minimum qualification of OND in allied field, with 3 years experience and relevant safety certifications
- Safety Officers: Minimum qualification of OND, with 2 years experience and relevant safety certifications

iv. Security

- Security Lead: Minimum qualification of OND with proven competency in Security
- Security Personnel: Minimum qualification of Secondary School Certificate with pre-requisite training

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Approved by		
Engr. Sarki Auwalu, ***MNSE*** **(Director/CEO, Department of Petroleum Resources)**		
	Date	**1st September 2020**

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GUIDELINES FOR THE ESTABLISHMENT OF AN AUTOGAS REFUELLING STATION AND ADD-ON GAS FACILITY IN NIGERIA

(LPG, CNG, LNG)

ISSUED BY

DEPARTMENT OF PETROLEUM RESOURCES

2020

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1 INTRODUCTION

1.1 Purpose

The purpose of this document is to describe the procedures and conditions for approving the establishment of Autogas Refuelling Stations and Add-On Facilities in Nigeria pursuant to the Petroleum Regulations 1967. It provides the baseline requirements for the safe design and construction of Autogas Refuelling Stations and Add-On Facilities, to ensure the risk in Facility is minimised to as low as reasonably practicable.

1.2 Scope

These guidelines and requirements apply to processes for obtaining various approvals and license for the establishment of LPG Autogas, LNG and CNG Refuelling stations and their Add-On Refuelling and Refilling skid on existing petroleum products Retail Outlets in Nigeria.

1.3 Definition of Terms

I. Autogas and Refuelling Facility

This refers to a facility designated for the sale of Gas products (LNG, CNG, LPG) to Vehicles and Automobiles. They are similar to the Petroleum Product Retail Outlets. The License issued for the facility are as follows:

a. LTO for LNG Refuelling facility when the Gas product is LNG
b. LTO for CNG Refuelling facility when the Gas product is CNG
c. LTO for LPG Autogas facility when the Gas product is LPG

II. Retail Outlet Gas Add-On Facility

This refers to the instance where existing/licenced Petroleum Product Retail Outlets introduces a facility within the station for the purposes of selling Gas Product (LNG, CNG,

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and LPG to vehicles) or refilling LPG cylinders for household use. Special requirements for Add-on Gas facilities are in Section 3.2.2.

Note: Underground Storage tanks are only applicable to LPG Autogas and it's Add-On facilities, and not for CNG and LNG Refuelling stations.

III. Gas Products

This refers to LNG, CNG and LPG.

2 APPLICATION, APPROVAL AND LICENSE PROCEDURE

2.1 Application Overview

Any company intending to establish an Autogas Refuelling station or Add-on Gas facility to an existing Petroleum Product Retail Outlet in Nigeria shall:

i. Apply through the Automated Gas System portal on elps.dpr.gov.ng
ii. Pay the applicable Statutory and Processing fees
iii. Satisfy the requirement stipulated by the DPR and obtain the required and applicable approvals contained in the stages depicted below:
    a. Site Suitability Approval
    b. Approval to Construct (ATC)/ Approval to Install
    c. License to Operate

Note: The company shall comply with the minimum requirements stipulated for design, construction and installation (**Section 3**) to secure the approvals/licenses.

2.2 Site Suitability Approval (SSA)

Site Suitability Approval is a business enabling and advisory instrument set up to eliminate possible loss of investment that may result should the site be deemed unsuitable at Approval to Construct (ATC) phase. The company shall be required to pay the applicable fees and upload the following documents required for Site Suitability Approval.

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i. Survey plan of the land
ii. Certificate of Incorporation and Memorandum and Article of Association of the company
iii. A sketch of proposed site layout, showing the existing or proposed buildings on the site, adjoining properties, if any and the relevant distances of the tank(s) to critical facilities within the premises, roadways and adjoining fence with 3rd parties

2.2.1 *Procedure for Site Suitability Inspection*

The applicant shall be issued the Site Suitability Approval following the satisfactory review of the uploaded documents and successful outcome of the site suitability inspection in line with **Section 3.2.1.** Upon receipt of the SSA, the proponent is required to display conspicuously a sign tagged 'DPR Autogas Refuelling Station Approved Site (Approval number)'.

2.2.2 *Validity of Site Suitability Approval:*

The site suitability approval shall be valid for 18 months in the first instance. This approval and any renewal thereof is subject to the following:

i. No development/encroachment of public and residential structures that was not considered during the suitability approval.
ii. No significant changes in the plot size capable of affecting the minimum safety distances for the proposed capacity.

2.3 Approval to Construct/Approval to Install

Following receipt of Site Suitability Approval from the Department, the company shall commence actions towards obtaining Approval to Construct/Install for the proposed

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facility. The company shall pay the applicable fees, upload the required documents, and satisfy the following requirements:

i. A letter/ approved building plan from the appropriate Town Planning Authority, authorizing the siting of the facility at the proposed site. The submission shall contain all relevant drawings such as:
    a. Piping and Instrumentation Diagram (P&ID),
    b. Electrical and mechanical specifications,
    c. Codes, Standards and Specification adopted in the design, construction and installation of ancillary equipment.

Note: (The town planning approval may be exempted for Add-on facilities)

ii. A fire report by Chief Federal/State Fire officer or an officer authorized by him, stating satisfaction with the proposed arrangement for the prevention of fire.

iii. Any of the following shall subsist - Current Tax clearance certificate, Evidence of Tax Payment, Tax Identification Number (TIN) or evidence of tax exemption.

iv. Health Safety and Environment (HSE) policy for the proposed Facility/Environmental Impact Assessment report of the project if above 10 MT.

v. An approval letter from the Divisional Police Officer where the facility will be sited or an officer authorized to act on his behalf, stating that the station will not obstruct traffic or constitute any security hazard during its operations. (This is not required for Add-on Gas facilities).

2.3.1 Review of Submitted Documents

The submissions shall be reviewed in line with specifications listed in section 3 of this document. The objective of DPR's review is to ensure safety-in-design and sustainable operation of the Autogas Refuelling Station or Add-on Gas facility. Site inspection shall

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follow the satisfactory review of the documents and design. The site inspection shall, at a minimum, revalidate the requirements of the SSA.

2.3.2 *Conditions for Approval to Construct/Install*

Approval to Construct shall have a validity of thirty (30) months on the following conditions (in the first instance):

i. The facility shall commence meaningful development. The company shall update the nearest DPR office at six months intervals.
ii. Signpost shall be installed on-site immediately after the Approval to construct is granted. The signpost should indicate the name of the company and the reference number of the Approval letter.
iii. The construction and installation shall comply with the requirements stated in Section **3.**
iv. Companies involved in building of the facility, construction and fabrication of Storage tanks shall possess valid and appropriate DPR Oil and Gas Industry Service Permits.

2.4 License to Operate (LTO)

Upon completion of construction works and leak tests, the company shall apply for LTO. The company shall pay the applicable fees, and upload all statutory/technical requirements on the portal as follows:

i. Valid Calibration Certificates/Report of Measuring Equipment for the facility issued by DPR accredited companies and witnessed by DPR in line with relevant standards.
ii. Manufacturers' data sheet for any Autogas Refuelling Station and Add-On Facility storage tanks.
iii. Ultrasonic Thickness Measurement (UTM) test certificates of the storage tank. This test shall be conducted on site for all tanks and done prior to burial for underground

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tanks. The UTM test shall be carried out by a company with applicable OGISP and witnessed by the DPR.

iv. Pressure test reports and certificate or any other DPR approved integrity test report for tanks and piping. The Pressure test shall be carried out by company with applicable OGISP and witnessed by the Department. The Pressure test should be carried out for a new tank at installation before operation and after every Five (5) years. After 20 years of service, pressure test on the LPG tank should be carried out every two (2) years.

v. Any of the following shall subsist - Current Tax clearance certificate, Evidence of Tax Payment, Tax Identification Number (TIN) or evidence of tax exemption.

vi. List and evidence of trained staff by a consultant with applicable OGISP.

vii. Approved Standard Operating Procedure (SOP) for the proposed facility operations in line with the DPR SOP template.

viii. '8 x 10' size Photographs of Plant from different vantage points showing its amenities.

ix. As built Layout drawing. This will be verified by DPR during pre-licence inspection.

x. Factory Acceptance Tests (FATs)/reports (where applicable) and Site Acceptance Tests of all critical components shall be witnessed by the Department.

xi. Price Display Board

Note: For Retail outlet Add on Facility, the LTO for the retail outlet will be submitted

2.5 Procedure for Pre-License Inspection

In order to issue LTO to the facility, the DPR shall conduct a Pre-license inspection, following the satisfactory review of documents submitted in the application. The inspection shall confirm extent of compliance with these Guidelines. At the minimum, the following shall be confirmed to be in place:

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i. Organogram, list of competent persons and evidence of MISTDO training of the relevant staff
ii. Functional Automated/Manual leak tester.
iii. Functional Fire alarm system and mounted gas detectors at designated areas (Like pump and compressor room, discharge/offloading area and piping connector at the storage vessel, etc).
iv. Reference Scale provided at customer's waiting room.
v. Safety warning notices and Personnel Protective Wears for personnel.
vi. Emergency shut down system in at least two locations (At the Gate and operations area).
vii. Visible display of MOSR, Operating Instructions, Emergency Telephone numbers of Fire Service, Police and DPR.
viii. Muster Point designated areas earmarked in the facility.
ix. Car parking areas shall be provided outside the facility. Only cars with spark arrestors are allowed to drive into the facility (safety distance of 15m between the car and the storage tank/dispensing bay must be maintained).
x. Clean and hygienic Public toilet with steady water supply at the facility
xi. Demarcation of tank storage areas to unauthorized persons and limiting access to only trained personnel.
xii. A perimeter fence of at least 2 metres high shall be provided around the facility.
xiii. CCTV and automatic monitoring and control systems
xiv. Price Display Board
xv. Risk assessments and Safety Justifications (Applicable to LNG and CNG)
xvi. A visible display of chemical and physical properties of LNG at the storage and dispensing area.

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xvii. A visible chart of operations procedure for loading and unloading operations at the tie-in point or loading area.

xviii. Adequate fire water storage, deluge and sprinkler system in line with relevant codes and standards.

xix. Functional Fire alarm system and mounted gas detectors at designated areas (Like pump and compressor room, discharge/offloading area and piping connector at the storage vessel, etc).

xx. Power Generator or other alternative source power.

xxi. Well-stocked First Aid Box

xxii. Fire Hydrant system/control points and booster pumps

2.5.1 Renewal of License to Operate

On the expiration of an existing LTO, the company shall apply through the online portal, for the renewal of LTO. The company shall pay the applicable fee and upload relevant document used for the LTO application. DPR officers shall conduct an inspection of the facility and auxiliary equipment to confirm at the minimum the status and integrity of all equipment amenities in line with the standards.

2.6 Relocation of Existing Facility

If a company desires to relocate an existing and licensed Refuelling Station to a new site, the applicant must submit the justification (reasons) for the proposed relocation of the facility to DPR. The conditions for the grant of Approval to Construct and LTO for a new refuelling station shall be the same for relocated refuelling station.

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2.7 Lease/Takeover of Facility

The company for Lease/Takeover of a Site Suitability Approval (SSA), ATC and LTO shall pay the applicable fees and submit the following documents.

i. Duly signed Sales Agreement by both parties.
ii. Letter of Release.

The requirements as applicable for SSA, ATC and LTO shall apply. Inspection shall be carried out as part of the process.

2.8 Modification of Facility

The company shall apply and submit the following documents and pay the applicable fees through the online portal.

i. Details of proposal for modification.
ii. The As-built layout drawing for the existing facility.
iii. Proposed layout sketch for the facility.
iv. Detailed Piping and Instrumentation Diagram (P&ID) of the proposed facility.
v. Updated Standard Operating Procedure (SOP) consistent with this guide.
vi. Manufacturers' datasheet of the storage tank(s), where applicable.

Note: Facility Inspection shall apply.

2.9 Decommissioning/Conversion of Facility

All applications that fall under the above classification shall be in hard copy addressed to the DPR Operations Controller having jurisdiction over the Facility, giving full details of the proposal. Decommissioning shall be in line with the relevant Nigerian Oil & Gas Regulations and Guidelines applicable to such facilities. If a company wishes to covert to Autogas Refuelling station, the requirements of ATC and LTO in line with the guideline shall apply.

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3 MINIMUM DESIGN, CONSTRUCTION, AND INSTALLATION REQUIREMENTS

3.1 General Requirements

The design, construction, installation, commissioning, and operation shall comply with the provisions of Petroleum Act 1969 as amended and MOSR 1997; conform to acceptable design codes such as Standards Organization of Nigeria , American Society of Mechanical Engineers, National Fire Protection Association, American Welding Society – Structural Welding Code, British Standards (BS), and other codes and standards recognised by the Director of Petroleum Resources.

3.1.1 Standards For Design and Construction

During the design, construction, installation, commissioning of a facility, all necessary mitigations shall be applied to reduce risk associated with storage, transport, transfer, usage of gas to as Low as reasonably practicable (ALARP). The storage tanks, fittings, pumps, manifolds, meters, hoses, valves, and other equipment and accessories of the facility shall be designed for efficient and safe operation in line with applicable codes and standards. The installation and commissioning of the system shall only be undertaken by competent persons and companies, in accordance with manufacturer's instructions and industry best practices. Further conditions governing the establishment of Autogas Refuelling or Add-On Gas Facilities are as follows:

i. Participation of DPR representatives in the project and compulsory witnessing of milestone construction activities such as tank burial, pressure/leak test, and calibration of tanks.

ii. All critical equipment and piping shall be commissioned after installation in accordance with manufacturer’s instructions. Integrity tests and other applicable tests shall be conducted companies with relevant OGISP permits and witnessed by the Department.

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3.2 Facility Layout and Site Selection

3.2.1 Site Selection Criteria

1. Any site chosen for a facility shall be sufficiently spacious to allow it to be designed to minimize the risks from LPG to any structure close to the facility and person likely to be at or near the facility.
2. The site shall meet the following requirements:
   i. The site shall be accessible from the roadside.
   ii. The site shall not be within, under, or close to known hazards such as pipeline Right of Way (ROW), high voltage cable, railways, etc.
   iii. The minimum horizontal distance between the shell of a pressurized tanks and the line of adjoining property that may be developed shall be as shown in Section 3.3. Where residences, public buildings, places of assembly, or industrial sites are located on adjacent property, greater distances or other supplemental protection (firewall/underground tank) as provided in section 3.3 shall apply.
   iv. The drainages to be constructed or existing ones shall not be channelled to a stream or waterway. Contaminated water shall be contained and treated onsite.

3.2.2 Special Requirements for Add-on Gas facility

For Add-on Gas facilities, the following are the minimum requirements:

i. The maximum allowable tank size for Add-On Gas Facility is **Ten (10) Metric Tonnes**. However, companies seeking to establish more than 10 metric tonnes shall consider one of the following measures:
   a. Burial of the storage tanks when the product is LPG
   b. Establishing a full Autogas Refuelling facility, if the desire is the sale of gas products to automobiles.
   c. a stand-alone LPG Refilling facility if the desire is the sale of LPG for household use.

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ii. The existing retail outlet must have at least 1,300 square meters of land size available to accommodate the Add-on facility. More space may be required for LNG and CNG facilities.

iii. There must be physical demarcation (wire mesh, wire fence, bollards, etc) when the Retail Outlet Add-on facility is for cylinder refilling for public homes. Only trained and authorized operators shall have access to the demarcated area.

iv. Add On facilities for the sale of LPG for Household use must be located outside the vehicle refuelling area

3.2.3 Facility Layout for Autogas Refuelling/Add-On Gas Facility

i. Proper hazard area classification and Risk Assessment shall be considered for safe design, layout and operation of the facility to minimize, so far as is reasonably practicable, the releases of containments and to prevent the ignition and spread of any unavoidable or accidental releases.

ii. The locations of tanks, fill points, vent pipes, dispensers, road tanker delivery stands, buildings, customer waiting points with reference scale etc shall be designed to ensure that the facility layout has:

   a. Satisfactory means of escape for persons in the event of a fire and other incidents;
   b. Protection of hazardous areas from sources of ignition;
   c. Safe access, parking space, and exit routes for customer vehicles, service vehicles, and road tankers.

iii. The site layout shall have designated vehicular routes required around and within the facility to avoid route conflicts for customers including other motorists. Provision of extended sightlines, speed restrictions, and appropriate signs and markings can be used.

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iv. The facility dangerous areas shall have open-air ventilation and be clear of other buildings or obstructions that might otherwise adversely affect the ventilation.

v. Pipework, tanks to offset fill points, dispensers, and vent pipes shall be routed and located to ensure protection from external effects or interference and allow access if required

vi. The stand for delivering vehicle fuels into storage tanks shall be in the open, away from the facility buildings, dispensing activities and emergency escape routes, and be large enough to allow a road tanker to be positioned wholly within it during delivery.

vii. The siting of other activities which the facility may perform (e.g. parking areas, car wash facilities) shall not hinder safety and vehicle flows through the Facility.

viii. Areas such as the forecourt that are liable to contamination shall be impermeable to all hydrocarbons and seepage through or below the surface.

ix. Electrical connections shall be made in accordance with the manufacturer's instructions and shall maintain the integrity of the explosion protection.

x. The minimum distance in section 3.3 must be complied with

3.3 Separation Distances

The minimum distance for the establishment of Autogas Refuelling Station and Add-on Gas facilities are as follows. In case of closeness to public and residential properties, stricter safety measures shall be applied.

3.3.1 Separation Distances for LNG

The separation distance for LNG are in accordance with

Table 3.1.

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Table 3.1 Minimum Safety Distances from LNG Storage Tank to Adjoining Properties or Amenities

TANK STORAGE CAPACITY (MT) AT LNG DENSITY 450kg/m³	MINIMUM DISTANCE FROM EDGE OF IMPOUNDMENT OR LNG TANK DRAINAGE SYSTEM TO PROPERTY/AMENITIES (m)	MINIMUM DISTANCE BETWEEN STORAGE TANKS (m)
0.9 - 3.4	4.6	1.5
3.4 – 28.3	7.6	1.5
28.3 – 51.3	15	1.5
51.3 – 119.3	23	1.5
> 119.3	30	

Note: Bund wall installations are critical for LNG facilities

3.3.2 *Separation Distances for CNG facilities*

Individual cylinders used for the storage or dispensing natural gas shall be located with respect to the nearest building or compressor equipment or other sources of ignition in accordance with **Table 3.2.**

Table 3.2 Isolation distances from building and boundaries to CNG Gas storage Unit(s)

Total capacity of onsite Gas storage (Cubic Ft)	Minimum distance (metres)	Minimum on-site distance between Gas storage units and a 4hr. FRR concrete or Masonry wall (metres)
Up to 1,100 (5MT)	5	1.0
1,100 to 2,450 (5- 70MT)	7.5	1.0

Note:

a. A blast wall or fire clearance zone of a minimum 3 metres shall be maintained around the perimeter fence of any CNG storage facility.

b. Firewall shall be installed to adjoining residential or public buildings.

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3.3.3 Separation Distances for LPG.

The separation distance for LPG tanks within an Autogas Refuelling and refilling are depicted in **Table 3.3**. The requirement for underground installations are depicted in **Table 3.4**.

Table 3.3 Minimum Separation Distances for Above Ground LPG Storage Tanks

Capacity (Metric Tonnes)		Separation Distance (Meters) from tanks to the line of Adjoining Properties, Control buildings, or fixed source of ignition.				
Of any single tank	Of any group of tanks	From Adjoining Property that May be Developed/Non-Public & Non-Residential		From Public and Residential Boundaries		Between tanks
		A: No fire wall	B: With Fire wall	A: No fire wall	B: With Fire wall	
0.1 – 5	0.1– 5	5	5	30	15	1.0
5.1 - 10	5.1 - 10	7.5	5	30	20	1.0
10.1 – 60	10.1 – 60	15	7.5	50	30	1.5
60.1 - 150	60.1 – 150	22.5	11	50	30	¼ of sum of the diameter of 2 adjacent vessels
150.1 – 300	150.1 – 300	30	15	50	30	

Table 3.4: Minimum Separation Distances for Underground LPG Storage Tanks

Capacity (Metric Tonnes)	Separation Distance (Meters) from the relief valve to the line of Adjoining Properties, Control buildings, or fixed source of ignition.
0.1 - 10	3
>10.1	7.5

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The separation distances from surrounding buildings within the service station should not be less than those specified in

Table 3.5

Table 3.5 Separation Distance within an LPG Refuelling and Refilling Station

	LPG Tank with submersible pump	Extended fill connection of LPG tank	LPG Dispenser	Fill Connection of LPG Vehicle
LPG tank with submersible pump	-	-	3m	3m
LPG Dispenser	3m	3m	-	-
Underground petrol tank manhole or filling point	1.5m	3m	3m	3m
Petrol tank vents (in plan)	3m	3m	3m	3m
Petrol/Diesel pumps/Dispensers (Flameproof)	3m	3m	1.5m	1.5m
Site boundary, buildings, fixed source of ignition	7.6m	7.6m	4.25m	4.25m

3.4 Minimum Requirement for Storage Vessel/Tanks

The storage tank/vessel shall be designed, constructed and installed by DPR accredited/approved company in accordance with internationally recognised standards. It shall comply with the following:

i. The storage tank/vessel shall be located in a manner that allows safe access and subsequent removal if required, clear of any building foundations or underground features, such as drains and tunnels. Additionally, the Location shall not allow any

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flammable concentrations or any releases to reach potential ignition sources or accumulate where they might pose a danger.

ii. The fill points for storage tank/vessel shall be positioned such that other vehicle movements do not pose risk to tanker discharge, and accidental releases does not pose an immediate threat to personnel.

iii. Tanks and piping must be constructed with materials that provide appropriate level of safety and environmental protection. E.g. carbon steel, reinforced fibre glass, or others acceptable to DPR.

iv. All storage tank design specification detail shall be conspicuously displayed.

v. All storage tanks shall be fitted with pressure relief valves, pressure gauges, temperature gauges and important safety equipment. Lightning protection shall be installed as appropriate.

vi. Water sprinkler system shall be provided at the top of the vessel. If required, an access ladder to the top of the gas storage tank shall be provided for inspection and maintenance needs.

vii. Storage systems and vessels shall be fitted with overpressure protection devices to release excess pressure under normal operating conditions and in emergencies.

viii. Manually operated valves shall also be fitted to release pressure during maintenance.

Note: All propane storage and handling facilities shall comply with Propane Rated Standards.

3.4.1 Additional Requirements for Underground LPG Tank Burial and Leak Test

Only LPG storage tanks may be buried. The requirements for tank burial include the following:

i. No tank(s) shall be buried without DPR approval and the burial must be witnessed by DPR officials.

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ii. All tanks to be buried shall meet all the specifications of the manufacturer, ASTM, and other internationally approved codes.

iii. The excavation of the pit for the LPG storage tank shall permit allowance of not less than 70 centimetres when the tank has been set in its final position.

iv. The tank shall be set in a chamber of waterproof concrete of not less than 23 centimetres thick and the top a watertight detachable or removable concrete slab with a manhole at the centre.

v. The manhole of every tank installation shall be raised above the level of the surrounding ground to prevent the ingress of surface water into it.

vi. All piping below ground level shall be protected against damage and corrosion to the satisfaction of the Department of Petroleum Resources.

vii. All individual tanks shall be provided with efficient electrical earth connections independent of pipe connections, having a current not exceeding 10 Ohms when measured by an earth resistance tester "Megger" or similar type.

viii. All fixed pipes shall be of metal or fiberglass coated and shall be in a position where they may not be liable to damage.

ix. Minimum separation distances from a building, boundary or fixed source of ignition to underground or mounded tanks of 10 Tons capacity or less shall be 3 meters, and 7.5 meters for tanks above 10 tons capacity.

x. Separation distances for all underground and mounded storage tanks shall be measured from the pressure relief valve and the filling connection.

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xi. The installation shall be accomplished with appropriate equipment that ensure the Underground Tanks are not dropped, dragged or handled with sharp objects

xii. The installation of underground tanks shall be in such a way that enables easy removal without jeopardising the safety or integrity of adjacent tanks or infrastructure.

xiii. Where the soil may be corrosive, the tank shall be set on a clean shingle or sweet sand free of extraneous materials to avoid seepage of products to underground water courses or any drainage system.

xiv. Foundations and sub-soil shall be examined and prepared to support the tank to prevent movement, uneven settlement or concentrated loading in the tank shell.

3.4.1.1 Corrosion Protection for Buried Tanks

i. A suitable system of cathodic protection (typically sacrificial anode for small installations and impressed current for large installations) shall be provided. Appropriate current and voltage readings should be taken periodically, recorded and analysed to ensure that the condition of the tank is effectively monitored.

ii. External surfaces of the tank should be suitably prepared and treated with a coating manufactured and applied in accordance with a recognised standard, to both protect against chemical and mechanical damage and minimise cathodic protection current drain.

iii. Avoid damage to the tank coating during installation. Fault detection equipment can be used to check that the coating is intact. Rectification of any damage should be completed before back-filling the tank.

3.4.2 Requirements for Skid-mounted and Containerized Facility

The following shall apply for standalone Containerized and Skid-mounted facilities:

i. They shall meet same safety distances in section 3.3, for autonomous Autogas refuelling stations.

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ii. Additional safety measures for adequate ventilation, gas and fire detectors, CCTV and fire- fighting equipment shall apply.

iii. Technical and functional specifications of the skids shall be made available to DPR, to ensure consistency and availability of the system.

iv. Any relocation of the skids, change in layout of the approved site and any other Any relocation of the skids, change in layout of the approved site and any other modification shall be promptly reported to the Department for concurrence and approval.

3.4.3 Requirements for CNG tanks

In addition to the requirements for tanks listed in section 3.4, the following are applicable to CNG tanks:

i. Each cylinder or bulk tank used for the storage of CNG shall be equipped with an approved pressure relieving device and an approved isolating valve which shall be readily accessible when installed in the gas unit. The isolating valve shall not be capable of closing off the pressure relief device.

ii. Piping and gas storage systems shall be protected against over-pressure by safety relief devices. Relief devices installed to protect the storage systems shall be such that it limits the pressure to 120 per cent above the maximum allowable working pressure of the system or the pressure which produces a loop stress of 75% of the specified minimum yield strength, whichever is lower.

iii. A shut-off valve shall not be installed between the pressure relief valve and the gas unit or bulk tank except that a shut-off valve may be used on multiple valve installations where the arrangements of the valve will provide full required flow

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through the safety relief devices at all times. The opening or connection between the gas storage unit and safety relief device or devices shall have at least the combined areas of all connected safety relief device inlets.

iv. All safety valves shall be fitted with vent pipes discharging vertically upwards at a minimum height of 2 meters above the rank top. The vent pipes shall be fitted with loose fitting rain caps.

v. Every CNG storage unit including each manifold group of cylinders or bulk storage tank shall be provided with suitable pressure gauges which shall communicate directly with the tank or storage unit system and shall have an opening not to exceed 1.4 mm diameters at the connection. The pressure gauge shall have a dial graduated to read approximately double the operating pressure, but in no case less than 1.2 times the pressure at which the pressure relief valves is set to function. Pressure gauges shall be checked and calibrated at intervals not exceeding 12 months in line with MOSR 1997.

vi. Methane gas leak detection device shall be provided at the CNG facilities for warning when an airborne methane gas concentration exceeds 20% of the lower explosion limit, warning shall be plainly audible and visible to those within the zone of potential exposure to fire or explosion of vessel, system or delivery operation.

vii. Multiple cylinder units or groups stored in the vertical position shall be limited to a width of no more than 4 cylinders. Units or groups stored in the horizontal position shall be limited to a height of 6 cylinders at a width of 4 cylinders. When stacked horizontally, the units or groups shall be separated by not less than 1.5 meters.

3.4.4 Requirements for LNG tanks

In addition to the requirements for tanks listed in section 3.4, the following are applicable to LNG tanks:

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i. All tanks for the storage of LNG shall be designed for a working pressure corresponding to the vapour pressure and at the maximum ambient/ minimum temperature that the tanks are likely to reach.
ii. All LNG tank systems shall be designed for both top and bottom filling.
iii. The tank must possess devices for measuring the liquid content and its temperature. The maximum quantity of LNG filled into any tank shall be such that the maximum operating volume it would occupy should not be more than 95% of the capacity of the storage.
iv. Remote-controlled hydraulically operated shut-off valves shall be fitted to each storage tank system.
v. Excess flow valve shall be fitted to prevent the loss of LNG from storage tanks, transport tanks and points where flexible hoses are used.
vi. Vacuum insulated storage tanks shall be considered for use for LNG facilities.
vii. Storage vessels shall be installed aboveground only and on stable, non-combustible foundations outdoors in the open air in a position that will not allow accumulation of LNG vapour at ground level. They should never be installed in or on buildings or in open pits.
viii. Fuel degradation in storage shall be considered when determining the size of storage containment. Design shall, where practical, include measures to promote a longer storage life, for example, the reduction of heat gain and boil-off.
ix. There shall be some means of isolation in the pipework between the fuel storage vessel and the fuel delivery point (typically, at the tanker hose termination coupling or tank control panel). The isolation shall be closed when fuel deliveries are not taking place and/or for maintenance purposes. The isolation device shall be located in a secure area.
x. Exposed insulation shall be non-combustible, shall contain or inherently be a vapour barrier; shall be water-free and shall resist dislodgment by fire hose

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systems. The space between the inner container and the outer container shall contain insulation that is compatible with LNG and is non-combustible.

xi. Storage vessels shall be spaced and located in accordance with the provisions of this document. The layout shall consider the effects of a release of a cryogenic liquid such that any release can rapidly evaporate and have minimum effect on the storage tank supporting structure, such that the storage tank will remain adequately supported.

xii. Ground features such as open drains, manholes, gullies and cellar hatches, within the separation distances should be sealed or trapped to prevent the passage of LNG vapour.

xiii. The minimum separation distance between any type of LNG container of capacity 265,000 liters equivalent water capacity shall be at least 15m. Refer to Table 3.1.

3.4.4.1 LNG Boil-Off Gas Handling

i. Boil-off and flash gas shall be set to discharge into a closed system or into the atmosphere such that they do not create a hazard to people, equipment or adjacent properties.

ii. Boil-off venting systems shall be designed so that it cannot inspirate air during normal operations.

3.5 Facility Connecting Pipework and Valves

Piping, Valves and fittings are to be fabricated, installed, and tested in line with international standards such as ASME Process Piping Code or any other applicable codes recognised by DPR. Any exterior piping shall be buried or installed above ground and supported and protected against mechanical damage. Additionally, the following shall apply at a minimum:

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i. Pipes and pipework components (including weld/braze compounds) shall be of a material that is resistant to corrosion. Underground and aboveground piping shall also be protected from corrosion in compliance to recognized best practices.
ii. Special protection such as coatings or cathodic protection shall be considered and applied for pipe systems and valves. For LNG connections, vacuum insulation of cryogenic pipes in ducts may apply.
iii. Where practical, pipe shall be continuous, unjointed and uninterrupted. Where there are breaks in the continuity of pipework, consideration shall be given to electrical bonding across the joint. Threaded pipe and fittings are not allowed underground.
iv. Manual shut-off valves, emergency shut-off valves, overpressure shut-off valve, flow check valves, non-return valves and backflow check valves used in piping systems shall conform to applicable standards.
v. Relief and safety valves shall be inspected by a DPR accredited consultant and witnessed by the Department every thirty (30) months or at such shorter intervals as shall be necessary to maintain them in satisfactory condition.
vi. All pipework shall that are insulated should accessible to facilitate periodic inspection, examination and/or testing.

3.5.1 Pressure Relief Systems

Relief devices shall be designed such that the operations safely disperse contents without the risk of accumulation, ignition, or impingement on personnel, equipment and buildings. For LNG, the following applies at the minimum:

i. All vents including those of safety relief devices and purge valves shall be connected to a vent stack and/or any other boil-off gas utilization systems put in place.

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ii. All vent systems shall be adequately supported to cope with loads created during discharge, as well as those created by the weather e.g. wind loading.

iii. Natural gas vent lines shall terminate in a safe area at high level therefore, vent systems shall be designed to discharge vertically upwards.

iv. The minimum pressure-relieving capacity in kilogram per hour shall not be less than three percent (3%) of the full tank content in 24 hours.

v. The following notices shall be clearly displayed on or near the vent stack(s), particularly at personnel access points.

   a. do not spray water on vent stack
   b. flammable gas
   c. beware of frostbite

vi. Conductive parts (e.g. metal fitments) on the installation including fencing, gates, tanks and all pipework, vent stacks and vent recovery hoses, shall be adequately equipotential (earth) bonded.

3.6 Pumps, Compressors and Fittings

Pumps, other than submersible types, should be adequately secured to a concrete foundation or bolted to a structural steel support. Where the drive unit is not integral with the pump, attention should be given to ensure correct alignment, and all moving parts should be suitably guarded

3.7 Emergency Systems

The following emergency system shall be installed in the facility at the minimum:

i. Gas and fire detection system shall be installed and routinely tested.

ii. Appropriate warning notices, safety signs and instructions, shall be positioned at strategic locations and control rooms. Audio/visual alarms that is routinely tested is mandatory for LNG.

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iii. Adequate intrinsically safe lighting systems of explosion-proof type shall be installed at points to aid safety, security and dentification of the product(s) (signage and labels). Note: vent outlets and potential release points shall be avoided

iv. Where numerous storage vessels are used, consideration should be given to separating these into isolatable sub-groups. ESDs activating these isolation valves shall be provided both locally at each exit point from the storage site and remotely.

3.8 Fire/Blast Walls

When Fire walls are used as specified in Section 3.3, the walls shall, at a minimum, be of the following features:

i. imperforated and substantially constructed from reinforced concrete or solid masonry and be capable of achieving at least 30 minutes fire resistance. Where the wall separates vulnerable populations from the dangerous substance, the fire resistance provided shall be for a minimum of 60 minutes.

ii. shall not be less than the height of the vessel or the height of the vessel, whichever is greater.

iii. The thickness of the Firewall shall not be less than of 0.23m (9 inch)

iv. The separation distance between the vessel and the firewall shall not be less than 3 meters.

v. The installation of the fire walls shall not significantly impaired natural ventilation. The provision on one side is normally sufficient. However, it shall not be more than two sides.

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Note: The specification and composition of materials for the Firewall shall be submitted to the appropriate DPR field/zonal office and the construction shall also be monitored by the assigned DPR representatives.

3.9 General Requirements for Dispensers

The dispenser pump shall be designed and installed in accordance with international standards. The following shall apply at the minimum:

i. The dispenser shall be controlled to prevent unauthorized access and protected against damage by vehicles.
ii. The dispensers shall be in the open air, adequately ventilated, such that vehicles can be parked easily alongside without restricting the movement of other vehicles.
iii. The display of the dispenser for Autogas Refuelling facility shall clearly indicate at the minimum:
    i. volume/weight of product being sold (only mandatory for household LPG);
    ii. unit price of product sold; and
    iii. total price of product sold.
iv. Dispenser nozzles or hose lines shall be fitted with a safe break/breakaway coupling and non-return valve. Hoses shall be kept away from vehicles.
v. The fuel gas supply to the dispenser shall be capable of being isolated/isolation valve. To prevent unauthorized or inadvertent reactivation of isolated services, the isolation point shall be in a secure location. Where the isolation point is in an area accessible to the public or unauthorized parties outside operating hours, it shall be fitted with appropriate security devices e.g. CCTV

3.10 Refilling Canopy/ Container

The requirements for Refilling canopy/ container are the following:

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i. Container, canopies and other structures at Autogas Refuelling and Add-On Gas facilities shall be designed and in conformance with the requirements of international recognised standard.

ii. The Refilling canopy/ container including signages shall be constructed of materials that will not contribute to any fire occurring within the underside of the canopy area and the height shall be such that it does not obstruct appropriate ventilation

iii. Signage and lighting components shall be designed and installed by appropriate competent persons and comply with relevant standards.

iv. Key areas such as electrical wiring/distribution systems, canopy luminaires, illuminated signs shall be properly controlled from potential ignition sources. The polarity, earth continuity, insulation resistance, adequacy of equipotential bonding, fuse rating shall be checked regularly.

v. Vehicle and Cylinders as applicable shall be filled place designed for that purpose. The Filling buildings shall be open-sided.

vi. Piping shall be protected or painted with appropriate industrial colour.

vii. Fire extinguishers in quantities specified by fire service shall be provided at strategic places within the premises and the plant personnel shall have easy access to the extinguisher.

viii. Adequate explosion-proof lighting shall be provided to illuminate the working and the storage areas of the plant.

ix. Filling shed flooring shall be covered with spark-resistant material to prevent spark ignition.

3.10.1 Safety Signages

Safety signages in written or pictorial form shall be displayed conspicuously in the facility. Examples include signages depicting highly flammable, switch off engine, no smoking and many others.

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3.11 Establishment of Other Services

A company wishing to establish or operate other services such as convenience stores, car wash, car parks within the facility shall carry out proper risk assessment and comply with the following:

i. Adequate separation distance to avoid the possibility of customers not associated with vehicle fuel sales affecting the safe operation of vehicle fuel dispensing or road tanker delivery.
ii. Provision of clearly marked routes and parking areas as well as control of vehicle fuel sales.
iii. Alternative means of escape for both staff and customers away from the Facility in the event of an emergency.

3.12 Fire Protection

1. The fire protection system of a facility shall be required and designed to prevent or reduce the likelihood of a fire or explosion, to minimize its intensity should such an event occur and ensure timely emergency response and escape of all persons in the facility.
2. The fire protection measures shall ensure that adequate controls are put in place, including special, technical and organizational measures taken for all work process, including receipt, storage dispensing of products and other activities in connection with the Autogas Refuelling / Retail Outlet Gas Add-On Facility to prevent fire/explosion; deal with the incident should such an event occur, and ensure emergency response and escape of all persons in the facility.
3. Additionally, the Autogas Refuelling / Retail Outlet Gas Add-On Facility shall provide the following firefighting and emergency facilities in the facility:
    i. Clean Water Reservoir of minimum size 15 cubic metres.
    ii. Functional firefighting gadgets must be kept handy and at alert.

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iii. At least two dry powder fire extinguishers less than 9kg each and suitable for appropriate Gas fires with a test fire rating of at least 21A and 183B as defined in MSA EN 3-7:2004 should be readily available at strategic locations to deal with fires adjacent to the meter/vehicle being filled.

iv. During refuelling, vehicles shall be turned off.

v. Vehicle routes, to and from the dispensing area shall be laid out such that there is no need for vehicles to pass through the fuel delivery demarcation area whilst delivery is taking place. All vehicle movement routes and restrictions on the Refuelling Station should be clearly identified by the use of signs or arrows (i.e. entrance, exit etc.).

vi. Warning/safety signs shall be conspicuously displayed at dispensing points.

vii. Fire hydrant system and booster pumps shall be made available.

4 SANCTIONS

These Guidelines provide the requirements for establishing a Autogas and Add on facilities in Nigeria. Noncompliance with the requirements of this Guidelines shall be deemed as violations to relevant sections of the Petroleum Act 1969 as amended, Petroleum Regulations 1967 & subsequent amendments and Mineral Oils (Safety) Regulation, 1997. These violations may result in applicable consequence management, including, but not limited to, fines, penalties and/or revocation of license.

5 GLOSSARY

Abbreviations, terms and references used in this document are explained hereunder:

AGS	Automated Gas System
ALARP	As Low As Reasonably Practicable
ATC	Approval to Construct
CCTV	Closed Circuit Television

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CNG	Compressed Natural Gas
EIA	Environmental Impact Assessment
FAT	Factory Acceptance Test
FRR	Fire Resistance Rating
HAZID	Hazard Identification
HAZOP	Hazard and Operability
HSE	Health Safety and Environment
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LTO	License to Operate
MISTDO	Minimum Industry Safety Training for Downstream Operators
MOSR	Mineral Oils (Safety) Regulation
MT	Metric Tonnes
P&ID	Piping and Instrumentation Diagram
ROW	Right of Way
SOP	Standard Operating Procedure
SSA	Site Suitability Approval
UST	Underground Storage Tanks
UTM	Ultrasonic Thickness Measurement

Approved by

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Engr. Sarki Auwalu, ***MNSE*** **(Director/CEO, Department of Petroleum Resources)**		
	Date	**1st September 2020**

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DEPARTMENT OF PETROLEUM RESOURCES ....Petroleum Regulatory Agency Of Nigeria DPR	Applicable to all Oil & Gas Operators
GUIDELINES FOR THE ESTABLISHMENT AND OPERATIONS OF GAS STORAGE AND UTILISATION FACILITIES IN NIGERIA	Code: DPR Guide 0020 - 2020 Revision Date: 1st September 2020

GUIDELINES FOR THE ESTABLISHMENT AND OPERATIONS OF GAS STORAGE AND UTILISATION FACILITIES IN NIGERIA

(LNG Regasification, CNG Downloading, LPG Industrial Storage)

ISSUED BY

DEPARTMENT OF PETROLEUM RESOURCES

2020

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1 INTRODUCTION

1.1 Purpose

The purpose of this document is to describe the procedures and conditions for granting approval for the establishment and operations of LNG regasification, CNG downloading, LPG industrial storage facilities in Nigeria pursuant to compliance with the Petroleum Regulation 1967. It provides the baseline requirement for the safe design and construction of a Gas Storage and Utilisation Facility to ensure the risk in the facility is minimised as low as is reasonably practicable. The objective is to ensure that the minimum HSE requirements are achieved and maintained in all Gas Storage and Utilisation Facility in Nigeria.

1.2 Scope

These guidelines and requirements are applicable to the establishment of Gas Storage and Utilisation Facility comprising of LNG Regasification, CNG Downloading, LPG Industrial Storage Facilities in Nigeria.

1.3 Definition of Terms

I. Gas Storage and Utilisation Facility

This refers to the use of LNG Regasification Facility, CNG Downloading and LPG Industrial Storage for power generation, heating, cooking etc.

II. Regasification Facility

This refers to a facility installed to convert Liquefied Natural Gas (LNG) to natural gas at atmospheric temperature for power generation, heating etc.

III. Downloading Facility

This refers to a facility installed for the purpose of let-down pressure of Compressed Natural Gas via PRMS into a usable fuel source for heating, power generation etc. by pressure regulation and measurement.

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IV. LPG Industrial Storage

This refers to the storage and utilization of LPG under pressure at ambient temperature in fixed vessels larger than 500kg capacity. The LPG stored is for the purpose of power generation, heating, cooking etc., for own use and not intended for sale.

2 APPLICATION, APPROVAL AND LICENSE PROCEDURE FOR FACILITY

2.1 Application Overview

Any company or industry intending to establish a Gas Storage and Utilisation Facility in Nigeria shall:

i. Apply through the DPR application portal elps.dpr.gov.ng
ii. Pay the applicable Statutory and Processing fees
iii. Satisfy the requirement stipulated by the DPR and obtain the required approvals contained in the stages depicted below:
    a. Site Suitability Approval
    b. Approval to Construct (ATC)/ Approval to Install
    c. License to Operate

Note: The company shall comply with the minimum requirements stipulated for design, construction and installation (**Section 3**) to secure the approvals/licenses.

2.2 Site Suitability Approval (SSA)

The SSA is a business enabling and advisory tool set up to eliminate possible loss of investment that may result should the site be deemed unsuitable at Approval to Construct (ATC) phase. The company shall be required to pay the applicable fees and upload the following documents required for Site Suitability Approval on the portal.

i. Survey plan of the land
ii. Certificate of Incorporation and Memorandum and Article of Association of the company.

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iii. A sketch of the proposed site layout, showing the existing or proposed buildings on the site, adjoining properties, if any, and the relevant distances of the tank(s) to critical facilities within the premises, roadways and adjoining fence with 3rd parties.

2.2.1 *Procedure for Site Suitability Inspection*

The applicant shall be issued the Site Suitability Approval following the satisfactory review of the uploaded documents and successful outcome of the site suitability inspection in line with **Section 3.2**. Upon receipt of the SSA, the proponent is required to display conspicuously a sign tagged 'DPR Gas Storage and Utilisation Facility Approved Site (Approval number)'.

2.2.2 *Validity of Site Suitability Approval*

The site suitability approval shall be valid for 18 months in the first instance. This approval and any renewal thereof is subject to the following:

i. No development/encroachment of public and residential structures that was not considered during the suitability approval.
ii. No significant changes in the plot size capable of affecting the minimum safety distances for the proposed capacity.

2.3 Approval to Construct/Approval to Install

Following receipt of Site Suitability Approval from the Department, the company shall commence actions towards obtaining Approval to Construct/Install for the proposed facility. The company shall pay the applicable fees, upload the required documents, and satisfy the following requirements:

i. A letter/ approved building plan from the appropriate Town Planning Authority, authorizing the siting of the facility at the proposed site. The submission shall contain all relevant drawings such as:
    a. Piping and Instrumentation Diagram (P&ID),

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b. Electrical and mechanical specifications,
c. Codes, Standards and Specification adopted in the design, construction and installation of ancillary equipment.

ii. A fire report by Chief Federal/State Fire officer or an officer authorized by him, that he is satisfied with the proposed arrangement for the prevention of fire.
iii. Any of the following shall subsist - Current Tax clearance certificate, Evidence of Payment, Tax Identification Number (TIN) or evidence of tax exemption.
iv. Health, Safety and Environment (HSE) policy for the proposed plant, if less than 10 MT or Environmental Impact Assessment (EIA) report, if above 10 MT.

2.3.1 Review of Submitted Documents and Drawings

The submissions shall be reviewed in line with specifications listed in **Section 3** of this document. The objective of DPR's review is to ensure safety-in-design and sustainable operation of Gas Storage and Utilisation Facility. Site inspection shall follow the satisfactory review of the documents and design. The site inspection shall, at the minimum, revalidate the requirements of the SSA.

2.3.2 Conditions on the Approval to Construct/Install

Approval to Construct shall have a validity of 30 months (in the first instance) on the following conditions:

i. The facility shall commence meaningful development. The company shall update the nearest DPR office at six months intervals.
ii. Signpost shall be installed on-site immediately after Approval to construct is granted. The signpost should indicate the name of the company and the reference number of the Approval letter.
iii. The construction and installation shall comply with the requirements stated in **Section 3**.

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iv. Companies involved in building of facility, construction and fabrication of Storage tanks shall possess valid and appropriate DPR Oil and Gas Industry Service Permits.

2.4 License to Operate (LTO)

Upon completion of construction works and leak tests, the company shall apply for LTO. The company shall pay the applicable fees and upload all statutory/technical requirements on the portal as follows:

i. Valid Calibration Certificates/Report of Measuring Equipment for the facility issued by DPR accredited companies and witnessed by DPR in line with relevant standards.

ii. Manufacturers' datasheet for any Gas Storage and Utilisation Facility storage tanks.

iii. Ultrasonic Thickness Measurement (UTM) test certificates of the storage tank. This test shall be conducted on site for all tanks and done prior to burial for underground tanks. The UTM test shall be carried out by a company with applicable OGISP and witnessed by the DPR officials.

iv. Pressure test reports and certificate or any other DPR approved integrity test report for tanks and piping. The Pressure test shall be carried out by company with applicable OGISP and witnessed by the Department. The Pressure test should be carried out for a new tank at installation before operation and after every Five (5) years. After 20 years of service, pressure test on the LPG tank should be carried out every two (2) years.

v. List and evidence of trained staff by a consultant with applicable OGISP.

vi. Any of the following shall subsist - Current Tax clearance certificate, Evidence of Tax Payment, Tax Identification Number (TIN) or evidence of tax exemption.

vii. Approved Standard Operating Procedure (SOP) for the Gas Storage and Utilisation Facility.

viii. '8 X 10' Photographs of the facility clearly showing all built structures and operational facilities as well as safety equipment.

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ix. As built Layout drawing. This will be verified by DPR during pre-licence inspection.

x. Factory Acceptance Tests (FATs)/reports (where applicable) and Site Acceptance Tests of critical components shall be witnessed by the Department.

2.5 Procedure for Pre-License Inspection

To issue LTO for a facility, the DPR shall conduct a Pre-license inspection, following the satisfactory review of documents submitted in the application. The inspection shall confirm the extent of compliance with these Guidelines. At a minimum, the following shall be confirmed to be in place:

i. Organogram, list of competent persons, and evidence of MISTDO training of the relevant staff.

ii. Functional Automated/Manual leak tester.

iii. Automatic monitoring and control systems.

iv. Standard Operating Procedures.

v. Functional Fire alarm system and mounted gas detectors at designated areas (Like pump and compressor room, discharge/offloading area and piping connector at the storage vessel, etc).

vi. Safety warning notices and Personnel Protective Wears for personnel.

vii. Emergency shut down system in at least two locations (At the Gate and operations area).

viii. Visible display of Emergency Telephone numbers of Fire Service, Police and DPR.

ix. Adequate fire water storage, deluge and sprinkler system in line with relevant codes and standards.

x. Muster Point designated areas earmarked in the facility.

xi. Car parking areas shall be provided outside the facility. Only cars with spark arrestors should be allowed to drive into the facility. However, safety distance

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of 15m between the car and the storage tank/dispensing bay must be maintained.

xii. Clean and hygienic toilets with steady water supply at the facility.

xiii. Demarcation of facility tank Storage areas to unauthorized persons and limiting access to operations area to only trained personnel.

xiv. A perimeter fence of at least 2 metres height shall be provided around the facility.

xv. Well-stocked First Aid Box

xvi. Fire Hydrant system/control points and booster pumps

2.5.1 *Pre-License Inspection for New or Renewal of License of Operate*

On the expiration of an existing operating licence, the company shall apply through the online portal for LTO. The company shall pay the applicable fee and upload relevant documents used for the LTO application. DPR officers shall conduct an inspection of the Gas Storage and Utilisation Facility, to confirm at the minimum the status and integrity of all equipment and amenities in line with standards.

2.6 Relocation of Existing Facility

If a company desires to relocate an existing and licensed facility to a new site, the applicant must submit the justification (reasons) for the proposed relocation of the facility. The conditions for the grant of Approval to Construct and operating license for a new Facility shall be the same for relocated Facility.

2.7 Lease/Takeover of Facility

The company for Lease/Takeover of a Site Suitability Approval (SSA), ATC and LTO shall pay the prescribed application fee and submit the following documents.

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i. Duly signed Sales Agreement by both parties.
ii. Letter of Release.

The requirements as applicable for SSA, ATC and LTO shall apply. Inspection shall be carried out as part of the process.

2.8 Modification of Facility

The company shall apply and submit the following documents and pay the applicable fees through the online portal:

i. Details of proposal for modification
ii. The As-built layout drawing for the existing facility.
iii. Proposed layout sketch for the facility.
iv. Detailed Piping and Instrumentation Diagram (P&ID) of the facility.
v. Updated Standard Operating Procedure (SOP) consistent with this guide.
vi. Manufacturers' datasheet of the storage tank(s), where applicable.

Note: Facility inspection shall apply.

2.9 Decommissioning of Facility

All applications shall be forwarded to the DPR Operations Controller having jurisdiction over the Facility, giving full details of the proposal. Decommissioning shall be in line with relevant Nigerian Oil & Gas Regulations and Guidelines applicable to such facilities.

3 MINIMUM DESIGN, CONSTRUCTION AND INSTALLATION REQUIREMENTS

3.1 General Requirements

The design, construction, installation, commissioning and operation shall comply with the provisions of Petroleum act 1969 as amended, MOSR 1997; conform to acceptable design codes such as Standards Organization of Nigeria, American Society of Mechanical

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Engineers, National Fire Protection Association, American Welding Society – Structural Welding Code, British Standards (BS), and other codes and standards recognised by the Director of Petroleum Resources.

3.1.1 Design and Construction Standard

During the design, construction, installation, commissioning of a facility, all necessary measures and mitigations shall be applied to reduce the risk associated with storage, transport, transfer, usage, etc. to as low as reasonably practicable (ALARP). The storage tanks, fittings, pumps, manifolds, meters, hoses, valves, and other equipment and accessories of the facility shall be designed for efficient and safe operations in line with applicable codes and standards. The installation and commissioning of the system shall only be undertaken by competent persons and companies, in accordance with the manufacturer's instructions and best practices. Written standard procedures shall be drawn up and used for installation and/or commissioning. Further conditions governing the establishment of a Gas Storage and Utilisation Facility are as follows:

i. Participation of DPR representatives in the project and mandatory witnessing of milestone construction activities such as the tank burial, pressure/leak tests and tank calibrations.

ii. All critical equipment and piping shall be commissioned after installation in accordance with manufacturer’s instructions. Integrity tests and other applicable tests shall be conducted companies with relevant OGISP permits and witnessed by the Department.

3.2 Facility Layout & Site Selection

3.2.1 Site Selection Criteria

1. Any site chosen for the facility shall be sufficiently spacious to allow it to be designed to minimize the risks from LNG, CNG or LPG as applicable to any structure close to the facility and persons likely to be at or near the facility.

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2. The site shall meet the following requirements:
   i. The site shall be accessible from the roadside.
   ii. The site shall not be within, under or close to know hazards such as pipeline Right of Way (ROW), high voltage cable, railways, etc.
   iii. The minimum horizontal distance between the shell of a pressurized tanks and the line of adjoining property that may be developed shall be as shown in Section 3.3. Where residences, public buildings, places of assembly, or industrial sites are located on adjacent property, greater distances or other supplemental protection (firewall/underground tank) as provided in Section 3.3 shall apply
   iv. The drainages to be constructed or existing ones shall not be channelled to a stream or waterway. Contaminated water should be contained and treated onsite.

3.2.2 *Facility Layout*

i. Proper hazard area Classification and Risk Assessment shall be considered for safe design, layout and operation of the facility to minimize, to ALARP, the releases of containment to prevent the ignition and spread of any unavoidable or accidental releases.

ii. The location of tanks, fill points, vent pipes, dispensers, road tanker delivery stands, buildings, etc shall be designed to ensure in the layout of the facility that:
   a. Satisfactory means of escape for persons in the event of a fire or other incident,
   b. Hazardous areas are protected from sources of ignition,
   c. There is safe access, routing, parking and exit, service vehicles and road tankers.

iii. The facility dangerous areas shall be in open-air ventilation and clear of other buildings or obstructions that might otherwise adversely affect the ventilation.

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iv. Pipework, tanks to offset fill points, dispensers and vent pipes shall be routed and located to ensure protection from external effects or interference and allow access if required

v. The stand for delivering fuels into storage tanks shall be in the open, away from the facility buildings, dispensing activities and emergency escape routes, and be large enough to allow a road tanker to be positioned wholly within it during delivery.

vi. The siting of other activities which the facility may perform (e.g. parking areas, car wash facilities) shall not affect safety .

vii. Electrical connections shall be made in accordance with the manufacturer's instructions and shall maintain the integrity of the explosion protection.

viii. The minimum distance stated in **Section 3.3** must be complied with.

3.3 Separation Distances

The minimum distance for the establishment Gas Storage and Utilisation Facility are as follows:

3.3.1 LNG Regasification Separation Distances

The distances given in the table below indicate the minimum approved horizontal distances between the nearest point on the storage tank and a specified feature, e.g. an adjacent storage tank, building or boundary and the dispensers.

Table 3.1 Minimum Safety Distances from LNG Storage Tank to Adjoining Properties or Amenities

TANK STORAGE CAPACITY (MT) AT LNG DENSITY 450kg/m³	MINIMUM DISTANCE FROM EDGE OF IMPOUNDMENT OR LNG TANK DRAINAGE SYSTEM TO PROPERTY/AMENITIES (m)	MINIMUM DISTANCE BETWEEN STORAGE TANKS (m)
0.9 - 3.4	4.6	1.5
3.4 – 28.3	7.6	1.5
28.3 – 51.3	15	1.5
51.3 – 119.3	23	1.5
> 119.3	30	

Note: Bund wall installations are critical for LNG facilities

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3.3.2 *Separation distance for Downloading Facilities*

Each individual cylinder used for the storage or dispensing natural gas shall be located with respect to the nearest building or compressor equipment or other sources of ignition in accordance with table 3.2.

Table 3.2: Isolation Distances from Building and Boundaries to as Storage Unit

Total capacity of Gas storage (Cubic FT)	Minimum distance (metres)	Minimum on-site distance between Gas storage units and a 4hr. FRR concrete or Masonry wall (metres)
Up to 1,100 (5MT)	5	2.0
1,100 to 2,450 (5MT-70 MT)	7.5	2.0

Note:

a. A blast wall or fire clearance zone of a minimum 3 metres shall be maintained around the perimeter fence of any CNG storage facility.

b. Firewall shall be installed to adjoining residential or public buildings

3.3.3 *LPG Separation Distances*

The separation distance for LPG tanks within a Gas Storage and Utilization facility are depicted in Table 3.3 while the requirements for underground installations are depicted in Table 3.4.

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Table 3.3 Minimum Separation Distances for Above Ground LPG Storage Tanks

Capacity (Metric Tonnes)		Separation Distance (Meters) from tanks to the line of Adjoining Properties, Control buildings, or fixed source of ignition.				
Of any single tank	Of any group of tanks	From Adjoining Property that May be Developed/Non-Public & Non-Residential		From Public and Residential Boundaries		Between tanks
		A: No fire wall	B: With Fire wall	A: No fire wall	B: With Fire wall	
0.1 – 5	0.1– 5	5	5	30	15	1.0
5.1 - 10	5.1 - 10	7.5	5	30	20	1.0
10.1 – 60	10.1 – 60	15	7.5	50	30	1.5
60.1 - 150	60.1 – 150	22.5	11	50	30	¼ of sum of the diameter of 2 adjacent vessels
150.1 – 300	150.1 – 300	30	15	50	30	

Table 3.4: Minimum Separation Distances for Underground LPG Storage Tanks

Capacity (Metric Tonnes)	Separation Distance (Meters) from the relief valve to the line of Adjoining Properties, Control buildings, or fixed source of ignition.
0.1 - 10	3
>10.1	7.5

3.4 Minimum Requirement for Storage Vessel/Tanks

The storage tank/vessel shall be designed, constructed and installed by DPR accredited/approved company in accordance with internationally recognised standards. It shall comply with the following:

i. The storage tank/vessel shall be located in a manner that allow safe access and subsequent removal if required, clear of any building foundations or underground features, such as drains and tunnels or allow any flammable concentrations or any releases not to reach potential ignition sources, accumulate where they might pose a danger.

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ii. The fill points for storage tank/vessel shall be positioned such that other vehicle movements does not pose risk to tanker discharge, and accidental releases does not pose an immediate threat to personnel.

iii. Tanks and piping must be constructed with materials that provide appropriate level of safety and environmental protection. e.g. carbon steel, reinforced fibre glass or others acceptable to DPR.

iv. All storage tank design specification details shall be conspicuously displayed.

v. All storage tanks shall be fitted with pressure relief valves, pressure gauges and important safety equipment. Lightning protection shall be installed as appropriate.

vi. Water sprinkler system shall be provided at the top of the vessel. If required, access ladder to the top of the gas storage shall be provided for inspection and maintenance needs.

vii. Storage systems and vessels shall be fitted with over pressure protection devices to release excess pressure under normal operating conditions and in emergency situations.

viii. Manually operated valves shall also be fitted to release pressure during maintenance.

Note: All propane storage and handling facilities shall comply with Propane Rated Standards.

3.4.1 Additional Requirements for Underground LPG Tank Burial and Leak Test

Only LPG storage tanks may be buried. The requirements for tank burial include the following:

i. No tank or tanks shall be buried without DPR approval and the burial must be witnessed by DPR officials.

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ii. All tanks to be buried shall meet all the specifications of the manufacturer, ASTM, and other internationally approved codes.

iii. The excavation of the pit for the LPG storage tank shall permit allowance of not less than 70 centimetres when the tank has been set in its final position.

iv. The tank shall be set in a chamber of waterproof concrete of not less than 23 centimetres thick and the top a watertight detachable or removable concrete slab with a manhole at the centre.

v. The manhole of every tank installation shall be raised above the level of the surrounding ground to prevent the ingress of surface water.

vi. All piping below ground level, shall be protected against damage and corrosion.

vii. All individual tanks shall be provided with efficient electrical earth connections independent of pipe connections, having a current not exceeding 10 Ohms when measured by an earth resistance tester "Megger" or similar type.

viii. All fixed pipes shall be of metal or fiber glass coated and shall be in a position where they may not be liable to damage.

ix. Minimum separation distances from a building, boundary or fixed source of ignition to tank for the underground or mounded tanks of 10 Tons capacity or less shall be 3 meters and 7.5 meters for tanks above 10 tons capacity.

x. Separation distances for all underground and mounded storage tanks shall be measured from the pressure relief valve and the filling connection.

xi. The installation shall be accomplished with appropriate equipment that ensure the underground tanks are not dropped, dragged or handled with sharp objects

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xii. The installation of the underground tank shall be in such a way that enables easy removal without jeopardising the safety or integrity of adjacent tanks or infrastructure.

xiii. Where the soil may be corrosive, the tank shall be set on a clean shingle or sweet sand free of extraneous materials to avoid seepage of products to underground water courses or any drainage system.

xiv. Foundations and sub-soil shall be examined and prepared to support the tank to prevent movement, uneven settlement or concentrated loading in the tank shell.

3.4.1.1 Corrosion Protection for Buried Tanks

i. A suitable system of cathodic protection (typically sacrificial anode for small installations and impressed current for large installations) shall be provided.

ii. External surfaces of the tank should be suitably prepared and treated with coating manufactured and applied in accordance with a recognised standard, to both protect against chemical and mechanical damage and minimise cathodic protection current drain.

3.4.2 Requirements for Storage Cylinders

Where LPG storage installation consists of a set of cylinders, the installation shall be in line with relevant codes and standards and shall comply with the following:

i. The construction or installation of cylinders should be in form of two or more sets of paired cylinders connected to a manifold, with supply provided from one pair of cylinders at any time.

ii. The installations should enable cylinders to stand upright, secured by straps or chains against a wall outside the building.

iii. The cylinders should be positioned on a firm, level base such as concrete of at least 50mm in thickness or a paving slab bedded on a mortar. It should be located in a

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well-ventilated position at ground level, so that the cylinder valves will be at least 1m horizontally and 300mm vertically from openings in the buildings or from sources such as flue terminal or tumble dryer vents. The cylinders should also be at least 2m horizontally from untrapped drains, unsealed gullies or cellar hatches unless an intervening wall not less than 250mm high is present.

iv. Cylinders should be readily available, reasonably protected from physical damage and shall be located where they do not obstruct exit routes from the building.

3.4.3 Requirements for Skid Mounted, Modularised and Containerized Facility

The following shall apply for standalone containerized and skid-mounted facilities:

i. They shall meet same requirements and safety distances in **Section 3.3.3**.

ii. Additional safety measures for adequate ventilation, gas and fire detectors and fire-fighting equipment shall apply.

iii. Technical and functional specifications of the skids shall be made available to DPR, to ensure consistency and availability of the system.

iv. Relocation of the skids change in layout of the approved site and any other modification shall be promptly reported to the Department for concurrence and approval.

3.4.4 Requirements for CNG tanks

In addition to the requirements for tanks listed in **Section 3.4**, the following are applicable to CNG tanks:

i. Each cylinder or bulk tank used for the storage of CNG shall be equipped with approved pressure relief device and isolation valve, which shall be capable of shutting off the pressure relief device.

ii. Piping and gas storage systems shall be protected against over-pressure by safety relief devices. Relief devices installed to protect the storage systems shall be such that it limits the pressure to 120 per cent above the maximum allowable working

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pressure of the system or the pressure which produces a loop stress of 75% of the specified minimum yield strength, whichever is lower.

iii. A shut-off valve shall not be installed between the pressure relief valve and the gas unit or bulk tank except that a shut-off valve may be used on multiple valve installations where the arrangements of the valve will provide full required flow through the safety relief devices at all times. The opening or connection between the gas storage unit and safety relief device or devices shall have at least the combined areas of all connected safety relief device inlets.

iv. All safety valves shall be fitted with vent pipes discharging vertically upwards at a minimum height of 2 meters above the rank top. The vent pipes shall be fitted with loose fitting rain caps.

v. Every CNG storage unit including each manifold group of cylinders or bulk storage tank shall be provided with suitable pressure gauges which shall communicate directly with the tank or storage unit system and shall have an opening not to exceed 1.4 mm diameters at the connection. The pressure gauge shall have a dial graduated to read approximately double the operating pressure, but in no case less than 1.2 times the pressure at which the pressure relief valves is set to function. Pressure gauges shall be checked and calibrated at intervals not exceeding 12 months in line with MOSR 1997.

vi. Methane gas leak detection device shall be provided at the CNG facilities for warning when an airborne methane gas concentration exceeds 20% of the lower explosion limit, warning shall be plainly audible and visible to those within the zone of potential exposure to fire or explosion of vessel, system or delivery operation.

vii. Multiple cylinder units or groups stored in the vertical position shall be limited to a width of no more than 4 cylinders. Units or groups stored in the horizontal position shall be limited to a height of 6 cylinders at a width of 4 cylinders. When stacked horizontally, the units or groups shall be separated by not less than 1.5 meters.

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3.4.5 Requirements for LNG tanks

In addition to the requirements for tanks listed in **Section 3.4**, the following are applicable to LNG tanks:

i. All tanks for the storage of LNG shall be designed for a working pressure corresponding to the vapour pressure and at the maximum ambient/ minimum temperature that the tanks are likely to reach.
ii. All LNG tank systems shall be designed for both top and bottom filling.
iii. The tank must possess devices for measuring the liquid content and its temperature. The maximum quantity of LNG filled into any tank shall be such that the maximum operating volume it would occupy should not be more than 95% of the capacity of the storage.
iv. Remote controlled hydraulically operated shut-off valves shall be fitted to each storage tank system.
v. Excess flow valve shall be fitted to prevent the loss of LNG from storage tanks, transport tanks and points where flexible hoses are used.
vi. Vacuum insulated storage tanks shall be considered for use for LNG facilities.
vii. Storage vessels shall be installed aboveground only and on stable, non-combustible foundations outdoors in the open air in a position that will not allow accumulation of LNG vapour at ground level. They should never be installed in or on buildings or in open pits.
viii. Fuel degradation in storage shall be considered when determining the size of storage containment. Design shall, where practical, include measures to promote a longer storage life, for example, the reduction of heat gain and boil-off.
ix. There shall be some means of isolation in the pipework between the fuel storage vessel and the fuel delivery point.
x. Exposed insulation shall be non-combustible, shall contain or inherently be a

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vapour barrier; shall be water-free and shall resist dislodgment by fire hose systems. The space between the inner container and the outer container shall contain insulation that is compatible with LNG and is non-combustible.

xi. Storage vessels shall be spaced and located in accordance with the provisions of this document. The layout shall consider the effects of a release of cryogenic liquid such that any release can rapidly evaporate and have minimum effect on the storage tank supporting structure to ensure that the storage tank remains adequately supported.

xii. Ground features such as open drains, manholes, gullies and cellar hatches, within the separation distances should be sealed or trapped to prevent the passage of LNG vapour.

3.4.5.1 LNG Boil-Off Gas Handling

i. Boil-off and flash gas shall be set to discharge into a closed system or into the atmosphere to safe location.

ii. Boil off venting systems shall be designed not to inspirate air during normal operations.

3.5 Facility Connecting Pipework and Valves

Piping, Valves and fittings are to be fabricated, installed, and tested in line with international standard such as ASME Process Piping Code or any other applicable codes recognised by DPR. Any exterior piping shall be buried or installed above ground shall be supported and protected against mechanical damage. Additionally, the following shall, at a minimum, apply:

i. Pipes and pipework components (including weld/braze compounds) shall be of a material that is resistant to corrosion.

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ii. Special protection such as coatings or cathodic protection shall be considered and applied for pipe systems and valves. For LNG connections, vacuum insulation of cryogenic pipes in ducts may apply.

iii. Where practical, pipe shall be continuous, unjointed and uninterrupted. Where there are breaks in continuity of pipework, consideration shall be given to electrical bonding across the joint. Threaded pipe and fittings are not allowed underground

iv. Manual shut-off valves, emergency shut-off valves, overpressure shut-off valve, flow check valves, non-return valves and back flow check valves used in piping systems shall conform to applicable standards.

v. Relief and safety valves shall be inspected by a DPR accredited consultant and witnessed by the Department every thirty (30) months or at such shorter intervals as shall be necessary to maintain them in satisfactory condition.

vi. All pipework shall that are insulated should accessible to facilitate periodic inspection, examination and/or testing.

3.5.1 Pressure Relief Systems

Relief devices shall be designed such that the operations, safely disperses contents without the risk of accumulation, ignition, or impingement on personnel, equipment and buildings. The following shall, at the minimum, apply:

i. All vents including those of safety relief devices and purge valves shall be connected to a vent stack and/or any other boil-off gas utilization systems put in place.

ii. All vent systems shall be adequately supported to cope with loads created during discharge, as well as those created by the weather e.g. wind loading.

iii. Natural gas vent lines shall terminate in a safe area at high level therefore, vent systems shall be designed to discharge vertically upwards.

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iv. The minimum pressure-relieving capacity in kilogram per hour shall not be less than three percent (3%) of the full tank content in 24 hours.

v. The following notices shall be clearly displayed on or near the vent stack(s), particularly at personnel access points(applicable to LNG).

   a. do not spray water on vent stack

   b. flammable gas

   c. beware of frost bite

vi. Conductive parts (e.g. metal fitments) on the installation including fencing, gates, tanks and all pipework, vent stacks and vent recovery hoses, shall be adequately equipotential (earth) bonded.

3.6 Pumps, Compressors and Fittings

Pumps, other than submersible types, should be adequately secured to a concrete foundation or bolted to a structural steel support. Where the drive unit is not integral with the pump, attention should be given to ensure correct alignment, and all moving parts should be suitably guarded.

3.7 Emergency Systems

The following emergency system shall, at the minimum, be installed in the facility:

i. Gas and fire detection system shall be installed and routinely tested.

ii. Appropriate warning notices, safety signs, and instructions shall be positioned at strategic locations and control rooms. Routine testing for audio/visual alarms is mandatory for LNG systems.

iii. Adequate intrinsically safe lighting systems of explosion-proof type shall be installed at points to aid safety, security, and identification of the product(s) (signage and labels). **Note**: Vent outlets and potential release points shall be avoided.

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iv. Where numerous storage vessels are used, consideration should be given to separating these into isolatable sub-groups. ESDs activating these isolation valves shall be provided both locally at each exit point from the storage site and remotely.

3.8 Fire/Blast Walls

When Fire walls are used as determined in **Section 3.3**, the walls shall, at the minimum, be of the following features:

i. imperforated and substantially constructed from concrete or solid masonry and be capable of achieving at least 30 minutes of fire resistance. Where the wall separates vulnerable populations from the dangerous substance, the fire resistance provided shall be for a minimum of 60 minutes.

ii. shall not be less than the height of the vessel. For larger vessels, it should not be less than 2 meters high or the height of the vessel, whichever is greater.

iii. The thickness of the Firewall shall not be less than of 0.23m (9 inch).

iv. The separation distance between the vessel and the firewall shall not be less than 3 meters.

v. The installation of the fire wall shall not significantly impair natural ventilation. The provision on one side is normally sufficient. However, it shall not be more than two sides.

Note: The specification and composition of materials for the Firewall shall be submitted to the appropriate DPR field/zonal office and the construction shall also be monitored by the assigned DPR representatives.

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3.9 Protection against Static Electricity:

The installation should have electrical continuity, be effectively connected to earth and bonded to comply with the requirements of the Institute of Petroleum's Model Code of Safe Practice, Part 1, Electrical and BS 7671:2001 or equivalent international standard.

1. All piping, tanks, valves and discharge & dispensing equipment must be bonded continuously so that all non-current carrying metal parts have the same potential to ground that can potentially result in a catastrophic fire or explosion.
2. All dispensing equipment including pumps, hoses and nozzles must be properly rated for the intended usage.
3. Adequate explosion-proof lighting shall be provided to illuminate the working and the storage areas of the plant.

3.10 Fire Protection

The fire protection system of facility shall be required and designed to prevent or reduce the likelihood of a fire or explosion, to minimize its intensity should such an event occur and ensure timely emergency response and escape of all persons in the facility. The fire protection measures shall cater and ensure that adequate controls are put in place, including special, technical and organizational measures taken for all work process, including receipt, storage and other activities in connection with the Facility to prevent fire/explosion; deal with the incident should such an event occur; and ensure emergency response and escape of all persons in the facility. Additionally, the Gas Storage and Utilisation Facility shall, at the minimum, provide the following firefighting and emergency facilities:

i. Clean Water Reservoir of minimum size 15 cubic metres.
ii. Functional firefighting gadgets must be kept handy and at alert.

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iii. At least two dry chemical powder fire extinguishers less than 9kg each and suitable for gas fires with a test fire rating of at least 21A and 183B as defined in MSA EN 3-7:2004 should be readily available at strategic locations to deal with fires adjacent to the meter/vehicle being filled.

iv. Warning/safety signs shall be conspicuously displayed.

v. A portable fire extinguisher not less than 9kg and suitable for LNG fires with a test fire rating of at least 21A and 183B as defined in MSA EN 3-7:2004 should be readily available at the dispensing area and other strategic locations to deal with fires.

vi. Fire hydrant system and booster pumps shall be made available.

4 MINIMUM HSE REQUIREMENTS FOR THE OPERATION OF THE FACILITY

4.1 Facility Competent Person

1. Facility operations shall be conducted by competent persons that are duly qualified and possess satisfactory training to carry out assigned functions.
2. The Facility shall put in place access control to screen out persons not connected with the operations and ensure that only competent persons who have specific functions are allowed at tank storage and other hazardous areas.
3. All activities and operations in the Facility shall be supervised by a competent personnel/Manager

4.2 Minimum Training for Facility Competent Persons

1. Gas Storage and Utilisation Facility shall be required to provide training to competent/responsible person in the facility covering safe work procedures and emergency actions.
2. Training records and training content shall be maintained for five years and will be made available to the DPR upon request.

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3. The personnel shall be aware of Standard Operating Procedures, Gas Storage and Utilisation Facility site-specific guide and policy, safe practices, documentation and procedures in day-to-day operations.
4. The personnel shall undergo at an approved/ accredited Safety and Emergency Training Centre in Nigeria the HSE training to obtain the Minimum Safety Training for Downstream (MISTDO).
5. Advanced training shall be carried out for personnel working directly in the dangerous areas in the Facility as maybe peculiar to their jobs.

4.3 Housekeeping

1. The Gas Storage and Utilisation Facility shall ensure that the landscaping, surrounding, good housekeeping practices and environment are well-maintained. Poor housekeeping shall be deemed a sign of negligence by the Operator.
2. The Facility shall be kept in sound condition and free of unnecessary items such as unused drums, lumber and combustible paper, plastics and other objects can contribute to spread of fire, hindrance to easy evacuation or escape of personnel or spill and homes for unwanted animals.

4.4 Personal Protective Equipment (PPE)

1. Appropriate clothing shall be worn by personnel in the Facility for the discharge of duties.
2. Personnel working in the tank area or performing maintenance work in the Facility shall be required to wear required PPE which include hard hat, hand glove, fire retardant reflective clothing, steel toe boot and safety goggle as appropriate.
3. Ear protections shall be requirement in areas mapped as noisy area e.g. generator etc.

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4. Special PPE e.g. breather etc. shall be provided to individual performing other functions such as tank cleaning which require special PPE type for the operation.

4.5 Security

1. Gas Storage and Utilisation Facility shall employ sound security measures to prevent vandals, unwanted individuals, and animals from entering the Storage .
2. The installation and use of Closed-circuit television (CCTV) is highly encouraged.
3. Dangerous areas in the facility such as storage area shall be off-limits to unauthorized persons.
4. The entry and exits of the Facility shall be specified and clearly labelled.

4.6 Facility Signage

1. Gas Storage and Utilisation Facility shall install safety signages that indicates the key areas that properly warn persons and public of potential dangers areas.
2. Danger signs such as "No Smoking", "Authorized Entry Only" "No Mobile Phones" and other Warning Signs shall be posted in strategic locations at facilities.

4.7 Standard Operating Procedure

1. Gas Storage and Utilisation Facility shall have available on-demand, duly approved SOPs and Safe Work Procedures which shall guide all operations in the facility.
2. Employees shall be instructed regularly to make use of the relevant SOPs for their specific functions.

4.8 Emergency Preparedness

1. Safety at the Facility shall be of utmost importance to save lives, prevent injury and protect property and the environment.

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2. Gas Storage and Utilisation Facility shall have duly approved emergency response and preparedness plan which shall be available on Demand.
3. The facility operators and workers shall be familiar with emergency response and preparedness plan, emergency actions, appropriate resources and equipment.
4. This emergency procedure shall have in-built scenarios and management and shall be tested in drills regularly.
5. Emergency notification placards which boldly list 24-hour emergency phone numbers shall be posted at the strategic places in the facility.

4.9 Fire Precautions and System

1. Ensure all special, technical and organizational measures are in place in the Facility to prevent or reduce the likelihood of a fire or explosion, prevent the rapid spread and minimize its intensity should such an event occur in the premises in connection with the carrying out of any work process.
2. Fire extinguishers must be kept pressurized and should be checked every month.

4.10 Material Safety Data Sheets (MSDS)

The MSDS for each product stored at the facility should be kept at the site.

4.11 Waste Management

The Facility shall have a comprehensive waste management system which shall ensure that:

i. Proper waste segregation into its individual waste streams are adopted
ii. Wastes are properly contained in sealed drums or skips and labelled properly
iii. Cradle to grave philosophy is adopted by the operator as it is the responsibility of an operator to ensure proper handling and management of all waste

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generated onsite. Proper record of all waste consignment notes should be kept.

iv. Gas Storage and Utilization Facility shall ensure that only a DPR accredited waste manager is engaged.

4.12 Facility Inspection

1. Gas Storage and Utilisation Facility shall deploy the best means of inspection to prevent loss of containment from occurring and appropriate mitigation measures shall be applied should one occur to keep the Facility in sound condition.
2. Facility Operators shall follow manufacturer instructions, industry and regulatory standards in line with good oil field practice in the facility maintenance and inspection of tanks, and other equipment in the facility.
3. All jobs shall be in line with a job permit system that is duly authorized.

4.13 Conducting Inspections

1. Facility Inspections shall be on a regular basis in a standardized fashion. Daily, operator shall walk through the facility to note overall facility condition.
2. The formal and thorough inspection through an approved checklist and methodology shall be conducted as and when due by an appropriate inspector or company as applicable.
3. The inspection shall cover all important areas of the Facility and equipment.
4. The Facility shall be required to demonstrate or show evidence how they complete the inspection form, follow up on findings, fix deficiencies and how significant problems are handled.
5. The appropriate Inspectors and company conducting the inspection shall be required to possess relevant certification and qualifications to carry out the inspection.

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4.14 Maintenance

1. Maintenance and replacement of parts shall be carried out as and when due.
2. The maintenance which shall be carried out by qualified personnel with approved procedure, risk assessment, permit to work and job safety analysis.
3. Only appropriate and approved spares shall be used
4. Prior to any major modification of the Facility, Approval for the Modification shall be obtained from the DPR.
5. Gas Storage and Utilisation Facility shall train and empower their personnel to intervene and exercise a stop work authority in any operation or procedure that is not considered safe.

4.15 Documentation and Record Keeping

1. All facilities shall be required to put in place adequate document control that ensure the easy retrieval and protection of records. Records of all activities pertaining to the facility should be kept on location. These documents should include:

    i. License to Operate.
    ii. Emergency procedures.
    iii. Security Plan.
    iv. Facility Response Plans.
    v. Operation Manual.
    vi. Training records.
    vii. Operator Training Reports
    viii. Copies of Inspections reports carried out.
    ix. Maintenance Records.
    x. Operations record in line with Section 4.18
    xi. Approved checklist for the facility.
    xii. SOPs

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xiii. Waste Management Plan.

xiv. Waste Consignment Note

4.16 Static Electricity in Operations:

1. The Facility must ensure that all equipment are bonded continuously or designed to eliminate the threat of discharge of static electricity.
2. During discharging from a truck, the Facility shall ensure the grounding of the truck and secure bonding wire to the tank being filled. It shall not be removed during operations until it is confirmed that there is no threat of static electricity.

4.17 Storage Tanks Management

1. Storage tanks shall be maintained in good condition to prevent loss of containment.
2. Avoid prolonged periods of low tank volume to minimize operational issues.
3. At the minimum, tanks shall be equipped and inspected for Safety Elements, Overfill Protection, visible leaks etc.
4. The effectiveness of a cathodic and corrosion protection shall be regularly monitored and maintained in accordance with the design standards. Pad foundation or supports, tank welds shell seams, and bottom to side seams shall also be free from rust.
5. Ensure that vents are clear of debris or other plugging.

4.17.1 Internal Inspection of Storage tanks

1. The storage tanks shall be opened for internal inspection at intervals of not more than 60 calendar months in line with the MOSR, 1997 or subjected to an approved Risk Based Methodology.
2. For these inspections, tanks should be emptied and cleaned, and the inside examined for holes and corrosion.
3. During the storage tank cleaning operations, adequate ventilation shall be provided inside the tank and as work progresses, frequent tests shall be carried out to detect

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any increase in gas concentration.

4. Adequate safety equipment and devices shall be provided for workers entering the tank for their protection and survival in case of emergency while working in the tank.
5. The tanks shall be subjected to thorough visual and non-destructive test inspections and Ultrasonic Thickness Measurement (UTM) of tank shells, roof, shall be carried out and records made available on demand.
6. Any defect affecting the integrity and operability of the tanks observed shall be repaired and/or rectified.

4.17.2 Tank Entering

1. Only trained and qualified persons should conduct internal inspections. Under no circumstances should anyone else enter the tanks.
2. No workman, without appropriate breathing apparatus, shall be allowed to enter a hydrocarbon storage tank for cleaning or inspection unless it is free of hydrocarbon and is continuously ventilated.
3. The tank shall be certified safe by a competent person and there must be strict adherence to confined space entry procedure.

4.18 Operations, Report and Returns

All Gas Storage and Utilisation Facilities shall furnish the DPR with periodic reports (on quarterly bases or as may be required). The report shall detail the volume of product received and utilised, price, operational highlights and issues during the period.

4.19 Reporting of Incidents

1. The Facility shall establish procedure for reporting, documenting, follow-up and closing out near misses, incidents and accidents.
2. Whenever fire occurs at the Facility or in case of serious injury or fatality, a report of

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the circumstances and probable cause of the fire shall be forwarded to the nearest DPR office within 24 hours and to the Director of Petroleum Resources within 48 hours of occurrence.

5 SANCTIONS

These Guidelines provide the requirements for establishing Gas Storage and Utilization Facility in Nigeria and minimum requirements for operating same safely. An non-compliance with the requirements of these guidelines shall be deemed as violations to relevant sections of the Petroleum Act 1969 as amended, Petroleum (Drilling and Production) Regulations 1969 & subsequent amendments and Mineral Oils (Safety) Regulation, 1997. These violations may result in applicable consequence management, including, but not limited to, fines, penalties and/or revocation license.

6 GLOSSARY

Abbreviations, terms and references used in this document are explained hereunder:

AGS	Automated Gas System
ALARP	As Low As Reasonably Practicable
ATC	Approval to Construct
CCTV	Closed Circuit Television
CNG	Compressed Natural Gas
EIA	Environmental Impact Assessment
ESD	Emergency Shut Down
FAT	Factory Acceptance Test
HAZID	Hazard Identification
HAZOP	Hazard and Operability
HSE	Health Safety and Environment

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LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LTO	License to Operate
MISTDO	Minimum Industry Safety Training for Downstream Operators
MOSR	Mineral Oils (Safety) Regulation
MSDS	Material Safety Data Sheet
MT	Metric Tonnes
P&ID	Piping and Instrumentation Diagram
PRMS	Pressure Reducing and Metering Station
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
ROW	Right of Way
SOP	Standard Operating Procedure
SSA	Site Suitability Approval
UST	Underground Storage Tanks
UTM	Ultrasonic Thickness Measurement

Approved by		
Engr. Sarki Auwalu, ***MNSE*** **(Director/CEO, Department of Petroleum Resources)**		
	Date	**1st September 2020**

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GUIDELINES FOR THE ESTABLISHMENT AND OPERATIONS OF CNG COMPRESSION FACILITIES IN NIGERIA

ISSUED BY

DEPARTMENT OF PETROLEUM RESOURCES

2020

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1 INTRODUCTION

1.1 Purpose

The purpose of this document is to describe the procedures and conditions for granting approval for the establishment of CNG Compression facilities in Nigeria pursuant to Petroleum Regulation, 1967. It provides the baseline requirements for the safe design and construction of a gas Compression facility which is aimed at ensuring that the risk in the facility is minimised to as low as is reasonably practicable. The objective is to ensure that minimum HSE requirements are achieved and maintained in all Compression facilities in Nigeria.

1.2 Scope

These guidelines and requirements are applicable to the establishment of CNG Compression facility in the Nigeria.

1.3 Definition of Terms

I. CNG Compression Facility (Mother Station)

This refers to a facility constructed for the purpose of compressing Natural Gas at atmospheric temperature to approximately 250Bar. They are used to fill large (bulk) volumes of CNG into mobile tube trailers or cascade, for onward supply of gas to Daughter Stations, Industrial Users and Gas Distribution Systems.

2 APPLICATION, APPROVAL AND LICENSE PROCEDURE FOR FACILITY

2.1 Application Overview

Any company intending to establish a CNG Compression Facility in Nigeria shall:

i. apply through the DPR application portal, elps.dpr.gov.ng
ii. Pay the applicable Statutory and Processing fees

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iii. Satisfy the requirement stipulated by the DPR and obtain the required approvals contained in the stages depicted below:

a. Site Suitability Approval
b. Approval to Construct (ATC)/ Approval to Install
c. License to Operate

Note: The company shall comply with the minimum requirements stipulated for design, construction and installation (Section 3) to secure the approvals/licenses.

2.2 Site Suitability Approval

The SSA is a business enabling and advisory tool set up to eliminate possible loss of investment that may result should the site be deemed unsuitable at Approval to Construct (ATC) phase. The company shall be required to pay the applicable fees and upload the following documents required for Site Suitability Approval on the portal:

i. Survey plan of the land.
ii. Certificate of Incorporation and Memorandum and Article of Association of the company.
iii. A sketch of the proposed site layout, showing the existing or proposed buildings on the site, adjoining properties, if any, and the relevant distances of the tank(s) to critical facilities within the premises, roadways and adjoining fence with 3rd parties.

2.2.1 *Procedure for Site Suitability Inspection*

The applicant shall be issued Site Suitability Approval following the satisfactory review of the uploaded documents and successful outcome of site suitability inspection in line with **Section 3.2.** Upon receipt of the SSA, the proponent is required to display conspicuously a sign tagged 'DPR CNG Compression Facility Approved Site (Approval number)'.

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2.2.2 *Validity of Site Suitability Approval:*

The site suitability approval shall be valid for 18 months in the first instance. This approval and any renewal thereof is subject to the following:

i. No Development/Encroachment of Public and Residential structures that was not considered during the suitability approval.
ii. No significant changes in the plot size capable of affecting the minimum safety distances for the proposed capacity.

2.3 Approval to Construct/Approval to Install

Following receipt of Site Suitability Approval from the Department, the company shall commence actions towards obtaining Approval to Construct/Install for the proposed facility. The company shall pay the applicable fees, upload the required documents, and satisfy the following requirements:

i. A letter/ approved building plan from the appropriate Town Planning Authority, authorizing the siting of the facility at the proposed site. The submission shall contain all relevant drawings such as:
    a. Piping and Instrumentation Diagram (P&ID),
    b. Electrical and mechanical specifications,
    c. Codes, Standards and Specification adopted in the design, construction and installation of ancillary equipment.
ii. A fire report by Chief Federal/State Fire officer or an officer authorized by him on his behalf, that he is satisfied with the proposed arrangement for the prevention of fire.
iii. Any of the following shall subsist - Current Tax clearance certificate, Evidence of Tax Payment, Tax Identification Number (TIN) or Evidence of tax exemption.
iv. Health, Safety and Environment (HSE) policy for the proposed plant, if less than 10 MT or Environmental Impact Assessment (EIA) report, if above 10 MT.

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2.3.1 *Review of Submitted Documents and Drawings*

The submissions shall be reviewed in line with specifications listed in Section 3 of this document. The objective of DPR's review is to ensure safety-in-design and sustainable operation of CNG Compression Facility. Site inspection shall follow the satisfactory review of the documents and design. The site inspection shall, at the minimum, revalidate the requirements of the SSA.

2.3.2 *Conditions for Approval to Construct/Install*

Approval to Construct shall have a validity of 30 months (in the first instance) on the following conditions:

i. The facility shall commence meaningful development. The company shall update the nearest DPR office at least six months intervals.
ii. Signpost shall be installed on site immediately after Approval to construct is granted. The signpost should indicate the name of the company and the reference number of the Approval letter.
iii. The construction and installation shall comply with the requirements stated in Section 3.
iv. Companies involved in building of facility, construction and fabrication of onsite Storage (cascade) tanks shall possess valid and appropriate DPR Oil and Gas Industry Service Permits.

2.4 License to Operate (LTO) for CNG Compression Facility

Upon completion of construction works and leak tests, the company shall apply for LTO. The company shall pay the applicable fees and upload all statutory/technical requirements on the portal as follows:

i. Valid Calibration Certificates/Report of Measuring Equipment for the facility issued by DPR accredited companies and witnessed by DPR in line with relevant standards.
ii. Manufacturers' Data Sheet for any Gas Compression Facility storage tanks.

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iii. Ultrasonic Thickness Measurement (UTM) test certificates of the onsite storage tank. This test shall be conducted on site for all tanks and done prior to burial for underground tanks. The UTM test shall be carried out by a company with applicable OGISP and witnessed by DPR officials.

iv. Pressure test reports and certificate or any other DPR approved integrity test report for tanks and piping. The Pressure test shall be carried out by company with applicable OGISP and witnessed by the Department. The Pressure test should be carried out for a new tank at installation before operation and after every Five (5) years. After 20 years of service, pressure test on the LPG tank should be carried out every two (2) years.

v. Any of the following shall subsist - Current Tax clearance certificate, Evidence of Tax Payment, Tax Identification Number (TIN) or evidence of tax exemption.

vi. '8 X 10' Photographs of the facility clearly showing all built structures and operational facilities as well as safety equipment.

vii. Approved Standard Operating Procedure (SOP) for the proposed facility operations in line with the DPR SOP template.

viii. List and Evidence of trained staff by a consultant with applicable OGISP.

ix. As-built Layout drawing. This will be verified by DPR during pre-licence inspection.

x. Factory Acceptance Tests (FATs)/reports (where applicable) and Site Acceptance Tests of all critical components shall be witnessed by the Department. FATs from the manufacturer may be accepted where it is practically impossible to witness by the Department.

xi. Other relevant document that may aid the Approval decision.

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2.5 Procedure for Pre-License Inspection

To issue LTO for a facility, the DPR shall conduct a Pre-license inspection, following the satisfactory review of documents submitted in the application. The inspection shall confirm the extent of compliance with these Guidelines. At a minimum, the following shall be confirmed to be in place:

i. Organogram, list of competent persons and evidence of MISTDO training of the relevant staff.
ii. Functional Automated/Manual leak tester.
iii. Automatic Monitoring and Control Systems.
iv. SOPs.
v. Post Compression Temperature Regulating System.
vi. Functional Fire alarm system and mounted gas detectors at designated areas (Like pump and compressor room, discharge/offloading area and piping connector at the storage vessel, etc).
vii. Safety warning notices and Personnel Protective Wears for personnel.
viii. Emergency shut down system in at least two locations (At the Gate and operations area).
ix. Visible display of MOSR, Operating instructions, Emergency Telephone numbers of Fire Service, Police and DPR.
x. Adequate fire water storage, deluge and sprinkler system in line with relevant codes and standards.
xi. Muster Point designated areas earmarked in the facility.
xii. Clean and hygienic toilets with steady water supply at the facility.
xiii. Demarcation of facility Tank Storage areas to unauthorized persons and limiting access to operations area to only trained personnel.
xiv. A perimeter fence of at least 2 metres high shall be provided around the facility.

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xv. Well-stocked First Aid Box

xvi. Adequate Fire Water Storage, Fire Hydrant system/control points and booster pumps

2.5.1 Renewal of License to Operate

On the expiration of an existing LTO for a facility, the company shall apply through their profile on the appropriate portal, for the renewal of LTO. The company shall pay the applicable fee and upload current and valid documents used for the LTO application. DPR officers will conduct an inspection of the facility and ancillary equipment. The inspection shall confirm, at the minimum, the status and integrity of all equipment and amenities in line with relevant standards.

2.6 Relocation of Existing Facility

If a company desires to relocate an existing and licensed facility to a new site, the applicant must submit the justification (reasons) for the proposed relocation of the facility. The conditions for the grant of Approval to Construct and LTO for a new Facility shall be the same for relocated Facility.

2.7 Lease/Takeover of CNG Compression Facility

The company for Lease/Takeover of a Site Suitability Approval (SSA), ATC and LTO shall pay the prescribed application fee and submit the following documents.

a. Duly signed Sales Agreement by both parties.
b. Letter of Release.

The requirements as applicable for SSA, ATC and LTO shall apply. Inspection may be carried out as part of the process.

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2.8 Modification of Facility

The company shall apply and submit the following documents and pay the prescribed application fee through the online portal:

i. Details of proposal for modification.
ii. The As-built layout drawing for the existing facility.
iii. Proposed layout sketch for the facility.
iv. Detailed Piping and Instrumentation Diagram (P&ID) of the facility.
v. Updated Standard Operating Procedure (SOP) consistent with this guide.
vi. Manufacturers' datasheet of the storage tank(s), where applicable.

Note: Facility Inspection shall apply.

2.9 Decommissioning of Facility

All applications shall be forwarded to the DPR Operations Controller having jurisdiction over the facility, giving full details of the proposal. Decommissioning shall be in line with relevant Nigerian Oil & Gas Regulations and Guidelines applicable to such facilities.

3 MINIMUM DESIGN, CONSTRUCTION AND INSTALLATION REQUIREMENTS

3.1 General Requirements

The design, construction, installation, commissioning and operation shall comply with the provisions of Petroleum Act 1969 as amended, MOSR 1997; conform to acceptable design codes such as Standards Organization of Nigeria, American Society of Mechanical Engineers, National Fire Protection Association, American Welding Society – Structural Welding Code, British Standards (BS), and other codes and standards recognised by the Director of Petroleum Resources.

3.1.1 Design And Construction Standard

During the design, construction, installation, commissioning of a facility, all necessary measures and mitigations shall be applied to reduce risk associated with storage, transport, transfer, usage etc. to as low as reasonably practicable (ALARP). The storage

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tanks, fittings, pumps, manifolds, meters, hoses, valves, and other equipment and accessories of the facility shall be designed for efficient and safe operations in line with applicable codes and standards. The installation and commissioning of the system shall only be undertaken by competent persons and companies, in accordance with manufacturer's instructions and best practices. Written Standard Procedures shall be drawn up and used for installation and/or commissioning. Further conditions governing the establishment of a Compression Facility are as follows:

i. Participation of DPR representatives in the project and mandatory witnessing of milestone construction activities such as tank burial, pressure/leak test of the tanks and tank calibrations.

ii. All critical equipment and piping shall be commissioned after installation in accordance with manufacturer's instructions. Integrity tests and other applicable tests shall be conducted companies with relevant OGISP permits and witnessed by the Department.

3.2 Facility Layout & Site Selection

3.2.1 Site Selection Criteria

Any site chosen for the facility shall be sufficiently spacious to allow it to be designed to minimize the risks from CNG as applicable to any structure close to the facility and person likely to be at or near the facility. Furthermore, the site shall meet the following requirements:

i. The size of the proposed land site shall be adequate and accessible from the roadside.

ii. The site shall not be within, under or close to know hazards such as pipeline Right of Way (ROW), high voltage cable, railways etc.

iii. The minimum horizontal distance between the shell of a pressurized tanks and the line of adjoining property that may be developed shall be as shown in **Table**

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3.1 Isolation distances from building and boundaries to gas storage unit(s)Table 3.1 . Where residences, public buildings, places of assembly, or industrial sites are located on adjacent property, greater distances or other supplemental protection (firewall/underground tank) shall apply.

iv. The constructed or existing drainage from the site will not go into a stream or river and that Contaminated water are to be contained and treated onsite.

3.2.2 *Facility Layout for Compression Facility*

i. Proper Hazard Area Classification and Risk Assessment shall be considered for safe design, layout and operation of the facility to minimize, to ALARP, the releases of containments to prevent the ignition and spread of any unavoidable or accidental releases.

ii. The locations of tanks, fill points, vent pipes, dispensers, road tanker delivery stands, buildings, etc shall be designed to ensure in the layout of the facility that:

   a. Satisfactory means of escape for persons in the event of a fire or other incident,
   b. Hazardous areas are protected from sources of ignition,
   c. There is safe access, routing, parking and exit of customers' vehicles, service vehicles and road tankers.

iii. The facility dangerous areas shall be in open air ventilation and clear of other buildings or obstructions that might otherwise adversely affect the ventilation.

iv. Pipework, tanks to offset fill points, dispensers and vent pipes shall be routed and located to ensure protection from external effects or interference and allow access if required

v. The stand for delivering fuels into storage tanks shall be in the open, away from the facility buildings, dispensing activities and emergency escape routes, and be large enough to allow a road tanker to be positioned wholly within it during delivery.

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vi. The siting of other activities which the facility may perform (e.g. parking areas, car wash facilities) shall not adverse safety and main vehicle flows on and off the site through the facility.

vii. Electrical connections shall be made in accordance with the manufacturer's instructions and shall maintain the integrity of the explosion protection.

viii. The minimum distances stated in section 3.3 must be complied with.

3.3 Separation Distances

The minimum distance for the establishment of Additional Requirements for CNG Compression Facility.

3.3.1 Separation distance for Compression Facilities

The distances given in table below indicate the minimum approved horizontal distances between the nearest point on the storage tank and a specified feature, e.g. an adjacent storage tank, building or boundary and the dispensers.

Table 3.1 Isolation distances from building and boundaries to gas storage unit(s)

Total capacity of Onsite Gas storage (Cubic FT)	Minimum distance (metres)	Minimum on-site distance between Gas storage units and a 4hr. FRR concrete or Masonry wall (metres)
Up to 1,100 (5MT)	5	2.0
1,100 to 2,450 (5MT-70 MT)	7.5	2.0

Note:

a. Each individual cylinder used for the storage or dispensing natural gas shall be located with respect to the nearest building or compressor equipment or other sources of ignition in accordance with table 3.1.

b. A blast wall or fire clearance zone of a minimum 3 metres shall be maintained around the perimeter fence of any CNG storage facility.

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c. Firewall shall be installed to adjoining residential or public buildings.

3.4 Minimum Requirement for Onsite Gas Storage Cascade/Tanks

The storage cascade/tank/ shall be designed, constructed and installed by DPR accredited/approved company in accordance with internationally recognised standards. It shall comply with the following:

i. The storage tank/vessel shall be located in a manner that allows safe access and subsequent removal if required, clear of any building foundations or underground features, such as drains and tunnels. Additionally, the location shall not allow any flammable concentrations or any releases to reach potential ignition sources or accumulate where they might pose a danger.

ii. The fill points for storage tank/vessel shall be positioned such that other vehicle movements does not pose risk to tanker discharge and accidental releases does not pose an immediate threat to personnel.

iii. Tanks and piping must be constructed with materials that provide an appropriate level of safety and environmental protection. e.g. carbon steel, reinforced fibre glass or others acceptable by DPR.

iv. All storage tank design specification details shall be conspicuously displayed.

v. All storage tanks shall be fitted with pressure relief valves, pressure gauges, temperature guages and important safety equipment. Lightning protection shall be installed as appropriate.

vi. Water sprinkler system shall be provided at the top of the vessel. If required, access ladder to the top of the gas storage tank shall be provided for inspection and maintenance needs.

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vii. Storage systems and vessels shall be fitted with over pressure protection devices to release excess pressure under normal operating conditions and in emergency situations.

viii. Manually operated valves shall also be fitted to release pressure during maintenance.

Note: All propane storage and handling facilities shall comply with Propane Rated Standards.

3.4.1 Requirements for CNG Cascade tanks

In addition to the requirements for tanks listed in section 3.4, the following are applicable to CNG tanks:

i. Each cylinder or bulk tank used for the storage of CNG shall be equipped with an approved pressure relief device and isolation valve which shall be capable of shutting off the pressure -relief device.

ii. Piping and gas storage systems shall be protected against over-pressure by safety relief devices. Relief devices installed to protect the storage systems shall be such that it limits the pressure to 120 per cent above the maximum allowable working pressure of the system or the pressure which produces a loop stress of 75% of the specified minimum yield strength, whichever is lower.

iii. A shut-off valve shall not be installed between the pressure relief valve and the gas unit or bulk tank except that a shut-off valve may be used on multiple valve installations where the arrangements of the valve will provide full required flow through the safety relief devices at all times. The opening or connection between the gas storage unit and safety relief device or devices shall have at least the combined areas of all connected safety relief device inlets.

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iv. All safety valves shall be fitted with vent pipes discharging vertically upwards at a minimum height of 2 meters above the rank top. The vent pipes shall be fitted with loose fitting rain caps.

v. Every CNG storage unit including each manifold group of cylinders or bulk storage tank shall be provided with suitable pressure gauges which shall communicate directly with the tank or storage unit system and shall have an opening not to exceed 1.4 mm diameters at the connection. The pressure gauge shall have a dial graduated to read approximately double the operating pressure, but in no case less than 1.2 times the pressure at which the pressure relief valves is set to function. Pressure gauges shall be checked and calibrated at intervals not exceeding 12 months in line with MOSR 1997.

vi. Methane gas leak detection device shall be provided at the CNG facilities for warning when an airborne methane gas concentration exceeds 20% of the lower explosion limit, warning shall be plainly audible and visible to those within the zone of potential exposure to fire or explosion of vessel, system or delivery operation.

vii. Multiple cylinder units or groups stored in the vertical position shall be limited to a width of no more than 4 cylinders. Units or groups stored in the horizontal position shall be limited to a height of 6 cylinders at a width of 4 cylinders. When stacked horizontally, the units or groups shall be separated by not less than 1.5 meters.

3.5 Facility Connecting Pipework and Valves

Piping, Valves and fittings are to be fabricated, installed, and tested inline with international standard such as ASME Process Piping Code or any other applicable codes recognised by DPR. Any exterior piping shall be buried or installed above ground and shall be supported and protected against mechanical damage. Additionally, the following shall, at a minimum, apply:

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i. Pipes and pipework components (including weld/braze compounds) shall be of a material that is resistant to corrosion.
ii. Special protection such as coatings or cathodic protection shall be considered and applied for pipe systems and valves.
iii. Where practical, pipe shall be continuous, unjointed and uninterrupted. Where there are breaks in continuity of pipework, consideration shall be given to electrical bonding across the joint. Threaded pipe and fittings are not allowed underground
iv. Manual shut-off valves, emergency shut-off valves, overpressure shut-off valve, flow check valves, non-return valves and back flow check valves used in piping systems shall conform to applicable standards.
v. Relief and safety valves shall be inspected by a DPR accredited/approved consultant and witnessed by the Department every thirty (30) months or at such shorter intervals as shall be necessary to maintain them in satisfactory condition.
vi. All pipework shall that are insulated should accessible to facilitate periodic inspection, examination and/or testing.

3.5.1 Pressure Relief Systems

The relief devices shall be designed such that the operations safely disperses contents without the risk of accumulation, ignition, or impingement on personnel, equipment and buildings. The following shall, at the minimum, apply:

i. All vents including those of safety relief devices and purge valves shall be connected to a vent stack and/or any other boil-off gas utilization systems put in place.
ii. All vent systems shall be adequately supported to cope with loads created during discharge, as well as those created by the weather e.g. wind loading.
iii. Natural gas vent lines shall terminate in a safe area at high level therefore, vent systems shall be designed to discharge vertically upwards.

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iv. The minimum pressure-relieving capacity in kilogram per hour shall not be less than three percent (3%) of the full tank content in 24 hours.

v. Conductive parts (e.g. metal fitments) on the installation including fencing, gates, tanks and all pipework, vent stacks and vent recovery hoses, shall be adequately equipotential (earth) bonded.

3.6 Pumps, Compressors and Fittings

Pumps, other than submersible types, should be adequately secured to a concrete foundation or bolted to a structural steel support. Where the drive unit is not integral with the pump, attention should be given to ensure correct alignment, and all moving parts should be suitably guarded.

Compressors shall be designed for continuous full head duty, mechanically, electrically or hydraulically powered and shall be intended for CNG cylinder refilling applications. Such compressors shall usually, but not necessarily, be multistage reciprocating compressors with cooled lubricated cylinders of either trunk type or crosshead design. Design details, full specifications of compressors shall be submitted to the DPR and approval obtained prior to installation.

Design and operation of the compressor controls shall be such that the compressor shall shut down safely in the event of loss of electrical power or loss of hydraulic oil pressure.

Compressor shall be provided with clear and permanent markings readily accessible and easy to read where the compressor is in the installed position. Each compressor shall be supplied with installations and operating instructions as well as maintenance schedule.

3.7 Emergency Systems

The following emergency system shall, at the minimum, be installed in the facility:

i. Gas and fire detection system shall be installed and routinely tested.

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ii. Appropriate warning notices, safety signs and instructions, shall be positioned at strategic locations and control rooms. Audio/visual alarms that is routinely tested is mandatory.

iii. Adequate intrinsically safe lighting systems of explosion-proof type shall be installed at points to aid safety, security and dentification of the product(s) (signage and labels). Note: vent outlets and potential release points shall be avoided

iv. Where numerous storage vessels are used, consideration should be given to separating these into isolatable sub-groups. ESDs activating these isolation valves shall be provided both locally at each exit point from the storage site and remotely.

3.8 Fire/Blast Walls

When Fire wall are used as determined by Section 3.3, the walls shall be of the following features at the minimum:

i. Imperforated and substantially constructed from reinforced concrete or solid masonry and be capable of achieving at least 30 minutes fire resistance. Where the wall separates vulnerable populations from the dangerous substance, the fire resistance provided shall be for a minimum of 60 minutes.

ii. Shall not be less than the height of the vessel. For larger vessels, it should not be less than 2 meters high or the height of the vessel, whichever is greater.

iii. The thickness of the Firewall shall not be less than of 0.23m (9 inch).

iv. The separation distance between the vessel and the firewall shall not be less than 3 meters.

v. The installation of the fire wall shall not significantly impair natural ventilation. The provision on one side is normally sufficient. However, it shall not be more than two sides.

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Note: The specification and composition of materials for the Firewall shall be submitted to the appropriate DPR field/zonal office and the construction shall also be monitored by the assigned DPR representatives.

3.9 Protection against Static Electricity:

The installation should have electrical continuity, be effectively connected to earth and bonded to comply with the requirements of the Institute of Petroleum's Model Code of Safe Practice, Part 1, Electrical and BS 7671:2001 or equivalent international standard.

1. All piping, tanks, valves and discharge & dispensing equipment must be bonded continuously so that all non-current carrying metal parts have the same potential to ground that can potentially result in a catastrophic fire or explosion.
2. All dispensing equipment including pumps, hoses and nozzles must be properly rated for the intended usage.
3. Adequate explosion-proof lighting shall be provided to illuminate the working and the storage areas of the plant.
4. Filling shed flooring shall be covered with spark-resistant material to prevent spark ignition due to any accidental cylinder drop.

3.10 Fire Protection

The fire protection system of facility shall be required and designed to prevent or reduce the likelihood of a fire or explosion, to minimize its intensity should such an event occur and ensure timely emergency response and escape of all persons in the facility. The fire protection measures shall cater and ensure that adequate controls are put in place, including special, technical and organizational measures taken for all work process, including receipt, storage and other activities in connection with the Industrial Storage Facility to prevent fire/explosion; deal with the incident should such an event occur; and ensure emergency response and escape of all persons in the facility. Additionally, the Compression Facility shall provide the following firefighting and emergency facilities:

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i. Clean Water Reservoir of minimum size 15 cubic metres.

ii. Functional firefighting gadgets must be kept handy and at alert.

iii. At least two dry chemical powder fire extinguishers less than 9kg each and suitable for CNG fires with a test fire rating of at least 21A and 183B as defined in MSA EN 3-7:2004 should be readily available at strategic locations to deal with fires adjacent to the meter/vehicle being filled.

iv. Sources of ignition shall not be permitted inside the transfer point. Trucks themselves are not considered sources of ignition.

v. Warning/safety signs shall be conspicuously displayed at dispensing points.

vi. A portable fire extinguisher not less than 9kg and suitable for CNG fires with a test fire rating of at least 21A and 183B as defined in MSA EN 3-7:2004 should be readily available at the dispensing area and other strategic locations to deal with fires.

vii. Fire hydrant system and booster pumps shall be made available.

4 MINIMUM HSE REQUIREMENTS FOR THE OPERATION OF FACILITY

4.1 Facility Competent Person

1. Facility operations shall be conducted by competent persons that are duly qualified and possess satisfactory training to carry out assigned functions.
2. The Facility shall put in place access control to screen out persons not connected with the operations and ensure that only competent persons who have specific functions are allowed at tank storage and other hazardous area.
3. All activities and operations in the Facility shall be supervised by a competent personnel/Manager

4.2 Minimum Training for Facility Competent Persons

1. Compression Facility shall be required to provide training to competent/responsible person in the facility covering safe work procedures and emergency actions.
2. Training records and training content shall be maintained for five years and will be

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made available to the DPR upon request.

3. The personnel shall be aware of Standard Operating Procedures, site-specific guide and policy, safe practices, documentation and procedures in day-to-day operations.
4. The personnel shall undergo at an approved/ accredited Safety and Emergency Training Centre in Nigeria HSE training to obtain the Minimum Safety Training for Downstream (MISTDO).
5. Advanced training shall be carried out for personnel working directly in the dangerous areas in the Facility as maybe peculiar to their jobs.

4.3 Housekeeping

1. The Compression Facility shall ensure that the landscaping, surrounding, good housekeeping practices and environment are well-maintained. Poor housekeeping shall be deemed a sign of negligence by the Operator.
2. The Facility shall be kept in sound condition and free of unnecessary items other objects can contribute to spread of fire, hindrance to easy evacuation or escape of personnel or homes for unwanted animals.
3. The floors of the facility and forecourt shall be kept clean and free of oil and grease at all times shall always be kept clean and free of oil and grease.

4.4 Lighting

1. The Facility shall be required to provide adequate illumination so that persons can see their way around the facility, help detect spills at night and to keep intruders out.
2. Facility and the primary fuelling area are required to have sufficient lighting to perform night operations.
3. Burned out light bulbs should be replaced as soon as possible.

4.5 Personal Protective Equipment (PPE)

1. Appropriate clothing shall be worn by personnel in the Facility for the discharge of duties.
2.

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3. Personnel working in the tank area or performing maintenance work in the Facility shall be required to wear required PPE which include hard hat, hand glove, fire retardant reflective clothing, steel toe boot and safety goggle as appropriate.
4. Ear protections shall be requirement in areas mapped as noisy area e.g. generator etc.
5. Special PPE e.g. breather etc. shall be provided to individual performing other functions such as tank cleaning which require special PPE type for the operation.

4.6 Security

1. Compression Facility shall employ sound security measures to prevent vandals, unwanted individuals and animals from entering the Storage.
2. The installation and use of Closed-circuit television (CCTV) is highly encouraged.
3. Dangerous areas in the facility such as storage area, shall be restricted to unauthorized persons.
4. The entry and exits of the Facility shall be specified and clearly labelled.

4.7 Facility Signage

1. Compression Facility shall install safety signages that indicates the key areas of the facility and safety signage which properly warn persons and public of potential dangers areas.
2. Danger signs such as "No Smoking", "Authorized Entry Only" "No Mobile Phones" and other Warning Signs shall be posted in strategic locations at facilities.
3. If smoking is to be permitted, smoking areas shall be clearly defined.

4.8 Standard Operating Procedure

1. Compression Facility shall have available on-demand duly approved SOPs and safe work procedures which shall guide all operations in the facility.
2. Employees shall be instructed on a regular basis make use of the relevant SOPs for their specific functions.

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4.9 Emergency Preparedness

1. Safety at the Facility shall be of utmost importance to save lives, prevent injury and protect property and the environment.
2. Compression Facility shall have duly approved emergency response and preparedness plan which shall be available on Demand.
3. The facility operators and workers shall be familiar with emergency response and preparedness plan, emergency actions, appropriate resources and equipment.
4. This emergency procedure shall have in-built scenarios and management and shall be tested in drills regularly.
5. Emergency notification placards which boldly list 24-hour emergency phone numbers shall be posted at the strategic places in the facility.

4.10 Fire Precautions and System

1. Ensure all special, technical and organizational measures are in place in the Facility to prevent or reduce the likelihood of a fire or explosion, prevent the rapid spread and to minimize its intensity should such an event occur in the premises in connection with the carrying out of any work process.
2. Fire extinguishers must be kept pressurized and should be shaken every month.

4.11 Material Safety Data Sheets (MSDS)

The MSDS for each product which is stored at the facility should be kept at the site.

4.12 Waste Management

The Facility shall have a comprehensive waste management system which shall ensure:

i. Proper waste segregation into its individual waste streams are adopted.
ii. Waste are properly contained in sealed drums or skips and labelled properly.
iii. Points of Discharge: Waste materials such as oily water, oily debris, sanitary waste, sludges from tanks, other chemical and petroleum products spill, contaminated storm water shall not discharge directly or indirectly into inland waters, swamps, coastal/offshore water and any pit other than a temporary

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holding or land fill that is designed to prevent overflows and leaks into surface/groundwater.

iv. Cradle to grave philosophy is adopted by the operator as it is the responsibility of an operator to ensure proper handling and management of all waste generated onsite. Proper record of all waste consignment notes should be kept.

v. Compression Facility shall ensure that only a DPR accredited Waste Manager are engaged.

4.13 Facility Inspection

1. Compression Facility shall deploy the best means of Inspection to prevent loss of containment from occurring and appropriate mitigating measures should one occur to keep the Compression Facility in sound condition.
2. Facility Operators shall follow manufacturer instructions, industry and regulatory standards in line with best practice in the facility maintenance and inspection of equipment.
3. All jobs shall be in line with a job permit system that is duly authorized.

4.14 Conducting Inspections

1. Facility Inspections shall be on a regular basis in a standardized fashion. Daily, operator shall walk through the facility to note overall facility condition.
2. The formal and thorough inspection through an approved checklist and methodology shall be conducted as at when due by an appropriate inspector or company as applicable.
3. The inspection shall cover all important areas of the Facility and equipment.
4. The Facility shall be required to demonstrate or show evidence how they Complete the inspection form, follow up on findings, fix deficiencies and how significant problems are handled.

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5. The appropriate Inspectors and company conducting the inspection shall be required to possess relevant certification and qualifications to carry out the inspection.

4.15 Maintenance

1. Maintenance and replacement of parts shall be carried out as and when due.
2. The maintenance which shall be carried out by qualified personnel with approved procedure, risk assessment permit to work and job safety analysis.
3. Only appropriate and approved spares shall be used.
4. Prior to any major modification of the Facility, Approval for the Modification shall be obtained from the DPR.
5. Gas Compression Facility shall train and empower their personnel to intervene and exercise a Stop Work Authority in any operation or procedure that is not considered safe.

4.16 Documentation and Record Keeping

1. Compression Facility shall be required to put in place adequate Document Control that ensure the easy retrieval and protection of records. Records of all activities pertaining to the facility should be kept on location. These documents should include:
   i. License to Operate.
   ii. Emergency procedures.
   iii. Security Plan.
   iv. Facility Response Plans.
   v. Operation Manual.
   vi. Training records.
   vii. Operator Training Reports
   viii. Copies of Inspections reports carried out.
   ix. Maintenance Records.
   x. Approved checklist for the facility.

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xi. Periodic reports in line with Section 4.19

xii. SOPs

xiii. Waste Management Plan

xiv. Waste Consignment Note

4.17 Static Electricity in Operations:

1. The Facility must ensure that all equipment are bonded continuously or designed to eliminate the threat of discharge of static electricity.
2. During the r discharging from a truck, the Compression Facility shall ensure the grounding of the truck and secure bonding wire to the tank being filled. It shall not be removed during operations until it is confirmed that there no threat of static electricity.

4.18 Storage Tanks Management

1. Storage tanks shall be maintained in good condition to prevent loss of containment.
2. Ensure tight seal on the fill and dip point covers to prevent entry of extraneous matter. Remove all stagnant water around tank fill covers.
3. Avoid prolonged periods of low tank volume to minimize operational issues.
4. At the minimum, the tanks shall be equipped and inspected for Safety Elements, Overfill Protection, visible leaks etc.
5. The effectiveness of a cathodic and corrosion protection shall be regularly monitored and maintained in accordance with the design standards. Pad foundation or supports, tank welds shell seams, and bottom to side seams shall also be free from rust.
6. Ensure that vents are clear of debris or other plugging.

4.18.1 Internal Inspection of Storage tanks

1. The storage tanks shall be opened for internal inspection at intervals of not more than 60 calendar months in line with the MOSR, 1997 or subject to an approved Risk Based Methodology.

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2. For these inspections, tanks should be emptied and cleaned, and the inside examined for holes and corrosion.
3. During the storage tank cleaning operations, adequate ventilation shall be provided inside the tank and as work progresses, frequent tests shall be carried out to detect any increase in gas concentration.
4. Adequate safety equipment and devices shall be provided for workers entering the tank for their protection and survival in case of emergency while working in the tank.
5. The tanks shall be subjected to thorough visual and non-destructive test inspections and Ultrasonic Thickness Measurement (UTM) of tank shells and roof shall be carried out and records made available on demand.
6. Any defect affecting the integrity and operability of the tanks observed shall be repaired and/or rectified.

4.18.2 Tank Entering

1. Only trained and qualified persons should conduct internal inspections. Under no circumstances should anyone else enter the tanks.
2. No workman, without appropriate breathing apparatus, shall be allowed to enter a hydrocarbon storage tank for cleaning or inspection unless it is free of hydrocarbon and is continuously ventilated.
3. The tank shall be certified safe by a competent person and there must be strict adherence to confined space entry procedure.

4.19 Operations Report and Periodic Returns

All Compression Facility shall furnish the DPR with periodic reports (on quarterly bases or as may be required). The report shall detail the volume of product received and utilised, price, operational highlights and issues during the period.

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4.20 Reporting of Incidents

1. Compression Facility shall establish procedure for reporting, documenting, follow-up and closing near miss, incidents and accidents.
2. Whenever fire occurs at the Compression Facility or in case of serious injury or fatality in the Compression Facility, a report of the circumstances and probable cause of the fire shall be forwarded to the nearest DPR inspector or office within 24 hours and to the Director of Petroleum Resources within 48 hours of the occurrence.

5 SANCTIONS

These Guidelines provide the requirements for establishing Gas Compression Facility in Nigeria and minimum requirement for operating same safely. Noncompliance with the requirements of this Guidelines shall be deemed as violations to relevant sections of the Petroleum Act 1969 as amended, Petroleum (Drilling and Production) Regulations 1969 & subsequent amendments and Mineral Oils (Safety) Regulation, 1997. These violations may summarily lead to fines to operators/facility owner or personnel and/or temporary or permanent Revocation License and/or Permit.

6 GLOSSARY

Abbreviations, terms and references used in this document are explained hereunder:

AGS	Automated Gas System
ALARP	As Low As Reasonably Practicable
ATC	Approval to Construct
CCTV	Closed Circuit Television
CNG	Compressed Natural Gas
DPR	Department of Petroleum Resources
EIA	Environmental Impact Assessment
ESD	Emergency Shut Down
FAT	Factory Acceptance Test

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HAZID	Hazard Identification
HAZOP	Hazard and Operability
HSE	Health Safety and Environment
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LTO	License to Operate
MISTDO	Minimum Industry Safety Training for Downstream Operators
MOSR	Mineral Oils (Safety) Regulation
MSDS	Material Safety Data Sheet
MT	Metric Tonnes
P&ID	Piping and Instrumentation Diagram
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
ROW	Right of Way
SOP	Standard Operating Procedure
SSA	Site Suitability Approval
UST	Underground Storage Tanks
UTM	Ultrasonic Thickness Measurement

Approved by		
Engr. Sarki Auwalu, ***MNSE*** **(Director/CEO, Department of Petroleum Resources)**		
	Date	**1st September 2020**

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GUIDELINES FOR THE ESTABLISHMENT AND OPERATIONS OF GAS RETICULATION FACILITIES IN NIGERIA

(DOMESTIC LPG INSTALLATIONS IN HOUSING ESTATES)

ISSUED BY

DEPARTMENT OF PETROLEUM RESOURCES

2020

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1 INTRODUCTION

1.1 Purpose

The purpose of this document is to describe the procedures and conditions for granting approval for the establishment of Gas Reticulation facilities in Nigeria pursuant to the Petroleum Regulations, 1967. These Guidelines is for Domestic LPG installations in Housing Estates, where LPG is stored under pressure at ambient temperature in fixed vessels larger than 500kg capacity and distributed through piping to residential units. These Guidelines shall cover the location, design, installation, commissioning, operation, maintenance and inspection of equipment used in Domestic LPG Installations in Housing Estates.

1.2 Scope

These Guidelines and requirements are applicable to the establishment and operations of gas reticulation facilities in Nigeria. The following categories of companies may apply for License to operate Domestic LPG Installations for Housing Estates.

(i) Licensed LPG plants or

(ii) Depot operators.

(iii) Any company that is accredited by DPR to distribute and reticulate gas.

1.3 Definition of Terms

I. Gas Reticulation Facility

This refers to where LPG is stored under pressure at ambient temperature in fixed vessels larger than 500kg capacity and distributed through piping and metered to residential units.

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2 APPLICATION, APPROVAL AND LICENSE PROCEDURE FOR GAS RETICULATION FACILITIES

2.1 Application Overview

Any company intending to establish a Gas Reticulation Facility in Nigeria shall:

i. Apply to the Director of Petroleum Resources
ii. Pay the applicable Statutory and Processing fees
iii. Satisfy the requirement stipulated by the DPR and obtain the required and applicable approvals contained in the stages depicted below:
    a. Site Suitability Approval
    b. Approval to Construct (ATC)/ Approval to Install
    c. License to Operate

Note: The company shall comply with the requirements stipulated as minimum requirements design, construction during design, construction and installation (**Section 3**) for the obtainment/renewal of approvals/licenses.

2.2 Site Suitability Approval (SSA)

Site Suitability Approval is a business enabling and advisory instrument set up to eliminate possible loss of investment that may result should the site be deemed unsuitable at Approval to Construct (ATC) phase. The company shall be required to pay the applicable fees and upload the following documents required for Site Suitability Approval.

i. Survey plan of the land
ii. Certificate of Incorporation and Memorandum and Article of Association of the company.
iii. A sketch of proposed site layout, showing the existing or proposed buildings on the site, adjoining properties, if any and the relevant distances of the tank(s) to critical facilities within the premises, roadways and adjoining fence with 3rd parties.

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2.2.1 *Procedure for Site Suitability Inspection*

The applicant shall be issued Site Suitability Approval following the satisfactory review of the uploaded documents and successful outcome of site suitability inspection in line with **Section 3.2.** Upon receipt of the SSA, the proponent is required to conspicuously display a sign tagged 'DPR Gas Reticulation Approved Site (Approval number)'.

2.2.2 *Validity of Site Suitability Approval:*

Site suitability approval shall be valid for 18 months in the first instance. This approval and any renewal thereof is subject to the following:

i. No development/encroachment of Public and Residential structures that was not considered during the suitability approval.
ii. No significant changes in the plot size capable of affecting the minimum safety distances for the proposed capacity.

2.3 Approval to Construct/Approval to Install

Following receipt of Site Suitability Approval from the Department, the company shall commence actions towards obtaining Approval to Construct/Install for the proposed facility. The company shall pay the applicable fees, upload the required documents, and satisfy the following requirements:

i. A letter/ approved building plan from the appropriate Town Planning Authority, authorizing the siting of the facility at the proposed site. The submission shall contain at the minimum all relevant drawings such as:
    a. Piping and Instrumentation Diagram (P&ID)
    b. Electrical and mechanical specifications
    c. Codes, Standards and Specification adopted in the design, construction and installation of ancillary equipment.
ii. A fire report by Chief Federal/State Fire officer or an officer authorized by him,

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stating satisfaction with the proposed arrangement for the prevention of fire.

iii. Any of the following shall subsist - Current Tax clearance certificate, Evidence of Tax Payment, Tax Identification Number (TIN) or evidence of tax exemption.

iv. Health Safety and Environment (HSE) policy for the proposed plant/Environmental Impact Assessment report of the project if above 10 MT.

2.3.1 Review of Submitted Documents and Drawings

The submissions shall be reviewed in line with specifications listed in **Section 3** of this document. The objective of DPR's review is to ensure safety-in-design and sustainable operation of the Gas Reticulation Facility. Site inspection shall follow the satisfactory review of the documents and design. The site inspection shall, at the minimum, revalidate the requirements of the SSA.

2.3.2 Conditions for Approval to Construct/Install

Approval to Construct shall have a validity of 30 months (in the first instance) on the following conditions:

i. The facility shall commence meaningful development. The company shall update the nearest DPR office at least every six months interval.

ii. Signpost shall be installed on-site immediately after the Approval to Construct is granted. The signpost should indicate the name of the company and the reference number of the Approval letter.

iii. The construction and installation shall comply with the requirements stated in **Section 3.**

iv. Companies involved in building of the facility, construction and fabrication of Storage tanks shall possess valid and appropriate DPR Oil and Gas Industry Service Permits.

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2.4 License to Operate (LTO)

Upon completion of construction works and leak tests, the company shall apply for LTO. The company shall pay the applicable fees, and submit the following statutory/technical requirements:

i. Valid Calibration Certificates/Report of Measuring Equipment for the facility issued by DPR accredited companies and witnessed by DPR in line with relevant standards.
ii. Manufacturers' data sheet for any Gas Reticulation Facility storage tanks.
iii. Ultrasonic Thickness Measurement (UTM) test certificates of the storage tank. This test shall be conducted on site for all tanks and done prior to burial for underground tanks. The UTM test shall be carried out by a company with applicable OGISP and witnessed by DPR officials.
iv. Pressure test reports and certificate or any other DPR approved integrity test report for tanks and piping. The Pressure test shall be carried out by company with applicable OGISP and witnessed by the Department. The Pressure test should be carried out for a new tank at installation before operation and after every Five (5) years. After 20 years of service, pressure test on the LPG tank should be carried out every two (2) years.
v. Any of the following shall subsist - Current Tax clearance certificate, Evidence of Tax Payment, Tax Identification Number (TIN) or Evidence of tax exemption.
vi. List and Evidence of trained staff by a DPR accredited consultant.
vii. Approved Standard Operating Procedure (SOP) for the proposed facility operations in line with the DPR SOP template.
viii. '8 x 10' size Photographs of Plant from different vantage points showing its amenities.
ix. As-built Layout drawing. This will be verified by DPR during pre-licence inspection.

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x. Factory Acceptance Tests (FATs)/reports (where applicable) and Site Acceptance Tests of all critical components shall be witnessed by the Department. FATs from the manufacturer may be accepted where it is practically impossible to witness by the Department.

2.5 Procedure for Pre-License Inspection

In order to issue LTO, the DPR shall conduct a Pre-license inspection, following the satisfactory review of documents submitted in the application. The inspection shall confirm the extent of compliance with these Guidelines. At a minimum, the following shall be confirmed to be in place:

i. Organogram, list of competent persons and evidence of MISTDO training of staff.
ii. Functional Automated/Manual leak tester.
iii. Installation of Gas detectors and Functional Fire alarms shall be required for the LPG storage, gas distribution network and in every housing unit/apartment.
iv. Safety warning notices and Personnel Protective Wears for the Plant operators.
v. Quick shut-off valves shall be provided.
vi. Visible display of Emergency Telephone numbers of Fire Service, Police and DPR.
vii. Water sprinkler system in line with relevant codes and standards.
viii. Muster Point designated areas earmarked in the facility.
ix. Escape rope(s) or ladder(s) for high-rise apartments.
x. Hoses shall be checked regularly to ensure that they are properly secured with hose clips. Damaged hoses or hoses showing signs of wear, shall be replaced with hose(s) of correct quality.
xi. A fence of at least 2 metres high shall be provided to enclose the facility.
xii. Fire blankets.
xiii. Fire Hydrant system/control points and booster pumps.

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xiv. Adequate fire extinguishers shall be provided (DCP and CO_2).

xv. Demarcation of facility tank Storage areas to unauthorized persons and limiting access to operations area to only trained personnel.

2.5.1 *Renewal of License to Operate*

On the expiration of an existing LTO, the company shall apply for the renewal of LTO. The company shall pay the applicable fee and submit relevant documents used for the LTO application. DPR officers shall conduct an inspection of the facility and auxiliary equipment to confirm the status and integrity of all equipment amenities in line with applicable standards.

2.6 Modification of Facility

The company shall apply and submit the following documents and pay the prescribed application fee.

i. Details of the proposal for modification.
ii. The As-built layout drawing for the existing facility.
iii. Proposed layout sketch for the facility.
iv. Detailed and legible Piping and Instrumentation Diagram (P&ID) of the proposed facility.
v. Updated Standard Operating Procedure (SOP) consistent with this guide.
vi. Manufacturers' datasheet of the storage tank(s), where applicable.

Note: Facility Inspection shall apply.

2.7 Decommissioning/Conversion of Facility

All applications that fall under this category shall be forwaded to the DPR Operations Controller having jurisdiction over the Facility. Decommissioning shall be in line with relevant Nigerian Oil & Gas Regulations and Guidelines applicable to such facilities.

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3 MINIMUM DESIGN, CONSTRUCTION AND INSTALLATION REQUIREMENTS

3.1 General Requirements

The design, construction, installation commissioning and operation shall comply with the provisions of Petroleum act 1969 as amended, MOSR 1997, other applicable regulations, standards and guidelines. The design and construction of such facilities must conform to acceptable design codes such as Standards Organization of Nigeria, American Society of Mechanical Engineers, National Fire Protection Association, American Welding Society – Structural Welding Code, British Standards (BS), and other codes and standards recognised by the Director of Petroleum Resources.

3.1.1 Design And Construction Standard

During the design, construction, installation, commissioning of a facility, all necessary measures and mitigations shall be applied to reduce risk associated with storage, transport, transfer, usage etc. to as low as reasonably practicable (ALARP). The storage tanks, fittings, pumps, manifolds, meters, hoses, valves, and other equipment and accessories of the facility shall be designed for efficient and safe operations in line with applicable codes and standards. The installation and commissioning of the system shall only be undertaken by competent persons and companies, in accordance with manufacturer's instructions and best practices. Written standard procedures shall be drawn up and used for installation and/or commissioning. Further conditions governing the establishment of a Reticulation Facility are as follows:

i. Participation of DPR representatives in the project and mandatory witnessing of milestone construction activities such the tank burial, pressure/leak test of the tanks and tank calibrations.

ii. All critical equipment and piping shall be commissioned after installation in accordance with manufacturer’s instructions. Integrity tests and other applicable tests shall be conducted companies with relevant OGISP permits and witnessed

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by the Department.

3.2 Facility Layout & Site Selection

3.2.1 Site Selection Criteria

1. Any site chosen for the facility shall be sufficiently spacious to allow it to be designed to minimize the risks from LPG to any structure close to the facility and person likely to be at or near the facility.
2. The site shall, at the minimum, meet the following requirements:
   i. It shall be accessible from the roadside.
   ii. It shall not be within, under, or close to known hazards such as pipeline Right of Way (ROW), high voltage cable, railways, etc.
   iii. The minimum horizontal distance between the shell of a pressurized tank and the line of adjoining property that may be developed shall be as shown in **Table 3.1.** Where residences, public buildings, places of assembly, or industrial sites are located on adjacent property, greater distances or other supplemental protection (firewall/underground tank) as provided in **Table 3.1** shall apply.
   iv. The drainages to be constructed or existing ones shall not be channelled to a stream or waterway. Contaminated water shall be contained and treated onsite.

3.2.2 Facility Layout for Gas Reticulation Site

1. Proper Hazard Area Classification and Risk Assessment shall be considered for safe design, layout and operations of the facility to minimize, to ALARP, the releases of containments to prevent the ignition and spread of any unavoidable or accidental releases.
2. The location of tanks, fill points, vent pipes, road tanker delivery stands, buildings, etc. shall be designed to ensure in the layout of the facility, that:
   i. Satisfactory means of escape for persons in the event of a fire or other incident are provided.

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ii. Hazardous areas are protected from sources of ignition.

iii. There is safe access, routing, parking and exit for service vehicles and road tankers.

3. The facility's dangerous areas shall be open air ventilated and clear of other buildings or obstructions that might otherwise adversely affect the ventilation.
4. Pipework, tanks to offset fill points, and vent pipes shall be routed and located to ensure protection from external effects or interference and to allow access if required.
5. The stand for delivering fuels into storage tanks shall be in the open, away from the facility buildings, and emergency escape routes, and be large enough to allow a road tanker to be positioned wholly within it during delivery.
6. Electrical connections shall be made in accordance with the manufacturer's instructions and shall maintain the integrity of the explosion protection.
7. The minimum separation distance in case of closeness to public and residential properties are as follows:

Table 3.1 Minimum Separation Distances for Above Ground LPG Storage Tanks

Capacity (Metric Tonnes)		**Separation Distance (Meters) from tanks to the line of Adjoining Properties, Control buildings, or fixed source of ignition.**				
Of any single tank	**Of any group of tanks**	**From Adjoining Property that May be Developed/Non-Public & Non-Residential**		**From Public and Residential Boundaries**		**Between tanks**
		A: No fire wall	**B: With Fire wall**	**A: No fire wall**	**B: With Fire wall**	
0.1 – 5	0.1– 5	5	5	30	15	1.0
5.1 - 10	5.1 - 10	7.5	5	30	20	1.0
10.1 – 60	10.1 – 60	15	7.5	50	30	1.5
60.1 - 150	60.1 – 150	22.5	11	50	30	¼ of sum of the diameter of 2 adjacent vessels
150.1 – 300	150.1 – 300	30	15	50	30	

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Table 3.2 Underground Distance

Capacity (Metric Tonnes)	Separation Distance (Meters) from the relief valve to the line of Adjoining Properties, Control buildings, or fixed source of ignition.
0.1 - 10	3
>10.1	7.5

3.3 Minimum Requirement for Gas Storage Vessel/Tanks

The storage tank/vessel shall be designed, constructed and installed by DPR accredited company in accordance with internationally recognised standards. It shall comply with the following:

i. The storage tank/vessel shall be located in a manner that allows safe access and subsequent removal if required, clear of any building foundations or underground features, such as drains and tunnels. Additionally, the location shall not allow any flammable concentrations or any releases to reach potential ignition sources or accumulate where they might pose a danger.

ii. The fill points for storage tank/vessel shall be positioned such that other vehicle movements do not pose risk to tanker discharge, and accidental releases or subsequent ignition does not pose an immediate threat to personnel.

iii. Tanks and piping must be constructed with materials that provide an appropriate level of safety and environmental protection. E.g. carbon steel, reinforced fibre glass, or others acceptable to DPR.

iv. All storage tank design specification details shall be conspicuously displayed.

v. All storage tanks shall be fitted with pressure relief valves, pressure and temperature gauges, and other important safety equipment. Lightning protection shall be installed as appropriate.

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vi. Water sprinkler system shall be provided at the top of the vessel. If required, an access ladder to the top of the gas storage tank shall be provided for inspection and maintenance needs.

vii. Storage systems and vessels shall be fitted with overpressure protection devices to release excess pressure under normal operating conditions and in case of emergencies.

viii. Manually operated valves shall also be fitted to release pressure during maintenance.

3.3.1 Additional Requirements for Underground LPG Tank Burial and Leak Test

LPG storage tanks may be buried. The requirements for tank burial include the following:

i. No tank(s) shall be buried without DPR approval and the burial must be witnessed by DPR officials.

ii. All tanks to be buried shall meet all the specifications of the manufacturer, ASTM, and other internationally approved codes.

iii. The excavation of the pit for the LPG storage tank shall permit allowance of not less than 70 centimetres when the tank has been set in its final position.

iv. The tank shall be set in a chamber of waterproof concrete of not less than 23 centimetres thick and the top a watertight detachable or removable concrete slab with a manhole at the centre.

v. The manhole of every tank installation shall be raised above the level of the surrounding ground to prevent the ingress of surface water.

vi. All piping below ground level shall be protected against damage and corrosion.

vii. All individual tanks shall be provided with efficient electrical earth connections independent of pipe connections, having a current not exceeding 10 Ohms when measured by an earth resistance tester "Megger" or similar type.

viii. All fixed pipes shall be of metal or fiberglass coated and shall be in a position where they may not be liable to damage.

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ix. Minimum separation distances from a building, boundary or fixed source of ignition to underground or mounded tanks of 10 Tons capacity or less shall be 3 meters, and 7.5 meters for tanks above 10 tons capacity.

x. Separation distances for all underground and mounded storage tanks shall be measured from the pressure relief valve and the filling connection.

xi. The installation shall be accomplished with appropriate equipment that ensure the underground tanks are not dropped, dragged or handled with sharp objects.

xii. The installation of the underground tanks shall be in such a way that enables easy removal without jeopardising the safety or integrity of adjacent tanks or infrastructure.

xiii. Where the soil may be corrosive, the tank shall be set on a clean shingle or sweet sand free of extraneous materials to avoid seepage of products to underground water courses or any drainage system.

xiv. Foundations and sub-soil shall be examined and prepared to support the tank to prevent movement, uneven settlement or concentrated loading in the tank shell.

3.3.1.1 Corrosion Protection for Buried Tanks

i. A suitable system of cathodic protection (typically sacrificial anode for small installations and impressed current for large installations) shall be provided.

ii. External surfaces of the tank should be suitably prepared and treated with a coating manufactured and applied in accordance with a recognised standard, to both protect against chemical and mechanical damage and minimise cathodic protection current drain.

3.3.2 Requirements for Skid and Containerized Facility

The following shall apply for standalone containerized and skid-mounted facilities:

i. They shall meet same requirements and safety distances in **Table 3.1** and **Table 3.2** of autonomous refilling plants.

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ii. Additional safety measures for adequate ventilation, gas and fire detectors, and fire- fighting equipment shall apply.

iii. Technical and functional specifications of the skids shall be made available to DPR, to ensure consistency and availability of the system.

iv. Relocation of the skids, change in layout of the approved site and any other modification shall be promptly reported to the Department for concurrence and approval.

3.3.3 Additional Requirements for LPG tanks for Reticulation

The Storage tank/vessel with any associated pipe work connecting the system to a combustion appliance providing space or water heating, or cooking facilities shall be designed, constructed and installed by DPR with appropriate OGISP in accordance with internationally recognised standards. It shall, at the minimum, comply with the following:

i. Every tank shall be separated from any building(s) or fixed source of ignition, in order to reduce the risk of fire spreading to the tank or to the building in the event of a fire, to enable and/or maintain safe dispersal of LPG.

ii. Tanks should be situated outdoors in a position that will not allow accumulation of LPG vapour at ground level. See all applicable safety distances in **Table 3.1** and **Table 3.2**.

iii. Ground features such as open drains, manholes, gullies and cellar hatches, within the separation distances should be sealed or trapped to prevent the passage of LPG vapour.

3.4 Facility Connecting Pipework and Valves

All piping, tubing material and distribution network shall be designed in accordance with international standards such as National Fire Protection Association (NFPA) 58 LPG code of practice and other similar/relevant International codes of practice. The piping shall generally be in accordance with the standard NFPA 54, ANSI/ ASME B31.8-2012. It shall

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meet the following at the minimum:

i. Hose connections and flexible connectors shall be fabricated of materials that are resistant to the action of LP gas both as liquid and vapour.

ii. Pressure-containing metal parts of valves shall be made of steel, ductile (nodular) iron, malleable iron or brass.

iii. Manual shut-off valves, emergency shut-off valves, overpressure shut-off valve, flow check valves, non-return valves and back flow check valves used in piping system shall comply with the provisions for LPG storage and installation valves.

iv. Proper flow control using approved Pressure Regulation Systems (PRS).

v. Emergency shut-off valves shall be approved and shall incorporate all the following means of closing:

   a. Automatic shut-off through thermal (fire actuation).
   b. Manual shut-off from a remote location.
   c. Manual shut-off at the installed location.

vi. Pressure, temperature, level and flow gauges should be incorporated into the system to ensure proper control and monitoring of the installation.

vii. For gas piping installed underground, a sufficient clearance from any other underground structure to avoid contact therewith. Clearance for the piping shall be provided to allow maintenance, and to protect against damage from proximity to other structures.

viii. Gas piping that shall be in contact with earth or other corrosive materials shall be protected against corrosion. When dissimilar metals are joined underground, an insulating coupling or fitting shall be used.

ix. Adequate protection shall be provided for gas piping installed underground so as to prevent excessive stressing of the piping. Piping shall be buried in a manner that shall protect the piping from physical damage:

   a. A minimum of 300mm cover shall be provided for underground piping

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systems.

b. Where damage to pipe from external forces is likely to occur, then a minimum cover of 460mm shall be provided.
c. Where a minimum cover of 300mm cannot be provided, the pipe shall be installed in a conduit or bridged (shielded).

3.5 Master Switches

In addition to the site main isolator controlling the electrical installation, a separate isolation switch should be provided to isolate the supply to the LPG installation. This should be so positioned as to be readily visible and within easy reach for quick operation in cases of emergency.

3.6 Pumps, Compressors and Fittings

Pumps, other than submersible types, should be adequately secured to a concrete foundation or bolted to a structural steel support. Where the drive unit is not integral with the pump, attention should be given to ensure correct alignment, and all moving parts should be suitably guarded.

3.7 Manifolds

Manifolds are to be securely fixed to avoid strain on connections under normal working conditions. On a housing estate forecourt, such connection valves should be immediately downstream of the shear valve or excess flow valve protecting the meter.

3.8 Pressure And Flow Control

The piping manifold used for the supply of LPG to compound or building site shall be designed and installed to ensure uninterrupted and safe LPG supply in active and standby operations mode. LPG flow shall be delivered through pigtails and controlled through three-stage Pressure Regulation System (PRS) to residential units.

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3.9 Metering

All meters shall be installed in such a manner as to prevent undue stresses on the connecting piping and/or the meter. Customers' meters and regulators may be located either inside or outside of buildings, depending on local conditions.

When located outside of buildings, meters and service regulators shall be installed in a location that is readily accessible and where they will be reasonably protected from damage and corrosion.

3.10 Emergency Systems

The following emergency system shall, at the minimum, be installed in the facility:

i. Gas and fire detection system shall be installed and routinely tested.
ii. Appropriate warning notices, safety signs and instructions, shall be positioned at strategic locations and control rooms.
iii. Adequate intrinsically safe lighting systems of explosion-proof type shall be installed at points to aid safety, security and dentification of the product(s) (signage and labels). **Note:** vent outlets and potential release points shall be avoided.
iv. Where numerous storage vessels are used, consideration should be given to separating these into isolatable sub-groups. ESDs activating these isolation valves shall be provided both locally at each exit point from the storage site and remotely.

3.11 Fire/Blast Walls

The purpose of a firewall is to protect vessel or vessels from thermal radiation from a fire nearby and to ensure adequate dispersion distance to boundaries, buildings and sources of ignition for LPG leaking from the vessel or its fittings where normal separation distances cannot be achieved. The walls shall, at the minimum, be of the following features:

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i. Imperforated and substantially constructed from re-inforced concrete or solid masonry and be capable of achieving at least 30 minutes fire resistance. Where the wall separates vulnerable populations from the dangerous substance, the fire resistance provided shall be for a minimum of 60 minutes.

ii. Shall not be less than the height of the vessel. For larger vessels, it should not be less than 2 meters high or the height of the vessel, whichever is greater.

iii. The thickness of the Firewall shall not be less than of 0.23m (9 inch).

iv. The separation distance between the vessel and the firewall shall not be less than 3 meters.

v. The installation of the fire wall shall not significantly impair natural ventilation. The provision on one side is normally sufficient. However, it shall not be more than two sides.

Note: The specification and composition of materials for the Firewall shall be submitted to the appropriate DPR field/zonal office and the construction shall also be monitored by the assigned DPR representatives.

3.12 Protection against Static Electricity:

The installation should have electrical continuity, be effectively connected to earth and bonded to comply with the requirements of the Institute of Petroleum's Model Code of Safe Practice, Part 1, Electrical and BS 7671:2001 or equivalent international standard.

1. All piping, tanks, valves and discharge & dispensing equipment must be bonded continuously so that all non-current carrying metal parts have the same potential to ground that can potentially result in a catastrophic fire or explosion.
2. All dispensing equipment including pumps, hoses and nozzles must be properly rated

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for the intended usage.

3. Adequate explosion-proof lighting shall be provided to illuminate the working and the storage areas of the plant.

3.13 Fire Protection

The fire protection system of the facility shall be required and designed to prevent or reduce the likelihood of a fire or explosion, to minimize its intensity should such an event occur and ensure timely emergency response and escape of all persons in the facility. The fire protection measures shall cater and ensure that adequate controls are put in place, including special, technical and organizational measures taken for all work process, including receipt, storage and other activities in connection with the Industrial Storage Facility to prevent fire/explosion; deal with the incident should such an event occur; and ensure emergency response and escape of all persons in the facility. Additionally, the Industrial Storage Facility shall, at the minimum, provide the following firefighting and emergency facilities:

i. Clean Water Reservoir of minimum size 15 cubic metres.
ii. Functional firefighting gadgets must be kept handy and at alert.
iii. At least two dry chemical powder fire extinguishers less than 9kg each and suitable for LPG fires with a test fire rating of at least 21A and 183B as defined in MSA EN 3-7:2004 should be readily available at strategic locations to deal with fires adjacent to the meter/vehicle being filled.
iv. Warning/safety signs shall be conspicuously displayed.
v. A portable fire extinguisher not less than 9kg and suitable for LPG fires with a test fire rating of at least 21A and 183B as defined in MSA EN 3-7:2004 should be readily available at the dispensing area and other strategic locations to deal with fires.
vi. Fire hydrant system and booster pumps shall be made available.

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4 MINIMUM HSE REQUIREMENTS FOR THE OPERATIONS OF THE FACILITY

4.1 Facility Competent Person

1. Facility operations shall be conducted by competent persons that are duly qualified and possess satisfactory training to carry out assigned functions.
2. The Facility shall put in place access control to screen out persons not connected with the operations and ensure that only competent persons who have specific functions are allowed at underground tank storage and other hazardous area.
3. All activities and operations in the Facility shall be supervised by a competent personnel/Manager.

4.2 Minimum Training for Facility Competent Persons

1. Gas Reticulation Facilities shall be required to provide training to competent/responsible person in the facility covering safe work procedures and emergency actions.
2. Training records and training content shall be maintained for five years and will be made available to the DPR upon request.
3. The personnel shall be aware of Standard Operating Procedures, Gas Reticulation site-specific guide and policy, safe practices, documentation and procedures in day-to-day operations.
4. The personnel shall undergo and obtain the Minimum Safety Training for Downstream (MISTDO) at an approved/ accredited Safety and Emergency Training Centre in Nigeria.
5. Advanced training shall be carried out for personnel working directly in the dangerous areas in the Facility as maybe peculiar to their jobs.

4.3 Housekeeping

1. The Gas Reticulation Facility shall ensure that the landscaping, surrounding, good housekeeping practices and environment are well-maintained. Poor housekeeping shall be deemed a sign of negligence by the Operator.

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2. The Facility shall be kept in sound condition and free of unnecessary items such as unused drums, lumber and combustible paper, plastics and other objects can contribute to spread of fire, hindrance to easy evacuation or escape of personnel or clean-up in the event of a leak or spill and homes for unwanted animals.

4.4 Personal Protective Equipment (PPE)

1. Appropriate clothing shall be worn personnel in the Facility for the discharge of duties.
2. The attendants shall be required to wear, at the minimum, fire-retardant clothing and shoes.
3. Personnel working in the tank area or performing maintenance work in the Facility shall be required to wear required PPE which include hard hat, hand glove, fire retardant reflective clothing, steel toe boot and safety goggle as appropriate.
4. Ear protections shall be required in areas mapped as noisy area e.g. generator etc.
5. Special PPE e.g. breather etc. shall be provided to individual performing other functions such as tank cleaning which require special PPE type for the operation.

4.5 Security

1. Gas Reticulation Facility shall employ sound security measures to prevent vandals, unwanted individuals and animals from entering the Storage.
2. The installation and use of Closed-circuit television (CCTV) is highly encouraged.
3. Dangerous areas in the facility such as storage area, discharge area, generator area shall be restricted to unauthorized persons.
4. The entry and exits of the Facility shall be specified and clearly labelled.

4.6 Facility Signage

1. Gas Reticulation Facility shall install Facility signage that indicates the key areas of the facility and safety signage which properly warn persons and public of potential dangers areas.
2. Danger signs such as “No Smoking”, “Authorized Entry Only” “No Mobile Phones”

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and other Warning Signs shall be posted in strategic locations at facilities.

3. If smoking is to be permitted, smoking areas shall be clearly defined.

4.7 Standard Operating Procedure

1. Gas Reticulation Facility shall have duly approved SOPs and safe work procedures which shall guide all operations available on-demand in the facility.
2. Employees shall be instructed on a regular basis make use of the relevant SOPs for their specific functions.

4.8 Emergency Preparedness

1. Safety at the Facility shall be of utmost importance to save lives, prevent injury and protect property and the environment.
2. Gas Reticulation Facility shall have duly approved emergency response and preparedness plan which shall be available on Demand.
3. The facility operators and workers shall be familiar with emergency response and preparedness plan, emergency actions, appropriate resources and equipment.
4. This emergency procedure shall have built in scenarios and management and shall be tested in drills regularly.
5. Emergency notification placards which boldly list 24-hour emergency phone numbers shall be posted at the strategic places in the facility.

4.9 Fire Precautions and System

1. Ensure all special, technical and organizational measures are in place in the Facility to prevent or reduce the likelihood of a fire or explosion, prevent the rapid spread and to minimize its intensity should such an event occur in the premises in connection with the carrying out of any work process.
2. Fire extinguishers must be kept pressurized and should be shaken every month, spill clean-up kit, non-combustible drain plug and all other safety equipment shall be in good working order, all safety equipment in place and all safety precautions followed.

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4.10 Material Safety Data Sheets (MSDS)

The MSDS for each product which is stored at the facility should be kept at the site.

4.11 Waste Management

The Facility shall have a comprehensive waste management system which shall, at the minimum, ensure that:

i. Proper waste segregation into its individual waste streams are adopted.
ii. Waste are properly contained in sealed drums or skips and labelled properly.
iii. Cradle to grave philosophy are adopted by the operator as it is the responsibility of an operator to ensure proper handling and management of all waste generated onsite. Proper record of all waste consignment notes should be kept.
iv. Gas Reticulation Facility shall ensure that only a DPR accredited waste manager are engaged.

4.12 Facility Inspection

1. Gas Reticulation Facility shall deploy the best means of inspection to prevent loss of containment from occurring and appropriate mitigation measures shall be applied should one occur to keep the Facility in sound condition
2. Facility Operators shall follow manufacturer instructions, industry and regulatory standards in line with good oil field practice in the facility's maintenance and inspection including for Storage tanks.
3. All jobs shall be in line with a job permit system that is duly authorized.

4.13 Conducting Inspections

1. Facility Inspections shall be on a regular basis in a standardized manner. The operator shall walk through the facility to note the overall facility condition daily.
2. The formal and thorough inspection through an approved checklist and methodology shall be conducted as at when due by an appropriate inspector or company as

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applicable.

3. The inspection shall cover all important areas of the Facility and equipment.
4. The Facility shall be required to demonstrate or show evidence on demand how they complete the inspection form, follow up on findings, fix deficiencies and how significant problems are handled.
5. The appropriate Inspectors and company conducting the inspection shall be required to possess relevant certification and qualifications to carry out the inspection.

4.14 Maintenance

1. Maintenance and replacement of parts shall be carried out as and when due.
2. Maintenance shall be carried out by qualified personnel with approved procedure, risk assessment, permit to work and job safety analysis.
3. Only appropriate and approved spares shall be used.
4. Prior to any major modification of the Facility, Approval for the Modification from the DPR shall be required.
5. Gas Reticulation Facility shall train and empower their personnel to intervene and exercise a Stop Work authority in any operation or procedure that is not considered safe.

4.15 Documentation and Record Keeping

1. All facilities shall be required to put in place adequate document control that ensures the easy retrieval and protection of records. Records of all activities pertaining to the facility should be kept on location. These documents should include:

    i. License to Operate.
    ii. Emergency procedures.
    iii. Security Plan.
    iv. Facility Response Plans.
    v. Operation Manual.

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vi. Training records.
vii. Operator Training Reports
viii. Copies of Inspection reports carried out.
ix. Maintenance Records.
x. Approved checklist for the facility.
xi. Operations Report inline with Section 4.18
xii. SOP
xiii. Waste management plan.
xiv. Waste consignment note

4.16 Static Electricity in Operations:

1. The Facility must ensure that all equipment are bonded continuously or designed to eliminate the threat of discharge of static electricity.
2. During the Pumping or discharging from a truck, the Facility shall ensure the grounding of the truck and securing bonding wire to the tank being filled and it shall not be removed during operations until it is confirmed that there is no threat of static electricity.

4.17 Storage Tanks Management

1. Storage tanks shall be maintained in good condition to prevent loss of containment.
2. At the minimum, the tanks shall be equipped and inspected for Safety Elements, Overfill Protection, visible leaks e.t.c
3. The effectiveness of a cathodic and corrosion protection shall be regularly monitored and maintained in accordance with the design standards. Pad, foundation or supports, tank welds shell seams, and bottom to side seams shall also be free from rust.
4. Ensure that vents are clear of debris or other plugging to ensure fumes can escape,

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hence reducing the potential for ruptures and collapses.

4.17.1 Internal Inspection of Storage tanks

1. The storage tanks shall be opened for internal inspection at intervals of not more than 60 calendar months in line with the MOSR, 1997 or subject to an approved Risk Based Methodology.
2. For these inspections, tanks should be emptied and cleaned, and the inside examined for holes and corrosion.
3. During the storage tank cleaning operations, adequate ventilation shall be provided inside the tank and as work progresses, frequent tests shall be carried out to detect any increase in gas concentration.
4. Adequate safety equipment and devices shall be provided for workers entering the tank for their protection and survival in case of emergency while working in the tank.
5. The tanks shall be subjected to thorough visual and non-destructive test inspections and Ultrasonic Thickness Measurement (UTM) of tank shells, roof, shall be carried out and records made available on demand.
6. Any defect affecting the integrity and operability of the tanks observed shall be repaired and or rectified.

4.17.2 Tank Entering

1. Only trained and qualified persons should conduct internal inspections. Under no circumstances should anyone else enter the tanks.
2. No workman, without appropriate breathing apparatus, shall be allowed to enter a hydrocarbon storage tank for cleaning or inspection unless it is free of hydrocarbon and is continuously ventilated.
3. The tank shall be certified safe by a competent person and there must be strict adherence to confined space entry procedure.

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4.18 Operations Report and Returns

All Gas Storage and Utilisation Facility shall furnish the DPR with periodic reports (on quarterly bases or as may be required). The report shall detail the volume of product received and utilised, price, operational highlights and issues during the period.

4.19 Reporting of Incidents

1. The Facility shall establish procedure for reporting, documenting, follow-up and closing out near misses, incidents and accidents.
2. Whenever fire occurs at the Facility or in case of serious injury or fatality , a report of the circumstances and probable cause of the fire shall be forwarded to the nearest DPR inspector or office within 24 hours and to the Director of Petroleum Resources within 48 hours of the occurrence.

5 SANCTIONS

These Guidelines provide the requirements for establishing Gas Reticulation Facility in Nigeria and minimum requirement for operating same safely. Non-compliance with the requirements of these Guidelines shall be deemed as violations to relevant sections of the Petroleum Act 1969 as amended, Petroleum (Drilling and Production) Regulations 1969 & subsequent amendments, and Mineral Oils (Safety) Regulation, 1997. These violations may summarily result in applicable consequence management, including, but not limited to, fines, penalties, revocation of license.

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6 GLOSSARY

Abbreviations, terms and references used in this document are explained hereunder:

AGS	Automated Gas System
ALARP	As Low As Reasonably Practicable
ATC	Approval to Construct
CCTV	Closed Circuit Television
CNG	Compressed Natural Gas
EIA	Environmental Impact Assessment
ESD	Emergency Shut Down
FAT	Factory Acceptance Test
HAZID	Hazard Identification
HAZOP	Hazard and Operability
HSE	Health Safety and Environment
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LTO	License to Operate
MISTDO	Minimum Industry Safety Training for Downstream Operators
MOSR	Mineral Oils (Safety) Regulation
MSDS	Material Safety Data Sheet
MT	Metric Tonnes
P&ID	Piping and Instrumentation Diagram
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
ROW	Right of Way
SOP	Standard Operating Procedure
SSA	Site Suitability Approval
UST	Underground Storage Tanks
UTM	Ultrasonic Thickness Measurement

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Approved by		
Engr. Sarki Auwalu, ***MNSE*** **(Director/CEO, Department of Petroleum Resources)**		
	Date	**1st September 2020**

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