

**GUIDELINES FOR THE ESTABLISHMENT
OF A NATURAL
GAS PLANT FACILITY IN NIGERIA.**

DPR 2006

APPLICABLE GOVERNMENT POLICIES

Local Content:

Company shall demonstrate sufficient commitment to ensuring that all aspects of the project that can be competently executed locally are handled by Nigerian contractors.

Nigerianisation:

Project Management structure shall be composed in a manner that shall reflect the indigenization policy of the government.

The Department of Petroleum Resources shall attach relevant personnel to participate in all the different phases of the project development.

Zero-Flare compliance:

All project development programs shall be established with an objective amongst others of complying with the directive of the government, on the elimination of routine operational flaring of associated gas by 1st of January 2008.

Green House Gases

The use of green house gases- Chloro-Flouro Carbon (CFCs) e.g. Helon in fire fighting systems is prohibited in line with DPR environmental guideline and standards for the Petroleum Industry.

Use of Chemicals

The use of chemicals for oil and gas production operations shall comply fully with the requirements of the national environmental guidelines and standards for the petroleum industry as issued by the Department

Handling of Hazardous Materials

The use and handling of hazardous materials for oil and gas production operations shall comply fully with the requirement of the national environmental guidelines and standards for the petroleum industry as issued by the Department Material Safety Data Sheets (MSDS) shall be compiled and approval obtained from the Department before use.

GUIDELINES FOR THE ESTABLISHMENT OF A NATURAL GAS PLANT FACILITY IN NIGERIA

SECTION 1

1.1 SCOPE

These guidelines are issued pursuant to Regulation (2) and (3) of the Petroleum Refining Regulations, 1974 and Petroleum Regulations 1969 as amended, any regulations that may come in force and shall apply to the construction of a Gas treating/conditioning plant, Liquefied Natural Gas (LNG) and Natural Gas Liquids (NGL) Plants, Petrochemical Plant, Fertilizer Plant (in which gas is the feedstock) and Gas Treating Facility. Application for approval to establish a gas plant facility or any other process plant shall be made in the manner described in (1.2) below and in the form schedule annexed to these guidelines

1.2 APPROVAL PROCESS FOR THE DESIGN, CONSTRUCTION, COMMISSIONING AND OPERATION OF A GAS PLANT FACILITY

The approval process described hereunder is designed to ensure that the applicant for licence to establish a gas plant facility understands the industry, the technical and economic implications of the project, the sociological and environmental impact of the plant, and maintenance provisions required to protect the health of the operating staff and safety of plant. It is designed to prevent avoidable waste of resources by ensuring at each stage that the applicant understands the statutory requirements of each phase of the project.

Consequently, the approval shall be given in the following sequential stages, culminating in the grant of a license to operate the plant

1.2.1 LICENSE TO ESTABLISH A GAS PLANT FACILITY CONCEPTUAL STUDY AND BASIC DESIGN

This approval stage is to confirm general feasibility of the proposed project.

The following submissions shall be made to the Director, Department of Petroleum Resources, 7 Kofo Abayomi Street, Victoria Island Lagos.

- a) **Conceptual Study:**
 - i) Project Concept
 - ii) Marketing study, indicating whether domestic, export, or if both markets are being targeted.
 - iii) Basis of Design
 - iv) Feedstock flow assurance report
 - v) Field Development Plant (FDP) approval
 - vi) Product volume and recovery.
 - vii) Feedstock composition and PVT analysis
 - viii) Proposed site for the project and coordinates.
 - ix) Proposed feedstock supply and product evacuation scheme.

- x) Proposed safety provisions and preliminary environmental impact assessment study.
- xi) Infrastructural support strategy.
- xii) Organization plan, including staff training plans.
- xiii) Financial plan.
- xiv) Local content plan
- xv) Application fee as prescribed by the Department in bank draft payable to “Federal Government of Nigeria – DPR fees account”

b) Basic Design

- i) Project design philosophy.
- ii) Block flow scheme showing process configurations and capacities, including utilities, and offsites.
- iii) Process flow diagram of the process units.
- iv) List of codes and standards applicable to the project
- v) Feedstock and product metering systems and proving procedures.
- vi) Plot plan and equipment general assembly.
- vii) Project-implementing schedule.
- viii) Process Hazard Identification (HAZID).

Having fulfilled the above requirements in addition to a formal presentation of the conceptual study to the Department, the Director may grant the applicant the licence to establish the Gas plant consequent upon which the applicant may proceed with the detailed Engineering, Procurement and Construction (EPC) phase of the gas plant project.

The validity of the licence to establish the gas plant shall be for a period of two years after which it shall lapse.

The Department shall participate in all the activities that lead to the development of the above documents.

SECTION 2

2.0 DETAILED ENGINEERING DESIGN/APPROVAL TO CONSTRUCT A GAS PLANT FACILITY

The applicant shall submit the detailed engineering design reports of the gas plant facility to the Department of Petroleum Resources which shall include the following:

- (i) Approved Environmental Impact Assessment (EIA) report.
- (ii) Engineering review reports.
- (iii) Approved for Construction (AFC) drawings
 - (a) Detailed process configuration including Piping & Instrumentation Diagrams (P&ID) and Process Flow Diagrams (PFD), showing the detailed Material Balance and feedstock composition/PVT data.
 - (b) Electrical one-line diagram
 - (c) Equipment list and general facility layout diagram

- (d) Equipment test procedures.
- (e) Final project implementation schedule

(iv) Application fee as may be prescribed by the Director.

Participation of the Department at the following engineering reviews is mandatory.

- 1. Design/P&ID's review
- 2. HAZOP review
- 3. Safety reviews
- 4. Model reviews
- 5. Quarterly Management review meetings

Gas plant designs shall be subjected to engineering reviews at the following stages of the design and development.

- 1) At the completion of the plot plans and front end engineering design.
- 2) At the completion of the detailed engineering design and specifications.
Accredited representatives of the Department shall be present at these reviews.

For this purpose a minimum of four weeks notice shall be given to the Department. Arrangements shall be made for the participation of the Department's representative at these reviews, and all relevant review documents shall be made available for appropriate review ahead of time.

All engineering activities are to be carried out in compliance with the provisions of the relevant Nigerian/International codes and standards:

Having satisfied the requirements in addition to a formal presentation of the detailed engineering package to the Department, the Director may grant the applicant an approval to construct the gas plant.

2.1 PROCUREMENT/CONSTRUCTION

This comprises procurement, fabrication, installation and erection stages.

Procurement

The Department shall participate in factory acceptance test (FAT) of major equipment. For this purpose, a minimum of four (4) weeks notice shall be given to the Department for arrangement to be made for the participation of its representatives at these FATs.

Fabrication

- a) All fabrication and welding procedures shall generally follow the relevant specifications in the under-listed documents:
 - i) American Welding Society – Structural Welding Code A.W.S.D.1.1 88 and the subsequent revisions.
 - ii) API Standards 1104 – 17th and subsequent editions for welding of pipelines and related facilities.
 - iii) ASME Section VIII, Div. 1 & 2

- b) The gas plant facility owner shall provide the Director with the following information before the commencement of fabrication:
 - i) The name of the contractor and the fabrication program.
 - ii) The yard in which all pressure vessels, columns and ancillary equipment would be fabricated.
 - iii) The arrangements made for the statutory monitoring of the various stages of the fabrication by officials of the Department.
 - iv) The name and job references of the company appointed as quality control inspectors for the job and Curriculum Vitae (CV) of its principal technical staff.

- c) At the completion of fabrication, the quality control inspecting company shall compile a report confirming that all materials used were strictly in accordance with approved specifications as verified through steel mill certificates with the approved Standards and Codes of Practice. The quality control inspection shall be by Non-Destructive Examination (NDE). Consequently, inspection and certification of all welded parts of vessels, columns and piping shall be by any of the following techniques as applicable viz.:
 - i) Liquid Penetrant Technique.
 - ii) Magnetic Particle Technique.
 - iii) Radiographic Technique.
 - iv) Ultrasonic Technique.

A comprehensive report of the inspection so carried out shall be forwarded to the Director through the plant owner.

2.2 ENVIRONMENTAL AND SAFETY CONSIDERATION

2.2.1 ENVIRONMENTAL FACTORS

These shall include all available meteorological parameters, such as the prevailing wind direction, maximum wind velocity, maximum and minimum atmospheric temperature, relative humidity, rainfall, local flood or tide conditions.

- a) All environmental parameters shall be obtained from independent site survey with all the data gathered being properly documented.
- b) Soil test and geo-technical investigations shall be carried out for foundation or load-carrying characteristics of the site.
- c) Contour maps (site plan), showing ground elevations shall be prepared
- d) Effect of borehole water withdrawal on ground water table shall be investigated and result submitted.

2.2.2 ENVIRONMENTAL PROTECTION

- a) There shall be a detailed Environmental Impact Assessment (EIA) study of the area as provided for in the National Environmental Guidelines and Standards for the Petroleum Industries, before commencement of construction.

- b) The general layout of the location and provisions for all waste disposal in the gas plant shall comply with the applicable specifications in the National

Environmental Guidelines and Standards for the Petroleum Industry in Nigeria, issued by the Department of Petroleum Resources

- c) The gas plant shall be equipped with adequate provisions for containing and handling spills and accidental discharge of potential contaminants.
- d) All the systems and components of the gas plant shall be designed to withstand any anticipated extremes of environmental phenomena on location.
- e) The provision of effluent and recipient water quality monitoring shall be in accordance with the Environmental Guidelines and Standards issued by the Department of Petroleum Resources for the Petroleum Industry.

i) Emergency Flaring

Flare stack design shall generally conform to the provisions of API RP 14C and API 521 and shall specifically ensure the following:

- a. Maintenance of flame stability to avoid excessive and unnecessary flame extinguishments or blow out.
- b. Avoidance of flashback in the flare system.
- c. Complete combustion for smoke suppression.

Flare stack shall be located such that the maximum heat radiation exposure of personnel complies with the stipulations of the National Environmental Guide for the Petroleum Industry. (6.40 KW/hr.m²)

ii) Hydrocarbon Containment

The facility shall be equipped with adequate provisions for the containment and handling of spillage and potential contaminants.

iii) Drainage

The facility shall be configured in such a way that there will be an efficient drainage system with adequate provision for handling and disposing drained liquids in accordance with the Environmental Guideline and Standard for the Petroleum Industry in Nigeria.

vi) Effluent Handling

The facility shall be equipped with adequate effluent treatment systems to achieve the specifications contained in the environmental guidelines and standards issued by the department.

vii) Atmospheric Venting

In the event where it is operationally necessary to vent any hydrocarbon carrying vessels into the atmosphere, venting shall be safely done through flame/spark arrestors to area that are considered safe.

2.2.3 SAFETY FACTORS

- a) All offices, warehouses and process buildings shall be constructed with utmost consideration for the safety of the workers and equipment. Laboratory building construction shall take into consideration the safety of personnel and provision of adequate ventilation as well as that for proper disposal of waste.
- b) Material Safety Data Sheet (MSDS) shall be prepared in respect of all potentially hazardous chemicals and materials.
- c) Emergency alarm system and evacuation programs shall conform to Standard Industry Practice to the satisfaction of the Director.
- d) Initiation of an ESD should activate audible and visual alarms at the main control point. Alarms should be displayed in such a way that the location and the source of initiation of the ESD can be readily identified at the main control point.
- e) Power supplies for the ESD logic system should be arranged such that automatic changeover to a standby supply is available in the event of failure of the normal supply.
- f) Noise level at any point of the facility emanating from the engines and fluid velocities in the pipelines shall not exceed 85 dB (It mean tolerable limit). In areas of the facility where this level is exceeded, wearing of earmuff shall be mandatory. The noise level in living quarters shall not exceed 45 dB.
- g) The flare stack shall be located at a distance of at least 60m (200ft) from the unit or storage tanks and the flare shall conform to the approved limit of atmospheric emission.
- h) The automatic control system for emergency shutdown of all strategic or critical equipment in the gas plant such as columns, fired heaters, separators, surge vessels, pipeline and manifolds compressors and pump discharge headers shall be based on fail-safe logic designs.
- i) Fire sensors and gas detection and alarm system shall be installed at strategic points of the gas plant and its offsite facilities. In addition, adequate fire mitigation systems shall be provided at all identified fire risk areas of the gas plant.

SECTION 3

3.0 LICENSE TO OPERATE GAS PLANT FACILITY

3.1 COMMISSIONING AND OPERATING LICENCE

Upon mechanical completion of the plant, a pre-commissioning inspection of the facility shall be carried out by the Department prior to the issuance of operating licence.

The following shall be the pre-requisites to quality:

- 1) A qualified gas manager is appointed and his appointment is notified in writing to the Director of Petroleum Resources.
- 2) Complete equipment reports on all critical equipment such as pressure vessels, heat exchangers, fractionation column, compressors, drivers, rotating equipment and storage tanks.
- 3) Completion of all metering equipment and systems to approved standards.
- 4) Availability of adequate spare parts, chemicals, catalysts, lubes, greases and other operating consumable materials in the warehouse appropriately codified and organized.
- 5) Availability of commissioning spare parts, apart from operating spare parts, all properly coded and arranged in the warehouse.
- 6) Approved operating manuals, maintenance manuals, mechanical catalogues, would have all been supplied, subject to appropriate modifications after commissioning.
- 7) Approved operating and maintenance organization and availability of trained manpower in sufficient strength.
- 8) Functional and effective fire prevention and fighting organization already in existence.
- 9) Functional and effective Safety enforcement Organization and Policies already in existence.
- 10) All approved engineering drawings in agreed numbers of copies have been supplied by the contractor, subject to modifications to reflect changes during construction.
- 11) The quality control laboratory is completed and functional.
- 12) A well-staffed and equipped First Aid Clinic is in place.
- 13) All other provisions, which are reasonably required to facilitate effective commissioning of the plant, have been made.
- 14) Confirmation that all-environmental protection standards during design have been met.
- 15) Payment of prescribed license fees.

3.2 PLANT OPERATION

- a) The gas plant facility shall be operated in compliance with the provisions of the Petroleum Refining Regulations, 1974 and any regulations that may come in force.

- b) The operator shall prepare and submit an annual program of activity in the form of a presentation to the Director of Petroleum Resources at the beginning of each calendar year.

3.3 MAINTENANCE

This comprises routine, preventive scheduled and turn-around maintenance.

- a) The gas plant facilities shall be periodically examined for corrosion detection and corrosion protection systems and devices installed shall be regularly checked to ensure effective performance. All these anti-corrosion performance monitoring shall be carried out in accordance with current NACE (National Association of Corrosion Engineers) Standards and procedures.
- b) All turn-around maintenance (TAM) schedules shall be duly submitted to the Director of Petroleum Resources at least three months prior to its commencement and thereafter, monthly progress report of the maintenance shall be rendered until completion for monitoring purposes only.

3.4 PLANT MODIFICATION

Any proposed modification or enlargement of existing gas plant and facilities shall be communicated to the Department and must be approved in accordance with the provisions of Regulation 3 of the Petroleum Refining Regulations, 1974 and its subsequent revisions before being carried out.

3.5 PLANT RELOCATION

In the case of a request to relocate an existing plant to Nigeria, the applicant shall provide the following information to the Director of Petroleum Resources.

- a) Reason for the plant relocation.
- b) Operational history of the plant including years of operation.
- c) Types of feedstock the relocated gas plant units will process.
- d) Proposed Process Flow Diagram.
- e) Layout for the relocated gas plant
- f) List of process units/package units to be re-designed and new gas plant configuration.
- g) List of equipment to be re-engineered.
- h) Land requirement for relocation
- i) Feedstock supply and products evacuation scheme.
- j) Electrical single line diagrams.
- k) Process and Instrumentation Diagrams (P&ID's) of the process units and utilities
- l) Safety, Process and maintenance manuals.
- m) HAZOP review report of the re-designed and re-engineered gas plant.
- n) Environmental Impact Assessment report.
- o) The design parameter and the As-built drawings of the entire plant, offsite and utilities.
- p) Current technical status of the plant certified from a comprehensive technical audit carried out by an internationally reputable inspection agency.

- q) A SAFE Chart analysis of the plant.
- r) An Environmental Impact Report of the plant
- s) Flow assurance report
- t) Any other requirement as the Director may specify from time to time.

On application to relocate gas plant facilities, the statutory non-refundable application fee for Licence to establish a gas plant facility shall apply.

Upon receipt and completion of the review of the above, the Director shall appoint experts to carry out a physical inspection of the plant and accessories on location in order to verify the integrity of the plant elements. If satisfied, the Director may grant an approval for the plant to be relocated to Nigeria, at the total risk of the promoters.

The licence to construct a gas plant facility and the licence to operate gas plant facility shall apply at the appropriate phase of development of the project.

Department of Petroleum Resources

SCHEDULE

FORM

(Regulation 1)

Petroleum Refining Regulations 1974

APPLICATION FOR A LICENSE TO CONSTRUCT/OPERATE

A GAS PLANT IN NIGERIA

1. Name of applicant:.....
2. Registered address in Nigeria:.....
.....
3. Nationality of applicant:.....
.....
4. a) Names, address and nationality of directors (where applicable)
.....
.....
.....
c) Names, addresses and nationality of every individual or company participating in The project and the extent of each individual's or company's participation:.....
.....
.....
.....
5. Capital available to applicant for the construction of the gas plant facility and details of the Method of financing proposed:
.....
.....
6. Proposed location of the Gas Plant Facility:.....
.....
.....
7. Type of gas plant proposed :.....
.....
.....
8. Plant capacity range:.....
.....

9. Proposed source(s) of feedstock:.....
.....
.....

10. a) Products to be produced:.....
.....
.....

b) Detailed specifications of products (to be attached to this application):.....
.....
.....
.....

11. Proposed market for products produced:

Estimate, by product grade, or proposed product exports, if any.....
.....
.....

12. State if participants will accept participation of private Nigerian investors:.....
.....
.....

13. Any additional information in support of application (provide the information on a separate sheet wherever necessary):.....
.....
.....

I declare that the foregoing particulars are true and correct.

.....
Signature of applicant, or his Attorney.

Date:.....

- N.B
- i) The non-refundable application fee of \$50,000.00 (Fifty thousand US Dollars) should be forwarded with this application.
 - ii) Particulars of documents attached to the application should be listed hereunder.