

Draft Report

Natural Gas Transportation Manual

*Commercial Rules for Third Party
Access for Pipeline Transportation of
Natural Gas*

Prepared for:

The Office of the Special Assistant to
the President, Petroleum Matters

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Griffin House, 1st Floor South, 161 Hammersmith Road, London W6 8BS, UK
Tel: +44 20 7950 1600 Fax: +44 20 7950 1550

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This document, The Natural Gas Transportation Manual (or “Gas Manual”) sets out guidelines for the drafting of a **Natural Gas Network Code**.

1.1 NATURAL GAS AND THE GAS TRANSPORTATION NETWORK

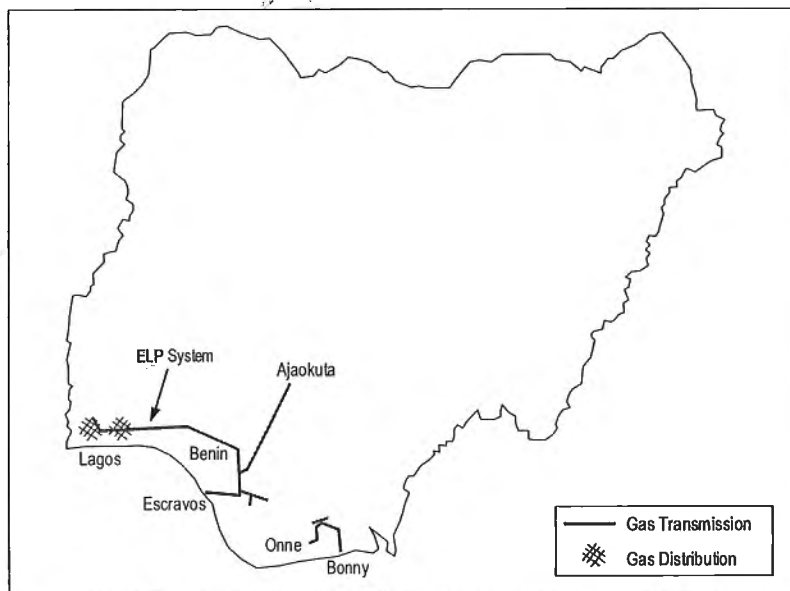
Natural Gas is a naturally occurring gaseous hydrocarbon mixture, which is made up of several gases, notably; Methane, Ethane, Propane, Butane etc. When most people refer to natural gas and for the context of this Natural Gas Transportation Manual, natural gas is taken to mean a gas primarily consisting of methane.

Natural gas demand originates from three main sources: as fuel for electricity generation, as fuel for heating industry and homes, and as feedstock for petrochemical processes. For the latter (petrochemical feedstock applications), consumers have no other choice but to utilise natural gas, whereas for the former two (electricity generation and heating) natural gas competes with other primary energy sources such as petroleum liquids, coal, and even firewood.

Due to the fact that gas is not readily fungible, it is generally transported from the producer(s) to the consumer(s) by pipeline in almost all cases: This is the Natural Gas Transportation Network.

Responsibility for the gas transportation network in Nigeria falls to the Nigerian Gas Company (NGC). The gas transportation network to date has more or less developed on a project specific basis with a Western and an Eastern system that are presently not integrated (refer Figure 1.1).

Figure 1.1 The Natural Gas Transportation Network in Nigeria Today



PP: Nigeria Energy Sector Reform/Oil & gas/Pipeline/FE_1

The Western system is the larger of the two systems and comprises mainly of the Escravos-Lagos Pipeline (ELP) system. The ELP had the original design intent of supplying gas fired power stations in Lagos as well as acting as a backbone to spur gas demand growth. The ELP is unfortunately presently under-utilised though there are projects being developed that would take up some of its available capacity. The Eastern system was designed less as a network but rather more to serve specific industrial projects, some of which have been shut down altogether due to issues unconnected with gas supply. There are also plans to integrate the Western and Eastern systems, but financing for this is presently not believed to be in place.

Though a number of other project specific gas pipelines have also been developed by some producers in the Niger Delta region, the network coverage of Nigeria as a whole is limited as can be seen from the figure above.

The rigid nature of pipeline infrastructure, coupled with the fact that pipelines carry high fixed costs, but low marginal costs of supply (i.e. the cost of serving a single customer of an established network is low), makes pipelines monopolistic entities by nature. This makes the gas market more analogous to other monopolies such as railways, postal services, and water utility supply.

In order therefore to grow a gas market against a background of: competition in production/supply; monopolistic intermediate supply infrastructure; and an end consumer market which is competitive in nature, *it is essential to allow consumers a choice of upstream gas suppliers, and a mechanism for allocating capacity* in the pipeline system.

¹ Quote from Transco Network Code Version 2.35 - Reference 3.

1.2 WHAT IS THE GAS NETWORK CODE AND WHY IS IT REQUIRED?

A Gas Network Code essentially forms the basis against which gas transport pipeline capacity is allocated competitively between gas shippers, and defines how the gas transporter is regulated.

A Gas Network Code does not specify the wellhead price of gas or the consumer price paid for gas, but it does detail and regulate the gas transportation tariff, which is usually a significant proportion of the final gas price to the consumer. As gas transportation is a high fixed-cost, low marginal-cost business, in addition to the gas transportation tariff, pipeline charges frequently include a capacity charge, which can be a comparatively high percentage of the gas tariff. Such capacity charges also fall under the scope of the Gas Network Code and should be regulated as such.

A Gas Network Code on its own does not mean a competitive gas market will result, or that if one develops on the supply side, that the benefits will be passed on to the consumer. Therefore, the Gas Network Code must be backed up with robust regulation of the industry by an autonomous and capable Gas Regulator, who has the resources available to perform this role.

1.3 WHEN CAN OR SHOULD A GAS NETWORK CODE BE INTRODUCED?

The OECD Committee on Competition Law & Policy¹ states “*One lesson learned is that it is far easier to achieve structural reforms to promote competition before an integrated monopolist is privatised*”. This conclusion was based on the experience with British Gas privatisation in the UK, and is generally accepted as industry wisdom today.

Historically, gas development in Nigeria occurred more as an afterthought of oil production which invariably has led to limited and fragmented network development. The sector currently lacks proper legal and regulatory frameworks that have been specifically designed for gas, and, of equal significance, no regulator for the sector presently exists, which has forced NGC to assume the regulatory mantle in addition to its commercial role. This clearly poses severe conflicts of interest for the company and the sector. This NGC recognises and is keen to see a resolution to the problem. These issues are being addressed by a major World Bank funded study, the Nigerian Natural Gas Strategy Study and will not be addressed directly in this document, however proposed reforms of the gas sector in that study include possible privatisation of the system. Nexant has also recently completed the first draft of a National Oil & Gas Policy in which we propose an urgent need for the creation of a Gas Regulator.

On the operational level, NGC is vested with the rights to develop and market gas in the country by law, making it a merchant trader and the sole supplier to gas consumers in Nigeria. This arrangement has two major drawbacks:

- As a merchant trader NGC is unnecessarily forced to tie up working capital in purchasing the gas it transports, which limits its ability to fund maintenance or network development
- NGC as sole supplier of gas in the gas network restricts consumer choice and possible access to cheaper gas.

Again these issues are being addressed by the aforementioned studies the outcomes of which may result in unbundling of NGC from NNPC, followed possibly by full privatisation.

The current situation in Nigeria is therefore that NGC controls the gas “network” and is an *integrated monopoly*, encompassing production², transmission, as well as distribution/marketing, while the sector as a whole is on the verge of major reform. This would suggest that the present appears to be a good time to introduce rules for reform in Nigeria, which would include the Gas Network Code. However, the fact that limited network infrastructure presently exists for gas means that the code would need to be mindful of implications for network development under open access rules.

¹ Reference 1, Promoting Competition in the natural gas industry, OECD Directorate for Financial, Fiscal and Enterprise Affairs; Committee on Competition Law and Policy.

² Through the parent company, NNPC

The NATURAL GAS TRANSPORTATION CODE (or “Gas Network Code”) is the principal document defining the gas network operations, and forms the basis of the agreements between a GAS TRANSPORTER (or “Transporter”) and a GAS SHIPPER (or “Shipper”) whose gas it transports. The code, which is a standalone document, covers all gas pipeline Transporters operating in the country, present and future.

This document, the NATURAL GAS TRANSPORTATION MANUAL, (or “Gas Manual”), sets out the guidelines and key considerations for developing the Gas Network Code, and is written to allow future development into the Gas Network Code.

2.1 MAIN DOCUMENTS

A Gas Network Code typically consists of the following main documents:

- **“Heads of Agreement” or Transportation Agreement** This brief document describes the key terms to which the contracting parties (the Gas Transporter and the Gas Shipper) sign up to, and commits the parties to be bound by the terms of the Gas Network Code. It covers principally the details of the parties entering into the contract, governing law, liability definition and limitation, termination provisions etc.
- **Principal Agreement:** This document is the agreement to which contracting parties in the Heads of Agreement sign up. It contains the fine detail of the legal agreements in defining the Gas Network Code e.g. shipping terms, technical specifications for gas and storage systems, confidentiality agreements, dispute resolution etc.
- **Gas Market Rules:** These define what the participants can and cannot do e.g. a holder of a Supplier or Shipper License may also hold a Marketer’s License, but MAY NOT hold a Transporter’s License except as define in Section 4.3.1.

Additionally, a further section could be included to cater for the transition period.

- **Transition Agreement:** This document defines the transition from monopoly transporters and shippers, to a more competitive gas network arrangement. It takes precedence over the Principal Agreement until critical dates defined in the Gas Network Code are passed.

The above listed documents together constitute the main elements of a Gas Network Code. In its final form the Gas Network Code would be a detailed document which will define the operation of the pipeline system. But underlying the detail the essential features should be clear.

2.2 OWNERSHIP AND REVISION OF THE GAS NETWORK CODE

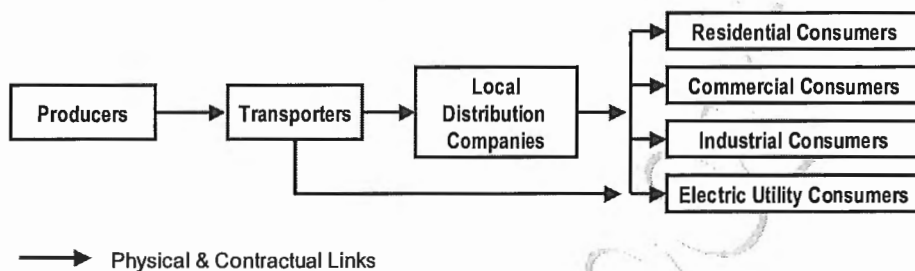
Ownership of the Gas Network Code as it is proposed should lie with the Regulator of the gas sector or Gas Regulator. This overcomes the problem of responsibility for maintaining and obtaining the Gas Network Code, where several companies are covered by the term Gas Transporters, as is the case in Nigeria.

It is a given that the Gas Network Code once defined will most certainly need revisions to cater for market realities and changes to legislation. It (the Gas Network Code) must therefore be flexible and allow room for changes from time to time, but not too frequently as to create confusion amongst market participants as to the effective Gas Network Code revision under which they operate. Provision must be made such that any market participant (e.g. Supplier, Shipper, Regulator etc.) in the deregulated environment may initiate changes to the code.

3.1 TRADITIONAL GAS MARKETS

Traditional gas markets may be depicted as shown in Figure 3.1 below.

Figure 3.1 Traditional Gas Market Structure



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In the traditional gas market, there is typically a single producer, usually state owned or controlled, with the sole rights to prospecting for and producing natural gas. Such producers, in order to get their gas to market, demonstrate a high degree of vertical integration, usually owning and operating the downstream gas transportation pipeline supplying power stations and industry, as well as the local distribution companies supplying commercial and residential consumers. Under the traditional market structure, competition in gas markets is restricted by the monopolistic nature of the transmission and distribution system, and in most cases by the fact that the consumer has no choice of supplier.

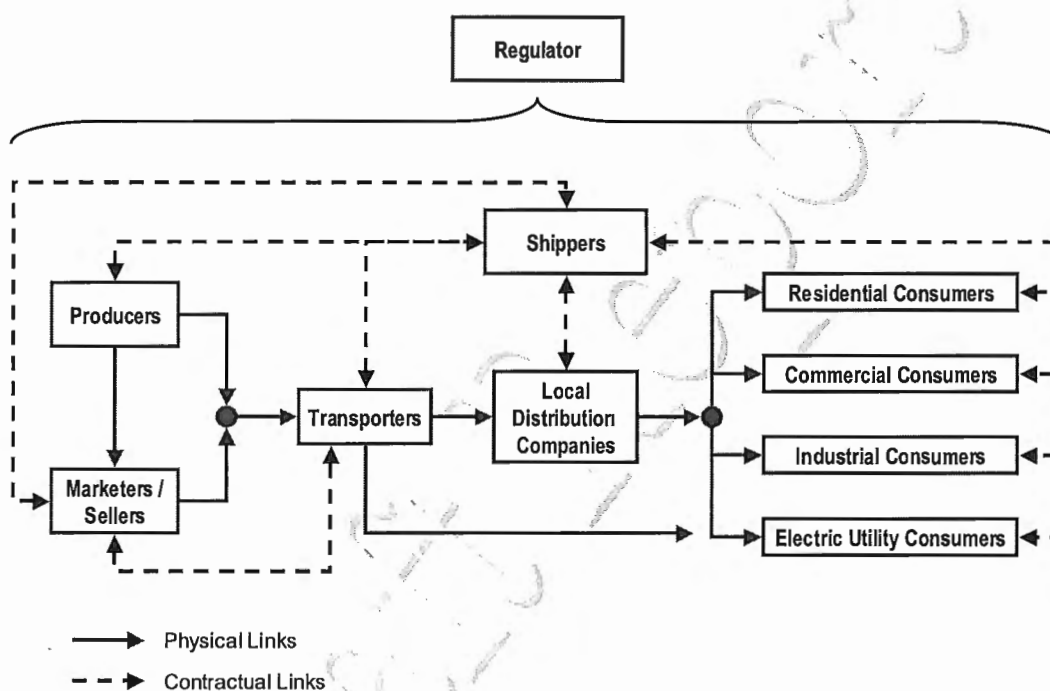
The gas system in Nigeria today retains many of the features of a traditional gas market in that the market chain is dominated by the state oil & gas company directly and indirectly, and gas sales agreements are signed directly with NGC as gas supplier, rather than the gas producers. This limits competition in the sector and is one of the contributing factors to the relatively low utilisation and uptake of gas in Nigeria today. It also limits NGC's capacity to expand the gas network and promote gas market growth.

3.2 MODERN COMPETITIVE GAS MARKETS

With the increase in demand for gas, traditional structures are being revisited and modernised to facilitate competition in the industry, with the ultimate goal of improving efficiency and delivering lower gas prices to consumers.

A typical competitive gas market structure can be depicted as shown in Figure 3.2 below. This structure introduces a number of new participants. The roles of participants depicted in the diagram are defined later in Section 4.

Figure 3.2 Typical Gas Market Structures



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The key point to note with the competitive gas market structure is the fact that the roles of shipper and producer/supplier have been unbundled from that of the transporter, with the transporter being prohibited from owning the gas it transports.

The roles of the participants in the competitive market structure are outlined below.

4.1 GAS TRANSPORTER(S)

The TRANSPORTER (or “Transporter”) is the owner of the natural gas pipeline through which gas is moved irrespective of whether this is a high or low pressure system. Currently in Nigeria, the owner of the high pressure transmission network is the Nigerian Gas Company (NGC), while several local distribution companies (Distributors) have signed Build-Operate-and-Transfer (BOT) agreements with NGC for the low-pressure networks they have developed or plan to develop. Irrespective of the owner of the pipeline network, or whether it is high pressure or low pressure, the Gas Network Code for which guidelines are set out in this Gas Manual applies.

The one complication with the situation in Nigeria presently is that NGC is a Merchant Transporter rather than Transporter in the high pressure system, since it owns title to the gas it transports (a legislative requirement), and operates against stipulated gas sales prices fixed by the government under a memorandum of understanding (MOU). This means that NGC, the high-pressure system Transporter is:

- The de facto sole supplier of gas to the Nigerian market since it also supplies the Distributors with gas.
- Required to tie-up greater working capital than necessary in purchasing gas for transportation
- Exposed to revenue fluctuations since it purchases (or would purchase) gas at “market value” from producers, but sells to Consumers under fixed prices, which in many cases do not cover the cost of supply.

These outcomes are clearly undesirable since a truly competitive market cannot develop where there is; inappropriate pricing, and where the Transporter is also a Supplier of gas, since a strong incentive would be created to restrict the capacity available to rival Suppliers. Additionally, revenue fluctuations arising from gas price volatility and fixed Consumer contract pricing arrangements limit the Merchant Transporter’s capacity to make financial plans, and affect its capacity to fund infrastructure maintenance.

Furthermore, the OECD Committee for Competition Law & Policy notes that “a regulated pipeline operator, which is integrated into gas production or gas marketing has a strong incentive to offer transportation service of a higher price or lower quality to rival producers or marketers, and to resist regulatory attempts which force it to offer non discriminatory access”. The committee goes on to state “Vertical separation of the pipeline network from upstream producers and downstream customers/retailers can enhance competition amongst gas producers and gas retailers”¹.

¹ Reference 1, Promoting Competition in the natural gas industry, OECD Directorate for Financial, Fiscal and Enterprise Affairs; Committee on Competition Law and Policy.

Where such vertical separation is not present, or in the case of Nigeria, where a Gas Network Code might be introduced ahead of a decision to unbundle NGC from its parent company the Nigerian National Petroleum Company (NNPC), who is itself a gas producer/supplier, then an Independent System Operator (ISO) to operate the facilities becomes mandatory in order to ensure a competitive market does develop.

These issues clearly need to be addressed and are being analysed in several on-going studies, and are under consideration for review by the Nigerian government.

4.1.1 Independent System Operator (ISO)

An ISO is a private company whose sole function is to operate the pipeline on behalf of the Transporter. An ISO operates under a license issued by the industry licensor, which in this case is the Gas Regulator. The ISO assures the safe, efficient operation of the pipeline, while guaranteeing non-discriminatory, open access operations for all qualified Shippers. The ISO cannot purchase, own or sell natural gas, or participate in any way in the financial aspects of natural gas production, marketing or transportation.

Regardless of whether the Transporter is NGC, an ISO, a Distributor, or some other entity, the guidelines contained in the Gas Network Code shall apply.

The pipeline owner retains development and ownership rights to the gas network at all times and will contract with the ISO for the provision of operating services as described, and can also contract with the ISO as a Gas Shipper on the same basis as all other shippers.

This Gas Manual will proceed on the following important basis meanwhile:

1. NGC is fully unbundled from NNPC, or in the alternative, an ISO is appointed to operate and manage the network.
2. The high pressure Transporter is specifically prohibited from owning the gas it transports.
3. Low pressure transporters or Distributors retain their right to own and market gas transported in their system, unless or until:
 - a) A consumer contracts for a volume equal to or larger than the Threshold Volume (to be defined in the latter sections of this document), in which case the consumer shall be free to contract directly with the upstream gas producer/supplier of its choice, or
 - b) The expiration of the original BOT agreement, or
 - c) After a specified period of operation as agreed between the parties (but in any event not before the project cost recovery period for the Transporter).

The aim of these measures will be to promote consumer choice, thereby enhancing competition. They have another minor advantage as they enable all Gas Transporters to be treated generically within this Gas Manual and the Gas Network Code to be developed from it.

4.2 SHIPPERS

“Shippers” are hereby defined as anyone who wishes to ship gas for their own use or for sale to Consumers through the pipeline. They can therefore be:

- Private or government entities who are Distributors, Marketers or Sellers
- Consumers (end-users) of natural gas
- Producers of natural gas

Interested individuals may contact the Transporter to be added to a List of Approved Shippers. Said list will be maintained and published by the Transporter. The Transporter may remove Shippers from this list according to the provisions delineated in Section 8.1, Sanctions.

4.3 DISTRIBUTORS

“Distributors” or Local Distribution Companies (Distributors) are defined as companies that purchase gas and distribute the same through a distribution system to residential, commercial and industrial customers. Distribution companies would have to maintain Firm Transportation capacity to supply certain classes of customer (e.g. residences, power stations or hospitals). Supply to these customers would not be interruptible unless an Emergency or Force Majeure is declared. A higher tariff would be payable to guarantee supply unless where specifically exempted e.g. for hospitals. All other customers would be on an interruptible supply.

4.3.1 Special Exemption

As a special exemption, Distributors can be Shipper and Transporter as defined in this document under specific circumstances. These are:

- To a Consumer whose consumption is lower than the Threshold Volume.
- After a specified period of pipeline operation (as agreed between the parties, but in any event not before the project cost recovery period for the Transporter), and/or within the period of validity of the company’s BOT agreement.

4.4 CONSUMERS/END USERS

4.4.1 Large Consumers

Large Consumers, as defined herein, are those natural gas users that would be in a position to purchase and ship gas meeting or exceeding the Threshold Volume for their own needs. This group would include power plants, industrial and large commercial customers. Power plants may contract as firm customers requiring Firm Transportation capacity, unless they have the ability to switch to other fuels or they have a low dispatch priority.

4.4.2 Small Consumers

Small Consumers, as defined herein, are those natural gas users that consume gas volumes falling below the Threshold Volume. This group would include small industrial and commercial customers as well as domestic customers. Such Consumers would usually be firm and would not be subject to interruption of services, except where special circumstances, such as force majeure apply.

4.5 PRODUCERS/SELLERS

Producers, as defined herein, are those companies engaged in exploration for, and extraction and processing of gas to meet technical standards as defined in the Gas Network Code for sale to Consumers.

Sellers, as defined herein, are those companies engaged in the sale of gas meeting the appropriate specification for the network as defined in the Gas Network Code for sale to Consumers.

For the purposes of this Gas Network Code, Producers and Sellers shall be treated equally and can contract directly with Transporters for allocation of network capacity, and with qualifying Consumers (meeting the Threshold Volume) for Gas Sales Agreements (GSA).

Producers shipping gas for their own use would be considered as Consumers. That is, they would be either firm or interruptible. When producers are shipping gas on behalf of others, as Sellers, the volumes of gas for non-interruptible customers would have to be under a Firm Transportation schedule, while those of other Consumers would be interruptible as permitted under the Gas Network Code.

4.6 INDEPENDENT ADVISORY BOARD

If an ISO is required then an Independent Advisory Board (IAB) shall be appointed to provide the ISO with advice on policies, procedures, regulations and pricing for the operation of the system (Note: neither the ISO nor the IAB is shown in Figure 3.2). The Independent Advisory Board will be composed of three representatives from the groups of Shippers, one from the high pressure gas Transporter, two from the low pressure gas Transporters (if required), one from the Office of the Gas Regulator, and one from the Department of Petroleum Resources, for a total of seven.

In order to clearly identify the roles of participants operating in a competitive gas market under the Gas Network Code, it is necessary to define some key terms for the operation of the system.

5.1 DEFINITIONS

5.1.1 Natural Gas Pipeline Network

Natural gas pipeline network within the context of this document refers to all pipelines (trunklines and or distribution networks or laterals) designed to convey natural gas from producers or suppliers to consumers, or from receipt points to delivery points. The Gas Network Code shall apply regardless of whether a pipeline is standalone (e.g. a project specific pipeline) or interconnected with other pipelines and or storage facilities.

5.1.2 Product Transported

The product transported is Natural Gas, which is defined as the processed hydrocarbon gases consisting primarily of methane.

5.1.3 Receipt Points

Natural Gas will be received at the head of the pipelines, at the interconnection of the Transporter's facilities with those of the Producer/Seller or Shipper. New receipt points, or connections, will be in accordance with the operating procedures as discussed below.

5.1.4 Delivery Points

Natural Gas is delivered at the interconnection to the Shipper or Consumer's facilities or to the facilities of any third party receiving the gas once the transportation service has been performed.

5.1.5 Storage Points

Natural gas can be stored in dedicated storage facilities¹ at, for example, system nodes or bottlenecks. They enable network flow smoothing whereby excess gas can be transported through the network at off-peak periods, to be withdrawn at peak demand periods. Gas storage facilities may be operated by the Transporter, Distributor or by a separate storage company.

5.1.6 Transmission Pressure

Pipeline gas can be divided as follows:

- High-pressure "transmission" systems, which are usually point-to-point and operate between 30 and 100 bar of pressure.
- Low-pressure "distribution" systems which are usually grids serving small and medium sized Consumers, and operating at up to 30 bar of pressure

The divide between these two groups is not rigid.

¹ Storage tanks, cavities, as LNG etc.

5.1.7 Pipeline Quality Gas

Pipeline quality gas is gas meeting a specified:

- Calorific value,
- Density,
- Dew point (to avoid condensation in transport lines and damage to compressors), and
- Gas Composition (with little or no impurities).

5.1.8 Threshold Volume

Open Access or Third Party Access on any Transporter's network shall be made available to an end-user or Consumer utilising 2.0 MMSCFD (for example) or more of natural gas at a single site when averaged over 365 days.

5.1.9 System Balancing

Within an Open Access or Third Party Access system, it is impossible for every shipper to exactly match demand from their customer at all times, which produces an imbalance of supply and demand. The process known as "System Balancing" or "Balancing" is where, a single party designated by law or the Gas Regulator, has the responsibility of ensuring the network safety, integrity and efficiency by introducing additional gas into the system to meet shortfalls, or withdrawing excess gas to address over supply. Though the Gas Network Code makes each Shipper financially responsible for the costs incurred in managing a system imbalance, it is logical that only one entity, the Transporter, has the responsibility for physically balancing the gas network.

In order to prevent abuse of the system by any party, such physical intervention by the Transporter shall only be initiated beyond an allowable tolerance for imbalance fluctuation within the system i.e. low or high pressure beyond specific limits and likely to lead to a network emergency if not corrected. In other words, if the imbalance is within network operating limits (plus or minus a few percentage points of pressure), then no action is taken. Such minor imbalances can be redressed by the Shipper at the end of an operating month when such imbalances are totalled and gas credits or debits requested from the affected shippers.

In the event that a Shipper delivers too little or supplies too much gas as to be in danger of endangering the system, i.e. the allowable daily imbalance limits are exceeded, then the Transporter shall act to maintain system integrity by adding or debiting gas from the system as the situation warrants.

To avoid monopolistic practices within the balancing operation, the Gas Network Code must ensure the Transporter is encouraged to purchase or sell gas for emergency system balancing on a competitive basis i.e. close to the cost of supply using gas from the lowest cost Supplier on the day of purchase or sale (usually achieved through spot market pricing).

Equally, in order to discourage Shippers creating or deliberately running an imbalance, a penalty system is utilised by the Gas Network Code. For a negative imbalance, i.e. under supply by a Shipper, the Transporter's cost of supply is multiplied by a factor greater than unity (i.e. cost plus) so that the Shipper is charged a fee above the cost of supply of gas. Conversely, for a positive imbalance, i.e. over supply by a Shipper, the Shipper is paid their cost of supply multiplied by a factor less than unity (i.e. cost minus) so that the Shipper recovers less than their cost of purchasing gas. In so doing, each Shipper is provided with an economic incentive for remaining within system tolerance limits.

5.1.9.1 Special System Balancing Rules

Where there exists more than one Transporter in a chain, such as a high pressure system and a low-pressure system (an example being NGC and a Distributor), then the high-pressure system operator shall be deemed to be the "Transporter" for system balancing purposes, while the low-pressure system operator shall be deemed to be the "Shipper". The low-pressure system operator may then recover any costs so incurred from the Shipper causing the imbalance from within its own network.

5.1.10 Shrinkage¹

"Shrinkage" accounts for unaccounted for gas such that may be lost in the system through leaks, accounting meter errors, and that consumed for own use by the Transporter (e.g. for compressor drivers). The Transporter shall be responsible for procuring such shrinkage gas in addition to its responsibilities in system balancing. A Gas Network Code shall make provision for the Transporter to recover the cost of such shrinkage gas through the tariff system, but unlike for system balancing, such Shrinkage gas shall be recovered at cost only without the application of penalties. In other words the Transporter shall be cash neutral for Shrinkage gas transactions.

¹ Strictly speaking, shrinkage in the true gas sense refers to tangible losses such as reduction in volume across a gas plant due to extraction of liquids for example. However, in this document it is taken to cover tangible, and intangible losses.

Pipeline natural gas is generally homogeneous. The Transporter will accept natural gas that is "Pipeline Quality Gas" given that it meets the specifications for acceptable natural gas for transportation as defined in the Principal Agreement section of the Gas Network Code. Should natural gas delivered by the Shipper fail to meet the requisite specifications the Transporter may refuse to accept delivery. Further, the Transporter can reject all natural gas involved in litigation or whose title is suspect; that is the Shipper must have clear title to the product. The Shipper must provide such clear title evidence to the Transporter or submit an indemnity bond to protect the Transporter.

Product specifications need to be within a tight tolerance to ensure uniformity of gas sold, and that, where there are several Suppliers operating, Shippers get out what they put in. This is achieved through a heat (calorific) value specification on the gas, or a Wobbe Number specification. A typical gas specification is provided in the table below:

Table 6.1 Sample Gas Specification

Constituents/Data	Est. Values
Methane	91.09
Ethane	6.05
Propane	1.34
i-Butane	0.27
n-Butane	0.26
i-Pentane	0.09
n-Pentane	0.06
Hexanes	0.05
Heptane+	0.09
CO ₂	0.45
N ₂	0.25
O ₂	Nil
H ₂ S	0.00
Total	100.00
Specific Gravity @ 60°F	0.64
Net Heat Value (BTU/SCF)	960.00
Wobbe Number (BTU/SCF)	1200.00

For the purposes of a gas user, the Wobbe Number is probably the most useful number, since if this is maintained constant or within limits, then the user obtains a fixed quantity of heat for a given quantity of gas.

Open Access or Third Party Access can be defined as a system whereby owners or operators of pipelines are compelled to make transmission capacity within their facilities available to any individual or company (the Third Party) wishing to ship product through the facilities to their own consumers at recognised delivery points along the system. This is usually done in exchange for a transportation charge payable by the shipper, which can either be explicitly defined or established by auction. In either case, the Gas Network Code allows for regulation of the tariff charged for transporting product through the pipeline by the industry regulator.

The importance of the open access principle is that it is an effective tool for inducing competition in an industry with the natural characteristics of a monopoly, thereby ensuring consumer choice which helps to drive efficiency up, and prices down.

7.1 OPEN ACCESS POLICY

All qualified natural gas owners who wish to ship their product from the Receipt Point(s) to the Delivery Point(s) shall have access to the pipeline on a non-discriminatory basis according to the terms of the operating procedures as outlined below.

New connections to the Transporter's pipeline will be considered only if made by formal, written notice to the Transporter, and Transporter will be required to make such connections subject to the following:

- All connections will be subject to design requirements necessary for the safe, secure and efficient operation of Transporter's pipeline in accordance with generally accepted industry standards.
- All connections must be in accordance with Government regulations, including environmental and safety regulations.
- Permits and licenses will be obtained from the Gas Regulator who will be responsible for construction inspection to ascertain that new connections adhere to existing regulations.

7.1.1 Service Obligations

Unlike competitive industries, no obligation exists on a Transporter to supply a consumer even if the transporter's facilities are proximal to the consumer. This again is due to the high capital-cost, low marginal-cost nature of the gas market. Put differently, the marginal cost (gas volume, administration etc.) of supplying a customer is comparatively small when the capital cost of the infrastructure (pipeline, valves, metering etc.) to supply that customer is considered. Various countries address this in different ways. Some place a service obligation on the Transporter not to refuse service to a customer within its area of operation; while others (e.g. Korea) state that the Transporter is obliged to provide a service where this is requested by more than 25 consumers (in the case of households) within a 100-meter distance.

This Gas Manual proposes that service shall not be denied to a consumer who so requests, where service to that consumer will result in a burner tip gas price (gas + capacity charge + variable charge) that is say less than 90% of the averaged annual cost of alternative fuel to that consumer. The figure of 90% is used as an example as research¹ has shown that a consumer will convert to natural gas if the overall cost reduction achieved in consuming gas over an alternative fuel choice on a calorific value basis is more than 7%. It should be stressed that the 90% value is a general guideline and would not apply in every case and cannot therefore be applied rigidly since some customers may have particularly high conversion costs due to the nature of their process and or equipment.

¹ The Economic Appraisal of Natural gas Projects, Oxford University Press 1998, Willem J.H. van Groenendaal

7.1.2 Peak Demand & Interruptibility of Service

Demand for natural gas is not constant due to the nature of the Consumers; power generation, heating, cooking etc., with demand undergoing daily, as well as seasonal cycles. Where open access to a pipeline network operates, different producers/suppliers will contract with their Consumers up to their maximum capacity to supply or the ultimate pipeline capacity, and NOT on a pro rata basis taking into account the number of other producer/suppliers engaged in gas supply. This therefore creates bottlenecks during peak times, for which a system needs to be designed to ration network capacity.

The simplest means by which this can be done for short-term rationing of network capacity is through supply restrictions to consumers who have agreed to sign or are obliged to sign “interruptible service” agreements as specified by the Gas Network Code. Such consumers usually have dual-firing capability and can obtain lower tariffs for gas transportation from the Transporter for this concession. However, this system could be open to abuse since it could for example encourage the Transporter to interrupt the flow of gas to such consumers more regularly than is necessary, to persuade them to move to a higher, less-interruptible service tariff. It should be noted that this differential tariff method is by inference more complex to regulate.

A more complex but open way to manage peak capacity allocation is for open bidding for pipeline capacity at various times of the day or year. This however leaves the door open to artificial capacity constraints where a supplier bids for more capacity than is needed in order to deny that capacity to rival suppliers. Though this can be addressed by the regulator mandating that unused capacity after a specified period becomes freely available for resale to other suppliers, the preference would be for an Interruptible Service type arrangement.

Other forms of peak demand smoothing can be employed such as storage, LNG and “line packing”¹. These also need to be regulated under the Gas Network Code with regards to ownership, operation and costs.

¹ Line packing describes the method by which the gas network itself, which constitutes a substantial voidage, can be used to store excess gas by increasing system operating pressure during off-peak periods. The excess gas compressed into the system in so doing can then be withdrawn in peak periods with little effect on consumer offtake.

7.2 OPERATING PROCEDURES

7.2.1 Duties of the Transporter

Prior to the initiation of open access operations, the Transporter will publish detailed operating specifications that include, at a minimum, the points discussed in these operating procedures in the Network Code Principal Agreement. The specifications will include such items as publications of shipping schedules; daily, monthly and annual nominations; quality restrictions for the receipt of natural gas, and other operational factors as required. Shippers will be required to meet these operational specifications as set forth by the Transporter or Gas Regulator.

The Transporter will assure the receipt, transportation and delivery of natural gas with reasonable dispatch and diligence, in a prudent and efficient manner, in accordance with good industry practices. The Transporter will test and meter the natural gas of each Shipper prior to its receipt from Shipper and prior to delivery to the Shipper or Consumer. Shippers and Consumers have the right to be present during said testing or metering of their shipments. Quantities of receipts will be based on Total Calorific Value expressed in British Thermal Units (Btu's). Quantities may be adjusted for line losses and fuel use related to the transportation of the gas received.

7.2.2 Specifications and Restrictions

The Transporter will accept natural gas of a certain quality based on heating value; water, hydrogen sulphide, and carbon dioxide content; and other quantifiable impurities. The Transporter will reject delivery of gas that does not meet "Pipeline Quality Gas" specifications.

The Transporter will prepare the specifications for the gas to be transported in the pipeline that will not affect the operation and integrity of the transportation system. These specifications will be subject to approval by the Gas Regulator.

7.2.3 Types of Contracts

The Transporter will establish three different service schedules for the three types of transportation services it will provide to Shippers. These services are: (1) Firm Transportation (FT), (2) Interruptible Transportation (IT), and (3) Exchange and Displacement (ED).

1. Firm (or Non-Interruptible) Transportation Service: this service implies the delivery of contract quantities without interruption, except in emergency or Force Majeure cases.
2. Interruptible Transportation Service: this service foresees and allows the interruption of deliveries by the Transporter, with due notice, to the Shipper(s). These interruptions are not only due to emergency and Force Majeure, but also those necessary for the Transporter to comply with all its FT schedules.
3. Exchange and Displacement Transportation Service: this service allows Shippers to replace the delivery point of gas and/or to replace receipt points; within specified limitations. This service shall be performed as a firm service, subject to interruption only when capacities at the delivery/receipt point exceed the operating capacity of the pipeline, or in case of emergency or Force Majeure. Shipper is responsible for any necessary arrangements with third parties to arrange this transportation, and these arrangements must be compatible with the Transporter's system operation.

7.2.4 Nominations

Shippers shall provide the Transporter, for each transportation schedule above, estimates of the daily, monthly and annual quantities of natural gas that the Shipper desires to be transported through the pipeline(s) at least three months in advance of the services, every year of the duration of the transportation agreement. Also, the Shippers will prepare an estimate of daily quantities for the following month two weeks in advance of the same. For service required on any day under each of the Shippers' service agreements, the Shipper will prepare its Daily Nominations, in writing, by 3 p.m. on the day immediately preceding the day for which the service is required (Shippers Daily Quantity). This quantity will not exceed the Maximum Daily Quantity limits (as explained below).

In the event that the Transporter determines it can not supply these daily-nominated volumes, it will inform the Shipper before 5 p.m. of the same day of the Available Quantity. The Shipper will advise the Transporter no later than 6 p.m. of a Revised Quantity that shall not exceed the Available Quantity. Unless an emergency or Force Majeure is declared, the Transporter will be obligated to supply no less than the agreed upon firm transportation capacity for those Shippers with FT agreements and such quantities permitted by the provisions of the other service agreements.

7.2.4.1 Maximum Daily Quantity

The Maximum Daily Quantities (MDQ) are specified in the executed service agreements for the different transportation services. The volumes of gas identified in MDQ's (plus the retention percentages for fuel and losses also in the agreement) represent the delivery obligations of the Transporter. The Transporter's maximum daily delivery obligation shall not exceed the lesser of the following two quantities: (a) Shippers' MDQ or (b) the Shippers Daily Quantity (as explained above).

7.2.4.2 Efficient Utilization - Nomination

It is in the public interest that the pipeline system be operated efficiently, maximizing its utilization. Efficient utilization requires that potential Shippers not be denied service because of unrealistic or excessive (unused) nominations by any Shipper. To discourage such activity, the Transporter shall be permitted to include in its monthly billings to Shippers a Nomination Under-run Penalty. This penalty will be calculated by multiplying the amount by which the quantities effectively used by the Shipper on every day of the month are less than the nominated quantities, by a penalty amount expressed in No. ___ per MMBtu. The amount of daily quantities subject to this penalty will have to exceed a permissible tolerance of 3% (say) of nominations either way, to allow for metering errors and to allow Shippers some leeway.

7.2.4.3 Gas Imbalances and Make-up Gas

After the end of each month the Transporter will determine for each service agreement the difference between the quantities taken by the Shipper from the Transporter and the Shipper's actual deliveries to the Transporter during such delivery month (Gas Imbalance). For these Gas Imbalances, the Shipper will pay the Transporter a charge equal to the imbalance multiplied by No. ___ per MMBtu. This penalty will be applied if the quantities taken by the Shipper exceed the volumes delivered by the same Shipper for that month, unless the Transporter and the Shipper agree on a procedure by which Shipper shall make-up such gas imbalance.

The Shipper may be allowed to Make-up all gas imbalances as from the first day of the month following the delivery month in which the gas imbalance occurred at the discretion of the Transporter¹, subject to no single imbalance event by the Shipper in that month exceeding the allowable system imbalance limits. Make-up will be scheduled to take place evenly over a period of time (Recovery Period) as approved by the Transporter. The Transporter shall use its best efforts to schedule such Make-Up so that the Recovery Period is as short as possible.

If the gas imbalance is caused by the Transporter, and due to such non-compliance the quantities taken by the Shipper should be less than the Shipper's actual deliveries to the Transporter, the Transporter will deduct from the next bill a compensatory charge. If the Transporter and the Shipper do not have an agreed upon procedure to make-up said imbalance, the Transporter will deduct from the Shippers bill a sum equal to the Gas Imbalance multiplied by No. ___ per MMBtu.

7.2.5 Transportation Tariffs

The tariffs for transportation of natural gas for the three types of services (FT, IT and ED) from receipt to delivery points are included in the Tariff Methodology section of the Gas Network Code (to be developed along with the Gas Network Code).

The Transporter is responsible for publishing the Transportation Tariffs and any revisions in such a manner that all the Shippers will know the tariff prior to tendering for any shipments on the system. Each publication of the Transportation Tariff will include the effective date of the applicable tariff. The tariff charged for any shipment will be that tariff that is effective when the Shipment is received into the system.

The Transporter will invoice Shippers monthly for their shipments during the proceeding month. Shippers must render said payments for natural gas transportation within 20 days of the receipt of an invoice from the Transporter.

In the event that an ISO is required to operate the system ahead of unbundling of NGC from the parent company NNPC, then the Tariff system will include the amount for actual transportation that is remitted by the ISO to the Owner (NGC) plus a surcharge, which is the amount that is required to compensate the ISO for operating the system.

¹ The Transporter's discretion may also be applied where for example a Shipper is not a repeat or habitual imbalance causer.

7.2.5.1 Tariff Structure

Setting a Tariff structure is a key but complex task for a Gas Regulator, and which will only be touched on briefly in this document. The problem usually lies in determining the cost structure of the Transporter i.e. the proportion of fixed versus variable costs, and establishing a value of the assets in place. This makes it difficult to establish what should be a reasonable rate of return for the Transporter, and means that the Transporter, who wields significant market power could effectively negotiate to its advantage to allow it charge significantly above their *long run marginal cost* of supply. To address this problem requires a well-trained and capable regulator (who where necessary calls on the assistance of established regulators and or consultants) to arrive at an appropriate Tariff Methodology.

Assuming that regulatory capacity is not an issue for now, then there are generally two tariff structures available to the regulator in controlling market power in a monopolistic market, these are:

1. Rate of Return tariff systems.
2. Incentive Tariffs such as Price Cap tariff systems.

The problem with the first, Rate of Return Regulation is that it can lead to what is generally referred to as “Gold Plating”, where a Transporter over invests in infrastructure and provision of services, which do not add value for the customer. The result of this would be that tariffs would need to be higher (than if optimal investments had been made) in order to give the Transporter the stipulated rate of return. Another important disadvantage is that it discourages network expansion and market growth, since a Transporter could achieve better rates of return by over investing in existing facilities.

The second, Price Cap Regulation, though more complex to operate, actually delivers better results to the Consumer, which is the objective of deregulation. The most effective form of such price cap regulation is linked to inflation or retail price index (RPI) less a calculated efficiency factor. This is generally expressed as (RPI-X)%. The theoretical effectiveness of this type of regulation is that it generates real cost reductions over time, and compels companies to be more efficient year-on-year.

Without prejudice to any of the above, the following sanctions will be in force for the transportation of natural gas under the open access regime.

8.1 SANCTIONS

8.1.1 Transporter

If the Transporter, including any of its employees or managers, violates, or conspires to violate, any of the open access provisions of these Commercial Rules, said Transporter (and/or employees and managers) would be subject to fines and imprisonment according to the laws of Nigeria. Repeated violations of such Open Access Rules will result in the confiscation of the Natural Gas Transportation System by the Ministry of Petroleum Resources for sale to another independent party.

8.1.2 Independent System Operator (If Required)

Where an ISO operates, and in the event that the ISO violates any provision of the license to operate the system, the following will occur:

If the situation can be remedied, the ISO will have 60 calendar days to remedy the situation. If after the said 60 days, the situation is not remedied, the ISO is subject to revocation of its license, which will then be awarded to a new firm according to the procedures for granting such licenses.

If the situation cannot be remedied, the Ministry of Petroleum Resources will rule on the ability of the ISO in violation of the rules to continue its functions. If the Ministry rules that a new ISO is required, a new firm will be licensed to act as the ISO according to the procedures for granting such licenses. Between the time of the ruling and selection of a new firm to act as the ISO, the system will be operated by the offending ISO under the supervision of the Ministry.

If the ISO, including any of its employees or managers, violates, or conspires to violate, any of the open access provisions of these Commercial Rules, said ISO (and/or employees and managers) will be subject to fines and imprisonment according to the laws of Nigeria. Repeated violations of such open access rules will result in the revocation of the ISO's license, and the Ministry of Petroleum Resources will select a new ISO according to the procedures for granting such licenses. Between the time of the ruling and selection of a new firm to act as the ISO, the system will be operated by the offending ISO under the supervision of the Ministry.

8.1.3 Producers/Sellers

If any Shipper, including any of its employees or managers, violates, or conspires to violate, any of the open access provisions of these Commercial Rules, said Producer/Seller (and/or employees and managers) would be subject to fines and imprisonment according to the laws of Nigeria. The repeated violation by any Producer/Seller (and/or its employees or managers) of the open access provisions of the Gas Network Code will result in the Producer/Seller being deleted permanently from the List of Approved Suppliers.

8.1.4 Shippers

If any Shipper, including any of its employees or managers, violates, or conspires to violate, any of the open access provisions of these Commercial Rules, said Shipper (and/or employees and managers) will be subject to fines and imprisonment according to the laws of Nigeria. The repeated violation by any Shipper (and/or its employees or managers) of the open access provisions of these Commercial Rules will result in the Shipper being deleted permanently from the List of Approved Shippers.

Any Shipper who does not pay the Transportation Tariff within 20 days of receipt of an invoice must pay interest on the overdue amount for each day of delayed payment at a rate of interest equal to 125 percent (125%) of the prevailing Central Bank of Nigeria base rate (if the funds are sourced in Naira), or 125 percent (125%) of the central bank base rate in the currency the funds are sourced in. Repeated late payments may result in the deletion of the offending Shipper from the List of Approved Shippers at the discretion of the Transporter (or ISO).

Shippers who violate the Operating Specifications and Regulations published by the Transporter are subject to fines, removal from the List of Approved Shippers or both at the discretion of the Transporter.

8.2 REMEDIES

These will be as defined in the Gas Network Code or as negotiated between the parties

DISCONTINUED

In the event that a dispute should arise between the parties, the Gas Network Code must set out the rules for resolving such disputes with as quickly and efficiently as possible. This manual will refer readers to Section A.10 of the attached Sample Gas Network Code for an outlining principle for typical dispute resolution.

A.1 PREAMBLE

This Sample Gas Network Code, henceforth termed the “Sample Network Code” to avoid confusion with the **Gas Network Code**, is a sample document that highlights certain important elements of the relationship between network operators and suppliers that are necessary to support the introduction of a more competitive natural gas transportation market.

This Sample Network Code is based on the Gas Network Code issued by the Australian Ministry of Mines and Energy.

A.2 DEFINITIONS

“Access arrangement” means an access arrangement for third parties to access a pipeline network, deemed to be approved by the Gas Regulator;

“Approved request for service” means a completed request for service in respect of which the network operator has capacity to supply the service;

“Basic metering equipment” to be defined in gas market rules adopted by the Gas Regulator;

“Claim” includes any claim, legal action or demand;

“Completed request for service” means a completed request for service under an access arrangement;

“Consumption data” means the historical data collected on the consumption of natural gas by a customer;

“Customer” or **“Consumer”** means a person who is supplied with natural gas by a supplier;

“Data error” means a failure by a measurement device to operate or register accurately, a transmission error, corruption of data or any other incident (including unauthorised use of gas), which causes inaccurate or incomplete data to be used by a network operator;

“Delivery point” means a point on a network at which gas is withdrawn from the network for delivery to a customer and which is normally located at:

- The inlet of a gas installation at a customer’s premises; or
- The outlet of the basic metering equipment at a customer’s premises;

“Dispute” includes any difference, dispute, matter, question, controversy, claim or legal action;

“Sample Network Code” or **“Third Party Access Code”** means the third party access code for natural gas pipeline systems to be developed and approved by the Gas Regulator; and

“Gas installation” term to be defined in the gas supply act/regulations adopted by the Gas Regulator;

“Gas Market Rules” to be adopted by the Gas Regulator;

“Gas meters regulation” to be adopted by the Gas Regulator;

“Gas Regulator” to be defined

“Gas Supply Agreement” means the supply contract with the customer. General terms (standard form) to be approved by the Gas Regulator;

“Network” means a distribution pipeline within the meaning of the Sample Network Code;

“Non-safety network matter” means a non-safety matter relating to the operation of the network, including the gas works, and which a supplier cannot address with a customer without advice from the network operator;

“Person” includes a natural person, a firm, an unincorporated association or body corporate;

“Regulation” means the gas supply (natural gas retail) regulation to be adopted by Gas Regulator;

“Requirement” means any statutory requirement, notice, order or direction received from or given by a government agency in carrying out its functions under any law;

“Shipper” means a person who holds a shipper’s authorisation/licence and supplies gas to customers within the network;

“Small retail customer” has the meaning given to that term in the gas supply act/regulations adopted by the Gas Regulator;

“Shipper’s authorisation” means an authorisation to supply natural gas to a person by means of a distribution pipeline under the gas supply act/regulations adopted by the Gas Regulator;

“Transporter” means a person who holds an authorization/licence to operate the system;

“TJ” means terajoule.

A.3 APPLICATION OF THE SAMPLE NETWORK CODE

The purposes of the Sample Network Code are to set out the minimum standards for those matters that relate to:

- Exchange of information between, and the management and monitoring of inquiries by, a network operator and a supplier;
- The maintenance and security of meters;
- Maintenance which affects supply to a customer's premises;
- Connection of gas to a customer's premises;
- Discontinuance and recommencement of the supply of gas to a customer's premises; and
- Dispute resolution and other general matters.

Sample Network Code applies to each network operator and supplier and where relevant, Sample Network Code sets different standards for different network operators to take into account varying local circumstances.

Sample Network Code applies to the extent that it is consistent with other laws and access arrangements.

To the extent that Sample Network Code is inconsistent with any law or access arrangement, the law or the access arrangement will apply to the extent of the inconsistency.

A.4 MINIMUM SERVICE STANDARDS

A network operator must offer terms, and a supplier must comply with the requirements, set out in Sample Network Code (“default standards”).

Sample Network Code shall not prevent a network operator and a supplier agreeing to higher service standards than the default standards, subject to compliance with any relevant laws and access arrangements.

If a network operator enters into an agreement with a supplier to provide services at a higher standard than as prescribed under default standards it shall not affect the default standards otherwise required for other suppliers under any provision of the Sample Network Code.

A.5 NETWORK-RELATED INQUIRIES REPORTING PROCEDURES

A network operator and a supplier must at all times have in place practices and procedures to manage the prompt and efficient handling of inquiries reported by customers and the general public to a supplier concerning non-safety network-matters.

There shall be a detailed procedure set for the management and monitoring of network inquiries by a network operator and the framework of rules it must comply with. Such rules shall include but not limited to the following:

- Receipt of a network inquiry from a customer (or the general public) a supplier must notify the network operator of that network inquiry;
- Receipt of a network inquiry notice, the network operator must acknowledge receipt of the network inquiry notice and give an inquiry number to the supplier;
- Receipt of the network inquiry notice or within another time frame agreed between the network operator and the supplier:
 - The network operator to use its best endeavours to attend to and finalise the network inquiry in a reasonable manner; and
 - If the network operator cannot attend to and finalise the network inquiry in a reasonable manner within that time frame, the network operator to advise the supplier of the work to be undertaken and the period of time required to attend to the network inquiry; and
 - The network operator to notify the supplier of attending to and finalising the network inquiry.

If required by a supplier, a network operator must ensure that it can report back to and update the supplier in a reasonable and timely manner determined by the network operator on the status of network inquiries referred to that network operator under the framework of rules referred to above.

Network operator shall notify supplier of its inability to access customer's premises. A network operator must notify a supplier:

- If a customer of the supplier has refused or failed to give the network operator or its representative access to the customer's premises;
- If a customer of the supplier has obstructed the network operator or its representative in relation to any act, matter, thing done or to be done in carrying out any function under the gas supply act or under a customer supply contract; or
- If the network operator is otherwise unable to access the customer's premises.

A network operator must notify a supplier of an incident referred above within a defined timeframe about the date the incident occurred.

A.6 NETWORK SAFETY INCIDENT REPORTING PROCEDURES

A network operator and a supplier must at all times have in place practices and procedures to manage the prompt and efficient handling of emergency incidents, outages, faults and difficulties in gas works, unplanned interruptions of supply and other safety situations reported by customers and the general public to the supplier or reported directly to the network operator.

A network operator must make available to the customers of each supplier a telephone service 24 hours a day, 7 days a week that:

- Can operate on a number to which a customer can be connected for the price of a local telephone call (whether the customer calls that number directly or is transferred to that number by a supplier);
- Can receive notice of, and give information to, customers regarding network safety incidents. An automated answering service satisfied this requirement only if it makes provision for the transfer of calls to a human operator.

A supplier must include the relevant network operator's emergency telephone number on its customers' bills.

A network operator must answer network safety incident calls made directly to the network operator or transferred to a network operator by a supplier. Network operator has to respond and transfer in neutral and non-discriminatory manner

If required by a supplier, a network operator must ensure that it can report to and update that supplier in a reasonable and timely manner determined by the network operator on the status of network safety incidents.

A supplier must have a 24 hour capability to enable network safety incident calls received by a supplier to be transferred to the network operator's emergency telephone number immediately.

A supplier must participate in relevant training, emergency exercises, planning and post-emergency evaluation processes that are initiated by a network operator.

A network operator must give a supplier reasonable notice of the planning and evaluation processes in which it is required to participate.

A supplier must provide site contact details (including contact person and telephone number) to a network operator to assist the network operator to carry out its obligations under the law to manage a safe and reliable network.

Prior to notifying a network operator, a supplier must obtain from the customer a signed data consent form permitting that supplier to obtain access to the customer's consumption data.

The supplier must ensure that the data consent form includes all necessary details

A supplier may, by notice to a network operator, request the network operator to provide a customer's consumption data to the supplier. If the customer consumes greater than 10 TJ of gas per year, the notice must include a copy of the data consent form completed and signed by the customer.

Following receipt of a request from a network operator, a supplier must:

- Obtain an audit of data consent forms held by that supplier in respect of customers who consume 10 TJ or less per year; and
- Make that audit available to the network operator by no later than [1] month from receipt by the supplier of the network operator's request.

Network operator to provide consumption data to the extent permitted by law, within:

- Reasonable time frame for consumption data 12 months old or less; and
- Reasonable time frame for consumption data more than 12 months old, of receipt of a notice, a network operator must use its best endeavours to provide the consumption data to the supplier in an appropriate format determined by the network operator after reasonable consultation with suppliers.

A.7 BILLING INFORMATION FOR CUSTOMERS

Billing information has to be provided in respect of small retail customers unless otherwise agreed between a network operator and a supplier, a network operator must provide to a supplier in respect of each of the supplier's small retail customers the following billing information:

- Charges for transportation services provided by the network operator;
- Charges for services other than transportation services provided or arranged by the network operator;
- While the network operator provides meter reading services to the supplier, particulars of the meter readings for the billing period; and
- The estimated or measured quantity of gas supplied for the billing period.

Unless otherwise agreed with a supplier, the network operator must provide to the supplier the billing information no less than once every 3 months.

A supplier may, by notice to a network operator, request the network.

Operator to provide assistance or further information regarding the billing information of a small retail customer of the supplier where the supplier does not hold the information necessary to address the small retail customer's inquiry.

Within defined time frame from receipt of a billing inquiry notice the network operator has to:

- Provide to the supplier the information or assistance set out in the billing inquiry notice; or
- If the network operator cannot provide the assistance or information set out in the billing inquiry notice, inform the supplier of the reasons why it cannot provide the assistance or information.

A.8 METERING

Supplier must not interfere with basic metering equipment. If a supplier interferes with basic metering equipment without the approval of a network operator, that supplier must pay to the network operator the reasonable costs of investigation, adjustment, repair, replacement and testing of the basic metering equipment. This applies until the network operator ceases to provide meter-reading services as a reference service under an access arrangement.

For the security of basic metering equipment a network operator must provide a supplier with minimum reasonable requirements to be used to protect basic metering equipment from unauthorised interference or damage.

If a network operator finds evidence that the accuracy of basic metering equipment has been affected by any tampering, other than by meter reversal or bypass, then the network operator must test, or cause the testing of, the basic metering equipment to ensure that the basic metering equipment operates within the limits established in the gas meters regulation. This shall apply until the network operator ceases to provide meter-reading services as a reference service under an access arrangement.

When reasonably requested by a network operator, a supplier must use its best endeavours to assist the network operator to gain access to basic metering equipment at the premises of a supplier's customer.

The network operator must ensure that it provides to a supplier the following current information:

- Any installation or service requirements with which a customer must comply; and
- Particulars of the proper care and custody to be exercised by the customer, in respect of basic metering equipment or other equipment installed by the network operator at the premises of the supplier's customers.

Supplier may request evidence of accuracy of meters. When reasonably requested by a supplier, a network operator must provide evidence that, with respect to basic metering equipment, the network operator is complying with its requirements under the gas meters regulation.

A supplier may, by notice to a network operator, request the network operator to test basic metering equipment. In a meter test request a supplier must include:

- Sufficient information to enable a network operator to identify the particular basic metering equipment; and
- The prescribed fee for testing basic metering equipment set out in the gas meters regulation plus any additional costs reasonably determined and advised by the network operator to undertake a test of the basic metering equipment and required to be paid under the gas meters regulation.

As soon as possible upon receipt of a meter test request, a network operator must:

- Remove the basic metering equipment which is the subject of the meter test request from, and install replacement basic metering equipment at, the delivery point; and
- Arrange for the basic metering equipment, which is the subject of the meter test request to be tested in accordance with the gas meters regulation.

Within defined timeframe of receiving the results of the meter test, a network operator must inform the supplier of the result of that test.

If the result of the meter test was that the basic metering equipment did not comply with the requirements of the gas meters regulation a network operator must:

- Refund the amount within a reasonable period; and
- With the supplier, prepare an estimate for the gas consumed at the relevant delivery point in accordance with the gas retail market business rules.

Network Operator shall trace back up to 12 months if network operator has over charged or under-charged a retail customer and shall take all necessary further actions to recover what should have been billed as correct gas transportation charges, and if applicable make an interest payment on that difference at the rate.

A.9 NETWORK RELATED WORKS

Except as provided by regulations, a network operator must use its best endeavours to give a supplier and affected customers at reasonable notice period prior to carrying out any planned maintenance, inspections, repairs or testing which will interrupt or substantially affect supply to a customer's delivery point.

The notice referred above, required to be given by a network operator to a supplier and customers prior to carrying out any network maintenance may be in the form reasonably determined by the network operator and must include the following details:

- General description of planned activity;
- Expected commencement time and completion time;
- Contact details for enquiries related to the activity;
- Any actions that are required of customers; and
- In the notice to the supplier only, the delivery points for which the supplier is responsible that will be affected by the network maintenance.

To the extent practicable a network operator must keep the relevant supplier informed as to variations in the notice given by a network operator to a supplier.

A network operator's representative seeking access to a customer's premises must:

- Wear in a visible manner official identification of the network operator or such other identification as is approved by the network operator indicating the relationship between the network operator and its representative; or
- Carry the identification and show it to the customer present at the customer's premises.

In the case of an unplanned interruption of gas supply to a delivery point of a customer, a network operator must provide a 24-hour telephone number to enable a supplier to ascertain details including the expected response time and duration of the interruption.

A network operator must, at the request of a supplier, provide an explanation for any unplanned maintenance and/or interruption to supply to a customer's delivery point and, such explanation if to be in writing if so requested by the supplier, and within a reasonable timeframe of the request.

A network operator must use its best endeavours to make a new transportation service available at a delivery point within defined timeframe from the date of an approved request for service and, where possible, of the acceptance of an offer for a completed request for service made by a supplier to a network operator to connect a person to that network operator's network, subject to:

- The access arrangement and any applicable law;
- Adequate capacity being available at the required volume and pressure at the boundary immediately adjacent to the required supply position;
- The gas installation complying with the law; and
- Any agreement otherwise between the network operator and the supplier.

The obligation of a network operator to connect the supply address is subject to a supplier complying with the following requirements:

- If required by the network operator, ensuring that the notices of installation or completion of gas installation work are provided to the network operator;
- If required by the network operator, satisfying the network operator that necessary safe, convenient and unhindered access to the supply address and delivery point is available; and
- Providing contact details of the customer requested by the network operator including the address of the customer's premises.

A supplier may, by notice to a network operator, request the network operator to discontinue the supply of gas to a delivery point.

A discontinuance notice must specify:

- Whether the request is at the instigation of the supplier of the customer at the delivery point;
- If it is at the request of the customer, whether the customer is a small retail customer; and
- The reason why discontinuance of supply is required.

Network operators must discontinue supply within:

- Defined period of receipt by the network operator of a discontinuance notice specifying that a small retail customer of a supplier has requested the discontinuance of supply; and
- Defined period of receipt by the network operator of a discontinuance notice in any other case, a network operator must disconnect supply to basic metering equipment at the delivery point specified in the discontinuance notice unless the network operator has been advised under the gas retail market business rules that another supplier intends to supply gas to the delivery point; or
- In the reasonable opinion of that network operator it is unsafe or impractical to discontinue supply to the basic metering equipment at the delivery point.

Except in the case of planned maintenance, unauthorised utilisation or for health and safety reasons, a network operator:

- May discontinue supply to the basic metering equipment at a delivery point following receipt of a discontinuance notice only on a defined times; and
- Must not discontinue supply without any further notification to the supplier or the affected customer.

A supplier may, by notice to a network operator, request a network operator to recommence supply to existing basic metering equipment at a delivery point. In such cases a network operator must reconnect subject to:

- Planned maintenance, unauthorised utilisation or for safety reasons,
- The gas installation at the delivery point complying with applicable laws; and
- The basic metering equipment at the delivery point complying with applicable laws, a network operator must reconnect supply to the basic metering equipment at the delivery point within reasonable timeframe of receipt of a recommendation notice or another timeframe agreed between the network operator and the supplier.

A supplier may discontinue supply to basic metering equipment at a delivery point of a customer by either of the following methods:

- Shutting and sealing a meter control valve; or
- Wadding or plugging an outlet of the basic metering equipment.

A supplier must not discontinue or recommence supply to basic metering equipment at a delivery point unless the supplier:

- Is certified in accordance with relevant laws by the network operator to perform the discontinuance and commencement of supply to basic metering equipment at a delivery point; and
- Complies with the network operator's technical and safety specifications for the discontinuance and commencement of supply to basic metering equipment at a delivery point.

A supplier may recommence supply to basic metering equipment at a delivery point to which that supplier has previously discontinued supply or may request discontinuance of supply by the network operator.

A supplier must not request a network operator to recommence supply to basic metering equipment at a delivery point if the supplier had previously discontinued supply to that delivery point.

Within defined time prior to discontinuing or recommencing supply to basic metering equipment, a supplier must notify the network operator that it intends to carry out the discontinuance or commencement of supply, as the case may be in a format reasonably determined by the network operator.

A.10 DISPUTE RESOLUTION

If a dispute arises in connection with the Sample Network Code or its subject matter then either party involved in the dispute may give to the other parties involved in the dispute a written notice of dispute that particularises the relevant dispute.

If a dispute that is the subject of a notice of dispute is not resolved within defined timeframe of the giving of the relevant notice of dispute, the dispute must, as a condition precedent to the commencement of litigation, be the subject of mediation by:

- A mediator agreed between the disputing parties; or
- If the disputing parties cannot agree within defined timeframe, the parties may appoint a mediator.

If mediation does not result in settlement of the relevant dispute within defined timeframe and is terminated, a disputing party may elect to refer the matter to expert determination in accordance with the dispute resolution clause of the Sample Network Code.

A dispute to be referred to an independent expert under the dispute resolution clause of the Sample Network Code must be determined by an independent expert in the relevant field:

- Agreed between and appointed jointly by the disputing parties; or
- In the absence of agreement within seven days of the referral by a disputing party to expert determination under the dispute resolution clause of the Sample Network Code.

The expert appointed to determine a dispute:

- Must have a demonstrated, technical understanding of the issues in dispute;
- Must inform the disputing parties before being appointed the extent of the expert's understanding of each disputing party's business or operations and, if that information indicates a possible bias, then that expert must not be appointed except with the written approval of the disputing parties.

The disputing parties must enter into an agreement with the expert appointed under the dispute resolution clause of the Sample Network Code setting out the terms of the expert's engagement and the fees payable to the expert.

In reaching a determination with respect to a dispute, the independent expert must give effect to the purposes of Sample Network Code.

The expert must:

- Act as an expert and not as an arbitrator;
- Proceed in any manner as the expert thinks fit without being bound to observe the rules of evidence provided that the expert must observe the rules of natural justice;
- Take into consideration any relevant final determinations included in the Sample Network Code interpretation register;
- Take into consideration all documents, information and other material that the disputing parties give to the expert which the expert in his or her absolute discretion considers relevant to the determination of the dispute;
- Not be expected or required to obtain or refer to any other documents, information or material (but may do so if the expert so wishes);
- Issue a draft certificate stating the expert's intended determination giving each disputing party reasonable time to make further submissions;
- Issue a final certificate stating the expert's determination; and
- Act with expedition with a view to issuing the final certificate as soon as practicable.

The disputing parties must comply with all reasonable directions given by the expert with respect to the resolution of the dispute and must within the reasonable time specified by the expert, give the expert:

- A statement of facts and; if each desires, a submission with respect to the dispute;
- A description of the dispute; and
- Any other documents, records or information that the expert reasonably requests.

The expert will hold a meeting with the disputing parties present to discuss the dispute.

The meeting must be conducted in a manner that the expert considers appropriate.

The meeting may be adjourned to and resumed at, a later time in the expert's discretion.

The disputing parties agree that a meeting is not a hearing and does not constitute arbitration.

The disputing parties must procure that a mediator or expert agrees as a condition of his or her appointment subject to above provision/confidentiality agreement, to keep confidential all documents, information and other material, disclosed to him or her during or with respect to the expert determination or mediation, not to disclose any confidential documents, information and other material except:

- To a disputing party or adviser who has signed a confidentiality undertaking; or
- If required by law to do so; and
- Not to use confidential documents, information or other material disclosed to him or her during or with respect to the expert determination or mediation for a purpose other than the expert determination or mediation.

The disputing parties must keep confidential and must not disclose or rely upon or make the subject of a subpoena to give evidence or produce documents in any arbitral, judicial or other proceedings:

- Views expressed, proposals or suggestions made by a disputing party or the expert during the expert determination or mediation relating to a possible settlement of the dispute;
- Admissions or concessions made by a disputing party during the expert determination or mediation with respect to the dispute; and
- Information, documents or other material concerning the dispute that are disclosed by a disputing party during the expert determination or mediation unless such information, documents or facts are otherwise discoverable in judicial or arbitral proceedings.

The disputing parties agree that the final determination by an expert will be final and binding upon them.

An expert or mediator will not be liable with respect to the expert determination or mediation, except in the case of fraud or misfeasance by the expert or mediator.

The disputing parties agree to release and indemnify an expert from and against all claims, except in the case of fraud or misfeasance by the expert, which may be made against the expert by any person with respect to the expert's appointment to determine the dispute.

The disputing parties must share equally:

- The mediator's reasonable costs in undertaking the mediation referred to above; and
- The expert's costs in making the determination. For the avoidance of doubt, each disputing party is responsible for its own costs in respect of a dispute.

Despite the existence of a dispute, the disputing parties must continue to perform their obligations under the Sample Network Code.

A notice or other communication connected with Sample Network Code ("notice") has no legal effect unless it is in writing and:

- Delivered by hand at the address for service of the addressee;
- If the address is in Nigeria and the notice is being sent from within Nigeria, sent by security post, certified mail or postage pre-paid, to the address for service of the addressee;
- If the address is outside Nigeria or if the notice is being sent from outside Nigeria, sent by prepaid airmail to the address for service of the addressee;
- Sent by facsimile to the facsimile number of the addressee; or
- If the addressee has notified an address, sent by electronic mail transmission or any other method of electronic communication to the electronic address of the addressee.

Procedures are to be set for the deemed delivery with respect to post, facsimiles and/or other electronic means.

A.11 EFFECTIVE DATE AND EXPIRATION

The Sample Network Code is effective from the commencement of the Gas Market Rules.

This Sample Network Code will expire if determined by the Gas Regulator, provided that reasonable notice of termination is given to each network operator and supplier.

A.12 VARIATION OF SAMPLE NETWORK CODE

The Sample Network Code may be amended or varied in a consultative and transparent manner determined by the Gas Regulator.

1. Promoting Competition in the natural gas industry, OECD Directorate for Financial, Fiscal and Enterprise Affairs; Committee on Competition Law and Policy
2. Transco "Network Code – the Summary"
3. Transco Network Code Version 2.35
4. Presentation: "Basic requirements for Non-Discriminatory Access: Progress to Date"; The Brattle Group, October 2000
5. Standard Transportation Agreement, Bord Gais Transmission
6. Code of Operations, Agreement, Bord Gais Transmission
7. Natural Gas Distribution: Focus on Western Europe, International Energy Agency, 1998
8. Gas Network Code for Full Retail Competition, Ministry of Energy and Utilities, Australia, Dec. 2001.

Nexant Ltd

Griffin House
1st Floor South
161 Hammersmith Road
London W6 8BS
Telephone: +44 20 7950 1600
Facsimile: +44 20 7950 1550

Nexant Inc

Head Office

101 Second Street,
11th Floor
San Francisco
CA 94105
USA
Telephone: +1 415 369 1000
Facsimile: +1 415 369 9700

Nexant Inc

44 South Broadway
White Plains
New York
10601-4425
USA
Telephone: +1 914 288 3000
Facsimile: +1 914 288 5599

www.nexant.com

e-mail: info@nexant.com

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