The Uniform Network Code (UNC)

An Overview of the Industry and its Processes

Foreword

For many decades, homes and businesses across the nation have relied on gas as Britain's most dependable form of energy, and over 22 million gas consumers have grown accustomed to instant, trouble-free delivery whenever they turn on a gas tap. Thanks to that continuing dependability, most gas consumers had not noticed the way the gas industry had reinvented itself until the introduction of competition into the domestic market. Full competition has now been firmly established throughout many areas of the gas market and an industry code has been developed to meet the evolving needs and requirements of all parties.

In March 1996, following the introduction of competition, the Network Code became the legal hub around which the transportation of gas operated in Great Britain, and Transco (now National Grid) owned and operated all of the major gas networks across the mainland. This landscape changed in May 2005, with the introduction of a Uniform Network Code (UNC) that facilitated the owning of gas networks by companies other than National Grid.

The UNC defines the rights and responsibilities for users of gas transportation systems, and provides for all system users to have equal access to transportation services. The major concepts underlying the Uniform Network Code are that:

- *Gas transportation services should meet market requirements.*
- *System security and safety should be assured.*
- *Pricing should reflect the real costs of the services concerned.*
- *Robust computer systems should be developed and maintained.*
- *Daily energy balancing should be operated.*
- *Gas Shippers (Shippers) should be incentivised to balance their own supply and demand.*

This summary provides a high level view of the processes that support the competitive gas industry in Great Britain. However, with an effective modification process in place to enable change, the UNC will continue to develop in response to market requirements. This summary is therefore a snapshot in time and, just like the UNC, should be expected to change and develop over time.

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This document provides an overview of how the regime envisaged within the UNC is operated in practice.

1 The Gas Supply Chain

Before considering the business activities and processes that underpin the UNC regime, here is a summary of who is involved in the gas supply chain and what they do. The participants include:

1.1 Producers

Producers explore for gas, drill wells and operate gas production facilities. Until recently, almost all this country's gas came from offshore producers, and primarily from the North Sea. These offshore producers transport their gas to this country through undersea pipes.

1.2 Importers

As North Sea gas supplies dwindle Britain needs to maintain its security of supply. To meet these requirements gas is now sourced via imports. There are two means of importation - by undersea pipeline and as a liquefied product (liquefied natural gas – LNG) by tanker.

Operated by Interconnector (UK) Ltd, a gas pipeline links Britain (Bacton) with continental Europe (Zeebrugge) and enables the flow of gas in both directions, into and out of Britain. (Further information can be found on the website: http://www.interconnector.com). Shippers can contract for capacity to import and export gas through this pipeline. A second interconnector between Britain and continental Europe is due to start transporting gas from the Netherlands to Great Britain in December 2006.

(There are two other interconnectors connected to Britain. The Irish interconnector is owned and operated by Bord Gais Eireann, which transports gas from the Moffatt offtake in South West Scotland to Loughshinney near Dublin. The Scotland to Northern Ireland Pipeline (SNIP) supplies gas to Northern Ireland via the Bord Gais Interconnector, but starts at Twynholm in South West Scotland and runs to Ballylumford power station on the outskirts of Belfast. Currently these two pipelines can only be utilised in an export capacity.)

To receive LNG gas supplies by tanker importation, terminals have to be constructed and connected to the NTS. The terminal is used to berth and unload LNG ships, and store LNG prior to its regasification and delivery into the NTS. A terminal is now operational at the Isle of Grain (Kent), while new terminals are under construction at Milford Haven (Wales).

1.3 Terminals and Terminal Activities - Delivery Facility Operators (DFOs)

These companies operate the gas processing facilities at terminals around Britain. The gas is processed, metered, and delivered to the Transporters.

There are seven main beach terminals: St Fergus, Bacton, Theddlethorpe, Easington, Barrow, Burton Point, and Teesside. The terminals monitor pressure and calorific value. The main functions of the shore facilities are to receive and meter the gas, monitor its quality and remove unwanted liquids and other contaminants.

1.4 Transporters

The Transporters operate the networks that transport gas from the terminals to the 22 million gas consumers in England, Wales and Scotland. British Gas originally owned and operated the entire network. Prior to the start of the UNC, Transco plc (now National Grid Gas plc) was the principal Gas Transporter licence holder, but with the introduction of the UNC new licences have been granted to reflect the introduction of new Transporters. National Grid operates the NTS, and each Local Distribution Zone (LDZ) is now operated by its relevant Transporter.

Each Transporter is required to develop and operate its pipeline network in an efficient, economical and safe manner. A list of organisations holding a current Gas Transporter licence can be found on Ofgem's website: www.ofgem.gov.uk.

1.5 Storage Operators

Gas storage sites are generally linked to the NTS and Storage Operators operate one or more of these facilities in which gas can be stored.

1.6 Shippers

Companies that have acceded to the UNC and have been granted a Gas Shipper Licence buy gas from the Producers, sell it to the Suppliers, and employ the Transporters to transport the gas to consumers. A Shipper may also store gas with a Storage Operator to help it manage the balance between its supplies and the consumer's demand. A Shipper's licence requires it to be reasonable and prudent in the way it uses the Transporters' pipeline networks. A list of organisations holding a current Gas Shipper Licence can be found on Ofgem's website: www.ofgem.gov.uk.

1.7 Gas Suppliers

A company with a Gas Supplier Licence granted by Ofgem contracts with Shippers to buy gas, which it then sells to industrial and domestic consumers. A Supplier may also be licensed as a Shipper. However, a Supplier that is not also a Shipper has no direct relationship with the Transporters. A list of organisations holding a current Gas Supplier Licence can be found on Ofgem's website: www.ofgem.gov.uk.

1.8 The Transporters' Agent

The Transporters' Agent provides a number of core services that support the contractual and licence obligations of the Transporters. Jointly owned by the five gas Distribution Network companies and National Grid's Transmission business, xoserve acts as the Transporters' Agent to deliver centralised core services, including Supply Point Administration, Demand Estimation, recording and calculation of transportation volumes, Energy Balancing, invoicing, and the management of information systems.

1.9 Industry Regulators

The Gas and Electricity Markets Authority (GEMA) is a non-ministerial Government department and regulator of the GB onshore gas industry. The Office of Gas and Electricity Markets (Ofgem, www.ofgem.gov.uk) supports GEMA. It grants the licences needed by the Transporters, Shippers and Suppliers.

The Health and Safety Commission (HSC) is responsible for health and safety regulation in Great Britain. The Health and Safety Executive (HSE, www.hse.gov.uk) is the main enforcing authority that works in support of the Commission, and regulates health and safety in offshore gas and oil installations as well as the safety of the gas networks.

1.10 Gas Traders

These companies buy and sell gas from each other before it reaches the consumer. They operate in the On-the-Day Commodity Market (OCM) or other markets that provide ways of obtaining gas without needing a long-term contract with a Producer. These companies must hold a Gas Shipper Licence.

1.11 Allocation Agent(s)

These act for Shippers both at Shared Supply Meter Points and at entry points. The Allocation Agent calculates how much of the gas input at an entry point (or offtaken at an exit point) should be apportioned to each Shipper and then informs the Transporters, who use the values when calculating transportation charges.

1.12 Shipper's Agent(s)

A Shipper may choose to employ an agent (referred to as a 'User Agent' in the UNC) to carry out all or some UNC processes/activities on its behalf, e.g. to inform the NTS of the quantity of gas the Shipper plans to transport each day.

1.13 Shrinkage Provider

This is a role carried out by each Transporter, as each Transporter is responsible for obtaining the gas that is needed to fuel the compressors and balance any leakage in its transportation network.

1.14 Market Operator

The Market Operator, currently APX Gas, is responsible for the provision and operation of the On-the-day Commodity Market (OCM).

1.15 Meter Reading Agents

These companies obtain meter readings from consumers' meters and provide them to Suppliers to enable the gas consumed to be billed. Meter readings are also passed to Transporters to enable Shippers to be billed for gas transportation.

2 Important Concepts

There are a number of basic concepts that are central to an understanding of several of the business processes. These are described below.

2.1 Calorific Value (CV) and Gas Quality

When you withdraw cash from a bank, you do not expect to receive the same notes and coins that you originally deposited. Similarly, the gas used by a Shipper's consumers is probably not the same gas that the Shipper bought from a Producer.

This makes better sense if you do not think of the gas in its physical state, but of the energy it represents. The Shipper inputs a certain quantity of energy and its customers consume the equivalent quantity of energy. This is why the Transporters account and invoice for the gas which they transport and store in energy units (kWh - kilowatt hours).

The ratio of energy to volume for gas is referred to as its Calorific Value (CV). CV is measured by calorimeters, which are situated at the terminals and other strategic points around the networks. Most measurements are taken in volume terms and converted to energy units by applying the CV from the nearby calorimeter(s), following an agreed approach.

For a gas to be accepted into the NTS it must meet the specification contained within the Gas Safety (Management) Regulations 1996. Each Transporter is required to deliver gas within a fairly tight range of Wobbe Index (which is dependent on CV) to ensure the gas burns safely in consumer appliances. Some gas is of a quality that is outside this range, but this gas can be processed or blended with other gas before its entry to the networks to bring it within the safe specification. The relationship between the volume of gas and its energy content is important to all gas pipelines, which are designed to move a certain volume of gas. Shippers must therefore specify the CV of the gas when they nominate how much they intend to input to the networks each day.

2.2 The Network

The most efficient way to move large quantities of gas over long distances is through a large diameter pipe at high pressure. This method is used to take gas between the terminals, the storage facilities, the sites of several very large consumers of gas (for example gas fired power stations), and specific regional sites for subsequent local distribution. The national high-pressure network is called the National Transmission System (NTS) and contains around 6,300 km of pipeline. Gas enters the NTS at a pressure of up to 85 bar.

Gas leaves the NTS either via an offtake into a Local Distribution Zone (LDZ), or directly to a large industrial user connected to the NTS (a ‘direct connect’). Following its passage through a NTS/LDZ offtake, compressor stations help to move the gas through a series of decreasing pressure tiers (down to 25 millibar) until it reaches the consumer. Each tier progressively reduces the pressure to that needed for safe operation of consumer appliances and to meet legislative requirements.

There are a number of specialist engineering services associated with the offtake of gas that Shippers may choose if it is appropriate to their sources of supply or customer portfolio. These include:

- Compression services - these raise the gas pressure to meet System entry or specific consumer requirements.

- Preheating gas - some supply points are fed directly from the high-pressure System. When pressure is reduced the gas temperature also falls. The Transporters can heat the gas before handing it over so that, despite the pressure reduction, it is at the required temperature.

- Frequency Response and Ramp Rate Notice Period – these provide gas-fired power stations with the facility to respond to electricity grid balancing requirements.

2.3 Meters

The Transporters' charges are based on a daily energy balance and, to support this process, meters (which may be read remotely) are installed on the networks at the input points and at large Offtakes. Some meters provide a continuous reading; others (data loggers) can be read on demand. These Offtake meters measure the volume of gas consumed each day, and supply points fitted with such devices are called Daily Metered (DM) sites.

With current technology, it is not practical or economic to install daily read devices at all 22 million supply points and most of these are still read using traditional meter reading methods. These sites are referred to as Non Daily Metered (NDM) sites and can be read at monthly, six-monthly or even longer intervals.

2.4 Local Distribution Zones (LDZs)

To charge Shippers for transporting the gas consumed by their NDM sites, the gas networks are divided into zones, for which the total output demand can be measured each day. These zones, called Local Distribution Zones (LDZs), are based on groups of Offtakes from the NTS and are operated by the DNOs.

2.4.1 NDM Consumption

Daily measurements record the total consumption in an LDZ and the total consumption by the DM sites located within the LDZ. After taking into account changes in gas inventory within the LDZ (known as Stock Change) and estimated shrinkage, the difference between these two totals gives the NDM consumption for that LDZ. By applying an agreed formula this amount is then divided between (and appropriately invoiced to) the Shippers who supply gas to that LDZ. This process is termed RbD (Reconciliation by Difference).

2.4.2 Exit Zone

On a particular day, a supply point may receive its gas via any of the Offtakes within its LDZ. However, on the day of highest demand (peak day) there is an optimum arrangement in which the Offtake(s) serving each supply point can be identified precisely. The supply points for each Offtake on a peak day are therefore grouped into another type of zone - an Exit Zone. This is then used as the basis for the exit charges that Transporters apply to Shippers.

2.5 Daily Cycle

Although there are some business processes that occur once, or at irregular intervals, the principal operations of Transporters are based around a daily cycle.

The daily cycle of gas transportation is divided into three phases - getting ready for the Gas Flow Day, operating during the Gas Flow Day, and accounting after the Gas Flow Day. Activities and processes are therefore geared to, and often referred to as, taking place Before the Day, During the Day, or After the Day.

The "Gas Flow Day" means, in relation to the application of any provision of the Code, the Day in relation to deliveries, offtakes or flows of gas or other operations on which such provision is to apply. (UNC GTC2.2.1(c)).

The 'Day' means the period from 06:00 hours on one day until 06:00 hours on the following day. (UNC GTC2.2.1(a)).

2.6 System Balance

2.6.1 National Balancing Point (NBP)

The National Balancing Point (NBP) is a notional point to which all gas entering the NTS is assumed to flow. Similarly gas leaving the NTS is assumed to come from the NBP. The NTS is therefore 'balanced' at the NBP.

A Shipper's fundamental requirement is to get gas to its customers by inputting and offtaking gas via the transportation System, and the basic transportation services therefore enable Shippers to 'input' gas into the NBP (entry service) and to 'output' gas from the NBP (exit service).

2.6.2 On-the-day Commodity Market (OCM)

This provides a screen based anonymous gas trading market in which the Shippers and Transporters (in their role as Shrinkage Providers) can post bids and offers to buy or sell gas either at the NBP or at other specific points on the gas network.

The NTS uses this market as a means of securing or disposing of gas in order to keep the System in balance.

2.6.3 Physical Transportation

It is not meaningful to think of a Shipper's gas travelling along a particular route. The entry and exit points are known, but what happens in between depends on several factors. For example, what other quantities are being transported that day? From where to where is the gas going? Are there any temporary constraints, such as compressor maintenance, which affect the route the gas can use?

From a physical viewpoint, just like a road network, there are often several routes that could be used to move gas between two points – and gas does not always flow in the same direction along each length of pipe.

2.6.4 Shrinkage

Shrinkage is the term for combined energy losses within the transportation system. For the NTS, it is the difference between the measured energy input to the NTS and that actually delivered to directly connected consumers and LDZs. For LDZs, shrinkage is estimated from the flow of gas into LDZ and an annually derived factor. This factor is determined from the physical characteristics of the LDZs, taking into account leakage surveys, estimated levels of theft and gas used by the DNO itself for transportation purposes.

2.6.5 Demand Forecasting

A significant proportion of the gas usage in Great Britain depends on weather conditions, particularly wind-speed and temperature, and the forecasting of gas demand is required to make sure that the gas transmission system can be operated in a safe and reliable manner. Gas demand forecasts are made for each of the LDZs at regular times each day, but further forecasts may be made if the weather forecast or demand changes.

2.6.6 Balancing the System - Who maintains the balance?

What goes into the System must come out, and this gas industry variation of 'what goes up must come down' is obvious, but also raises an important question: *Who is responsible for balancing the gas used by consumers with the gas that is input from the Producers?*

The safety and efficiency of the System depends on the balance being consistently achieved, and ideally each Shipper should control a balance for its own customers. If it does not, the NTS, on behalf of the Transporters, is obliged to restore the balance through measures such as purchases or sales of gas, which

then incur additional costs. Similarly, a Shipper's behaviour generates extra costs if it ships much more or much less gas than it has previously stated.

Due to weather variations, unplanned gas production restrictions, and other uncertainties it is not feasible to require every Shipper to nominate exactly and to be in balance at all times. Therefore the UNC regime assigns responsibility for balancing as follows:

- the NTS is responsible for ensuring the physical balance of the total System; and
- each Shipper is financially responsible for the costs incurred each day to manage an imbalance in its supply and demand or a difference between its gas nominations and actual flows.

Similarly the NTS and the Delivery Facility Operators (DFOs) have agreed Local Operating Procedures (LOPs). Their main purpose is the Daily Flow Notification (DFN) in which a DFO tells a Transporter what flow it believes will enter the Transporter's system at that Delivery Facility during the next day.

Each time a DFO receives a significantly revised nomination from a Producer, it sends a revised DFN to the Transporter. DFNs, in conjunction with other information, are used to inform the way the NTS is configured and the measures that may be needed to maintain a System balance.

The operator of the NTS is financially incentivised to take efficient System balancing actions. This incentive encourages the NTS to buy or sell gas for balancing purposes at close to, or better than, the average price of gas traded on the OCM for that Gas Flow Day.

To ensure System security and maintain the balance the NTS utilises a variety of 'balancing tools':

- Buying /selling gas on the OCM
- Use of Operating Margins (OM) Gas
- Local action (interruption, curtailment of inputs, use of constrained LNG)
- National/Local Emergency Procedures.

2.6.7 Interruption

When demands on the System exceed the capacity it is necessary to reduce demand to overcome the shortfall and maintain safe and secure supplies to 'firm' consumers. Certain large consumers are required to interrupt their gas supply for agreed periods, in exchange for a reduction in transportation charges. Such consumers might be expected to make alternative fuel arrangements, such as stored petroleum distillate, so that their operations can continue.

If a capacity constraint occurs in the NTS interruption is generally invoked over a wide area. However when a constraint occurs in a LDZ it may only affect a small number of consumers in a particular locality. As a result of this some consumers may experience more frequent interruption than others, depending on location and severity of local weather conditions, or other circumstances, e.g. emergency. (See also below, section 4.4.2 During the Day; (e) Interruption Requirements.)

2.6.8 Planned Maintenance

Planned maintenance is carried out at scheduled intervals on plant, pipelines and equipment, in order to prevent sudden unexpected failure or breakdown.

The frequency of maintenance intervals is carefully planned to cause minimal disruption to the gas transportation system. When maintenance is carried out on the high-pressure network it is sometimes necessary to isolate and decommission a pipeline, and it is therefore essential that sufficient capacity is available in the rest of the network to meet demand.

Whilst maintenance is carried out at various points of the Total System, the UNC only covers maintenance of the NTS itself. Details of the programme of planned maintenance on the NTS, called the 'April Maintenance Programme', are issued by 01 April each year, and an updated version, the 'October Maintenance Programme', is also published (by 01 October).

2.7 Storage

The Transportation System has a number of storage facilities connected to it, and in general these are treated in the same way as other inputs and outputs.

2.7.1 Storage Facilities

The different types of storage facilities in use in Great Britain are:

(a) Liquefied Natural Gas (LNG) facilities

There are currently four LNG storage facilities around the country. Gas is cooled until it becomes liquid (at -160 degrees Celsius) and is then stored in insulated metal tanks. Each tank holds about 10 million therms, and there are between one and four tanks at each site. The LNG facilities have high deliverability compared to the volume stored, and can generally be emptied in around five (5) days. LNG facilities are 24 hour operations and can start feeding gas into the System within one hour (from cold it takes 11 hours).

(b) Salt cavities

Dissolving underground salt layers creates this type of storage facility. One example is the Hornsea facility in East Yorkshire, where nine large cavities have been created 1800 metres below ground, providing about 120 million therms of storage.

(c) Depleted gas fields

Gas is compressed back into the field for subsequent use. The offshore facility Rough, connected to the Easington terminal, is by far the largest depleted gas field, with a total capacity of more than 1,000 million therms. Onshore fields can also be used.

National Grid LNG Storage, a subsidiary of National Grid plc, operates the LNG storage facilities; the terms of its services are included in the UNC and are summarised below (see). Other companies operate other storage facilities.

2.7.2 Uses of Storage

Storage has three main uses:

(a) Supply and demand matching

Gas production facilities are designed to vary their output rates to accommodate changes in demand. However it would be uneconomic to continuously provide sufficient production capacity and the associated offshore pipelines to meet high levels of demand. Storage helps Shippers better match supplies to demand throughout the year and in some cases is used purely as a trading tool.

(b) Operating Margins

The NTS ensures the safe operation of its system by utilising gas from storage (particularly LNG) to deal with operational incidents such as:

- Large changes in demand forecasts

- Sudden loss of offshore supplies
- Compressor trips (breakdowns) and breaks in the pipeline
- Orderly run down if supplies are exhausted.

This is known as 'Operating Margins' and rules for its use are included in the UNC.

(c) Transmission Support

The presence of storage facilities close to areas of high gas demand enables an increase in the capacity to supply demands in those areas, thereby avoiding the need for expensive pipeline investment. Facilities that provide this service are designated in the UNC as 'Constrained Storage Facilities' and at present there are two Constrained Storage Facilities – at Avonmouth LNG and at Dynevor Arms LNG.

The NTS has the right to order gas flows from these facilities when demand is high (known as 'constrain on'). Gas stocks in these facilities must be maintained at appropriate levels, depending on the time of year, so that gas can be made available when required.

In recognition of this service, Shippers booking a storage service at these facilities receive a payment - a 'transportation credit' - from the NTS.

2.7.3 National Grid LNG Storage

As described above, LNG has an important role in ensuring the safe and economical operation of the transportation system. It also offers storage services to Shippers, characterised by high output rates and short lead-times, and is therefore well suited to a 'peak-shaving' role, i.e. the meeting of short duration peak demands. Any Shipper that is short of gas on a peak day will be exposed to 'cash-out', potentially at extremely high prices. Access to LNG storage is a good way of insuring against this possibility.

In addition to Operating Margins, National Grid's LNG Storage offers two specific types of service to Shippers:

(a) A constrained service at Avonmouth, and at Dynevor Arms

Although the NTS has the right to constrain on, this will be only at times of high demand when Shippers typically require additional gas, especially if their consumers are in the affected areas. Shippers providing this system support receive transportation credits from the NTS, which reduce the effective cost of a constrained LNG booking.

(b) An unconstrained service at Partington and at Glenmavis

Shippers are able to withdraw previously injected gas at high rates whenever they wish.

2.7.4 Storage at LNG Terminals

Currently there is one LNG terminal on the System (the Isle of Grain) where frequent deliveries of LNG shipments allow the site to perform the same functions as other entry terminals. Substantial quantities of storage are utilised to minimise the docking times of the ships whilst providing consistent hourly and daily flows of gas into the System. This storage is also used for Operating Margins.

2.8 Constrained, Firm, and Safety Monitors

The Transporters' networks are designed to cope with the highest demand that can be expected which is deemed as: *On one single day in twenty years.* This is known as the 1-in-20 peak day security criterion.

Shippers are incentivised by the transportation credit described above to book constrained storage sites in preference to unconstrained sites. The UNC rules also ensure that storage stocks are kept at sufficient levels throughout the winter to ensure that there is sufficient gas to fulfil the Transmission Support role. These levels are known as "monitors" and typically stay at a high level from early October to mid January then steadily reduce to zero by the end of March.

The same concept is used so that Shippers have information on the level of storage stocks required to meet the demands that would be associated with the 1-in-50 Severe Winter (i.e. a Winter of Severity only to be expected to occur one winter in fifty). The NTS publishes two monitor types:

- Firm Gas Monitors, which are the storage stock requirements associated with all firm demand for a 1-in-50 Severe Winter.

- Safety Monitors, which are the storage stock requirements associated with 1-in-50 demand that cannot be readily isolated, such as priority loads (e.g. hospitals) and domestic loads.

The NTS also produces weekly 'snapshots' of storage stocks so that Shippers can take appropriate action to prevent these stocks falling below the monitor levels. Both monitors and stocks are published as aggregates by 'Storage Type' groupings. Facilities with similar withdrawal 'durations' (i.e. number of days from full to empty at full withdrawal rates) are grouped together. If the Safety Monitor limit is approached the NTS will increase the frequency of publishing stock information and if Shippers do not respond by taking steps to conserve stocks then the NTS, in its role as Network Emergency Coordinator (NEC), will initiate emergency procedures which allow direct control of demand and storage withdrawals.

2.9 Technology and Dataflows

2.9.1 Computer System Support

Computer system support is critical to the success of the UNC regime. The large volumes of data, the complexity and detail of the processes, and the required speed of response, necessitate the use of modern computer and telecommunications systems. The increasingly complex development of the industry also highlights the need for the effective facilitation of the interactive provision and efficient flow of data between parties:

- Each organisation affected by the regime originates some of the data (for example Shippers confirm their supply points and make gas nominations; Transporters measure gas flows and calculate daily balances).

- Each such organisation needs to see data created by others, e.g. Transporters need to see Shippers' nominations; Shippers need to see Transporters' allocations.

- Each Shipper needs to see data that concerns its own business but should not be allowed to see other Shippers' data.

The best way to meet these requirements is for the service provider and its customers to share a single computer system, and the majority of the gas transportation and storage industry shares one system, known as 'UK Link'.

2.9.2 UK Link

The various applications that constitute UK Link are operated by the Transporters but are used by the Shippers for many of the core functions of their businesses. Some of the transactions operate on-line. Other applications receive or produce batches of records in standard formats. Most Shippers have therefore developed interfacing systems to produce the inputs to UK Link and/or to make use of its outputs.

The UK Link applications share a common database so that each transaction only needs to be entered once by the organisation that originates it. Each system user is restricted in various ways so that it only has access to its own data, and commercial sensitivities are respected.

The Operations sub-system provides real-time control of the pipeline network; Demand Estimation derives the parameters needed for the calculation of NDM nominations and allocations.

Within UK Link:

- Gemini manages the energy balancing, entry and exit capacity regime, giving Shippers on-line access to their data
- Supply Point Administration enables Shippers to take responsibility for the transportation charges to each of their consumers
- Invoicing and Reconciliation calculates the Transporters' invoices and sends them to Shippers
- 'Sites and Meters' is maintained as the database of the premises linked to the networks, on which all the other sub-systems depend.

2.9.3 IX Network (IX)

This is the physical communications infrastructure that allows UK Link users (Shippers and Transporters) to communicate with each other. Here, the term 'network' is used to refer to the combination of the hardware with the software and services that control and support it.

2.9.4 Information Exchange website and Active Notification System (ANS)

The Network Operations, Information Exchange websiteholds information of general interest to the gas industry, and is available to all internet users.

However, there are situations when Transporters need to notify Shippers of exceptional events at short notice, e.g. the start and end of alerts and emergencies, and in such circumstances it would be inappropriate for Transporters simply to post this information on the SIS. Instead they transmit messages over a mobile radio network to a remote messaging device held by each Shipper.

This device, called an ANS handset, acknowledges all successful transmissions and Transporters can therefore quickly detect messages that are either fail to be delivered or are not acknowledged by the Shipper. The Transporter can then attempt to make contact by other means, e.g. telephone or fax.

2.10 Liabilities/Standards of Service

The UNC contains Standards of Service that are currently focused predominantly on Supply Point Administration activities, computer system availability, and operational query resolution.

Transporter and Shipper performance is reported monthly to Shippers and Ofgem. For certain Standards of Service where a Transporter's performance per Shipper (averaged over a month) falls below planned performance levels, compensation payments, known as liabilities, are made to those Shippers affected.

These Standards of Service are reviewed against actual performance and, where necessary, adjusted according to an agreed mechanism, ensuring that Transporters remain incentivised to deliver a service that is focused on the needs of the Industry.

3 User Admission – becoming a Shipper

Market entry involves the meeting of certain conditions laid down in the UNC, and upon fulfilment of those conditions a new entrant can become a 'User', and is then fully able to interact with the Transporters and other market participants. The UNC forms the contractual relationship between the Transporters and their customers. It is the legal framework that governs how the Gas Transporters and their customers, the Gas Shippers participate and interact within the gas market, and when a potential Shipper signs the Accession Agreement it is agreeing to abide by these business rules.

The registration, set-up and configuration of a new Shipper can be complex, involving the co-ordination of various business functions, including legal, financial, technical (systems and applications), and training, underpinned by appropriate administration and organisation. Under the terms of the UNC the responsibility lies with the Transporters for enabling a market entrant to fully participate in all areas of the gas market appropriate to its business intentions.

In practice this means facilitating market entry and exit, as well as any business changes that it may undergo in its company lifetime, and these obligations are carried out by xoserve on behalf of the Transporters. A company intending to enter the UK gas market and carry out shipping or trading activities should contact the Customer Lifecycle Team in xoserve, who will guide and facilitate a potential Shipper's progress through the market entry ('User Admission') process. Initial enquiries can be made through the following address: generalenquiries.commercial@xoserve.com. (There is also an agreed process for exiting the market – termed 'Voluntary Discontinuance' – and a Shipper who makes a business decision to leave the market should also direct its initial enquiry to: generalenquiries.commercial@xoserve.com.)

Once it has been granted a licence, signed legal agreements, set up credit and security arrangements with each Transporter over whose network it expects to ship gas, and has agreed to operate under the terms of the UNC the new Shipper will need to undertake some or all of the following activities depending on its business intentions (though not necessarily in the order shown):

- Understand its rights and responsibilities under the UNC and organise itself to operate in line with the UNC obligations.
- Learn how to access and use the supporting computer systems.
- Sign customers and register their premises with the relevant Transporter.
- Arrange gas supplies - book entry and exit capacity and/or obtain it on the secondary market (some Shippers play a trading role and choose not to book capacity)
- Enter its first gas nominations and receive its first allocations.

4 Activities and Associated Processes

The next sections describe individual business activities within the UNC regime.

4.1 Supply Point Administration

Information relating to each sites (supply points) connected to the networks is recorded in a comprehensive electronic database known as 'Sites and Meters'. The database includes postal addresses, meter point reference numbers, Supplier name, Shipper name, meter exchange, removal and reading history, and annual consumption, as well as various other relevant details.

To ensure the accuracy of the database (new information or changes to existing supply point information) Shippers communicate with Transporters using a process called Supply Point Administration (SPA). xoserve maintain this database and operate the associated SPA process on behalf of the Transporters.

4.1.1 Nominations

For certain new supply points and for existing ones that consume more than 73,200 kWh a year, the Shipper sends the Transporter a Supply Point Nomination. The Transporter responds with a 'Transportation Offer' - a quotation for the cost to the Shipper of transporting gas to that supply point.

For supply points over 73,200 kWh, a Shipper preparing a Supply Point Nomination can enquire about the current details held by the Transporter.

4.1.2 Confirmations

To accept the Transportation Offer, the Shipper sends to the Transporter a 'Supply Point Confirmation'. This indicates that the Shipper wishes to take responsibility for the transportation charges to that supply point from a specified date.

For existing supply points in the domestic market (i.e. consuming no more than 73,200 kWh) and certain new supply points, the Shipper only sends a Supply Point Confirmation.

In either case, the Supply Point Confirmation must be received not more than thirty (30) Business Days and not less than fifteen (15) Business Days before the intended start date (D-15), except where there is no change to the Shipper, e.g. for 'new' or 'green field' supply points, or where the Shipper has indicated it no longer wishes to supply the supply point. In these cases only eight (8) Business Days are required.

4.1.3 Transfers and Objections to Transfers

For existing supply points, the Transporter advises the incumbent Shipper of the Supply Point Confirmation via a 'Withdrawal Notice'.

As a safeguard against inappropriate transfers, the incumbent Shipper (and consumer) is entitled to raise an Objection Notification, should it wish to do so. Seven (7) Business Days, or until the end of D-8 (whichever is the sooner), is allowed for this.

If received from the incumbent Shipper, the Transporter forwards the Objection Notification to the confirming Shipper but takes no part in any subsequent negotiations between them.

If:

- there is no objection, the supply point transfers to the confirming Shipper on day D.
- the objection is resolved within seven (7) Business Days of the Confirmation Withdrawal Notice or by D-8 (whichever is sooner), the incumbent Shipper submits an Objection Cancellation. The Transporter informs the confirming Shipper and the transfer goes ahead.
- the objection is not resolved in the time allowed, the incumbent Shipper retains responsibility for the supply point and the transfer does not go ahead.

An incumbent Shipper can voluntarily withdraw from a supply point although it remains liable for any charges until that supply point is transferred to another Shipper, or is isolated. In this instance, the time between confirmation and transfer can be reduced from fifteen (15) to eight (8) Business Days. An incumbent Shipper can also have a supply point isolated, re-connected, or can amend various details relating to it, e.g. to change the meter reading frequency, or to change the level of capacity booked at the supply point.

4.2 Capacity Booking

This process enables Shippers to book the transportation capacity they need from the Transporters.

In simple terms, a pipeline has a maximum capacity depending on the diameter of the pipe and the maximum rate at which gas moves along it. Once the Shipper has become a User under the UNC, it can book or trade capacity. Transportation capacity is either booked by Shippers or assigned by the Transporters in three places:

- at entry to the NTS from a terminal (entry capacity);
- at all NTS exit points (NTS/LDZ offtakes and direct connects) (exit capacity); and
- within the LDZ (LDZ capacity).

A Shipper is responsible for obtaining its total NTS entry capacity at a level appropriate to its aggregate customer base. Shippers obtain their entry capacity by bidding for it through a series of capacity auctions, ranging from a long-term release to on-the-day assessments, as follows:

a) Long Term Capacity

Long term capacity auctions are held annually and make capacity available in quarterly tranches. Shippers can bid for entry capacity at each entry point in each quarter over a period, which runs from about two to fifteen years ahead of the auction.

b) Medium Term Capacity

Medium term capacity auctions are also held annually and release capacity in monthly tranches for up to two-years ahead (starting from soon after the completion of the auction). This allows Shippers to obtain capacity prior to the time when their long-term capacity takes effect.

Monthly capacity is also released via Rolling Monthly System Entry Capacity (RMSEC) auctions, which are held every month and in which capacity is made available for the succeeding month.

c) Daily Capacity

Daily capacity auctions provide Shippers with the opportunity to bid for additional capacity to meet their needs for individual Gas Flow Days. Entry capacity is offered on a firm and interruptible basis, subject to the Transporter's assessment of the capacity availability for the day in question.

The NTS may also buy back capacity rights when it is unable to transport all of the gas that Shippers wish to deliver on a particular day.

The Transporters are largely responsible for booking NTS exit capacity and LDZ capacity on behalf of Shippers - on a monthly cycle for DM sites, and on a daily cycle for NDM sites.

There are strong incentives in the UNC to ensure Shippers book sufficient capacity for their requirements. If a Shipper delivers more gas to the system than its entry entitlement on any Gas Day, an overrun charge is incurred at a rate that is linked to the market prices for capacity for the same period. If a Shipper offtakes more than its exit entitlement at its firm DM sites, a charge (equivalent to 12 months' capacity charge at a premium rate) is incurred. Additionally at exit, a tranche of capacity is booked for the Shipper by the Transporters to offset the risk of further capacity breaches. If the Shipper exceeds its LDZ capacity

entitlement for firm DM sites, it incurs the 12 months' charge and must also pay at the higher capacity level from then on.

4.3 Capacity Trading – Buying and Selling Entry and Exit Capacity

Shippers with spare capacity may offer it for sale, and Shippers requiring capacity can view what is on offer and make bids for a part or all of it. The seller chooses which bid to accept and the Transporters effect the transfer of entitlement. The second method of obtaining entry or DM exit capacity is to buy it from another Shipper who has spare capacity.

An efficient secondary market in capacity benefits several parties:

- A Shipper with spare capacity can recover its costs.
- A Shipper with insufficient booked capacity is able to ship its gas.
- The efficiency of the commercial regime is optimised ensuring that capacity surpluses and shortfalls are matched and that the amount of annual capacity booked through the Transporters is appropriate to the requirements.

Once Shippers have completed a capacity trade, the appropriate details of the trade are registered with the Transporters who, taking account of the trade, instantaneously update the relevant Shippers' capacity holding positions.

The UNC regime therefore facilitates the following capacity trading process:

- A Shipper with spare capacity posts a 'Capacity Offer', specifying the quantity, location, duration and suggested price of the capacity.
- A Shipper who needs capacity can scan the list of outstanding offers. For each offer, it can see what 'capacity bids' have already been received, though not who the bidders are.
- It can then post a bid for some or all of the capacity for some or all of the duration. The bid price may be different to that requested on the offer.
- Once a bid has been made it cannot be amended, but it can be withdrawn. If a bidder wishes to change any aspect of a bid, it must create a new bid. A bidder can have more than one bid against the same offer.
- The offering Shipper reviews the bids and may select one winning bid. The Transporters' computer system then effects the transfer of entitlement.
- Although capacity entitlement passes to the successful bidder, liability for payment of the capacity charges to the Transporters remains with the original owner.
- The Transporters take no part in the financial settlement of the trade because it is the responsibility of the parties making the trade.
- Two Shippers may agree to trade capacity directly, i.e. without inviting and selecting bids. The selling Shipper records the offer plus the name of the buying Shipper. The buying Shipper approves the transaction to confirm the trade.

4.4 Gas Transportation – the Daily Cycle

4.4.1 Before the Day

Some activities need to be carried out before the Gas Flow Day, as the NTS needs to know where gas is planned to be delivered into the System and calculate the total System demand. Shippers must nominate for their DM sites and notify their producers of their next day's requirements. The NTS will continue to update demand forecasts, and will liase with DFOs to ensure that deliveries of gas will meet the System requirements.

(a) Gas Nominations

By a certain time each day, a Shipper must inform the NTS how much gas it wishes to transport on the following day. This helps the NTS to plan and control the daily operation of the pipeline system. Then, during the day, the Shipper can modify its nominations, for example to take account of any changes in supply or demand.

A Gas Nomination (usually shortened to 'Nomination') is the means by which a Shipper advises the NTS how much gas it wishes to transport on a certain day. The NTS uses that information to help schedule its daily operations.

There are three kinds of nomination:

- Into the NBP on an entry service.
- From the NBP on an exit service.
- NBP to NBP for gas trading.

A nomination specifies its type, location, date and quantity of gas (in energy units). For input nominations it must also specify either the CV or the quantity in volume units.

Output nominations for NDM sites are calculated using the same formula as is used to calculate their allocations of gas. This takes into account the total forecast demand, and so the Transporters carry out the calculation because they have access to the necessary data. However each Shipper (or its agent) is responsible for all its other nominations.

Note: Both gas nomination and supply point nomination are commonly abbreviated to 'nomination', even though they are different processes.

(b) Gas Nomination Process

A Shipper can record its nominations up to one month in advance and can also change them at any time during that period. It cannot withdraw them (for audit reasons) though it can set them to zero.

The nominations are finalised on the afternoon before the Gas Flow Day to which they apply, according to the following approximate timetable:

- By 13:00 hours - the Shipper nominates for transportation to DM sites.
- At 13:00 hours – the NTS forecasts total demand using the latest weather forecast.
- At 14:00 hours – the NTS forecasts demand for NDM sites in each exit zone for each Shipper, and creates NDM nominations.
- By 16:00 hours – the Shipper nominates its inputs at Terminals.

In all cases Shipper nominations must be approved by the NTS. (Possible reasons for rejecting a nomination include non-specification gas quality, gas trade nominations that do not match, inability to cover financial obligations, or transmission constraints resulting in zero flow.)

To assist each Shipper to manage its own balance, the computer system maintains (and can display) a running total of the difference between each Shipper's input and output gas nominations.

(c) Daily Capacity – Firm and Interruptible

In addition to the quarterly and monthly entry capacity that Shippers hold, the NTS provides a mechanism for Shippers to buy or sell daily entry capacity, with the NTS acting as the counter-party for all such transactions.

Following the 'day ahead' demand forecast that is produced at 13:00 hours each day, the NTS assesses delivery capabilities. If the NTS believes more gas can be moved than it expects to be delivered, it can make extra entry capacity available to Shippers. Equally if the NTS' assessment suggests that it may not be able to transport all of the gas it expects to be delivered to terminals, then it can buy back entry capacity which Shippers hold and would otherwise be able to use.

The buying and selling of capacity by the NTS in respect of each Gas Flow Day is conducted through a series of auctions held both on the day before and periodically within each Gas Flow Day. Shippers can place bids for a given day's capacity up to seven (7) days ahead of the Gas Flow Day, which are valid only for the Gas Flow Day in question. This allows Shippers the opportunity to buy and sell daily capacity on a frequent basis for any particular Gas Flow Day.

In addition to daily firm capacity, the NTS makes available daily capacity on an interruptible basis. The availability of interruptible capacity at an entry point is based on the NTS's assessment of the firm capacity that is unlikely to be utilised by the holders (Use it or Trade it). Bids for interruptible capacity can be made up to seven (7) days in advance of the Gas Flow Day, and interruptible capacity is allocated by way of a single auction held between 13:00 hours and 15:00 hours on the day before the Gas Flow Day.

(d) Gas Trading and managing Capacity Restrictions and Imbalance

Gas trading was mentioned previously as one of the types of gas nominations (NBP to NBP), and gas trading 'on the system' is another way to overcome capacity restrictions. For example, one Shipper with spare entry capacity may input gas then sell it to another Shipper with sufficient exit capacity. It also allows a specialist role, i.e. a wholesaler of gas that inputs it to the system under an entry service and sells it on to other Shippers.

Gas trading can also be used to help manage gas imbalances. During the Gas Flow Day two Shippers who find they will have opposite imbalances can arrange a trade to bring each of them into better balance. Having agreed a trade, the two parties each create a gas nomination that specifies the other party, instead of the usual entry or exit point. If the two nominations match, the system recognises this and the NTS approves the trade. However, the NTS takes no part in the financial settlement of the trade.

Shippers can also trade gas on the OCM for a Gas Flow Day between 12:00 hours the day before and 03:35 hours on the day. The OCM is made up of three markets:

- NBP Title Trades
- NBP Physical Trades
- Location Specific Trades.

Trades within the NBP Title market effectively transfer title to gas between the trading partners. NBP Physical Trades are accompanied by a requirement on the initial trading party to make a corresponding

renomination(s) within a predetermined time. Location Specific Trades have the same accompanying requirement as NBP Physical Trades except that the resultant renomination must be at the location specified in the trade.

Having completed a trade on the OCM, the Market Operator will submit details of trading positions to the NTS, from which Shipper nomination positions are deemed and adjusted accordingly.

4.4.2 During the Day

The gas that has been booked enters the System, flows to its destination, and exits the System. The System is constantly monitored to maintain a physical balance, using the balancing tools as necessary.

(a) Renomination

From 18:00 hours on the day before until 03:59 hours on the day - and subject to NTS approval - Shippers are able to amend existing nominations or create new ones. Both new and amended nominations made during this period are called 'renominations'.

On output, Shippers may renominate their DM sites to take account of changes in demand, e.g. interruption (see below) or changes in the weather (causing a change in consumption). Similarly the NTS recalculates NDM nominations whenever it receives a changed weather forecast (up to four times a day).

Having renominated on output, a Shipper will aim to amend its input nominations to correspond and so remain in balance. Difficulties of supply may cause a Shipper to renominate downwards at one entry point and increase or create a nomination at another. Finally, Shippers may create input or output renominations to reflect 'on the day' gas trades.

(b) Physical Operations

Transporters aim to be ready to respond whenever there is a change in demand. Forecasts of demand are therefore kept under review. The Transporters receive frequent weather forecasts that they use to forecast resulting changes in gas demand. They also have access to Shippers' input and output nominations and to the current status of all parts of the networks, providing information on expected gas flows.

Often, market based actions by Shippers will result in the physical changes needed for the NTS to accommodate a change in demand. If they do not, then the pressure of the gas in the NTS (linepack) will vary. However, sometimes the expected change is too big for the pressure within the NTS to remain within its target range. This is a normal occurrence - it does not happen every day but on some days it can happen several times.

There is usually several hours' notice in which the NTS can plan a response to this change. If the pressure appears to be dropping, then either more gas must be input or some load(s) must be reduced. If the pressure appears to be rising, then opposite actions are necessary. The UNC defines a market-based solution for making this happen, using the OCM.

(c) The NTS' use of the OCM for balancing

When a Shipper has a clear idea of its supply and demand on a particular day, it may decide to use the OCM to buy gas from or sell gas to the NTS for system balancing purposes. This buying and selling action is normally considered from the point of view of the Shipper, and for this purpose the Shipper would normally make NBP Physical Trades.

To start the process the Shipper makes an NBP Physical Bid on the OCM, specifying whether it is a 'buy' or a 'sell', the date(s) to which it applies, the quantity of gas, how quickly it could be

implemented, and the price per kWh. The Shipper might also make Location Specific bids, which can be selected by the NTS when it needs to increase or reduce flows at a particular location.

The Shipper enters the bid on the OCM, to which the NTS and all the other Shippers who subscribe to the OCM have access. They can see the bids that have already been made, though not who made them. (Providing that its bid has not yet been accepted a Shipper may withdraw a bid at any time, for example to re-bid at a different price.)

The bids that the NTS accepts are normally selected based on price, i.e. lowest for a 'sell' trade, highest for a 'buy' trade. Adherence to this criterion may be overridden when specific operational requirements need to be met, e.g. to obtain gas quickly or at a particular location.

The OCM informs the successful bidder of the bid's acceptance, and who is then required to arrange for the change to be implemented. In the case of a Physical Trade this includes making a flow renomination. If the bidder fails to do so, it is likely to incur additional scheduling and imbalance charges or, in the case of a late flow renomination, a physical renomination incentive charge. Unaccepted OCM bids become redundant at 03:35 hours on the Gas Flow Day to which they apply.

Finally the Shippers are either billed or receive credit for their accepted bids.

(d) Changes to Daily Capacity

As discussed within the previous section (Before the Day) Shippers have the opportunity to adjust their level of entry capacity entitlement for a given Gas Flow Day by placing 'buy' or 'sell' bids with the NTS both within and before the Gas Flow Day.

As with quarterly and monthly entry capacity, Shippers can also alter their capacity entitlement by trading their daily entry capacity with other Shippers.

(e) Interruption Requirements

There are occasions when Transporters need to interrupt the supply to sites, for example:

- to relieve a transportation constraint at a particular point of the network

- when depletion of peak storage could compromise the security of supply for the rest of the winter (in accordance with Emergency Procedures).

To prepare for these potential events, Transporters make arrangements with Shippers whereby certain of the Shippers' large and very large DM sites are declared to be 'interruptible'. In exchange for this flexibility, the Shipper is deemed exempt from NTS Exit and LDZ Capacity charges for these particular sites. Transporters can then require those sites to interrupt their use of gas at short notice, up to an agreed number of days per year.

A Transporter's choice of sites to interrupt must not discriminate in favour of, or against, any Shipper or group of Shippers, and it must treat all Shippers equitably. However, for a specific situation or locational difficulty, its choice may be dependent entirely on operational necessity.

When a situation requiring resolution by interruption arises, the Transporter provides each relevant Shipper with a total interruptible requirement and a list of suitable sites. The Shipper may request changes to the list of sites actually interrupted provided that the revised list would achieve the same result. The Shipper is then responsible for instructing all its affected sites to interrupt their use of gas within the required timescales.

It is essential that a site ceases using gas when instructed to do so. If a site fails to interrupt as required, the Shipper incurs a substantial charge. If the failure to interrupt puts the system at risk, the

Transporter can take steps to disconnect that site and charge the Shipper for its subsequent reconnection.

4.4.3 After the Day

The gas has been transported through the system to meet requirements, and now all that remains is to work out how much gas actually flowed into and out of the system and to whom it belonged so that the appropriate charges can be made.

(a) Measurement

Meter reading data is collected from around the networks. The large flows at strategic points are read daily by automated methods (DM sites), and the consumptions of smaller sites (NDM sites) are measured at longer intervals.

The Gas Flow Day ends at 06:00 hours and, shortly afterwards, the DM readings (volume, energy, and CV) become available. They are taken at the following locations:

- Terminals and on-shore fields
- NTS offtakes
- DM sites
- Storage sites.

If any reading is unavailable, perhaps because of a meter or line fault, the computer system provides an estimated value, and at about 16:00 hours on the day after the Gas Flow Day, these readings and estimates are passed into the Allocation process. If a corrected value becomes available later (up to five days after the Gas Flow Day) it is used to re-run the Allocation process.

(b) Allocation and daily balancing

Gas flows in different parts of the network are allocated in different ways and division of the actual gas flows recorded by measurement is made among the Shippers according to rules in the UNC.

The first stage is to allow for the three uses of gas that are not the responsibility of Shippers. These are:

- LDZ Stock change - a change in the pressure in the LDZ and or change in holder stocks between the start and end of the Gas Flow Day.
- Own use gas (OUG) - the gas taken from the pipeline to drive compressors or preheat gas for pressure reduction.
- Unaccounted for gas (UAG) - the gas that is lost through leakage or measurement errors.

The allocation process takes place in the evening following the Gas Flow Day, and each Shipper can then inspect its own allocations. Shippers pay commodity charges per unit of gas shipped.

(i) Terminals and Onshore Fields

An Agent for each terminal is appointed by the Shippers using that terminal to manage allocation as follows:

- Transporters calculate default allocations based on the nominations received.
- Producers inform each Shipper how much they have delivered to the terminal.
- Shippers advise the Agent of their claims.

- Transporters advise the Agent of the measured quantity via the shared computer system.

- The Agent checks that the measured and claimed quantities tally and co-ordinates the resolution of any mismatches.

- The Agent records the claims on the shared computer system. (Providing they total to the measured quantity, these claims replace the default values.)

This process is normally completed within seven (7) days after the Gas Flow Day, though the business rules allow certain types of change until fifteen (15) days after the following month-end.

(ii) Daily Metered (DM) Sites

The quantities shown by the meter readings from DM sites are allocated to the respective Shippers.

(iii) Non-Daily Metered (NDM) Sites - Demand Attribution

For every NDM site, the Transporters record the LDZ in which it is located, the Shipper who ships gas to it, its designated pattern of consumption, and how much gas it used in the previous year. In this way the Transporters can estimate how much each Shipper expects to supply to each LDZ on a particular day in normal weather.

In each LDZ, there are daily measured values for the total demand (at its NTS offtakes) and the daily metered demand (from the DM sites within it). The difference between the two amounts is the NDM demand for that particular LDZ. By applying suitable factors to allow for the actual weather, Transporters divide the NDM demand between the Shippers in an equitable way. This process takes place in the evening following the Gas Flow Day and each Shipper can then inspect its own allocations:

Inputs	**Outputs**
Measured at a terminal	*Measured at a DM site*
Withdrawn from storage	*Injected into storage*
Bought in a gas trade with another Shipper or a Transporter	*Sold in a gas trade with another Shipper or a Transporter*
	Attributed at an LDZ for NDM

This compares each Shipper's input and output allocations, and if they are found to be out of balance, additional charges are made to recover the costs of correcting the imbalance.

As soon as the Allocation process is complete, a balance is struck for each Shipper between aggregate inputs to the system and aggregate outputs (withdrawals) from it. The results of the balancing process are made available to Shippers along with the allocations.

Output allocations are recalculated if revised meter readings are received within five (5) days. Input allocations may be changed as described at (i) 'Terminals and Onshore Fields', above. Whenever an allocation changes the corresponding balance is recalculated.

Shippers that input more than their outputs are paid for the extra gas, and Shippers that input insufficient gas are charged. These payments and charges are based on the prices of trades on the OCM, which are outside the Shippers' control. They are likely to pay more than normal for the gas they buy and receive less than normal for the gas they sell. They therefore effectively pay a charge for being 'out of balance'.

(c) Invoicing

Each month the Transporters produce detailed invoices for the various types of charge which Shippers must pay. The invoices are delivered to the Shippers electronically via the shared data network (IX Network).

Much of the data on which these charges and payments are based (e.g. allocations and balances) is made available to Shippers on the day following the Gas Flow Day to which it relates. These are not necessarily the final values as there may be an agreed period to allow for revised meter readings, claims, etc. However, this does give Shippers an early indication of the likely charges/payments and allows queries to be raised and resolved before invoices are raised.

The generating of the invoices follows a monthly cycle. Separate invoices are produced for the separate elements at different times throughout the month, spreading the administrative workload.

The volume of data in a typical invoice can be quite large, and the invoices are therefore transmitted to Shippers as electronic files. Shippers can then load these files into their own computer systems for validation and settlement.

(d) Reconciliation

The Demand Attribution formula gives an estimate of what was consumed at NDM supply points, but it is only an estimate. When an actual reading is taken at an NDM site, its value is passed on to the Transporters. With knowledge of the true consumption, it is now possible to compare attributed and actual consumption for the period since the previous reading and calculate the difference for large sites (an NDM reconciliation variance).

Smaller NDM supply points are not individually reconciled. Instead they are reconciled in aggregate within each LDZ. The calculation is based on the difference between the total LDZ demand and the energy billed to other sites in the LDZ.

If datalogger readings are not received within five (5) days, the corresponding charges are based on a default value. Therefore, when the correct value is received, a DM reconciliation adjustment is raised. DM reconciliation adjustments are also made where meter readings are found to be in error.

(e) Charging

Except where stated, the Transporters calculate charges each day. These charges include:

- Capacity - for entry, exit and LDZ capacity.
- Commodity - for transporting gas within the NTS and LDZs.
- Customer - for activities associated with supply points.
- Capacity overrun (monthly), flexibility overrun or supply point ratchet (monthly) - when a Shipper ships more than its capacity entitlement.
- Scheduling - based on any difference between the nominated and delivered quantities.

Some transactions may result in either payments or charges:

- An imbalance caused by supplying too much gas produces a payment; supplying too little gas creates a charge.

- Reconciliation may produce a rebate or an extra charge.

- Adjustments associated with the correction of erroneous data may be positive or negative.

- Late settlement of a Transporter's invoice generates an interest charge; late settlement of a payment by a Transporter generates an interest payment.

The principle is that a financial balance is retained in respect of NTS' balancing costs and receipts. Therefore, each month, items such as the total receipts and payments for accepted bids, imbalances and scheduling charges are netted out and each Shipper then receives a debit or credit in proportion to the amount of gas it shipped that month. However, the NTS makes or loses money depending on how effectively it maintains the System balance, and so is incentivised to operate at minimum cost.

(f) Information

The data created by the daily cycle of processes is also used to monitor and improve performance. For example, to promote the efficient and transparent running of its pipeline network, the NTS produces and makes available to Shippers the following types of daily or monthly report:

- Shipper operations reports – these summarise (for each Shipper) such things as its balancing performance, scheduling performance, capacity booking and trading activity, and nomination and renomination activity.

- Network operations reports – these provide aggregated information about such aspects as the forecast and actual demand, imbalance charge prices, patterns of supply at sub terminals and the use by the NTS of storage stocks. They analyse trends over a month, and from month to month.

5 Conclusion

We hope that this overview has helped you gain an insight into the UNC regime, which has been in operation since May 2005 for gas transportation within Great Britain. Any comments on this document and suggestions for improvement would be welcome, and can be sent to enquiries@gasgovernance.com.

Joint Office of Gas Transporters
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