

CHAPTER 1

The Nature of Gas

An understanding of the basic chemical and physical properties of gas (in all of its possible forms) will be essential to parties planning to contract for its sale and transportation since those properties will in many ways shape the nature of the resultant sales, storage, processing and transportation arrangements. 1-001

WHAT IS GAS?

“Gas” is a shorthand term for those hydrocarbon (also called petroleum) deposits which occur naturally in a gaseous or a mixed gaseous and liquid state, consisting primarily of methane, ethane, propane and then the progressively heavier fractions of butane, pentane, hexane, heptane and octane. This is natural gas, which at the point of production is often called “raw gas”, and can be distinguished from the synthetically-produced mixtures of methane and other gases which are derived from the distillation of coal (often called “town gas” or “syn-gas”). 1-002

Gas, as the term is used principally in this book, is a fossil fuel formed when layers of decomposing plant and animal matter have been exposed to intense heat and pressure over many thousands of years. “Biogenic gas” is the name given to gas created by this process in shallow sedimentary basins (such as marshes and bogs) and with the assistance of micro-organic agents, whilst “thermogenic gas” is the name given to gas created at much greater depths and without the presence of such agents. The discovery of thermogenic gas is the primary objective of most exploration drilling.

The advanced thermal efficiency and clean combustion characteristics of natural gas (in its various forms) makes it attractive as a fuel and yet it has certain physical characteristics which present disadvantages and need to be managed through sales and transportation arrangements. 1-003

By comparison, crude oil has a high energy-to-volume ratio and is a stable and relatively inert liquid which is readily capable of sale, transportation and storage as such. A barrel of oil is a freely saleable commodity across multiple markets and through well-defined exchanges.

Gas, on the other hand, has a much lower energy-to-volume ratio and is much less accommodating to store and transport. One thousand cubic metres of gas has about the same calorific value (see below) as one tonne of crude oil, but that one tonne of oil occupies roughly one cubic metre. A given quantity of gas therefore occupies around one thousand times the volume which the energy equivalent quantity of oil would occupy.

There are several derivations to note on the general theme of gas: 1-004

- (i) *Condensate, NGLs and wet gas.* Also called “light liquid hydrocarbon”, the term “condensate” is used to describe the heavier (pentane to octane)

hydrocarbon fractions which exist in a liquid form at ordinary atmospheric temperature and pressure. In sub-surface (reservoir) conditions these fractions will typically exist in a gaseous state because of the greater temperatures and pressures underground. "Natural gas liquids" ("NGLs") is the term used to describe the ethane, propane and butane fractions which are extracted from a gas stream. The term "wet gas" is used indiscriminately to describe condensate and natural gas liquids; not quite correspondingly, "dry gas" is often used to describe any combination of methane and ethane. The terms "wet gas" and "dry gas" are also used sometimes (inaccurately) to indicate the levels of water found in a gas stream. "Rich gas" indicates raw gas higher in the heavier fractions, whilst "lean gas" indicates raw gas which is principally methane.

A gas seller may have an interest in extracting the various liquids from the gas stream (see below) as part of the commercialisation of gas reserves where those liquids can be sold separately from the resultant dry gas stream. Indeed, a project whose economics are based on such a liquids-stripping activity could be the foundation for the sale of dry gas effectively as a by-product. Alternatively, the presence of wet gas could present a problem where the buyer has a demand only for dry gas and there is no obvious market for the stripped liquids.

- (ii) *Associated gas and non-associated gas.* "Associated gas" (also known as "solution gas" or "casinghead gas") exists in solution or in close contact with crude oil deposits and is produced only when the crude oil deposits with which it is associated (the "associated liquids") is produced. The associated gas will need to be separated from the associated liquids. Consequently, any interruption to the production of those associated liquids might also interrupt the production of the associated gas, and vice versa.

Correspondingly, "non-associated gas" is gas which can be produced without dependence upon the production of any associated liquids.

Virtually all crude oil deposits have some accumulations of gas associated with them but many gas accumulations exist independently of any crude oil (sometimes called "free gas"). The producer's decision as to whether it is viable to develop an associated gas field will usually be made only in conjunction with an assessment of the viability of developing the field for the production of the associated liquids.

Where gas is produced as a consequence of the production of associated liquids then the producer will need to do something with that gas. The producer's options are to vent or flare the gas, although the producer should be reluctant to waste a resource in this manner and it is often the case that any regulatory consent which may be required to permit venting or flaring will limit the extent of such an activity. Or the producer can reinject the gas into the oil field, which has the advantage of maintaining reservoir pressure, although there will be limits to the amount of reinjection which can take place in the interests of maintaining the integrity of the structure of the reservoir, and such reinjection does not guarantee a later return of the entirety of the injected gas volumes.

Alternatively the producer could sell that associated gas. In some situations it may even be that an agreement for the sale of the gas component is necessary to make the production of the associated liquids economical. In such a circumstance the gas buyer might argue that the price payable for the gas should pass through a relative discount to reflect the ad-

ditional value to the producer of the associated liquids stream which the producer has become able to commercialise in consequence of the associated gas sales agreement.

Associated gas sales could also be structured as interruptible (8-018) or as seller's nomination sales (26-002) in order to take account of the exigencies of associated liquids production. Associated gas production is not inherently unreliable, however, simply because of what it is. There can be significant associated gas deposits which are capable of being commercialised as stand-alone projects.

- (iii) *LNG, LPG and CNG.* "Liquefied natural gas" ("LNG") is predominantly methane which has been liquefied through a process of refrigeration to a temperature of approximately minus 160°C (minus 260°F). The transformation from a gas to a liquid produces a volume reduction of approximately six hundred to one and so makes it possible to transport greatly increased volumes of gas in its liquefied form, typically by specialist LNG ships (28-003). Upon arrival at its eventual destination the LNG will be regasified (i.e. restored from a liquid to its original vaporous state) and the resultant regasified LNG ("regas") will then be available for sale and further transportation. As a rough guide, one trillion cubic feet (see below) of feedgas will be necessary to produce 20 million metric tonnes of LNG (with these amounts to be scaled up and apportioned accordingly to reflect greater quantities and multi-year production respectively). "Liquefied petroleum gas" ("LPG"), also known as "bottle gas" or "tank gas", is any mixture of propane and butane, which can exist in a liquid or gaseous state and is stored in pressurised containers for use as vehicle fuel or heating fuel.
- "Compressed natural gas" ("CNG") is primarily methane which is compressed and stored in high-pressure tanks and is used as vehicle fuel.
- (iv) *Sweet gas and sour gas.* "Sour gas" is gas which contains relatively significant amounts of hydrogen sulphide (H₂S), and so "sweet gas" is gas which does not. The term "acid gas" is sometimes used interchangeably with sour gas, although strictly speaking acid gas is a gas that contains relatively significant amounts of any acidic gases, such as carbon dioxide or hydrogen sulphide.
- (v) *AMM, CBM and CSG.* "Abandoned mine methane" ("AMM") is a term used to describe pockets of methane which reside in redundant coal-mining workings. "Coal bed methane" ("CBM"), also called "coal seam gas" ("CSG"), is natural gas (predominantly methane, rather than any of the heavier hydrocarbon fractions) which is adsorbed onto the surface of un-mined coal seams. CBM deposits can be extracted through processing and can, despite being an unconventional source of natural gas (see below), be of a size sufficient to underpin a stand-alone gas recovery programme.
- (vi) *Unconventional gas.* "Unconventional gas" is a generic term used to describe natural gas deposits which are recoverable by any technology other than conventional drilling (such as by hydraulic fracture stimulation ("fracking")), and includes coal bed methane (see above), hydrates (methane deposits trapped within a crystalline water structure like ice), shale gas (raw gas deposited within fissile, relatively impermeable mineral

strata) and tight gas (raw gas which is difficult to extract because of its accompanying geological conditions).

1-005 The essential operational characteristic to appreciate is that gas (whether raw gas straight from a gas field, raw gas which has been processed, or regas) will be sold in a relatively continuous flow where it is delivered by pipeline, whereas LNG is delivered by ship in the discrete portions of the full cargo lot (9-013). The underlying sales and transportation agreements will be written, and applied, in recognition of this reality.

Gas sales and transportation contracts will therefore need to apply a technical definition of "gas" which accurately represents the precise nature of the commodity being sold and purchased and transported. There is no standard or industry-wide accepted definition of gas (or LNG) which can be applied universally in contracts for sale and transportation.¹

THE BEHAVIOUR OF GAS

1-006 Gas is a fluid (that is, dynamic rather than liquid) body composed of molecules in constant and chaotic motion. Gas is highly compressible but equally it will expand to fill any vessel in which it is placed. The behaviour of gas with reference to the three primary behavioural characteristics of temperature (the thermodynamic quotient of the gas), pressure (the molecular compression of the gas) and volume (the space occupied by a given quantity of gas) can be predicted in part by the application of three theoretical laws, together known as the "gas laws":

- (i) *Boyle's Law*. Also known as "Mariotte's Law", or the "Boyle-Mariotte Law", which says that the volume of gas is inversely proportional to pressure where temperature is constant.
- (ii) *Charles' Law*. Also known as the "law of volumes", which says that the volume of gas is directly proportional to temperature where pressure is constant.
- (iii) *Gay-Lussac's Law*. Also known as the "pressure law", which says that the pressure of gas is directly proportional to temperature where volume is constant.

The gas laws apply to gas in theory, an "ideal gas" (a hypothetical gas which ignores the properties of a real gas), and much of the behaviour of a real gas ignores these theorems, not least since the constants referred to above will not apply where anything other than standardised conditions apply. The gas laws are still useful, however, as a baseplate for predicting the physical behaviour of gas when preparing arrangements for the sale and transportation of gas.

1-007 Such prediction will require recognition that there is a system of interdependent variables, notably, temperature, pressure and volume, but also the chemical

¹ This is reflected even in the model form contracts which are used in the industry. The AIPN GSA (3-010) defines Natural Gas as "gaseous hydrocarbons, or a mixture of gaseous hydrocarbons and inert gases, existing in the gaseous state or in solution in oil under reservoir conditions and includes Natural Gas associated with oil, Natural Gas dissolved in oil and Natural Gas not dissolved in oil", the AIPN LNG MSA (3-010) defines Natural Gas as "any combustible hydrocarbon or mixture of hydrocarbons consisting primarily of methane and including other combustible and non-combustible gases in a gaseous state" and the AIPN model form joint operating agreement defines Natural Gas as "all Hydrocarbons in a gaseous state at standard temperature and pressure (including wet gas, dry gas, and residue gas)."

composition of the gas, which will be determined on a case-by-case basis and which will condition many of the terms for the sale and transportation of that gas:

- (i) Raw gas at the point of its production from source will be at a relatively high temperature and pressure and will typically be at that temperature and pressure immediately at the point of entry into any pipeline prior to the transportation of that gas (unless an intervention is made to change the temperature or pressure).
- (ii) As gas expands into a pipeline its temperature and pressure will begin to fall. There will be a continuing cooling of the gas and pressure drop over the length of the pipeline, and friction between the gas and the pipeline wall will also cause a continuing pressure drop.
- (iii) Compression of the gas, specifically through the operation of compressors or by a reduction in pipeline volume as the gas passes through a reduced pipeline section, will increase the temperature and the pressure of that gas.
- (iv) The satisfaction of a required pressure and temperature test for the delivery of gas at the delivery point in a pipeline gas sale (16-008) will be derived from the pressure and temperature of the gas at the point of input into the pipeline, the effects of pressure drop and compression over the length of the pipeline and gas heating or cooling at the delivery point.
- (v) The maximum operating pressure of any gas pipeline will be determined by the dimensions of the pipeline and the application of compression. This will be relevant in determining the availability of linepack quantities (23-008) and wider delivery flexibility options.
- (vi) The temperature reduction which inevitably accompanies the refrigeration of methane to give LNG (see above) leads also to a corresponding reduction in gas volume. This allows for gas to be transported, in its compressed and refrigerated state, as a liquid.

MEASUREMENT UNITS

Gas sales and transportation arrangements measure in particular the volume, calorific value (see below) and pressure (see below) of the gas to be sold and transported. These units are often applied interchangeably.

The imperial unit for the measurement of gas volume is the "cubic foot" ("cu.ft." or "ft³"). In its simplest form this is defined as the amount of gas that would nominally fill the space represented by a cubic foot but because gas expands and contracts according to changes in pressure and temperature the measurement of a cubic foot is typically standardised at a temperature of 60°F and at a pressure of 14.7 pounds per square inch to give a "standard cubic foot" ("scf"). In the SI or modern metric system gas (and particularly LNG) volume is measured in cubic metres ("m³"), where one cubic metre (defined, for example, in ISO 1000:1992(E)) is approximately equal to 35.3 cubic feet.

In the sale of LNG the in-ship volume of LNG is typically measured volumetrically (in thousands of cubic metres) but the sales volume of LNG is typically measured in units of calorific value. Production volumes of LNG are also typically measured in millions of metric tonnes ("MMT").

The units of volume used variously in this book are: standard cubic foot ("scf"); thousand standard cubic feet ("mscf"); billion standard cubic feet ("bcf"—one thousand millions); trillion standard cubic feet ("tcf"—one million millions); and metric tonnes ("MT").

1-008

1-009

1-010 Calorific values (see below) are measured using a number of different units. The usual imperial unit for the measurement of the calorific value of gas or LNG is the "British thermal unit" ("Btu") which can be defined as the amount of heat required to raise the temperature of one pound of pure water from 59°F to 60°F at an absolute pressure of 14.7 pounds per square inch, and typically measured in millions of Btus ("mmBtus"). In the SI system gas calorific value is typically measured in Joules, also defined in ISO 000:1992(E) and often scaled up to the mega Joule ("MJ"), meaning one million Joules, and the giga Joule ("GJ"), meaning one billion Joules. One Btu is equal to approximately 1055 Joules.

Other units used for the measurement of calorific value are the kilowatt hour ("kWh") and the therm ("th"), which is commonly used in UK gas sales and which corresponds to 100,000 Btus. A common unit of use is the "mmBtu" (one million Btus), and a "dekatherm" is sometimes used to connote one million Btus.

1-011 The usual imperial unit for the measurement of gas pressure is the pound per square inch (or "lbf/in²" or "psi"). One psi equates to 144 pounds of pressure per square foot. The SI unit for gas pressure is the Pascal ("Pa") or kilopascal ("kPa") (also defined in ISO 1000:1992(E)), where one kPa is equal to 0.145 lbf/in².

Gas sales and transportation arrangements typically reference atmospheric pressure in various technical and operational provisions. Because atmospheric pressure varies with temperature and elevation above sea level an agreement might specify its own particular definition of atmospheric pressure.

COMPOSITION AND CALORIFIC VALUES

1-012 Any raw gas stream will have a particular chemical composition and calorific value and may require processing prior to transportation or delivery as gas, and prior to liquefaction to give LNG.

Although raw gas consists predominantly of hydrocarbon fractions (and within those fractions the gas stream is typically between 70 per cent and 95 per cent methane), at the point of production the raw gas stream could contain minute vapourised quantities of components such as water, carbon dioxide, sulphur compounds, hydrogen sulphide, nitrogen and mercury, and minute solid particles of sand, dust and wax.

1-013 These other components are generally undesirable within the gas stream. Water and carbon dioxide are corrosive to metals and water can freeze and obstruct the flow of gas through pipelines and other equipment. Hydrogen sulphide is highly corrosive and toxic. Nitrogen, whilst neither corrosive nor toxic, has no calorific value and will displace the calorific value of the gas stream. Mercury is particularly corrosive of aluminium and its alloys and solid particles could build up and obstruct the flow of gas through pipelines and other equipment.

The gas quality specification provisions in the gas sales arrangements (Ch.16) will set out the maximum permissible levels of these other components in the gas stream. The seller might need to process the raw gas at or after the point of its production in order to meet a gas quality specification which is required under the terms of those arrangements. Where the gas being sold is regas the original liquefaction process, for the transformation of raw gas into LNG, will have removed many of the usual impurities from the raw gas stream.

1-014 In contrast to crude oil, which from its natural state is virtually unusable without extensive refining and processing, raw gas needs relatively little processing before it can be put to commercial use. Notwithstanding this the raw gas stream can, prior to its delivery to the buyer or into a gas pipeline for transportation, undergo several

processes in order to modify its constitution:

- (i) *Impurities removal.* The raw gas stream could be treated in order to remove any impurities, or at least to reduce those impurities to commercially and/or operationally acceptable levels.
- (ii) *Liquids stripping.* The interest of the seller in extracting hydrocarbon fractions other than methane prior to the delivery of gas to the buyer will depend on a combination of the extent to which those fractions are present in the raw gas stream, how their presence offends the agreed gas quality specification (e.g. by taking the calorific value beyond a specified range) and the opportunity for the seller to commercialise such extracted fractions. Liquids stripping can be an inherent part of the process of LNG production where the raw gas stream is wet gas.
- (iii) *Calorific value modification.* Where the calorific value of the raw gas stream is too rich or too lean (see below) to meet the requirements of the gas (or LNG) sales arrangements then the seller or the transporter may have to blend (or "spike") the raw gas stream by introducing a heavier hydrocarbon fraction (such as propane) in order to enhance the calorific value or an inert component (such as nitrogen) to lower the calorific value. This modification process might also be applied to LNG at the point of unloading.
- (iv) *Various.* The gas could be heated or cooled and may be odourised through the addition of an odourising agent.

"Calorific value" (also called "thermal value" or "energy content") defines how many units of heat output will be released when a given volume of gas (measured, for example, in standard cubic feet or cubic metres) is combusted. The determination of calorific values enables a straight line comparison to be made between gas and other fuel sources and is necessary because greater or lesser calorific values for gas can result in correspondingly greater or lesser economic values for that gas, where, typically, higher calorific values can make the gas more valuable as a commodity, because of its proportionately higher thermal content.

Calorific values can be quoted as "gross" (or "higher heating value"), meaning that any latent heat released by water vapour produced during combustion of the gas has been added into account in determining the calorific value, or as "net" (or "lower heating value"), meaning that any latent heat so released has been subtracted in determining the calorific value of the combusted gas.

The calorific value of gas will vary across the range of hydrocarbon fractions with methane having the lowest calorific value ("lean gas") and progressively heavier fractions having progressively higher calorific values ("rich gas"). The calorific value of a gas stream increases as the molecular weight increases, with the heavier hydrocarbon fractions having greater calorific values. Thus, the net calorific value of methane is 909 Btu/scf (or 33.8 MJ/m³), and this figure rises progressively to give 1,618 Btu/scf (or 60.3 MJ/m³) for ethane and 2,316 Btu/scf (or 86.2 MJ/m³) for propane.

Gas required by a buyer as feedstock for combustion in a gas-fired power plant is typically bought by reference to its calorific value rather than by reference to volume, because the turbines through which the gas will be combusted will be designed to consume gas within a specified range of calorific values for the greatest operational efficiency. Consequently the calorific value of gas is more important to the buyer than the volume of gas which is delivered. The gas sales arrangements in this instance will therefore dictate in the gas specification provisions (16-002) a range of calorific values within which the buyer will require the seller to deliver gas.

1-015

1-016 The calorific value of a particular quantity of gas will be determined by the chemical composition of that gas. For pipeline gas deliveries, where the seller delivers gas to the buyer which per unit is of a lower calorific value than, unless the calorific value of the gas stream can be increased by bringing in alternative supplies of richer gas or by blending in heavier hydrocarbon fractions with higher calorific values, a greater volume of gas will need to be delivered by the seller in order to maintain the aggregate calorific value of the quantity of gas nominated by the buyer for delivery. For example:

Delivery nomination for gas (Btu)	Calorific value of gas (Btu/scf)	Equivalent gas volumes (scf)
5 billion	1200	4.16 million
5 billion	1000	5 million
5 billion	800	6.25 million

The seller will need to bear this in mind in light of the physical constraints of its gas production and transportation infrastructure, which might have insufficient capacity to accommodate any greater volume of gas which is required. This inability to deliver the requisite quantity of gas by reference to calorific values could lead to a default of the seller under the gas sales arrangements.²

To protect the seller from the situation where a falling calorific value might necessitate (and so give rise to the impossibility of) the delivery of increasing physical volumes of gas, the gas sales arrangements could contain a provision to the effect that where over a specified period the average calorific value of delivered gas has fallen below a certain level then the seller's gas delivery obligation (8-011) will be adjusted correspondingly.³

1-017 From the buyer's perspective however such a mechanism will mean a reduced gas delivery, which might be commercially or operationally unacceptable. The buyer might therefore require the seller to address the problem by taking such operational steps as may be needed to maintain the calorific value of the gas stream at the required level.

Conversely, where the calorific value increases and there is a resultant reduction in the physical volume of gas requiring to be delivered to meet the buyer's nomination then this could lower the gas delivery profile to the point where there could be the risk of a shutdown in the gas delivery facilities. Thus, the gas sales agreement might also contain a mechanism allowing the seller to curtail gas deliveries (without liability for shortfall—15-002) where this happens too.⁴

Similar provisions could apply in the context of gas transportation, in protection of the transporter (Ch.24).

In the delivery of LNG the essential determination of quantities will be calorific, although this must be read against the necessity to reconcile this determination with the LNG-carrying capacity of the LNG ships (28-003) which are applied to the service of the SPA. This will lead to reconciliation between the calorific value of the LNG and the capacity of the LNG ships.

² See Appendix B19.

³ See Appendix B6.

⁴ See Appendix B6.

FLOW CONTROL AND PRESSURE CONTROL

Where gas (whether raw gas or regas) is delivered by pipeline, the issue of whether facilities will exist at the delivery point (8-002) for the control of the flow of gas or for the maintenance of pressure, and how those facilities are capable of operation, will need to be determined and the consequences catered for in the gas sales and transportation arrangements. **1-018**

It may be that at the delivery point the flow of gas can be controlled by either party by the deployment of a valve which is configured to do so. Alternatively, the ability of gas to flow freely could effectively be controlled by either party maintaining certain gas pressure differentials in their respective facilities. Where, for example, the buyer maintains a higher gas pressure in its gas reception facilities than the seller maintains in its gas delivery facilities then there will be a pressure barrier which could prevent the seller from being able to deliver gas into the buyer's gas reception facilities.

Correspondingly, a much lower gas pressure in the gas reception facilities will lead to a pressure drop and the seller may be unable to control the flow of gas from its gas delivery facilities into the gas reception facilities.

If the buyer can exercise flow control and/or can control the gas pressure then the buyer could have the ability to undertake or to overtake gas (Ch.27) and the gas sales arrangements should address this. The same applies in respect of the shipper under the gas transportation arrangements.

Alternatively, the seller may control the flow of gas and/or the gas pressure regime in which case the buyer is unlikely to have the ability to undertake or overtake, but in such a situation the seller may require a delivery tolerance (8-014) and a shortfall tolerance (15-002) in the gas sales arrangements in order to account for over-deliveries or under-deliveries. The same applies in respect of the transporter under the gas transportation arrangements.

CHAPTER 9

Quantities, Rates, Reserves

Whether the seller will deliver gas on a homogenous basis or from identified sources of supply, the sales contract will provide that the quantity of gas which the seller will sell and which the buyer will buy will be broken out in the sales contract into certain defined measures of quantity (often by reference to certain periods of time). The measures differ between pipeline gas and a GSA and LNG and an SPA.

9-001

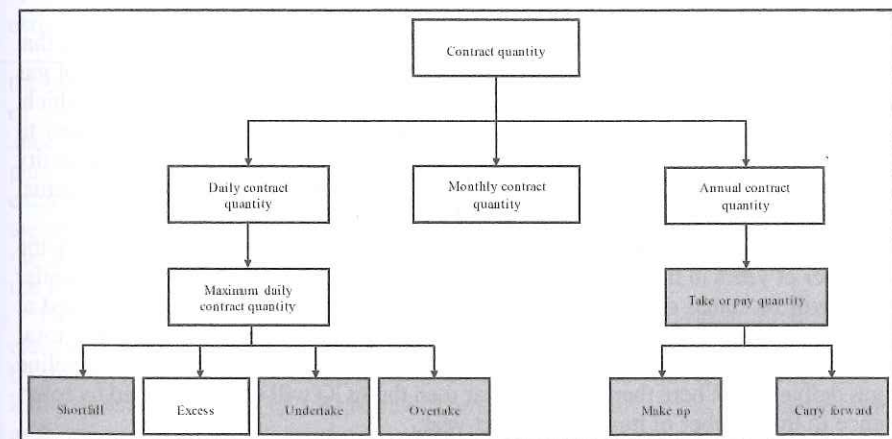
A GSA could also specify the anticipated rates of delivery of gas over certain periods of time.

The sales contract might also contain detailed provisions regarding any reserves of gas which are to be committed by the seller for sale to the buyer in order to ensure the full performance of the sales contract.

EXPRESSING QUANTITIES

Quantities of gas can be expressed in the sales contract in volumetric units or by reference to the calorific value of that gas (1-015). Whichever method of expression is used the sales contract will still contain the same basic quantities relationships. Diagrammatically the relationship between the quantities provisions in a GSA can be expressed thus:

9-002



Each of the above elements will now be examined, except that the shaded components are dealt with in separate chapters in this book. The differences which apply in respect of LNG and an SPA are discussed below.

CONTRACT QUANTITY¹

9-003

The first task for the buyer and the seller is to determine the overall quantity of gas which is to be sold under the sales contract, which is usually known as the "contract quantity". The contract quantity is often applied to represent the maximum quantity of gas which the seller is obliged to deliver to the buyer over the lifetime of the sales contract, although this can be a difficult matter to estimate in advance and the actual quantities of delivered gas could well be lesser than or greater than the defined contract quantity.

The seller will calculate the contract quantity which it is prepared to offer by reference to the quantity of economically-recoverable reserves of gas (see below) which it estimates it has (or will have—depending on future exploration programmes) access to through production, and also by reference to volumes of gas which it can access through contracting for purchase. The buyer will calculate the contract quantity which it requires for its commercial purposes. A matching of how much gas the seller has versus how much gas the buyer needs will determine the definition of the contract quantity in the sales contract.

It is not essential that the sales contract recites the contract quantity if the quantities basis of the sales contract is derived from a method of calculation such as the annual contract quantity (see below) where the sales contract exists for a specified number of years, since the multiplication of these two factors will effectively give an overall contract quantity. Consequently it is not the case that every sales contract will recite an overall contract quantity.

ANNUAL CONTRACT QUANTITY²

9-004

The "annual contract quantity" ("ACQ") is intended to represent the maximum quantity of gas which the seller is obliged to deliver to the buyer in any year. The ACQ is particularly relevant as the cornerstone of the buyer's annual take or pay commitment (13-004) but will also underpin any take and pay quantity commitment (13-002).

The sales contract might provide in the exclusions from shortfall (15-002) that the seller will not be liable for shortfall where it fails to deliver any quantity of gas against the buyer's nomination (26-002) or scheduled requirement (30-001), which, if accepted, would cause the aggregate delivered quantity of gas over the year to exceed the ACQ. It should also be open, however, to the seller to deliver a quantity of gas in excess of the ACQ in a year if it and the buyer so requires. Thus, the actual quantity of gas delivered in a year could exceed the defined ACQ.

The ACQ could be derived from the contract quantity (see above) divided by the number of years in the basic term (7-002) but more usually the ACQ for a particular year will be stated as an absolute figure in the sales contract or may be arrived at by multiplying the applicable daily contract quantity (see below) by the total number of days in that year (which will cover leap years), in the case of pipeline gas deliveries. Where there is a part year then the ACQ will be apportioned by reference to the number of days in that part year.

9-005

In the context of delivering LNG the seller's obligation could be written as a requirement to deliver a volume of LNG equal to the ACQ in respect of a contract

¹ See Appendix B6.

² See Appendix B6.

year. The more accurate way of phrasing this obligation however is to say that the seller will deliver a series of LNG cargoes against the scheduled requirements of the SPA (30-001), where the aggregate amount of LNG represented within those cargoes should add up to give the ACQ. Critically, under such a formulation the seller's shortfall in the delivery of LNG would be determined on a cargo-by-cargo basis, rather than by reference to the delivery (or not) of an aggregate quantity of LNG represented by the ACQ in respect of a contract year.

Where the SPA recites an ACQ, the ACQ is determined typically as an aggregate calorific value (1-015) of LNG to be delivered by the seller in respect of a contract year. When setting the shipping schedule for the delivery of LNG in that contract year there may be a perfect correlation between the cargo-carrying capacities of the scheduled LNG ships, the average calorific value of the LNG and the ACQ, but such a coincidence is unlikely to happen. The reality is that it will become apparent towards the end of the contract year that the total delivered quantity of LNG will be something less than the required ACQ when rounded up to the next full cargo lot (9-013). To cater for this the SPA might provide³ that the quantity of LNG delivered by the seller in the contract year will be rounded up (that is, increased) by whatever amount is necessary to get to the next full cargo lot and so the ACQ. This additional "round-up" quantity of LNG will have to be taken delivery of (and paid for) by the buyer, and will be deemed to increase the ACQ for the contract year in which the round-up is applied, but the round-up quantity (that is, the excess over the ACQ) will then be carried forward and applied as a deduction to the ACQ for the next contract year. This, in effect, is a carry forward right.

An alternative to the round-up formulation is that of "round-down", whereby the quantity of LNG which is the next full cargo lot necessary to achieve the ACQ will be deducted from the ACQ for that contract year and (and the ACQ will thereby be reduced for the contract year in which the round-down is effected) and the round-down quantity (that is, the deficiency from the ACQ) will then be added to the ACQ for the following contract year.

Similar round-up/round-down principles could apply where the aggregate GHV (1-015) and LNG delivered in respect of a contract year is greater or lesser than the estimated GHV for that contract year.⁴

In respect of a contract year the obvious measure of the quantity of LNG which the buyer has taken delivery of will be the quantity of LNG actually taken delivery of within that contract year but the SPA typically also goes on to give an allowance also for the quantity of LNG taken delivery of by the buyer during the early part of the following contract year when measuring the buyer's performance. This extension (sometimes called the "seven-day rule") is intended to allow for a moderate amount of slippage in the LNG shipping activities which were scheduled under the annual programme for one contract year but which were actually performed in the following contract year.⁵

The quantities clause in the sales contract might recite⁶ the right of the buyer to elect to take delivery of more gas in respect of a contract year than is provided for by the ACQ, up to a defined amount (often defined as the "buyer's upward flexibility quantity" or "BUFQ"). This should be contrasted with excess gas (see below) as it reflects a firm entitlement of the buyer, if the election to take it is made, and

9-006

³ See Appendix C6.

⁴ See Appendix C6.

⁵ See Appendix C6.

⁶ See Appendix C6.

the seller will face an exposure to the shortfall liability (15-002) if it fails to deliver that gas. Also, or alternatively, the quantities clause in the sales contract might entitle the buyer to nominate a reduction to the ACQ in respect of a particular contract year, again up to a defined amount (and known as the "buyer's downward flexibility quantity" or "BDFQ").

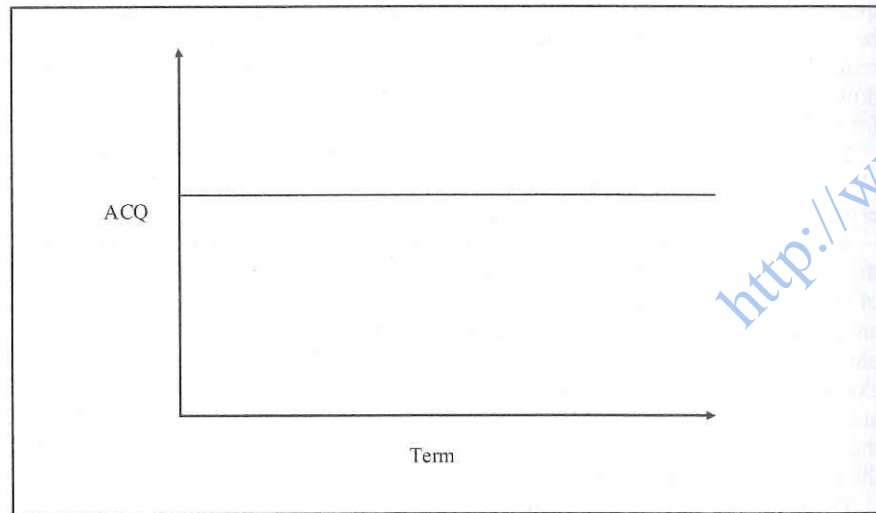
On the other hand it may be the case under the sales contract that the seller holds the right to nominate upward or downward flexibility quantities, up to a defined amount (known respectively as the "SUFQ" or the "SDFQ") and these elections, if made by the seller, will determine the buyer's ACQ.

Each of the BUFQ and the BDFQ represent additional value to the buyer, at the expense of the seller's position under the sales contract. The reverse is true in respect of the SUFQ and the SDFQ. The right to reduce contractually committed offtake volumes will be particularly important to a buyer in a falling demand market. The extent to which any of these provisions can be negotiated into the sales contract will depend up on the relative leverage enjoyed by the parties at the time of negotiating the sales contract.

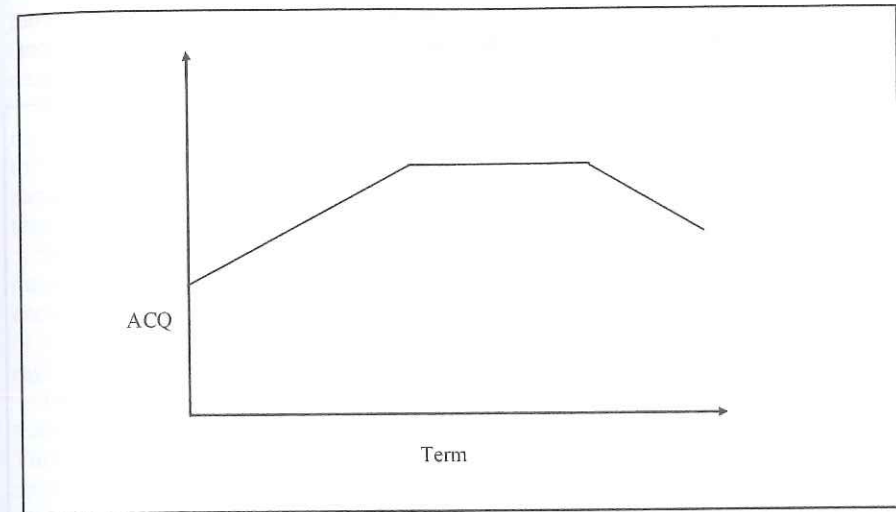
It will also remain to be agreed between the parties as to whether any of the upward flexibility quantities should be priced at the contract price or at a premium to the contract price. It is also apparent that not all of these upward and downward flexibility constructions can be accommodated for the seller and the buyer in a sales contract (since they would otherwise cancel themselves out) and so some order of priority will be necessary.

9-007

In a supply-based contract (5-005) the ACQ should be the same for each year within the basic term, since gas is typically being supplied without reference to the deliverability profile of a particular gas field:



In a depletion-based contract (5-005) however the ACQ could vary annually during the basic term, in order to reflect the varying rates of production as the dedicated gas field starts production during the ramp-up period, produces gas at a steady rate during a "plateau period" and depletes and ramps down during the decline period:



The seller usually has a right to set an ACQ for the decline period. This right may be unlimited or it may be subject to limitations. A right of the seller to set a decline pattern of an ACQ of zero is effectively an economic termination right in favour of the seller (35-007), although the ability to exercise such a right may be subject to the completion of a defined plateau period for the protection of the buyer.

MONTHLY CONTRACT QUANTITY

After the ACQ has been determined the sales contract might then go on to prescribe a "monthly contract quantity" ("MCQ"). This formulation does not appear in all sales contracts, since most agreements usually proceed from the ACQ to the daily contract quantity (see below), but there are two instances where it does have a use:

9-008

- (i) *Monthly forecasting.* Where the seller wishes the buyer to give forecasts of or nominations for gas on a monthly basis as part of its nominations or scheduling operations.
- (ii) *Monthly take or pay.* Where a monthly take or pay regime (13-004) exists in the sales contracts.

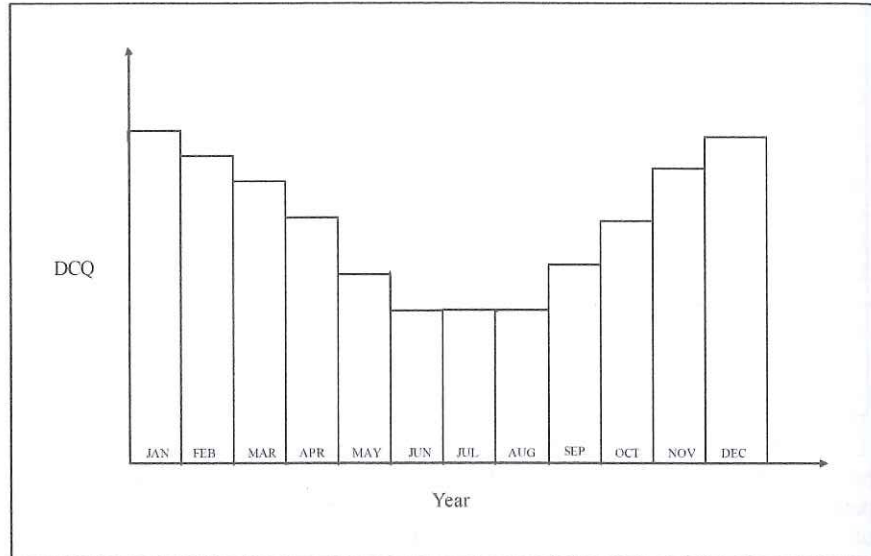
DAILY CONTRACT QUANTITY

In respect of pipeline gas deliveries, whether of raw gas or regas (1-003), the buyer and the seller will calculate the baseload quantity of gas which is to be delivered by the seller on each day during each year. This "daily contract quantity" ("DCQ") could be determined as the product of the ACQ divided by the total number of days in the contract year, but more typically the DCQ will be a set quantity of gas which is stated in its own right in the GSA to apply in respect of each day in each year.

9-009

Subject to what is said below about the maximum daily contract quantity, the DCQ forms the basic determinant of the maximum quantity of gas which the buyer is entitled to nominate for delivery in respect of each day.

If the GSA recognises seasonal gas demand patterns for the buyer during the course of a year (e.g. where the buyer's demand for gas is spread over a summer and winter cycle) then the DCQs could vary on a monthly basis within that year:



9-010

The buyer might have a unilateral right in the GSA to reduce the DCQ (subject to certain limits) in response to changing market demands for gas over the lifetime of the GSA but this may be difficult for the seller to accept. The expectation of the seller under the GSA is to receive revenue for the sale of a certain volume of gas at a certain price. Any downward change to that volume (e.g. through a reduction of the DCQ) will affect the seller's anticipated revenue return.

Where the GSA does contain such a right in favour of the buyer the degree of variability of the DCQ in the buyer's favour might be accompanied by corresponding inverse variations in the contract price (10-006) in the seller's favour (i.e. a lower DCQ leads to a higher gas price in order to compensate the seller).

The GSA might also contain a right of the seller to reduce the DCQ where the seller's performance in the delivery of gas (which in turn would depend, for example, on the depletion of gas in the seller's gas fields) would suggest this to be necessary. Such a DCQ reduction would be an alternative to the perhaps more draconian remedy of economic termination (35-007) and would give the buyer a greater reason to examine the seller's gas reserves expectations (see below).

Where the GSA contains a right of either party to reduce the DCQ there might also be provision for subsequent restoration of the reduced quantity where circumstances would so permit.

Since the delivery of LNG is effectively measured by cargoes (see below) the concept of a daily contract quantity is not relevant to an SPA.

MAXIMUM DAILY CONTRACT QUANTITY

9-011

In the context of pipeline gas deliveries the seller will allow the buyer in respect of each day to nominate for delivery a maximum quantity of gas equal to the DCQ and may also allow the nomination of a further percentage of the DCQ, where the

further percentage is often called the "swing factor". The swing factor represents the peak loading of gas that the buyer can access in order to meet spikes in its gas demand and consequently a buyer will prefer to have as much swing as possible.

The swing factor and the underlying DCQ are together called the "maximum daily contract quantity" ("MDCQ") in respect of a day and the quantity of gas which the buyer can require for delivery in a day, up to the MDCQ, equates to the delivery capacity which the seller will be required to maintain within its gas production and transportation facilities.

Subject to what is said below about excess gas, the MDCQ is the maximum quantity of gas which the buyer can nominate for delivery at the delivery point on each day and this in turn will condition the limits of the application of the shortfall (15-002), excess gas (9-013) and the undertake gas and overtake gas (Ch.27) regimes.

The seller must ensure that the physical capabilities of its gas production and transportation facilities can accommodate the daily delivery of gas at the MDCQ. This may require the seller to incur the expense of building additional delivery capacity into its gas production and transportation facilities, which might periodically be redundant, but the seller will typically factor these redundancy costs into the contract price. For this reason the buyer should assess whether it really needs the flexibility afforded by the swing factor or whether the buyer is better placed to provide or procure that flexibility itself from elsewhere.

Where the ACQ is the product of the DCQ multiplied by the number of days in a year, it follows that where in respect of a day the maximum quantity of gas deliverable by the seller is the MDCQ then in respect of a year the seller could in theory deliver a quantity of gas equivalent to the MDCQ multiplied by the number of days in that year, to give what is effectively a maximum ACQ.

Depending upon the configuration of the seller's gas production (and any transportation) infrastructure it may be that over the course of a year the maximum quantity of gas deliverable by the seller is limited to the ACQ and that the delivery of a quantity of gas equivalent to the maximum ACQ is not possible. Where this is the case then the GSA should recite that the buyer's right to take gas at the MDCQ in respect of a day is subject to an overall cap on the annually deliverable quantity at the ACQ. This may require in practice that the buyer must balance its daily offtakes over the year to get back within the ACQ.

Since the DCQ is not a relevant concept within an SPA, neither will the MDCQ be applicable to the delivery of LNG.

FULL CARGO LOTS

The conventional measure of LNG is the "full cargo lot", being the quantity of LNG contained within a particular LNG ship. This is a variable amount, depending upon the characteristics of the individual ship size. The customary expectation in an SPA is that the parties contract around the expectation of delivery of a full cargo lot, and this will ordinarily shape the seller's shortfall liability, and the buyer's offtake requirement. Within-ship, LNG is measured in thousands of cubic metres, but the contract measure of LNG to be delivered and paid for is set as a calorific value.

An SPA ordinarily does not conceive of a volumetric delivery as the measure of LNG to be delivered and offtaken which could result in only part of a full cargo lot being delivered. This is not an absolute proposition however as the SPA will often address part-cargo volumes of LNG (whether directly or by implication):

9-012

9-013

- (i) *The buyer's take and pay liability or take or pay liability.* This could be determined on a cargo-by-cargo basis and so would relate to the full cargo lot, but where the SPA defines the buyer's obligation by reference to units of LNG over a particular period of time (e.g. an ACQ measured in calorific values and set over a year) then the buyer's obligation would be further quantified through part-cargo measures in order to reach the target.
- (ii) *The seller's liability for off-specification LNG.* Because the existence of off-specification LNG will be discovered part way through the loading or unloading of a full cargo lot, where the buyer could be relieved from the obligation to take delivery of the further part of the cargo, then a part-cargo construction becomes an operational inevitability.
- (iii) *LNG bulk-breaking.* Where an LNG project is founded on the principles of bulk-breaking (2-007) then the buyer's obligations in respect of the taking delivery of LNG will be set by reference to volumes of LNG (measured typically by reference to calorific volumes) and the notion of a full cargo lot as the principal delivery measure becomes inconsistent.

EXCESS GAS

9-014

There may be times in respect of a day where the buyer requires delivery of a quantity of gas which is greater than the MDCQ, or there may be times where the buyer requires the delivery of LNG in respect of a contract year which is greater than the ACQ (or over any rateably shorter period of time and volume). These are both measures of excess gas. In respect of pipeline gas deliveries, excess gas can also be defined as the delivery of gas by the seller in response to a requested variation of a nomination by the buyer which is made outside of the strict time limits for the variation of a nomination (26-008).

In these circumstances it is customary for the sales contract to say that the seller will in response to a request by the buyer use reasonable endeavours (37-014) to deliver such quantities of excess gas, which could be paid for by the buyer at a premium to the contract price, although the buyer will argue for application of the contract price only.

In respect of a contract year excess LNG could be determined beforehand by agreement between the parties when the annual programme for that contract year is set (30-002), or it could come into existence during the course of the contract year.

Excess gas represents a commercial opportunity for the seller to make more money for comparatively little risk and can be seen as a pricing device rather than as a physical measure of the quantity of gas.

9-015

In respect of pipeline gas deliveries, the buyer might argue that, because it has a firm right to take a quantity of gas in a year up to the ACQ, then any quantities of gas requested by the buyer on a day in excess of the MDCQ, in the aggregate up to the ACQ for the year, should not constitute excess gas, and particularly so where excess gas is priced at a premium. The seller might prefer, however, to proceed with the determination of excess gas on a daily and individual nomination basis.

Usually the seller is only obliged to use reasonable endeavours to deliver excess gas but most buyers will require that where the seller accepts the buyer's request to deliver excess gas then the seller's obligation to deliver that excess gas should be firm and so should result in the entitlement of the buyer to the agreed shortfall remedy (15-002) if the seller then fails to deliver that excess gas. Some sales contracts only give the seller a further reasonable endeavours obligation to deliver

the excess gas which it has said it will deliver, wherein a failure to make such a delivery would not constitute a shortfall.

Where the seller has accepted the buyer's request to deliver excess gas and any failure of the seller to thereafter deliver that excess gas is classified as a shortfall the seller's shortfall could result in the application of the shortfall price discount to the extent of the shortfall based on either a premium excess gas price or based on the contract price (where the two prices are not the same). This potential for confusion is addressed at 15-017.

Whether excess gas should reduce the contract quantity and/or should count towards satisfaction of the buyer's take and pay or take or pay commitment (13-002, 13-004), or should even constitute carry forward (14-011) and so an adjustment to the following year's take or pay quantity, will be a matter for negotiation between the seller and the buyer. The buyer would always prefer that delivered excess gas will so count and, in principle, it is perhaps fair for the buyer to maintain this argument where excess gas which the seller agrees to deliver becomes a firm nomination (or schedule) for the delivery of gas and/or where the excess gas is priced at a premium to the contract price.

The parties will also need to decide on the treatment of a request by the buyer for excess gas which is made during a period when the buyer is recovering make up (14-002). The buyer may suggest that since make up is recoverable at a zero contract price then so should excess gas be; the seller may counter, however, with the suggestion that the buyer still has to pay the premium to a deemed contract price for such excess gas, albeit that the underlying contract price is zero.

It may be that where associated gas is being sold (1-003) the seller might require the buyer to take delivery of additional quantities of gas in order that production of the associated liquids can be maintained. Such additional gas should not constitute excess gas for which a premium is payable, and the buyer might even request a discount to the contract price in these circumstances because of the service which it is rendering to the seller.

QUANTITY CLASSIFICATIONS

In respect of pipeline gas deliveries, it may become appropriate to reclassify certain gas quantities where the need for such reclassification becomes operationally apparent in the lifetime of the GSA. This would relate for example to shortfall (Ch.15), overtake and undertake gas (Ch.27) and force majeure claims (Ch.32). The GSA might therefore provide for the reclassification of certain quantities of gas. The GSA will more usually set out a generic description of the principles of any reclassification mechanism however, rather than a prescriptive regime, to better ensure that a particular circumstance is not overlooked in a specific list of examples.⁷

Where the seller is responsible for preparing the necessary invoices, statements and gas quantity computations (31-003) then the seller will prepare the statements according to its determination of how any necessary reclassifications should have been performed and the buyer will have a right to dispute those determinations through its right to dispute a corresponding payment which is alleged by the seller to be due (31-019).

In respect of LNG deliveries, under the SPA the total quantity of LNG to be

⁷ That said, a prescriptive reclassification mechanism is set out in Appendix B Sch.7 in order to better describe some of the options for such reclassifications and the AIPN GSA (3-010) also addresses these reclassifications in some detail.

9-016

9-017

9-018

delivered by the seller could be distinguished between amounts of LNG in respect of which the seller is liable to the shortfall remedy for a failure to deliver (such as the ACQ), in respect of which the seller might not be liable to the shortfall remedy for a failure to deliver (such as excess LNG (see above) and possibly any FMRQ—32-011) and in respect of LNG which is to be priced at the contract price, at a premium to the contract price (such as BUFQ, or SUFQ—see above) or at anything less than the contract price (such as make up).

To make clear the extent of the buyer's rights and the seller's obligations under the SPA therefore the SPA could⁸ recite a hierarchy (often called the "attributed order") in which the total amount of LNG which is actually delivered to the buyer over the course of the contract year will be deemed to have been delivered, such as the following:

- (i) firstly—delivery in satisfaction of the ACQ; then
- (ii) secondly—to the recovery of any accrued make up entitlements; then
- (iii) thirdly—to the recovery of any FMRQ; and then
- (iv) fourthly—to the delivery of any excess LNG.

The attributed order recognises the need to distinguish the treatment of certain quantities of LNG delivered by the seller under the SPA where those quantities might be subject to different commercial principles or prices.

In a typical GSA there is less obviously an attributed order of gas deliveries although the same net effect could be achieved through the aggregation of provisions which require that make up recovery is subordinated to delivery of the ACQ first and regarding how excess gas deliveries are ranked against make up recovery.

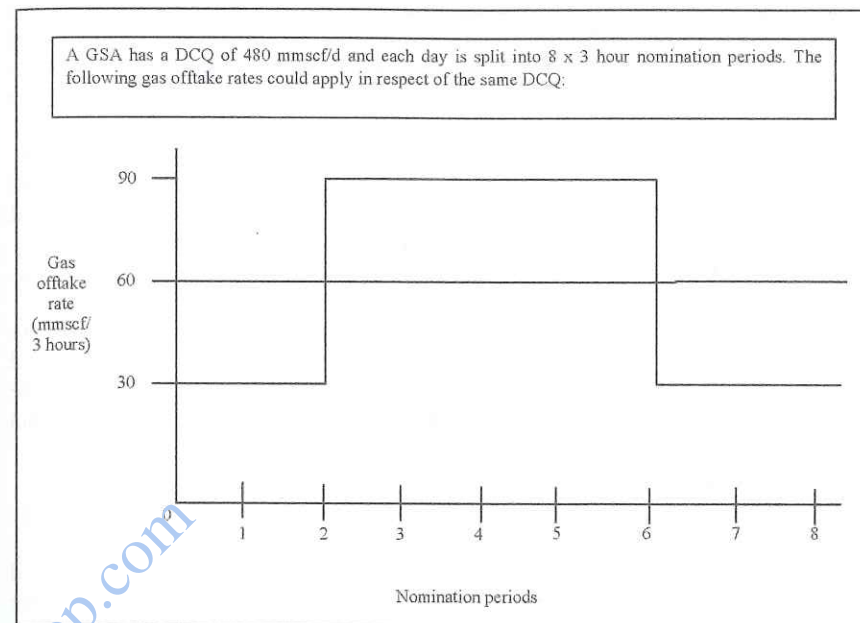
GAS RATES

9-019

In respect of pipeline gas deliveries, the GSA will usually provide that the delivery of gas will, as far as practicable, be made by the seller at a relatively uniform and constant rate during the course of a day. Where there are several nomination periods (26-004) over the course of a day then the uniform rate could be the weighted average of all the nominations for that day. The delivery of gas at a uniform rate is usually of assistance to the seller (and the transporter) in managing the operation of the gas production (and transportation) facilities.

In the course of a day, however, the buyer may require the rate of delivery of gas to vary according to any fluctuations in its downstream demands and that this is reflected in the gas sales (and transportation) arrangements. This would translate to the provisions for the nomination of gas for transportation and delivery in respect of a day and for the variability of these nominations. The seller (or any transporter) will wish to minimise the prospects for volatility in these provisions, in the interests of maintaining a stable and predictable production (and transportation) profile.

Consider the following example of the prospectively divergent aspirations of the seller and the buyer:



Where the buyer is able to secure a right to the delivery of gas at other than a uniform rate, the highest point of the increased rate of gas delivery is often known as a "maximum instantaneous rate" ("MIR"). The seller might be able to accommodate this increased rate as long as the buyer's daily offtake of delivered gas is balanced elsewhere.

RESERVES

9-020

Consideration has previously been given to whether a sales contract might be a supply-based contract or a depletion-based contract (5-005) and this distinction will shape the decision as to whether a defined gas field is specified in and is committed to the sales contract.

A sales contract could also impose certain obligations on the part of the seller to give initial reserves certificates and to undertake remedial works where the level of remaining reserves has fallen below a particular level, or where the seller proposes to enter into further gas sales commitments with third parties. Consequently the issue of how gas reserves are defined in the sales contract will assume some importance.

Gas reserves will be estimated by reference to the probability of the existence of gas in accordance with industry-accepted standard definitions, such as the following⁹:

- (i) *Proved reserves*. Sometimes also called "IP" or "P90" reserves, these are defined as "those quantities of petroleum which, by analysis of geoscience and engineering data, can be estimated with reasonable certainty to

⁸ See Appendix C6.

⁹ See *Petroleum Resources Management System*, prepared between the SPE, WPC, AAPG and SPEE and issued in 2007 and amended and reissued in 2011.

CHAPTER 24

Pipeline Project Terms

This chapter considers the key commercial elements which together make up the contractual relationship, embodied within the GTA, for the transportation of gas by pipeline. This chapter addresses the identification of the parties to the GTA, the term and the duration of the GTA, the principles of input and delivery, the respective obligations of the parties to the GTA and the liabilities to which those parties might be exposed as a consequence of a failure to perform those obligations. These are the essential “non-price” terms. The tariff (and its associated economic terms) payable for the use of the pipeline is addressed separately in Ch.25.

24-001

THE PARTIES

There will be two parties to any GTA (assuming a conventional gas transportation model)—“the transporter”, being the party which holds any necessary authorisation to own and/or operate the pipeline and which assumes responsibility for the transportation of gas through the pipeline on behalf of a shipper, and “the shipper”, being the party which requires the transportation of gas through the pipeline by a transporter. It may also be necessary for the GTA to describe the intended involvement of any third parties who will support the commitments of the parties, such as any guarantor of a shipper’s obligations.

24-002

The original value of the contracting parties in the GTA could be preserved and protected through provisions controlling the transfer of interests by a party and reacting to change of control to which a party might be subject (34-010).

In the simplest situation there will be a single transporter and a single shipper. The AIPN GTA (3-010) adopts this two-party formulation.

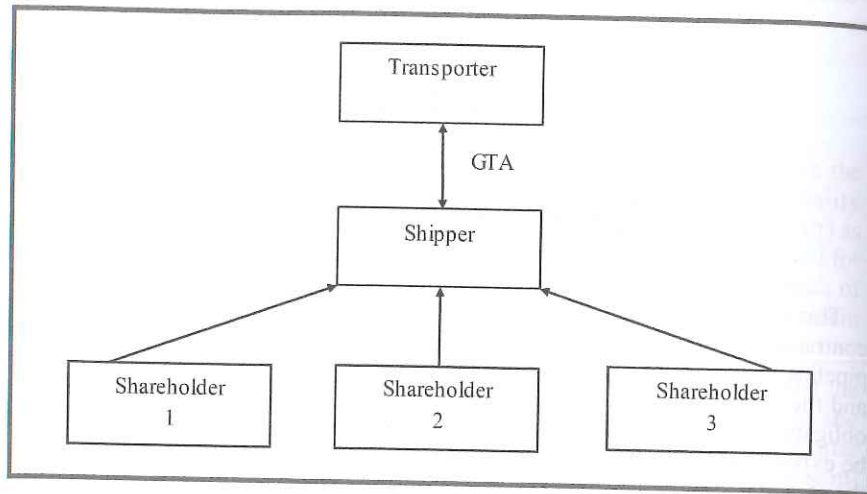
Like the GSA, the position becomes more complicated where multiple entities directly or indirectly constitute a party to the GTA, which is more likely where private companies acting in joint venture are involved in the development of a gas project. Where this happens the precise capacity in which a party is acting will need to be determined and appropriate drafting inserted in the GTA to reflect that capacity.

Where several persons have agreed to ship gas together those parties could, subject to any applicable regulatory principles (4-003), structure the shipper-side relationship by reference to the following models:

24-003

- (i) *Joint venture company shipper.* The prospective shippers could decide to incorporate a joint venture company (in which they will hold their agreed equity interests and wherein their relationship will be governed by a shareholders’ agreement) and that entity, rather than its constituent shareholders, will be the recipient of transportation services provided by a transporter and will be the party with liability to the transporter under

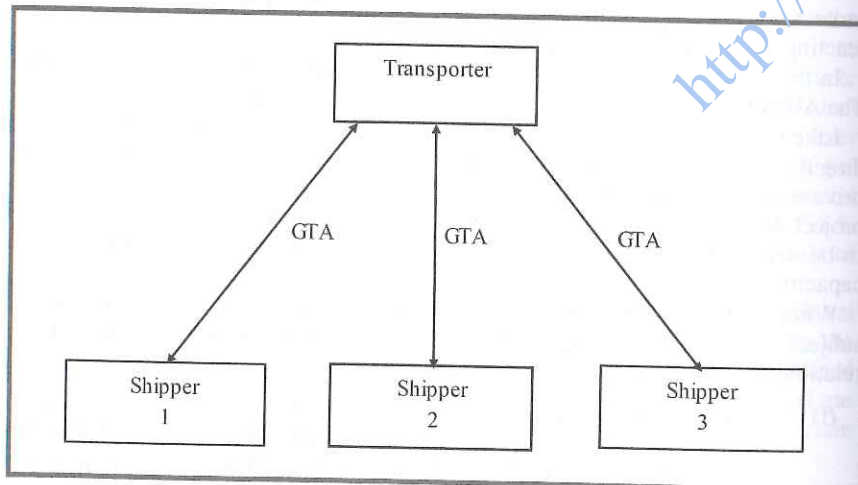
the GTA:



The critical issue for the transporter to appreciate is that its contractual remedies under the GTA will ordinarily be enforceable only against the joint venture company as the shipper and not against the shareholders themselves, unless those shareholders have expressly undertaken to support the commitments of the joint venture company.

- (ii) *Separate shippers.* The prospective shippers could decide to require transportation services directly, and the transporter itself may require this formulation, on the basis that the direct contractual commitment of the prospective shippers is preferable to that of their joint venture company.

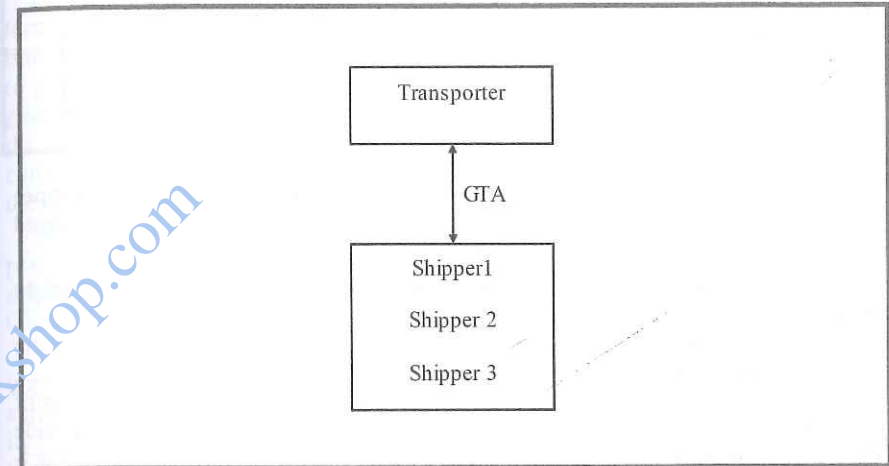
One way of doing this is for each shipper to have its own separate GTA with the transporter (although the terms of the individual GTAs will be negotiated to be identical), with each GTA reciting an individual reserved capacity which when aggregated across the various GTAs will meet the shippers' total gas requirements:



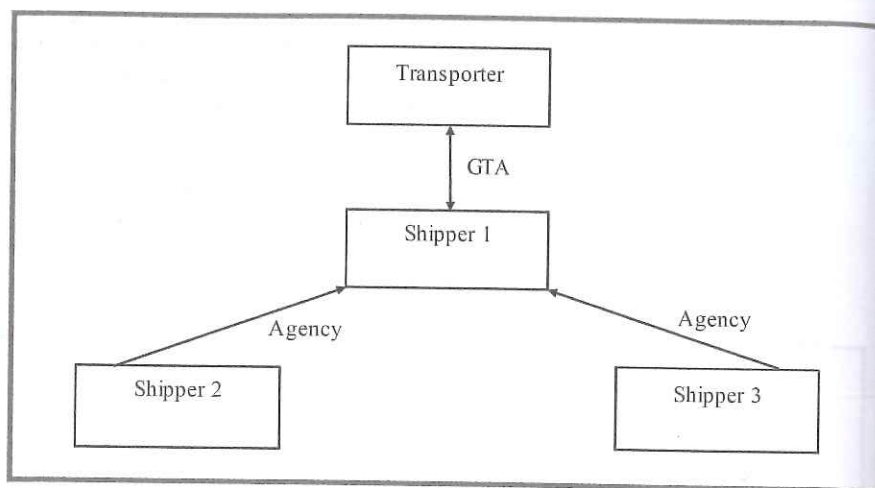
This model results in the several liability of each shipper to the transporter. To provide a single point of contact for the administration of joint

operational matters such as aggregating reserved capacities, responding to nominations and the giving and receiving of notices across the individual GTAs there might also be a form of common stream agreement (6-003) entered into between all of the shippers and the transporter.

- (iii) *Joint shippers.* The transporter might object to the model suggested under (ii) above on the basis that a series of separate GTAs and a common stream agreement is administratively too onerous to accommodate and because the transporter may wish the prospective shippers to assume joint liability within a single GTA. In this instance there could be a single GTA entered into jointly by all of the shippers, with joint and several liability, with the transporter:



- (iv) *Agency transportation.* To provide for a single GTA with the joint liability of multiple shippers but with a single shipper-side point of contact the GTA could be structured such that one of the shippers will be appointed to act for itself and as the declared agent of the other shippers in the transportation of gas by the transporter, with the corresponding agency liability (6-003):



In this case a single GTA will be entered into between one shipper (representing itself and acting as agent for the other shippers as disclosed principals) and the transporter.

24-004 The transporter might be a state-owned entity entitled to transport gas or it might be a private company holding a concession to do so.

The transporter might be the pipeline owner or it might be any party with the right to allocate capacity in the pipeline.

It is less typical (but not impossible) that there will be multiple transporters of gas. The transporter will usually be a single entity which has undertaken to provide the transportation services, which could be a single company or several entities acting together through a joint venture company (6-003).

That said, several parties could each undertake to provide a transportation service to a shipper within the medium of a single GTA, with joint or several liability for the provision of the transportation service amongst those multiple transporters, if that is what is required.

THE TERM

24-005 The GTA will have a start date and an intended duration. The circumstances in which the GTA could come to an end before the end of that intended duration are addressed separately (Ch.35). In particular, however, attention should be paid to the circumstances for the possible cotermination of the GSA and the GTA where they are interdependent arrangements (see below).

24-006 As is the case with the GSA, the commencement of the GTA will be determined by a combination of when the GTA is executed, when the start date (7-009) for the provision of the transportation services comes into force and the application of any conditions precedent (7-005). In the context of the GTA there might be a specific condition precedent for tie-in agreements at either end of the pipeline (19-004). A late start by the transporter in the provision of the transportation services could also lead to a right of the shipper to recover some form of liquidated damage (33-021).

Where the shipper is also the seller under the GSA then the shipper will need to ensure that the effective commencement (and the remaining in place thereafter) of the provision of the transportation services under the GTA is consistent with the requirements of the GSA.

In this circumstance the shipper's preference could be for a GTA which is set to exist for the duration of the GSA, as before committing money to the construction of gas production facilities and executing the GSA the shipper will want to ensure that a reliable means of transporting its gas will exist for the anticipated sales period.

Alternatively the shipper might require a GTA which subsists for the operational lifetime of the gas field which underpins its gas sales arrangements. This might be a period which exceeds the term of a particular GSA however and so the shipper should only request a gas transportation commitment of this nature if it is confident of the need for the transportation capacity beyond the lifetime of the GSA (and beyond the guarantee of revenue which the GSA suggests).

Because there may be circumstances in the GSA which allow a premature termination then this could trigger a cotermination of the GTA. To protect the transporter's interests the transporter may require a commitment from the shipper to pay for the transportation services for a defined plateau period, such that a guaranteed revenue stream will accrue to the transporter. During this plateau period the shipper would be denied the right to terminate the GTA, at least for reasons of commercial convenience, and the shipper might also be denied the right to reduce the reserved capacity. **24-007**

Where the shipper is also the seller of gas under the GSA and has agreed a plateau period with the buyer for the sale and purchase of gas (9-007) then that seller/shipper should seek to correspond the respective plateau periods under each of the GSA and the GTA.

The GTA might also be set to track any extension periods under the GSA by having an equivalent extension right in favour of the shipper but this could offend any applicable regulatory principles (4-007) by allocating incremental pipeline capacity on a preferential basis. Consequently the alternative is to structure the GTA such that pipeline capacity is booked for the full term of the GSA, to include any prospective extension periods, with a right of the shipper to terminate the GTA prematurely if the extension period under the GTA capacity is not required in order to perform the GSA.

The ability of the transporter to set a GTA with a lengthy duration could be subject to competition law issues in the same manner as applies to long term arrangements for the sale of gas (4-003). **24-008**

The GTA might also be written so that it comes to an end after the transporter has transported a defined quantity of gas on behalf of the shipper (see the AIPN GTA (3-010)).

COMMISSIONING¹

Where the transporter is building a new pipeline the transporter may wish to have the shipper provide certain quantities of gas in order that the pipeline can be commissioned. Commissioning will not be relevant in respect of a pipeline which has already been built. The commissioning gas regime will be similar to that provided for under the GSA (7-014). Commissioning gas will usually be bought by the transporter from the shipper, in a manner similar to one of the options for the provision of fuel gas by the shipper to the transporter (23-010). **24-009**

Commissioning gas required by the buyer under the GSA will be transported

¹ See Appendix D6.

through the pipeline and will be the subject of a tariff and/or capacity payment by the shipper in the ordinary way.

COTERMINATION OF THE GTA AND THE GSA

24-010 An issue which is often discussed in the negotiation of the GTA is the principle of whether the termination of a GSA to which the shipper (in its capacity as the seller, assuming a delivered sale (8-002)) is subject and which the GTA is intended to service might result in either an automatic termination of the GTA (in its entirety, or at least insofar as the capacity of the GTA relates to the terminated GSA, which will be more appropriate where a single GTA is used for the carriage of gas for several GSAs) or in a right, but not an obligation, of the shipper to terminate the GTA (again, whether in its entirety or only insofar as it relates to the GSA).

The shipper might also require an equal consideration of this principle for the situation where the performance of the GSA is suspended, which might result in an equivalent suspension of the provision of the transportation services and the shipper's payment obligations.

The shipper's rationale for requiring a corresponding termination or suspension of the GTA is that since the GSA represents the flow of revenue to the shipper (as seller) which is in turn applied to meet the shipper's tariff and/or capacity payment or ship or pay commitments (Ch.25) then a loss of that revenue flow under the GSA must be compensated for by corresponding relief under the GTA. The shipper could seek a right to terminate or to suspend the GTA simply at its convenience, or could reference that right specifically to corresponding events under the GSA.

24-011 The transporter might argue however that the risk of termination or suspension of the GSA must be the shipper's risk alone to bear and that there is no justification for why the transporter should also suffer through a termination or suspension of the GTA, not least since the transporter might have developed and financed the pipeline solely or largely in reliance upon the anticipated tariff and/or capacity payment and ship or pay payments which were expected from the shipper. In furtherance of this principle of pure transportation, the transporter could even seek to preclude the shipper from being able to secure force majeure relief (Ch.32) in respect of its liabilities under the GTA because of an event affecting or otherwise relating to the GSA.

As a counterpoint to this, the GTA might also prescribe that any recoveries which the seller makes in consequence of the termination or suspension of the GSA should flow through (in whole or in part) to the transporter under the GTA (since, says the transporter, it should share equally in the risks and the rewards under the GSA).

A possible compromise in respect of these competing interests might be represented by provision in the GTA that the shipper's right to so terminate or suspend in consequence of a corresponding termination or suspension of the GSA can only apply where the GSA is terminated or suspended for reasons other than by the buyer because of the seller's default under the GSA. This would therefore allow a termination or suspension of the GTA where the GSA is terminated or suspended by the seller for the buyer's default or by either party for prolonged force majeure or even by the seller where the seller has an economic termination right to do so (35-002).

It should also be noted that a right of the shipper to reduce the reserved capacity under the GTA, or provision in the GTA that the shipper is entitled to an adjustment to the ship or pay quantity (25-010), in either case in respect of disruptions

under the GSA, could have the effect of affording relief to the shipper under the GTA which could be applied where there has been a problem with the GSA but without the need to rely on a formal termination or suspension of the GTA.

THE INPUT POINT AND THE DELIVERY POINT

The GTA will define an input point and a delivery point and will provide for how title, custody and risk (see below) are intended to transfer between the parties. **24-012**

The "input point" (sometimes called the "delivery point" and not to be confused with the delivery point under the GSA (8-002), although in certain circumstances they could be the same physical location) is the point on the pipeline at which the shipper will deliver and transfer custody of the gas to the transporter for transportation in the pipeline. The "delivery point" (sometimes called the "redelivery point") is the point on the pipeline at which the transporter will deliver and transfer custody of the gas back to the shipper.

The pipeline might be developed by the transporter to provide for multiple input points and multiple delivery points along its length, which might be built in initially upon the development of the pipeline or which might be added in during the lifetime of the pipeline (e.g. through an expansion—21-012).

INTERRUPTION OF DELIVERIES

In some GTAs the transporter might reserve the right to interrupt the delivery of gas to the shipper, typically for a defined period of time and usually only upon a requisite period of notice being given to the shipper and often only on a defined number of occasions in each year. **24-013**

Such a right of interruption is of commercial advantage to the transporter where the transporter is transporting gas on behalf of several shippers and wishes to prefer the provision of transportation services for certain shippers, for example at a time where operational constraints prevent the transporter from being able to transport gas to all of its shippers.

From the shipper's perspective a right of interruption should only be acceptable where the shipper is able to switch to an alternative means of gas transportation or is able to manage without gas transportation services for the duration of the interruption.

To give the shipper an economic incentive to accept a GTA with a right of interruption in favour of the transporter either the overall tariff might be lower or where the transporter exercises the interruption right the shipper might be compensated by the application of a tariff discount in respect of equivalent following quantities of gas. The interruption will usually also give an adjustment to the ship or pay quantity. In a GTA based upon capacity payments the shipper will not pay for the interruption insofar as it relates to the reserved capacity and might receive a further discount.

TITLE, RISK AND CUSTODY

The GTA will provide for the allocation of title to, risk of loss of or damage to and custody of the gas to be transported as between the transporter and the shipper. **24-014**

In a conventional GTA the formulation appears as follows:

- (i) *Title.* Title to the gas could transfer to the transporter for the duration of the carriage of that gas within the pipeline or title could remain with the shipper whilst the gas is in the pipeline up to the delivery point. In the NTS (21-002) title to all gas in the transmission network vests in the transporter at the point of entry and transfers back to the shipper at the point of exit, effectively giving the shipper a contractual drawing right against the transporter. This structure is applied ostensibly in recognition of the legal difficulty commonly associated with multiple shippers holding title to separate portions of gas in a commingled stream (22-002). This is not a universal practice however and in some pipelines (see e.g. the AIPN GTA (3-010)) each shipper could retain title to its share of the gas in the pipeline, an interest realised effectively through a form of tenancy in common where an individual shipper's share as a tenant in common in the commingled stream is determined according to the extent of its original contribution to that stream. The entitlement of each shipper would be established through the application of an allocation process (22-003).

Where title does not ostensibly transfer to the transporter, title might still transfer to the transporter under any emergency powers where the transporter is obliged to make a forced disposal (by sale or otherwise) of the shipper's gas in order to maintain safe operating pressures.

Any intermediate title transfer point, where there is a notional title transfer not accompanied by an equivalent transfer of physical custody, will need to consider the English law rules applicable to purported title transfers in respect of unascertained goods (8-010).

- (ii) *Risk.* Risk of the loss of or damage to the gas whilst it is in the custody of the transporter could remain with the shipper and the transporter will have no liability to the shipper (other than a lost gas liability (24-019)) for the loss of or damage to the gas whilst it is in the transporter's custody. This might be disapplied however such for loss or damage caused by the transporter's wilful misconduct (33-017). In some GTAs however risk passes to the transporter for the duration of the carriage of the gas within the pipeline. Whichever party bears the risk at any time should insure the gas against the risk of loss or damage, at least to the extent that an insurance recovery would be needed to defray a lost gas liability (for the transporter) or to top up a lost gas remedy (for the shipper).
- (iii) *Custody.* Custody (i.e. possession) of the gas will inevitably transfer from the shipper to the transporter at the input point and from the transporter back to the shipper at the delivery point.

Under the buyback transportation model (21-003) there is an absolute sale of gas from the shipper to the transporter at the sales (input) point and from the transporter back to the shipper at the resale (delivery) point. Consequently title, custody and risk will each transfer absolutely between the shipper and the transporter at the point of each sale (reflective of the sales process).

24-015

Where the seller under the GSA and the shipper under the GTA are the same person then the delivery and the transfer of custody of the gas by the transporter to the shipper at the delivery point could be the precursor of the delivery and the transfer of custody of the gas to the buyer under the GSA and consequently there will at the delivery point be a series of immediately sequential custody transfers from the transporter to the shipper (i.e. the seller) and then from the seller on to the buyer.

The GTA may contain warranties of good title and freedom from encumbrances in respect of gas delivered by the shipper at the input point and in respect of those warranties by the transporter at the delivery point. The GTA might also seek to exclude certain implied conditions which might otherwise apply to the transfers of title, risk and custody under the GTA (37-027).

THE TRANSPORTER'S OBLIGATIONS²

The GTA will recite a series of obligations on the transporter's part. It is important that the scope of the services to be performed by the transporter is clearly set out, not least since these services will be the justification for the tariff and/or capacity payments payable by the shipper (Ch.25). 24-016

Principally, the transporter's obligations will be to take delivery of gas from the shipper at the input point and to redeliver gas to the shipper at the delivery point, in such volumes and at such times that are consistent with the shipper's requirements and otherwise in accordance with certain quality specification conditions.

More specifically, the transporter's obligations under the GTA will include the following:

- (i) *Transportation of gas from the input point to the delivery point.* Under a quantities-based contract the transporter should be obliged to accept the shipper's gas at the input point, effect the transportation of that gas through the pipeline and redeliver a reciprocal quantity of gas to the shipper at the delivery point (although in reality the shipper will not input and take delivery of the exact same molecules of gas and consequently the term "transportation" is perhaps over-stated). The redelivered gas should also meet the requisite quality specification.

Quantities of gas could be transported by the transporter in excess of the shipper's firm entitlements subject to the transporter either using reasonable endeavours to do so (37-014) or through a general commitment of the transporter to act as a reasonable and prudent operator (37-018).

The shipper may require the pipeline to transport gas for immediate delivery, or to store gas for later delivery. Thus, the pipeline is both a transportation and a storage asset, although not a storage asset in the conventional sense (and the transporter might not share this view).

- (ii) *Treatment and processing of gas.* The transporter might undertake responsibility for treating and processing gas prior to delivering it to the shipper at the delivery point. It may also be that the transporter has no choice but to exercise this function because of the transporter's admission of off-specification gas into the pipeline. The transporter might also offer gas processing services to the shipper prior to the entry of gas into the pipeline or at its facilities upstream of the delivery point (for a fee).

Where the GTA includes a processing service the agreement is often called a "transportation and processing agreement" ("TPA").

The transporter might also offer an emergency processing and treatment service for a shipper in order to address off-specification gas, which would be above and beyond any standard transportation and processing commitment (and which might be priced accordingly).

² See Appendix D3.

- (iii) *Facilities.* The transporter may be obliged (in the case of a new-build pipeline) to design, construct, install, commission, operate and maintain the pipeline and ancillary facilities. These requirements may be the subject of a specific facilities obligation (19-002). Any incremental facilities which may be required during the lifetime of the GTA (e.g. compression or looping) could be paid for by the transporter or by the shipper, depending on whether the GTA makes provision for such a cost pass-through.
- (iv) *Measurement.* The transporter may be obliged to meter the quantity and analyse the quality of gas at the input point and at the delivery point. The subject of measurement is addressed at Ch.18.
- (v) *Allocation and attribution.* The GTA, whether directly or indirectly through any pipeline system rules (21-015), could reference the principles of allocation and attribution which will be undertaken by the transporter in a multi-shipper pipeline (addressed in Ch.22).
- (vi) *Stock accounting.* The transporter could be obliged to maintain accounts of each shipper's stock of gas in the pipeline from time to time, including in relation to the shipper's linepack accounts (23-008) and linefill accounts (23-009).

24-017 The transporter might reserve the right to suspend the provision of the transportation services (without liability to the shipper for doing so) where, for example, the shipper has failed to perform its obligations, such as the obligation to make payment, where the shipper has failed to input gas at the input point which meets the input point quality specification or where the shipper has failed to perform any obligation to take delivery of delivered gas.

The GTA might also excuse the transporter from providing the transportation service on a day unless the quantity of gas nominated by the shipper (either alone or together with all other shippers in the pipeline) meets or exceeds the required linefill quantity, or where the safe operating pressure regime of the pipeline might be impaired.

The GTA could also provide that the transporter will have no say in how the shipper conducts its business either side of the input point and the delivery point, nor the shipper in how the transporter conducts its business, in a manner similar to the seller's reservations under a GSA (8-016).

THE SHIPPER'S OBLIGATIONS

24-018 The GTA will also recite several obligations on the shipper's part which will be necessary for the proper performance of the GTA:

- (i) *Payment.* The primary obligation of the shipper under the GTA is to make payment to the transporter. Payment will be due from the shipper as tariff for nominated quantities, as capacity payments for reserved capacities and under any ship or pay commitment. The mechanism in the GTA for invoicing and payment is addressed in Ch.31.
- (ii) *Facilities.* The shipper may be obliged to design, construct, install, commission, operate and maintain certain facilities at the input point and possibly at the delivery point. This requirement may be the subject of a specific facilities obligation (19-002).
- (iii) *Nominations.* The GTA should require the shipper to give to the transporter a notice of the nominated quantities of gas to be transported in the pipeline on the shipper's behalf, with such frequency and in respect of such periods as is agreed in the GTA (Ch.26).

- (iv) *Delivery and taking delivery of gas.* The shipper might not be obliged to deliver gas into the pipeline at the input point, but any gas which the shipper does deliver should meet the requisite quality specification.³ The GTA might oblige the shipper to take delivery at the delivery point of the quantities of gas which the transporter has transported to the delivery point on the shipper's behalf. Although the shipper may wish to use the pipeline effectively for the storage of gas there may be other shippers using the pipeline for the transportation of associated gas (1-003) for whom a constant through-flow of gas is necessary in order to maintain the production of associated liquids and those other shippers may have caused the transporter to mandate the taking of delivery of gas by all shippers at the delivery point as part of the pipeline system rules (21-015). Taking delivery of gas will also protect the safe operating pressure regime for the pipeline.

The GTA could therefore contain a provision akin to an undertake provision under the GSA (27-002) in order to incentivise the shipper to take delivery of gas at the delivery point. Alternatively the transporter could refuse to accept the delivery of gas by the shipper at the input point where the shipper does not maintain the taking of delivery of equivalent quantities of gas at the delivery point.

- (v) *Provision of linefill.* The GTA might oblige the shipper to provide quantities of linefill gas and fuel gas (see Ch.23) in certain circumstances.

TRANSPORTER FAILURE

Where the transporter has failed to provide the transportation services, as required by the terms of the GTA, the shipper will seek a remedy. This could even result in termination of the GTA by the shipper (35-002).

The shipper, where it is also the seller under the GSA, will likely face a loss of revenues and some liability to its buyer for a failure to deliver gas in response to that buyer's nominations and will seek to recover at least part of this exposure from the transporter. "Lost gas" is the term sometimes used to denote gas which the transporter has failed to deliver to the shipper at the delivery point when required. The GTA might make exceptions to lost gas for gas not redelivered by the transporter for reasons of force majeure, due to the shipper's acts or omissions or due to permissible non-deliveries in a manner similar to the exclusions from shortfall (15-002).⁴

In respect of the transporter's obligations the transporter cannot undertake an absolute guarantee to meet the shipper's requirements, since the reality is that over the lifetime of the GTA there may be circumstances which could interrupt the ability of the transporter to meet those obligations. The GTA must address such possibilities and consequently the transporter's failure to take delivery of gas or to redeliver gas could be attributable to any of the following:

- (i) *Permissible failure.* The transporter's failure could be permissible according to the terms of the GTA. The transporter may, for example, be relieved from the obligation to take delivery of or to redeliver gas because it is exercising scheduled maintenance rights (20-002) or in the exercise of a

³ See Appendix D17.

⁴ See Appendix D16.

- delivery interruption right or for operational safety reasons, for which the transporter will have no liability to the shipper.
- (ii) *Relieved breach.* The transporter's failure could be a breach of the GTA in respect of which the transporter is entitled to claim relief from any prospective liability in accordance with the force majeure provisions in the GTA (Ch.32), for which the transporter will have no liability to the shipper.
 - (iii) *Unrelieved breach.* The transporter's failure could be a breach of the GTA which is not permissible and in respect of which the transporter is not entitled to claim relief and for which the transporter will be liable to the shipper, with the extent of the transporter's liability to be determined under applicable law or by the application of specific liability provisions under the GTA.

Consequently, whenever the transporter fails to take delivery of or to redeliver gas the circumstances of the particular failure must be analysed in order that the correct provisions of the GTA are applied between the parties.

The shipper might argue that because the pipeline is a vehicle to service the performance of the GSA, and because the transporter has an indirect economic interest in the GSA through the receipt of tariff and/or capacity payments under the GTA which is payable by the shipper out of the proceeds of sale which it has received from the buyer under the GSA, the transporter must bear at least some of the risks associated with the GSA, and so there will be some pass-through of GSA liabilities into the GTA.

In response the transporter might point out that its commercial expectations under the GTA are quite different to those of the seller under the GSA and consequently its liability for non-performance of the GTA should match the commensurately lower reward which it expects to earn. Much will depend on the transporter's operating philosophy for the pipeline.

The transporter might also require that, before it accepts any liability to the shipper for lost gas, the shipper is under an obligation to demonstrate that it actually has suffered a loss or liability because of the transporter's failure (e.g. the shipper, as seller under the GSA, might have been able to make good the transporter's failure to transport gas through drawing gas from storage, supplying gas from elsewhere or negotiating some relief with the buyer under the GSA). The shipper might also require a right to access the transporter's facilities to verify a lost gas event but the transporter might be reluctant to permit this.

24-020

Where the transporter is obliged to compensate the shipper because of the transporter's failure to provide the transportation service that compensation might be represented by a positive payment obligation for lost gas in favour of the shipper (through a defined lost gas price) or by a discount to future tariff and/or capacity payments.

Where the transporter accepts the principle of liability to the shipper the transporter might insist that its liability for a failure to perform its obligations should be limited to the right of the shipper not to have to make any tariff and/or capacity payments in respect of the transporter's failure. In any event, the transporter will wish it to be made particularly clear in the GTA that the transporter has no liability to the shipper for any consequential losses which the shipper has incurred (33-015).

The GTA might provide for a scalar liability of the transporter for a failure to deliver the shipper's nominated quantities at the delivery point in proportion to the transporter's failure (that is, a 100 per cent failure gives rise to a 100 per cent liability), in preference to the strict and absolute liability of the transporter for any failure.

The transporter's liability for a failure to provide the transportation services could also be applied on a differential scale according to whether the transporter was able to forewarn the shipper of the impending failure, so that the shipper could investigate alternative arrangements, and the extent of that warning.

Where the GSA provides for a late start liability (7-011) then the shipper, which may be exposed to incurring this liability in its capacity as the seller under the GSA, might also seek to pass this liability back to the transporter under the GTA where the liability has arisen because of an act or omission of the transporter. Paradoxically, however, the transporter might wish to secure a proportion of any early start premium which might be afforded to the shipper as the seller by the GSA.

SHIPPER FAILURE

It is also possible that the shipper could fail to perform its obligations under the GTA. The remedies that a party might have under the GTA in order to address a default in payment when due by the other party are addressed in Ch.31. These would apply in respect of the shipper's failure to make payments when due under the GTA.

24-021

The potential for termination of the GTA by the transporter because of a failure of the shipper to make gas available for transportation arguably should not apply where the shipper has made corresponding ship or pay payments (25-010) but the GTA could nevertheless recite a termination right in the transporter's favour in such a circumstance (similar to the manner in which the seller might have a termination right under a GSA for the buyer's failure to take gas, despite the existence of a take or pay commitment). Such a termination right for the transporter arguably should not apply where the GTA is based upon a capacity reservation structure, which would mean that the transporter should be indifferent to whether a shipper actually transports gas.

CHAPTER 28

Shipping Structures and Principles

Whether the seller has assumed responsibility for transporting LNG to the delivery point in a DES-based sale (8-006), or whether the buyer has assumed responsibility for transporting LNG away from the delivery point in an FOB-based sale (8-006), whichever party has assumed responsibility for transporting the LNG will need to give some thought to the commercial arrangements which will be required to effect that transportation. This chapter assumes LNG will be transported by ship, rather than by truck or by rail, which are also possibilities. **28-001**

THE NEED FOR LNG SHIPPING

It may be that the transporting party has its own LNG ship, which it is able simply to apply for the benefit of the SPA without entering into any formal shipping arrangement, but this is unlikely. The more typical proposition is that the transporting party will contract with a third party (which could be an affiliate of the transporting party, where that party's corporate group owns and operates its own fleet, or which could be a genuinely independent and unconnected third party) for the reservation of shipping capacity through a charterparty arrangement. The form of these agreements is considered further in Ch.29. **28-002**

THE MECHANICS OF LNG SHIPPING

An LNG ship is a self-propelled hull with the capability for loading, storing and unloading LNG. LNG ships are classified according to the extent of their LNG-carrying capacity. These capacities range from anything between 5,000m³ to 30,000m³ of LNG (for littoral tankers, used often for small scale and bulk break projects (2-007)) to up to 210,000m³ ("Q-flex") and 266,000m³ ("Q-max") of LNG for the largest LNG ships currently in service. **28-003**

The specialist feature of any LNG ship is the refrigerated containment system within which the cargo of LNG is transported safely and securely, subject to the inevitable vapourisation of a very small percentage of the cargo ("boil-off"), which could be diverted to the LNG ship's engines for use as a fuel or which could be refrigerated on-board and returned to the containment system as LNG. **28-004**

Boil-off not only reduces the overall volume of LNG which is contained in the LNG ship but it also contributes to an increase in the calorific value (1-015) of the remainder of the LNG cargo through the initial boil-off of the lighter hydrocarbon fractions (a characteristic called "weathering"). This could cause problems where the quality specification in the SPA requires the delivery of LNG from an LNG ship within a certain calorific value range in a DES-based sale, leading possibly to the need to modify the composition of the cargo at the unloading port in order to meet the required specification.

“Heel” is the term used to define a minimum quantity of LNG which is retained in the LNG ship after the cargo has been unloaded, in order to maintain temperature in the containment system for the ballast voyage back to the next cargo loading.

In an FOB-based sale the buyer bears the obligation to retain the heel and will also absorb the boil-off losses, whereas these risks will stay with the seller in a DES-based sale.

A “full cargo lot” (9-013) is the term commonly used to describe the entire LNG carrying capacity of any particular LNG ship (including the heel).

TERMINAL ACCESS ARRANGEMENTS

28-005 It may be that a loading port is used by many different shipowners, each bringing in their LNG ships in order to load LNG (including where LNG is being bought on an FOB basis). The converse will apply to an unloading port (including where LNG is being bought in on a DES basis).

It is typically the case that, as a condition of entry to a port, the master of the LNG ship will, on behalf of the shipowner, sign onto a form of contract which regulates the ship’s access to the port. This will be a requirement of the portowner. This contract is known variously as a “terminal access agreement” or “conditions of use” (or “COU”), acceptance of which would be a condition of the shipowner’s access to the port. The necessity to execute the conditions of use could be referenced by the SPA.¹

There is inevitably a risk of loss or damage arising from collision between an LNG ship and the relevant port facilities. The conditions of use could describe a mutual hold harmless regime (33-003) to apply between the portowner and the shipowner in respect of damage respectively to the port and the LNG ship, or alternatively a guilty party pays regime (33-003) might be imported into the conditions of use. Whichever liability allocation is adopted within the conditions of use will need to be reconciled with whatever insurance regime applies between those parties.

Ship-to-ship collisions will typically be dealt with by reference to applicable law and conventions, unless there is an express inter-shipowner accord (in respect of any loading port or unloading port) which allocates liabilities in a particular manner, entry into which could be required by the conditions of use.

28-006 The conditions of use could also address a number of other matters:

- (i) *LNG ship movements.* The timings of the arrivals into and the departure from the port, including estimated timings, arrival at pilot boarding stations and proceeding to berth.
- (ii) *Port services.* The provision of pilots, tugs, safety vessels, bunkers, victuals and LNG measurement and processing services by or through the portowner.

¹ See Appendix C18.

- (iii) *Port operations.* Acceptable weather limits, night time and tidal restrictions, emergency procedures and circumstances in which the operation of the port can be suspended.

BILLS OF LADING

A “bill of lading” (sometimes known as a “BoL” or “BL”) is simply a document, which comes in a relatively standard form, issued by a shipowner (or, more commonly, by the master of the ship acting on behalf of the shipowner) to a charterer, to acknowledge the shipowner’s receipt of a specified cargo for shipping on the charterer’s behalf in accordance with whatever terms have been agreed between the shipowner and the charterer, including under the terms of the charterparty.² **28-007**

The bill of lading evidences that the charterer’s cargo has been loaded on board the ship (such proof of shipment could necessary for customs clearance and insurance purposes and to evidence compliance with the terms of another contract, such as the SPA), acts as documentary evidence of the charterer’s title to the cargo, and could also recite the commercial terms of the required shipping arrangements.

Any number of signed original bills of lading can be issued in respect of the same cargo; the usual number is two, so that one is held by each of the shipowner and the charterer (assuming that the charterer is also the owner of the cargo), although more could be issued (e.g. in favour of any lenders which have an economic interest in the cargo). The face of the bill of lading should recite the total number of originals which were issued. All of the originals will be discharged, and should be marked as such, when the cargo is delivered in accordance with the applicable instructions.

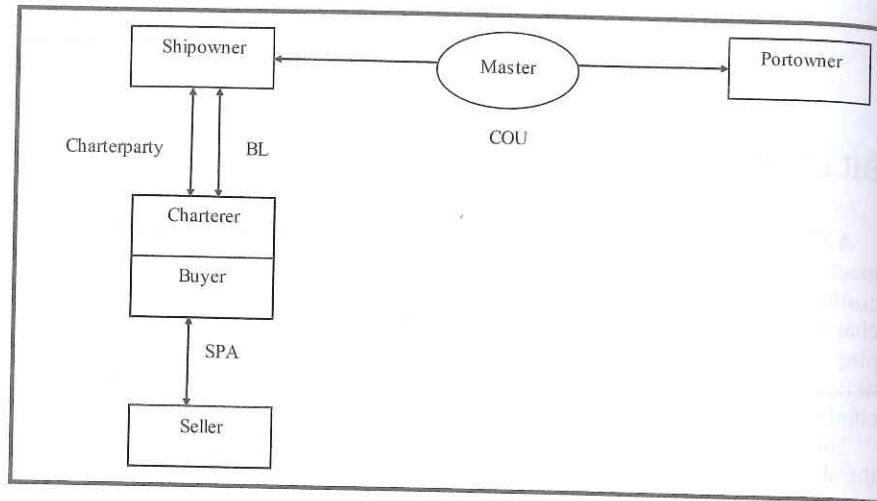
The charterer could require the shipowner to perform the transportation service other than in accordance with the conditions indicated in the bill of lading; the shipowner will ordinarily act in accordance with the charterer’s instructions, as long as the shipowner is fully indemnified by the charterer against the risks of doing so.

Most bills of lading will be subject to the application of certain international rules which relate to the allocation of liability for loss of or damage to the cargo between the shipowner and the charterer (notably the Hague Rules (1924), the Hague-Visby Rules (1968) and the Hamburg Rules (1978)). **28-008**

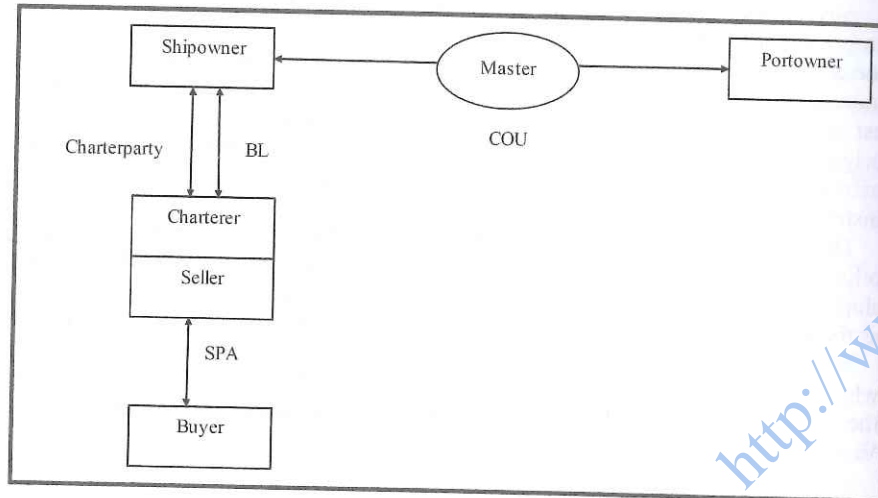
OVERALL PROJECT STRUCTURING

In a project for the sale and transportation of LNG on an FOB basis the overall project structure will appear as follows: **28-009**

² “A bill of lading is [a] writing signed on behalf of the owner of a ship in which goods are embarked, acknowledging the receipt of the goods and undertaking to deliver them at the end of the voyage, subject to such conditions as may be mentioned in the bill of lading” (per Blackburn LJ, *Coventry v Gladstone (No.1)* [1867] (1867) L.R. 4 Eq. 493).



28-010 In a project for the sale and transportation of LNG on a DES basis the overall project structure will appear as follows:



CHAPTER 29

Charterparties

This chapter assumes that the transporting party proposes to contract with a third party for the shipping of LNG and so will examine the key terms of a typical charterparty. This chapter does not address the situation where the transporting party also proposes to contract for the financing and/or the construction of a new LNG ship and so needs to consider the terms of the ancillary financing and shipbuilding arrangements. 29-001

This chapter focuses on conventional LNG ships which are engineered solely for the purposes of loading, transporting and unloading a cargo of LNG, rather than on ships capable of regasifying a cargo of LNG offshore and discharging the cargo (as regas) through an offshore mooring buoy, and vessels capable of liquefying gas offshore to give LNG.

CHARTERPARTY FORMS

A "charterparty" is a contract for the hire of a ship, entered into between the shipowner and the charterer, whether that charterer is the LNG seller or the LNG buyer. Although the existence of a charterparty would more obviously be expected where the shipowner and the charterer are unconnected parties, even where the party which has assumed responsibility under the SPA for transporting LNG has direct access to an LNG ship which its corporate group owns, there will generally be an arm's length charterparty put in place between that party and its shipping affiliate in the interests of maintaining a separation of corporate interests and liabilities. 29-002

Charterparties are commonly distinguished between "voyage charters" and "time charters", wherein, respectively, the shipowner would provide the ship for a defined voyage or would provide a ship for a defined period of time. Under a "bareboat charter" only the ship itself would be provided by the shipowner, not the crew.

A charterparty might be a bespoke agreement which results from negotiation between the parties and reflects the nuances of the particular SPA which it is intended to support, although there has been increasing reliance on the use of model form contracts.

For the shipping of LNG the principal model form charterparty to note is ShellLNGtime1 (3-013). This was originally published in 2005, and was derived from earlier Shell-published charterparties for shipping crude oil. ShellLNGtime1 is used for time charters of various durations (including single voyage charters for spot cargoes). The principal terms of a charterparty, referenced to ShellLNGtime1, are considered below.

In 2016 BIMCO and GIIGNL introduced a voyage charterparty for LNG, principally intended for use in transporting spot cargoes (3-013).

- to the initially intended port under the SPA and any diversion port where the SPA recites principles of destination flexibility. Ancillary to this, in the charterparty the shipowner will usually warrant that the LNG ship will be compatible with certain terminals (at loading ports and unloading ports) which are listed in the charterparty.
- (viii) *Exceptions and war risks.* The charterparty will usually contain what is called an "exceptions" clause, whereby the parties will be exempted from loss or damage caused by acts which fall within the list of events or circumstances generally regarded as constituting force majeure; in essence, events or circumstances beyond the reasonable control of the affected party, although force majeure per se is rarely addressed specifically in a charterparty. The charterparty will also address what happens where the LNG ship is requisitioned by a government or if war breaks out which affects the trade envisaged for the LNG ship (which could give a right to terminate the charterparty).
- (ix) *Default.* The charterparty might be negotiated to contain a list of events of default, such as the insolvency of a party and a party's material default in the performance of its obligations under the charterparty, which will give rise to the right of the non-defaulting party to terminate the charterparty, and which, from the shipowner's perspective, would also allow withdrawal of the LNG ship if the charterer failed to pay the hire. From the charterer's perspective however the right to terminate the charterparty could be a meaningless remedy where the market is such that a suitable alternative LNG ship cannot be found as a replacement, and provision for the payment of compensation to the charterer from the shipowner could be preferable.
- (x) *Charterer's and shipowner's provision.* Under the charterparty the charterer will be responsible for providing the bunkers (see below) as fuel to be used by the LNG ship and for meeting port charges and fees. The shipowner will undertake to pay the wages and costs associated with the master and the crew of the LNG ship and the costs of insuring the LNG ship.
- (xi) *Hire and payment.* "Hire", being the rate of hire for the LNG ship payable by the charterer to the shipowner (sometimes called "freight"), will be recited as an amount per day for each day of the charterparty. This hire is usually payable per calendar month in advance, with an offset for certain amounts due to the charterer from the shipowner. Failure of the charterer to make payment of the hire as required usually will usually entitle the shipowner to withdraw the LNG ship from service. The charterparty will also recite the necessary mechanics for payment of the hire. For a long term hire of an LNG ship the hire figure could be indexed to allow for escalation. The shipowner will usually be granted a lien over the LNG cargo as security for amounts due for payment under the charterparty (principally hire).
- (xii) *Bunkers and heel.* The LNG ship will be delivered with defined volumes of voyage fuel ("bunkers"), which the charterer will pay the shipowner for, and will be redelivered at the end of the charterparty with defined volumes of bunkers on board, which the shipowner will pay the charterer for, in each case according to defined prices for bunkers. Title to the heel, which the shipowner will provide, is usually intended to remain with the shipowner. The charterparty might be further modified to reflect on-board re-liquefaction of boil-off and the use of LNG as fuel for the ship,

- which are both relatively recent operational additions. The charterparty could describe the condition of the LNG ship's tanks at the point of delivery of the LNG ship by the shipowner to the charterer (where those tanks could be any of cooled, warm under vapour or warm and inerted).
- (xiii) *Off-hire.* Hire is payable under the charterparty at all times between delivery of the LNG ship to the charterer and redelivery of that LNG ship to the shipowner at the end of the charterparty, although an exception to this obligation of the charterer will apply where the charterer exercises a right to take the LNG ship off-hire. Because of the potential loss of revenue to the shipowner in such a circumstance the shipowner will be keen to restrict the opportunity of the charterer to make an off-hire election. Typically such an election can be made where the LNG ship is unable to perform the service for which it has been chartered (e.g. where the LNG ship fails to meet the performance conditions specified under the charterparty, where the LNG ship has broken down or has been involved in any accident or incident, either of which could fall within the exceptions clause, where the crew has failed to perform its duties or where the LNG ship is due to undergo maintenance).
- (xiv) *Laytime and demurrage.* Of particular application to the transportation of a single cargo, the charterparty could specify the required period of laytime and the rate of demurrage (30-008) payable by the charterer to the shipowner in the event the charterer detains the LNG ship without good reason.
- (xv) *Subletting.* Of relevance to longer term charterparties, the charterparty might give the charterer the right to sub-let the LNG ship, provided that the charterer remains fully responsible to the shipowner for the performance of the charterparty.
- (xvi) *Transshipment.* The charterparty could address the ability of the charterer to require an offshore ship-to-ship ("STS") transfer of the cargo. This could be limited to transshipments solely for reasons connected with preservation of the LNG ship or could be extended to include commercially-required transshipments. Any transshipments will be required to be undertaken in accordance with prescribed operational guidelines.
- (xvii) *Protective clauses.* The charterparty will usually contain a number of "protective clauses", including "both to blame collision", a circular indemnity regime which allocates losses arising from a collision; "general average", provision for compensation of the shipowner for loss arising from an act intended to preserve the LNG ship; "New Jason", provision for certain recoveries by the shipowner from the charterer; and "general paramount", the implication of certain convention principles relating to bills of lading (28-007).
- (xviii) *Law and dispute resolution.* The charterparty should define the law which applies to it and should provide a forum for the resolution of disputes between the charterer and the shipowner (e.g. arbitration (36-006) in accordance with a defined set of rules).

THE CHARTERPARTY AND THE SPA

The buyer of LNG under the SPA will be the shipper under the charterparty in an FOB-based sale (8-006), and the seller of LNG under the SPA will be the ship-

per under the charterparty in a DES-based sale (8-006). In either case, for these transporting parties it will be necessary to ensure a proper interface between the terms of the SPA and the charterparty. There will be a number of areas of interface between the charterparty and the SPA, which will need to be addressed as part of the process of the overall structuring of the LNG project:

- (i) *Duration.* Where a time charter exists (29-002), the charterer should ensure that at the outset the charterparty is structured so as to subsist for a length of time equal to the intended duration of the relationship created by the SPA, unless alternative arrangements for LNG shipping can be made, such as through a series of charterparties sufficient to meet the charterer's needs. Suspension or termination of the SPA will not automatically lead to equivalent suspension or termination of the charterparty however, not least since the shipowner will be unwilling to assume the risks associated with the commercial relationship under the SPA, and so the charterer will need to recognise this risk (which may, at least in part, be mitigated by the off-hire provisions in the charterparty). Looking at this from the perspective of the SPA, loss of the LNG ship will typically result in immediate termination of the charterparty and this is an event which could be reflected back in the SPA, whether as an event of force majeure or as a termination event, unless alternative shipping arrangements can be made. The counterparty to the SPA, the non-transporting party, might not be so willing to assume these risks however.
- (ii) *Default.* A default by a party under the terms of the SPA, where that defaulting party is also the charterer, could be attributable to a failure of the transportation arrangements under the charterparty (e.g. the seller in a DES-based SPA is late or fails in delivering the cargo to the unloading port or delivers a cargo of off-specification LNG, or the buyer in an FOB-based SPA is late or fails in collecting the cargo from the loading port). In these circumstances the liability of that party for that default, where not capable of being relieved on the grounds of force majeure, might be capable of being defrayed (at least in part) to the shipowner where the default is attributable to an act or omission of the shipowner under the terms of the charterparty. This could be done through a reduction in the hire payable because of a failure of the LNG ship (and/or its crew) to meet the requisite performance standards, although it should be appreciated that hire savings made by the charterer under the charterparty might not equate to a full offset of that party's liability under the SPA. There is not ordinarily however a straight pass through of liability or loss between the SPA and the charterparty in these instances.
- (iii) *Force majeure.* The exceptions clause in the charterparty generally recites events and circumstances which are related only to loss or damage involving the LNG ship and arising from or resulting from those events, all as specified in the exceptions clause. It may be however that (if this can be agreed with the shipowner) the charterparty is modified to incorporate wider force majeure events which affect the overall LNG project to which the LNG ship is committed so that, for example, loss of or damage to unloading port or loading port facilities or problems impacting the performability of the SPA, any of which impact the necessity for use of the LNG ship, could be claimed as force majeure under the charterparty, leading to the declaration of an off-hire event, or even

termination of the charterparty. Most shipowners are understandably reluctant to accept such a pass-through of wider project risk however.

- (iv) *Maintenance.* Whatever maintenance standard is adopted in the charterparty, the charterer will need to ensure that the maintenance schedule for the LNG ship which causes the LNG ship to be taken out of trade for any period of time is reflected in the SPA as relief from that party's obligations thereunder (unless a replacement LNG ship is provided). There could also be the possibility to correspond maintenance periods between the SPA and the charterparty.
- (v) *Shipowner security.* The shipowner's lien over the charterer's cargo as security for amounts due and unpaid under the charterparty will need to be reconciled with any warranties given by the seller in the SPA regarding freedom of the LNG cargo from encumbrances.
- (vi) *Off-specification LNG liability.* In a DES-based SPA the seller could argue that a cargo of LNG which is delivered to the unloading port and which is found to be off-specification is attributable to the carriage of that LNG in the LNG ship. The buyer under the SPA would not be interested in the forensics of this argument and so the seller would have to make a claim against the shipowner, related to the performance characteristics of the LNG ship under the charterparty. This is not an argument which the shipowner would be keen to encourage by modification of the customary terms of the charterparty however.
- (vii) *Diversions.* The SPA could contain rights for the seller and/or the buyer to require the diversion of the LNG ship to an unloading port other than that which was principally envisaged by the SPA. The ability of such a diversion to be effected could be constrained by issues such as the trading limits, a general issue of the compatibility of the LNG ship and the intended port (see above) and competition law constraints.
- (viii) *LNG ship damage.* The SPA could present a mutual hold harmless liability allocation regime (33-003) between the parties, where the transporting party assumes responsibility for loss of or damage to the LNG ship as part of its facilities. This regime will need to be reconciled with any corresponding provisions in the charterparty and with any conditions of use.

CHAPTER 30

Scheduling and Transportation

The SPA will need to provide a mechanism for determining the buyer's requirements for LNG, the seller's ability to meet those requirements and the logistical arrangements which will underpin the business of LNG loading, shipping and unloading. 30-001

In a long-term SPA there could be multiple cargoes of LNG due for delivery in each contract year. In this situation the scheduling of LNG for delivery will typically be based around an "annual delivery programme" for each contract year and around a more frequent within-contract year specific programme. Cargo-specific arrangements will apply in respect of single cargo sales, including multi-cargo trades under an MSA.

The SPA or the MSA should make provision for compensation for delays caused by, or to, the transporting party and for ensuring that LNG ships and the terminals at which they load and unload LNG are compatible.

THE ANNUAL DELIVERY PROGRAMME¹

In a DES-based SPA (8-006) the following formulation might appear in respect of setting the annual delivery programme for a particular contract year: 30-002

- (i) Not less than 90 days before the start of the contract year the buyer will give to the seller an indication of the total quantity of LNG the buyer wishes to have delivered in that contract year. This quantity will be in a range of zero to the ACQ (9-004), and possibly beyond the ACQ where the SPA conceives of excess LNG (9-014) if the buyer can predict the need at the time of submitting that indication. The buyer could also indicate the number of cargoes required for delivery in the contract year, by reference to LNG ship capacities (28-003) and a pattern for delivery and unloading which the relevant loading and unloading port can accommodate, in order to deliver that quantity, if the buyer is so able.
- (ii) Not less than (say) 75 days before the start of the contract year the seller will respond to the buyer with an indication of the total quantity of LNG the seller is able to deliver in response to the buyer's previously indicated requirements.
- (iii) Thereafter the buyer and the seller will consult on setting the annual delivery programme for the contract year, and not less than 30 days before

¹ See Appendix C18.

the start of the contract year the seller will issue the final form of the annual delivery programme for the contract year.

It is often a matter for debate between the seller and the buyer as to which party should have the final say in issuing the final form of the annual delivery programme.

30-003

Once issued, the annual delivery programme will identify the following components:

- (i) The total quantity of LNG to be delivered by the seller for the contract year, which will ordinarily be up to the ACQ, subject to downwards adjustment for the buyer's notified requirements which are less than the ACQ and any BDFQ or SDFQ (9-005), and subject to upwards adjustment for the buyer's recovery of make up (14-002) and/or excess LNG (9-014) and/or any BUFQ or SUFQ (9-005).
- (ii) The number of cargoes to be delivered by the seller, and the delivery pattern for those cargoes, in the relevant contract year.
- (iii) Identification of the LNG ship for each cargo to be delivered by the seller and details of each LNG ship's anticipated arrival, unloading and departure schedule.

30-004

It may be that the seller or the buyer will require a change to be made to the annual delivery programme after it has been issued. Such changes might be required for logistical reasons (e.g. to reflect changes in operational arrangements at the relevant unloading port or loading port), as a reaction to an event of force majeure affecting either of the parties or for purely commercial reasons (e.g. the seller or the buyer wants to deliver or to take delivery respectively of less or more LNG than has been scheduled under the SPA). Changes for operational reasons or to reflect the incidence of force majeure should in principle be capable of reconciliation by agreement between the parties, but a change for purely commercial reasons might be less capable of accommodation without some corresponding commercial incentive between the parties.

Within the SPA the parties might be obliged to consult on making revisions to the annual delivery programme, with a proviso that the parties cannot unreasonably withhold their consent to a revision. It may however be reasonable for a party to withhold its consent to a revision which is proposed for purely commercial reasons, since this would ostensibly undermine the basic economic accord between the parties. In support of this the SPA should be careful to restrict the ability of a party to disguise a commercial change behind a purported operational reason.

THE NINETY DAY PROGRAMME²

30-005

The annual delivery programme will contain a significant amount of detail regarding the scheduling of LNG to be delivered in a contract year but it will inevitably be necessary to fine-tune the annual delivery programme within the contact year.

To this end the SPA (by way of example, by reference to a DES-based SP—8-002) will typically contain a mechanism by which the seller will provide to the buyer a rolling forward programme showing planned cargo deliveries for the following three-month period. It may be that the first month of that three-month period (sometimes called the "front month") is firm and the second and third months are

good faith best estimates. As the three-month programme rolls forward those second and third months become the first month and firm, and so on. This specific programme (sometimes also called a "ninety day programme" or a "specific lifting schedule") will determine the exact order of the seller's LNG delivery obligation and thus will be determinative of what constitutes a failure by the seller to meet that obligation (15-002). The ninety day programme might also be open to adjustment after it has been finalised between the parties.

SPOT CARGO SALES

The provisions referred to above in respect of annual delivery programmes and ninety day programmes will not apply where LNG is sold as a cargo under a confirmation notice which is issued under an MSA (5-004), or otherwise in respect of the sale of a spot cargo, because the MSA will be geared towards the delivery of LNG cargoes on a spot basis. The MSA will however recite the more detailed timings for individual LNG ship movements which are referred to above, in order to provide a basis for the rights, remedies and liabilities of the parties also referred to above.

30-006

TRANSPORTATION

In a DES-based SPA there will be a series of procedures (often dictated by any applicable conditions of use) which govern the arrival of the seller's LNG ship at the unloading port, starting with a reducing series of estimated time of arrival ("ETA") declarations and ending with the arrival and berthing of the LNG ship such that it is then ready to commence the unloading of LNG. In an FOB-based SPA similar procedures will apply, except that they will necessarily be referenced to the arrival of the buyer's LNG ship at the loading port and the readiness to commence the loading of LNG.

30-007

In a DES-based SPA the timing of the arrival of the seller's LNG ship at the unloading port in accordance with the agreed schedule for doing so will determine the seller's liability for delivery failure and so the seller's compliance (and ability to comply) with the arrival procedures will be key in making that determination. In an FOB-based SPA the seller's delivery failure will be determined by reference to the seller's inability to load the buyer's LNG ship when required and the arrival procedures for the buyer's LNG ship will be linked to making that determination.

30-008

The SPA will contain shipping-specific provisions relating to laytime and demurrage which are not found in an agreement for the transportation of gas by pipeline.³ These provisions are intended to address the relationship between the responsibility of the non-transporting party (that is, the buyer in a DES-based SPA and the seller in an FOB-based SPA) for ensuring the efficient operation of the loading port or the unloading port, as appropriate, and the responsibility of the charterer as the transporting party (that is, the seller in a DES-based SPA and the buyer in an FOB-based SPA) to ensure the efficient utilisation of the LNG ship. The operation of these provisions in the charterparty is often complex but can be stated simply as follows:

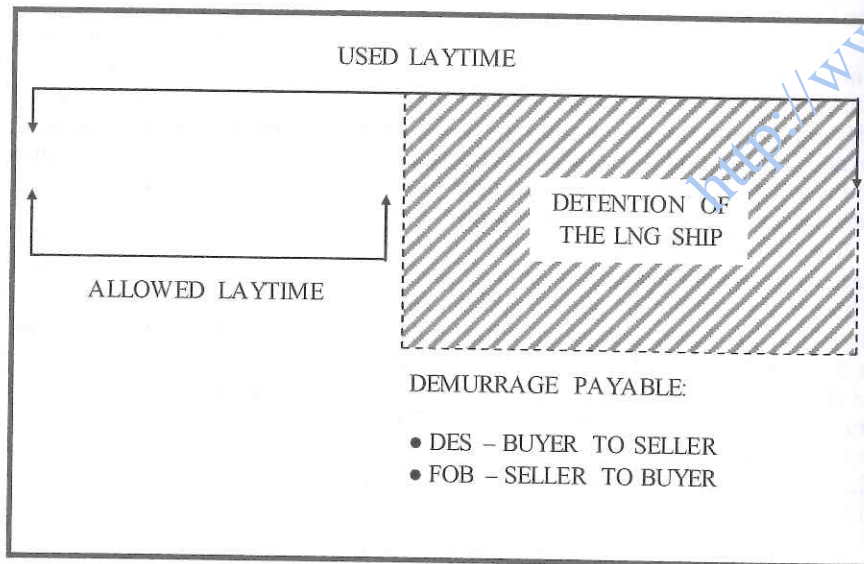
- (i) *Laytime*. This is a measure of the time which it is envisaged the LNG ship will take to unload or load a cargo of LNG (as appropriate), more usually

² See Appendix C18.

³ See Appendix C19.

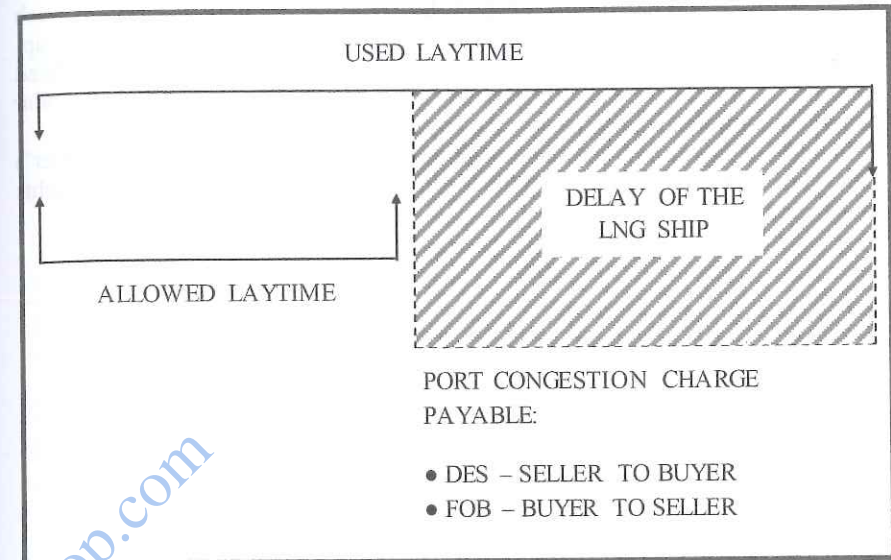
referenced as “allowed laytime”. The SPA will define a number of hours, which could be a flat amount or scaled according to the size of the LNG ship, within which an LNG ship should be able to safely proceed to berth, tie-up, unload or load a cargo of LNG (as appropriate) and then be ready to depart. The defined number of hours for this allowed laytime (sometimes called “running hours”) will usually be extended to take account of the impact of occurrences beyond the control of the transporting party such as events of force majeure and defined adverse weather conditions. Allowed laytime is determined by the terms of the contract.

- (ii) *Used laytime.* This is the period of time which it actually takes for the LNG to ship to safely proceed to berth, tie-up, unload or load a cargo of LNG (as appropriate) and then be ready to depart from the berth. Used laytime is determined as a matter of fact.
- (iii) *Demurrage.* If in respect of the movement of the LNG ship through the loading port or the unloading port (as appropriate) the used laytime exceeds the allowed laytime then, in recognition of the presumption that the excess of used laytime over allowed laytime should be attributable to a failure of the non-transporting party to ensure the efficient operation of the relevant port, the non-transporting party will be required to compensate the transporting party for the consequences of that failure by the payment of a monetary sum (“demurrage”). Demurrage is typically set at a pre-determined amount of money, payable for each such hour of excess and without regard to the actual loss or liability (if any) suffered by the transporting party, and thus is effectively a form of liquidated damage (33-021), unless the demurrage is determined by reference to a straight pass-through of any additional loss or liability incurred by the transporting party under the charterparty. Thus, in a DES-based SPA demurrage would be payable by the buyer to the seller, and in an FOB-based SPA demurrage would be payable by the seller to the buyer.



- (iv) *Port congestion.* If in a DES-based SPA the seller delays the departure of its LNG ship from the unloading port for any reason—other than in

consequence of an event of force majeure or the default of the buyer—then the seller may be obliged to pay some measure of compensation to the buyer for any loss or liability caused to the buyer by the seller’s



unwarranted congestion of the unloading port. This is effectively demurrage in reverse, and is sometimes referred to as a “port congestion charge” in the SPA so as to avoid confusion with the principal definition of demurrage. A similar provision might apply in an FOB-based SPA to give rise to payment due from the buyer to the seller, to apply where the buyer delays the departure of its LNG ship from the loading port without justification. The loss or liability suffered by the non-transporting party in these circumstances, which the port congestion charge is intended to compensate for, could be reflected through loss of income from the full use of the port (if that party is the portowner) or through a further liability to the actual portowner.

Where a transporting party becomes liable to pay a port congestion charge under the SPA and the reasons for the delayed departure of the LNG ship are attributable to a failing of the LNG ship or its crew then the transporting party, as the charterer could seek to pass this liability back to the shipowner under the charterparty (arguably because the LNG ship has failed to meet the applicable performance standards). This is an amendment to the customary form of the charterparty which the shipowner will be reluctant to admit.

SHIP COMPATIBILITY

In a DES-based SPA the buyer will wish to ensure that the seller’s LNG ship meets certain defined standards (both local and international) of construction, operation, specification and maintenance, including compliance with safety requirements, crewing and compatibility with the unloading port facilities. These standards

will be recited in the SPA⁴ and the buyer will retain rights to inspect the seller's LNG ship, which should be reflected by the reciprocal reservation, by the transporting party, of LNG ship inspection rights in the charterparty, and even to require the provision of an alternative LNG ship in the event that a failure to meet any such standard is found. The seller will usually be free to modify its LNG ship or to apply a replacement ship to the performance of the SPA, as long as the defined standards continue to be met. Reciprocally, the seller might wish to ensure a similar pattern of compliance in respect of the buyer's unloading port facilities.

In an FOB-based SPA the same positions will apply viz the seller, the buyer's LNG ship, and compatibility with the loading port facilities, and the seller's rights to inspect the buyer's LNG ship.

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⁴ See Appendix C18.