National Grid

OPERATING MARGINS

2008/09

Contents

1 About this Document

This document is published pursuant to National Grid's obligations under the Uniform Network Code Section K Part 2.2.3, which places a requirement on National Grid to publish the following information:

- The assumptions used in the determination of Operating Margins (OM)
- The aggregate amount of OM
- The maximum rate of deliverability required for OM
- The amounts of deliverability and space in each storage location
- The OM profile

The terms and conditions of the Uniform Network Code apply to the contents of the document.

The resultant OM booking also meets National Grid Gas requirements to conform to its current Safety Case.

Issued by:
National Grid
Transmission - Commercial
National Grid House
Warwick
CV34 6DA

Contact: Peter Parsons
Telephone: 01926 656334
E-mail: peter.j.parsons@uk.ngrid.com

Date of issue: 1 March 2008

2 Background Information

2.1 Use of Operating Margins

The criteria for the use of Operating Margins (OM) are set out in the System Management Principles Statement.

2.1.1 The triggers for use of OM are: -

1. Primarily, OM will be used in the immediate period following operational stresses such as beach supply failure as a result of a failure offshore, unanticipated demand changes or unexpected pipeline and/or plant unavailability to maintain system pressures in the period before other balancing measures become effective.

2. Orderly Rundown requires a quantity of OM stock to ensure safe rundown of the system in the event of a Network Gas Supply Emergency while firm load shedding takes place as required in our Safety Case.

3. OM will also be used to support system pressures on the gas day in the event of a compressor trip, pipe break, or other failure or damage to transmission plant. Following the day of the event, any reduction in capacity resulting from the event becomes equivalent to a planned maintenance activity, and therefore is unlikely to be supported by the use of OM.

2.1.2 Refilling of OM

If the volume of OM, at any point in the winter, falls below the monitor level calculated by National Grid at individual sites, National Grid may seek to refill OM to the extent of the published monitor where it is practical to do so.

2.2 Safety Case OM Requirements

Besides meeting our Network Code requirements for OM, the OM booking must also satisfy our current Safety Case requirements for OM. These are broadly similar and for reporting purposes we now use terminology that is consistent with our Safety Case definitions for OM.

3 Overview of the OM methodology

This year, National Grid has determined its OM requirement by consideration of all available storage facilities on the NTS.

National Grid Gas now procures OM services from storage and importation facilities and their capacity holders rather than from specific storage facilities. To that end, National Grid Gas has recently completed a tender to procure storage capacity offers.

The philosophy behind this year's methodology is consistent with that used last year, with the total booking being split between Group 1, Group 2 and Group 3 as broadly defined in our Safety Case.

GROUP 1 - includes those events that, although unlikely to occur co-incident with a 1 in 50 winter, would have a major impact on the safe operation of the NTS. This group includes a major loss of supply, e.g. subterminal, or loss of infrastructure .

GROUP 2 - includes those events that could reasonably be expected to happen during any winter, but potentially more so in a severe winter as alternative supplies are expected to be less available and occurrences of such events could escalate due to higher demands. Inclusion of this OM is required in order that OM is kept available for a series of such events. This events group includes analysis for compressor failure; routine forecast errors and significant supply losses as required in our Safety Case.

GROUP 3 - Orderly Rundown is OM stock to ensure safe rundown of the system in the event of a Network Gas Supply Emergency while firm load shedding takes place as required in our Safety Case.

OM is primarily calculated by network analysis of the system and to a lesser extent by using various analytical models. Section 4 provides a more detailed explanation of the calculation of the individual elements.

4 Assumptions used in the determination of Operating Margins (OM)

4.1 Assumptions used in the OM calculations

1. Supply is utilised in the following order: UKCS supplies and imports, Long duration storage (Rough), Medium duration storage (MRS) and Short duration storage (LNG).

2. UKCS gas and imports have been set at a combined level of approximately 4150 GWh/d (383 mcm/d). This level reflects a combination of the operational experience we have encountered this winter and some of the uncertainty associated with the delivery of new and existing import infrastructure.

3. Other storage, NTS compressors and pipelines have 100% availability (apart from the specific failure condition being considered).

4. Relevant storage facilities are on short standby at high demands.

5. If operating conditions require OM stocks to be depleted they may be refilled[1] to the stock profile shown in Section 7.

4.1.1 OM requirements for Group 1

The determination of the requirements for Group 1, include assessment of the following scenarios:

- Loss of key infrastructure, notably loss of Forties liquids pipeline and an electrical supply failure at St Fergus.
- Loss of the largest sub-terminal at each terminal.

Group 1 OM requirement is calculated by network analysis of the system.

4.1.2 OM requirements for Group 2

The requirements for Group 2 include compressor failures and other operational factors such as forecast changes and significant supply losses. These requirements are added together reflecting that all of these events could reasonably be expected to occur, in some cases more than once during a severe winter.

[1] This may need to be effected by transfer of gas in store because of limited injection capacity.

Group 2 OM requirement is calculated by network analysis of the system (for significant supply losses) and by using a range of analytical models using historic and forecast data (for compressor failure and routine forecast errors).

4.1.2.1 NTS Compressor failure assumptions

1. Our compressor model takes into account our most recent compressor performance data, including:
   - Planned running hours (for a severe winter)
   - Mean time between failure (MTBF)
   - Start probabilities
   - Average repair times
   - Complete station trip data (reliability)
   - Planned and unplanned unit availability

2. The compressor model determines 3 key components namely:
   - Station trips
   - Station emergency shut downs (SESDs)
   - Unavailability

   From these a compressor power loss is determined.

3. Network analysis is them used to determine the volume loss due to compressor power loss and this is then assigned to appropriate storage sites.

4.1.2.2 Forecast Changes

1. This component has been included to reflect the operational fact that during any winter a level of under forecasts can be expected, and in the extreme this may require OM support.

2. The OM requirement has been calculated based upon historic trends in 1600 hours forecasting performance, assuming 10 mcm of linepack is available.

3. Although recent winters have been mild it is assumed that in a cold winter the requirement would not increase: though demand would be higher it may not necessarily be more volatile.

4.1.3 OM requirement for Group 3 - Orderly Rundown

4.1.3.1 Orderly rundown assumptions

1. Severe winter has been experienced, no shipper storage available from 06:00 hrs and no shipper firm load reduction.

2. A Network Gas Supply Emergency is declared effective from 06.00hrs and firm load shedding of VLDMCs and LDZ DM loads is required to balance supply and demand.

3. NTS linepack is used to smooth out the mis-match between supply and demand within day, but is limited to +/- 10mcm.

4. With no shipper storage available, the within day supply shortfall is assumed met by a combination of OM booked storage in Rough, MRS and LNG.

5. As detailed in Section 3, this assessment may change or be expanded following engagement with the Distribution Networks re their participation in their assessment for orderly rundown

5 Isle of Grain OM Requirements

Due to the strategic location of Grain, National Grid continues to book some OM at Grain for safety purposes.

6 Aggregate Operating Margins requirement 2008/09

Table 1 below summarises the expected bookings required from the regulated LNG facilities and all other service providers as a result of the competitive tender process. This was completed in early 2008 and forms part of National Grid's overall procurement process. Further details on this year's tender round will be available as part of the procurement guidelines statement to be published in March.

The aggregated OM requirement for 2008/09 is 1261GWh.

Table 1: 2008/09 Operating Margins Booking

	2007/08 Space Booking (GWh)	**2008/09 Space Booking (GWh)**	2008/09 Max Deliverability (GWh/d)
Avonmouth	213	**177**	156
Dynevor Arms	116	**37**	49
Glenmavis	135	**131**	101
Partington	266	**262**	220
All other providers	764	**654**	
Total[2]	1494	**1261**	

[2] Totals may be slightly out due to rounding errors

This booking explicitly meets our UNC and Safety Case obligations.

6.1 The maximum rate of deliverability required for Operating Margins

The combination of the aggregated LNG deliverability in Table 1 combined with that from other providers meets the calculated maximum OM deliverability requirement. To reduce costs and to reflect at high demand that many of these sites are expected to be flowing gas, we will not be booking any site deliverability. Hence we will use interruptible deliverability or over-run deliverability on the day of use.

7 The Operating Margins profile

Table 2 below shows the Operating Margins profile, the quantity of gas required in store for each month of the year. Though not shown the storage profiles can be site specific reflecting their individual OM needs.

Table 2: 2008/09 Operating Margin Profile

	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Monitor (GWh)	475	475	475	475	475	1261	1261	1261	1249	1014	863	475	475
Monitor (%)	38%	38%	38%	38%	38%	100%	100%	100%	99%	80%	68%	38%	38%

8 Operating Margins WACOG Calculation Principles

Per K4.2.6(b) of the UNC, National Grid Gas must publish the principles by which the Net Margins WACOG will be calculated in relation to facilities where National Grid Gas has entered into OM Gas Delivery Arrangements. National Grid Gas currently enjoys OM Gas Delivery Arrangements at the Isle of Grain LNG Importation Terminal, as provided by Contracting Shippers. The Net Margins WACOG in respect of these OM Gas Delivery Arrangements at the Isle of Grain LNG Importation Terminal shall be calculated as follows:

DC = DQ * DGP

Where:

DC is the Net Margins WACOG

DQ is the quantity delivered (in GWh) to National Grid Gas pursuant to the OM Gas Delivery Arrangements on the day in question:

DGP is the greater of:

a price (in GBP/GWh) calculated as the average of the three highest System Average Prices (in GBP/GWh) in the five Days immediately after the date on which the delivery occurred, minus the average of System Entry Capacity Charges applicable in respect of the Gas Delivery point in the same period;

and

the weighted average of the System Average Price (in GBP/GWh) in the three hundred and sixty-five Days immediately before the date on which the delivery occurred, minus the average of System Entry Capacity Charges (in GBP/GWh) applicable in respect of the Gas Delivery Point in the same period.

This methodology applies to the first 279GWh, or the 1.5 times the highest service quantity for any month in the calendar year of OM gas delivered to National Grid Gas in that calendar year. In the event that further gas is required for OM purposes, for quantities above this level, gas delivered up to 1000GWh is subject to a price (GBP/GWh) or a formula for arriving at the price quoted by the Contracting Shipper that is subject to a cap of (GBP/GWh) the greater of:

the highest System Marginal Buy Price (in GBP/GWh) in the 25 days before the delivery occurs and ending 5 days after the delivery occurs, minus the average of the System Entry Capacity Charges (in GBP/GWh) applicable in the same period

and

the weighted average of the System Average Price (in GBP/GWh) in the 365 Days immediately before the date on which the delivery occurred, minus the average of the System Entry Capacity Charges (in GBP/GWh) applicable in the same period.

In the event that further gas is required for OM purposes above 1000GWh in the calendar year, National Grid Gas must enter into supplementary arrangements with the Contracting Shipper regarding Delivery Charges to be negotiated at such a time. The Net Margins WACOG in such circumstances will be determined as the quantity delivered to NGG (in GWh) multiplied by the price (in GBP/GWh) payable by National Grid Gas to the Contracting Shipper pursuant to any such supplementary arrangement.

Please note that this clarification does not affect the prevailing methodology for the recovery of gas costs where OM services are provided from facilities at which NGG benefits from Operating Margins Capacity Arrangements.