nationalgrid

T/PM/E/1

PROCEDURE FOR
NETWORK GAS SUPPLY EMERGENCY

Version 10.0 May 2021

FOREWORD

The Network Emergency Co-ordinator (NEC) approved this procedure in May 2021 for use by all those with a duty of co-operation as provided for in the Gas Safety (Management) Regulations 1996 (GS(M)R).

These documents are revised, when necessary, by the issue of new versions. Users must ensure that they are in possession of the latest edition by referring to the Register of Safety and Engineering Documents available on National Grid Infonet system or via the Emergency and Incident Framework Team.

Further information can be requested via.boxgasops.emergencyplanning@nationalgrid.com or by following this link Network Gas Supply Emergencies (NGSE)

Compliance with this document does not confer immunity from prosecution for breach of statutory or other legal obligations.

BRIEF HISTORY

First Published	1997
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9.1 Revision, annual review of document. Minor administrational changes	March 2020
Tenth Revision. Figure 3 and section 3.3 updated to reflect the inclusion of Bio Methane. Section 3.4 wording changed from “import” and “export” to “inject” and “withdrawal” to reflect common industry terminology	May 2021

DISCLAIMER

This document is provided for use by National Grid. Where any other party uses this document, it is the responsibility of that party to ensure that this document is correctly applied.

MANDATORY AND NON-MANDATORY REQUIREMENTS

In this document:

must: indicates a mandatory requirement.

should: indicates best practice and is the preferred option. If an alternative method is used then a suitable and sufficient risk assessment must be completed to show that the alternative method delivers the same, or better level of protection.

CONTENTS

EXECUTIVE SUMMARY

T/PM/E/1 is the management procedure used for managing a Network Gas Supply Emergency prepared in accordance with the Network Emergency Coordinator's Safety Case. Associated with this procedure are the Local Gas Supply Emergency Procedures [GDN/PM/E2], applicable to Distribution Networks, and the Gas National Control Centre Response to a Gas Supply Emergency [T/PM/GNCC/E/3], applicable specifically to the Primary Transporter.

A Network Gas Supply Emergency is where a situation exists on the Primary System (the National Transmission System) which has the potential to cause, or has caused, a supply emergency, defined in GS(M)R as "an emergency endangering persons and arising from a loss of pressure in a network or any part thereof".

A Network Gas Supply Emergency could be caused by:

a) Insufficient gas supplies available to the Primary System (Gas Deficit).
   - Gas Deficit Emergency – Insufficient supplies available to the Primary System.
   - Safety Monitor Breach – where there is or may be insufficient gas storage available to meet the winter demand conditions.

b) A Critical Transportation Constraint in the Primary System.
   - This may occur when there is sufficient gas available but due to a constraint on the Primary System the gas cannot be transported to the correct location.

To provide a measured, appropriate and co-ordinated response to a Network Gas Supply Emergency the NEC Safety Case defines four stages of an emergency. The NEC may request emergency actions are completed out of sequence if deemed appropriate in the interest of health and safety. Below are the four stages of a Network Gas Supply Emergency and the actions available at each stage.

	Network Gas Supply Emergency (NGSE) Classification		
	Emergency Type		
	Gas Deficit: Insufficient Gas Supplies Available to the NTS		**Critical Transportation Constraint in the NTS**
Emergency Stage	**Gas Deficit Emergency**	**GS(M)R Monitor Breach**	**Critical Transportation Constraint**
1 (Potential)	• Gas conforming to Schedule 3 Part II of GS(M)R • NTS Linepack • Distribution Network utilisation ○ Distribution Network Storage ○ Emergency Interruption* • Public Appeals	• Instruct shippers & storage operators to amend storage flows • Distribution Network utilisation ○ Emergency Interruption* • Public Appeals	• Gas conforming to Schedule 3 Part II of GS(M)R • NTS Linepack • Distribution Network utilisation ○ Distribution Network Storage ○ Emergency Interruption* • Public Appeals
2	• National Grid Gas plc's participation in the OCM will be suspended • Direct Supplies into NTS • Load Shedding • Public Appeals	• National Grid Gas plc's participation in the OCM will be suspended • Direct Supplies into NTS • Load Shedding • Public Appeals	• National Grid Gas plc will continue to participate in the OCM • Direct Storage into NTS • Load Shedding • Public Appeals
3	• Public Appeals • Allocation & Isolation	• Public Appeals • Allocation & Isolation	• Public Appeals • Allocation & Isolation
4	• Restoration		

**Emergency Interruption will remain as an action that applies to Distribution Networks' contracted interruptible sites only.*

T/PM/E/1 provides further information on these emergency stages as well as detail on the prioritisation of consumers, communication routes in an emergency and the formation of the emergency strategy. The procedure also provides a summary of the roles and responsibilities of the NEC and the Primary Transporter.

1. Introduction

T/PM/E/1 is the industry procedure used for managing a Network Gas Supply Emergency (NGSE) occurring on the Primary System. Detailed arrangements are not included in the procedure, as these should be incorporated into the emergency plans of the affected parties.

Throughout the procedure the terms referenced in the Network Emergency Co-ordinator (NEC) Safety Case will be used.

This will include describing the Network as defined in the NEC Safety Case.

Figure 1: Definitions

Term Used	Alternative
Primary System	National Transmission System (NTS)
Primary Transporter	Gas National Control Centre (GNCC) National Grid (NG)
Secondary System	Distribution Network (DN) Interconnectors Directly connected loads
Secondary Transporter	Distribution Network Control Centres (DNCC)
Supplementary Systems	Systems supplied from secondary systems

The arrangements described in this document take effect from May 2021.

This document supersedes Issue 9.1 of T/PM/E/1 which was issued in March 2020

T/PM/E/1 is produced and maintained by the Emergency and Incident Framework Team, Gas Operations, National Grid Gas plc.

1.1 Scope

T/PM/E/1 is designed to provide a consistent approach for managing gas supply emergencies on the Primary System (National Transmission System (NTS)). T/PM/E/1 is not applicable for the management of Local Gas Supply Emergencies (LGSE) on a secondary system Distribution Network (DN). GDN/PM/E/2 should be used for managing a LGSE.

T/PM/E/1 is aligned with the current NEC Safety Case.

T/PM/E/1 is the procedure that should be used when all normal operational tools available to the Primary Transporter have failed to address the developing situation.

T/PM/E/1 expands on the 4 stages of a NGSE identified in the NEC Safety Case.

1.2 Purpose

The purpose of T/PM/E/1 (the procedure) is to provide a measured, appropriate and co-ordinated response to a NGSE and to meet all the requirements of Section 4 of the current NEC Safety Case. As a national or Primary System borne supply emergency cannot occur if the Network is fully pressurised, the procedure is designed to keep the Network fully pressurised for as long as possible by maximising gas supplies that are available to the Primary Transporter using normal commercial arrangements and by the use of emergency measures, including load shedding, to match supply and demand in the Network.

A reduction in system pressure in some parts of the Network may occur when systems, or parts of systems, are isolated during an emergency. This should require the primary and secondary transporters to take action to prevent one or more supply emergencies occurring in these systems.

The procedure has 4 clearly identified stages, which correspond with the 4 stages of the NEC's Safety Case. The NEC should declare the NGSE as a Gas Deficit Emergency, a Safety Monitor Breach or a Critical Transportation Constraint Emergency. More than one type of emergency can be relevant at any one time i.e. A Safety Monitor Breach can be declared during a Gas Deficit Emergency. This does not affect the Stages which must be declared sequentially.

1.3 The Network Emergency Management Team and the BEIS Emergency Response Team

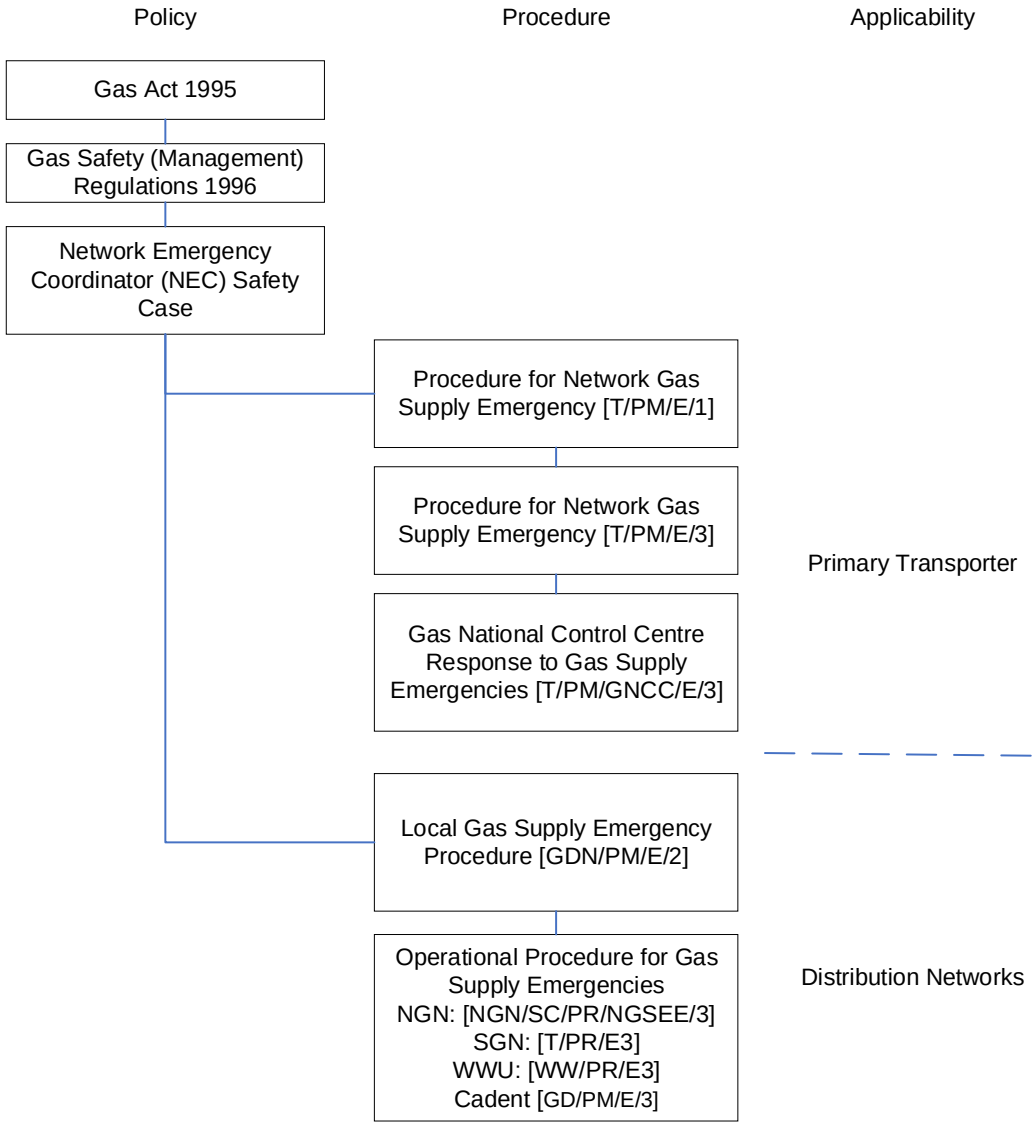
In the event of a potential or actual NGSE, a Network Emergency Management Team (NEMT) will be set up, led by an Incident Controller, who will manage the incident, develop the emergency strategy and liaise with the Network Emergency Co-ordinator. Procedure T/PM/GNCC/E/3 governs the processes of the NEMT.

In a potential or actual NGSE, the Department for Business, Energy & Industrial Strategy (BEIS) would form their Emergency Response Team (ERT) in accordance with the BEIS National Emergency Plan for Gas and Electricity. The BEIS ERT would receive information from wider government, National Grid Electricity and Gas Transmission, the NEMT, Gas Distribution Networks and other relevant gas and electricity industry representatives on the wider impacts of the NGSE. Based on this information BEIS may issue Notices of Direction that must be taken into account by the NEMT when determining the emergency strategy.

1.4 Supporting Documents

This procedure links directly to the Network Emergency Coordinator Safety Case which is governed by GS(M)R. Associated with this procedure is the Local Gas Supply Emergency Procedure [GDN/PM/E2] applicable to Distribution Networks and the Gas National Control Centre Response to a Gas Supply Emergency [T/PM/GNCC/E/3] applicable specifically to the Primary Transporter.

Figure 2 - Linked plans

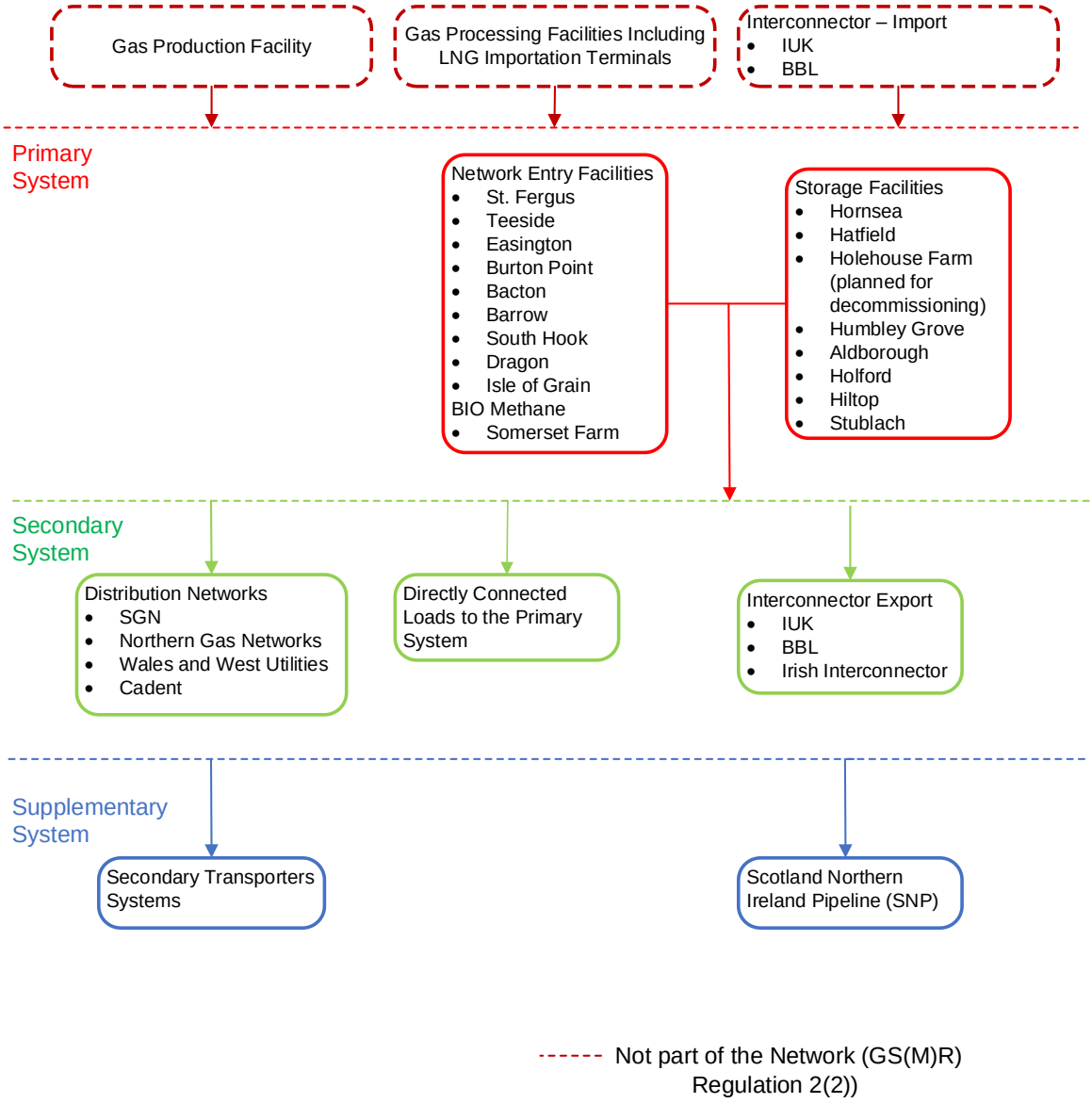


2. The Network

The NEC Safety Case identifies that the Network consists of three types of system, specifically primary, secondary and supplementary.

This classification enables the NEC to clearly differentiate between the roles of the various conveyors operating on the Network and those involved in identifying a potential or actual supply emergency. The Network is summarised in Figure 3.

Figure 3: The Network



2.1 Primary System

The Primary System (NTS) transports gas from the gas processing facilities, storage facilities and interconnectors to all secondary systems. In the majority of cases the Primary System is the main source of gas for secondary systems. The Primary Transporter operates the Primary System.

The operation of the Primary System is controlled from the Primary Transporter's Gas National Control Centre (GNCC). The GNCC is responsible for the continuous monitoring and control of the physical network ensuring its safe operation at all times. In addition, it undertakes the application of commercial activities associated with the Uniform Network Code.

2.2 Secondary Systems

A system taking gas from the Primary System via offtakes is classified as a secondary system. Secondary systems include large loads and Distribution Networks (DNs) supplying domestic and non-domestic end users.

Secondary system conveyors have arrangements in place for monitoring the operation of their systems.

2.3 Supplementary Systems

Supplementary systems take gas from secondary systems and supply domestic and/or non-domestic end users.

Supplementary system conveyors have arrangements in place for monitoring the operation of their systems.

3. Supplies to the Primary System

3.1 Network Entry Facilities

Figure 3 details the network entry facilities that deliver gas to the Primary System. This comprises of input terminals that deliver production from the UK continental shelf, interconnectors, Bio Methane Production Facilities and LNG importation terminals. The quality of gas entering the Primary System is monitored to ensure compliance with the requirements of GS(M)R Schedule 3 Part I.

Should additional network entry facilities come on stream then National Grid Gas plc will operationally utilise them in line with these classifications, as will the NEC to prevent a potential or actual supply emergency from occurring, whether documented in the E/1 or not.

3.2 LNG Importation Terminals

LNG importation terminals are classified as gas processing facilities, under section 2(1) of GS(M)R and as such, subject to the duty of co-operation with the NEC.

Should additional LNG importation facilities come on stream then National Grid Gas plc will operationally utilise them in line with these classifications, as will the NEC to prevent a potential or actual supply emergency from occurring, whether documented in the E/1 or not.

3.3 Bio Methane Facilities

BIO Methane facilities are classified as gas production facilities, under section 2(1) of the Gas Safety (Management) Regulations and as such, are subject to the duty of co-operation with the NEC.

3.4 Gas Storage Facilities

These facilities are connected to the Primary System and can operate in two modes, injection or withdrawal. The quality of gas entering the Primary System is monitored to ensure compliance with the requirements of GS(M)R Schedule 3 Part I. Gas is held in some or all of these facilities to meet the requirements of Operating Margins and Safety Monitor gas.

If a potential or actual supply emergency has been identified the NEC will request via the Primary Transporter the co-operation of storage operators to prevent a potential or actual supply emergency developing.

Should additional storage facilities come on stream then National Grid Gas plc will operationally utilise them in line with these classifications, as will the NEC to prevent a potential or actual supply emergency from occurring, whether documented in the E/1 or not.

3.4 Operating Margins Gas

Operating Margins (OM) gas is required under the Primary Transporter's safety case to support the Primary System as required. OM gas is used in exceptional circumstances to maintain Primary System pressures in the period before other system management services become effective (e.g. national or locational balancing actions). This service ensures that normal market operation can be maintained by allowing time for the market to deliver additional supply where possible.

Primarily, OM gas will be used in the immediate period following supply losses, the identification of a demand forecast change or pipeline or plant non-availability. A further quantity of OM gas is also procured to manage the orderly run-down of the system in the event of a Network Gas Supply Emergency (NGSE) whilst load shedding takes place. The Safety Case places an obligation on National Grid Gas to maintain OM gas at levels and locations determined throughout the year.

3.5 Safety Monitor Gas

Gas is required in storage to protect small embedded industrial and commercial consumers, domestic consumers and supplies to Ireland.

3.6 Interconnectors

There are three interconnector pipelines connected to the Primary System.

- Interconnector to Ireland
- Interconnector to Belgium I(UK)
- Interconnector to the Netherlands (BBL)

If a potential or actual supply emergency has been identified the NEC will request, via the Primary Transporter, the co-operation of interconnectors to prevent a potential or actual supply emergency from occurring. Should any additional interconnectors connect to the NTS then the NEC will also request their co-operation to prevent a potential or actual supply emergency from occurring, whether they are specifically referenced in the E/1 or not.

4. Definition of a Network Gas Supply Emergency

A “Network Gas Supply Emergency” is any situation which has resulted in, or could result in, a loss of pressure to consumers connected to the primary, secondary and/or supplementary system requiring action to prevent one or more supply emergencies from occurring. Insufficient gas supplies being available to the Primary System or a Critical Transportation Constraint within the Primary System could cause a NGSE.

When a potential or actual supply emergency has been identified by the Primary Transporter the NEC will be notified.

The co-ordination of the action taken by the all relevant parties in a NGSE is the responsibility of the NEC. If a potential or actual supply emergency is identified, the NEC will request via the Primary Transporter, co-operation of all relevant parties listed in GS(M)R Regulation 6(2).

The NEC will provide clarity to the duty holders on classification and stage of any supply emergency at all times.

5. Causes of a Network Gas Supply Emergency

In normal operation of the Network the shippers provide sufficient gas to the Primary System to meet the demand of their supply points on a daily basis. GNCC continuously monitors the balance between supply and demand on the Primary System. Under all normal conditions this must produce a balance between supply and demand in the Primary System. However, there are exceptional conditions that could result in an imbalance between supply and demand in the Primary System, or in part of the Primary System, which cannot be corrected by the use of normal commercial arrangements; this imbalance may lead to a Network Gas Supply Emergency.

A Network Gas Supply Emergency could be caused by:

a) Insufficient gas supplies available to the Primary System (Gas Deficit).

- Gas Deficit Emergency – Insufficient supplies available to the Primary System.
- Safety Monitor Breach – where there is or may be insufficient gas storage available to meet the winter demand conditions.

b) A Critical Transportation Constraint in the Primary System.

- This may occur when there is sufficient gas available but due to a constraint on the Primary System the gas cannot be transported to the correct location.

6. Classifications of a Network Gas Supply Emergency

6.1 Gas Deficit Emergency - Insufficient Gas Supplies to the Primary System

This could occur due to a sudden event or it could develop slowly over a number of hours or days.

The foreseeable events resulting in insufficient supplies being available are:

- Failure of the Gas National Control Centre or the GNCC systems for monitoring and controlling the Primary System.
- The complete or partial failure of the Uniform Network Code (UNC) market regime arrangements for delivering gas to the Network including failure to nominate sufficient gas and incorrect network demand estimation.
- Shortage of input terminal gas due to one or more sources of gas being outside the gas quality criteria set out in GS(M)R Part I and/or Part II of Schedule 3.
- Shortage of storage gas at one or more storage facilities.
- A prolonged period of exceptionally cold weather exceeding the supply security criteria.
- Unplanned unavailability or capacity restriction of one or more gas processing facilities, or network entry facilities.
- Unplanned unavailability or capacity restriction at one or more storage facilities.
- Unplanned unavailability or capacity restriction of production facilities or associated pipelines due to: plant or pipeline failure, industrial action, natural disasters, severe weather, accident, acts of war or sabotage, etc.

6.2 Gas Deficit Emergency - Safety Monitor Breach

Gas shippers and suppliers are incentivised in accordance within their licences to take steps to secure gas supplies to satisfy the domestic supply security standard. This includes the 1:50 winter severity for their domestic end users.

All conveyors need to demonstrate the arrangements they have put in place to minimise the risk of a supply emergency occurring. The safe operation of all end users in a 1:50 severe winter is achieved by protecting gas consumers by allocating them to either a protected by isolation or a protected by monitor category. The Primary Transporter will determine the arrangements and the classification of all end users into each category.

Should end users classified as protected by isolation not respond to a request to cease using gas, the conveyors will need to demonstrate that they can physically isolate them in a timely fashion. All end users not classified as protected by isolation are classified as protected by monitor.

The Primary Transporter determines the quantity of Safety Monitor gas. The Safety Monitor gas includes gas for protected-by-monitor end users and gas required to maintain

adequate pressure to protected-by-monitor end users when protected-by-isolation end users are being isolated from the Network.

The Primary Transporter monitors storage levels to ensure there is no breach of Safety Monitor levels. The NEC will be notified in the event of a potential or actual breach of the Safety Monitor as this may lead to a potential or actual gas supply emergency developing.

6.3 Critical Transportation Constraint

A Critical Transportation Constraint Emergency will exist when the primary and secondary transporters have taken appropriate operational actions and put into effect all practicable measures to reconfigure the Network, but despite this a restriction on the Primary System prevents or has the potential to prevent the secondary transporter from supplying gas safely to its customers.

The foreseeable events that could result in a Critical Transportation Constraint in the Primary System are:

- Reduction in the maximum permitted operating pressure of a Primary System pipeline, e.g. due to third party damage.

- Primary System demand exceeding the supply security criteria.

- The need to isolate part of the Primary System due to the admittance of gas which does not meet the requirements of GS(M)R Part I or Part II of Schedule 3.

- Unplanned unavailability due to: pipeline or system plant failure, industrial action, natural disasters, severe weather, accident, and acts of war or sabotage of Primary System pipelines. Planned pipeline and plant outage is taken into account by the Primary Transporter in the scheduling process.

- Unplanned unavailability or capacity restriction at one or more storage facilities.

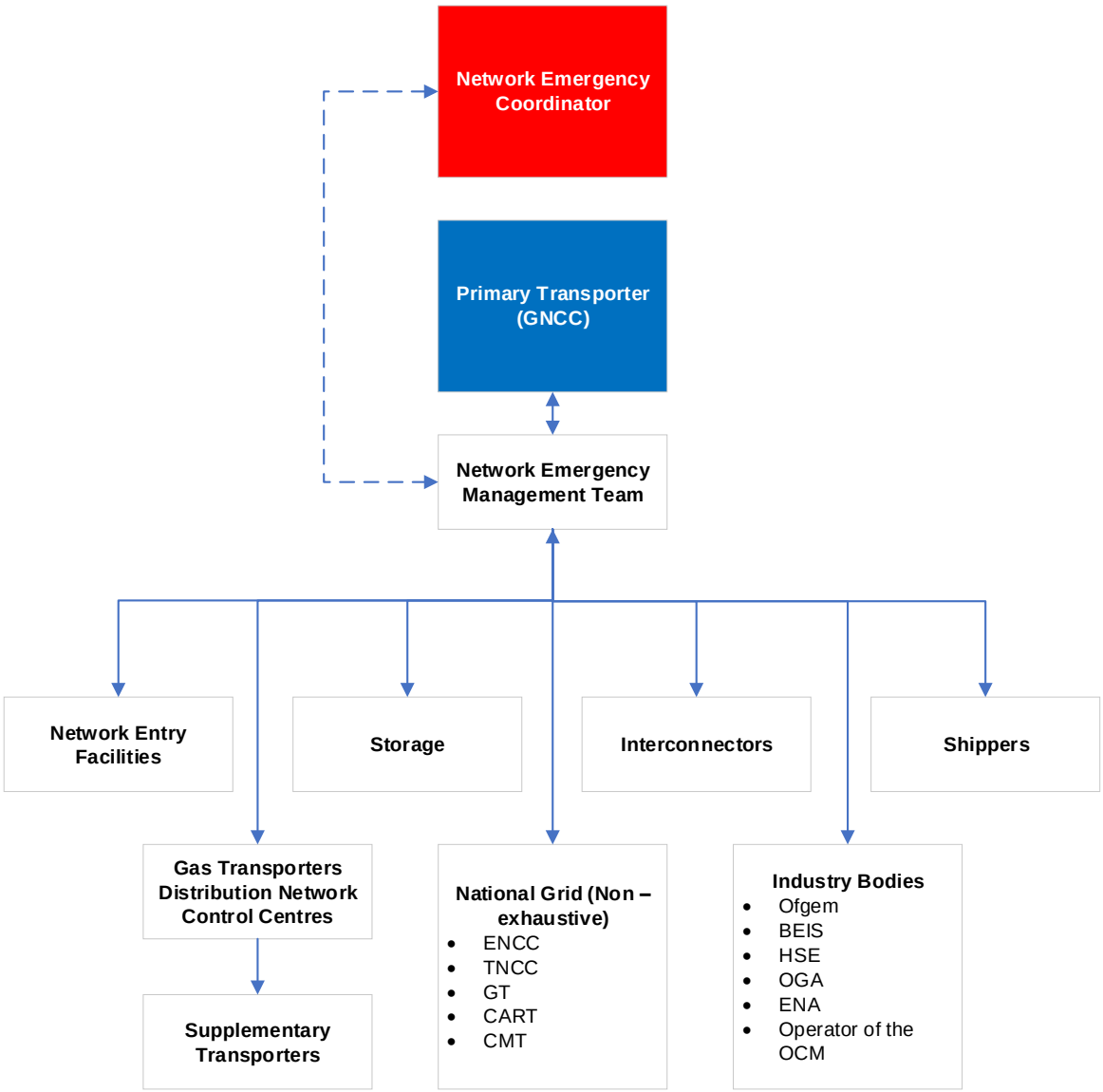
A Critical Transportation Constraint within the Primary System may result in a NGSE Critical Transportation Constraint Emergency being declared by the NEC.

7. Communications

7.1 NEC Declarations

- The notification routes for the declaration of a NGSE and the notice of a potential NGSE are shown schematically in Figure 4.
- All communication routes are two-way and must maintain, as far as possible, the normal communication processes taking place between the various parties in the course of the normal operation of the Network.
- Parties must avoid bypassing the communication chain in an attempt to deal directly with the NEC or the Primary Transporter.
- The communication medium must be agreed in advance between the parties, e.g. telephone backed up by fax or email.

Figure 4: Communication route used for NEC Declarations
NEC COMMUNICATION ROUTES



7.2 Communications from the Primary Transporter

All parties receiving notifications from the Primary Transporter must have a 24-hour telephone number and another separate 24-hour form of contact.

Shippers receive communications via the Active Notification System (ANS), as well as fax or email.

Communications to all other parties will be by fax or email (to the nominated 24-hour contact) with details of the situation and instructions for action. Confirmation of successful fax or email transmission must be taken as confirmation of receipt of the message by the shipper. If no response is received from the ANS (in the case of shippers), the fax or the email address then contact must be made by telephone. This should be regarded as a contingency measure due to the time involved in making individual telephone calls.

All parties must be notified of any special email addresses, telephone and any other forms of contacting the Primary Transporter for the duration of the gas supply emergency. All parties should avoid contacting the Primary Transporter in the event of an emergency unless it is essential.

8. Uniform Network Code

The Uniform Network Code (UNC) section Q (Emergencies) sets out the operational arrangements in place between shippers and gas transporters in the event of a gas supply emergency.

T/PM/E/1 is based on the provisions of section Q of the UNC and should be revised as a result of changes to the UNC.

UNC modification 195AV has removed the availability of NTS emergency interruption from October 2012 and modification 90 reduced the availability of Distribution Network interruption from October 2011.

9. The Primary Transporter's Emergency Strategy

9.1 Information Provision

The Primary Transporter will develop an emergency strategy to identify what stages of the NGSE are required to address the imbalance or constraint.

The following list provides a guide of the information that will be used by the Primary Transporter to develop the emergency strategy. Some of this information will be requested from the secondary transporters where time permits before the NEC has declared any stage.

- Estimates of the primary and secondary system supply and demand balance.
- Current and forecast gas deliveries at the input terminals – this can be obtained in conjunction with OGA via the Gas Availability Status report or the 5-day Situation Report.
- Potential maximum gas available at the input terminals.
- Potential volume and location of available gas conforming to GS(M)R Schedule 3 Part ll.
- Current gas deliveries to the Primary System from storage facilities.
- Potential maximum gas deliverable to the Primary System from storage facilities.
- Storage stock levels for Primary System and storage facilities.
- Distribution Network utilisation including minimising flows by way of the use of DN linepack and storage stocks and available contractual interruption.
- Location and nature of any capacity constraints being experienced or anticipated by conveyors, network entry facility operators and storage facility operators.
- The quantity of load identified as protected by isolation.
- The quantity and location of industrial/commercial loads available for load shedding.
- The quantity and location of domestic and priority load available for load shedding.
- Volume and location of the storage gas required to maintain Safety Monitor levels.

9.2 Emergency Strategy

The Primary Transporter will prepare an emergency strategy setting out the action necessary to restore supply-demand balance to the Primary System or the affected part of the Primary System. This strategy will be submitted to the NEC for approval.

The strategy adopted by the Primary Transporter for the restoration of the supply-demand balance has three aspects:

- The quantities of gas available to re-balance the Primary System or the affected part of the Primary System at stages 1 and 2.
- The lead times associated with delivering these quantities of gas to the Primary System or the affected part of the Primary System.
- Ability to maintain adequate Safety Monitor storage levels to support protected by monitor consumers throughout winter.

It is possible that sufficient quantities of gas could be available to the Primary System or the affected part of the Primary System to restore supply-demand balance but that it could not be delivered in time to prevent failure at one or more secondary system offtakes.

Failure could occur where the quantity of gas being delivered from the Primary System to a secondary system is insufficient to meet the immediate demand of that secondary system (taking into account the gas stored within the secondary system and the load management measures in place) resulting in a fall in secondary system pressure to a level at which supplies to consumers are affected.

The emergency strategy provides a process for the Primary Transporter to match the correct amount of supplies or demand reduction measures to address the Primary System imbalance.

In estimating the quantities of gas required a tolerance band is necessary for the ineffectiveness or uncertainty of each of the actions proposed. These tolerances must be stated in the emergency strategy, e.g. LNG delivery must have a high certainty of delivery time and quantity and may have a low tolerance bandwidth. Load shedding may be judged to be less certain in delivery time and quantity and have a higher tolerance bandwidth. The emergency strategy should be based on the mid-point of the tolerance bands if appropriate contingency actions are available to recover the situation if all the actions under-perform at the extreme tolerance limit.

The Primary Transporter has a decision support tool which assesses the effects of the various lead times on the Primary System and identifies if, and when, failure could occur.

For the purposes of the emergency strategy the NEC and Primary Transporter must assume that gas delivery rates at network entry facilities should be maintained at the rates being delivered at the beginning of stage 1 and that no increase in delivery rates occur thereafter. If additional input terminal gas is subsequently actually delivered to the network during stages 1, 2 or 3 this must be taken into account by a revision of the emergency strategy.

10. Priority Consumers

Condition 6 Paragraph 17 of the Gas Transporters (GT) Licence (Gas Act 1995) requires that a gas transporter, when interrupting or restricting the conveyance of gas to any non-domestic customer, must give priority to the maintenance of the supply of gas to consumers on the priority list and the conveyance of gas to their premises.

Condition 6 states that, unless it has already done so, a gas transporter must establish a list of non-domestic customers who must be given priority with respect to the maintenance of a supply of gas and conveyance of gas to their premises. The gas transporter, in consultation with shippers, must review this list as often as is appropriate.

There are 3 defined types of priority consumer.

Category A
Consumers (above 25,000 tpa, 732 MWh) on firm supply contracts, where a failure in the supply to their premises could put lives at risk. Example of such consumers would be hospitals or homes for the elderly and disabled.

Category B
Consumers who would otherwise fall into category "A" but for the fact that they are on interruptible contracts. Where possible supplies to category “B” consumers will be maintained for the contractually agreed notice period used when interrupting the supply of gas under normal conditions.

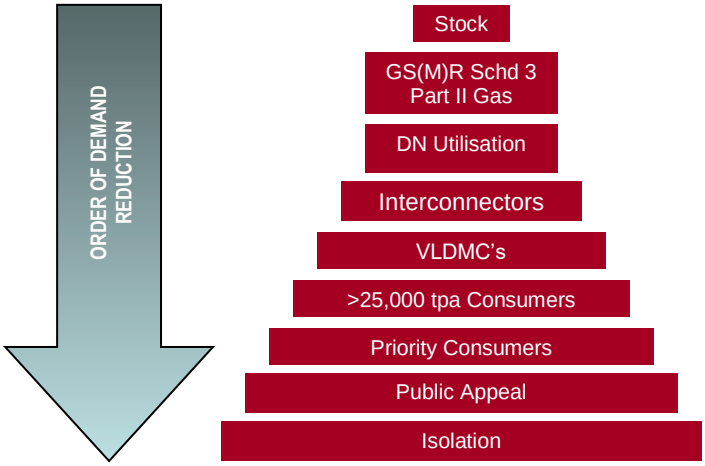
Category C
Consumers operating major items of capital plant, which require time to be safely shut, down and would sustain serious damage (£50 million or more) if gas supplies ceased suddenly. Examples of such consumers would be furnaces and glass works.

In a Network Gas Supply Emergency, the Primary Transporter in agreement with the NEC will establish a strategy that will, where possible, maintain gas supplies for as long as practicable to priority consumers. The Primary Transporter will not maintain gas supplies to priority consumers if this would result in the loss of gas supplies to domestic consumers.

The BEIS ERT may interface with the Primary Transporter and the NEC on the action to take with respect to the priority consumers.

In developing the emergency strategy, the Primary Transporter should adopt the following protocol.

Figure 5: Priority Customer Protocol



When gas transporters (or shippers) make contact with large consumers for the purpose of load shedding, they must establish whether the consumer is a priority consumer. Subject to operating conditions, priority consumers should NOT be issued with a direction notice and must be instructed that they should continue to take gas for essential purposes and disregard public appeals to stop using gas, unless otherwise directed by the gas transporter.

If any gas transporter directs a priority consumer to cease using gas and issue a direction notice accordingly, then that priority consumer MUST cease using gas.

11. Network Gas Supply Emergency Procedure

The NEC has identified 4 clear stages to manage the different types of NGSE. Figure 6 identifies the arrangements available to the NEC at each of the different stages. Although the stages run from 1 to 4 the NEC may declare the stages sequentially or simultaneously to address the supply-demand imbalance. As the implemented measures take effect, the NEC may revoke some or all of the stages until the NGSE is declared over.

Figure 6: shows the arrangements in place at each of the 4 stages

	Network Gas Supply Emergency (NGSE) Classification		
	Emergency Type		
	Gas Deficit: Insufficient Gas Supplies Available to the NTS		**Critical Transportation Constraint in the NTS**
Emergency Stage	**Gas Deficit Emergency (GDE)**	**GS(M)R Monitor Breach**	**Critical Transportation Constraint (CTC)**
1 (Potential)	• Gas conforming to Schedule 3 Part II of GS(M)R • NTS Linepack • Distribution Network utilisation ○ Distribution Network Storage ○ Emergency Interruption* • Public Appeals	• Instruct shippers & storage operators to amend storage flows • Distribution Network utilisation ○ Emergency Interruption* • Public Appeals	• Gas conforming to Schedule 3 Part II of GS(M)R • NTS Linepack • Distribution Network utilisation ○ Distribution Network Storage ○ Emergency Interruption* • Public Appeals
2	• National Grid Gas plc's participation in the OCM will be suspended • Direct Supplies into NTS • Load Shedding • Public Appeals	• National Grid Gas plc's participation in the OCM will be suspended • Direct Supplies into NTS • Load Shedding • Public Appeals	• National Grid Gas plc will continue to participate in the OCM • Direct Storage into NTS • Load Shedding • Public Appeals
3	• Public Appeals • Allocation & Isolation	• Public Appeals • Allocation & Isolation	• Public Appeals • Allocation & Isolation
4	• Restoration		

**Emergency Interruption will remain as an action that applies to Distribution Networks' contracted interruptible sites only.*

11.1 NGSE Stage One Arrangements

11.1.1 POTENTIAL NETWORK GAS SUPPLY EMERGENCY

A potential NGSE is any situation where:

A NGSE stage 1 Potential has been initiated, and the emergency strategy determines that the gas made available, or that could be made available, to the network as a result of stage 1 actions only is equal to, or greater than, the network supply deficit identified at the beginning of stage 1 and should, or could, be delivered to the network before failure occurs.

The Primary Transporter in consultation with the NEC determines the emergency strategy and as a result the NEC must issue either a notice of potential NGSE or declare a stage 2 Gas Deficit or Critical Transportation Constraint NGSE.

Figure 7: Emergency actions available at Stage 1

Stage 1 Arrangements	GDE	Safety Monitor Breach	CTC
Primary System Linepack	✓	×	✓
Distribution Network Utilisation	✓	×	✓
Gas conforming to Schedule 3 Part II of GS(M)R	✓	×	✓
Amendment of Storage Delivery	×	✓	×
Public Appeal	✓	✓	✓

11.1.2A GAS CONFORMING TO SCHEDULE 3 PART II OF GS(M)R

A transporter must not convey gas in the network unless it complies with the requirements specified in GS(M)R Part I of Schedule 3, Regulation 8(1). However, the NEC may, where it is necessary to prevent or delay the occurrence of a NGSE or a local gas supply emergency (and there is no equivalent amount of Schedule 3 Part I specification gas), authorise gas not conforming with Part I of Schedule 3 to be conveyed in the network if the gas conforms with the requirements of GS(M)R Part II of Schedule 3, Regulation 8(2). The NEC will not authorise the admittance of gas conforming to Part II of Schedule 3 when there is equivalent amount of gas conforming to Part I of Schedule 3 available.

This provision exists because there may be circumstances in which the introduction of gas conforming to Schedule 3 Part II of GS(M)R is less undesirable in safety terms than the loss of supply. The authorisation for gas conforming to Schedule 3 Part II of GS(M)R should be withdrawn once an equivalent amount of additional gas conforming to Schedule 3 Part I of GS(M)R becomes available or if the emergency has been averted. A risk assessment will be carried out to establish an acceptable duration for which gas conforming to Schedule 3 Part II of GS(M)R can be admitted into the Primary System or any secondary system.

The Primary Transporter may relax contractual obligations within the boundaries of Part I of Schedule 3 if this would prevent a NGSE (including a potential) occurring or to minimise the safety issues if one has already occurred. However, due to time constraints this process may be included in the NEC authorisation for the admittance of gas conforming to Part II of Schedule 3.

Figure 8: GS(M)R Gas Specification

Wobbe Number No Person Shall Convey Gas in the Network **> 52.85 MJ/m3**
Upper Limit of gas conforming to Part II Schedule 3 **>51.41 MJ/m3 to 52.85 MJ/m3**
51.41 MJ/m3 Gas conforming to Part I Schedule 3 **47.2 MJ/m3**
<47.2 MJ/m3 to 46.5 MJ/m3 Lower Limit of gas conforming to Part II Schedule 3
No Person Shall Convey Gas in the Network **< 46.5 MJ/m3**

ICF (Incomplete Combustion Factor)	
Gas conforming to Schedule 3 Part I of GS(M)R	**≤ 0.48**
Gas conforming to Schedule 3 Part II of GS(M)R	**≤ 1.49**

11.1.2B GAS CONFORMING TO SCHEDULE 3 PART II OF GS(M)R IN THE NETWORK

The Primary Transporter must initiate the request to the NEC for the admittance of gas conforming to Schedule 3 Part II of GS(M)R, directly or indirectly (i.e. through a secondary system) into any part of the Primary System or any secondary system.

The NEC will require demonstration that there is no equivalent gas conforming to Schedule 3 Part I of GS(M)R available to the Primary Transporter and the gas conforming to Schedule 3 Part II of GS(M)R is required.

The relevant transporter is responsible for the operational, commercial and contractual arrangements associated with the introduction and conveyance of gas conforming to Schedule 3 Part II of GS(M)R in its system and for any necessary agreements with third parties for the supply or transportation of the gas. Sufficient tolerance on the specification must be allowed to ensure that it does not fall outside the requirements of GS(M)R Part II of Schedule 3 at any point in the network.

The relevant transporter must obtain up to date information about the approximate quantities of gas conforming to Schedule 3 Part II of GS(M)R available at relevant network entry points and/or blending points and notify the NEC via the Primary Transporter of the quantities available on a daily basis, or otherwise as agreed, with the NEC.

The transporter who applied for the authorisation must monitor the supply-demand situation and inform the NEC via the Primary Transporter when the admittance of gas conforming to Schedule 3 Part II of GS(M)R is no longer required.

The relevant transporter must inform the NEC of the earliest practicable time at which all the gas being conveyed in the network should meet the requirements of GS(M)R Part I of Schedule 3 and when all the gas being conveyed in the network actually does meet the requirements of GS(M)R Part I of Schedule 3.

The NEC must withdraw the authorisation when all the gas in the network meets the requirements of GS(M)R Part I of Schedule 3.

The NEC must issue the authorisation for the admittance and withdrawal of gas conforming to Schedule 3 Part II of GS(M)R to the primary and/or affected secondary transporters orally and/or in writing.

11.1.3 PRIMARY SYSTEM LINEPACK AND SECONDARY SYSTEM STORAGE

During stage 1 all usable Primary System linepack will be utilised by the Primary Transporter. During the process of collecting data all secondary transporters will indicate to the Primary Transporter how much storage they have available. At stage 1 the Primary Transporter may ask the secondary transporters to release this storage by reducing the amount of gas they take from the Primary System.

11.1.4 CURTAILMENT OF NTS STORAGE DELIVERY

In the event that there is likelihood that the Safety Monitor will or has been breached the NEC will seek co-operation from shippers and storage operators to curtail delivery of storage gas to the Primary System. Shippers and storage operators should amend their flows in accordance with the Primary Transporter's request and undertake demand reduction measures or increase supplies to the Network to maintain a supply-demand balance. If demand reduction is required of consumers designated as protected by isolation, the NEC will declare a stage 2 NGSE.

11.1.5 PUBLIC APPEAL

If approved by the NEC, the Primary Transporter may instigate the use of public appeal. For a potential transportation constraint, the Primary Transporter may instigate the use of public appeal through the affected secondary transporters. The affected secondary transporters will implement public appeals in line with their operational emergency procedures.

For a potential supply-demand imbalance or where the transportation constraint impacts a large number of secondary systems, the public appeal process will be co-ordinated centrally. The BEIS ERT will deliver these centrally co-ordinated public appeals using their Incident Response Plan (IRP). Affected secondary transporters will contribute to the delivery of this centrally co-ordinated media appeal through their communication process.

Public appeal targets domestic and smaller industrial/commercial consumers (<25,000 tpa). The method for communicating the public appeal messages could include public appeal broadcasts over the radio or television or the use of relevant social media. Posters and leaflets drops should also be used.
Public appeals are made in two phases:

(i) An appeal to "use as little gas as possible".

(ii) An appeal "to stop using gas".

It is anticipated that the effect of public appeals would diminish as time passes and that they would need to be repeated and reinforced at frequent intervals and eventually it is possible that the reduction in demand from the appeals would be insufficient to maintain the pressure at the extremities of one or more secondary systems.

It is the responsibility of the affected gas transporter to monitor the effectiveness of public appeals and to repeat as necessary. If the public appeals are being co-ordinated centrally then the Primary Transporter will request additional appeals as required.

11.2 NGSE Stage Two Arrangements

11.2.1 DECLARATION OF A GAS DEFICIT, SAFETY MONITOR BREACH OR CRITICAL TRANSPORTATION CONSTRAINT NETWORK GAS SUPPLY EMERGENCY

If the arrangements available to the Primary Transporter at stage 1 are insufficient to address the supply-demand imbalance or the transportation constraint, the NEC will consider authorising a stage 2 Network Gas Supply Emergency. A stage 2 NGSE will exist when there is no action available to the Primary Transporter that could be taken in the time available to re-balance the Primary System without the recourse to measures available in stage 2.

Upon declaration of a stage 2 NGSE the NEC will categorise the type of NGSE that exists. The NEC may declare the following types of Network Gas Supply Emergency.

a) Critical Transportation Constraint (CTC)

A CTC will exist when the Primary Transporter and the NEC agree that the Primary Transporter will be unable to maintain adequate pressure at one or more Primary System offtakes during the current gas day or the next gas day.

b) Gas Deficit Emergency (GDE)

A GDE will exist when the Primary Transporter and the NEC agree that the Primary Transporter will be unable to maintain an acceptable balance between supply and demand for the current gas day or the next gas day.

c) Safety Monitor Breach

A Safety Monitor Breach will exist when the Primary Transporter and the NEC agree there is a potential or actual breach of the Safety Monitor.

If at any time during a NGSE CTC Emergency, additional shipper gas would be beneficial in the management of the emergency, the NEC would re-declare the emergency as a NGSE Gas Deficit Emergency.

Figure 9: Emergency actions available at Stage 2

Stage 2 Arrangements	GDE	Safety Monitor Breach	CTC
Direct Supplies into NTS	✓	✗	✗
Direct Storage into NTS	✓	✓	✓
Public Appeal	✓	✓	✓
Suspend National Grid's Residual Balancer role in the OCM	✓	✓	✗
Load Shedding	✓	✓	✓

NOTE - Neither National Grid nor the NEC has any special arrangements with producers, field operators, suppliers or any other party for the supply of gas to the Network in a NGSE. Under the duty to co-operate the NEC would expect all gas supplies to be made available and be delivered to the Primary System during a NGSE.

11.2.2 DIRECTING SUPPLIES

If it has been identified that there are additional supplies available, then the Primary Transporter will request that shippers source as much gas as they can and arrange for delivery to the relevant entry facilities. Communications between the OGA and the terminal operators will have identified how much gas can be delivered and its associated delivery timescales. Shippers should source this gas and inform the Primary Transporter of what can be delivered through the appropriate channels.

If it is identified that this additional gas can only be made available through the use of an Order in Council, the Primary Transporter will communicate with BEIS's Emergency Response Team to discuss this strategy.

11.2.3 DIRECTING DELIVERY OF NON-SAFETY MONITOR STORAGE GAS

If it has been identified that there is additional Primary System storage gas available over and above that already being delivered or being made available for use, the NEC will request the Primary Transporter to make arrangements for the delivery of this storage gas.

Uniform Network Code Section Q authorises the Primary Transporter to issue direct instructions to the operator of any storage facility to deliver gas to the system if a stage 2 NGSE GDE or CTC is declared. For determining the emergency strategy, the stock of storage gas should be run down to, but not below, the relevant Safety Monitor level.

The Primary Transporter will communicate directly with the storage operators for the delivery of this gas in accordance with the Primary Transporter's operational procedures.

11.2.4 SUSPENDING NATIONAL GRID'S ROLE AS RESIDUAL SYSTEM BALANCER IN THE ON-THE-DAY COMMODITY MARKET (OCM) – GDE AND SAFETY MONITOR BREACH ONLY

Once a stage 2 GDE or Safety Monitor Breach has been declared, the Primary Transporter will contact the operator of the OCM to inform of the suspension of National Grid's role as residual system balancer with immediate effect. Shippers will continue to be able to trade.

Once the NGSE is declared over, the OCM market operator will be contacted to reinstate National Grid's residual system balancer role with effect from 05:00hours on the next gas day.

11.2.5 USE OF PUBLIC APPEAL

See stage 1 arrangements for use of public appeal.

11.2.6 LOAD SHEDDING

Load shedding is the procedure used by transporters to secure a graduated and controlled reduction in demand on all or part of their systems in order to keep the system securely pressurised.

The Primary Transporter will identify, in the emergency strategy, the volume and location of the load shedding required. If the emergency strategy identifies the need for load shedding in a secondary system, the Primary Transporter will communicate with the relevant gas transporter the volume to be shed. It is the responsibility of the relevant gas transporter to maintain a supply-demand balance in their part of the network. In the event that the Primary Transporter requests load shedding in a secondary system it is the responsibility of the secondary transporter to ensure this is implemented.

The Primary Transporter must determine the actual effect of the measures by continuously monitoring the offtake of gas from the Primary System and updating the NEC. If the supply-demand imbalance is deteriorating, the Primary Transporter in consultation with the NEC must revise the emergency strategy and increase the quantity of load shedding or it should request the NEC to escalate the NGSE to stage 3.

Figure 10 shows the tranches of load shedding implemented during a stage 2 NGSE. In a Safety Monitor Breach, NGSE loads above 2 mtpa are classified as protected by isolation. These would be the first tranche of load to be shed at stage 2 of this type of NGSE.

Figure 10: Comparison of load shedding between GDE, CTC and Safety Monitor Breach

CTC / GDE	Safety Monitor Breach
Very Large Daily Metered Consumers	Protected by Isolation (>2M tpa)
Consumers >25,000 tpa	Flow Safety Monitor Storage Gas
	Protected By Monitor (<2M tpa)
Public Appeal Message 1	Protected By Monitor (<25,000 tpa via Public Appeal messages)

If further load reduction was required consumers > 25,000 tpa would be contacted by secondary transporters or shippers and load shed. Public appeal messages would be used to reduce load < 25,000 tpa.

Although the terminology is different between the categories of consumer for a GDE and CTC emergency and that of a Safety Monitor Breach emergency, the process for contacting these consumers is the same.

11.2.6A LOAD SHEDDING - CRITICAL TRANSPORTATION CONSTRAINT, GAS DEFICIT OR SAFETY MONITOR BREACH NETWORK GAS SUPPLY EMERGENCY

If the previous arrangements available to the Primary Transporter at stage 2 are insufficient to address the supply-demand imbalance or the transportation constraint, the NEC will consider authorising load shedding. Load shedding will exist when there is no action available to the Primary Transporter that could be taken in the time available to re-balance the Primary System without the recourse to load shedding.

Figure 11: Load shedding actions available to the Primary Transporter at stage 2 of a Gas Deficit Emergency or a Critical Transportation Constraint

Stage 2 Load Shedding – CTC-GDE	GDE	CTC
VLDMCs including Interconnectors	✓	✓
Consumers >25,000 tpa (732 MWh)	✓	✓
Public Appeal	✓	✓

Figure 12: Load shedding actions available to the Primary Transporter at stage 2 of a Safety Monitor Breach

Stage 2 Load Shedding	Safety Monitor Breach
Protected by isolation Consumers	✓
Public Appeal Message 1	✓
Flow Storage Monitor Gas	✓
Protected by Monitor Consumers	✓
Public Appeal Message 2	✓

Figures 11 and 12 identify the different arrangements in place for managing a GDE, CTC and a Safety Monitor Breach. During stage 2 load shedding, consumers would normally be contacted in order of load size with the largest users of gas first, however, there may be circumstances where this is not desirable. This may be through the requirement of

maintaining supplies to large priority consumers or under direction from the BEIS ERT to maintain supplies to specific consumers, e.g. to maintain supplies to some electricity producers. The Primary Transporter will consider the above factors when developing the emergency strategy. Any communications or instructions from the Primary Transporter will clearly identify any special arrangements, i.e. supplies to some or all priority consumers are to be maintained.

11.2.6B ARRANGEMENTS FOR LOAD SHEDDING IN A NGSE GAS DEFICIT, SAFETY MONITOR BREACH AND CRITICAL TRANSPORTATION CONSTRAINT

Load shedding is put into effect by the primary, secondary and supplementary transporters initiating arrangements for making direct or indirect contact with large consumers and instructing them that they must stop or reduce their consumption of gas.

To assist the load shedding process, gas transporters may seek co-operation from shippers and suppliers to contact consumers on behalf of the transporter. If this approach is adopted, it is essential that all consumers understand that the supplier is operating under the directions of the transporter and that consumers are aware of the need to follow any directions issued by the transporter.

11.2.6C PRIMARY SYSTEM LOAD SHEDDING

The Primary Transporter is responsible for contacting all loads directly connected to the Primary System (Very Large Daily Metered Consumers (VLDMCs)) and directing them to cease taking gas. Where time permits the Primary Transporter when making contact with the VLDMC will issue a direction notice pursuant to GS(M)R Regulation 6(4).

If the Primary Transporter is unable to make direct contact with one or more consumers for whatever reason for the purpose of load shedding they will contact the shipper.

The Primary Transporter will monitor the response of the consumers connected to the Primary System. If the consumer fails to co-operate with the direction to cease using gas, the Primary Transporter may take action to physically isolate the site from the Primary System.

The Primary Transporter will communicate with the affected shippers that their sites have been instructed to cease taking gas.

In the case of secondary systems that export gas from Great Britain, the Primary Transporter will implement demand reduction measures that are achievable without causing adverse implications on the system where the load arises. From the information continually gathered throughout the NGSE (including stage 1 potential) the NEC and Primary Transporter, in conjunction with the BEIS ERT where applicable, will ensure that the most appropriate demand reduction strategy is identified.

This strategy may involve reducing secondary systems supply from the Primary System to zero in line with the category of consumer they have been aligned with, e.g. VLDMCs, protected by monitor, protected by isolation. These secondary systems will not be requested to go to zero where it can be demonstrated that the reduction would directly impact on domestic consumers and cause a supply emergency where the load arises.

In the event that domestic consumers would be directly affected by these secondary systems continuing taking gas from the Primary System, the Primary Transporter in conjunction with NEC will implement a percentage demand reduction strategy.

The relevant secondary transporter will be instructed by the Primary Transporter on behalf of the NEC to reduce its hourly offtake of gas from the Primary System so that its daily offtake of gas is reduced by a percentage equal to the amount of the actual, or anticipated, overall supply deficit in the affected secondary systems and the affected part of the Primary System on that gas day. This reduction will be expressed as a percentage of demand in the affected secondary systems and affected part of the Primary System.

The percentage reduction will be reviewed from time to time by the NEC and should increase or decrease according to the prevailing supply-demand conditions. The reduction in offtake quantity must be in force until revoked by the NEC.

If the load deficit in the affected secondary systems is likely to affect the supply to domestic consumers in those systems in Great Britain, such that there is an increased risk of a supply emergency as defined in the GS(M)R, then it may be necessary on safety grounds, to further reduce or cease flows through these systems.

The Primary Transporter must only invoke the arrangements described above when it can be demonstrated that domestic consumers in Great Britain will be directly affected. This would usually be after public appeal has proved inadequate.

The Primary Transporter, if instructed to do so by the NEC, must physically restrict the flow at any secondary system offtake point if the required reduction in flow is not apparent within a reasonable time of the instruction being given. If it is not possible to physically restrict the flow, then isolation of the secondary system must take place.

11.2.6D SECONDARY SYSTEM LOAD SHEDDING

Secondary transporters are responsible for contacting all loads directly connected to their system to direct them to cease taking gas. The Primary Transporter will provide the required volume that needs to be shed. The Primary Transporter may request specific sites to be maintained or shed.

The secondary transporter is responsible for contacting all VLDMCs connected to their secondary system. If time permits, the secondary transporter should issue a direction notice pursuant to GS(M)R regulation 6(4) when contacting consumers.

The secondary transporter may contact large consumers direct or they may seek co-operation from shippers and suppliers to contact the consumer for the purpose of load shedding.

If the shipper is contacting consumers on behalf of the gas transporter, no direction notice pursuant to GS(M)R regulation 6(4) must be issued at this time. This is due to the difficulty for the gas transporter to generate and issue large numbers of direction notices quickly and, as speed is a priority, the benefits of rapid response would be lost if this were attempted.

11.2.6E SUPPLEMENTARY SYSTEMS LOAD SHEDDING

Supplementary transporters are responsible for contacting all loads directly connected to their system to direct them to cease taking gas. The secondary transporter will provide the required volume that needs to be shed. The secondary transporter may request specific sites to be maintained or shed.

The supplementary transporter is responsible for contacting all VLDMCs and other consumers connected to their system. If time permits, the supplementary transporter should issue a direction notice pursuant to GS(M)R regulation 6(4) when contacting consumers.

11.2.6F PROGRESS OF LOAD SHEDDING

In order for load shedding to be effective, it is essential that consumers be contacted rapidly. The following response criteria have been set to ensure that those involved in the load shedding process can plan their resources and systems appropriately.

Figure 13 provides indicative times within which each transporter should be able to contact all the relevant category of consumers connected to their part of the network once instructed by the Primary Transporter. In the event the transporter uses the shippers to contact consumers, a timescale has been provided for completeness.

The update column is an indication of the timeliness of regular updates to the relevant transporter on progress of the load shedding process, when the contacting of all relevant consumers is complete and to inform of any consumers that have failed to stop taking gas when requested to do so.

The Primary Transporter will update their Network Emergency Management Team (NEMT).

Figure 13: Contact times for the purpose of Load Shedding

System	VLDMCs CTC/GDE	>100,000 tpa CTC/GDE	Protected by Isolation Safety Monitor Breach	Update
Primary (P/T)	30 mins	N/A	60 mins	60 mins NEMT
Secondary (S/T)	30 mins	180 mins	180 mins	60 mins Contact P/T
Supplementary	30 mins	180 mins	180 mins	60 mins Contact S/T
Shipper	30 mins	180 mins	180 mins	Contact relevant transporter as required

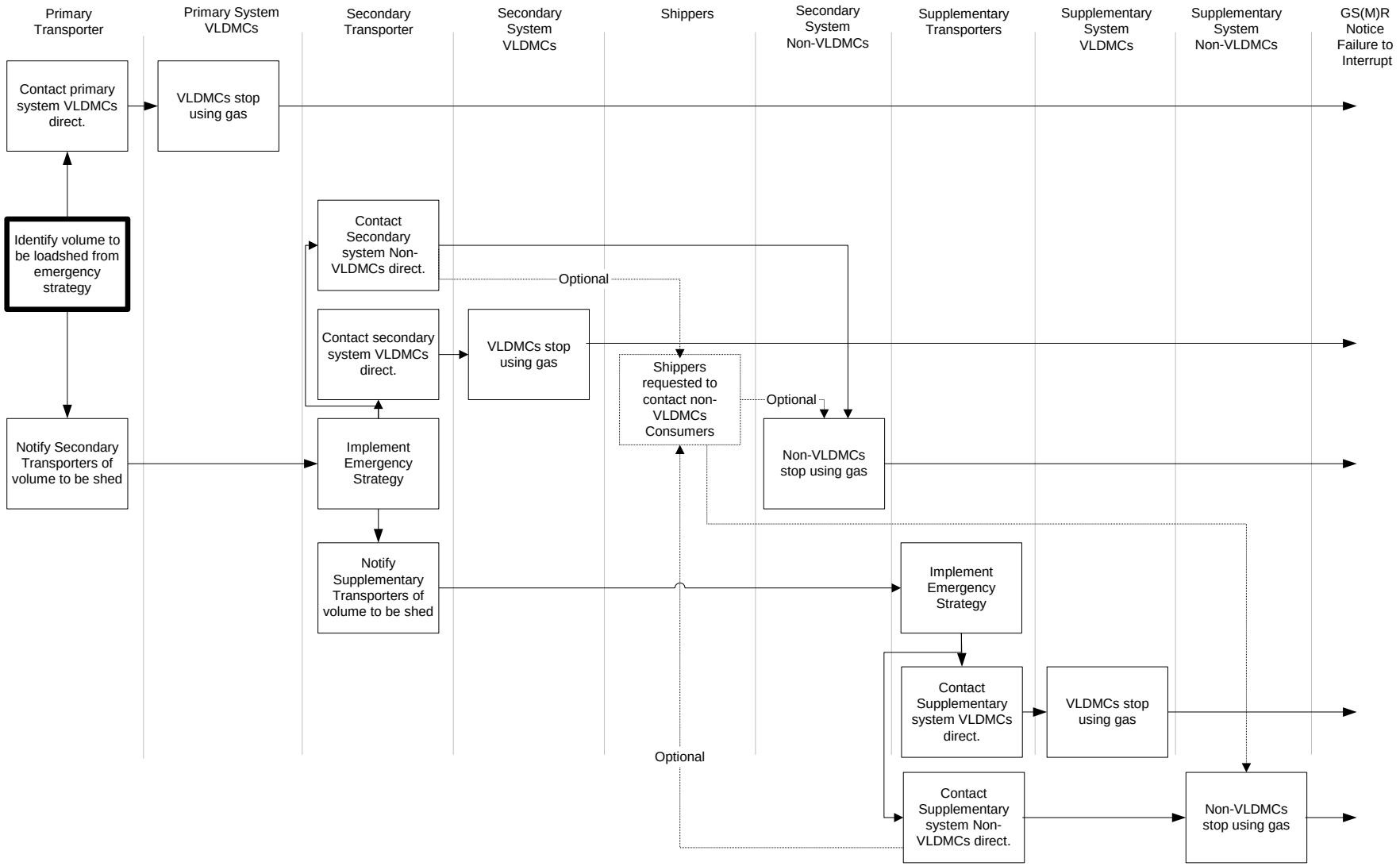
Customers using >25,000 tpa and those who fall into the protected by monitor category should be contacted on a best endeavours basis, however, the swifter the contact is made, the greater the contribution to resolving the supply-demand imbalance on the Network.

11.2.6G LOAD SHEDDING FAILURE TO CEASE TAKING GAS - ALL TRANSPORTERS

If, having been given a direction by a shipper on the direction of the gas transporter, a consumer fails to stop using gas in the shortest and safest practicable time, the relevant gas transporter must issue a direction to stop using gas pursuant to GS(M)R Regulation 6(4) if the transporter determines that the failure to interrupt results in a risk to system security.

If a consumer has failed to cease taking gas and, in the judgement of the gas transporter, thereby puts supply security at risk (irrespective of whether a direction notice pursuant to GS(M)R regulation 6(4) has been issued), the transporter should take any steps available to it to isolate or disconnect any or all supply meter points (irrespective of whether any is a shared meter point) comprised in the supply point. See Uniform Network Code Section G, e.g. the gas transporter should cut off the supply to the premises by cutting or isolating the supplying main or by closing the meter control valve(s).

Figure 14: Load Shedding



11.2.7 FLOWING SAFETY MONITOR STORAGE GAS

In the event that load shedding of the protected by isolation consumers and, where applicable, the use of public appeal does not address the supply-demand imbalance, the NEC may request the Primary Transporter to flow Safety Monitor Storage gas to maintain supply to protected-by-monitor consumers. The strategy developed by the Primary Transporter will identify how much gas should flow and from what storage facilities.

The Primary Transporter will not flow gas that is required for the orderly run down of the system at stage 3.

The Primary Transporter will contact the shippers and storage operators to make arrangements for the requested gas to flow into the Primary System.

11.3 NGSE Stage Three Arrangements

11.3.1 ALLOCATION OF AVAILABLE GAS AND SYSTEM ISOLATION, CRITICAL TRANSPORTATION CONSTRAINT, GAS DEFICIT OR SAFETY MONITOR BREACH EMERGENCY

If the load shedding arrangements available to the Primary Transporter at stage 2 are insufficient to address the supply-demand imbalance or the transportation constraint, the NEC will consider authorising a stage 3 Network Gas Supply Emergency. A stage 3 NGSE will exist when there is no action available to the Primary Transporter that could be taken in the time available to re-balance the Primary System without the recourse to measures available in stage 3.

The arrangements available to the Primary Transporter at stage 3 of a Gas Deficit Emergency, Safety Monitor Breach or a Critical Transportation Constraint are shown in Figure 15.

Figure 15: Emergency actions available at Stage 3

Stage 3 Arrangements	GDE	Safety Monitor Breach	CTC
Allocation of Available Supplies	✓	✓	✓
Isolation of secondary systems	✓	✓	✓

In the event that insufficient supplies are available from the Primary System, isolation of secondary systems may be required. To support this process, the BEIS ERT have arrangements in place for providing additional resources to affected transporters in the event of individual domestic consumers requiring isolation from the Network.

The BEIS ERT also has arrangements in place to facilitate the use of self-isolation and self-restoration media material. The BEIS ERT in conjunction with the NEC will confirm if this approach is to be implemented.

11.3.2 ALLOCATION OF AVAILABLE SUPPLIES

If insufficient gas is available to supply the network or parts of the network as applicable, even with load shedding, the NEC allocates the available gas to secondary systems and must instruct the Primary Transporter to physically restrict the offtake of gas by secondary

systems to the allocated amount. If secondary transporters are unable to maintain acceptable minimum pressures in their systems, they must apply to the NEC via the Primary Transporter for an increased allocation. If no additional gas allocation is possible, the affected secondary transporters in liaison with the associated supplementary transporters must isolate their systems, or part of their systems, in order to reduce demand to match the allocation available from the Primary System and preserve the pressure in the transmission pipelines (>7 bar).

Those parts of the network supplying domestic consumers are particularly vulnerable to supply emergencies due to the large number of individual consumers taking gas from the Network. The NEC's arrangements for allocation of gas, therefore, gives priority to maintaining gas supplies to secondary systems supplying domestic consumers.

The criteria for the allocation of gas to secondary systems and associated supplementary systems are as follows:

a) The NEC must issue gas allocations directly to the Primary Transporter. The Primary Transporter must notify the secondary transporters (including transporters exporting gas from Great Britain) of their allocations. Secondary transporters must liaise with their associated supplementary transporters on the effect of the allocations.

b) The primary, secondary and supplementary transporters must be responsible for maintaining the supply-demand balance within their parts of the network and protecting supplies to domestic consumers by appropriate demand management which could include more frequent public appeals, or physical isolation of industrial/commercial premises.

c) The NEC and the Primary Transporter in liaison with the secondary transporters must review the allocation of gas across all the secondary systems to determine if any systems have "surplus" allocated gas that could be redistributed to those systems in "deficit".

11.3.3 SYSTEM ISOLATION

If the NEC is unable to increase the allocation of gas to one or more secondary systems, it must, in consultation with the primary and secondary transporters and BEIS, review the allocation of gas in order to match network supply and demand by selected system isolation by either:

- Maintaining partial supplies to all affected secondary systems and associated supplementary systems, with some consumers isolated in each affected secondary system with the possibility of supplementary systems being isolated also; or

- Maintaining full supplies to one or more secondary systems whilst isolating some or all consumers in one or more other secondary and associated supplementary systems.

- Where a secondary transporter is not allocated sufficient gas to maintain minimum pressures at the extremities of its system it must take steps to isolate the extremities of those systems to maintain the pressure in the upstream pipelines operating at 7 bar or above. This should protect the Primary System and preserve the bulk transportation capability of the secondary system for as long as possible.

Isolation of these lower pressure systems will almost certainly result in a loss of gas pressure to consumers.

Each transporter should use their own procedure for system isolation identified in their operational procedures.

Through regular communications with the affected secondary transporters the Primary Transporter will monitor the actual effect of the measures implemented during stage 3.

If the supply-demand imbalance is deteriorating, the NEC will direct the Primary Transporter to reduce the gas allocation until the Primary System can maintain a supply-demand balance. This may require all secondary systems to be isolated.

If the supply-demand balance is improving the NEC must authorise the Primary Transporter to progress to stage 4 - restoration.

11.4 NGSE Stage Four Arrangements

11.4.1 SYSTEM RESTORATION, GAS DEFICIT EMERGENCY, SAFETY MONITOR BREACH OR CRITICAL TRANSPORTATION CONSTRAINT EMERGENCY

When sufficient supplies are available to restore pressure to isolated systems or revoke emergency actions taken during stage 1, 2 and 3 the NEC must initiate the restoration process and, on completion, declare the end of the NGSE. The Primary Transporter must communicate the revocation as detailed in section 7 - Communications.

11.4.2 RESTORATION

If the supply-demand balance is improving, the Primary Transporter will develop a strategy to progressively revoke the measures taken during the various stages of the emergency. The Primary Transporter will propose a strategy for the NEC to approve and co-ordinate the actions of secondary transporters to revoke emergency measures on secondary systems. Secondary transporters must co-ordinate actions with the supplementary transporters to revoke the emergency measures taken on supplementary systems.

If allocation and isolation actions have been taken during the emergency, it is likely to take a considerable amount of time to restore all affected customers. When the supply situation has returned to normal and restoration has been completed, apart from those in sections of the network isolated at stage 3, the NEC must notify the Primary Transporter of the revocation of the NGSE.

To help facilitate restoration of their systems, secondary transporters may declare a Local Gas Supply Emergency. This process does not affect the ability of the NEC to revoke any stage nor declare the end of the NGSE.

11.4.3 RESTORATION PROCEDURE

The restoration procedure could be affected by the weather conditions, the available supply sources and the availability of Primary System and secondary system plant and pipelines. There are many permutations and it is not practicable for gas transporters to prepare detailed specific restoration procedures in advance.

Certain basic principles must be applied to the process of restoration:

- No restoration of end users will take place until and unless the security of the Primary System is assured.
- Restoration of end users is matched to available Primary System supply.
- In the event of a Safety Monitor Breach being declared, the Safety Monitor will be restored by injection to the affected storage facilities. These actions or any alternative actions must be agreed by the NEC.
- The actions taken by the relevant conveyors are co-ordinated by the NEC. Where more than one secondary system has been affected, the NEC consults with the Primary Transporter and may consult with the BEIS ERT on the restoration priorities.
- Restoration of supplies to systems operating below 7 bar may take a long time due to the complexity of the system and the large numbers of consumers involved. Where there is sufficient quantity of gas available the supplies to industrial/commercial consumers (including VLDMCs) supplied from higher pressure systems may be restored before domestic consumers.
- Affected transporters must prepare procedures before commencing restoration of pressure in order to avoid a supply emergency arising or continuing in any part of its system during the restoration process.

If required, the BEIS ERT may have arrangements in place to facilitate the restoration process through the provision of additional resources or the implementation of self-restoration. These options would be progressed in conjunction with the Distribution Networks.

12. Roles and Responsibilities

The following section outlines the responsibilities of the NEC and Primary Transporter during a gas supply emergency on the Primary System. These responsibilities provide a high level overview and act as a reference guide. They do not replace detailed operational procedures that would be followed during a NGSE.

12.1 NEC Responsibility

Stage 1	GDE	Safety Monitor Breach	CTC	NEC Actions
Establish if there is a NGSE	✓	✓	✓	Identify from the strategy proposed by the Primary Transporter whether a potential or actual NGSE exists.
Declare NGSE (applies to all stages)	✓	✓	✓	Approve the strategy and declare the required stage.
Gas conforming to Schedule 3 Part II of GS(M)R	✓	×	✓	The NEC may authorise the admittance of gas conforming to GS(M)R Schedule 3 Part II to the network if it would prevent, as far as possible, a supply emergency developing, and where it cannot be prevented, admit gas conforming to Schedule 3 Part II of GS(M)R to minimise the safety consequences of the emergency.
Communications (applies to all stages)	✓	✓	✓	NEC will issue a notice, via the Primary Transporter, of the NGSE stage setting out the nature and location of the problem, the action required to avert escalation to the next stage and the time by which the remedial action must be taken. The NEC will request transporters to implement the strategy identified by the Primary Transporter and seek co-operation from those parties listed in GS(M)R Regulation 6(2).
Public Appeal (applies to stages 1 to 3)	✓	✓	✓	Although the NEC normally only authorises the use of public appeals to conserve or stop using gas during stage 2 of a NGSE, the NEC may direct gas conveyors to call for Public Appeal at other stages if this would further prevent the deterioration of the situation.
Escalation to next stage (applies to stages 1 and 2)	✓	✓	✓	If the supply-demand imbalance is deteriorating the NEC may escalate the NGSE to the next emergency stage.

	GDE	Safety Monitor Breach	CTC	NEC Actions
Revocation of stage (applies to stages 1, 2 and 3)	✓	✓	✓	If the supply-demand imbalance is improving the NEC may authorise the Primary Transporter to progress to NGSE stage 4, restoration.
Stage 2				
Communicate with the BEIS ERT	✓	✓	✗	Liaise with the BEIS ERT if additional gas is available via the use of an Order in Council.
Review Strategy and Load Shedding quantities	✓	✓	✓	NEC directs the conveyors to physically restrict the flow at an end user if the required reduction in flow is not apparent in agreed timescales.
Stage 3				
Allocation	✓	✓	✓	NEC authorises gas allocation directions to the Primary Transporter and relevant secondary transporters.
Allocation review	✓	✓	✓	NEC in consultation with the Primary Transporter and the relevant secondary transporter will review the allocation of gas in order to match network supply and demand.
Isolation	✓	✓	✓	If necessary, the NEC may authorise further reductions in gas allocation until a gas supply-demand balance is achieved on the Primary System.
Stage 4				
Restoration	✓	✓	✓	NEC may instruct the Primary Transporter to progressively revoke the measures taken during the emergency.
Revocation of the NGSE	✓	✓	✓	When the supply-demand imbalance is resolved the NEC notifies the primary and secondary transporters of the revocation of the NGSE.

12.2 Primary Transporter Responsibility

Stage 1	GDE	Safety Monitor Breach	CTC	Primary Transporter Actions
Develop emergency strategy	✓	✓	✓	Develop an emergency strategy.
DN Utilisation	✓	✓	✓	Seek co-operation from gas transporters to reduce their take from the Primary System by releasing storage from their secondary system and any contractual interruption.
Use of Primary System (NTS) Linepack	✓	×	✓	Optimise use of Primary System linepack.
Curtail storage delivery to the Primary System	×	✓	×	The Primary Transporter will request those relevant storage operators and shippers to curtail their delivery of storage gas to the Primary System.
Gas conforming to Schedule 3 Part II of GS(M)R	✓	×	✓	Demonstrate to the NEC the requirement for the admittance of gas conforming to GS(M)R Schedule 3 Part II.
Revocation of Stage 1	✓	✓	✓	Progress to NGSE stage 4, restoration.
Stage 2				
Suspend National Grid's residual balancing role in the OCM. Shippers continue to trade	✓	✓	×	Uniform Network Code states that National Grid's market activities will be suspended in a Gas Deficit Emergency and Safety Monitor Breach from declaration of stage 2.
Implement Emergency Strategy	✓	✓	✓	Requests implementation of measures set out in emergency strategy.
Communicate with the BEIS ERT	✓	✓	×	Liaise with the NEC and BEIS ERT if additional gas is available via the use of an Order in Council.
Progression to Stage 4 Restoration	✓	✓	✓	Progress to NGSE stage 4, restoration.

Load Shedding	✓	✓	✓	Implement established arrangements for load shedding and request secondary transporters to implement their arrangements.
Specification of load reduction	✓	✓	✓	Identify the reduction in gas demand in the affected system or systems for each conveyor.
Review Strategy and Load Shedding quantities	✓	✓	✓	Physically restrict the flow at an end user if the required reduction in flow is not apparent in agreed timescales.
Public Appeal	✓	✓	✓	Notify secondary transporters to commence public appeals.
Progression to 4 Restoration	✓	✓	✓	Progress to NGSE stage 4, restoration.
Stage 3				
Allocation	✓	✓	✓	Notify secondary transporters of allocations.
Allocation review	✓	✓	✓	In consultation with the NEC and the relevant secondary transporters review the allocation of gas in order to match network supply and demand.
Progression to Stage 4 Restoration	✓	✓	✓	Progress to NGSE stage 4, restoration.
Stage 4				
Restoration after Stages 1 and 2	✓	✓	✓	Progressively revoke the measures taken during stages 1 and 2.
Re-instatement of National Grid's residual balancing role in the OCM.	✓	✓	✗	Re-instatement of National Grid's residual balancing role in the OCM will take place at start of next gas day. (Market not suspended in a CTC).
Restoration after Stage 3	✓	✓	✓	Progressively revoke the measures taken during stages 1, 2 and 3.
Restoration after Isolation	✓	✓	✓	No restoration of end users will take place until and unless the security of the Primary System is assured.

13. GLOSSARY

Additional Gas	Gas that would be available to the Network at stage 2, (using whatever existing arrangements the Primary Transporter has in place for the delivery of such gas), but is either not available, or is not offered, to the Network at stage 1.
ANS	Active Notification System, one of the mediums used by GNCC to communicate with the shippers.
BEIS	UK Government Department for Business, Energy & Industrial Strategy.
Bio Methane Facility	A facility for the extraction of gas from strata or for the manufacture of gas.
Blending Point	A point where out of specification gas is mixed with other gas on the network to produce a gas of a new composition which is within the specification set out in GS(M)R Part I of Schedule 3*. *GS(M)R Guidance Note: Paragraph 14
Critical Transportation Constraint	Where there are sufficient gas supplies available to the Primary System in aggregate, but the Primary Transporter is unable to maintain adequate offtake pressures at one or more secondary system offtakes due to problems in transporting the gas within the Primary System.
DMC **(Daily Metered Consumer)**	Daily Metered Consumer supply points are supply points where the meter is read every day. The meter readings are stored in data loggers at each site and downloaded by telephone every day. DM supply points taking more than 2 mtpa are individually nominated.
DN Utilisation	Includes releasing available gas from secondary system through storage or any available contractual Interruption. The notice period and restriction on the number of days of interruption is waived during an emergency.
Duty Holder (GS(M)R)	A person conveying gas in the network. A duty holder may undertake the management of the gas flow within its system itself or it may delegate the performance of the duties to another person.
ENCC	Electricity National Control Centre
ERT	Emergency Response Team (BEIS)
Gas Processing Facility	Any gas processing facility which: - a. blends or purifies gas, removes from gas any constituent gases or separates from gas any oil or water; and b. is situated at a terminal which receives gas directly or indirectly from a gas production facility.
Gas Supply Emergency	Any situation which has resulted in, or could result in, a loss of pressure to consumers which would require action to prevent one or more supply emergencies occurring.
GNCC	Gas National Control Centre (National Grid).

GS(M)R	Gas Safety (Management) Regulations 1996.
GT (Gas Transporter)	Own and operate a pipeline system for the supply of gas to a customer base that may include domestic customers. There are also transporters of gas that are not licensed GTs. They own and operate pipeline systems that do not supply domestic customers. Several of the systems taking gas from the NTS fall into this category. The GS(M)R applies equally to those transporters that hold a GT licence and those that do not.
HSE	Health & Safety Executive.
Interruptible Supply Point	A supply point where the offtake of gas is subject to interruption in accordance with the Uniform Network Code Section G Paragraph 6.
Interruption	The procedure whereby, by prior agreement, Distribution Networks direct shippers to stop the offtake of gas at specified* industrial/commercial supply points. * Interruptible supply points must have an estimated gas usage >200,000 tpa.
LDZ	Local Distribution Zone
Linepack	A function of volume and pressure. Linepack is required for normal operation. In a gas supply emergency there may be a surplus linepack available, the quantity determined by location and demand conditions.
LNG	A Liquefied Natural Gas facility is a storage facility in which gas is liquefied, stored as LNG and either re-gasified for purposes of withdrawal or withdrawn as LNG by tanker.
Load Shedding	The procedure used by transporters to secure a graduated, controlled, reduction in demand on all or part of their system in order to keep the system fully pressurised. * *Whilst the Network is fully pressurised there is no possibility of a supply emergency occurring.
Local Gas Supply Emergency	Any situation which has resulted in, or could result in, a loss of pressure to consumers which would require action to prevent one or more supply emergencies occurring, and where the loss of pressure is caused by a fault in plant or pipes within the secondary or supplementary system, i.e. sufficient gas is available from the Primary System.
NEC	Network Emergency Co-ordinator.
NEMT	Network Emergency Management Team.
Network **(Part of the gas supply chain)**	A connected network of pipes used for the conveyance of gas from a gas processing facility, storage facility or an interconnector except those used exclusively for piping gas to non-domestic premises*.

	The network starts from a gas processing facility, storage facility or interconnector importing gas into Great Britain but does not include it**. The end of the Network is the outlet of the emergency control valve*** at the end of the service pipe. * GS(M)R Regulation 2(3). ** GS(M)R Guidance Notes Paragraph 10. *** As defined by GS(M)R Guidance Notes: Paragraph 2.
Network Entry Facility	A part of the network and may be a blending point* as defined by GS(M)R. * GS(M)R Guidance Notes: Paragraph 14.
Network Gas Supply Emergency	Any situation which has resulted in, or could result in, a loss of pressure to consumers which would require action to prevent one or more supply emergencies occurring, and where the loss of pressure occurred, or could occur, in the Primary System, resulting in a loss of pressure in one or more secondary/supplementary systems.
Network Operations	Department within National Grid responsible for the duties of gas flow management in the Primary System.
Notice of Direction	Issued by the Secretary of State under the Gas Act 1986 and 1995 directing a gas transporter to maintain supplies to a consumer.
NTS	The National Transmission System is the network of pipes, compressors and pressure reduction equipment that is part of the Primary System.
OCM	On the Day Commodity Market.
Offtake	An installation through which a secondary system or large industrial consumer takes gas from the NTS.
Ofgem	Office for the Gas and Electricity Markets.
OGA	Oil & Gas Authority.
OM	Operating Margins.
1 in 20 Peak Day Demand	The peak day demand that, in a long series of winters, with connected load being held at the levels appropriate to the winter in question, would be exceeded in one out of twenty winters, each winter being counted only once.
Operational Balancing	The process of addressing any physical mismatch between supply and demand.
Operational Guidelines	A document which National Grid is required to establish in accordance with of its GT licence. Its purpose is to identify the various balancing measures available to National Grid and the basis on which National Grid must employ particular balancing measures during any day.
Primary System	The NTS, the associated network entry facilities and blending points.
Primary Transporter	Transporter of gas through the Primary System.
Priority End User/Consumer	A customer type, such as hospitals, for whom the potential consequences of a loss of gas supply are

	such as to warrant priority status under government criteria.
Secondary System	Pipeline systems connected directly to the NTS.
Secondary Transporter	Transporter of gas through a secondary system.
Shipper	Holder of a licence authorising the person to arrange with any GT for the gas to be introduced into, conveyed by means of, or taken out of a pipeline system operated by that transporter. Shippers can buy gas from offshore or onshore gas production facilities, from storage facilities, under a trade at the input terminals, or within the system*. Also included as shippers are businesses which buy gas from producers for their own use, e.g. power generation companies. Shippers have a contract with the GT at each supply point for transportation. *At the national balancing point (NBP).
Supplementary System	Pipeline systems taking gas directly or indirectly* from a secondary system. *A supplementary system could take gas from another supplementary system.
Supplementary Transporter	Transporter of gas through a supplementary system.
Supplier	Holder of a supplier's licence authorising that person to enter into contracts with industrial, commercial, or domestic consumers for the supply of gas. Suppliers have contracts with shippers but no direct contractual relationship with the GT. Any person only supplying gas to premises taking more than 2 million therms per annum (mtpa) does not need a supplier's licence. Suppliers have a direct relationship with individual gas consumers.
Supply Emergency	An emergency endangering persons and arising from a loss of pressure in a network or any part thereof.* *GS(M)R Regulation 2(1).
Supply Point	A supply point where the offtake of gas is not subject to contractual interruption.
System	A discrete pipeline or a number of interconnected pipelines operated by one transporter and which can be considered to be independent of other systems for the purpose of load shedding.
Terminal	A gas processing facility* or a treatment point.** *GS(M)R Regulation 2(1). **GS(M)R Guidance Notes Paragraph 14.
TPA	Therms per annum.
Trade	An offer of flexibility between and amongst shippers and National Grid for their respective balancing purposes.
Transmission System	See Primary System.
Transportation capacity	The maximum quantity of gas that can be delivered through the gas distribution network. This is dependent

	on demand and supply conditions that may affect all or part of the network.
Transportation Constraints	arise where the demand on the Primary System or a part of the Primary System exceeds the capability of the Primary System to transport gas.
Transporters	Transporters own and operate pipeline systems which may supply domestic consumers.
Uniform Network Code	A document which describes the commercial arrangements made between a GT and shippers for the operation of a pipeline system.
VLDMC	Very Large Daily Metered Consumer supply points are very large supply points taking more than 50 mtpa.