

Safety Monitor Requirements

September 2016

Introduction

This document sets out 'Safety Monitors' for the 2016/17 winter, pursuant to National Grid's obligations under the Uniform Network Code (UNC), Section Q.

Safety Monitors were introduced in 2004 to replace the so-called 'Top-up' monitors, which had existed (through the Network Code) since 1996. Safety Monitors define levels of storage that must be maintained through the winter period. The focus of the Safety Monitors is public safety rather than security of supply. They provide a trigger mechanism for taking direct action to avoid a potential gas supply emergency (as defined in the Gas Safety (Management) Regulations).

Safety Monitor Methodology

It is our responsibility to keep the monitors under review (both ahead of and throughout the winter) and to make adjustments if it is appropriate to do so on the basis of the information available to us. In doing so, we must recognise that the purpose of the Safety Monitors is to ensure an adequate pressure can be maintained in the network at all times and thereby protect public safety. It is therefore appropriate that we adopt a prudent approach to setting the Safety Monitor levels.

The concept behind the Safety Monitors is to provide sufficient gas in storage to support those gas consumers whose premises cannot be physically and verifiably isolated from the gas network within a reasonable time period. To achieve this all gas consumers are categorised into one of two groups:

- Protected by Monitor - Gas is held in storage to facilitate continuity of supply to these consumers even in a 1 in 50 winter
- Protected by Isolation – Network safety would be maintained if necessary by physically isolating these customers from the network

The Safety Monitor has two components. These are the storage deliverability and storage space Safety Monitors. The storage deliverability Safety Monitor indicates the minimum level of deliverability required to both safely isolate loads that are "protected by isolation" and also support loads that are "protected by monitor". The deliverability Safety Monitor is therefore providing operational cover should an emergency be called on any particular day, whilst the space Safety Monitor provides sufficient gas in store to support "protected by monitor" loads for the remainder of the winter.

The level of the Safety Monitor is dependant on the level of non storage supplies (NSS) and therefore if the level of NSS reduces, the safety monitor will increase. This assessment is undertaken on a regular basis by National Grid throughout the winter period.

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Operation of Safety Monitors

It is a requirement of National Grid's Safety Case that we operate this monitor system and that we take action to ensure that storage stocks (space) do not fall below the defined level. The level of storage established by the Safety Monitor is that required to underpin the safe operation of the gas transportation system. Its aim is to ensure the preservation of supplies to domestic customers, other non-daily metered (NDM) customers and certain other customers who could not safely be isolated from the gas system if necessary in order to achieve a supply-demand balance and thereby maintain sufficient pressures in the network.

The space Safety Monitor defines the minimum level of stored gas required in aggregate in all UK storage, on each day of the winter. We monitor the level of gas in all storage facility types throughout the winter to ensure that the actual aggregate stock level does not fall below the space Safety Monitor level. If this were to occur, there would be insufficient gas left in storage to underpin the safe operation of the system in a 1 in 50 cold winter. Under these conditions, we would therefore be obliged by our Safety Case to take action to remedy this situation. In the lead-up to such a situation, we would advise the market with the objective of encouraging mitigating action. If necessary, however, the Network Emergency Co-ordinator (NEC) may require the relevant storage operators to reduce or curtail flows of gas out of storage. In this situation, we would expect the market to rebalance in order to achieve a match between supply and demand.

We would continue to provide information to the market as the situation developed. For this winter we will continue to provide through our website a five day ahead view of the supply/demand balance, historic and forward projections of storage use and how these levels relate to the Safety Monitor requirements.

The combination of relevant information and clarity of the remaining storage position should assist market participants in ensuring security of supply. While National Grid would seek to minimise the extent of any intervention in the market, the balance between allowing the market to resolve the situation and taking action via the NEC will clearly depend on the severity of the situation and the associated timescales.

Approach to the Safety Monitor Levels

This note is published in conjunction with the 2016/17 Winter Outlook Report¹, which contains more detailed coverage of our preliminary view of supplies for the coming winter.

For winter 2016/17 there continues to be significant levels of uncertainty with respect to NSS levels, in particular with import supplies. We will continue to review the Safety Monitor levels throughout the winter and, if necessary, we will revise them to reflect material changes to the supply-demand balance.

National Grid will continue to provide winter feedback to industry regarding supply assumptions and resulting changes to Safety Monitors by means of monthly updates via Operational forums and our reporting on our website.

¹ <http://www2.nationalgrid.com/UK/Industry-information/Future-of-Energy/FES/Winter-Outlook/>

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Supply Assumptions

The process used to determine our supply assumptions has changed this year, driven by changing supply patterns resulting from falling gas demand. This section summarises the process. Further detail is provided in Winter Outlook² report and the recently updated Safety Monitor Methodology Document³.

Figure 1 shows the NSS versus demand relationship for this year's safety monitor. The data set to create this chart is from the past 5 winters with a weighting towards the most recent winters.

Figure 1 – Non storage supply (NSS) versus demand for the winters 2011/12 to 2015/16

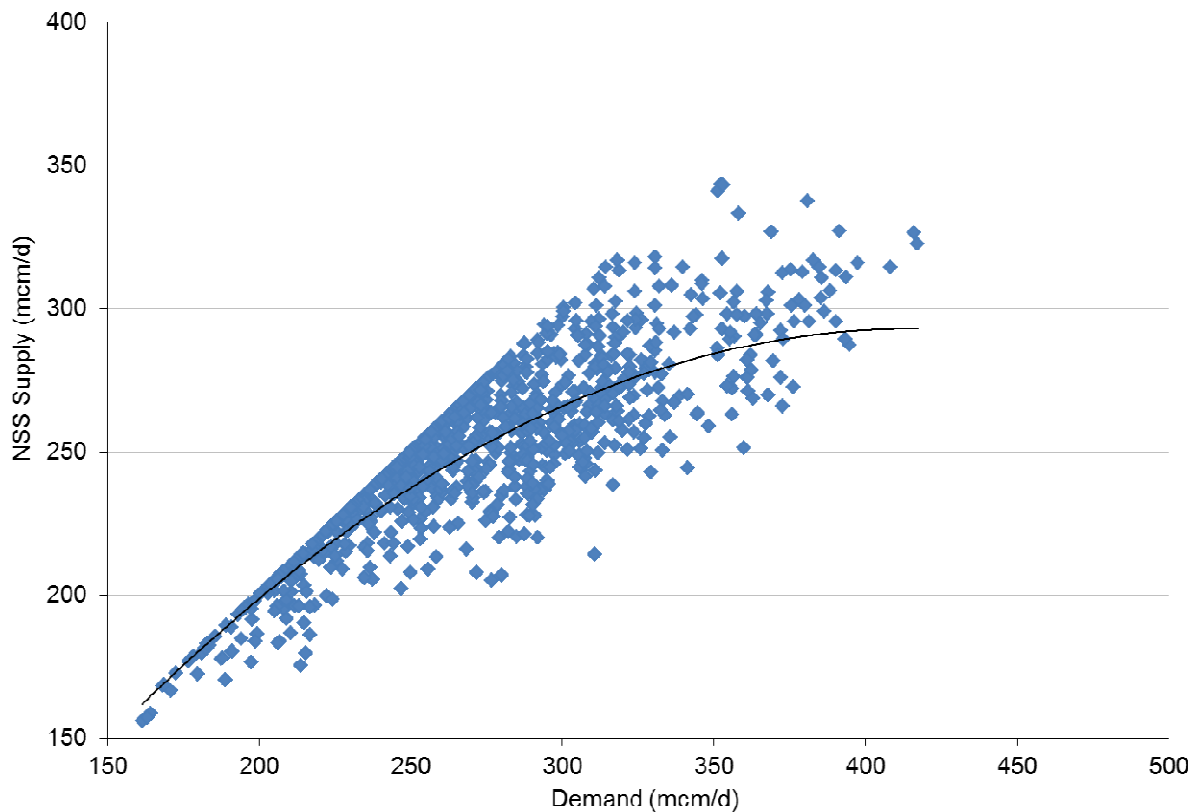


Figure 1 shows the NSS versus demand assumption for winter 2016/17, based on an analysis of the last five winters. This is used to establish a curve of how NSS is expected to change with demand. This continues the approach of using a variable NSS assumption which is demand dependent. The curve is then adjusted to meet our assumed NSS at a severe demand level, which is established for the upcoming winter. This is published and detailed in the Winter Outlook Report². For winter 2016/17 we assume 352mcm of NSS would be available at a demand of 402mcm/d. It is important

² <http://www2.nationalgrid.com/UK/Industry-information/Future-of-Energy/FES/Winter-Outlook/>

³ <http://www.gasgovernance.co.uk/monitors>

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that the assumed level of NSS used for calculating the Safety Monitors is available throughout the winter, notably at times of high demand. Hence in calculating the Safety Monitors, NSS at lower levels (95%) are used. There is also the further option to adjust the NSS assumption by a Winter Risk factor – for any specific supply issues we feel may arise during the winter. This winter this factor is zero.

Within winter monitoring of actual NSS levels will enable us to determine whether the NSS v demand relationship used within the Safety Monitor calculation methodology is fit for purpose: if it is found not to be, it can be revised based on the latest information.

Table 1 shows the anticipated availability of storage in winter 2016/17.

Table 1 – Storage Space and Deliverability Assumptions⁴

Storage type	Space (GWh)	Deliverability (GWh/d)
Medium (MRS)	14,850	1,089
Long (Rough)	13,838	330
Total	28,688	1,419

Demand Assumptions

The basis for the calculation of the Safety Monitor levels is our 2016 demand forecasts for 2016/17, using a severe (1 in 50 cold) load duration curve.

Safety Monitor Levels

Table 2 shows the initial Safety Monitor requirements for space and deliverability.

Table 2 – Stored Safety Gas and Storage Safety Deliverability Requirement

Assumed total storage space (GWh)	<u>Space</u> Safety Monitor (GWh)	Space requirement (%)	<u>Deliverability</u> Safety Monitor (GWh/d)
28,688	717	2.5 %	526

The Safety Monitor Space and deliverability requirements are little changed from last winter, as any changes in demand and NSS assumptions have largely offset each other.

⁴. Assumptions are as of September 2016 and may be liable to change during the winter. Reported deliverabilities may be different from 'name plate' capacities. Space includes Operating Margins. GWh to mcm conversions assume a CV of 39.6 MJ/m³.

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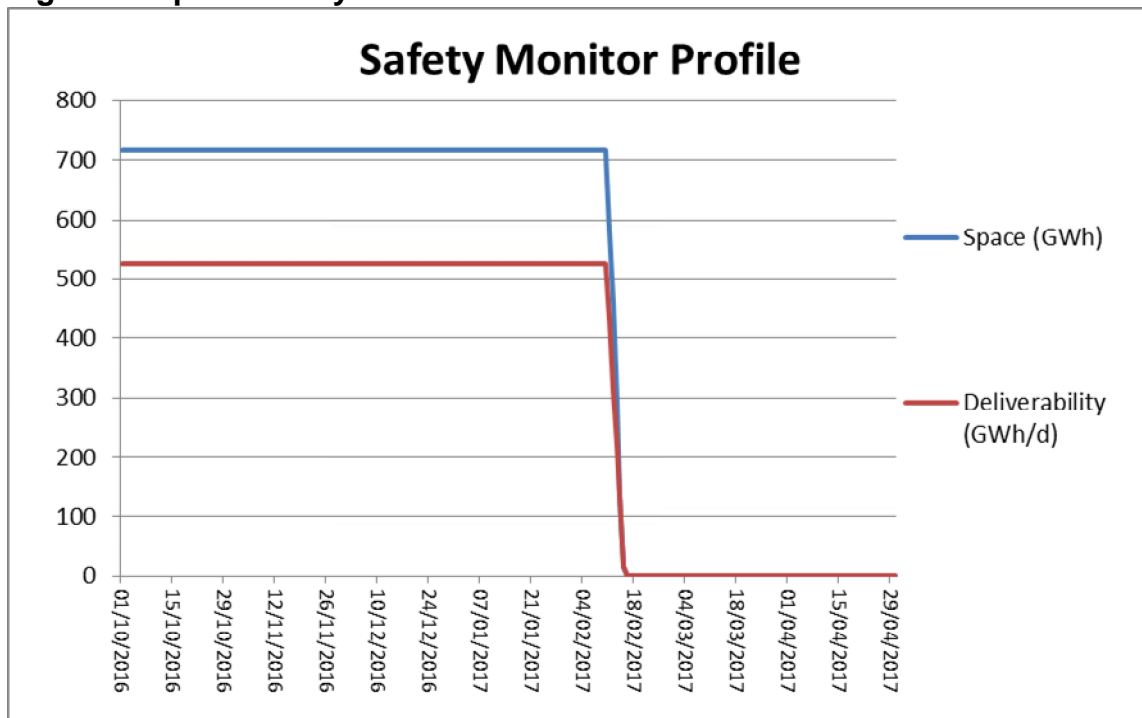
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Monitor Profiles

Figure 2 shows the space profile and deliverability profile for the Safety Monitor.

The objective of the Safety Monitor profile is to identify at any point in time the requirement for gas in store to underpin the safe operation of the gas transportation system for what remains of the winter period. The Safety Monitor allows for the possibility of late winter cold weather patterns based on analysis of historical temperatures. However, in the event of cold weather earlier in the winter, the profiles may be reduced to reflect the occurrence of cold weather.

Figure 2: Space Safety Monitor



Notes on Demand Assumptions

National Grid forecasts both diversified demand and undiversified demand. The diversified peak day is the peak day for the whole country, whilst the undiversified peak day is the peak day for each area of the country added together.

For planning and investing in the network, National Grid uses 1 in 20 peak day undiversified demand conditions (in addition to analysing other less severe weather conditions). This allows for the fact that there is no single profile of demand across the country associated with a 1 in 20 cold peak day, and therefore ensures sufficient transportation capacity is available to meet 1 in 20 demand under a range of conditions.

For security planning including Safety Monitors, National Grid uses diversified demand forecasts, which is the appropriate basis for assessing the balance between supply and demand on a national basis.