



Commission for Energy Regulation

An Coimisiún um Rialáil Fuinnimh

Single Approach to Gas Quality

Decision Paper

27th February, 2009



Table of Contents

1.0	Introduction	3
2.0	Regulatory Authorities' Position on Report's Conclusions:	4
2.1	Wobbe Index:	4
2.2	Oxygen:	5
2.3	Measurement:	6
2.4	Report's Recommendations	6
3.0	Decision	7
3.1	Gas Quality Entry and Exit Specification.....	7
3.2	Emergency Gas Quality Specification	9
3.3	Issues for review	9
4.0	Next Steps	10

1.0 Introduction

As part of the Common Arrangements for Gas (CAG) the Commission for Energy Regulation (CER) and the Utility Regulator (the Regulatory Authorities) assessed a single approach to gas quality. The two jurisdictions currently operate under different gas quality specifications which would create significant difficulties operating the networks as one given the potential incompatibility between gas either side of the border.

On 20th June, 2008 the Regulatory Authorities published a Consultation Paper¹ along with a report² submitted by Bord Gáis Networks (BGN). This report formed the basis for much of the Consultation Paper and had two sets of recommendations; gas quality specifications and measurement arrangements. The Consultation Paper requested comments on the BGN Report, on the Regulatory Authorities intention to adopt its recommendations, in addition to other issues raised such as the implications for security of supply and where the responsibility and cost for gas treatment should lie.

An industry workshop was held 9th July, 2008 in Belfast as part of the Consultation process. At that workshop there was a request from industry that the issue of gas quality be examined further by an industry group. The Regulatory Authorities agreed to this request, deferring a Decision on gas quality until after the publication of an industry Report in December of 2008. Accordingly the Regulatory Authorities issued a public invitation requesting participation from industry representatives. The Gas Quality Industry Group was established and held its first meeting on 5th September, 2008.

The Gas Quality Industry Group has submitted a Report on its findings and recommendations; this Report is published alongside this Decision Paper and forms the basis for the Regulatory Authorities' Decision.

For clarification it is important to define the roles of the parties involved. In Ireland the CER are responsible for gas safety regulations. In Northern Ireland the Health and Safety Executive (HSE(NI)) is the lead body responsible for the enforcement of gas safety legislation. The Utility Regulator however does have a general duty to protect the public from dangers arising from the use of gas. Overall, any decision impacting future gas quality to Northern Ireland will be overseen by the HSE(NI).

The Regulatory Authorities would like to take this opportunity to thank all of the members of the Group for their time and contributions to this process. The expertise and insight provided by each member of the Group was highly valuable, helped the process significantly and is greatly appreciated.

¹ Single Approach to Gas Quality: Consultation Paper (CER/08/101)

² BGN Report on Gas Quality Arrangements in the Republic of Ireland (CER/08/102)

2.0 Regulatory Authorities' Position on Report's Conclusions:

The Group made several findings based on the discussions and information presented at the meetings. These are outlined in detail in the Report and so are not reproduced here. Based on these findings the Group reached some broad conclusions. The Regulatory Authorities give their position on these conclusions below.

It should be noted that while there was not complete consensus on all of the issues discussed by the Group the conclusions and recommendations discussed in this paper reflect the general opinion the Group reached.

2.1 Wobbe Index:

Based on the substantial body of research currently available, particularly in relation to domestic appliances in the UK and Ireland, and the responses of power generators the Group concluded that the current gas quality specification stated in the Code of Operations is too wide and should be narrowed. In narrowing the specification the general view was that aligning with the GS(M)R would be most appropriate, given that this is effectively the specification of the gas currently being delivered to the transportation system in Ireland and would ensure harmonisation with the gas quality specification in Northern Ireland facilitating the physical flow of gas between both jurisdictions. It should be noted however that there was a difference of opinion amongst the Group as to whether there was a need to make a decision on gas quality in advance of LNG being available in Ireland.

The Regulatory Authorities support this conclusion, and supports the view that a decision should not be deferred any further. Given the evidence presented to the Group the Regulatory Authorities are of the view that there may be a serious safety issue were gas at the extremities of the current Code of Operations specification to enter the transportation system. Therefore, given that the current specification is too wide, the Regulatory Authorities consider it appropriate that the GS(M)R be adopted on an all-island basis for three reasons.

Firstly, the primary reason is safety. Effectively Ireland currently operates within the GS(M)R and experience to-date suggests no safety issues with this range of gas quality in addition to this the bulk of available research shows that operation within the GS(M)R range is safe but that there are potential safety issues outside of this range. The Regulatory Authorities therefore consider it prudent to adopt the GS(M)R. However, the Regulatory Authorities are cognisant of the opinions expressed by some members of the Group that a range slightly wider than the GS(M)R could be adopted without raising safety concerns.

Secondly, gas quality is an important issue for gas-fired power generators. The extent to which quality presents a difficulty to generators varies from plant to plant and accordingly generators were not in consensus regarding a detailed gas quality

specification but generally agreed that the Wobbe Index should be brought in line with GS(M)R as a minimum. The main issue for all generators was the Wobbe index and the rate of change of the Wobbe Index of the gas being delivered; a sudden change could cause damage to the plant and/or cause it to trip. Generally speaking, a variance of +/- 2% could be tolerated without bringing the plant off-line and a variance of +/- 5% could be accommodated by some plant but would require the plant to come off-line for adjustments to be made. This raises the possibility that if gas at the higher end of the current Code of Operations specification entered the system a significant portion of Ireland's generation capacity would be unavailable. The Regulatory Authorities are of the view that the current specification in the Code of Operations raises the potential for a serious issue in relation to electricity security of supply and that therefore the range should be narrowed.

Thirdly, given the initial rationale that the specification should be narrowed in line with the GS(M)R it makes sense to narrow the specification to the same specification as used in Northern Ireland. To arbitrarily choose a similar but different specification to GS(M)R may address the safety concerns but would then create difficulties moving gas from Ireland to Northern Ireland and may require treatment facilities on the border. The main objective of the CAG is to operate the system on an all-island basis, including the physical flow of gas between both jurisdictions.

The Regulatory Authorities consider it appropriate that a decision on gas quality be made now because the current specification is accepted as being too wide and so does not serve its purpose. The Regulatory Authorities will continue to monitor developments in gas quality, in particular the work of the CEN Study, and will review elements of the gas quality specification as these developments come to light.

2.2 Oxygen:

The Report recommends the adoption of the GS(M)R limit on oxygen; the main reason being that it provides additional options for the treatment of gas, particularly in the case of LNG. The Group were of the opinion that the limit of 0.2%mol, as opposed to the proposed 0.001%mol, would not give rise to any safety or pipeline integrity issues. However the Report recommends an examination of the relationship between the water content and oxygen limit with a view to revising the water content limit to a limit appropriate to an oxygen limit of 0.2%mol.

The Regulatory Authorities support this recommendation but note that while the GS(M)R oxygen limit meets the objectives of the CAG it is not within the very tight NTS entry specification limits³. Therefore it may not be possible to flow gas from the island to Great Britain without further treatment. The Regulatory Authorities will re-examine the oxygen limit as part of the further work to be undertaken by the Gas Quality Industry Group. This group will continue to meet regularly to review gas

³ 0.001%mol; The NTS entry specifications are set out in National Grid's Ten Year Statement

quality issues and the oxygen limit may be revised downwards in the future should it be considered necessary to align to the entry specifications in both jurisdictions with those of National Grid.

2.3 Measurement:

The issue of measurement was addressed by the Group, but no consensus was reached and it was concluded that further work was necessary. Gaslink, in line with the original BGN proposals, proposed that they independently measure the full range of gas quality parameters at each entry point. Generators were of the opinion that monitoring of gas quality on the network and the results be communicated, possibly in real time, to interested parties. The off-shore operators questioned firstly the need to separately measure quality at entry creating duplication, as this is currently measured by the operator and secondly whether the cost involved was justified.

The Regulatory Authorities support the conclusion that further work is required, and will progress this in 2009. At this stage, in advance of this further work, the Regulatory Authorities are not taking a position in relation to measurement, but are broadly supportive of the full range of gas quality parameters being measured at entry and that timely information be made available to generators and other interested parties allowing for cost.

2.4 Report's Recommendations

Based on the findings of the Group and the above conclusions the Report makes three recommendations:

- The adoption of the proposed specifications as an Entry/Exit Specification for the Transportation systems in Ireland and Northern Ireland.
- The GS(M)R emergency Wobbe Index limits of 46.5 – 52.85 MJ/m³ should be adopted.
- The Gas Quality Industry Group should meet at least twice yearly to address the further work that has been identified.

3.0 Decision

The Regulatory Authorities' Decision to adopt the GS(M)R requires the CER to narrow the specification in Ireland - the Decision accompanies this paper. The Decision will be implemented by modifying the Gaslink Code of Operations to include the recommended Entry and Exit specifications to the Irish transportation system. Connected System Agreements (CSAs) may also need to be modified to give effect to the Decision and there may be additional measures including incorporation into the safety cases. It is possible that additional legislation may be required in Ireland to give legal effect to the decision. These issues are currently being assessed by the CER.

Northern Ireland currently adheres to the GS(M)R under the GS(M)R Northern Ireland regulations (GS(M)R(NI)). The Health and Safety Executive (HSE(NI)) have been involved in this process and welcome the alignment of gas specification between both jurisdictions.

At this point the Regulatory Authorities are minded to adopt the recommended Entry and Exit specifications for the unified Code of Operations drawn up under CAG. However it is noted that the recommended Entry and Exit specifications contain some additional parameters to those in GS(M)R and that these additions will require a review of GS(M)R(NI) by HSE(NI).

3.1 Gas Quality Entry and Exit Specification⁴

Gas Component	Entry/Exit Specification
Hydrogen Sulphide	Max 5mg/m ³
Total Sulphur (including Hydrogen Sulphide)	Max 50mg/m ³
Hydrogen	Max 0.1%mol
Oxygen	Max 0.2%mol
Water Content	50mg/m ³

⁴ For the avoidance of doubt this includes both entry to and exit from both the transmission and distribution systems.

Wobbe Index	47.2 to 51.41 MJ/m ³ (Real Gross Dry)
Incomplete Combustion Factor	Max 0.48
Soot Index	Max 0.60
Gross Calorific Value	36.9 to 42.3 MJ/m ³ (Real Gross Dry)
Carbon Dioxide	Max 2.5%mol (Note 1)
Contaminants	Note 2
Odour	Note 3
Delivery Temperature	1 to 38°C
Organo Halides	Max 1.5mg/m ³
Radioactivity	Max 5 Becquerals/g
Ethane	Max 12%mol

Note 1: Limit will not be considered breached if the total inerts in the gas is low in the opinion of the Transporter.

Note 2: Gas delivered shall have no odour that might contravene the obligation of the Transporter to transmit gas which possesses a distinctive and characteristic odour. Where the Transporter requires gas to be odourised, the gas shall be odourised in accordance with the following specification: Odour intensity of 2 Olfactory degrees on the Sales Scale (Ref – IGE/SR/16/1989), or such other specification determined by the Transporter acting as a RPO.

Note 3: Natural gas shall not contain solid, liquid or gaseous material which may interfere with the integrity or operation of pipes or any natural gas appliance which a consumer or transporter could reasonably be

expected to operate. With respect to Mist, Dust, Liquid gas delivered shall be technically free in accordance with BS 3156 11.0 1998.

Note 4: Standard Reference Conditions: Combustion reference temp=15°C, Volume unit=m³ at 15°C and 1.01325 bar.

3.2 Emergency Gas Quality Specification

At the sole discretion of the National Gas Emergency Manager, gas outside of the Entry/Exit Specification may be admitted to the system, without prejudice to the generality of this, a Wobbe Index of 46.50-52.85 MJ/m³ and the Incomplete Combustion Factor of ≤ 1.49 may apply in the event of a natural gas emergency.

The emergency arrangements in Northern Ireland remain unchanged by this Decision.

3.3 Issues for review

As discussed above the Regulatory Authorities consider it prudent on the grounds of safety, electricity security of supply, and to facilitate CAG to bring the Wobbe Index in line with the GS(M)R range.

This Decision will be reviewed in full when further research in relation to gas quality becomes available, in particular the CEN (European Committee for Standardisation) Study on gas appliances and a recommended European gas quality specification is completed. This is due to be completed in 2012.

In the interim the Regulatory Authorities will work with the Gas Quality Industry Group and the HSE (NI) to investigate the possibility of slightly increasing the upper limit of the Wobbe Index. Any such increase in the limit could only be considered following a full consideration of the safety issues involved.

As discussed above, the Regulatory Authorities are minded to adopt the specifications tabled in section 3.1 as the CAG Entry and Exit Specifications for the unified Code of Operations drawn up under CAG. The CAG Entry and Exit specifications contain additional parameters to the GS(M)R which will require further review of GS(M)R(NI) by the HSE(NI). HSE(NI) will work with the Gas Quality Industry Group in order to progress this issue.

The following parameters will be reviewed with the Gas Quality Industry Group in 2009:

- Oxygen
- Water content
- Carbon Dioxide and limit on total inerts
- Hydrocarbon Dewpoint
- Contaminants

4.0 Next Steps

The Gas Quality Industry Group has proven a constructive forum in which to discuss all of the issues relating to gas quality and has identified a significant number of issues that need to be addressed. Therefore, the Regulatory Authorities propose to continue to facilitate the Gas Quality Industry Group, suggesting that it meet at least twice annually or as frequently as the Group considers appropriate.

The Regulatory Authorities will propose terms of reference and a work programme for the Group. This will include the following items of work:

- Review and investigation of the parameters listed in this Decision as for review
- Further investigation on the appropriate upper limit of the Wobbe Index
- Measurement:
 - Consideration of necessary measurement arrangements at entry
 - Consideration of necessary monitoring arrangements on the network, including communications to interested parties
 - A system of alerts for gas quality excursions
 - A review of the estimated costs involved
- Consideration of the necessity of having separate entry and exit specifications for distribution and transmission.
- To monitor developments at an EU level relating to gas quality