

NGT House
Warwick Technology Park
Gallows Hill, Warwick CV34 6DA

Telephone No: 01926 656444
Fax No: 01926 656605
E mail: nick.king@uk.ngrid.com

Mr J. Majdanski
Secretary, Modification Panel
Joint Office

4 October 2005

Dear Julian

Re: UNC Modification Proposal 0049 - "Optional limits for inert gases at System Entry Points"

In order to further inform parties wishing to respond to Modification Proposal 0049, we have set out in the attached note further explanation and clarification of our view of the likely impacts on gas compositions in the National Transmission System, were this Modification Proposal to be implemented. We would be grateful if you could circulate this letter and its attachment to the industry.

We will submit a formal response to the consultation in due course.

Yours sincerely,

Nick King
Connection Agreements Manager, UK Transmission - Commercial

Additional information in support of Uniform Network Code Modification Proposal 0049

1) Introduction

The primary purpose of Modification Proposal 0049 is to allow easier access to the market for gas with the objective of increasing the potential range of gas sources. This will better facilitate the efficient operation of the wholesale market and therefore deliver consumer benefits through increased competition between shippers and suppliers, reductions in gas prices and increased security of supply. However, the Modification Proposal needs to be considered in the context that implementation may change the pattern and composition of gas flow within the transmission and distribution systems.

Whilst the Proposal may affect the composition of gas offtaken by consumers, Transco NTS is only in a position to look at the effects on gas supplies into Great Britain to the extent that responses to the Transporting Britain's Energy process and discussions with the industry provide us with detailed predictions as to future gas specifications and volumes.

This note provides further explanation and clarification of our view of the likely impacts on gas compositions in the NTS, were this Modification Proposal to be implemented.

2) Effect of the Modification Proposal on levels of carbon dioxide

- Analysis of the composition of gas entering the NTS indicates that the mean average level of carbon dioxide in the NTS is 1.6% and that the mean average levels received at an aggregate terminal level vary between a low of 1.0 % and a high of 2.2%.
- The table of contractual parameters set out in the Ofgem open letter "Establishing a gas quality Review Group" dated 20th September 2004 (which can be accessed by using the link below) shows that several UK terminals already have "legacy" carbon dioxide levels in excess of the proposed 2.5% level. Current data indicates that these sub-terminals convey more than 40% of the gas brought into the NTS. Furthermore, as these sub-terminals have average levels that are below their contractual limits, they could increase the average levels of carbon dioxide in the gas they deliver to the NTS regardless of whether the Modification Proposal is implemented. It therefore seems reasonable to assume that such sub-terminals will not increase their delivered levels as a consequence of the Modification Proposal.
- Data also suggests that the sub-terminals with 2% limits are delivering gas containing average levels of carbon dioxide below their contractual limits and could increase their actual levels regardless of whether the Modification Proposal is implemented. It therefore seems reasonable to assume that such sub-terminals are unlikely to increase their delivered average levels as a consequence of the Modification Proposal.
- Due to a decline in production of UKCS fields with relatively high carbon dioxide and the pending delivery of increased quantities of LNG to the UK, Transco NTS currently forecasts that average levels of carbon dioxide levels will decline from 1.6% to about 1% by 2010. Even if all anticipated sources of gas that could benefit from a relaxation of carbon dioxide to 2.5% participated, a decline in average levels of carbon dioxide is still forecast.
- Whilst average levels of carbon dioxide are expected to decline, Transco NTS recognises that the Modification Proposal may result in some individual customers at particular locations potentially being exposed to additional levels of carbon dioxide of up to 0.5% (0.5% being the worst case difference between the levels that could be seen today at the

majority of sub-terminals, i.e. 2.0%, and the levels that could be seen at such sub-terminals if the Modification Proposal was to be implemented, i.e. 2.5%. As mentioned earlier, sub-terminals with contractual limits greater than 2.5% are likely to be unaffected). Any such increase in the proportion of carbon dioxide is likely to marginally increase carbon emissions. However, the extent of any increase depends upon the relative proportions of carbon dioxide, nitrogen, methane and higher hydrocarbons. Furthermore, the primary source of carbon dioxide emissions (approximately 99% for a gas containing 1% CO₂) arises from the combustion process itself rather than the carbon dioxide content of the gas.

3) Effect of the Modification Proposal on levels of nitrogen and total inerts

a) Current and future sources of gas

- Analysis of the composition of gas entering the NTS indicates that the average levels of nitrogen received at sub-terminal level vary between a low of 1.0 % and a high of 3.7%.
- From the table in the Ofgem open letter “Establishing a gas quality Review Group”, it can be seen that the majority of existing UK sub-terminals have agreements that place no direct limits on nitrogen or total inert levels. These sub terminals currently convey the majority of the gas brought into the NTS and could increase their average levels of nitrogen regardless of whether the Modification Proposal is implemented. It therefore seems reasonable to assume that such sub-terminals will not increase their delivered levels as a consequence of the Modification Proposal.
- The remainder of the sub-terminals have historically delivered gas containing average levels of nitrogen and total inerts below their contractual limits and could increase the average levels of nitrogen in the gas they deliver to the NTS regardless of whether the Modification Proposal is implemented. It therefore seems reasonable to assume that such sub-terminals are unlikely to increase their delivered average levels of nitrogen as a consequence of the Modification Proposal.
- With regard to new gas that is likely to be imported to the UK, it is noted that a significant proportion is likely to be in the form of Liquefied Natural Gas (LNG), which generally has high CV (and hence high Wobbe Number) and low levels of inerts. Unless LNG is “ballasted” through the addition of nitrogen to lower its Wobbe Number, it will not normally meet the Wobbe limits prescribed by the GS(M)R and could not therefore enter the NTS. Information contained in the ILEX report (which can be accessed by using the link below) suggests that the likely levels of nitrogen used for ballasting LNG could be in the region of 5%. This is within the range of nitrogen typically found in other sources of gas and is therefore unlikely to increase levels of nitrogen in the NTS.

b) Non conventional gases (i.e. biogases or synthetic natural gases)

- If the Modification Proposal were to be implemented, the levels of nitrogen and total inerts would be indirectly limited by the limits placed on Wobbe Number in the Gas Safety (Management) Regulations 1996.
- It is possible to produce non conventional gases (i.e. biogases or synthetic natural gases) which would comply with the GS(M)R specification but which could contain, at its most extreme, 20% nitrogen. However, such gases would only comply with the Wobbe Number limitations if significant quantities of higher hydrocarbons such as propane (approximately 25%) were added.
- Transco NTS is of the opinion that it is unlikely that a GS(M)R compliant gas of such a specification will ever be seen in practice for the following reasons:

- No naturally occurring natural gas has been found even close to this specification.
- The propane required to manufacture a natural gas with the above composition has a market value exceeding the value of the gas and would thus result in it being uneconomic.
- Likewise, should a natural gas of this composition be found, then the economic case for extracting the propane would outweigh the case for leaving it in the gas.
- In any event, given that a number of existing sub terminals do not have limits on the amount of nitrogen or inert gases that may be delivered to the NTS, it is possible that such gases could be delivered to the NTS today. Furthermore, in terms of network investment, such a gas would have a CV in excess of the Ten Year Statement upper limit of 42.3MJ/m³ and would therefore require less transportation capability per unit of energy (and therefore investment costs) relative to existing supplies (albeit, it would be outside of the current CV limits permitted by Transco NTS).
- More generally, due to the relatively large volumes of natural gases available today, Transco NTS does not anticipate non-conventional gases being used to meet energy needs for the foreseeable future.

4) **Effect of the Modification Proposal on calorific value**

- There is no direct correlation between the presence of carbon dioxide and low CVs. Indeed, at many wells (particularly those situated in the central North Sea or even further north), higher levels of carbon dioxide are associated with increased higher hydrocarbon proportions. Such gases, due to the relatively high CV of the higher hydrocarbons, often have higher CVs than other UK sourced natural gases.
- In general, there is a correlation between the presence of nitrogen and low CVs in beach gas. However, the existing contractual CV ranges will continue to provide protection against particularly low CV gases.
- However, nitrogen can serve a useful purpose in respect of gases with high CV and consequently high Wobbe Number. Unless such gas is “ballasted” through the addition of nitrogen to lower its Wobbe Number, then it will not normally meet the Wobbe Number limits and could not therefore enter the NTS. Whilst the addition of nitrogen overcomes this, the addition of nitrogen is in itself expensive. Given this fact, we believe that should nitrogen be added, the quantities injected are likely to be the minimum required to bring the gas within the GS(M)R Wobbe Number limits, and that the ballasted gas would therefore still be high CV/high Wobbe Number gas. Modification Proposal 0049 does not change contractual CV ranges, nor does it change Wobbe Number ranges which will continue to be set out in the GS(M)R.
- Having due regard to the anticipated new gas sources that could gain entry to the UK, Transco NTS is of the opinion that irrespective of whether the Modification Proposal is implemented, the gas in the NTS can in future be expected to have a marginally higher average CV than it does today.

5) **Effect of the Modification Proposal on levels of higher hydrocarbons (e.g. propane and butane)**

- Neither the GS(M)R nor Transco NTS’s entry agreements place direct limitations on higher hydrocarbons. However, hydrocarbons are limited indirectly through the limits on Wobbe Number, Incomplete Combustion Factor and Soot Index set out in the GS(M)R. Modification Proposal 0049 does not propose changes to these parameters.
- Higher hydrocarbons generally have a market price that exceeds that of natural gas and producers therefore tend to remove these components prior to the natural gas entering the

NTS. Likewise, the injection of higher hydrocarbons to enrich low Wobbe Number gas is relatively rare for economic reasons.

- Given the above, Transco NTS does not anticipate any material increases in higher hydrocarbons as a result of this Modification Proposal.

Links

<http://www.ilex.co.uk/pages/DTI-GasQuality.pdf>

http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/8705_21904.pdf?wtfrom=/ofgem/work/index.jsp§ion=/areasofwork/gasqualwetgas