Modification Proposal 0266: Amendment to the Gas Quality NTS Entry Specification for the North Morecambe Terminal

CV Shrinkage Analysis by National Grid NTS

1. Executive Summary

British Gas Trading Limited, in consultation with the Barrow Terminal operator Hydrocarbon Resources Limited, has proposed that the North Morecambe sub-terminal be permitted to widen its existing gas quality specification for Wobbe Number to the full range allowed under the Gas (Safety Management) Regulations 1996 (GS(M)R. No specific gas composition data has been provided, however Wobbe index[1] is related directly to the calorific value (CV) and the gas' relative density (RD), therefore if the Wobbe decreases there is a resultant decrease in the CV of the gas.

The analysis presented below assesses the likelihood of any National Transmission System (NTS) CV Shrinkage if the combined flows from North and South Morecambe terminals operated at the lower Wobbe limit of GS(M)R when compared to the other likely gas sources (St. Fergus /Easington) for the North West LDZ[2]. The Milford Haven LNG flows are not forecast to be sufficient to penetrate the North West LDZ for the time horizon considered and thus did not become a feature of this analysis.

The analysis was confined to a near term horizon and concentrated on network analysis of the 2010 demand and supply forecast only. The current analysis is considered appropriate until 2013, at which point new facilities have indicated an intention to connect at Barrow but which we cannot be certain at this stage will ultimately do so.

The results revealed that there was **no** NTS CV shrinkage being created in the North West LDZ if the Barrow terminal was operating at the lower Wobbe limit of GS(M)R for any of the five flow scenarios examined. Further analysis also revealed no CV Shrinkage across the NTS as a consequence of the proposed Wobbe limit change.

2. Background

The North Morecambe sub-terminal is operated by Hydrocarbon Resources Limited and is concerned with the reception and processing of natural gas and condensate from the Morecambe Bay fields.

For the purposes of this analysis, to obtain a Wobbe equivalence of 47.2 MJ/m^3 the flowing CV for the terminal (South Morecambe and North Morecambe combined)

[1] Wobbe is defined as the ratio of the gas calorific value and the square root of the relative density of that gas. (Wobbe = CV/$\sqrt{}$RD)

[2] Operational experience of gas flows in this area suggests that it would be at the lower end of the CV range where a CV shrinkage risk could potentially manifest rather than the higher end.

was taken to be 37.2 MJ/m^3. This note outlines the results of analyses performed to assess the likely NTS CV Shrinkage impact if the Barrow terminal introduced gas of such a CV onto the NTS.

This paper has been based on a detailed set of analyses of the 2010 NTS network models. Previous such studies have used a wider year range but there are mitigating circumstances that make the current approach valid. These are:

- The current uncertainty about which, if any, of the proposed new projects at Barrow (Hoegh, Gateway and Bains) will go ahead in 2013 makes long-term forecasting more problematic; and

- The critical point on the network with respect to the Barrow terminals is the Lupton multi-junction. Beyond 2013, the multitude of potential flow scenarios across the NTS that may impact this location makes complete analysis of CV shrinkage effects beyond this date impractical.

ANALYSIS

3. Assumptions

The following assumptions have been made:

- Five days across the 2010 Base Scenario Graphical Falcon networks have been used for the forecast.
- The analysis split (see table 1) has been determined by the available models, but has been configured to ensure that both high and low case flows have been analysed. This is to ensure that an appropriate range of CV effects have been modelled.

4. Results

The Barrow terminal daily flow profiles for the forecast year 2010 are summarised in Table 1. The models were configured to analyse the NTS CV Shrinkage based on peak, average winter and average summer flows across the analysis period.

Year/Flow (mscm/d)	**2010**
Peak (1)[3]	11.7
Average Winter Flow (3)	9.3
Average Summer Flow (1)	8.7

Table 1. Barrow flow profiles used in the analysis.

[3] Refers to the number of analyses in a particular season.

Figure 1 below presents the daily flow and CV for Barrow terminal in 2009 and indicates that the peak flows modelled have only been seen occasionally and the yearly average CV of 38.41 MJ/m^3 was significantly higher than that modelled[4].

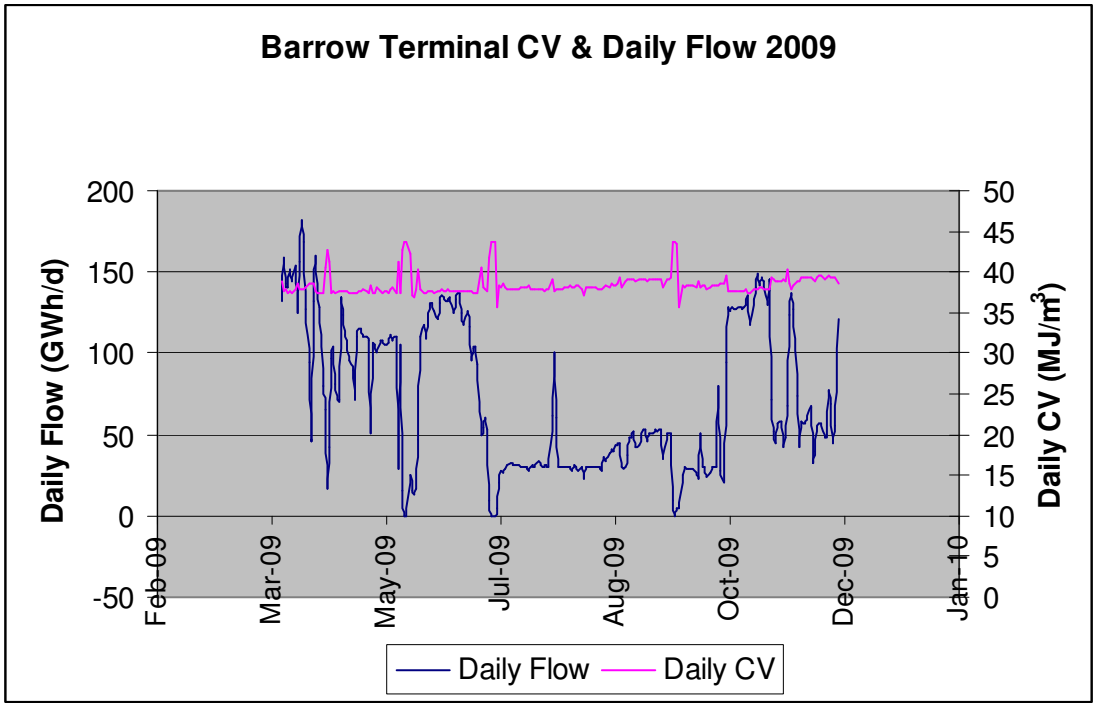

Figure 1. The Barrow terminal daily average CV and flow profile. (April 2009 to November 2009 inclusive).

The analysis revealed that there was **no** NTS CV shrinkage being created in the North West LDZ if the Barrow terminal was operating at a CV of 37.2 MJ/m^3 for any of the five flow scenarios.

The data from the network analysis was further evaluated across the entire NTS for any residual effect on NTS CV Shrinkage as a consequence of the proposed changes to Barrow's Wobbe limits. This again, revealed **no** NTS CV Shrinkage.

National Grid NTS has therefore concluded that the reduction of the North Morecambe Wobbe limit to 47.2 MJ/m^3 does not indicate a potential NTS CV Shrinkage issue before 2013. The uncertainties associated with network flows and supplies from Barrow beyond this date render analysis of CV shrinkage effects post 2013 impractical at this stage.

[4] 1 mcm = approximately 10.8 GWh