Modification Review Group UNC 251 – CV Shrinkage

Metering Review

The metering of natural gas is governed by DECC and Ofgem, their responsibilities are separated at the terminals. The DECC govern the producers' offshore metering at the terminals, while Ofgem has responsibility for monitoring compliance in relation to metering and CV measurements on the networks. The metering on the networks is covered by Gas Calculations of Thermal Energy (GCOTE) regulations 1996, (as amended 1997 GCOTE). The GCOTE regulations provide for either declared values or the FWACV methodology to be applied to calculate CV for a charging area.

The metering type within the networks (NTS and GDNs) is predominantly orifice plates, there are approximately 180 orifice plates (120 GDNs and 60 on the NTS) which is largely due to the US influence on the development of the NTS. The meters were originally installed for the purpose of network balancing and system control, however more recently they have been used for the purpose of billing.

The GCOTE regulations allow the Networks to define the charging areas and method of allocating CV to the charging area, declared or FWACV. FWACV is calculated from daily calorific values, which are measured at the relevant inputs to and outputs from a particular charging zone, which in turn are based on individual determinations of calorific value made by gas transporters using instruments approved by Ofgem. The location and manner of determination of calorific value is formally prescribed through Letters of Direction from Ofgem to the gas transporters. The Letter of Direction requires the use of instruments that are approved by Ofgem and this approval is formally given by Ofgem to the gas transporters through the use of a Letter of Approval. The regulator decided to allow flow weighted average calorific value to be used, but it was capped to a maximum of 1 MJ/m3 above the lowest calorific value of gas being transported in the area. The agreed, and current, way of applying FWACV is as that GDNs have to use the lower of either.

- the flow weighted average calorific value

or

- a figure obtained by adding one mega joule per cubic metre to the lowest CV flowing into the charging area

This ensures that there are no large swings between winners or losers. By adding one mega joule per cubic metre to the lowest CV no individual consumer will be disadvantaged by more than approximately 2.5%.

It is understood that the majority of the meters on the NTS and GDNs are orifice plate meters, operating to legacy standards in the form of supplementary agreements, which are based upon the legacy Transco Standard – BGS/PM/M1 - 'Offtake flow metering practices and methods'. The standard requires that volumetric flow rate is accurate to +/- 3.5% for 0 – 30% of full flow, and +/- 2% for 30 – 100 % of full flow. The Unified Network Code (UNC) Offtake Arrangements Document (OAD) appendix D document requires that flow metering be accurate to 1.1% on volume. This will apply to all

metering outside of supplementary agreements. It is understood that the majority of metering is covered by supplementary agreements.

Metering Standard Developments

In 2003 a new version of the BS EN IS0 5167-2:2003 was published, which replaced the International standard for orifice plate metering IS0 5167-1:1991. The ISO standards are normally updated every 5 years, the current version is ISO – 5167, 2003 which has introduced significant changes based upon technical research in the following areas :-

1. Discharge Coefficient
2. Expansibility Factor
3. Permanent Pressure Loss
4. Upstream Temperature

In each case, the changes have been introduced in response to new data to reduce the uncertainty at a minimal cost. The DTI, in 2007 published guidance setting out the requirement that all orifice plate terminal meters, should be operated to the latest standard of ISO 5267 – 2003. Further information can be found at :-

https://www.og.dti.gov.uk/upstream/measurement/ISO_5167-2003_Statement.pdf

Metering Standards on the network

It is understood that the majority of the networks are currently operating under the 1991 version of the metering standard, which is thought to overstate the volumes of gas, when compared to the 2003 version. The magnitude of the bias is influenced by the configuration of the meter. One of the main considerations is the Beta Ratio of the meter (the ratio of the metering tube diameter to the diameter of the orifice within the orifice plate). Other factors such as pressure will also influence the magnitude of the bias.

The majority of all network meters are operating to ISO 5167-1991, which potentially leads to an imbalance in the volumes recorded. Given that the terminals are now operating to the 2003 standard, Ofgem is interested to understand the impact of these changes on shrinkage gas.

Impact of 2003 and 1991

It is considered that the early standards systematically over-record volumes when compared to ISO 5167 - 2003, the extent of which will vary depending upon physical parameters, such as beta ratio and operating pressure.

The current configuration (i.e. entry meters set at ISO 5167 and offtake at legacy standards) is thought to lead to an imbalance in the NTS system.

Therefore it is reasonable to assume that the materiality of imbalance will depend upon the throughput and physical configuration of the metering station.

What is the scope of the review?

- Identify and confirm how the FWACV calculation is being applied, at NTS, GDN, Shipper and Supplier level
- Calculate any reduction in shrinkage if all meters operated the ISO 5167 - 2003
- Calculate the impact of utilising 1991 assuming that entry and exit were operating this standard
- Calculate the imbalance as a result of 2003 at entry and 1991 at exit
- Identify the Winners and losers of the current arrangements
- Assuming the average error, what would the impact be upon the FWACV for the charging areas, for a high flow and low flow period?
- This will assist in identifying the main contributory factors of shrinkage