

## **CV Measurement for New Entry Points with Annual Flows <5 Million therms**

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### **1. Introduction**

Review Group UNC 0251 has asked Ofgem to consider whether it is discrimination for the NTS and DN's to insist that CV of new gas flows is enriched to FWACV.

There is an additional issue that the Review Group is asked to consider and this relates to the standards applied to measurement of calorific value that apply to small flows of gas (such as onshore gas fields or biomethane sources)

This note sets out the current regime for CV measurement and proposes 3 options:

1. Do nothing
2. Maintain Direction by Ofgem but have lower level of accuracy for flows <5 million therms/annum
3. Do not Direct the sites but ensure that there is no CV Capping caused by the site (with enrichment if necessary) and with appropriate CV measurement standards defined in the NEA between the gas producer and the NTS/DN

### **2. Current Regulatory Regime: Letters of Direction and Letters of Approval**

The majority of gas consumers are billed on the basis of volume of gas measured at the point of consumption (corrected to volume at standard conditions of temperature and pressure), multiplied by a billing period CV calculated from an arithmetic average of daily CVs determined for their charging area. The daily charging area CV is calculated as a flow-weighted average of daily CVs determined at relevant input and output points to the charging area. The choice of input and output point is in effect decided by Ofgem, which has powers to direct a gas transporter to determine CV under Regulations 6(a), 6(b) and 6(c) of the Gas (Calculation of Thermal Energy) Regulations (1996).

Regulations 6(a) – 6(b) permit Ofgem to direct the places, times and manner in which gas samples are taken and determination of CV is made. Regulation 6(c) permits Ofgem to direct the premises, apparatus and equipment to be provided and maintained by the gas transporter. In practice the direction to determine CV is achieved through issuing of a Letter of Direction to the appropriate gas transporter for each sample point that CV is to be determined.

The apparatus and equipment that Ofgem direct under Regulation 6(c) is generally an approved type and such approval is given through issue of a Letter of Approval, which specifies in some detail how a particular instrument may be configured, operated, calibrated and maintained. Type approval of CV determination devices is generally given by Ofgem only after a period of testing and performance evaluation by their technical services provider

and on specific request from a gas transporter? This can involve considerable cost and so far, only one gas chromatograph is approved for use by gas transporters (the Danalyzer).

There currently is no clear specification for CV determination devices, although custom and practice and the Schedule attached to the Letter of Approval for the Danalyzer imply that performance evaluation to BS EN ISO 10723 should result in an error in CV of no more than 0.1 MJ/m<sup>3</sup> for gases lying within a range in composition given in the Annex to the Letter of Approval. In addition, periodic validation by injecting a test gas of known CV should result in a difference of no more than 0.14 MJ/m<sup>3</sup>. In addition to the implied performance specification Ofgem generally require minimum functionality (such as recovery from power failure, calculation of CV from composition to BS EN ISO 6976).

### **3. Options for New Entry Points with Annual Flows < 5 Million therms**

It is assumed that the CV of the gas will NOT give rise to any capping due to low CV. For example, if the FWACV is 39.0 MJ/M<sup>3</sup>, then the minimum CV of the injected gas would be 38.0 MJ/M<sup>3</sup> (the issue of who funds any enrichment is a separate question)

#### **3.1 Option 1 - no change**

The drawback of this approach is that the costs of a 0.1MJ/m<sup>3</sup> accuracy device (capital and operating) may be disproportionate to the gas flows. If, for example, the gas is from a biomethane source a typical annual throughput will be 500,000 – 1 million therms. If capex is >£150K and opex >£20K then this may not pass an 'economic and efficient' test.

#### **3.2 Maintain Direction by Ofgem but with new standards of accuracy**

Under this approach, Ofgem would allow CV measurement to a less accurate standard, this could be whatever was appropriate given accuracy/cost trade-off and impact on the accuracy of the FWACV calculation.

Retaining direction with altered Letters of Direction and Approval might be considered to be simpler and has the advantage of retaining the appropriate instruments to provide effective regulation.

#### **3.3 Non Direction of the site**

Based on a commitment that there will be no CV capping as a result of the operation on the Entry Point, it would be possible for Ofgem to agree not to Direct low flow sites with standards defined in the NEA.

If direction was not given by Ofgem, then lower-cost CV determination devices with a level of accuracy that Ofgem have agreed could be considered. In a "no-direction" situation, enrichment to the FWACV would ensure that the CV of gas consumed matched billing CV and any billing error would only be that arising from error in CV determination after enrichment.

If the range of the error from the target CV was tightened for these sites this could take into account the increased error in the cheaper measurement equipment.

Lower –cost CV determination devices are permissible under the existing regime, since all performance criteria for CV determination is embodied in the Letters of Direction and Approval. The current Letter of Direction generally specifies use of (in effect) any approved instrument. For low daily volume sites the Letter of Direction

could require use of either a specified approved instrument, or use of an approved instrument with a minimum performance. If this option were to be implemented then the existing Letters of Direction might require revocation and replacement with ones also requiring use of either a specified approved instrument, or use of an approved instrument with a specified minimum performance. For these higher daily volume sites the existing higher performance may need to be retained.

Minimum performance is readily specified with two parameters: Maximum Permissible Error and Maximum Permissible Bias, together with a composition approval range applicable to the MBE and MPB. ISO 10723, the current standard against which CV determination devices are approved in the UK, is currently undergoing revision and the proposed draft revision incorporates the above principles, which are considered to be best practice.

#### 4. Cost of determining CV

Because the UK only has the Danalyser, there is limited experience in relation to alternative devices that would have lower capex and opex but lower standards of accuracy.

Device	Accuracy (claimed by manufacturer) %	Standard	Capex	Opex
Danalyser	0.1%			
Gas PT				
Siemens				
SLS Germany				

Above needs to reflect both the gas chromatograph (or calorimeter) and all the associated equipment to make a system including such things as single stream or multi-stream, calibration, data handling, sampling, pressure reduction, software, data storage etc)

## **5. Conclusions**

### **5.1 Cost of CV determination**

Non-direction and alteration of Letters of Direction and Approval would both accommodate more appropriate levels of accuracy of CV determination at sites with low daily volume. Alteration of Letters would be simpler and would retain existing regulatory instruments.

### **5.2 Appropriate standards**

Analysis is required to inform the UK gas industry in relation to the costs for devices with appropriate levels of accuracy for CV measurement low flows into the network. There should be “fit-for-purpose” testing of any new devices with the implications on customers affected of any relaxation of measurement accuracy standards. It may be that the IFI scheme can be used to introduce such new devices with the accuracy measured as part of the IFI.

#### **Notes:**

1. Any review re 5.2 above can include flow metering standards to ensure they are also appropriate for low volumes
2. The NTS/DNs may still require a gas chromatograph for measuring gas qualities in addition to CV, though this will be determined by risk assessment on a site specific basis. If the producer has installed acceptable measurement equipment with appropriate safeguards there may not need to be duplication of measurement of some gas quality parameters.