Scienco's Response to the Initial Proposals 24th September 2004

Gas Quality

Wet Gas Administration Scheme

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Summary

In reviewing the proposals for the wet gas administration scheme, our report agrees, the current scheme appears to be out dated and not best serving the interests of either the consumer or gas transporters.

However, upon review there appears to be a number of issues which, may have been over looked and additional benefits from hygrometric testing not considered. Additionally the benefits to transportation companies may be far greater than those described.

Gas quality monitoring in the UK is performed by various means with varying accuracy and regularity. Wet gas monitoring currently forms part of the fiscal metering process, however as the proposal describes it is neither accurate nor sufficiently comprehensive to be used to adjust individual gas bills. However it does provide valuable information on the general quality of the gas supplied to a given gas network or distribution area. It also indicates whether the nation's gas distribution network is getting generally wetter or dryer.

Measurement of water in gas is advantageous for reasons other than correcting for dilution. The details of which are explored within this document.

Monitoring is currently performed by a number of companies including the gas transporters. The measuring process is then repeated by another contractor on behalf of Ofgem as a quality control process. To ensure the premise of the proposed new scheme and its continuing validity, an improved testing mechanism is described which reduces costs by removing duplication of effort, while improving reliability, accuracy and reporting.

The new proposals occur at a time when the gas transportation industry is about to undergo major changes, with a proposed sell off of 4 Transco Distribution Networks. The proposals rely upon all companies adopting the same proactive approach to wet gas as currently operated by NG Transco.

Solutions to these issues are discussed and recommendations made.

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2. History

The proposals of 24th September describe some of the history behind the dry gas prescription and the process by which water enters the distribution network. However if does not mention the full significant details or the most significant route of entry.

Following the conversion from manufactured towns gas to natural gas, the change in composition which included the absence of water, resulted in a massive increase in the leakage from lead yarn joints. Following several gas explosions over the Christmas and New Year period of 1976/77, the Secretary of State for Energy commissioned an inquiry chaired by Dr P J King. In repose to the findings of this enquiry, and to

correct the effect of dry gas, water vapor or steam was injected into the distribution network. As a result, whole networks were saturated and bills corrected accordingly.

British Gas then undertook an intensive research and development program to establish a mechanism for reducing leakage from lead yard joints using substances other than water. The final outcome resulted in the injection and vaporisation of mono-ethylene glycol, now know as gas conditioning or fogging.

Once the injection of steam was stopped, a detailed hygrometric testing program was performed to demonstrate the system was dry and bills could be corrected accordingly. Some of the test points installed as part of this exercise have since been used as part of the Wet Gas Administration Scheme. (This may account for the unsuitable location of many of the test points currently)

The new proposal fails to consider the advantage to gas transporters of allowing their networks to saturate or partially saturate with water. Water ingress or entry from the use of gas holders will be advantageous, effectively reducing leakage from old networks. There would therefore be no incentive to correct minor ingresses of water or reduce in zones of influence from gas holders. (In fact the opposite would be true). Water sealed gas holders are currently the major entry points for water and not leaking mains, and have the potential to operate as water saturators.

The injection of water vapour could therefore in effect restart, to the advantage of the transporters, but to the disadvantage of the customer.

4. Plastic Systems and Location of Test Points

The proposal describes how currently there are 1500 fixed wet gas test points in the distribution network. It is estimated that only 30 to 40% of customers are located down stream of these test points. However the proposal also reports, the distribution system now comprises of over 50% plastic, thus reducing the likelihood of leakage and water ingress.

From these figures, it would appear, by changing the historical location of these test point to new positions in the old, non plastic networks, considerable improvement in this situation could be achieved. For example, historically old networks, such as London, Birmingham, Manchester and the like are most likely to distribute wet gas, while new systems such as Milton Keyens and Telford would normally be dry.

In addition to the main's material, the most significant point of water ingress occurs from water sealed gas holders. Gas holders are by far the most significant entry point for water. The spread of wet gas from these can be very far, depending upon the way the network is administered.

Therefore from historical records and an examination of network analysis information, test points could be chosen to cover the majority of customers most likely to be effected by wet gas.

The current system of testing also uses fixed test points tested once per quarter. A random independent testing process, using targeted and randomly chosen locations would provide a more realistic overview of the matter, while reducing short term, dry gas management techniques.

Testing routines could then be designed around a simple model of spot testing and regular monitoring of pre-determined hot spots, as is common in many other investigative processes. This would provide additional protection to the consumer and incentives to the transporters to manage their systems effectively and dry as far as is reasonable practicable.

5. Costs

The proposal states the current scheme's administration costs are in the region of £1.1 million. Although these costs are not broken down, it is assumed they are a mixture of administrative and sampling costs.

Independent testing for 6000 tests following a scheme based upon the one discussed above is currently available at a cost of approximately £300,000. It is traceable to international standards and accredited to UKAS. Results can then be published in a web format allowing all who need access to do so without duplication of effort.

The proposal suggests the money saved by stopping the Wet Gas Administration Scheme is in the order of £1.1 million. This equates closely to the average test results for water content as determined for 2003 of 0.019% or 6p on a typical customer's gas bill.

However the continuing validity of these findings assumes:

1. The gas distribution system remains the same with respect to water content and water levels are not allowed to rise.
2. It also assumes it fair for those who are routinely, or as a result of an incident, exposed to high concentrations of water, not to receive bill correction or compensation.

Complete removal will also eliminate any incentive to maintain a dry network, because as the network becomes progressively wetter, gas transporters continue to gain more.

It could also be argued that the transporters further gain, as an increase in wet gas reduces the leakage figures reported. Additionally as previously discussed, wet gas will reduce the leakage in systems containing lead yarn joints and remove the need for MEG gas conditioning. Again an incentive to remain wet.

It would be possible for transporters to operate their networks at a dew point of -15 Celsius without any serious operating difficulties (Excluding a 1 in 20 winters). The cost benefit of doing so would be a correction of 0.16% or potentially £9.6 million nationally. It is unlikely this could be achieved, but certain older networks could benefit significantly from operating this way.

6. Additional Gas Quality Matters

Icing

In addition to the billing issues relating to volume correction, water in gas can cause icing problems when compressed. This occurs occasionally at installations such as NGV filling stations. Any future scheme should provide a mechanism for such issues to be investigated and resolved.

Corrosion

Water ingress can be advantageous in reducing leakage in the medium term, However ingress of water and its dissociation into oxygen and hydrogen will result in further corrosion and other chemical reactions within the system. Additionally the liquids produced will be contaminated and require special disposal, presenting potential for environmental damage.

Sulphidation

Sulphidation, is produced by a reaction between trace amounts of hydrogen sulphide in natural gas, and domestic copper pipework. The thin, shiny, black flakes of copper sulphide break off to be carried along the pipe and into gas appliances, where they accumulate in valves, filters and injectors. Recent reports have suggested the mechanism and randomness of this problem although not fully understood, may be significantly increased by the presence of oxygen and moisture. Therefore as hydrogen sulphide levels rise in the gas network, it would appear sensible to ensure water level drop. This should continue until moisture and

oxygen are ruled out as potentially accelerating the mechanism. The potential cost of this problem may far exceed the saving described in these proposals.

7. Conclusion

Scienco agrees with the finding of the review in respect of the imbalance of compensation to costs and benefits. We therefore agree changes to the scheme are advantageous as a whole.
However the proposal appears to make several assumptions which may not be the case, these include:

1. The system remains the same with respect to wet gas concentrations.
2. New transportation companies have the same commitment to maintaining a dry gas supply.
3. Major water entry point cannot be predicted and monitored in a satisfactory manor.
4. There is no advantage to transporters in maintaining a wet distribution network.
5. Water in gas does not increase the sulphidation problem currently spreading throughout the UK.
6. A cost effective monitoring program can not be produced, which is able to determine whether distributed gas is getting wetter or dryer as a whole, and can provide sufficient data for routinely disadvantage customers to be compensated in a realistic manor.

Therefore in our opinion, a certain amount of hygrometric testing should be maintained to ensure a degree of: quality control and a commitment to a dry gas delivery. To sell gas as dry without any endeavour to ensure its validity would appear to be unreasonable and against principles commonly applied to other products.

The potential benefit to the transportation industry as a whole by adopting the preferred proposal could be as follows.

Savings from administration costs	£1.1 million
Savings from over compensation on wet gas determinations	£5.0 million

Running of networks at -15 Celsius dew point	£9.6 million
Total Potential Savings	£15.7 million or ~ 80p per customer

Alternatively all wet gas controls could be removed and a fixed correction investigated, based around the -15 Celsius dew point with all bills corrected by 0.16% or any other figure deemed suitable from an examination of historical data.

8. Recommendations

The Gas Quality Wet Gas Administration Scheme should be dropped and the associated savings returned to the customer. However those consistently supplied with significantly wet gas (above a dew point of -15 Celsius should be entitled to appropriate compensation).

A simple sampling and monitoring model should be developed, guaranteeing the premise, from which these proposals are made remain the same or improve. The model should include:

- An examination of historical records and network analysis information, leading to more effective test point selection. New test points should be selected in an attempt to identify those customers most likely to be effected by wet gas.
- Consistently dry test points would be tested less often, allowing wet areas to be tested more regularly.
- New plastic installations would be tested very infrequently and old cast iron ones more often.
- As with all modern quality management systems, emphasis should be placed upon continual improvement and maintenance of assets.
- Water entry points such as gas holders, major incidents and historically porous mains should be treated separately and suitable proportional compensation paid if appropriate.
- One organisation should operate and coordinate all monitoring on behalf of Ofgem, at an estimated cost of £300.000 per year. (A realistic figure, relative to the quantity of gas shipped and the importance in quality control in fiscal metering)

- The figures should form part of a simple annual review similar to the average dew point evaluations made in the proposal and allow individuals who are significantly disadvantaged a chance of redress.