

British Gas Comments and Questions on Kelton Engineering Draft SMER

13th September 2013

These comments and questions are associated with the draft SMER produced by Keith Vugler of Kelton Engineering, Report Ref: NK3177-001.

The GL Noble Denton report, detailed within the Executive Summary, the estimated size of the error based upon the correction factors used. It would be useful if your report could provide a similar indication of error size.

General Comments & Questions

- The position of the orifice plate has not been confirmed, it has been derived from the measurement errors. This approach has a weakness in that there may have been other errors present that we do not know about. i.e. just because there is a flow step of “approx.” 30% or 50% at the time does not mean it is all attributable to the orifice plate position. These estimated “flows” are misleading as they are used as targets.
- There is no clarity provided as to why the plates were positioned at 99985 and 99950, although the ITE has made a statement as to why this occurred, there is no statement from the individuals concerned as to why they left the plates in those positions. The position of the plates remains a real concern and weakness in the report, based upon assumption rather than fact or evidence.
- The error for the insertion of the plates should be used and not the removal (this has been done) as both plates were being inserted and there is hysteresis in the winding mechanism.
- At the 99950 position there is considerable spread in the errors about 63% to 75%, depending on the flow rate, this spread of 10% or so has not been explained.
- The error must be determined by the errors at flow rates which are the closest to that on each day as there are differences in the errors wrt flows. The errors should not be averaged into a single figure to be applied to all of the days.
- The low differential pressure (DP) recorded should be used and not excluded, it does raise the question of whether the facility is being used outside of the agreed uncertainty and therefore commercial agreed operational envelope. It could be argued that no correction is applied as it has not been operated correctly. We can get into a situation where the uncertainties are so high that a random guess is as good as a calculated value.

Detailed Comments & Questions

1. No report reference:

Please confirm the dp low-flow cut off and that all values above this are used contractually for billing purposes and are therefore valid?

2. Section 7.2, Page 53: For the SMER period (1) 99985 counter reading plots, the three most obvious low error values are those representing the low flow test data (at typically 13- 15 mbar). **However, the CFD results for these test points (section 8 refers) agree favourably and for that reason there is no justification to exclude these site test values from further review.**

Please confirm that the Low flow tests and associated corrections are justified

3. Section 7.2, Page 53: For the SMER period (2) 99950 counter reading plots, the two most obvious low error values (Tests 9 & 11) are those again, representing the low flow test data (at typically 2-4 mbar). However, in this case the CFD results for these test points (section 8 refers) record a significant discrepancy which potentially casts doubt over the acceptability of these site test values.

Whilst not as obvious, the same can be said of the SMER period (2) Test 1 (medium pressure/low flow) which can be seen to fall “typically” within the main spread of the data set but much higher (in relation) to the other flow results. As in (2), the CFD result for this test point (section 8 refers) records a significant discrepancy which again, potentially casts doubt over the acceptability of this site value.

You have noted “significant discrepancies”, and in terms of dp measurement uncertainty this may be correct, however the Absolute error between these site tests and the CFD is very small, <1m barg and as this SMER is being progressed an “on-balance” and “best endeavours” approach, where little has been proven to be is certain, is this “significant discrepancies”, statement valid?

4. Section 7.3, Page 53: It was noted that the flow stability (difference between the test start and finish flows) observed throughout individual tests, varied on occasions and therefore had an effect on the value of reference flow rate used within the calculation of test errors (Section 5.4 refers);
Test 1 ≈4%
Test 2 ≈4%
Test 3 ≈7%

Test 4 ≈4%
Test 6 ≈3%
Test 7 ≈12%
Test 8- ≈4%
Test 9- ≈1%
Test 10- ≈11%
Test 11- ≈8%

Please can the author confirm whether any of the instabilities have included within any of the uncertainty calculation performed?

5. Section 7.5, Page 53: **7.5 Test Summary – SMER Period 1 (Counter Reading 99985)**

From review of the test results, it can be seen that a majority of the test results follow a very similar response profile and show good agreement with the CFD modelling (section 8 refers). Therefore, there is no reason to disregard any of the site testing results from this review. Interestingly, Tests 9 and 11 (low flow A & B) are the most remote which could be due to the low differential pressures seen at this test point (≈15 bar).

AND

Section 7.4, Page 53: **7.6 Test Summary – SMER Period 2 (Counter Reading 99950)**

From review of the test results, it can be seen that 70% of the test results follow a similar response profile and good agreement with the CFD modelling (section 8 refers) with the following exceptions;

Test 1 – Medium Pressure / Low Flow
Test 9 – Low Pressure / Low Flow
Test 11 – Low Pressure / Low Flow

As these site tests were performed at such high measurement uncertainty due to the extremely low differential pressures (2-4 mbar) and the CFD results for these test points (section 8 refers) record such a significant discrepancy, it is the opinion of the Independent Technical Expert that these site test values are considered unrepresentative for use within the final correction factor calculation.

Please further detail why Site Tests 1, 9 & 11 have been ruled out, especially when consideration to the Absolute errors being so small, the results being obtained at typical site conditions?

Please detail on what basis these results have been labelled as “outliers”, especially as not enough tests were performed for this to be proven?