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Client	:	**SCOTIA GAS NETWORKS**
Project Title	:	**BRAISHFIELD "B" MEASUREMENT ERROR REVIEW**
Document Title	:	**FURTHER RESPONSES to TECHNICAL QUALIFICATIONS RECEIVED on the DRAFT (SMER) REPORT**
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1	10/03/11	Issue for Information	KV	

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1.0 INTRODUCTION

This document details the responses of the Appointed Independent Technical Expert (ITE) to further Technical Qualifications submitted by British Gas (09/02/11) in reference to the Braishfield "B" SMER Draft Report (KELTON® report reference NK3173-003) dated 22/11/2010 and the associated discussions within the JO meeting of 25th January 2011.

The comments received on points 1, 2, 3, 4, 6, 8, 9, 10, 13 and 14 are either statements, reference to future requirements for similar SMER investigations or requests for additional data.

In response to the specific data requests, the following additional information has been incorporated within the final report or included within accompanying attachments to provide the complete transparency requested;

- The OFGEM Site Status Report (for 26/01/10) confirming site attendance to change-out the low range ΔP transmitter is included as Figure 3.2.
- A graph showing the increase in flow rate seen on 26/04/10 following the closure of the common manifold equalising valve, populated using HPMIS data, is included as Figure 3.5.
- A graph showing the increase in flow rate seen on 26/04/10 following the closure of the common manifold equalising valve, populated using HVOL data, is included as Figure 3.6.
- In response to BG points 5 & 7, a clear statement is included on page 9 that details the methodology reviewed by the ITE to validate the test results and SMER conclusions with actual operational data.
- All site testing data (available in "open" Excel spreadsheet format) has been supplied (as attachments) to support the conclusions made within the final report.

Having provided all of this additional data, 3 technical points (11, 12 and 15) require further comment and are appropriately addressed within section 2.0.

Section 2.0 is structured to;

1. Provide the "BG Further Comment Number" for which the Independent Technical Expert technical response refers.
2. The technical comment itself (cut & pasted exactly as received) from British Gas (highlighted in light blue text).
3. The associated response by the Independent Technical Expert (highlighted in block capital italics in dark blue text).

2.0 FURTHER TECHNICAL QUALIFICATIONs & RESPONSES

Comment 11

Initial British Gas Comment (22/12/10);

This is another potential mis-measurement and an over reading for the low range differential pressure cell of 1.8 mbar over its operating range. Error will be in the range of 2-4% (very approximate) for flows of less than approximately 60kSm3/hr, this needs further investigation.

ITE RESPONSE; MY FIRST IMPRESSIONS WERE THAT THIS DID SEEM TO BE A POTENTIAL ISSUE.

HOWEVER, ALL FIELD TRANSMITTERS WERE SUBJECT TO ME2 CALIBRATION CHECKS IN EARLY JANUARY (2010) – AS WE KNOW THE CAUSE OF THIS SMER WAS WHEN THE LOW DP TRANSMITTER WAS REPLACED ON 26TH JANUARY HAVING FAILED THE ME2 REQUIREMENTS. ALL TRANSMITTERS WERE SUBSEQUENTLY REPORTED AS A PASS AND A PRE-TEST (2ND AUGUST) REPEAT ALSO PASSED.

WE NEED TO BE CAREFUL HERE BECAUSE 2 READINGS PRODUCED FROM 2 SEPARATE TRANSMITTERS WILL NEVER READ THE SAME SO, WE NEED TO EXAMINE WHAT LEVEL WE CAN REASONABLY EXPECT THE READINGS TO AGREE TO;

AS THE TRANSMITTERS ARE CALIBRATED TO 0.2% OF THEIR CALIBRATED SPAN (FOR THE HI RANGE = 0-500 mbar) THERE IS STRAIGHT AWAY THE POSSIBILTY THAT THERE WOULD BE A DIFFERENCE OF ±1 mbar. INCLUDE THE ADC CALIBRATION REQUIREMENTS & THE UNCERTAINTY OF THE HIGH DP TX DOWN AT >50 mbar (typically 3-4%) etc. etc.....!!

Further British Gas Comment (09/02/11);

We note the small materiality of this issue however we believe, for completeness, it is important to address this issue. As we understand it, the low DP was reading higher within its calibrated range but the HP reading was used. Therefore we question why is it assumed that the high DP was correct at 20 mbar when this is not its operating range? In normal operation the low DP reading would have been used. Surely the DP instruments which would be in use should be used? Is the "offline calculation" just using the high DP reading?

FURTHER ITE RESPONSE; FOR THE SITE TESTS PERFORMED AT THE LOW FLOW RATE REQUIREMENT, THE START & FINISH FLOW RATES WERE TYPICALLY 73 KSm^3/h (64 mbar) AND THEREFORE STILL IN THE "OVERRANGE REGION" OF THE LOW RANGED ΔP TRANSMITTER. AS THE TEST END STABILISED FLOW IS USED AS THE REFERENCE FLOW RATE FOR THE CALCULATION OF ERROR, THIS COULD ONLY BE CAPTURED FROM THE HIGH RANGED ΔP TRANSMITTER. WHEN THE MEASURED ΔP FELL BELOW 50 mbar, THE LOW RANGED ΔP TRANSMITTER CAME INTO RANGE & THEREFORE PROVIDED AN OUTPUT WHICH, WHEN COMPARED TO THE HIGH RANGED ΔP, WAS TYPICALLY 1.8 mbar HIGH (AVERAGE OVER THE 4 SETS OF TEST RESULTS).

THIS RESULTED IN A STEP CHANGE OF THE TEST RESULTS DUE TO THE DIFFERENCE IN TRANSMITTER READINGS INTRODUCED "MID TEST" WHICH WAS OBVIOUSLY NOT RELATED TO ANY ACTUAL FLOW CHANGE & THEREFORE A CORRECTION (PURELY FOR TESTING ONLY) WAS REQUIRED TO NEGATE THIS EFFECT. THIS CAN BE SEEN FROM THE LOW FLOW TEST RESULTS INCLUDED AS ATTACHMENTS THAT ACCOMPANY THE FINAL REPORT.

(PLEASE SEE ALSO, THE ITE RESPONSE TO COMMENT 15 FOR ADDITIONAL CLARIFICATION).

2.0 FURTHER TECHNICAL QUALIFICATIONs & RESPONSES

Comment 12

Initial British Gas Comment (22/12/10);

Why is an average of the error being applied to each day, as the results have shown that the error varies slightly with flow rate the application of the correction should be based in minimising the uncertainty and reducing bias.

ITE RESPONSE; MY UNDERSTANDING FROM THE ITE GUIDELINES (AS SPECIFIED ON PRESENTATION SLIDE 3 & DRAFT REPORT PAGE 3) IS THAT DAILY CORRECTION IS THE REQUIRED DELIVERABLE.

Further British Gas Comment (09/02/11);

Unfortunately the response does not answer the question and we would appreciate an answer. A factor related to daily flow can be derived, it does not direct to using an average for the whole SMER period.

FURTHER ITE RESPONSE; THE SITE TESTING ACTIVITY DEMONSTRATES THAT THE RESULTS OF ALL 12 TESTS SHOW NO SIGNIFICANT BIAS & FALL WITHIN AN ACCEPTABLE SPREAD OF RESULTS (1%). THIS HAS ENABLED THE CALCULATION OF A SINGLE CORRECTION FACTOR THAT CAN BE APPLIED TO ALL FLOW RATES RECORDED DURING THE SMER PERIOD. THIS SINGLE CORRECTION FACTOR CAN THEREFORE BE APPLIED FOR ANY DURATION OR MULTIPLE DURATIONS.

SECTION 14 OF THE MEASUREMENT ERROR GUIDELINES (THE SMER - BULLET POINT 3) REQUIRES THAT THE MAGNITUDE OF THE MEASUREMENT ERROR SHALL BE DEFINED FOR EVERY DAY WITHIN THE SMER PERIOD.

Comment 15

Initial British Gas Comment (22/12/10);

It is noted that the standby DP shows a slightly different reading, so what evidence is there to justify using the high DP reading?

ITE RESPONSE; THE HIGH DP TRANSMITTER IS ALWAYS USED DURING NORMAL OPERATION AND THEREFORE TO REPLICATE THIS DURING TESTING, THE HIGH DP TRANSMITTER OUPUT WAS USED.

Further British Gas Comment (09/02/11);

There is a duty High DP and Standby High DP cell together with a low DP cell. With the discrepancy at Low DP, surely priority should be given to the low DP when it is operating in its range. The DP at low flows is given and will be within the range of the low DP cell with recorded DP's of 20 to 60 mbar and the Low DP cell range 0 – 50 mbar. Can you please advise what reason is there for using the high DP cell for such low readings? It was stated that as there are two readings it is not known which is correct. The fact that the Low DP cell gave a step change in the error should not be dismissed as being incorrect, especially if the DP cell was within its ME2 tolerance. It could be that the high DP cell was in error over its whole range. We would appreciate your view on this.

2.0 FURTHER TECHNICAL QUALIFICATIONs & RESPONSES

FURTHER ITE RESPONSE: ***THIS IS VERY SIMILAR ISSUE TO THAT REFERENCED IN POINT 11 (ANSWERED PREVIOUSLY) & HOPEFULLY THE ITE RESPONSE ASSISTS IN THE UNDERSTANDING HERE.***

AS THE MAIN POINT OF TESTING IS TO DERIVE THE "DIFFERENCE" BETWEEN THE REFERENCE FLOW & THAT OF THE OPEN EQUALISING VALVE FLOW (ERROR FLOW) THE 2 READINGS MUST BE COMPARABLE TO FULLY REFLECT THE MAGNITUDE OF THE TRUE ERROR DIFFERENCE.

DURING THE HIGH & MEDIUM FLOW TESTING, THE FLOW WAS DERIVED FROM THE OUTPUT OF THE HIGH RANGE TRANSMITTER THROUGHOUT THE ENTIRE FLOW RANGE, SO NO STEP CHANGE IS INTRODUCED BY HIGH/LOW TRANSMITTER CHANGE-OVER EFFECTS DURING TESTING.

HOWEVER AS SHOWN IN FIGURE 1 BELOW, THE LOW FLOW TESTING WAS DIFFERENT IN THAT THE LOW DP TRANSMITTER OUTPUT WAS SELECTED BY THE OMNI (AT <50 mbar) AND THEREFORE CREATED A "STEP CHANGE" IN THE COMPARED "ERROR FLOW" (DERIVED FROM THE LOW DP TRANSMITTER) & THE REFERENCE FLOW (DERIVED FROM THE HIGH DP TRANSMITTER). AS THIS DID NOT REFLECT THE TRUE DIFFERENCE BETWEEN THE FLOW RATES, A CORRECTION WAS MADE TO THE LOW DP TRANSMITTER TO NEGATE THIS EFFECT FOR TEST PURPOSES ONLY.

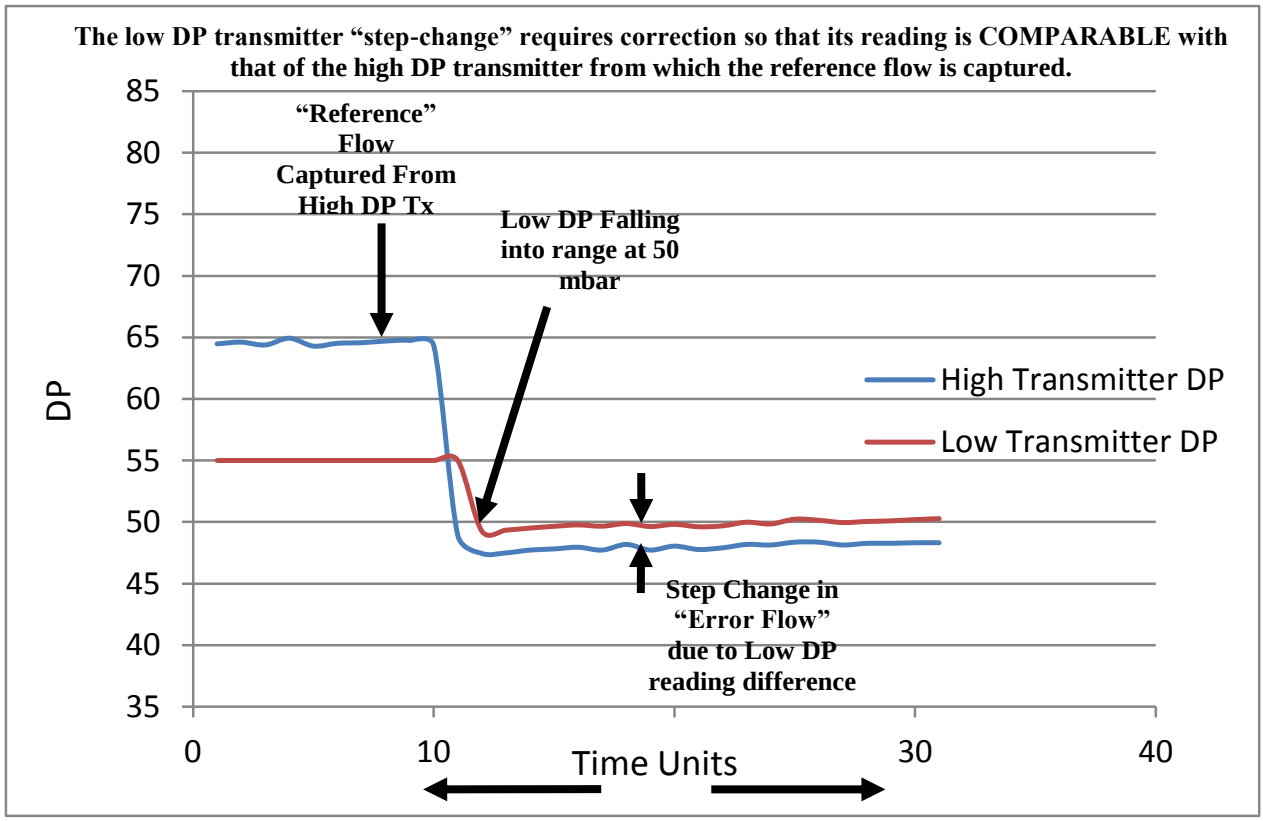

Figure 1