

METER ERROR REPORT**FINAL**

Reconcile?	Y
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Safety Issue?	Y/N
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Thesis Report No.	
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1. EXECUTIVE SUMMARY

SITE NAME	Braishfield B	
LDZ	SO	
START DATE (actual)		
LAST GOOD DATE	26 th Jan 2010	
END DATE	16 th June 2010	
SIZE OF ERROR (No reconciliation required if under 0.1%)	0.1492% under-registration	
ESTIMATE – Y/N?		
ROOT CAUSE	Initial DP discrepancy alarm identified high DP transmitter error. Subsequent failed validation checks for low DP, high DP and pressure transmitters.	
ANALYSIS	Recalculation of volumes using corrected low DP, high DP and Pressure	
METER TYPE	Orifice	
AUTHOR	H. Colbourne	
CHECKED BY	B. Kirkman	
ACCEPTED BY SGN NETWORK		
RECONCILIATION	Distribution	Transportation

2. BACKGROUND

Braishfield B has a single orifice plate meter stream using a gas chromatograph for CV determination and PTZ correction.

The differential pressure (DP) across the orifice plate is measured using two DP transmitters. One low ranged up to 50 mbar and one high ranged up to 500 mbar. The correct transmitter is automatically selected by the flow computer, switching up at 47.5 mbar and switching down at 45 mbar. A third standby DP transmitter is provided for discrepancy checking.

Following a DP discrepancy alarm (high DP versus standby DP) the CP11b (high DP transmitter check) failed on 27th April 2010, subsequently passing following re-calibration (This meter error has been identified as SO006).

During the annual validation the CP11a (low DP transmitter check) test failed on 15th June 2010; the CP11b (high DP transmitter check) test failed on 16th June 2010 and the CP10 (pressure transmitter check) test failed on 16th June 2010. All checks subsequently passed following re-calibration (This meter error has been notified as SO005).

3. ERROR QUANTIFICATION AND IMPACT

This analysis and meter error report include the errors notified as SO005 and SO006 which run concurrently.

The low DP, high DP and pressure measurements were corrected for the 'As Found' errors shown in Table 1, Table 2&3 and Table 4 respectively when the recorded measurement was in the appropriate range.

Corrected DP (mbar)	CP11a Error (% span)	CP4b Error (% span)	Combined Error (% span)
0	-0.30875	-0.0018	-0.3105
12.51	-0.3224	0.0047	-0.31765
25.02	-0.3333	0.0019	-0.331375
37.52	-0.2898	0.0043	-0.285475
50.03	-0.27785	0.0118	-0.266025

Table 1 – LDP As Found errors SO005 (26/01/2010 – 15/06/2010)

Corrected DP (mbar)	CP11b Error (% span)	CP4c Error (% span)	Combined Error (% span)
0	0.5469	-0.0100	0.5369
125.07	0.31715	0.0042	0.32135
250.14	0.31265	0.0138	0.3264
375.21	0.2629	0.0163	0.27925
500.28	0.11965	0.0198	0.13949

Table 2 – HDP As Found errors SO006 (25/04/2010 – 27/04/2010)

Corrected DP (mbar)	CP11b Error (% span)	CP4c Error (% span)	Combined Error (% span)
0	-0.2788	0.0170	-0.2618
125.07	-0.25565	0.0022	-0.2534875
250.14	-0.2644	0.0047	-0.25968
375.22	-0.2529	0.0039	-0.248965
500.29	-0.6079	0.0101	-0.597815

Table 3 – HDP As Found errors SO005 (27/04/2010 – 16/06/2010)

Corrected DP (mbar)	CP10 Error (% span)	CP4a Error (% span)	Combined Error (% span)
0	0	0.0138	0.0138
20.01	0.0823	0.0213	0.10355
40.02	0.1774	0.0231	0.200525
60.03	0.2568	0.0225	0.2793
80.04	0.34505	0.0425	0.38755

Table 4 – FP As Found errors SO005 (09/04/2010 – 16/06/2010)

A further correction factor of 2.847 was applied to the measured and corrected DPs for the duration of the SMER SO001 error period (26th January 2010 to 26th April 2010) to account for the correction that has already been made. The flow rates and daily volumes were recalculated using the measured DP & pressure and the corrected DP & pressure. The error was calculated on a daily basis as the difference between volume totals using measured and corrected DP & pressure.

The overall error is an under-registration of 0.1492 %.

4. CAUSES

SO006 - DP discrepancy alarms triggered for high DP; high DP transmitter failed during subsequent checks.

SO005 - Low DP transmitter, high DP transmitter and pressure transmitter checks failed during routine validation.

5. RECOMMENDATIONS AND LEARNING

Failures of this type will occur occasionally, if the same checks fail regularly then it suggests a fundamental problem with the equipment being tested and repairs or replacements should be made.

The start of the error cannot be identified therefore the total error to be reconciled should be halved in accordance with the Offtake Arrangements Document. Appendix A shows the daily correction factors, which have already been halved. On 10th June 2010 a very small daily volume was registered on Gemini but no valid DPs are shown in the RBD data and hence no daily volume has been calculated in this analysis. A correction factor has been applied to this day equal to the correction factor for the first previous day on which flows were recorded (i.e. 8th June 2010).

REFERENCES

HPMIS Database

BraishfieldA_SO005_SO006_Data.xls – calculation spreadsheet

BraishfieldA_SO005_SO006_Summary.xls – results spreadsheet

VERSION HISTORY

<i>Version</i>	<i>Changes</i>	<i>Author</i>	<i>Date</i>
O	<i>Original</i>	<i>H.Colbourne</i>	<i>21/03/2013</i>

DISTRIBUTION

Scotia Gas Networks

APPENDIX A – Daily Correction Factors

The daily correction factors shown below have been halved in accordance with the Offtake Arrangements Document because the start date of the errors are unknown.

*On 10th June 2010 a very small daily volume was registered on Gemini but no valid DPs are shown in the RBD data and hence no daily volume has been calculated in this analysis. A correction factor has been applied to this day equal to the correction factor for the first previous day on which flows were recorded (i.e. 8th June 2010).

Gas Day	Daily Correction Factor
25/01/2010	1.000000
26/01/2010	1.000166
27/01/2010	1.000433
28/01/2010	1.000394
29/01/2010	1.000245
30/01/2010	1.000168
31/01/2010	1.000033
01/02/2010	1.000152
02/02/2010	1.000032
03/02/2010	1.000382
04/02/2010	1.000317
05/02/2010	1.000535
06/02/2010	1.000277
07/02/2010	1.000140
08/02/2010	1.000177
09/02/2010	1.000000
10/02/2010	1.000000
11/02/2010	1.000016
12/02/2010	1.000051
13/02/2010	1.000325
14/02/2010	1.000217
15/02/2010	1.000233
16/02/2010	1.000164
17/02/2010	1.000647
18/02/2010	1.000528
19/02/2010	1.000076
20/02/2010	1.000011
21/02/2010	1.000000
22/02/2010	1.000009
23/02/2010	1.000000
24/02/2010	1.000648
25/02/2010	1.000087
26/02/2010	1.000000
27/02/2010	1.000224
28/02/2010	1.000000

Gas Day	Daily Correction Factor
01/03/2010	1.000148
02/03/2010	1.000132
03/03/2010	1.000003
04/03/2010	1.000015
05/03/2010	1.000777
06/03/2010	1.000459
07/03/2010	1.000184
08/03/2010	1.000003
09/03/2010	1.000644
10/03/2010	1.000219
11/03/2010	1.000000
12/03/2010	1.000184
13/03/2010	1.000794
14/03/2010	1.000536
15/03/2010	1.000052
16/03/2010	1.000391
17/03/2010	1.000915
18/03/2010	1.000908
19/03/2010	1.000666
20/03/2010	1.000978
21/03/2010	1.000613
22/03/2010	1.000764
23/03/2010	1.000593
24/03/2010	1.001422
25/03/2010	1.001181
26/03/2010	1.000869
27/03/2010	1.000093
28/03/2010	1.000141
29/03/2010	1.001032
30/03/2010	1.000567
31/03/2010	1.000178
01/04/2010	1.000420
02/04/2010	1.000364
03/04/2010	1.000666
04/04/2010	1.000532

Gas Day	Daily Correction Factor
05/04/2010	1.000633
06/04/2010	1.001227
07/04/2010	1.000690
08/04/2010	1.001696
09/04/2010	1.000179
10/04/2010	1.000630
11/04/2010	0.999952
12/04/2010	1.000218
13/04/2010	1.000203
14/04/2010	0.999417
15/04/2010	0.999724
16/04/2010	1.000099
17/04/2010	1.000383
18/04/2010	1.000215
19/04/2010	0.999772
20/04/2010	0.999588
21/04/2010	0.999831
22/04/2010	1.000336
23/04/2010	1.000168
24/04/2010	1.000917
25/04/2010	0.999502
26/04/2010	0.995065
27/04/2010	0.999374
28/04/2010	1.003123
29/04/2010	1.002104
30/04/2010	1.002379
01/05/2010	1.001019
02/05/2010	1.003359
03/05/2010	1.001703
04/05/2010	1.000869
05/05/2010	1.001469
06/05/2010	1.002234
07/05/2010	1.001891
08/05/2010	1.001015
09/05/2010	1.001315
10/05/2010	1.001554
11/05/2010	1.001591
12/05/2010	1.001449
13/05/2010	1.002966
14/05/2010	1.003700
15/05/2010	1.002909
16/05/2010	1.003910
17/05/2010	1.001951
18/05/2010	1.000719
19/05/2010	1.002700
20/05/2010	1.000486

Gas Day	Daily Correction Factor
21/05/2010	1.001085
22/05/2010	1.002481
23/05/2010	1.000973
24/05/2010	1.002473
25/05/2010	1.004183
26/05/2010	1.004698
27/05/2010	1.002826
28/05/2010	1.001795
29/05/2010	1.001970
30/05/2010	1.003491
31/05/2010	1.004689
01/06/2010	1.003039
02/06/2010	1.003750
03/06/2010	1.004221
04/06/2010	1.003610
05/06/2010	1.005108
06/06/2010	1.004489
07/06/2010	1.003029
08/06/2010	1.000997
09/06/2010	1.000000
*10/06/2010	1.000997
11/06/2010	1.000000
12/06/2010	1.000000
13/06/2010	1.000000
14/06/2010	1.000000
15/06/2010	0.999777
16/06/2010	1.000000