

METER ERROR REPORT**DRAFT**

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	Ross	
LDZ	SW	
START DATE (actual)	09:35 on 20 th March 2009	
LAST GOOD DATE		
END DATE	12:06 on 27 th August 2009	
SIZE OF ERROR (No reconciliation required if under 0.1%)	0.354 % under-registration	
ESTIMATE – Y/N?	N	
ROOT CAUSE	Failed validation checks for pressure transmitter and temperature ADC	
ANALYSIS	Recalculation of volumes using corrected pressure and temperature	
METER TYPE	Turbine	
AUTHOR	B. Kirkman	
CHECKED BY	A. Niazi	
ACCEPTED BY WWU NETWORK		
RECONCILIATION	Distribution	Transportation

2. BACKGROUND

Ross has two turbine meter streams using a gas chromatograph for CV determination and PTZ correction.

During the validation in August 2009 the CP5 (ADC Check (RTD Input)) and CP10 (Gauge Pressure Tramitter Check) tests failed on meter stream B both subsequently passing following re-calibration. Stream B had been the duty stream since the Stream A turbine was removed at 09:35 on 20th March 2009. Before this Stream A had been the duty stream.

3. ERROR QUANTIFICATION AND IMPACT

The pressure and temperature were corrected for the 'As Found' errors as shown in Tables 1 and 2.

Expected Temp (°C)	Displayed Temp (°C)	Error (°C)
-10.0	-10.48	-0.48
2.5	2.08	-0.42
15.0	14.50	-0.50
27.5	27.10	-0.40
40.0	39.57	-0.43

Table 1 – CP5 As Found errors

Corrected Pressure (barg)	Expected Current (mA)	Displayed Current (mA)	Error (%span)
0.000	4.000	3.961	-0.2438
20.012	8.002	7.961	-0.2588
40.024	12.005	11.965	-0.2488
60.036	16.007	15.969	-0.2389
80.048	20.010	19.970	-0.2476
100.06			
80.048	20.010	19.970	-0.2476
60.036	16.007	15.969	-0.2389
40.024	12.005	11.969	-0.2238
20.012	8.002	7.963	-0.2463
0.000	4.000	3.961	-0.2438

Table 2 – CP10 As Found errors

The density, flow rates and daily volumes were recalculated using the corrected and the measured pressure and temperature inputs. The error

was calculated on a daily basis as the difference between volume totals using corrected and measured pressure and temperature inputs.

The total error for the period 20th March 2009 to 27th August 2009 was an under-registration of 0.354 %.

4. CAUSES

ADC check (RTD input) and gauge pressure transmitter check 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. There is a known problem with Omni flow computers such as the one used at Ross. The ADC calibration drifts over time causing the ADC check to go out of tolerance, for this reason consideration should be given to shortening the interval between ADC checks if the checks fail frequently.

As there is no defined start date for the error period the volume error, calculated using the Dvol figures and Daily Correction Factors in Appendix A should be halved.

REFERENCES

HPMIS Database

Ross003_Data.xls – calculation spreadsheet

Ross003_Summary.xls – results spreadsheet

VERSION HISTORY

<i>Version</i>	<i>Changes</i>	<i>Author</i>	<i>Date</i>
<i>O</i>	<i>Original</i>	<i>B. Kirkman</i>	<i>23/04/10</i>
<i>Rev1</i>		<i>S. Western</i>	<i>04/10/10</i>

DISTRIBUTION

Wales & West Utilities Plc

APPENDIX A – Daily Correction Factors

Gas Day	Daily Correction Factor
20-Mar-09	1.00290782
21-Mar-09	1.00375461
22-Mar-09	1.00374545
23-Mar-09	1.00376278
24-Mar-09	1.00375214
25-Mar-09	1.00370296
26-Mar-09	1.00373730
27-Mar-09	1.00372611
28-Mar-09	1.00372456
29-Mar-09	1.00374023
30-Mar-09	1.00375771
31-Mar-09	1.00370258
01-Apr-09	1.00371816
02-Apr-09	1.00370597
03-Apr-09	1.00375703
04-Apr-09	1.00361921
05-Apr-09	1.00367178
06-Apr-09	1.00371046
07-Apr-09	1.00370090
08-Apr-09	1.00368016
09-Apr-09	1.00365017
10-Apr-09	1.00364174
11-Apr-09	1.00363141
12-Apr-09	1.00361839
13-Apr-09	1.00365498
14-Apr-09	1.00361731
15-Apr-09	1.00362474
16-Apr-09	1.00367516
17-Apr-09	1.00371635
18-Apr-09	1.00363990
19-Apr-09	1.00363661
20-Apr-09	1.00362449
21-Apr-09	1.00357745
22-Apr-09	1.00358336
23-Apr-09	1.00358916
24-Apr-09	1.00357076
25-Apr-09	1.00357447
26-Apr-09	1.00356264
27-Apr-09	1.00361373
28-Apr-09	1.00361544
29-Apr-09	1.00359324
30-Apr-09	1.00358815
01-May-09	1.00359463
02-May-09	1.00360213
03-May-09	1.00358134
04-May-09	1.00363620
05-May-09	1.00358934

Gas Day	Daily Correction Factor
06-May-09	1.00362489
07-May-09	1.00357843
08-May-09	1.00357351
09-May-09	1.00357682
10-May-09	1.00354432
11-May-09	1.00361706
12-May-09	1.00356723
13-May-09	1.00355881
14-May-09	1.00354676
15-May-09	1.00353385
16-May-09	1.00354272
17-May-09	1.00353886
18-May-09	1.00354556
19-May-09	1.00357897
20-May-09	1.00351697
21-May-09	1.00353172
22-May-09	1.00354396
23-May-09	1.00351126
24-May-09	1.00328262
25-May-09	1.00314967
26-May-09	1.00345426
27-May-09	1.00359804
28-May-09	1.00356851
29-May-09	1.00357213
30-May-09	1.00351238
31-May-09	1.00354427
01-Jun-09	1.00354626
02-Jun-09	1.00352746
03-Jun-09	1.00353535
04-Jun-09	1.00348471
05-Jun-09	1.00350033
06-Jun-09	1.00353602
07-Jun-09	1.00355668
08-Jun-09	1.00355296
09-Jun-09	1.00356735
10-Jun-09	1.00357539
11-Jun-09	1.00353889
12-Jun-09	1.00351232
13-Jun-09	1.00346958
14-Jun-09	1.00350582
15-Jun-09	1.00355648
16-Jun-09	1.00355798
17-Jun-09	1.00354210
18-Jun-09	1.00356274
19-Jun-09	1.00356125
20-Jun-09	1.00359603
21-Jun-09	1.00356970

Gas Day	Daily Correction Factor
22-Jun-09	1.00354833
23-Jun-09	1.00351211
24-Jun-09	1.00354212
25-Jun-09	1.00351067
26-Jun-09	1.00350344
27-Jun-09	1.00348870
28-Jun-09	1.00349364
29-Jun-09	1.00345696
30-Jun-09	1.00346985
01-Jul-09	1.00347232
02-Jul-09	1.00350578
03-Jul-09	1.00343584
04-Jul-09	1.00339955
05-Jul-09	1.00338697
06-Jul-09	1.00350281
07-Jul-09	1.00341997
08-Jul-09	1.00346830
09-Jul-09	1.00350135
10-Jul-09	1.00342651
11-Jul-09	1.00350822
12-Jul-09	1.00346677
13-Jul-09	1.00353701
14-Jul-09	1.00353767
15-Jul-09	1.00348524
16-Jul-09	1.00340318
17-Jul-09	1.00346537
18-Jul-09	1.00347549
19-Jul-09	1.00347195
20-Jul-09	1.00347741
21-Jul-09	1.00346081
22-Jul-09	1.00354051
23-Jul-09	1.00338429
24-Jul-09	1.00346084
25-Jul-09	1.00345168
26-Jul-09	1.00348738
27-Jul-09	1.00344431
28-Jul-09	1.00339784
29-Jul-09	1.00344034
30-Jul-09	1.00342046
31-Jul-09	1.00340629
01-Aug-09	1.00342462
02-Aug-09	1.00340904
03-Aug-09	1.00340386
04-Aug-09	1.00346402
05-Aug-09	1.00341593
06-Aug-09	1.00343276
07-Aug-09	1.00344362
08-Aug-09	1.00348895
09-Aug-09	1.00337688
10-Aug-09	1.00342776

Gas Day	Daily Correction Factor
11-Aug-09	1.00347480
12-Aug-09	1.00344965
13-Aug-09	1.00339504
14-Aug-09	1.00343861
15-Aug-09	1.00350400
16-Aug-09	1.00346085
17-Aug-09	1.00352515
18-Aug-09	1.00348161
19-Aug-09	1.00336759
20-Aug-09	1.00344111
21-Aug-09	1.00350650
22-Aug-09	1.00344521
23-Aug-09	1.00336256
24-Aug-09	1.00341727
25-Aug-09	1.00343143
26-Aug-09	1.00330543
27-Aug-09	1.00089078