

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	Littleton Drew	
LDZ	SW	
START DATE (actual)	14 th July 2009	
LAST GOOD DATE		
END DATE	1 st March 2010	
SIZE OF ERROR (No reconciliation required if under 0.1%)	0.119 % under-registration	
ESTIMATE – Y/N?	N	
ROOT CAUSE	Incorrect k factors used in flow computer	
ANALYSIS	Recalculation of volumes using correct k factors	
METER TYPE	Turbine	
AUTHOR	B. Kirkman	
CHECKED BY	A. Niazi	
ACCEPTED BY WWU NETWORK		
RECONCILIATION	Distribution	Transportation

2. BACKGROUND

Littleton Drew has a single turbine meter stream using a gas tracker for PTZ correction.

The turbine meter (serial number: 102294) was removed for calibration on 14th May 2009, calibrated on 30th June 2009 and reinstated on 14th July 2009.

The calibration procedure for the turbine meter produces a series of corrections for the meter based on the calibration errors. These are entered into the flow computer in paired points of frequency (Hz) and 'K factor' (pulses per cubic metre).

When the meter was reinstated the 'frequency / K factor' points were not updated until 1st March 2010 at 11:06.

3. ERROR QUANTIFICATION AND IMPACT

Once installed, the meter only operated on 4 days (3rd to 6th August 2009) before flowing continuously from 14th October 2009 onwards.

The daily volumes were recalculated using both the correct and incorrect 'K factors' as shown in Table 1.

Incorrect Values		Correct Values	
Frequency	K factor	Frequency	K factor
(Hz)	(pulses /m ³)	(Hz)	(pulses /m ³)
120	6756.37	118	6752.985
301	6762.45	304	6747.575
498	6773.27	498	6765.835
740	6773.95	743	6763.130
982	6775.30	978	6755.691
1250	6775.98	1232	6755.014

Table 1 – Frequency / K Factor pairs

The error was calculated on a daily basis as the difference between volume totals using correct and incorrect 'K factors'.

No data was available for the period between 14th and 19th October 2009 so a default daily correction has been applied to these days. This default correction is the mean of the daily correction factors between 20th and 31st October 2009.

The total error for the period 14th July 2009 to 1st March 2010 was an under-registration of 0.119 %.

4. CAUSES

The 'frequency / K factor' points were not entered into flow computer following reinstatement of the meter.

5. RECOMMENDATIONS AND LEARNING

When replacing or recalibrating the turbine meter it is important that the new details are entered into the flow computer correctly as they may be significantly different to the previous values. Following changes to the flow computer configuration it should be checked against the previous configuration to ensure that the correct values have been entered and nothing else has changed.

It is recommended that the error of 0.119 % under-registration be reconciled using the table in Appendix A.

REFERENCES

HPMIS Database

LittletonDrew_Data.xls – calculation spreadsheet

LittletonDrew_Summary.xls – results spreadsheet

Calibration Certificate 00072 for turbine meter 102294 from Bishop Auckland Test Facility, 21st September 1998

Calibration Certificate 05540 for turbine meter 102294 from GL Flow Centre (formerly Bishop Auckland Test Facility), 6th July 2009

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>

DISTRIBUTION

Wales & West Utilities Plc

APPENDIX A – Daily Correction Factors

Gas Day	Daily Correction Factor
03-Aug-09	1.00050126
04-Aug-09	1.00050126
05-Aug-09	1.00050126
06-Aug-09	1.00050126
14-Oct-09	1.00062805
15-Oct-09	1.00062805
16-Oct-09	1.00062805
17-Oct-09	1.00062805
18-Oct-09	1.00062805
19-Oct-09	1.00062805
20-Oct-09	1.00109068
21-Oct-09	1.00085820
22-Oct-09	1.00056411
23-Oct-09	1.00072214
24-Oct-09	1.00050126
25-Oct-09	1.00059048
26-Oct-09	1.00050231
27-Oct-09	1.00057461
28-Oct-09	1.00052323
29-Oct-09	1.00056969
30-Oct-09	1.00053863
31-Oct-09	1.00050126
01-Nov-09	1.00050126
02-Nov-09	1.00075500
03-Nov-09	1.00067477
04-Nov-09	1.00089007
05-Nov-09	1.00084591
06-Nov-09	1.00079856
07-Nov-09	1.00083904
08-Nov-09	1.00087447
09-Nov-09	1.00128601
10-Nov-09	1.00114524
11-Nov-09	1.00099785
12-Nov-09	1.00102131
13-Nov-09	1.00075679
14-Nov-09	1.00070270
15-Nov-09	1.00070008
16-Nov-09	1.00078916
17-Nov-09	1.00097985
18-Nov-09	1.00082493
19-Nov-09	1.00075856
20-Nov-09	1.00066116
21-Nov-09	1.00063016
22-Nov-09	1.00076574
23-Nov-09	1.00091442
24-Nov-09	1.00089832
25-Nov-09	1.00102703

Gas Day	Daily Correction Factor
26-Nov-09	1.00118542
27-Nov-09	1.00111354
28-Nov-09	1.00115087
29-Nov-09	1.00087137
30-Nov-09	1.00127235
01-Dec-09	1.00150706
02-Dec-09	1.00105685
03-Dec-09	1.00125526
04-Dec-09	1.00138929
05-Dec-09	1.00086864
06-Dec-09	1.00090602
07-Dec-09	1.00115638
08-Dec-09	1.00129322
09-Dec-09	1.00111093
10-Dec-09	1.00125805
11-Dec-09	1.00154190
12-Dec-09	1.00121183
13-Dec-09	1.00132212
14-Dec-09	1.00140391
15-Dec-09	1.00143929
16-Dec-09	1.00151540
17-Dec-09	1.00144630
18-Dec-09	1.00161884
19-Dec-09	1.00166980
20-Dec-09	1.00134939
21-Dec-09	1.00173058
22-Dec-09	1.00153700
23-Dec-09	1.00155219
24-Dec-09	1.00124775
25-Dec-09	1.00098182
26-Dec-09	1.00073337
27-Dec-09	1.00086077
28-Dec-09	1.00122969
29-Dec-09	1.00118125
30-Dec-09	1.00099026
31-Dec-09	1.00103264
01-Jan-10	1.00129987
02-Jan-10	1.00138630
03-Jan-10	1.00132522
04-Jan-10	1.00162576
05-Jan-10	1.00157667
06-Jan-10	1.00158920
07-Jan-10	1.00154231
08-Jan-10	1.00156299
09-Jan-10	1.00151762
10-Jan-10	1.00137975
11-Jan-10	1.00146450

Gas Day	Daily Correction Factor
12-Jan-10	1.00143848
13-Jan-10	1.00159704
14-Jan-10	1.00115128
15-Jan-10	1.00103709
16-Jan-10	1.00076677
17-Jan-10	1.00079789
18-Jan-10	1.00099120
19-Jan-10	1.00098823
20-Jan-10	1.00117867
21-Jan-10	1.00114442
22-Jan-10	1.00083909
23-Jan-10	1.00082180
24-Jan-10	1.00100472
25-Jan-10	1.00133299
26-Jan-10	1.00137841
27-Jan-10	1.00134670
28-Jan-10	1.00104693
29-Jan-10	1.00109961
30-Jan-10	1.00117376
31-Jan-10	1.00134382
01-Feb-10	1.00147394
02-Feb-10	1.00117457
03-Feb-10	1.00108279
04-Feb-10	1.00093774
05-Feb-10	1.00092583
06-Feb-10	1.00087309
07-Feb-10	1.00081824
08-Feb-10	1.00129383
09-Feb-10	1.00134518
10-Feb-10	1.00130908
11-Feb-10	1.00142526
12-Feb-10	1.00136600
13-Feb-10	1.00126928
14-Feb-10	1.00102008
15-Feb-10	1.00106751
16-Feb-10	1.00102002
17-Feb-10	1.00095644
18-Feb-10	1.00125150
19-Feb-10	1.00118413
20-Feb-10	1.00107491
21-Feb-10	1.00095975
22-Feb-10	1.00125992
23-Feb-10	1.00142809
24-Feb-10	1.00106255
25-Feb-10	1.00092522
26-Feb-10	1.00116554
27-Feb-10	1.00094187
28-Feb-10	1.00118811
01-Mar-10	1.00044437