

**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	Evesham	
LDZ	SW	
START DATE (actual)		
LAST GOOD DATE	28 <sup>th</sup> July 2011	
END DATE	1 <sup>st</sup> August 2012	
SIZE OF ERROR (No reconciliation required if under 0.1%)	1.016 % under-registration	
ESTIMATE – Y/N?		
ROOT CAUSE	Failed validation check for pressure transmitter	
ANALYSIS	Recalculation of volumes using corrected pressure	
METER TYPE	Turbine	
AUTHOR	B. Kirkman	
CHECKED BY	C. Jones	
ACCEPTED BY WWU NETWORK		
RECONCILIATION	Distribution	Transportation

## 2. BACKGROUND

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

On 1<sup>st</sup> August 2012 during the annual validation the CP10 (Gauge Pressure Transmitter Check) test failed on meter stream B, subsequently passing following re-calibration. Stream B had been the duty stream since the previous validation on 28<sup>th</sup> July 2011.

## 3. ERROR QUANTIFICATION AND IMPACT

The pressure was corrected for the 'As Found' errors shown in Table 1 taking into account the errors in analogue-to-digital conversion that also affected the pressure measurement. The pressure was between 20 and 40 barg for the duration of the error.

Corrected Pressure (barg)	CP10 Error (% span)	CP4a Error (% span)	Combined Error (% span)
0	0.05	0.0275	0.0775
20.012	-0.1279	0.02	-0.1079
40.025	-0.5557	0.0213	-0.5344
60.037	-1.0273	0.0138	-1.0135
80.049	-1.4864	0.0138	-1.4726

Table 1 – CP10 As Found errors

The density, flow rates and daily volumes were recalculated using the measured pressure and the corrected pressure. The error was calculated on a daily basis as the difference between volume totals using measured and corrected pressure.

## 4. CAUSES

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.

It is recommended that the error of 1.016 % under-registration is reconciled using the table in Appendix A. As the start date of the error cannot be identified only half of the error should be reconciled in accordance with the Offtake Agreements Document.



**REFERENCES**

HPMIS Database

Evesham\_Data1.xls – calculation spreadsheet (July 11 to Jan 12)

Evesham\_Data2.xls – calculation spreadsheet (Jan 12 to Aug 12)

Evesham\_Summary – 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>26/09/12</i>

**DISTRIBUTION**

*Wales & West Utilities Plc*

**APPENDIX A – Daily Correction Factors**

Where calculated (uncorrected) data differed significantly (>2%) from Gemini billed data a default correction factor has been used. The default correction factor is the average error excluding days where bad data was present or only part of the day was in error (=1.010174).

Gas Day	Daily Correction Factor
28-Jul-11	1.007463
29-Jul-11	1.010521
30-Jul-11	1.010543
31-Jul-11	1.010539
01-Aug-11	1.010174
02-Aug-11	1.010174
03-Aug-11	1.010174
04-Aug-11	1.010349
05-Aug-11	1.010352
06-Aug-11	1.010354
07-Aug-11	1.010352
08-Aug-11	1.010329
09-Aug-11	1.010325
10-Aug-11	1.010320
11-Aug-11	1.010323
12-Aug-11	1.010359
13-Aug-11	1.010373
14-Aug-11	1.010333
15-Aug-11	1.010326
16-Aug-11	1.010343
17-Aug-11	1.010353
18-Aug-11	1.010327
19-Aug-11	1.010352
20-Aug-11	1.010345
21-Aug-11	1.010345
22-Aug-11	1.010342
23-Aug-11	1.010325
24-Aug-11	1.010333
25-Aug-11	1.010339
26-Aug-11	1.010323
27-Aug-11	1.010331
28-Aug-11	1.010343
29-Aug-11	1.010333
30-Aug-11	1.010328
31-Aug-11	1.010336
01-Sep-11	1.010326
02-Sep-11	1.010330
03-Sep-11	1.010328
04-Sep-11	1.010341
05-Sep-11	1.010321
06-Sep-11	1.010335
07-Sep-11	1.007593
08-Sep-11	1.010331
09-Sep-11	1.010337

Gas Day	Daily Correction Factor
10-Sep-11	1.010360
11-Sep-11	1.010344
12-Sep-11	1.010337
13-Sep-11	1.010338
14-Sep-11	1.010328
15-Sep-11	1.010195
16-Sep-11	1.010349
17-Sep-11	1.010331
18-Sep-11	1.010344
19-Sep-11	1.010315
20-Sep-11	1.010312
21-Sep-11	1.010363
22-Sep-11	1.010333
23-Sep-11	1.010315
24-Sep-11	1.010309
25-Sep-11	1.010311
26-Sep-11	1.010303
27-Sep-11	1.009398
28-Sep-11	1.010271
29-Sep-11	1.010174
30-Sep-11	1.010253
01-Oct-11	1.010285
02-Oct-11	1.010288
03-Oct-11	1.010273
04-Oct-11	1.010278
05-Oct-11	1.010227
06-Oct-11	1.010220
07-Oct-11	1.010203
08-Oct-11	1.010196
09-Oct-11	1.010238
10-Oct-11	1.010215
11-Oct-11	1.010255
12-Oct-11	1.010252
13-Oct-11	1.010260
14-Oct-11	1.010254
15-Oct-11	1.010224
16-Oct-11	1.010210
17-Oct-11	1.010217
18-Oct-11	1.010188
19-Oct-11	1.010159
20-Oct-11	1.010165
21-Oct-11	1.010187
22-Oct-11	1.010196
23-Oct-11	1.010219

Gas Day	Daily Correction Factor
24-Oct-11	1.010223
25-Oct-11	1.010206
26-Oct-11	1.010155
27-Oct-11	1.010169
28-Oct-11	1.010180
29-Oct-11	1.010198
30-Oct-11	1.010266
31-Oct-11	1.010251
01-Nov-11	1.010244
02-Nov-11	1.010218
03-Nov-11	1.010268
04-Nov-11	1.010174
05-Nov-11	1.010219
06-Nov-11	1.010210
07-Nov-11	1.010164
08-Nov-11	1.010156
09-Nov-11	1.010169
10-Nov-11	1.010188
11-Nov-11	1.010179
12-Nov-11	1.010233
13-Nov-11	1.010256
14-Nov-11	1.010197
15-Nov-11	1.010172
16-Nov-11	1.010143
17-Nov-11	1.010170
18-Nov-11	1.010183
19-Nov-11	1.010188
20-Nov-11	1.010180
21-Nov-11	1.010180
22-Nov-11	1.010204
23-Nov-11	1.010179
24-Nov-11	1.010162
25-Nov-11	1.010179
26-Nov-11	1.010181
27-Nov-11	1.010214
28-Nov-11	1.010160
29-Nov-11	1.010179
30-Nov-11	1.010168
01-Dec-11	1.010153
02-Dec-11	1.010115
03-Dec-11	1.010156
04-Dec-11	1.010163
05-Dec-11	1.010107
06-Dec-11	1.010100
07-Dec-11	1.010124
08-Dec-11	1.010133
09-Dec-11	1.010121
10-Dec-11	1.010110
11-Dec-11	1.010130
12-Dec-11	1.010108

Gas Day	Daily Correction Factor
13-Dec-11	1.010101
14-Dec-11	1.010086
15-Dec-11	1.010084
16-Dec-11	1.010109
17-Dec-11	1.010086
18-Dec-11	1.010094
19-Dec-11	1.010102
20-Dec-11	1.010106
21-Dec-11	1.010134
22-Dec-11	1.010156
23-Dec-11	1.010155
24-Dec-11	1.010133
25-Dec-11	1.010187
26-Dec-11	1.010196
27-Dec-11	1.010190
28-Dec-11	1.010167
29-Dec-11	1.010148
30-Dec-11	1.010154
31-Dec-11	1.010198
01-Jan-12	1.010184
02-Jan-12	1.010146
03-Jan-12	1.010126
04-Jan-12	1.010109
05-Jan-12	1.010141
06-Jan-12	1.010141
07-Jan-12	1.010173
08-Jan-12	1.010177
09-Jan-12	1.010177
10-Jan-12	1.010157
11-Jan-12	1.010167
12-Jan-12	1.010167
13-Jan-12	1.010119
14-Jan-12	1.010103
15-Jan-12	1.010095
16-Jan-12	1.010052
17-Jan-12	1.010078
18-Jan-12	1.010153
19-Jan-12	1.010155
20-Jan-12	1.010151
21-Jan-12	1.010124
22-Jan-12	1.010107
23-Jan-12	1.010091
24-Jan-12	1.010120
25-Jan-12	1.010168
26-Jan-12	1.010158
27-Jan-12	1.010133
28-Jan-12	1.010119
29-Jan-12	1.010075
30-Jan-12	1.010056
31-Jan-12	1.010074

Gas Day	Daily Correction Factor
01-Feb-12	1.010055
02-Feb-12	1.010057
03-Feb-12	1.010045
04-Feb-12	1.010046
05-Feb-12	1.010112
06-Feb-12	1.010094
07-Feb-12	1.010050
08-Feb-12	1.010029
09-Feb-12	1.010037
10-Feb-12	1.010026
11-Feb-12	1.010043
12-Feb-12	1.010098
13-Feb-12	1.010138
14-Feb-12	1.010126
15-Feb-12	1.010149
16-Feb-12	1.010173
17-Feb-12	1.010177
18-Feb-12	1.010151
19-Feb-12	1.010145
20-Feb-12	1.010142
21-Feb-12	1.010173
22-Feb-12	1.010168
23-Feb-12	1.010224
24-Feb-12	1.010217
25-Feb-12	1.010200
26-Feb-12	1.010149
27-Feb-12	1.010126
28-Feb-12	1.010137
29-Feb-12	1.010166
01-Mar-12	1.010151
02-Mar-12	1.010144
03-Mar-12	1.010153
04-Mar-12	1.010094
05-Mar-12	1.010081
06-Mar-12	1.010093
07-Mar-12	1.010108
08-Mar-12	1.010116
09-Mar-12	1.010145
10-Mar-12	1.010173
11-Mar-12	1.010196
12-Mar-12	1.010167
13-Mar-12	1.010129
14-Mar-12	1.010129
15-Mar-12	1.010077
16-Mar-12	1.010105
17-Mar-12	1.010134
18-Mar-12	1.010119
19-Mar-12	1.010113
20-Mar-12	1.010151
21-Mar-12	1.010168

Gas Day	Daily Correction Factor
22-Mar-12	1.010160
23-Mar-12	1.010197
24-Mar-12	1.010229
25-Mar-12	1.010270
26-Mar-12	1.010263
27-Mar-12	1.010247
28-Mar-12	1.010267
29-Mar-12	1.010301
30-Mar-12	1.010279
31-Mar-12	1.010222
01-Apr-12	1.010242
02-Apr-12	1.010238
03-Apr-12	1.010152
04-Apr-12	1.010091
05-Apr-12	1.010131
06-Apr-12	1.010147
07-Apr-12	1.010174
08-Apr-12	1.010198
09-Apr-12	1.010177
10-Apr-12	1.010177
11-Apr-12	1.010152
12-Apr-12	1.010146
13-Apr-12	1.010149
14-Apr-12	1.010151
15-Apr-12	1.010144
16-Apr-12	1.010046
17-Apr-12	1.010051
18-Apr-12	1.010063
19-Apr-12	1.010082
20-Apr-12	1.010085
21-Apr-12	1.010133
22-Apr-12	1.010176
23-Apr-12	1.010110
24-Apr-12	1.010112
25-Apr-12	1.010085
26-Apr-12	1.010158
27-Apr-12	1.010145
28-Apr-12	1.010121
29-Apr-12	1.010056
30-Apr-12	1.010121
01-May-12	1.010166
02-May-12	1.010206
03-May-12	1.010156
04-May-12	1.010178
05-May-12	1.010180
06-May-12	1.010208
07-May-12	1.010173
08-May-12	1.010258
09-May-12	1.010239
10-May-12	1.010250

Gas Day	Daily Correction Factor
11-May-12	1.010236
12-May-12	1.010235
13-May-12	1.010239
14-May-12	1.010235
15-May-12	1.010198
16-May-12	1.010208
17-May-12	1.010234
18-May-12	1.010210
19-May-12	1.010219
20-May-12	1.010219
21-May-12	1.010245
22-May-12	1.010303
23-May-12	1.010300
24-May-12	1.010288
25-May-12	1.010310
26-May-12	1.010321
27-May-12	1.010316
28-May-12	1.010316
29-May-12	1.010323
30-May-12	1.010324
31-May-12	1.010303
01-Jun-12	1.010309
02-Jun-12	1.010297
03-Jun-12	1.010233
04-Jun-12	1.010262
05-Jun-12	1.010238
06-Jun-12	1.010295
07-Jun-12	1.010261
08-Jun-12	1.010251
09-Jun-12	1.010278
10-Jun-12	1.010287
11-Jun-12	1.010238
12-Jun-12	1.010239
13-Jun-12	1.010257
14-Jun-12	1.010263
15-Jun-12	1.010298
16-Jun-12	1.010277
17-Jun-12	1.010298
18-Jun-12	1.010308
19-Jun-12	1.010300
20-Jun-12	1.010300
21-Jun-12	1.010271
22-Jun-12	1.010269
23-Jun-12	1.010302
24-Jun-12	1.010308
25-Jun-12	1.010321
26-Jun-12	1.010304
27-Jun-12	1.010309
28-Jun-12	1.010320
29-Jun-12	1.010288

Gas Day	Daily Correction Factor
30-Jun-12	1.010290
01-Jul-12	1.010282
02-Jul-12	1.010289
03-Jul-12	1.010293
04-Jul-12	1.010320
05-Jul-12	1.010320
06-Jul-12	1.010316
07-Jul-12	1.010306
08-Jul-12	1.010303
09-Jul-12	1.010315
10-Jul-12	1.010297
11-Jul-12	1.010317
12-Jul-12	1.010323
13-Jul-12	1.010329
14-Jul-12	1.010310
15-Jul-12	1.010308
16-Jul-12	1.010308
17-Jul-12	1.010334
18-Jul-12	1.010325
19-Jul-12	1.010325
20-Jul-12	1.010328
21-Jul-12	1.010323
22-Jul-12	1.010330
23-Jul-12	1.010325
24-Jul-12	1.010354
25-Jul-12	1.010413
26-Jul-12	1.010425
27-Jul-12	1.010417
28-Jul-12	1.010409
29-Jul-12	1.010388
30-Jul-12	1.010262
31-Jul-12	1.010332
01-Aug-12	1.003001