

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	Kenn	
LDZ	SW	
START DATE (actual)	26 th March 2012	
LAST GOOD DATE		
END DATE	22 nd March 2013	
SIZE OF ERROR (No reconciliation required if under 0.1%)	0.1107% over-registration	
ESTIMATE – Y/N?		
ROOT CAUSE	Stream 1 and 2 turbine frequency flow computer inputs swapped	
ANALYSIS	Recalculation of volumes using correct inputs and k-factors	
METER TYPE	Turbine	
AUTHOR	H. Colbourne	
CHECKED BY	B. Kirkman	
ACCEPTED BY SGN NETWORK		
RECONCILIATION	Distribution	Transportation

2. BACKGROUND

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

During maintenance work between 24th and 25th March 2012 the flow computer inputs for the two turbine meters were switched. This meant that when real flow was passing through stream 1 it was input as stream 2 and vice versa. The error was present from 26th March 2012 until 22nd March 2013, at which time the inputs were switched back and the error resolved.

3. ERROR QUANTIFICATION AND IMPACT

The flow rates and daily volumes were recalculated using the inputs and K-factors for the corresponding stream. The K-factors are shown in Table 1.

Stream 1 (Serial no. 63108)		Stream 2 (Serial no. 63109)	
Frequency Test (Hz)	Calculated K-Factor (pls/m ³)	Frequency Test (Hz)	Calculated K-Factor (pls/m ³)
58.8628	635.6439	57.54	631.4596
115.3739	636.0482	119.27	631.0026
290.8443	635.9207	291.89	631.2652
460.0942	635.7109	454.78	631.4903
814.5130	634.2943	815.87	631.9063
1155.1883	634.5394	1148.93	632.1650

Table 1 – Calculated K-Factors

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

The overall error is an over-registration of 0.1107%.

4. CAUSES

Stream 1 and 2 inputs were swapped during maintenance work.

5. RECOMMENDATIONS AND LEARNING

The overall error is an over-registration of 0.1107%. It is recommended that the error is reconciled using the daily correction factors shown in Appendix A.

On a few days there was a small discrepancy between daily volumes registered on Gemini and in the RBD data, typically due to manual in-day corrections during validation periods. A correction factor has been applied to these days based on the average of the surrounding correction factors, as below:

27th March 2012 – Average of 26th and 28th March used for correction

28th April 2012 – Average of 26th to 29th April used for correction

16th March 2013 – Average of 14th to 18th March used for correction

REFERENCES

HPMIS Database

Kenn_Data1203_1209.xlsx – calculation spreadsheet Part 1

Kenn_Data1210_1303.xlsx – calculation spreadsheet Part 2

Kenn_Summary.xlsx – 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>24/06/2013</i>

DISTRIBUTION

Wales and West Utilities

APPENDIX A – Daily Correction Factors

The table below gives the daily correction factors which should be used to reconcile the error.

*On a few days there was a small discrepancy between daily volumes registered on Gemini and in the RBD data, typically due to manual in-day corrections during validation periods. A correction factor has been applied to these days based on the average of the surrounding correction factors, as below:

27th March 2012 – Average of 26th and 28th March used for correction

28th April 2012 – Average of 26th to 29th April used for correction

16th March 2013 – Average of 14th to 18th March used for correction

Gas Day	Daily Correction Factor
20/03/2012	1.000000
21/03/2012	1.000000
22/03/2012	1.000000
23/03/2012	1.000000
24/03/2012	1.000000
25/03/2012	1.000000
26/03/2012	1.029422
*27/03/2012	1.029719
28/03/2012	1.030016
29/03/2012	1.000000
30/03/2012	1.000000
31/03/2012	1.003329
01/04/2012	0.975376
02/04/2012	0.974170
03/04/2012	1.006021
04/04/2012	0.989944
05/04/2012	0.986980
06/04/2012	1.021802
07/04/2012	1.000000
08/04/2012	1.000000
09/04/2012	1.000000
10/04/2012	1.037884
11/04/2012	0.990595
12/04/2012	0.989187
13/04/2012	1.000480
14/04/2012	0.989061
15/04/2012	1.011316
16/04/2012	1.000000
17/04/2012	1.000000
18/04/2012	0.993192
19/04/2012	1.001372

Gas Day	Daily Correction Factor
20/04/2012	1.004799
21/04/2012	1.003763
22/04/2012	1.001516
23/04/2012	0.986654
24/04/2012	1.030696
25/04/2012	0.982490
26/04/2012	1.016913
27/04/2012	1.007562
*28/04/2012	1.004440
29/04/2012	0.988845
30/04/2012	1.000000
01/05/2012	1.000000
02/05/2012	1.000000
03/05/2012	1.000000
04/05/2012	1.000000
05/05/2012	1.000000
06/05/2012	1.000000
07/05/2012	1.000000
08/05/2012	1.000000
09/05/2012	1.014988
10/05/2012	1.000000
11/05/2012	1.000000
12/05/2012	1.069264
13/05/2012	1.000000
14/05/2012	1.000000
15/05/2012	1.000000
16/05/2012	1.000000
17/05/2012	1.000000
18/05/2012	1.000000
19/05/2012	1.000000
20/05/2012	1.000000

Gas Day	Daily Correction Factor
21/05/2012	1.000000
22/05/2012	1.000000
23/05/2012	1.000000
24/05/2012	1.000000
25/05/2012	1.046514
26/05/2012	1.057243
27/05/2012	1.029832
28/05/2012	1.000000
29/05/2012	1.018033
30/05/2012	1.056138
31/05/2012	1.055081
01/06/2012	1.029196
02/06/2012	1.000889
03/06/2012	1.020034
04/06/2012	1.017432
05/06/2012	1.000000
06/06/2012	1.022657
07/06/2012	0.999124
08/06/2012	1.010591
09/06/2012	1.033524
10/06/2012	1.000000
11/06/2012	1.000000
12/06/2012	1.000000
13/06/2012	1.012913
14/06/2012	1.000314
15/06/2012	1.019800
16/06/2012	1.002711
17/06/2012	1.023014
18/06/2012	1.025612
19/06/2012	1.034481
20/06/2012	1.012582
21/06/2012	0.999084
22/06/2012	1.021886
23/06/2012	1.022242
24/06/2012	1.033952
25/06/2012	1.028907
26/06/2012	1.024310
27/06/2012	1.025059
28/06/2012	1.037673
29/06/2012	1.020919
30/06/2012	1.024068
01/07/2012	1.022759
02/07/2012	1.016984
03/07/2012	1.011177
04/07/2012	1.026245
05/07/2012	1.025324

Gas Day	Daily Correction Factor
06/07/2012	1.016258
07/07/2012	1.001568
08/07/2012	1.038444
09/07/2012	1.011697
10/07/2012	1.016498
11/07/2012	1.022485
12/07/2012	1.000879
13/07/2012	1.023996
14/07/2012	1.012158
15/07/2012	1.018104
16/07/2012	1.018653
17/07/2012	1.030607
18/07/2012	1.025528
19/07/2012	1.029662
20/07/2012	1.024723
21/07/2012	1.032476
22/07/2012	1.031171
23/07/2012	1.040342
24/07/2012	1.043707
25/07/2012	1.051401
26/07/2012	1.045982
27/07/2012	1.035818
28/07/2012	1.017788
29/07/2012	1.016709
30/07/2012	1.018075
31/07/2012	1.023431
01/08/2012	1.016335
02/08/2012	1.023692
03/08/2012	1.028518
04/08/2012	1.021794
05/08/2012	0.997163
06/08/2012	1.011397
07/08/2012	1.017895
08/08/2012	1.022482
09/08/2012	1.042430
10/08/2012	1.031981
11/08/2012	1.021603
12/08/2012	1.026659
13/08/2012	1.014947
14/08/2012	1.028633
15/08/2012	1.013244
16/08/2012	1.013771
17/08/2012	1.029202
18/08/2012	1.032262
19/08/2012	1.025961
20/08/2012	1.030095

Gas Day	Daily Correction Factor
21/08/2012	1.012708
22/08/2012	1.014982
23/08/2012	1.014192
24/08/2012	1.001738
25/08/2012	1.005740
26/08/2012	1.013101
27/08/2012	1.004463
28/08/2012	1.025603
29/08/2012	1.000015
30/08/2012	1.005291
31/08/2012	1.011488
01/09/2012	1.009704
02/09/2012	1.008109
03/09/2012	1.027059
04/09/2012	1.013423
05/09/2012	1.019231
06/09/2012	1.013277
07/09/2012	1.017363
08/09/2012	1.006913
09/09/2012	1.013803
10/09/2012	1.010455
11/09/2012	1.003761
12/09/2012	1.008968
13/09/2012	1.021312
14/09/2012	1.021133
15/09/2012	1.030161
16/09/2012	1.008249
17/09/2012	1.004315
18/09/2012	1.001778
19/09/2012	1.002101
20/09/2012	0.998143
21/09/2012	0.999181
22/09/2012	1.000296
23/09/2012	0.984202
24/09/2012	0.998492
25/09/2012	1.002148
26/09/2012	0.996305
27/09/2012	1.002318
28/09/2012	0.997908
29/09/2012	0.997210
30/09/2012	1.004376
01/10/2012	0.992714
02/10/2012	0.991160
03/10/2012	0.987640
04/10/2012	0.998569
05/10/2012	0.995248

Gas Day	Daily Correction Factor
06/10/2012	0.991809
07/10/2012	1.002815
08/10/2012	1.006925
09/10/2012	0.990175
10/10/2012	0.994194
11/10/2012	1.001088
12/10/2012	0.984589
13/10/2012	0.987088
14/10/2012	0.989257
15/10/2012	0.994547
16/10/2012	0.998603
17/10/2012	1.000063
18/10/2012	0.995629
19/10/2012	0.992123
20/10/2012	0.995424
21/10/2012	1.003345
22/10/2012	0.999048
23/10/2012	1.001198
24/10/2012	0.996802
25/10/2012	0.995746
26/10/2012	0.976854
27/10/2012	0.979611
28/10/2012	0.985553
29/10/2012	0.988246
30/10/2012	0.992351
31/10/2012	0.986442
01/11/2012	0.983442
02/11/2012	0.979262
03/11/2012	0.981846
04/11/2012	0.981559
05/11/2012	0.980205
06/11/2012	0.991588
07/11/2012	0.989997
08/11/2012	0.992262
09/11/2012	0.988625
10/11/2012	0.985237
11/11/2012	0.990326
12/11/2012	0.994671
13/11/2012	0.997488
14/11/2012	0.992939
15/11/2012	0.988849
16/11/2012	0.992452
17/11/2012	0.984000
18/11/2012	0.988563
19/11/2012	0.997113
20/11/2012	0.995383

Gas Day	Daily Correction Factor
21/11/2012	0.989173
22/11/2012	0.988703
23/11/2012	0.984887
24/11/2012	0.987572
25/11/2012	0.987155
26/11/2012	0.985883
27/11/2012	0.981987
28/11/2012	0.975298
29/11/2012	0.974064
30/11/2012	0.978687
01/12/2012	0.977901
02/12/2012	0.983592
03/12/2012	0.982602
04/12/2012	0.976390
05/12/2012	0.973920
06/12/2012	0.977166
07/12/2012	0.979692
08/12/2012	0.984193
09/12/2012	0.982015
10/12/2012	0.976168
11/12/2012	0.975451
12/12/2012	0.976568
13/12/2012	0.980375
14/12/2012	0.986553
15/12/2012	0.983964
16/12/2012	0.985222
17/12/2012	0.986111
18/12/2012	0.987543
19/12/2012	0.997839
20/12/2012	0.989961
21/12/2012	0.990618
22/12/2012	1.007346
23/12/2012	0.995140
24/12/2012	0.991859
25/12/2012	0.984931
26/12/2012	0.988729
27/12/2012	0.985833
28/12/2012	0.999546
29/12/2012	0.985649
30/12/2012	0.992005
31/12/2012	0.988337
01/01/2013	0.984511
02/01/2013	0.997229
03/01/2013	0.999409
04/01/2013	0.997172
05/01/2013	0.990615

Gas Day	Daily Correction Factor
06/01/2013	0.988277
07/01/2013	0.993559
08/01/2013	0.997556
09/01/2013	0.992613
10/01/2013	0.983491
11/01/2013	0.985923
12/01/2013	0.984648
13/01/2013	0.980529
14/01/2013	0.977866
15/01/2013	0.983857
16/01/2013	0.980341
17/01/2013	0.979106
18/01/2013	0.973293
19/01/2013	0.974373
20/01/2013	0.972943
21/01/2013	0.977605
22/01/2013	0.974387
23/01/2013	0.975236
24/01/2013	0.984400
25/01/2013	0.983374
26/01/2013	1.000273
27/01/2013	0.990706
28/01/2013	0.996648
29/01/2013	1.007946
30/01/2013	0.999676
31/01/2013	0.996028
01/02/2013	0.989222
02/02/2013	0.986505
03/02/2013	0.999900
04/02/2013	0.992074
05/02/2013	0.986714
06/02/2013	0.983879
07/02/2013	0.982507
08/02/2013	0.988969
09/02/2013	0.990374
10/02/2013	0.987014
11/02/2013	0.983341
12/02/2013	0.981958
13/02/2013	0.987677
14/02/2013	0.992986
15/02/2013	0.997730
16/02/2013	0.995351
17/02/2013	0.995077
18/02/2013	0.994509
19/02/2013	0.992595
20/02/2013	0.981600

Gas Day	Daily Correction Factor
21/02/2013	0.975750
22/02/2013	0.976702
23/02/2013	0.980070
24/02/2013	0.977833
25/02/2013	0.983333
26/02/2013	0.983276
27/02/2013	0.979099
28/02/2013	0.987501
01/03/2013	0.988294
02/03/2013	0.982990
03/03/2013	0.984624
04/03/2013	0.990054
05/03/2013	1.007914
06/03/2013	1.007652
07/03/2013	0.998583
08/03/2013	1.008514
09/03/2013	1.000276
10/03/2013	0.978067
11/03/2013	0.975516
12/03/2013	0.981793
13/03/2013	0.990296
14/03/2013	0.999294
15/03/2013	0.993358
*16/03/2013	1.003156
17/03/2013	1.004813
18/03/2013	1.015158
19/03/2013	1.002550
20/03/2013	1.001623
21/03/2013	0.998078
22/03/2013	0.999396