

METER ERROR REPORTFINAL

Reconcile?	Y
Safety Issue?	N
Thesis Report No.	

## 1. EXECUTIVE SUMMARY

SITE NAME	Aylesbeare	
LDZ	SW	
START DATE (actual)	24th October 2010 (13:08)	
LAST GOOD DATE		
END DATE	24th October 2010 (18:02)	
SIZE OF ERROR (No reconciliation required if under 0.1%)	53,392.26 SCM over registration (equivalent to 6.886% )	
ESTIMATE – Y/N?		
ROOT CAUSE	Pressure transducer locked up.	
ANALYSIS	HPMIS RBD Data	
METER TYPE	Orifice Plate	
AUTHOR	S Western	
CHECKED BY	C Stock	
ACCEPTED BY UKD NETWORK		
RECONCILIATION	Distribution	Transportation

**2. BACKGROUND**

Gas is supplied to part of the South West LDZ, Wales & West Utilities Network, at Aylesbeare FWACV offtake. The site metering system comprises a single Orifice meter with an isolated bypass.

During a period of 4hr 54mins (13:08 to 18:02) on Gas Day 24<sup>th</sup> October 2010, for some undiscovered reason the pressure transducer locked. This caused the standard flow rate to be incorrectly calculated. The condition was rectified by turning the power to the instrument off and then back on again.

**3. ERROR QUANTIFICATION AND IMPACT**

The RBD data was reviewed before and after the pressure transducer (PT) locked up. The PT readings, 5 prior and 5 after, were averaged to estimate the actual pressure reading during the period of the PT locking up. See spreadsheet.

Using the HPMIS orifice plate design calculation (See Fig. 1a & 1b) together with the 4 minute RBD and gas composition data the volume flow for each 4/5 minute period was calculated. In each instance, the volume flows for the locked up PT and the estimated PT reading were calculated. By comparing these calculated flows over the period of the PT locking up it was estimated that orifice metering system over-registered 53,392.26 scm of gas.

From HPMIS, the Dvol for Gas Day the 24<sup>th</sup> of October 2010 was 0.775372mscm so the over-registration equates to 6.886% of Dvol. See spreadsheet.

Fig. 1a - HPMIS screen shot for flow calculation using locked pressure value (13:08).

Fig. 1b - HPMIS screen shot for flow calculation using calculated average pressure value (13:08).

**Orifice Plate Meter Design (ISO5167(BS EN 1042)) and Deflection Calculations**

Site : AYLESBEARE OFON  
 Stream : MTA ...  
 Site Design Capacity : 2.928 mscmd Design Mode : Flowrate  RBD Approved Design **Calc Flowrate**

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**Design Conditions**

Site Operating Pressure  
 Max : 70.0000 BarG  
 Min : 38.0000 BarG  
 Temperature : 12.004 °C  
 Pressure : 51.3570 BarA  
 Diff. Pressure : 12.05 mBar

**Gas Properties**

User Defined  Calculated  
 Gas Density : 44.5503427 kg/m<sup>3</sup>  
 Isentropic Index : 1.328  
 Viscosity : 116.7 µPoise  
 Calorific Value : 39.790 MJ/scm  
 Relative Density : 0.62165  
 Air Density : 1.22541 kg/scm

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**Dimensions**

Temp Corrected Dimensions  
 Drain Hole Correction  
 Drain Hole : No  
 Drain Hole Bore : mm  
 Certified Dimensions  
 Pipe Diam. : 304.800 mm at 19.00 °C  
 Orifice Diam. : 169.085 mm at 19.00 °C  
 Beta Ratio : 0.5547  
 Corrected Dimensions  
 Pipe Diameter : mm  
 Orifice Diameter : mm  
 Beta Ratio : mm  
 Plate Expn Coeff : 1.60E-05 /°C  
 Pipe Expn Coeff : 1.10E-05 /°C

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**Flow Rates**

Time Base : hour  
 Gas Design Flow Rates  
 Mass Flow : 16,814.59 kg  
 Volume Flow : 22,072.94 scm  
 Energy Flow : 878,293.15 MJ  
 Discharge Coeff. : 0.604059  
 Reynolds Number : 1,672,424  
 Meter Operating Flowrate  
 Max : 2.928000 mscmd  
 Min : 0.000000 mscmd

**4. RECOMMENDATIONS AND LEARNING**

A review of historical faults associated with the locking up of PT's has been conducted with a programme proposed for the installation of new PT's.

HPMIS (RBD data) should be monitored to identify any such future errors

**REFERENCES**

- ISO 5167
- HPMIS database

**VERSION HISTORY**

Version	Changes	Author	Date
Rev0	First issue	S Western	24/12/10
Rev1	First issue	S Western	06/01/11