METER ERROR REPORT

FINAL

Reconcile? Y

Safety Issue? N

Thesis Report No.

1. EXECUTIVE SUMMARY

SITE NAME		Aylesbeare		
LDZ		SW		
START DATE (actual)		11th April 2011 (23:12)		
LAST GOOD DATE				
END DATE		12th April 2011 (00:18)		
SIZE OF ERROR (No reconciliation required if under 0.1%)		5,500.59 SCM over registration (equivalent to 1.084%)		
ESTIMATE – Y/N?				
ROOT CAUSE		Pressure transducer locked in over range state		
ANALYSIS		HPMIS RBD Data		
METER TYPE		Orifice Plate		
AUTHOR		S Western		
CHECKED BY		C Stock		
ACCEPTED BY UKD NETWORK		I		
RECONCILIATION	Distribut	ion	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 1hr 6mins (23:12 to 00:18) on Gas Day 11th April 2011, 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 3/4/5 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 5,500.59 scm of gas.

From HPMIS, the Dvol for Gas Day the 11th of April 2011 was 0.507296mscm so the over-registration equates to 1.084% of Dvol. See spreadsheet.

Fig. 1a - HPMIS screen shot for flow calculation using locked pressure value (23:12).

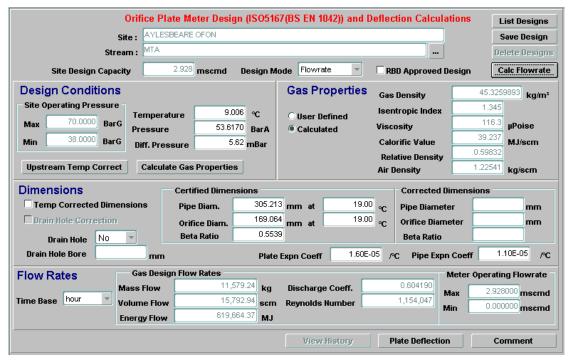


Fig. 1b - HPMIS screen shot for flow calculation using calculated average pressure value (23:12).

Ori	fice Plate Meter Desi	gn (ISO516	67(BS EN 1042)) and I	Deflection Calculations	List Designs	
Site :	AYLESBEARE OF N				Save Design	
Stream :	MTA				Delete Designs	
Site Design Capacity	2.928 mscmd	Design M	ode Flowrate 💌	RBD Approved Design	Calc Flowrate	
Design Conditions Gas Properties Gas Density 80.6902007 kg/m ³						
Site Operating Pressure		006 vr		Isentropic Index	1.472	
May 70.0000 BarG	emperature	~ ~ _	OUser Defined	Viscosity	132.3 µPoise	
38,0000 Barc		²⁷⁰ BarA ^{5.62} mBar	Calculated		^{39.237} MJ/scm	
)iff. Pressure	mBar			59832	
Upstream Temp Correct	Calculate Gas Propertie	s			22541 kg/scm	
Dimensions Certified Dimensions Corrected Dimensions						
Temp Corrected Dimension	ns Pipe Diam.	305.21	3 mm at 19.0	⁰ ∘c Pipe Diameter	mm	
Drain Hole Correction	Orifice Diam.	169.06	⁴ mm at 19.0	⁰ ∘C Orifice Diameter	mm	
Drain Hole No 🔻	Beta Ratio	0.553	9	Beta Ratio		
Drain Hole Bore	mm	Plate	Expn Coeff 1.60E	-05 /°C Pipe Expn Coeff	1.10E-05 /°C	
Flow Rates	as Design Flow Rates —		_		perating Flowrate	
	s Flow 15,	448.11 kg	Discharge Coeff.	0.604123 Max	2.928000 mscmd	
Time Base hour Volur		069.69 scm	Reynolds Number	1,353,578 Min	0.000000 mscmd	
Energ	gy Flow 826,	707.15 MJ			,	
			View History	Plate Deflection	Comment	

4. RECOMMENDATIONS AND LEARNING

HPMIS (RBD data) should be monitored to identify any such future errors. Should the error re-occur an assessment of the transmitter may be required to ensure its integrity.

REFERENCES

ISO 5167 HPMIS database

VERSION HISTORY

Version	Changes	Author	Date
Rev0	First issue	S Western	18/04/2011