METER ERROR REPORT

FINAL

Reconcile?	Y
Safety Issue?	N
Thesis Report No.	

1. EXECUTIVE SUMMARY

SITE NAME	Ilchester
LDZ	South West
START DATE (actual)	16th December 2010 (17:10)
LAST GOOD DATE	
END DATE	16th December 2010 (19:57)
SIZE OF ERROR (No reconciliation	65,057. SCM over registration
required if under 0.1%)	(equivalent to 3.53%)
ESTIMATE – Y/N?	N
ROOT CAUSE	Metering pressure head cell locking up
ANALYSIS	HPMIS RBD data
METER TYPE	Orifice Plate
AUTHOR	S Western
CHECKED BY	C Stock

2. BACKGROUND

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

On the 16th of December 2010 the metering pressure head cell locked up for some undiscovered reason for a period of 2 hours 47 minutes. This caused the standard flow rate to be incorrectly calculated. The condition was rectified by turning the power to the transmitter off and then on again.

3. ERROR QUANTIFICATION AND IMPACT

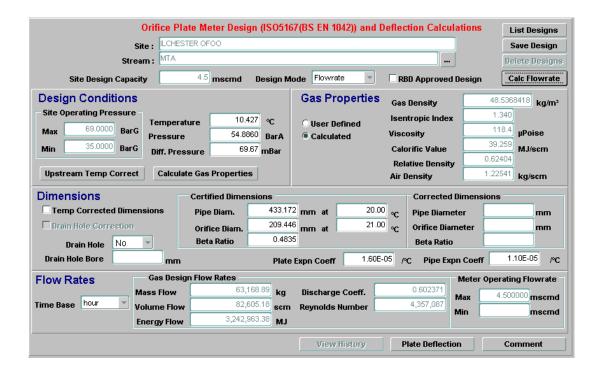
The RBD data was reviewed before and after the pressure transducer (PT) locked up. The five PT readings prior to and after the locking of the PT were averaged to estimate the actual pressure reading during the period of the PT locking up.

Using the HPMIS orifice plate design calculation (See Fig. 1a & 1b) together with the 8 minute RBD and gas composition data the volume flow for the period where the PT locked was calculated. In each instance, the volume flow 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 65,056.81scm of gas.

From HPMIS, the Dvol for Gas Day the 16th of December 2010 was 1.84209mscm so the over-registration equates to 3.532 % of Dvol. A spreadsheet detailing the calculations is available on request.

The error would have had a minor affect on odorisation.

Fig. 1a - HPMIS screen shot for flow calculation using calculated average pressure



Orifice Plate Meter Design (ISO5167(BS EN 1042)) and Deflection Calculations List Designs ILCHESTER OFOO Save Design Stream: MTA Delete Designs 4.5 mscmd Design Mode Flowrate RBD Approved Design Site Design Capacity Calc Flowrate **Design Conditions** Gas Properties 84.1350127 ka/m³ Gas Density Site Operating Pressure 1.463 10.427 ∘c Isentropic Index OUser Defined 69.0000 BarG 134.4 87.4180 BarA Viscosity **uPoise** Calculated Pressure 39,259 69.67 mBar BarG Calorific Value Diff. Pressure 0.62404 Relative Density Calculate Gas Properties Upstream Temp Correct 1.22541 kg/scm Air Density Dimensions **Certified Dimensions** Corrected Dimensions 20.00 ℃ Temp Corrected Dimensions 433.172 mm at Pipe Diam. Pipe Diameter 209.446 mm at 21.00 **℃** ☐ Drain Hole Correction Orifice Diameter mm Orifice Diam. 0.4835 No Beta Ratio Beta Ratio Drain Hole 1.10E-05 **/℃** Drain Hole Bore 1.60E-05 /°C Pipe Expn Coeff mm Plate Expn Coeff Gas Design Flow Rates Flow Rates Meter Operating Flowrate 83,180.04 0.602355 kg Discharge Coeff. 4.500000 mscmd Max Time Base hour 108,773.52 5,051,975 scm Min mscmd 4,270,295.50 **Energy Flow** MJ View History Plate Deflection Comment

Fig. 1b - HPMIS screen shot for flow calculation using locked pressure value

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 draft	S Western	24/12/2010