

**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 required if under 0.1%)	65,057. SCM over registration (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 odourisation.

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

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

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

Site :    
 Stream :    
  
 Site Design Capacity  mscmd Design Mode   RBD Approved Design

---

**Design Conditions**

Site Operating Pressure  
 Max  BarG Temperature  °C  
 Min  BarG Pressure  BarA  
 Diff. Pressure  mBar

**Gas Properties**

User Defined  Calculated

Gas Density  kg/m<sup>3</sup>  
 Isentropic Index   
 Viscosity  µPoise  
 Calorific Value  MJ/scm  
 Relative Density   
 Air Density  kg/scm

---

**Dimensions**

Temp Corrected Dimensions  Drain Hole Correction

Drain Hole  mm

**Certified Dimensions**

Pipe Diam.  mm at  °C  
 Orifice Diam.  mm at  °C  
 Beta Ratio

**Corrected Dimensions**

Pipe Diameter  mm  
 Orifice Diameter  mm  
 Beta Ratio

Plate Expn Coeff  /°C Pipe Expn Coeff  /°C

---

**Flow Rates**

Time Base

**Gas Design Flow Rates**

Mass Flow  kg  
 Volume Flow  scm  
 Energy Flow  MJ

Discharge Coeff.   
 Reynolds Number

**Meter Operating Flowrate**

Max  mscmd  
 Min

**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