

METER ERROR REPORT**FINAL**

Reconcile?	Y
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Safety Issue?	N
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Thesis Report No.	
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1. EXECUTIVE SUMMARY

SITE NAME	Seabank
LDZ	SW (Wales & West Network)
START DATE (actual)	15 th April 2009
LAST GOOD DATE	
END DATE	15 th April 2009
SIZE OF ERROR (No reconciliation required if under 0.1%)	1,883 SCM over registration (equivalent to 0.119%)
ESTIMATE – Y/N?	
ROOT CAUSE	Pressure Transducer 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 Wales & West network at Seabank FWACV offtake. The site meter system comprises of a single Orifice meter with an isolated bypass.

During a period of 5hrs 39mins (17:29 to 23:08) on the evening of the 15th April 2009, for some undiscovered reason the pressure transducer failed. This caused the standard flow rate to be incorrectly calculated. The condition was rectified by replacement of the pressure transducer.

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 at selected 4 minute periods 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 selected periods of the PT locking up it was estimated that orifice metering system over-registered 1,882.86 scm of gas.

From HPMIS, the Dvol for Gas Day the 15th of April 2009 was 1.588354mscm so the over-registration equates to 0.1185% of Dvol. See spreadsheet.

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 : SEABANK OFON
 Stream : MTA

Site Design Capacity : 6.3 mscmd Design Mode : Flowrate RBD Approved Design

Design Conditions

Site Operating Pressure
 Max : 70.0000 BarG
 Min : 35.0000 BarG

Temperature : 8.804 °C
 Pressure : 51.4148 BarA
 Diff. Pressure : 34.73 mBar

User Defined
 Calculated

Gas Properties

Gas Density : 47.1093482 kg/m³
 Isentropic Index : 1.326
 Viscosity : 117.1 µPoise
 Calorific Value : 39.682 MJ/scm
 Relative Density : 0.64095
 Air Density : 1.22541 kg/scm

Dimensions

Temp Corrected Dimensions
 Drain Hole Correction

Drain Hole : No
 Drain Hole Bore : mm

Certified Dimensions

Pipe Diam. : 308.020 mm at 20.00 °C
 Orifice Diam. : 192.961 mm at 21.00 °C
 Beta Ratio : 0.6265

Corrected Dimensions

Pipe Diameter : 307.982 mm
 Orifice Diameter : 192.923 mm
 Beta Ratio : 0.626

Plate Expn Coeff : 1.60E-05 /°C Pipe Expn Coeff : 1.10E-05 /°C

Flow Rates

Time Base : hour

Gas Design Flow Rates

Mass Flow : 39,534.73 kg
 Volume Flow : 50,335.07 scm
 Energy Flow : 1,997,390.09 MJ

Discharge Coeff. : 0.604215
 Reynolds Number : 3,877,799

Meter Operating Flowrate

Max : 6.300000 mscmd
 Min : 0.000000 mscmd

5. 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

HPMIS

VERSION HISTORY

Version	Changes	Author	Date
Rev0	First draft	S Western	15/08/2009
Rev1 SW00425092009	Final	S Western	24/09/2009