



# Measurement Error Report

**Severn Trent Water Limited**

**MER\_CAD\_228\_22 Strongford BNEF**

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## 1 Revision Control

Rev	Issue date	Description	Prep.	App.
1	31/01/2023	Issued for comment	KW	PK

## 2 Executive Summary

<b>Site Name</b>	Strongford BNEF
<b>DNO</b>	Cadent Gas Limited
<b>LDZ</b>	West Midlands
<b>Error Start Date</b>	12 <sup>th</sup> May 2022, 28 <sup>th</sup> September 2022
<b>(Or) Last Good Date</b>	
<b>Error Corrected Date</b>	1 <sup>st</sup> October 2022
<b>Size of Error (over or under read)</b>	1,257 Sm <sup>3</sup> over-registration (0.014 GWh)
<b>Error Description</b>	Erroneous fiscal USM flow readings
<b>Methodology</b>	Comparison of inlet meter and fiscal meter flow readings
<b>Meter Type</b>	Ultrasonic meter
<b>MER Unique Reference Number</b>	WM028
<b>Cadent Internal Reference</b>	MER/CAD/228/22

### 3 Error Description

Strongford BNEF has a single 2" Sick Flowsic500 ultrasonic meter stream for measurement of gas exiting the grid entry unit (GEU) and entering the distribution network (referred to in this report as 'Fiscal USM'). A second 2" Sick Flowsic500 ultrasonic meter is located on the inlet to the GEU for process control (referred to in this report as 'Inlet USM'). Propane injection is used to control the gas properties (e.g. calorific value, Wobbe number, etc.) to meet the requirements of the Gas Safety (Management) Regulations (GS(M)R). Gas that is not within specification is rejected by a diverter valve.

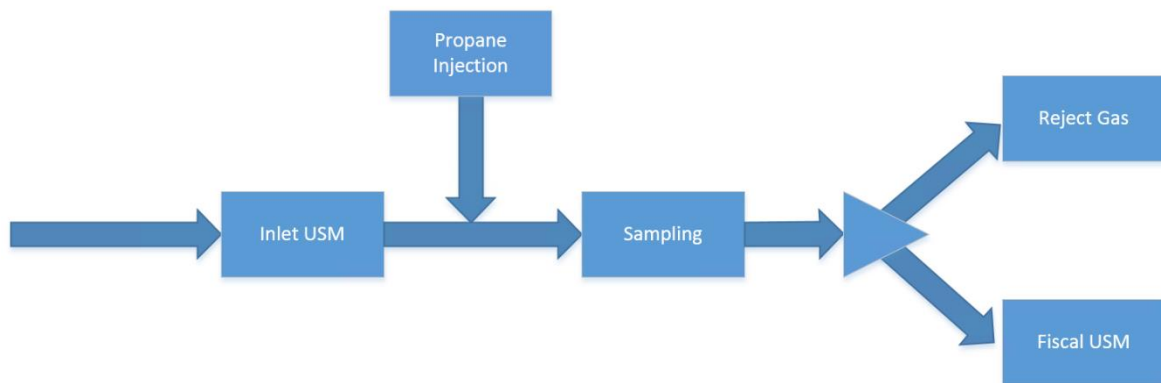


Figure 1 - Grid Entry Unit Flow Diagram

During normal operation the Fiscal USM will read slightly higher (~19.6 Sm<sup>3</sup>/h) than the Inlet USM due to the addition of propane.

During the following dates, errors were noted:

- 12/05/22
- 28/09/22 – 30/09/22

### 4 Methodology

The offset between the Inlet USM and Fiscal USM during normal operation was calculated from the periods of normal operation surrounding each error period, these being: 12<sup>th</sup> May, 28<sup>th</sup> September, 29<sup>th</sup> – 30<sup>th</sup> September & 30<sup>th</sup> September – 1<sup>st</sup> October.

The Fiscal USM volume flow rate was corrected by using the Inlet USM volume flow rate plus the average offset for that period when the fiscal meter should have been measuring continuously and also by setting fiscal meter flow rates equal to zero when the system was in recirculation mode and should not have been measuring.

Two sets of volume totals were calculated, one using the measured Fiscal USM flow and another using the corrected Fiscal USM flow, the error being the difference between the two. The volume flow rates for the Fiscal USM, the Inlet USM and the corrected Fiscal USM were plotted for the period between 28<sup>th</sup> September 2022 – 1<sup>st</sup> October 2022 in Figure 1 and for the 12<sup>th</sup> May in Figure 2.

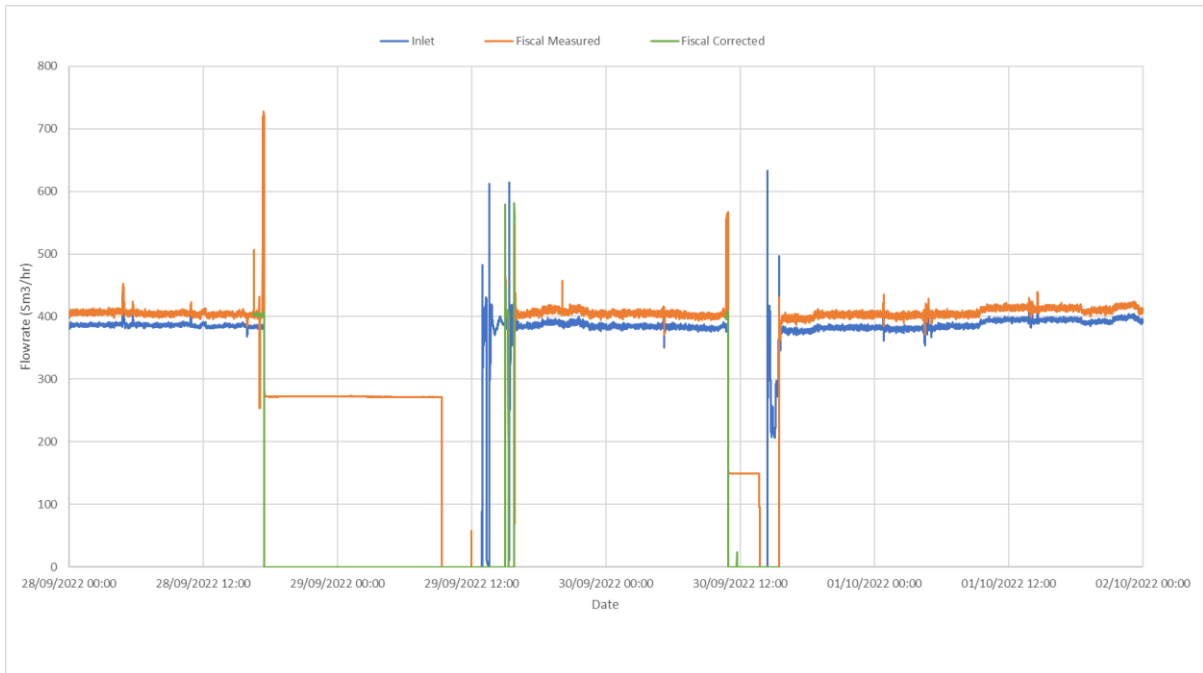


Figure 1 Volume flow rates for Fiscal USM, Inlet USM and corrected Fiscal USM (28/09/2022 – 02/09/2022)



Figure 2 Volume flow rates for Fiscal USM, Inlet USM and corrected Fiscal USM (12/05/2022)

## 5 Error Quantification

The error is estimated to be an overall over-registration of 5,611 Sm<sup>3</sup>. The error for each period is detailed in Table 1. The errors for 28<sup>th</sup> and 29<sup>th</sup> September 2022 have already been corrected in the Gemini data, therefore, corrections only need to be applied to 12<sup>th</sup> May and 30<sup>th</sup> September 2022. The error should be corrected using the daily correction factors in Appendix A. Please refer to the summary within the accompanying document (MER\_CAD\_228\_22\_Data) for further details on how these values were derived.

Gas Date	Total Error (Sm <sup>3</sup> )	Reconcile (Sm <sup>3</sup> )
12/05/2022	795.13	795.13
28/09/2022	3,168.85	0
29/09/2022	1,185.32	0
30/09/2022	462.20	462.20
<b>Total</b>	<b>5,611.49</b>	<b>1,257.33</b>

*Table 1 – Total error during the period of mismeasurement*

## 6 Learning

It is suspected that contamination on the ultrasonic meter transducers originating from the propane injection system has caused the meter to read erroneously. Consideration should be given to continuous monitoring, recording and time/date stamping the diverter valve position in order to ascertain if the system was recirculating or flowing to the distribution network. This would result in easier analysis if mismeasurements were to occur again.

## 7 References

Gemini Daily Volumes

MER\_CAD\_228\_22\_Data calculation spreadsheet

## Appendix A – Daily Correction Factors

The errors should be corrected using the Daily Correction Factors applied to the Gemini Daily Volumes as detailed below. The Daily Correction Factor is the ratio of the corrected volume to the uncorrected volume for each respective gas day.

<b>Gas Day</b>	<b>Gemini Daily Volume (MSCM)</b>	<b>Daily Correction Factor</b>
12-May-22	0.00864	0.908011
28-Sep-22	0.00505	1.000000
29-Sep-22	0.00543	1.000000
30-Sep-22	0.00826	0.944073