



# Measurement Error Report

**Air Liquide Biogas Solutions Europe**

**MER/CAD/219/22 Westry BNEF**

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## 1 Revision Control

Rev	Issue date	Description	Prep.	App.
1	28/09/2022	Issued for comment	KW	CJ

## 2 Executive Summary

<b>Site Name</b>	Westry BNEF
<b>DNO</b>	Cadent Gas Limited
<b>LDZ</b>	East Anglia
<b>Error Start Date</b>	29 <sup>th</sup> May 2022
<b>(Or) Last Good Date</b>	
<b>Error Corrected Date</b>	24 <sup>th</sup> August 2022
<b>Size of Error (over or under read)</b>	16512.26 Sm <sup>3</sup> under registration (0.18 GWh)
<b>Error Description</b>	Erroneous readings on Fiscal meter
<b>Methodology</b>	Comparison of Inlet meter and Fiscal meter flow readings
<b>Meter Type</b>	Ultrasonic meter
<b>MER Unique Reference Number</b>	
<b>Cadent Internal Reference</b>	MER/CAD/219/22

### 3 Error Description

Westry 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 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.

During normal operation the Fiscal USM will read slightly higher ( $\sim 49 \text{ Sm}^3/\text{h}$ ) than the Inlet USM due to the addition of propane.

During the following dates, process upsets were noted:

- 29/05/22 – 03/06/22
- 11/06/22 – 14/06/22
- 12/08/22 – 14/08/22
- 21/08/22 – 23/08/22

### 4 Methodology

The offset between Inlet USM and Fiscal USM during normal operation was calculated from the periods of normal operation before 29<sup>th</sup> May (only 28<sup>th</sup> May, as there were process upsets prior to this), between 4<sup>th</sup> June – 10<sup>th</sup> June and after 14<sup>th</sup> June (15<sup>th</sup> June – 5<sup>th</sup> August).

Similarly for August, the offset between Inlet USM and Fiscal USM during normal operation was calculated from the periods of normal operation before 12<sup>th</sup> August (11<sup>th</sup> August), between 15<sup>th</sup> August – 20<sup>th</sup> August and after 23<sup>rd</sup> August (24<sup>th</sup> August).

The Fiscal USM volume flowrate was then corrected using the Inlet USM volume flowrate plus the average offset for the periods. 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 flowrates for the Fiscal USM, the Inlet USM and the corrected Fiscal USM were plotted for the period between 29<sup>th</sup> May 2022 – 14<sup>th</sup> June 2022 in Figure 1.

The volume flowrates for the Fiscal USM, the Inlet USM and the corrected Fiscal USM were plotted for the period between 12<sup>th</sup> August 2022 – 23<sup>rd</sup> August 2022 in Figure 2.

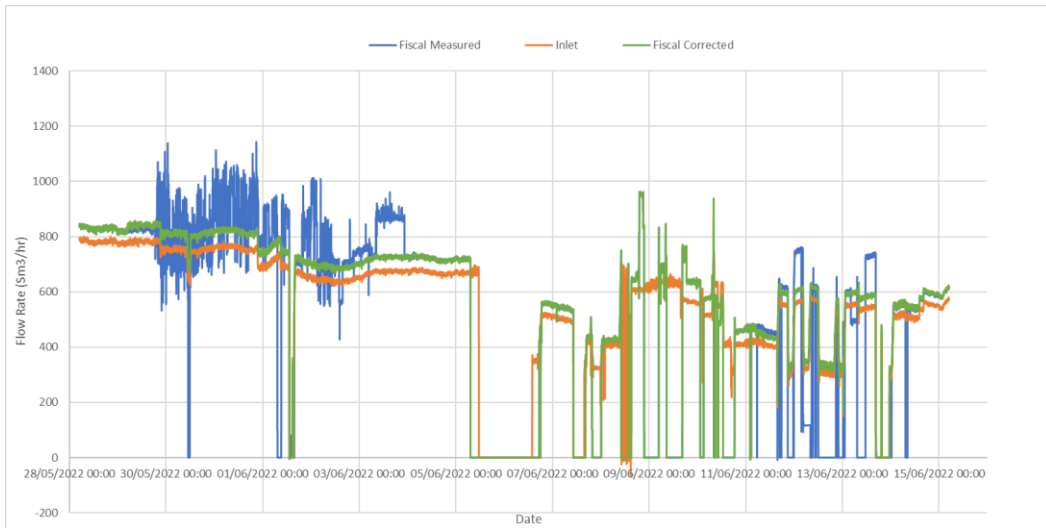


Figure 1 Volume flowrates for Fiscal USM, Inlet USM and corrected Fiscal USM



Figure 2 Volume flowrates for Fiscal USM, Inlet USM and corrected Fiscal USM

## 5 Error Quantification

The error is estimated to be an overall under registration of 7.2 % or 16512.2627 Sm<sup>3</sup>. The errors for each day are detailed in Table 1.

Gas Date	Total Error (Sm <sup>3</sup> )
29/05/2022	-121.73
30/05/2022	384.94
31/05/2022	2005.31
01/06/2022	268.68
02/06/2022	436.34
03/06/2022	2046.40
11/06/2022	-973.15
12/06/2022	-5787.70
13/06/2022	-2354.97
14/06/2022	-662.91
12/08/2022	-3691.59
13/08/2022	-7656.72
14/08/2022	101.36
21/08/2022	-525.34
22/08/2022	-240.48
23/08/2022	259.30
<b>Total</b>	<b>16512.26</b>

*Table 1 Total error during the period of mismeasurement*

## 6 Learning

Contamination on the Fiscal ultrasonic meter transducers has caused the meter to read erroneously. The pipework and meter was cleaned to prevent the issue from reoccurring. It is recommended considering additional liquid filtration on the propane injection line. Consideration should also be given to continuously monitoring and recording 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

Westry MER2 data pt 1  
Westry MER2 additional dates

## 8 Appendix A – Daily Correction Factors

The error should be corrected using the Daily Correction Factors applied to the Gemini Daily Volumes as detailed below.

Gas Day	Gemini Daily Volume	Daily Correction Factor
29-May-22	0.01984	1.00613
30-May-22	0.01968	0.98048
31-May-22	0.02110	0.90496
01-Jun-22	0.01611	0.98333
02-Jun-22	0.01711	0.97450
03-Jun-22	0.01948	0.89493
11-Jun-22	0.01070	1.08988
12-Jun-22	0.00462	2.17345
13-Jun-22	0.00732	1.32153
14-Jun-22	0.01319	1.05021
12-Aug-22	0.00860	1.42784
13-Aug-22	0.00288	3.62356
14-Aug-22	0.01783	0.99432
21-Aug-22	0.01378	1.03485
22-Aug-22	0.01009	1.02378
23-Aug-22	0.00817	0.97009