



Measurement Error Report

Air Liquide Biogas Solutions Europe

MER/CAD/233/23 Barnes Farm BNEF

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1 Revision Control

Rev	Issue date	Description	Prep.	App.
1	20/03/2023	Issued for comment	TB	BK

2 Executive Summary

Site Name	Barnes Farm BNEF
DNO	Cadent Gas Limited
LDZ	
Error Start Date	30 th November 2022
(Or) Error Last Good Date	
Error Corrected Date	13 th February 2023
Size of Error (over or under read)	1463 Sm ³ over registration
Error Description	Erroneous readings on Fiscal meter
Methodology	Comparison of Inlet meter and propane flow readings with Fiscal meter flow readings
Meter Type	Ultrasonic
MER Unique Reference Number	
Cadent Internal Reference	MER/CAD/233/23

3 Error Description

Barnes farm BNEF has a single ultrasonic flow meter stream for measurement of gas exiting the grid entry unit (GEU) and entering the distribution network (referred to as Fiscal Meter). A second ultrasonic flow meter is located on the inlet to the GEU for process control (referred to in this report as Inlet Meter). 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 via a diverter valve. During normal operation the Fiscal USM will read slightly higher than the Inlet USM due to the addition of propane.

During the following dates, errors were noted:

- 30/11/22; 10:28 to 14:04
- 30/01/23; 07:34 to 10:04
- 13/02/23; 05:30 to 10:30

4 Methodology

This MER report covers three separate measurement error occurrences. These are described as Error 1, Error 2 and Error 3 below.

4.1 Error 1 – 30/11/22

Over the period of interest, the flowrates on the fiscal meter dropped dramatically indicating the meter system had gone into reject mode but was still recording a flow. *Note: The switch to reject mode is evident from the trends in pressure and temperature.* The error consisted of the fiscal meter reading high for a total period of 216 minutes. The calculated error is the sum of the Fiscal Meter total volume flow for the affected time period. This calculated error value was then subtracted from the calculated daily volume.

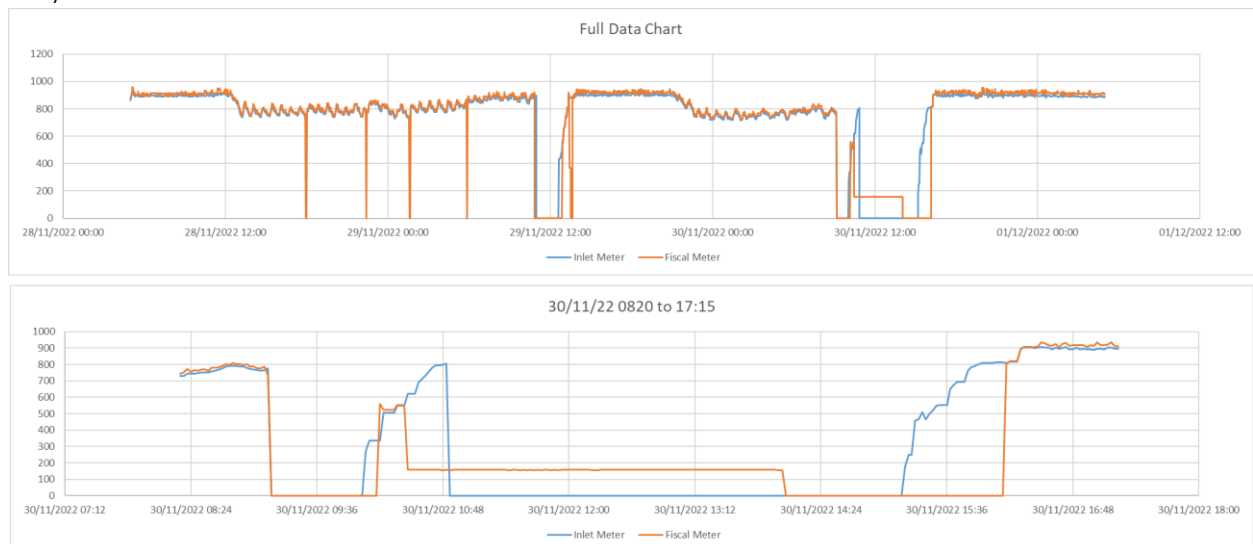


Figure 1 Volume flow rates for Inlet Meter and Fiscal Meter

4.2 Error 2 – 30/01/23

Over the period of interest, the flowrates on the fiscal meter dropped dramatically indicating the meter system had gone into reject mode but was still recording a flow. *Note: The switch to reject mode is evident from the trends in pressure and temperature.* The error consisted of the fiscal meter reading high for a total period of 150 minutes. The calculated error is the sum of the Fiscal Meter total volume flow for the affected time period. This calculated error value was then subtracted from the calculated daily volume.

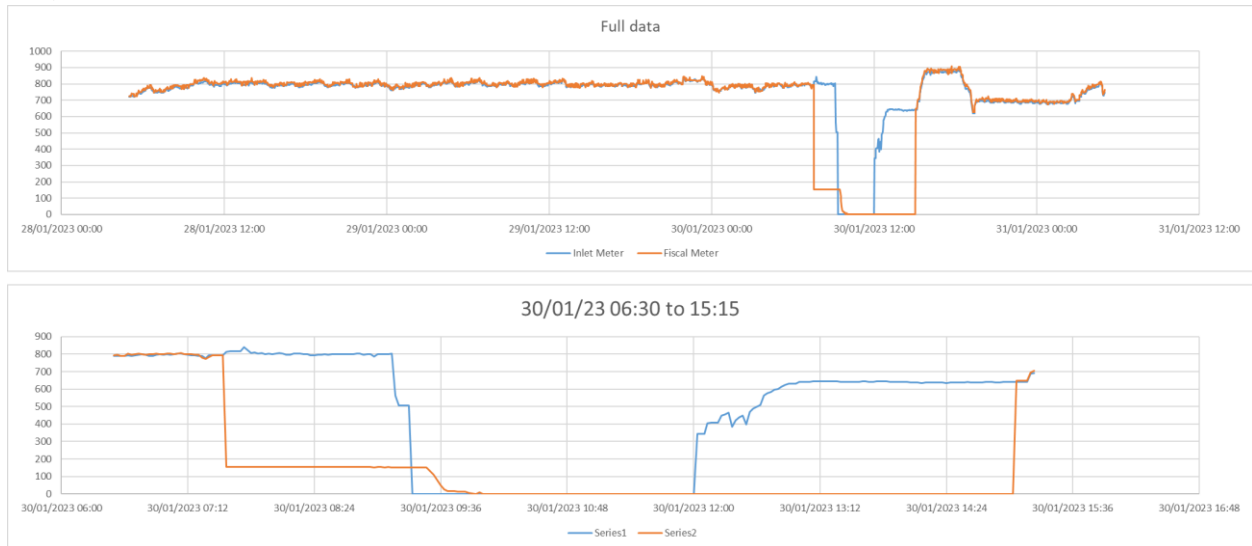


Figure 2 Volume flow rates for Inlet Meter and Fiscal Meter

4.3 Error 3 – 13/02/23

Over the period of interest, the flowrates on the fiscal meter dropped dramatically indicating the meter system had gone into reject mode but was still recording a flow. *Note: The switch to reject mode is evident from the trends in pressure and temperature.* The error consisted of the fiscal meter reading high for a total period of 300 minutes. The calculated error is the sum of the Fiscal Meter total volume flow for the affected time period. This calculated error value was then subtracted from the calculated daily volume.

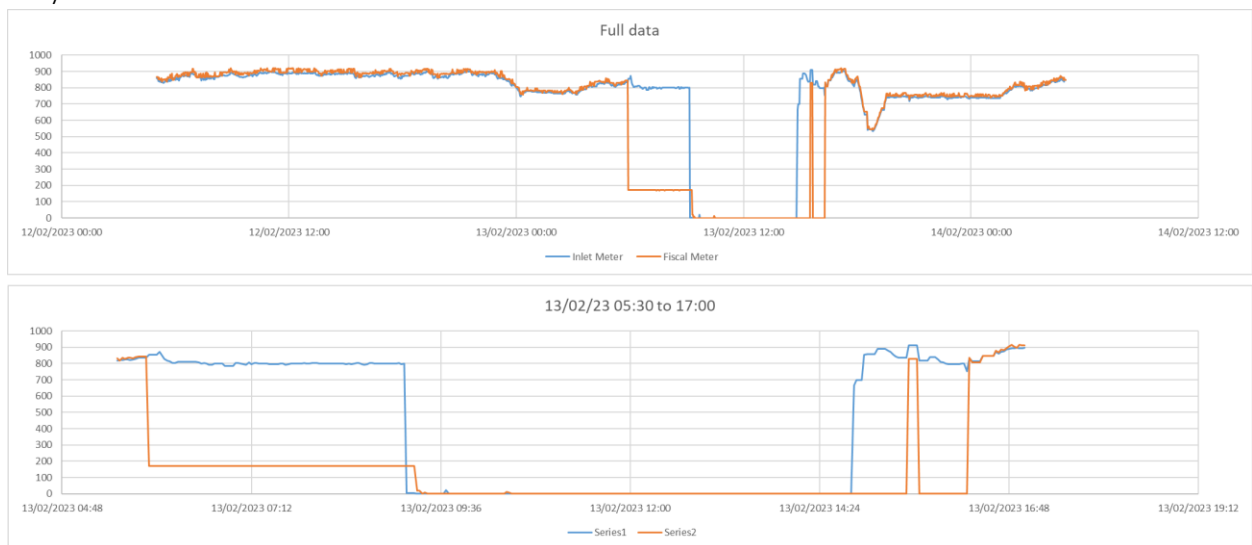


Figure 3 Volume flow rates for Inlet Meter and Fiscal Meter

5 Error Quantification

The data for each Error is detailed in the accompanying document “MER_CAD_233_23 Barnes Farm BNEF.xlsx”.

The error is estimated to be an overall over registration of **1454 Sm³**. The error should be corrected using the daily correction factors in Appendix A applied to the Gemini daily volumes. Table 1 details the daily volume total as reported and the corrected daily total using the error calculation data as detailed in this report.

Gas Day	Daily Volume (MSm ³)		
	Reported	Corrected	Error
30-Nov-22	0.01581	0.01524	0.000569
30-Jan-23	0.01278	0.01247	0.000313
13-Feb-23	0.01112	0.01055	0.000572

Table 1 – Daily totals 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 were cleaned to prevent the issue from reoccurring. It is recommended considering additional liquid filtration on the propane injection line. Consideration should be given to continuously 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 measurement errors were to occur again.

7 References

Gemini Billed Daily Volumes

MER_CAD_233_23 Barnes Farm BNEF Data.xlsx Calculation spreadsheet

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. The Daily Correction Factor is the ratio of the corrected volume to the uncorrected volume for each respective gas day.

Gas Day	Gemini Daily Volume	Daily Correction Factor
30 Nov 2022	0.01581	0.963995
30 Jan 2023	0.01278	0.975520
13 Feb 2023	0.01112	0.948545