



Measurement Error Report

Seven Trent PLC

MER/CAD/230/22 Finham

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1 Revision Control

Rev	Issue date	Description	Prep.	App.
1	31/03/2023	Issued for comment	TB	BK
1.1	25/05/2023	Issued for comment	TB	BK

2 Executive Summary

Site Name	Finham
DNO	Cadent Gas Limited
LDZ	West Midlands
Error Start Date	13/12/2022
(Or) Error Last Good Date	
Error Corrected Date	20/03/2023
Size of Error (over or under read)	Initial; D+5 Corrected (364 Sm ³ over registration) Plus additional; 117 Sm ³ over registration
Error Description	Erroneous readings on Fiscal meter
Methodology	Calculation of accumulated Sv _{ol} totals during periods of erroneous flowrates, and subtraction of these values from the reported totals.
Meter Type	Ultrasonic
MER Unique Reference Number	
Cadent Internal Reference	MER/CAD/230/22

3 Error Description

Finham bio-methane facility has a single 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 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 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:

- 13/12/2022; 12:09 to 14:38 (Error period 1)
- 20/03/2023; 08:57 to 09:36 (Error period 2)

4 Methodology

It should be noted that Inlet Meter data was not available for this error. The error period was defined by monitoring periods of steady meter frequencies and Svol flowrates and cross-referencing changes in stream pressure, temperature and CV.

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.*

4.1 Error period 1

The error consisted of the fiscal meter reading high for a total period of 149 minutes gas day 13/12/22. 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.

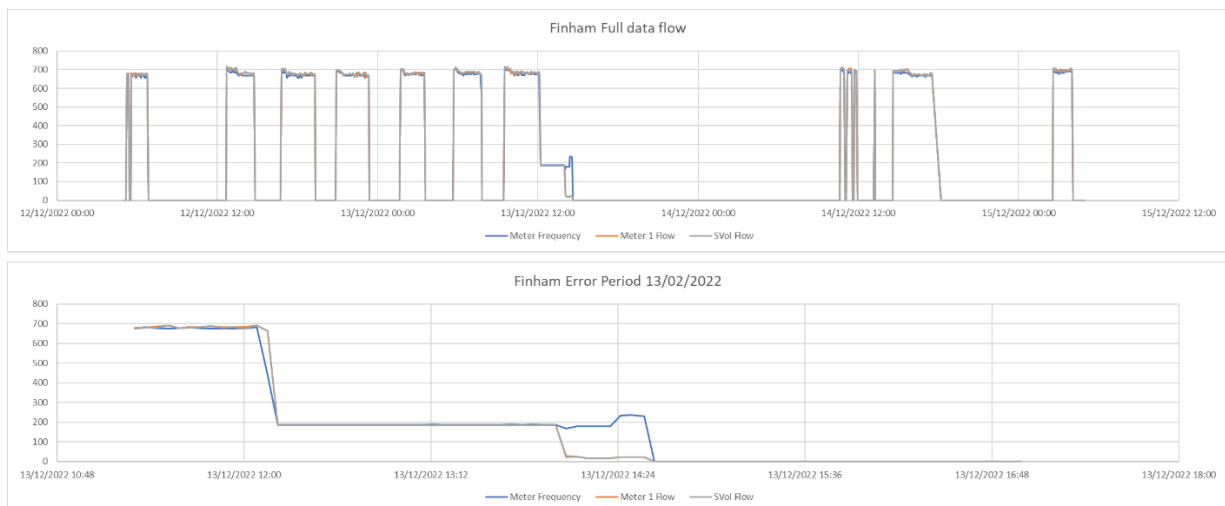


Figure 1 Meter frequency and Volume flow rates for Fiscal Meter

4.2 Error Period 2

The error consisted of the fiscal meter reading high for a total period of 39 minutes gas day 20/03/23. 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.

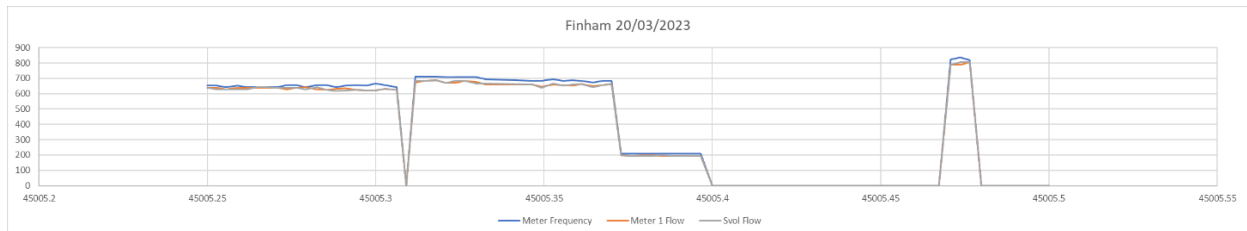


Figure 2 Meter frequency and Volume flow rates for Fiscal Meter

5 Error Quantification

The data for each Error is detailed in the accompanying document “MER_CAD_230_22 Finham Calc Data.xlsx”. This sheet contains a work sheet for the original Null error period, with the additional uncorrected error on an additional work sheet.

5.1 Error period 1

The error is estimated to be an overall over registration of **364 Sm³**. The error for the gas day is shown in MER_CAD_230_22 Finham Calc Data.xlsx

Gas Date	Estimated Error (Sm ³)
13/12/2022	364
Total	364

Table 1 – Daily totals during the periods of mismeasurement

Table 2 below details the daily volume total as measured by the non-resettable total for the gas day and the corrected daily total following correction using the MER calculation data as detailed in this report. There is a small discrepancy between the totaliser values and the values calculated from the raw data due to the resolution and timing of the raw data.

Gas Day	Daily Volume (MSm ³)		
	Measured	Corrected (estimate)	Gemini (Latest)
13-Dec-22	0.00362	0.00326	0.0318

Table 2 – Daily volumes during the periods of mismeasurement

This ‘Null’ calculation data confirms that the manual correction already processed is accurate and **no further reconciliation is required**.

5.2 Error period 2

The error is estimated to be an overall over registration of **117 Sm³**. The error should be corrected using the daily correction factors in Appendix A applied to the Gemini daily volumes. Table 3 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
20-Mar-23	0.012199	0.012082	0.000117

Table 3 – Daily totals for 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_230_22 Finham Calc 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
13-Dec-22	0.00318	N/A, previously corrected
20-Mar-23	0.01220	0.990409

Table 4 – Daily correction factor for the period of mismeasurement