



Measurement Error Report

Seven Trent PLC

MER CAD/217/22 Stoke Bardolph 2

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1 Revision Control

Rev	Issue date	Description	Prep.	App.
1	16/09/2022	Issued for comment	CJC	CJ
2	23/09/2022	Final	CJC	CJ

2 Executive Summary

Site Name	Stoke Bardolph 2
DNO	Cadent Gas Limited
LDZ	East Midlands
Error Start Date	30 th March 2022
(Or) Last Good Date	
Error Corrected Date	5 th April 2022
Size of Error (over or under read)	198.18 Sm ³ under registration (0.00215 GWh)
Error Description	Erroneous readings on Fiscal meter
Methodology	Fiscal Measurement set to zero during periods of confirmed reject
Meter Type	Ultrasonic meter
MER Unique Reference Number	EM012
Cadent Internal Reference	MER/CAD/217/22

3 Error Description

Stoke Bardolph 2 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. Where specific measurement issues are encountered Cadent can close a Remotely Operated Valve (ROV) on the outlet of the GEU to prevent gas flows to the network.

The fiscal meter returned unreliable data from 14:38 on 30th March 2022, when the flowrate dropped by 420 m³/h to an almost steady value of 180 m³/h. The site operated the diverter valve at this time, diverting gas to recycle. Cadent notified Seven Trent PLC of an issue with the received fiscal meter data, and closed the ROV at 16:01 on 30th March 2022. Once Cadent were satisfied with Seven Trent's response, the ROV was opened at 18:05 hours, allowing the site to flow to the grid again.

The issue then returned on 4th April and the ROV was again closed by Cadent at 01:16 hours, before being opened at 10:36 hours on the following day, 5th April 2022.

4 Methodology

The fiscal USM data has been corrected to zero flow during the two confirmed offline periods, when the site was in recycle and / or the ROV was closed. These being as follows:

14:38 to 18:05 on 30th March 2022

01:16 on 4th April to 10:36 on 5th April 2022

The measured and corrected volume flowrates for the Fiscal USM are plotted for the two periods in figures 1 and 2. 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.

Note: During periods of unreliable Fiscal USM flowrate data it would be preferable to reconcile using the inlet meter data, applying an offset for the additional propane entering the feed downstream of the inlet meter. However, in this case inlet meter data was not available as this data is only retained for 50 days, and the request for this data was made after this period.

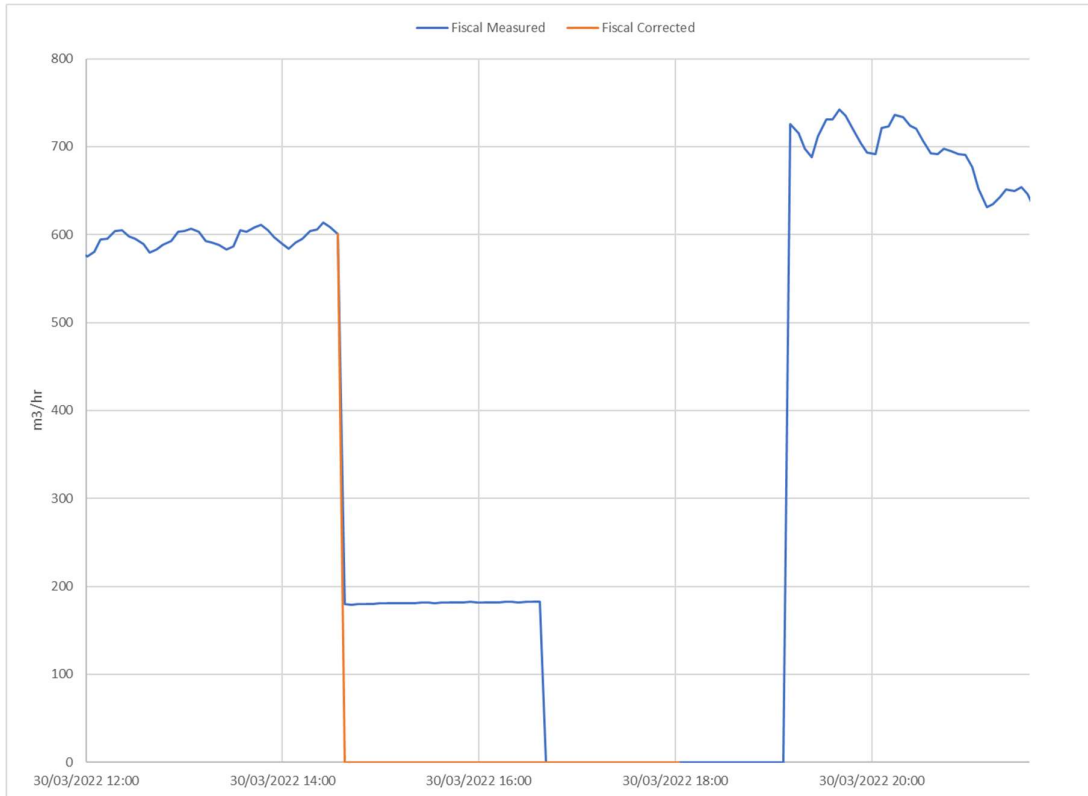


Figure 1 Measured and corrected volume flowrates for Fiscal USM (30th March 2022)

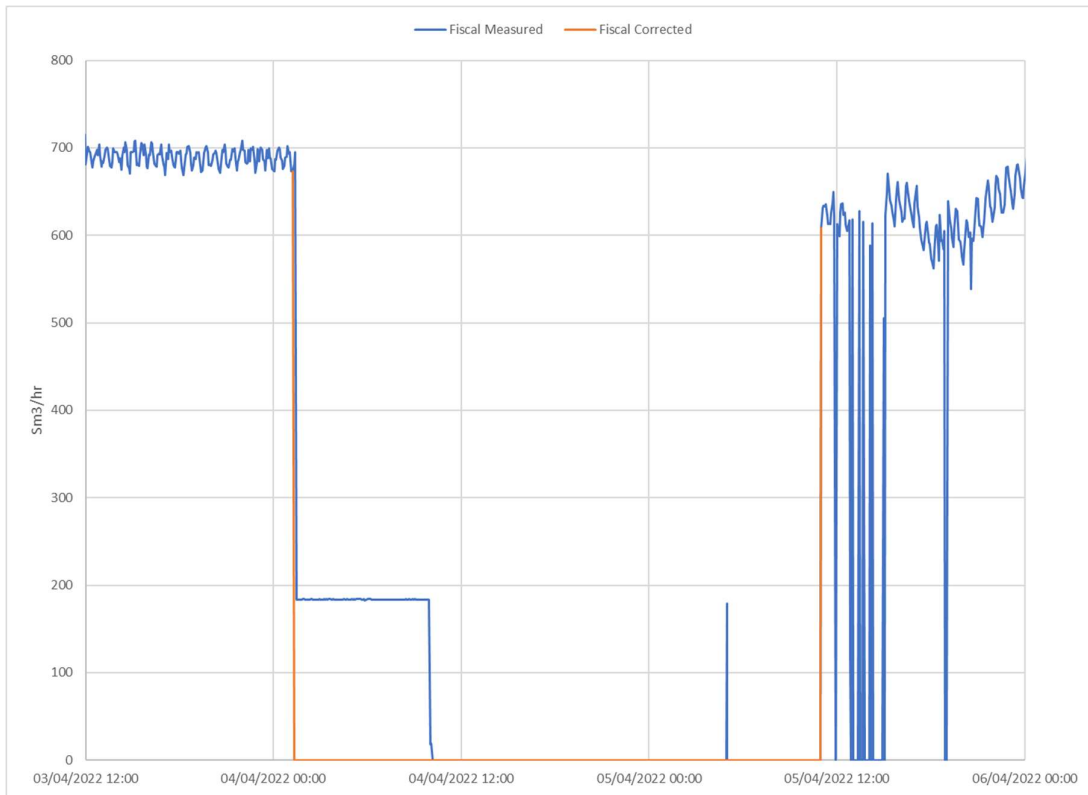


Figure 2 Measured and corrected volume flowrates for Fiscal USM (3rd, 4th and 5th April 2022)

5 Error Quantification

The error is estimated to be an overall over registration of 9.42% or 2,047.87 Sm³. However, it is noted that the reported Gemini data for the 30th March, 3rd and 4th April does not agree with the accumulated Fiscal meter data from the flow computer. This is presumably due to 'D+5' corrections applied to the Gemini data. The error in relation to the 'D+5' corrected Gemini data is estimated to be an overall under registration of 0.91% or 198.18 Sm³. Both errors for each day between the period of 30th March and 5th April are detailed in **Error! Reference source not found.**

Gas Date	Total Error (Sm ³) Based on measured and corrected volume flowrates	Total Error (Sm ³) Based on corrected volume flowrate and 'D+5' corrected Gemini data
30/03/2022	371.71	-393.01
31/03/2022	0	
01/04/2022	0	
02/04/2022	0	
03/04/2022	752.00	194.83
04/04/2022	924.16	0.00
Total	2,047.87	-198.18

Table 1 Total error during the period of mismeasurement

Based on the D+5 corrections already applied, the measurement error should be further reconciled using the daily correction factors in Appendix A applied to the D+5 corrected Gemini volumes.

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. In addition, recommend considering additional liquid filtration on the propane injection line.

It is recommended that an alarm is configured based on the expected offset between the inlet and Fiscal meter to quickly identify any contamination events.

It is recommended that the data for the GEU system is stored for more than 50 days or routinely backed up to aid any future reconciliation.

7 References

Stoke Bardolph MER Summary.xls

Stoke Bardolph MER 30th March data.xls

Stoke Bardolph MER 4th April data.xls

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
30-Mar-22	0.00717	1.054813
31-Mar-22	0.01021	1.0000
01-Apr-22	0.01032	1.0000
02-Apr-22	0.01655	1.0000
03-Apr-22	0.01438	0.986451
04-Apr-22	0.00000	1.0000