



Measurement Error Report

Cadent Gas Limited

MER WM026 Lower Drayton BNEF

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1 Revision Control

Rev	Issue date	Description	Prep.	App.
1	03/06/2022	Issued for comment	LJ	BK

2 Executive Summary

Site Name	Lower Drayton BNEF
DNO	Cadent Gas Limited
LDZ	West Midlands
Error Start Date	8 th March 2022
(Or) Last Good Date	
Error Corrected Date	8 th March 2022
Size of Error (over or under read)	22.71 Sm ³ over-registration (approximately 0.00025 GWh)
Error Description	Intermittent erroneous USM flow reading
Methodology	Comparison of inlet meter and fiscal meter flow readings
Meter Type	Ultrasonic meter
MER Unique Reference Number	WM026
Cadent Internal Reference	MER/CAD/214/22

3 Error Description

Lower Drayton 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.

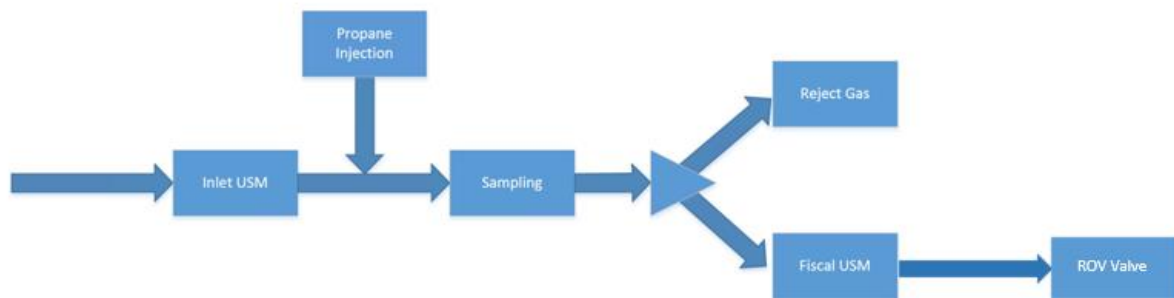


Figure 1 - Grid Entry Unit Flow Diagram

During normal operation, when closed, valve XV01 diverts the gas away from the Fiscal USM and towards the reject stream. Between 6th and 8th March 2022 the valve failed to seal when shut and as such was passing gas through the Fiscal USM. During this time the ROV valve was closed, with no flow entering the grid, and so the Gemini data was zeroed for this period.

The Fiscal USM will read slightly higher (~27 Sm³/h) than the Inlet USM during normal operation due to the addition of propane. On one occasion on 8th March 2022 the Fiscal USM intermittently read much higher than the Inlet USM for a short period. The individual descriptions of both error periods are contained in Appendix A. The errors were first discovered 8th March and have been attributed to considerable contamination that was found when the meter was cleaned and valved replaced on 21st March 2022.

4 Methodology

The measurement error on the 8th March 2022 was quantified by determining the offset between the Inlet USM and Fiscal USM during normal operation. The Fiscal USM volume flow was then corrected (on ~2-minute basis) using the Inlet USM volume flow plus the offset for that period. 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.

5 Error Quantification

The error is estimated to be an overall over-registration of 22.71 Sm³. The error for this period is detailed in Table 1.

Error Period	Date	Total Error Sm ³
1	8 th March 2022 – Fiscal USM Contamination	+22.71

Table 1 – Error Quantification

The error should be corrected using the Daily Correction Factors applied to the Gemini Daily Volume as detailed below in Table 2.

Gas Day	Gemini Daily Volume (MSCM)	Daily Correction Factor
08 -March-22	0.00155	0.985458

Table 2 - Daily Correction Factors

6 Learning

It is suspected that contamination on the valve seal has led to the Gas to Grid valve not shutting correctly and the ultrasonic meter transducers originating from the propane injection system has caused the meter to read erroneously. The meter and pipework were cleaned on 21st March 2022 to prevent the issue from reoccurring. The cause of the error is considered rectified as part of the work carried out on the 21st March, however if the error were to reoccur the addition of liquid filters on the propane line should be considered.

7 References

Lower Drayton Site Data Files (RD#####.T0014; DAT\$#####.ST3)
 Gemini Daily Volumes
 MER_WM026_Lower_Drayton_Data_R1.xlsx - Calculation Data spreadsheet

8 Appendix A – Period Descriptions

8.1 6th to 8th March 2022

At 13:54 on 6th March 2022, an attempt to shut the Gas to Grid valve, XV01 was conducted but it remained slightly open due to a seating issue. As a result, the Fiscal USM began to read a flow of ~146 Sm³/h. The flow rate decayed to ~17 Sm³/h over ~3 days, until 12:20 on 8th March 2022, at which point the XV01 shut completely and a flow on the Inlet USM began registering.

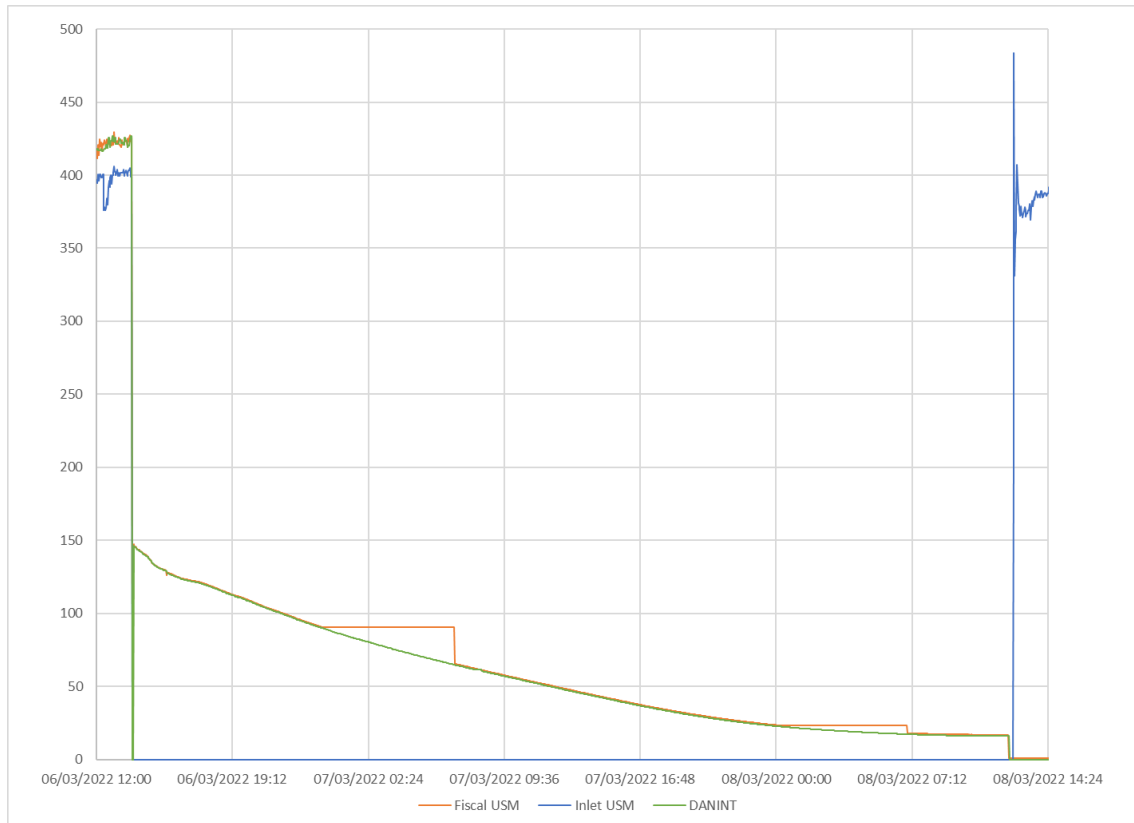


Figure 2 – 6th to 8th March 2022

8.2 Error Period – 8th March 2022

At 14:36 on 8th March 2022, the Gas to Grid valve opened and allowed gas to flow through the Fiscal USM. The Fiscal USM began reading with a flow rate of ~200 Sm³/h above the Inlet USM. This over-registration continued for 8 minutes until the Gas to Grid valve closed and gas diverted to reject. When the valve reopened the Fiscal USM began reading correctly with an offset of ~27 Sm³/h.

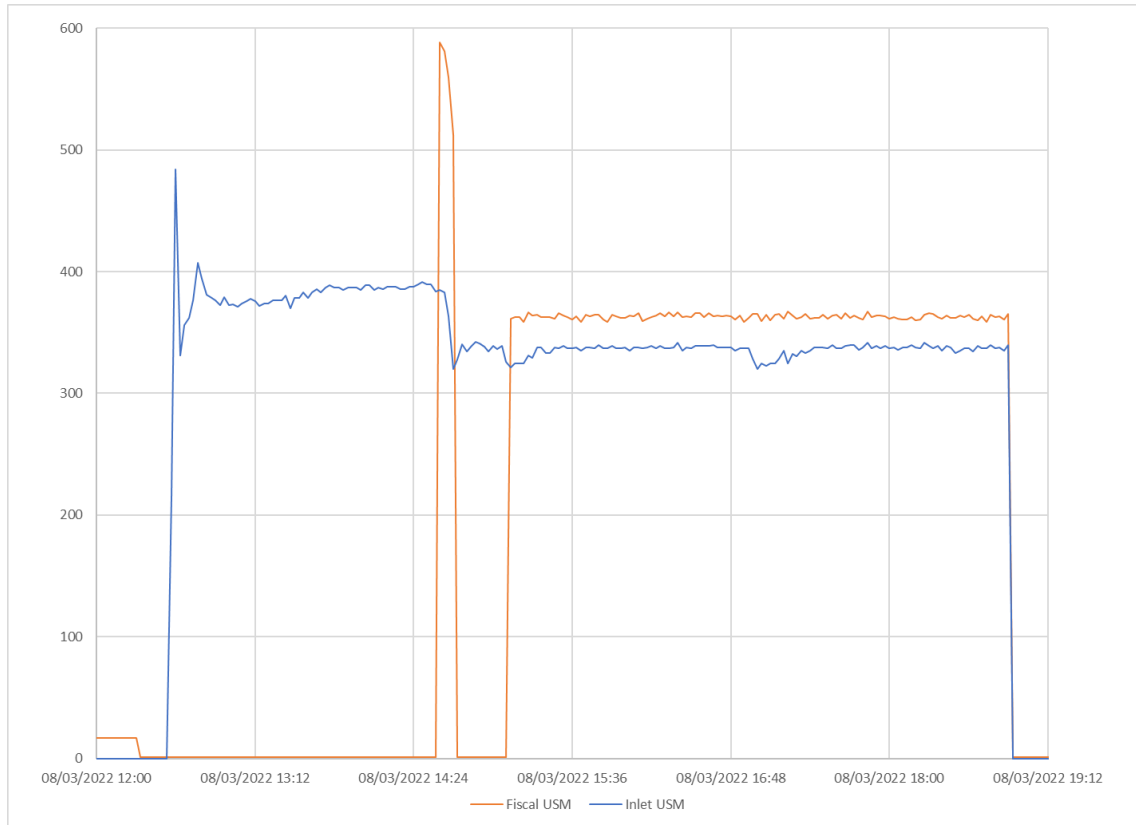


Figure 3 - Error Plot – 8th March 2022