

**NULL METER ERROR REPORT****FINAL**

Reconcile?	N
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Safety Issue?	N
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Thesis Report No.	
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**1. EXECUTIVE SUMMARY**

SITE NAME	Leamington	
LDZ	WM	
START DATE (actual)	22 <sup>nd</sup> January 2021	
LAST GOOD DATE		
END DATE	6 <sup>th</sup> August 2021	
SIZE OF ERROR (No reconciliation required if under 0.1%)	-0.00306% on original measured volume	
ESTIMATE – Y/N?	N	
ROOT CAUSE	Incorrect fixed factor for CO <sub>2</sub> entered into the flow computer	
ANALYSIS	Calculation of flowrates using incorrect and correct CO <sub>2</sub> fixed factors to determine the error using the worst case pressure and temperature.	
METER TYPE	Turbine	
AUTHOR	Damian Ray	
CHECKED BY	Simon Howard	
ACCEPTED BY CADENT NETWORK		
RECONCILIATION	Distribution	Transportation



**2. BACKGROUND**

Gas is supplied to part of the Cadent network at Leamington FWACV offtake. The site metering system comprises of dual stream Turbine meters.

On the 22<sup>nd</sup> January 2021, an incorrectly calculated fixed factor for carbon dioxide was entered into the site flow computer configuration.

**3. ERROR QUANTIFICATION AND IMPACT**

Table 1 details the correct and incorrect carbon dioxide fixed factors entered into the flow computer. Image 1 shows the incorrect CO2 fixed factor and image 2 shows the correct CO2 fixed factor.

	Incorrect CO <sub>2</sub> value	Correct CO <sub>2</sub> value
Turbine	0.205731	0.235645

Table 1 Correct and Incorrect CO<sub>2</sub> fixed factor

Data Analysis Period 1 January 2020 05:00 hrs to 1 January 2021 05:00 hrs inclusive

Average composition, flow pressure and flow temperature

site	h_ref	Count	meter	Stream	(mol.%)	(mol.%)	(mol.%)	(mol.%)	(mol.%)	(mol.%)	(mol.%)	(mol.%)	(mol.%)	(mol.%)	(mol.%)	(mol.%)	(bar.g)	(degC)	Calc (μPoise)	(index)	Average CO <sub>2</sub> (mol.%) Omni 6 d.p. TR_GO.DAT
					c1	c2	c3	nc4	ic4	nc5	ic5	neoc5	c6	co2	n2	P	T				
Leamington Spa	H3815	63497	MT1	3	92.82401608	5.38892577	0.34886283	0.059019871	0.064827375	0.007400988	0.01164144	8.27E-06	0.01723	0.205731	1.070014	28.08819	13.13821651			0.205731	
Leamington Spa	H3815	1262	MT2	3	92.82401608	5.38892577	0.34886283	0.059019871	0.064827375	0.007400988	0.01164144	8.27E-06	0.01723	0.205731	1.070014	28.08819	13.13815252			0.205731	

Image 1 Incorrect CO<sub>2</sub> fixed factor

site	h_ref	Count	meter	Stream	c1	c2	c3	nc4	ic4	nc5	ic5	neoc5	c6	co2	n2	P	T			
Leamington Spa *2	H3815	38520	MT1	3	92.868697	5.262463	0.376258	0.063290	0.071620	0.008849	0.014122	0.000485	0.021439	0.235645	1.077131	26.709788	14.987168			0.235645
Leamington Spa *2	H3815	0	MT2	3	92.868697	5.262463	0.376258	0.063290	0.071620	0.008849	0.014122	0.000485	0.021439	0.235645	1.077131	26.709788	14.987168			0.235645

Image 2 Correct CO<sub>2</sub> fixed factor

The error will be largest when the metering pressure is highest and metering temperature is lowest. Data for the period of the error was processed and the highest pressure and lowest temperature recorded. These values were used to calculate the worst case percentage error in the flowrate which is summarised in Table 2.

Percentage Error in Flowrate %	-0.00306
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Table 2 Error in Volumetric Flowrate

#### 4. CAUSES

The error was caused by the fixed factors being incorrectly calculated due to missing data in the extracted data.

#### 5. RECOMMENDATIONS AND LEARNING

An appropriate data validation process should be employed to ensure a complete data set is available for the fixed factor calculations.

#### REFERENCES

<https://gasgov.sharepoint.com/sites/JOTechTeam/Industry Information/Publications/Measurement Error Reports/2. Measurement Error Notifications and Reports/WM022 - Leamington MRAMRB MER Report.docx>  
09/03/2022

Leamington CO2 fixed factor Error 2021.xls

**VERSION HISTORY**

<i>Version</i>	<i>Changes</i>	<i>Author</i>	<i>Date</i>
1	<i>First Issue</i>	Damian Ray	20/10/2021