

NULL METER ERROR REPORT**FINAL**

| | |
|------------|---|
| Reconcile? | N |
|------------|---|

| | |
|---------------|---|
| Safety Issue? | N |
|---------------|---|

| | |
|-------------------|-----|
| Thesis Report No. | N/A |
|-------------------|-----|

1. EXECUTIVE SUMMARY

| | |
|-----------------|--------------------------------------|
| SITE NAME | Burnhervie offtake |
| LDZ | Scotland |
| LAST GOOD DATE | N/A |
| START DATE | 12:00 17 th October 2013 |
| END DATE | 11:00 29 th November 2013 |
| SIZE OF ERROR | NULL |
| ESTIMATE – Y/N? | N |
| ROOT CAUSE | Transducer failure |
| ANALYSIS | ME2 report, HPMIS data |
| METER TYPE | USM |
| AUTHOR | S.Stephenson |
| CHECKED BY | T.Ryan |

2. BACKGROUND

Gas is supplied to part of the Scottish network at Burnhervie Offtake which employs an USM to measure the volumetric flow rate.

The stream 2 USM was diagnosed as having a problem with Path 4 in error on the 6th June 2013. This was identified as a fault with the analogue block for the USM. This was replaced by Sick UK on 1st Aug 2013. No checks were completed on this USM at this time. When the ME2 metering validation on the 28th November 2013 was completed It highlighted that this USM was failing the CP14c - VOS test. SICK UK suggested that the wiring to the transducers may have been connected incorrectly when the analogue block was replaced. This was found to be the case on cords B&C and was corrected. Test CP14c of the Me2 was then repeated On the 18th December 2013 which passed.

Stream 2 USM was the duty stream for the period 17th Oct 2013, aprox 12:00 until 29th Nov 2013, aprox 11:00. Stream 1 USM was duty stream for all other times since last years metering validation.

3. ERROR QUANTIFICATION AND IMPACT

Advice from Sick UK is that in the worst case scenario the loss of 2 path's of a 4 path USM, they would expect an increased uncertainty of up to +/-0.5% of the flow reading (from +/- 0.2%) for an un-calibrated USM but not necessarily any systematic error. This is a calibrated USM which has maintenance log files checked on a monthly basis by Sick UK with no problems.

USM

ME2 test CP14c date 28th November 2013

Cord Results

| Cord | Transducer | Serial Number | Performance | Gain | SNR | Vos |
|------|------------|---------------|-------------|------|------|--------|
| A | up | 10450049 | 100 | 38 | 40.1 | 377.66 |
| A | down | 10450191 | 100 | 38 | 40 | |
| B | up | 10450032 | 100 | 55 | 37.1 | 363.48 |
| B | down | 10450034 | 100 | 54 | 36 | |
| C | up | 10450055 | 100 | 54 | 25.3 | 363.4 |
| C | down | 10450063 | 100 | 55 | 36.2 | |
| D | up | 10450033 | 100 | 38 | 40.3 | 377.23 |
| D | down | 10450035 | 100 | 37 | 39.8 | |

| | |
|---|----------|
| USM VOS | 370.4425 |
| Calculated VOS from AGA 8 for applied Temperature, Pressure & Composition | 377.77 |
| Percentage difference VOS | -1.940 |
| Validation Pass/Fail | Retest |

It is considered that to quantify this error would require considerable work and expense requiring trials at site or removal to a test facility and the resultant error would be very small. Therefore quantification cannot be justified in this case and a null status should be accepted.

4. CAUSES

Incorrect connection of B & C cord transducers following the replacement of the analogue block.

5. RECOMMENDATIONS AND LEARNING

An VOS (AGA8 CP14c) check should have been completed after this repair. It is a recommendation of this report that no reconciliation is carried out based on the information provided by Sick UK.

REFERENCES

ME2 reports

HPMIS rbd data

VERSION HISTORY

| <i>Version</i> | <i>Changes</i> | <i>Author</i> | <i>Date</i> |
|----------------|----------------|---------------------|---------------|
| <i>Rev 1.1</i> | <i>Final</i> | <i>S.Stephenson</i> | <i>1/9/14</i> |
| | | | |
| | | | |

DISTRIBUTION

NG UKT Data assurance and Quality Team

SGN Tom Ryan

SGN E Melen

SGN D Mitchell

SGN J Crowley

Joint Office of Gas Transporters