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SITE CHECKS FOR NTS TO LDZ OFFTAKE METERING SYSTEMS - PROCEDURE FOR GAS EXAMINERS

Unrestricted

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Executive Summary

During their regular visits to National Grid offtakes, gas examiners have the opportunity to carry out an overview inspection of the gas metering system. This procedure captures the actions required. The procedure is to be non-invasive in that no disconnection of wiring or pipework is to be done and no change is to be made to the flow computer configuration. A technician, preferably using the latest OMNICO file in an off-line mode, will perform any actions. Where this is not possible, flow computer keypad instructions are included within these procedures. The procedure may be spread over a number of visits throughout the year.

Project Code: 1/08802

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1 INTRODUCTION

During their regular visits to National Grid offtakes, gas examiners have the opportunity to carry out an overview inspection of the gas metering system. This procedure captures the actions required. The procedure is to be non-invasive in that no disconnection of wiring or pipework is to be done and no change is to be made to the flow computer configuration. A technician, preferably using the latest OMNICOM file in an off-line mode, will perform any actions. Where this is not possible, flow computer keypad instructions are included within these procedures. The procedure may be spread over a number of visits throughout the year.

An Excel® Workbook is available to document the results of the checks. A completed copy of this data is to be provided to the appropriate asset manager and to Ofgem via their website.

The names of keys to be pressed in the following instructions are in parentheses thus [key] and refer to those available on an Omni 6000 flow computer keypad. This method is for use when the OMNICOM file is not available.

There is a box at the bottom of each Worksheet for the entry of the gas examiner's name and the date that the checks were performed.

A question mark at the end of the check statement indicates that the result is recorded by a drop-down box.

All checks highlighted in blue are carried out on external metering equipment.

2 CONFIGURATION FILE

Save the current OMNI configuration file at the start of the procedure, for later use in checks offline.

3 GENERAL

- Enter the site name at the top of the General Worksheet; this pre-populates other worksheets.
- Checks on external equipment are highlighted in blue on the spreadsheet so that they can be grouped in order to save time.
- Check the metering system for obvious signs of gas leakage at impulse pipework couplings, isolation valves etc and comment if required.
- Check that the bypass stream is isolated and that the Ofgem seal is intact.
- Verify that the site was validated within the last 12 months – check HPMIS or spreadsheet summary form.
- Comment if required.

4 PRE/POST FLOW CHECK

- Carry out pre- and post-flow checks if the site is flowing. If not then carry out the following local checks on the telemetry local display unit:
 - FCV/PCV Position
 - F1 Flow
 - P1 Inlet pressure
 - P5 Outlet pressure
 - INTG Integrator
 - METER_1/2_DP Differential pressure
- Comment if required.

5 LOGS & DOCUMENTATION

- Ensure that a copy of the latest revision of the validation procedures (e.g. ME2 part 3) is available on site.
- Confirm the status of calibration/validation results from the meter validation certificate (HPMIS or print off) or check that all relevant tests have been completed.
- Check that the flow computer backup configuration is available on site.
- Examine the metering log.
- Comment if required.

6 ORIFICE-PLATE METER SYSTEM

This procedure is to be carried out annually without taking the orifice-plate out of the line.

6.1 Orifice meter tube

- Record the make, model and serial number of the meter tube and verify against its certificate. Enter a comment if they are indecipherable.
- Record the meter tube diameter and calibration temperature from the calibration certificate and HPMIS.
- Compare this data with the details held on the flow computer under “[Meter Run Setup](#)” in the saved configuration file.
- Comment if required.

6.2 Orifice plate

- Record the serial number of the orifice-plate in use and verify against its certificate and the site log or HPMIS. Establish by checking details of the last orifice-plate inspection and spare plate details in HPMIS. If unsure contact the calibration laboratory to verify the spare plate serial number.
- Record the orifice diameter and calibration temperature from the current calibration certificate and HPMIS.
- Compare this data with the details held on the flow computer under “[Meter Run Setup](#)” in the saved configuration file.

Or use the OMNI Front Panel key-presses listed in appendix A

- Record the orifice-plate’s installation date, calibration date and the calibration authority used. The details can be found in the last validation record CP14a for the site in HPMIS. The calibration facility name is not included on certificates issued by the National Grid calibration laboratory.
- Record if there is a drain hole and whether or not the hole dimensions have been taken into account in the flow computer. Only the presence rather than the absence of a drain hole will be noted on the certificate.
- Verify that the orifice-plate has been changed out within 12 months of the last validation as specified in National Grid document T/PR/ME/2 Part 3 procedure CP14a.
- Comment if required.

7 TURBINE METER

This procedure is to be carried out annually without taking the meter out of the line.

- Record the manufacturer, model and serial number of the meter and verify against its certificate and the site log or HPMIS.
- Record the calibration date and the calibration authority used from the current calibration certificate.
- Record the frequency and **K-factor pairs** derived from the high-pressure calibration.
- Compare the above with the details held on the flow computer under “[Meter Run Setup](#)” in the saved configuration file.

Or use the OMNI Front Panel key-presses listed in appendix A

- Record whether the turbine has been lubricated and if it has had a spin down test. If it has had a spin down test, record the spin down time: this is recorded in the comment section of CP14b on HPMIS.

- Check the meter's calibration history. Verify that a high-pressure calibration has been carried out at the required frequency as specified in National Grid document T/PR/ME/2 Part 3 procedure CP14b.
- Comment if required.

8 ULTRASONIC FLOW METER (USM)

This procedure is to be carried out annually without taking the meter out of the line.

- Record the manufacturer, model and serial number of the meter and verify against its certificate and the site log or HPMIS.
- Record the USM tube diameter, calibration temperature and temperature coefficient from the manufacturer's certificate (Instromet meter only).
- Record the calibration date and the calibration authority used from the current calibration certificate.
- Record the pulse frequency and K-factor pairs derived from the high-pressure calibration.
- Compare the above with the details held on the flow computer under "[Meter Run Setup](#)" in the saved configuration file.

Or use the OMNI Front Panel key-presses listed in appendix A

- Check the meter's calibration history. Verify that checks have been carried out in accordance with National Grid document T/PR/ME/2 Part 3 procedure CP14c.
- Comment if required.

9 DIFFERENTIAL PRESSURE MEASUREMENT

- Record the manufacturer, model and serial numbers of the DP transmitters and verify against the certificates and site log.
- Examine the transmitter validation record, record the calibrated range and comment if necessary.
- Compare the above with the details held on the flow computer under "[Diff. Pressure Setup](#)" in the saved configuration file.

Or use the OMNI Front Panel key-presses listed in appendix A

- Check that validation records are in place and current.
- Ensure that corrections for local gravity and calibration temperature are being applied in accordance with GMR00068 in the validation records.
- If possible shut down flow and measure offsets with the equalisation valve closed.

- Record whether any zero check at high static pressure is performed as part of the validation record.
- Check that the local gravity factor is traceable to the site's certificate.
- Comment if required.

10 PRESSURE MEASUREMENT

- Record the manufacturer, model and serial number of the pressure transmitter and verify against the validation records and log books.
- Examine the pressure transmitter validation record, record the calibrated range and comment if necessary.
- Compare the above with the details held on the flow computer under "Temp/Press Setup" in the saved configuration file.

Or use the OMNI Front Panel key-presses listed in appendix A

- Check that validation records are in place and current.
- Ensure that corrections for local gravity and calibration temperature are being applied in accordance with GMR00068 in the validation records.
- Check that the local gravity factor is traceable to the site's certificate.
- Comment if required.

11 EQUALISATION VALVES AND IMPULSE LINES FOR DP AND PRESSURE TRANSMITTERS

- Observe the condition of the impulse lines and ensure they are in good condition.
- If there are drain-legs, then establish if they contain any contamination.
- Ensure that the impulse lines fall to the tapping points and that no low points are present in the impulse lines except for drain-legs.
- Observe that the pressure tapping and transmitter are in an appropriate location for the type of meter installation. For orifice-plates this is the high side of the differential pressure; for turbine and ultrasonic meters this is on the body of the meter.

12 TEMPERATURE MEASUREMENT

- Record the manufacturer, model and serial number of the temperature transmitter, if relevant, otherwise record the manufacturer and serial number of the temperature element, if visible, and verify against the validation records and logs. Many sites use a 4-wire temperature element without a transmitter, in which case the calibrated range is not relevant and reference to it should be ignored.



- Examine the temperature transmitter validation record, record the calibrated range and comment if necessary.
- Compare the above with the details held on the flow computer under “Temp/Press Setup” in the saved configuration file.

Or use the OMNI Front Panel key-presses listed in appendix A

- Verify that the temperature measurement point is in an appropriate location for the type of meter installation. For orifice-plates this is between 5D and 15D downstream; for turbine meters this is within 5D downstream; for ultrasonic meters this is between 2D and 5D downstream. For non-compliance please enter in the Comment box whether upstream or downstream and the distance in diameters.
- Check that validation records are in place and current.
- Comment if required.

13 FLOW COMPUTER

- All references to the flow computer configuration relate to the configuration file saved at the start of these checks.
- Check that the “Override Code” for DP, pressure and temperature is 3 “Average on fail” under “Diff. Pressure Setup” or “Temp/Press Setup” in the saved configuration file.

- Check the fixed factors under “Factor Setup & Sys Const” in the saved configuration file, i.e. “Atmos Press”, “Base Press”, “Base Temp” and “Density of Air”. Check that the four values are correct.

Or use the OMNI Front Panel key-presses listed in appendix A

- Check that the values for Viscosity and Isentropic Index in the Fluid Data & Analysis are traceable to calculated values and record where the values came from.
- Check that the correct calculation routines are used: Density code 1 for AGA-8 detailed or code 2 for AGA-8 gross, HV code 2 for ISO6976 under “Fluid Data & Analysis” in the saved configuration file.

Or use the OMNI Front Panel key-presses listed in appendix A

- Check that the Meter Suspect Alarm is clear.
- Check the flow computer configuration according to procedure CP9 in National Grid document T/PR/ME/2 Part 3 and comment on any discrepancies.
- For orifice-plate metering systems only, check that the pressure measurement is upstream of the orifice plate. For all metering systems check that the temperature measurement is downstream of the meter.
- Comment if required.

14 GAS PROPERTIES

Demonstrate that live values not fixed factors are in use for gas composition, calorific value and relative density.

- Verify that the gas composition from the chromatograph is the same as the composition being used in the flow computer by checking Methane, CV and RD using procedure CP8a in National Grid document T/PR/ME/2 Part 3. In the Fluid Data and Analysis menu, from front panel of OMNI.
- Verify that the tracker and flow computer read the same values for the calorific value and the relative density of the gas using procedure CP8b in National Grid document T/PR/ME/2 Part 3.
- Comment if required.

15 ODORISATION

- Verify that the odourisation system is operating.
- Verify that the flowrate displayed on the odourant control panel matches the value on the flow computer.
- Comment if required.

APPENDIX A OMNI FRONT PANEL PROCEDURES

Meter Tube / Orifice Details

1. Press keys [Prog] [Setup] [Enter]
2. Scroll down to “Meter Run Setup”
3. Press [Enter]
4. Scroll down for details of the **meter tube** and check that they agree with the values recorded above.
5. Scroll down for details of the **orifice-plate** and check that they agree with the values recorded above.
6. Press [Prog] three times to return to the main display.

Turbine K factors and Serial Number

1. Press keys [Prog] [Setup] [Enter].
2. Scroll down to “Meter Run Setup”.
3. Press [Enter].
4. Scroll down and check that the following agree with the values recorded above:
 - Frequency and K-factor pairs.
 - Meter model, size and serial number.
5. Press [Prog] three times to return to the main display.

Ultrasonic Meter details

1. Press keys [Prog] [Setup] [Enter].
2. Scroll down to “Meter Run Setup”.
3. Press [Enter].
4. Scroll down and check that the following agree with the values recorded above:
5. Frequency and K-factor pairs.
6. Meter model, size and serial number.
7. USM tube diameter, calibration temperature and temperature coefficient (Instromet meter only).
8. Press [Prog] three times to return to the main display.

Differential Pressure Setup

1. Press keys [Prog] [Setup] [Enter].
2. Scroll down to **“Diff Pressure”**.
3. Press [Enter].
4. Scroll down for **“Override Code”** and calibrated range. Record the override code and the calibrated range. Check that the calibrated range agrees with the values recorded above.
5. Press [Prog] three times to return to the main display.

Pressure Measurement Setup

1. Press keys [Prog] [Setup] [Enter].
2. Scroll down to **“Pressure Setup”**.
3. Press [Enter].
4. Scroll down for **“Override Code”** and calibrated range. Record the override code and the calibrated range. Check that the calibrated range agrees with the values recorded above.
5. Press [Prog] three times to return to the main display.

Temperature Measurement Setup

1. Press keys [Prog] [Setup] [Enter]
2. Scroll down to **“Temperature Setup”**
3. Press [Enter]
4. Scroll down for **“Override Code”** and calibrated range. Record the override code and the calibrated range. Check that the calibrated range agrees with the values recorded above.
5. Press [Prog] three times to return to the main display.

Flow Computer DP / Pressure / Temperature Override Codes

1. Press keys [Prog] [Setup] [Enter]
2. Scroll down to “Temperature Setup”, “Pressure Setup” and “Diff.Pressure” (for orifice-plate meters) in turn
3. Press [Enter]
4. Scroll down to “Override Code”. Record the override code for each parameter.
5. Press [Prog] after each function to return to Setup menu for selection of the next.

Flow Computer Factor Setup

1. Scroll down to “Factor Setup”
2. Press [Enter]
3. Scroll down to “Atmos Press”, “Base Press”, “Base Temp” and “Density of Air”. Check that the four values are correct.
4. Press [Prog] to return to the Setup menu.

Flow Computer Fluid Data Analysis

1. Scroll down to “Fluid Data & Analysis”
2. Press [Enter]
3. Scroll down to “Viscosity”, “Isentropic Index”, “Density method” and “HV method”. Record the two values and check that the two codes are correct.
4. Press [Prog] three times to return to the main display.