

LDZ Offtake Meter Orifice Plate Error

National Grid became aware of an issue on a particular Offtake meter, Whitwell AGI, as a result of a routine audit inspection during July 2009.

LDZ Offtake meters are validated as part of an annual UNC process. There are two orifice plates specifically designed for each Offtake meter, one of which is in operational service while the remaining orifice plate is stored between annual inspections. The orifice plate in operational service is removed and replaced by the alternate orifice plate as part of the routine inspection procedure. Once removed, the orifice plate undergoes a series of measurements that are recorded on certificates. Given the inspection is carried out annually, it is typical that a specific orifice plate will spend roughly twelve months in operational service and the subsequent twelve months in storage.

During the July 2009 audit at Whitwell AGI it was noted that the internal 'bore hole' dimensions, as recorded on orifice plate measurement certificates, had deviated between recordings listed for 2006/07 and the adjacent certificate measurements. This particular check was not part of the routine inspection process for reasons discussed later and was identified by additional checks carried out by the auditor.

When the deviation was reported to us an internal investigation was triggered which indicated that a potentially incorrect calibration of a measuring device (a Kemco 700 machine, which is used to calculate orifice plate dimensions), was the probable root cause of the orifice plate dimensional inaccuracy.

Our internal investigations indicated that the machine's recalibration on the 13th October 2006 may have been inaccurate and had the potential to introduce a systematic error on all measurements carried out by the Kemco 700 machine between 13th October 2006 and 5th October 2007 (when it was subsequently calibrated again). Consequently, it is possible that all orifice plates measured during this time may have been incorrectly reported. However, it is only when an inaccurately measured orifice plate is reinstalled in an operational Offtake meter that such an inaccuracy could cause a gas flow calculation issue.

A measurement anomaly of this kind would affect the calculation of the volume of gas flowing into the Distribution Network from the NTS, and our subsequent investigations indicated that some 34 meters of this type could have been affected between 22nd March 2007 and 3rd July 2009. This is the period during which the first potentially affected orifice plate was installed and subsequently the last remaining inaccurately measured orifice plate was removed as part of the annual inspection process. For clarity, each individual Offtake meters could have been affected for approximately one year between the installation and subsequent removal as part of the UNC inspection process.

The Kemco machine was calibrated by a UKAS accredited organisation and the calibration procedure is expected to comply with international standards procedures. Accordingly, calibration would therefore not have been expected to introduce any errors into the process and as such, no checks were included in the routine audits to compare orifice plate diameter measurements. Consequently, we were unaware of the issue until the July 2009 audit and our subsequent investigation.

National Grid initiated the Uniform Network Code (UNC) Measurement Error Notification process on 11th September 2009. This was shortly after our investigation had identified the significance of the issue and in accordance with established UNC procedures. National Grid requested that the Joint Office convene an extraordinary meeting of the 'Offtake Arrangements Workstream' to discuss this matter with the industry as soon as possible.

As the cause of the potential error is believed to be associated with a particular calibration device used to re-calibrate a known batch of orifice plates, we believe we have identified all the National Grid Gas LDZ Offtakes potentially affected and the period during which this occurred.

We have since discussed the specific cause of this issue with National Grid Transmission and we understand they intend to carry out their own investigation on other Offtake meters flowing into directly connected NTS loads. Similarly we have made the iDN networks aware of the issue. We understand that for the period in question the affected Kemco 700 machine has not been used in Offtake orifice plate inspection processes by the iDNs and so we would not expect any further implications on other networks.

Formal UNC procedures will ensure independent investigation and determination of any inaccurate gas flow measurements impacting on energy and transportation charges. National Grid has since included certification checks as part of our internal procedures and in the meantime we will be co-operating fully with the UNC Offtake committee through the independent investigation. In addition, once the independent investigation has concluded National Grid will be in a better position to consider changes to audit procedures and to share findings with other DN owners.