Gas Distribution System Code

December 2012

Review of Unaccounted for Gas Benchmarks

Call for Submissions

1. Unaccounted for gas

1.1 Introduction

Unaccounted for gas (UAFG) is the difference between the quantities of gas measured into and out of a pipeline system, with allowance made for any change of gas held in the system between the start and end of the measurement period. UAFG can be expressed in terms of actual volume or energy, or is more frequently expressed as a percentage of the total quantity measured into the system.

Calculated UAFG figures are very rarely zero even if there are no leaks in the pipeline system. This is principally because there are errors associated with the metering of gas into and out of the system. For instance, meter installations supplying distribution systems that have between ±1.0% and ±2.5% volume measurement uncertainty (depending on meter size) comply with AEMO's Wholesale Market Metering Uncertainty Limits and Calibration Requirements Procedures for Victoria. Similarly, there are errors (typically in the range of +2% to -3%) associated with the measurement of gas delivered from the distribution system.

Given the magnitude of measurement errors at both the upstream and downstream ends of the distribution system, the level of uncertainty in UAFG attributable entirely to meter calibration errors could easily exceed ±2%. Apart from calibration errors, other factors that contribute to metering uncertainty include the accuracy of gas heating value (HV) allocation and barometric and ambient temperature effects. Moreover, the factors affecting UAFG will not be constant over time, especially as gas loads and meter populations change.

It is evident from the above discussion that the level of UAFG at any point in time, as well as changes in the level of UAFG over time, does not necessarily relate to changes in losses or leakage from the system.

The implications of pipeline leakage for UAFG are examined in more detail below. Multinet notes that there is no empirical evidence to establish a link between the replacement of cast-iron pipes and a decline in actual UAFG. Multinet therefore proposes to set a constant UAFG benchmark for the forthcoming period using the latest available actual UAFG data.

1.2 Pipeline Leakage

It is widely understood that welded steel and fused polyethylene distribution systems are not expected to leak as much as cast-iron pipelines. A relatively high proportion of Multinet's distribution network is composed of cast-iron pipes. It has also been noted that Multinet has implemented a program to replace the cast-iron sections of its distribution system.

Whilst cast-iron pipes are expected to leak more than other materials, there is no recognised way of determining accurately the magnitude of gas losses from individual sections of pipeline. It is therefore not valid to estimate reductions in leakages due to cast-iron pipe replacement, based on a fixed "losses per kilometre" rate. Specifically, leakage from individual joints will vary, such that one leak at a single point could be equivalent to the total leakage from the rest of a long continuous section of pipe.

Multinet's cast-iron pipeline systems are many years old and are continuing to deteriorate. Although sections of the cast-iron system are being replaced, the leakage from the cast-iron assets that remain in service can be expected to increase with time. Thus, the net leakage from Multinet's distribution network is unlikely to reduce in proportion to the length of cast-iron pipes that are replaced. In effect, any reduction in leakage from the replaced pipes is likely to be counter-balanced by increased leakage from the remaining cast iron pipes. As already explained, there is significant uncertainty in attempting to measure these countervailing effects because leakage is only one component of UAFG.

1.2.1 Impact of Pipeline Replacement on UAFG

The changing impact of metering uncertainty on UAFG means that the impacts of cast-iron replacement each year are going to be masked by the year-to-year fluctuations in the UAFG determination. Even assuming all UAFG is caused by losses from the cast-iron system (which is not the case) a 3% replacement rate for a typical 3.0% UAFG benchmark system rate would change the figure by less than 0.1% per year. However, as already noted, UAFG is not caused solely by cast-iron pipeline leakage.

The net effect of the tenuous link between actual UAFG and cast-iron pipeline replacement means that the UAFG benchmark figure does not provide a suitable business driver for ensuring on-going system integrity.

The UAFG benchmark figures are also a “trailing indicator” in that they are based on the UAFG figures from past years and thus do not represent the immediate past history. The UAFG figures take time to be finalised and it is necessary to average the UAFG over a number of years to reduce the impact of the year-to-year fluctuations.

1.2.2 Impact of UAFG Benchmarks on Pipeline Replacement

In light of the information set out above, it is evident that the existing system of setting UAFG benchmarks slightly lower than the actual past determined UAFG – to provide a business with incentives to replace deteriorating pipelines is inappropriate. There are too many uncertain factors that drive the actual UAFG. Moreover, the economic signals for pipeline replacement that a business sees under the current UAFG regime are not commensurate with the cost of pipeline replacement and so do not provide an effective investment driver in themselves. The main driver for pipeline replacement is safety rather than the economic value of the gas lost.

1.2.3 Distribution System Integrity

Distribution UAFG can be used as an indicator of gas distribution system integrity however, as already shown, the UAFG depends on a number of different (and uncertain) factors making it difficult to correlate any particular integrity component to the overall UAFG. This indicator is affected by the accuracy of custody transfer (receipt) and customer metering as well as the leakage and other losses from the system.

Distribution businesses do not have control over the custody transfer (receipt) metering component of distribution UAFG. However, distribution businesses do have control over the components of distribution system integrity such as customer metering and pipeline maintenance, repair and replacement.

Drivers to ensure the continuing integrity of the distribution system should be more directly targeted at the relevant distribution business activities that govern system integrity, rather than relying on an imperfect trailing indicator such as distribution UAFG.

1.3 Multinet’s current UAFG Benchmark

For the purpose of its current Access Arrangement, the Essential Services Commission established the UAFG benchmarks set out in the following table. Two benchmarks are determined based on a customer’s annual consumption of greater than or less than 250TJ.

Multinet and each User carry out an annual financial reconciliation to settle the difference between the actual UAFG and the benchmarks.

Table 1-1: Multinet current UAFG benchmarks

	Year Ending 31 December				
	2008	2009	2010	2011	2012
Class A	0.3%	0.3%	0.3%	0.3%	0.3%
Class B	3.2%	3.2%	3.2%	3.1%	3.1%
Non PTS	2.0%	2.0%	2.0%	2.0%	2.0%

The table below details Multinet's actual UAFG since 2006. The table clearly shows that Multinet has been unable to meet the UAFG benchmark in the current access arrangement period (shown in Table 12.1).

Table 1-2: Multinet actual UAFG

	Year Ending 31 December					
	2006	2007	2008	2009	2010	2011**
Class A	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
Class B	3.8%	4.2%	3.9%	4.1%	4.4%	4.4%
Non PTS	n/a	n/a	n/a	TBD*	TBD*	TBD*

* Awaiting injection data from AEMO

** Estimated

Under its current access arrangement, Multinet has faced strong incentives to minimise UAFG. Notwithstanding these incentives, the company has been unable to meet the UAFG benchmarks set by the ESC. The material difference between the benchmark and actual UAFG for Class B strongly suggests that the ESC's benchmarks were not set appropriately. In addition, the actual UAFG performance illustrates the variability of the measure over time and the absence of a downward trend, despite the replacement of cast iron pipes. The data therefore confirms the views already expressed that UAFG is a simple measure that conceals a number of complex factors that vary over time.

In this context, it is noted that during the current Access Arrangement Period, the Bas Gas Station located near Lang Lang and operated by Origin Gas was commissioned. From 2010, it has been operating at full capacity and injecting gas into the Longford line. This effectively changed the overall quality of gas entering Multinet's system. Gas obtained from Bas Gas is of an inferior quality to gas provided by Longford, and has changed the overall heating value of the gas when compared to earlier years. Multinet's analysis shows that this has contributed up to 0.4% of the increase in UAFG since 2006. Acknowledgment of the UAFG issue relating to the quality of gas from Bas Gas is recognised by AEMO – refer to AEMO Gas Market Issue IN031/09.

1.4 Multinet's proposed UAFG Benchmark

Based on the information set out above, Multinet considers it is neither possible nor appropriate to adjust UAFG benchmarks for the expected future impacts of cast-iron pipe

replacement. Multinet's actual UAFG has not declined since 2003, even though the company has replaced approximately 800 km of low pressure pipe since 2003. This fact, coupled with the information set out in the previous sections demonstrates that there is no empirical evidence to establish a link between the replacement of cast-iron pipes and a decline in actual UAFG. Given the circumstances, Multinet regards the actual UAFG data for 2011 to be the most appropriate benchmark for the forthcoming Access Arrangement Period. In particular, Multinet has faced financial incentives to reduce UAFG, and therefore the most recent actual data provides an efficient benchmark for the forthcoming Access Arrangement Period. For the reasons set out above, Multinet is not proposing to adjust the UAFG benchmark to reflect its proposed pipeworks program for the forthcoming period.

The table below sets out Multinet's forecast for UAFG for the 2013 to 2017 Access Arrangement Period.

Table 1-3: Multinet proposed UAFG benchmarks

	Year Ending 31 December				
	2013	2014	2015	2016	2017
Class A	0.3%	0.3%	0.3%	0.3%	0.3%
Class B	4.4%	4.4%	4.4%	4.4%	4.4%
Non- PTS	3.0%	3.0%	3.0%	3.0%	3.0%