



EVENT AUDIT

Greater Mt Maunganui and Greater Tauranga

21 March 2016

Under the Gas (Downstream Reconciliation) Rules 2008 the Gas Industry Company has commissioned Langford Consulting to perform an event audit in respect of GMM08001 Greater Mt Maunganui due to unusually large amounts of positive UFG and GTT 07701 Greater Tauranga due to increasing negative UFG. The purpose of the audit is to ascertain the cause or causes of the UFG.

Auditor Julie Langford

julie@langfordconsulting.co.nz

Table of Contents

1. Introduction.....	2
2. Information requested	2
3. Description of analysis.....	2
4. Issues arising from analysis.....	3
ICP association to gas gates.....	3
Comparison of information relating to ICP size.....	4
Comparison of pressure information.....	5
Comparison of altitude information.....	5
Comparison of gas composition information.....	5
Meter owner maintenance records	6
Transmission system owner information	6
Comparison of billing units and consumption information.....	7
TOU site review	7
Non-ACTC ICPs compared to the distributor's billing.....	8
Distributor's billing records compared to registry.....	8
July 2015 UFG movement between initial and interim allocations	9
5. Determination of material issues raised.....	10
6. Effect of audit findings on UFG.....	12
7. Conclusion	13
Appendix A – Terms of Reference.....	14

1. Introduction

Under the Gas (Downstream Reconciliation) Rules 2008 the Gas Industry Company decided to undertake an event audit in respect of GMM08001 Greater Mt Maunganui due to unusually large amounts of positive UFG and GTT 07701 Greater Tauranga due to increasing negative UFG. Their more detailed concerns are provided in the terms of reference in Appendix A. The purpose of the audit is to ascertain the cause or causes of the UFG.

Langford Consulting was contracted to perform this audit on 20th October 2015. Julie Langford was the responsible auditor and no other persons were used to perform the audit.

In preparing the draft and final reports, the auditor used the processes set out in the guideline note issued on 1 June 2013: *Guideline note for rules 65 to 75: the commissioning and carrying out of performance audits and event audits, version 3.0* (<http://www.gasindustry.co.nz/dmsdocument/2858>).

2. Information requested

Information was provided by the allocation agent and the registry, and further information was sought from Vector as distributor, Vector as the transmission system owner (TSO), the relevant retailers and AMS as meter owner. The auditor observed a good level of response from all participants to the information requests and the requested information was supplied within reasonable timeframes. Supplementary queries were also responded to in a co-operative manner.

The information requested related to the 30 months up to and including September 2015.

Participants were invited to highlight anything that they considered to be confidential when submitting the requested information. In providing information to the auditor under rule 69, an allocation participant may indicate where such information is considered to be confidential. Rule 69.5 stipulates that information is confidential if the allocation participant who either owns or holds the information considers that the information is commercially sensitive. Rule 72 provides that such information may be excluded from the draft and final audit reports provided to other allocation participants. It is at the discretion of the auditor as to whether any version of their audit report excludes confidential information (refer rule 72.2). A complete version of the report must be provided to the industry body.

It is not considered necessary by the auditor to exclude any part of this report when distributing to other participants, as no information requested by participants to be treated as confidential has been disclosed.

3. Description of analysis

The areas of analysis undertaken were as follows:

- Comparison of street addresses extracted from the registry, with the gas gate map provided by Vector as distributor, to check the accuracy of ICP association to gas gates.

- Information relating to ICP size: meter size (from AMS) and the price plan information (from Vector as distributor) were compared with ICP level billed units from Vector as distributor.
- Pressure information from AMS was compared with the pressure factor in the registry and that used by the retailers.
- Altitude information from Vector as the distributor was compared against the registry altitude and the altitude used by the retailers.
- Gas composition information supplied by Vector as TSO was compared with the gas composition used by the retailers.
- Meter owner maintenance records were reviewed for TOU meters.
- The metering records of Vector as TSO were reviewed for the four gas gates.
- Billing units from Vector as distributor were compared to retailer quantities, to look for significant differences.
- Trends in daily consumption information for each TOU site was reviewed.
- ICPs noted in the registry as having a status code of anything other than ACTC were compared to the distributor's billing records.
- Distributor's billing records were compared to the registry data to look for 'orphans'.
- During the audit the interim allocation for July 2015 occurred. This led to a significant movement in UFG so the cause of the movement was investigated.

4. Issues arising from analysis

ICP association to gas gates

A comparison of street addresses extracted from the registry was made with the gas gate map provided by Vector as distributor, to check the accuracy of ICP association to gas gates.

Initial review of the registry data suggested a large number of the street addresses had been inconsistently associated to different gate stations. These inconsistencies were therefore examined alongside a map supplied by Vector.

- It was observed that many ICPs were wrongly attributed within their "greater" gates, i.e. assignment errors between Mount Maunganui and Papamoa, or between Tauranga and Pyes Pa. However as UFG is calculated at the "greater" gas gate level these errors in gas gate assignment within the "greater" gas gates would not have given rise to UFG. The issue was referred to Vector for review.
- The review also identified 152 errors of gate association which resulted in the ICP being associated to the wrong "greater" gate, the most common error being Papamoa or Mount Maunganui ICPs being wrongly associated to Tauranga. This would affect UFG. Of these 152 the ICPs were mostly allocation group 6, but six ICPs were group 4.
- There were also 6 ICPs that had a Region description other than Bay of Plenty (these were Waikato and Wellington) that had been allocated to GTT or GMM. These ICPs need to be removed from these gas gates altogether and reallocated elsewhere. They were all allocation group 6 sites. This error suggests there is also a risk that ICPs that should be associated with

Mt Maunganui, Papamoa, Pyes Pa and Tauranga may in fact have been incorrectly associated to gates outside of these gates under audit.

Because of errors of gate station assignment found, all street addresses for allocation groups above group 6 were individually reviewed. No additional errors between the 2 “greater” gates were found.

An estimate of the UFG caused by the wrong assignment of 152 ICPs was made. This was done using the billing data supplied by Vector for the month of September 2015 at an ICP level. Some of the wrongly assigned gates were found to be inactive or to have flowed zero in that month, but the net effect of correcting the gate assignments in September 2015 was estimated to have been a reduction in the UFG loss at Greater Mt Maunganui of 1,349 GJs and a reduction in the UFG gain at the Greater Tuaranga gate of 1,349 GJs.

An estimate of the UFG effect was also made of the 6 ICPs with regions outside of Bay of Plenty who had been assigned to the GTT and GMM gates. In September 2015 the billing units for distribution only totalled 10 GJs.

The findings of this analysis were provided to Vector for comment/validation. They agreed that the list of 158 ICPs were associated with the incorrect gas gates and confirmed that they have now been corrected. This was verified in the registry by the auditor. They also stated that they would compile a list of all the other wrongly associated ICPs in the region and get these corrected also, but this was not yet complete at the time of drafting this report.

Comparison of information relating to ICP size

A comparison of billable quantities at an ICP level, against the QMax and Qmin of the meters and the distributor’s pricing category gave rise to concerns that some sites may have the wrong sized meters. Two lists of ICPs that may have over sized meters or under sized meters were sent to the meter owner for comment. The meter owner’s view was that they size a new measurement system for a retailer based on the maximum hourly quantity of gas they say is required, and the outlet pressure they say that the customer requires. If a customer needs, for example, more gas or less pressure, the meter owner would expect them to ask their retailer, who can in turn request a meter upgrade or a pressure downgrade respectively. This is therefore a retailer responsibility to monitor, as they have the relationship with the customer and the information to be able to assess whether they are using more than initially agreed.

The relevant retailers were therefore asked to comment on the meter size for the listed sites. Genesis responded that their gas meter providers carry out statistical sampling to ensure pressure factors are correct and that any undersized meters would normally create appliance burning issues and the customer would be aware of this.

Novagas replied that they are reviewing the detail that has been provided in conjunction with the GMS owner. The GMS owner advised Novagas that “current customer consumption patterns should not be confused with the required capacity for the site. As you’d be aware customers’ usage can and will vary, however the GMS that is installed is matched to the maximum capacity for the applicable site. The maximum capacity is determined prior to installation by the customers (or their gas fitters)

providing their full appliance load details for the site”. Novagas will endeavour to carry out a wider review of this nature during the 2016 year.

The auditor has concluded that on the evidence provided, it does not appear that the ongoing appropriateness of the size of meters for the site is being actively monitored by any participants presently. As the operation of a meter within its QMax/QMin range is an important part of ensuring the accuracy of a meter to the relevant NZS5259 standard of accuracy, this therefore represents a UFG risk. It is therefore recommended that retailers establish a risk based programme of revalidating meter size. It is considered this should be a retailer responsibility as they have access to flow information about their meters and have the relationship with the consumer, although they may need assistance from the meter owner.

Comparison of pressure information

Pressure information from AMS’ system was first compared with the information in the registry. These were well aligned and no queries arose.

The pressure information from the registry was then compared with that used in retailer systems. Generally these were well aligned but there were some exceptions that were raised with retailers.

Many of the discrepancies had already been identified and dealt with as a part of the Registry Amendments Implementation Group (RAIG) work. However the following did arise as a consequence of the queries made from this audit:

- Contact identified two residential ICPs where pressure discrepancies had been previously identified and rectified, but where no historical adjustment had been applied. One was an adjustment to the pressure factor of 24.57% for 12 months, the other an adjustment of 23.84% for 18 months. These adjustments will be picked up on wash-ups and affect the GTT UFG, but as allocation group 6 ICPs the effect will be minimal.

Comparison of altitude information

Altitude information as held by Vector as distributor was compared to that held in the gas registry and this was well aligned.

Altitudes held by retailer systems were then compared with the registry information. This was less well aligned, but the errors arising were small, particularly in this relatively low lying area. No errors above the accuracy threshold provided in NZS5259 arose. Contact as retailer did however comment that this was an area they were seeking to improve on through system enhancements.

Comparison of gas composition information

Gas composition information from Vector as TSO was compared to that used in retailer systems. Generally these compared well.

Some retailers dealing with small ICPs only use the Calorific Value component and do not calculate or apply compressibility. This is within the recommendation of NZS5259 to apply compressibility for pressures above 50 kPa.

Energy Online reported an error in their system which had been found in the past month, which they were in the midst of correcting and causes the monthly average CV to be incorrect. Currently they are manually correcting the CV so for wash-ups they have the correct monthly average. The error has caused the monthly CV factor to be (depending on the time of the year), slightly higher or lower than the transmission daily data. This has flowed through to the Billing Factor and consequently the monthly volume is slightly higher or lower, but within the error tolerances allowed by NZS5259.

Meter owner maintenance records

AMS supplied the Qmin and Qmax values for all ICPs as well as the meter pressures and other meter information. They also provided the maintenance records for the TOU meters. These included their maintenance policy document, records of all corrector and meter field checks, plus a sample of the technicians' worksheets.

The QMax and QMin issue arising from this (concern about possible meter size issues) has already been discussed above under the 'Comparison of information relating to ICP size' heading.

The maintenance policy provided included a statement that if the Base Volume Indication (BVI) test exceeds $\pm 1\%$ then the corrector should be replaced. Of the sample worksheets provided there was one example of a number exceeding 1% (1.15%) so AMS were asked if the corrector was changed and if there were any other instances of BVIs exceeding the range in the period. AMS reported that there have not been any corrector swaps at these ICPs in the period as, although there have been BVIs exceeding 1%, AMS is of the view that they have occurred due to a variance during the checking process, not due to inaccurate correctors. At a few sites with high flow rate the metering pressure varies quickly, enough to take the test result slightly outside the 1% limits. Changing out the corrector in this situation would mean changing out an accurate corrector unnecessarily. AMS intend to draft a field procedure to lock off a sample of gas at a steady pressure, to see if this helps overcome this pressure fluctuation issue. They did however state that if a corrector had been out by 5% or 10%, it would have been changed.

Transmission system owner information

Review of the information provided by Vector as TSO resulted in the following items.

Vector's metering operations manual contains a maintenance and verification plan. This proposes Base Volume Indication (BVI) verification approximately monthly with a maximum permissible error of $\pm 3\%$. The record of the checks done showed a number of checks outside of the $\pm 3\%$ range. Vector was therefore asked what action had been taken. Vector reported that where there were anomalies on the calculated BVI's exceeding $\pm 3\%$ the local technicians were advised and asked to investigate. They also reported that in all cases the follow up technician check calculated BVI was

within +/- 3% and, as there was no obvious onsite reason for the BVI to be outside the permissible error, it was assumed that the excursions were due to incorrect meter readings.

Vector reported that they treated the four gas gates as if they were at sea level (i.e. applied an altitude factor of 1). All the gates had altitudes below 50 metres, which is the threshold Vector as TSO use for applying altitude. This is comparable to the requirements of NZS5259 for downstream meters. They did however also report that, as a result of this audit, they were reviewing this policy.

The auditor queried the gas flow at Tauranga, which is frequently below the QMin of the meter, leading to potential inaccuracy. The flow was below the meter's QMin for 33% of the time during the 12 months ending November 2015, although 96% of the gas flow goes through the meter when it is above the QMin. Regular low flows at Tauranga DP have been occurring since October 2014 when set points of the district regulator stations within the Tauranga / Pyes Pa network (Greater Tauranga) were altered by Vector as distributor for operational reasons relating to odorant fade. This resulted in a shift in the balance of flows between the two delivery points. Vector is planning to increase the delivery pressure during 2016/17 which will require significant changes to the station componentry. It is intended that a meter with a much lower QMin will be installed at that time. It is not thought this change to the district regulator stations would affect the accuracy of any downstream metering as the change in the downstream pressure was very minimal.

- The metering records supplied showed three meters failed laboratory tests in the period reviewed, two of which resulted in data corrections. Corrections for these failed results were not computed or applied until several months after the lab tests, which meant they were not included in either the initial or interim allocations. The effect however was minimal as the corrections were small and they have been included in the final allocation.

Gas Gate	Lab test date	Period of correction	Correction applied	GJs
Mt Maunganui	14/5/14	7/3-6/5/14	23/2/15	23 GJ
Pyes Pa	29/5/14	27/3-26/5/14	23/2/15	183 GJ

Comparison of billing units and consumption information

Billing units from the distributor were compared to retailer as billed and consumption information, to look for significant differences. The following issue arose:

- During the preparation of their audit information Trustpower noticed an error in their as billed data submitted to the allocation agent for the last four months (June to September 2015). The discrepancy totalled 247 GJs for all four months for the GMM and GTT ICPs. Their consumption data and the distribution billing units reconciled. This 'as billed' error would not have affected the UFG.

TOU site review

An additional review of the TOU ICPs resulted in the identification of the following issue.

- A discrepancy was discovered in the calculation of submission volumes for one Genesis TOU ICP. A meter change was completed 30 April 2014 shortly after the ICP was switched to Genesis Energy on 1 April 2014. At this time, the format of the raw file changed. This change caused an under calculation of volumes from 30 April 2014 onwards totalling 2,555 GJs (up to November 2015). The customer is a seasonal user and the under submissions were limited to February – August 2015, so all but 3 GJs of the error will be corrected in the relevant final allocations.

Non-ACTC ICPs compared to the distributor's billing

The ICPs noted in the registry as having a status other than ACTC (the retailer has a contract to supply gas and the gas is able to flow or is temporarily disconnected) were compared with the billing information supplied by the distributor. It might be expected that ICPs with a status other than ACTC would not have any gas flow, although it is acknowledged there could be timing issues between the two systems.

Of the non-ACTC ICPs as at 1 October 2015, 263 were found to have billing units in the distributor's system for September 2015 totalling 569 GJs.

The findings of the non-ACTC comparison against distribution billing records were shared with retailers for comment. From those responses the following issues were identified:

- Trustpower identified they had some sites with incorrect status codes in their system. This resulted in the registry description noting some ICPs as ACTV when they should have been ACTC. This did not however have an effect on UFG as they returned consumption data to the allocation agent for the ACTV sites.
- Genesis also identified some sites with incorrect status codes, but again the consumption was being correctly reported.

Distributor's billing records compared to registry

Two further checks were performed comparing the network billing data for September 2015 with the registry data.

A comparison of the total number of ICPs in the registry data with a status of either ACTC or ACTV was compared with the total number of ICPs in the network billing file with billing quantities. The total number of ICPs with network billing quantities other than zero was 1.6% less than the number of ICPs in the registry with a status of ACTC or ACTV, suggesting limited opportunity for orphans.

ICPs with network billing quantities other than zero were compared against the registry to look for live ICPs with no responsible retailer recorded in the registry. Only 5 were found, all with a status of 'ready' and all categorised as domestic with minimal total usage. These were assumed to result from timing issues between the two databases.

July 2015 UFG movement between initial and interim allocations

During the audit the Interim allocation for the month of July 2015 occurred. This led to a significant movement in UFG as follows.

Gas Gate	Allocation	UFG
GMM	Initial	6,104
GMM	Interim	3,148
	Change	-2,956
GTT	Initial	425
GTT	Interim	-2,767
	Change	-3,192

The change in UFG for both gates suggests an increase in the consumption information provided by retailers between the initial and interim allocations. An analysis was therefore done comparing the initial and interim figures to identify where these consumption increases had occurred (there was no movement in the upstream gas gate injection data or the TOU data). Any retailer with an increase of more than 10% and 500GJs in an allocation group was asked what had led to the significant movement.

- Trustpower reported that there were two reasons why their consumption had moved at these gates. The first was that their customers were predominantly new business so estimating has to be done using prior month data rather than last year's data. This resulted in July initials being estimated based on May and June data, which were lower than the actual July winter usage used in the July interim. The second reason was an error in the set-up of two new customers in their system, which led to consumption totalling 520 GJs missing from their July initial data, but being correctly included in their July interim data.
- Figures were sent to Vector Gas Trading for comment as their allocation group 4 figures had increased by 50% at both GTT and GMM. Vector stated that the figures presented by the auditor were wrong and not what they loaded. This was then raised with the allocation agent who investigated further. Vector Gas Trading changed their shipper ID from On Gas Limited VGLON -> Vector Wholesale VW on 1/7/2015. During the July 2015 interim allocation there was a consequential mishandling of aggregated retailer submissions resulting in an over submission. The allocation system did not overwrite the initial submissions with the interim submissions where the contract ID had been changed. As a result, the initial and interim submissions were aggregated. The allocation agent has raised an alleged breach.
- Genesis reported that there were two ICP's that switched to Genesis at the beginning of July not included in the initial submission volumes that were in the interim. This was due to a timing issue with the switch. This led to an error of 555 GJs in the July 2015 initial UFG, resolved in the interim allocation.

5. Determination of material issues raised

Participant	Summary of issue	Rules potentially breached	Estimate of effect on UFG
Vector as distributor	Wrong gas gate assignment of 152 ICPs between GTT and GMM (136 ICPs with ACTC or ACTV status as at 1 Dec 2015)	R26.5	Greater Mt Maunganui 1,349 GJs/month Greater Tauranga 1,349 GJs/month (in the opposite direction)
Vector as distributor	6 ICPs with regions outside of Bay of Plenty, wrongly assigned to the GTT and GMM gates.	R26.5	10 GJs/month
Vector as distributor	ICPs wrongly assigned within the greater gas gates	R26.5	Nil
Contact as retailer	Historical corrections to two residential ICPs for pressure discrepancies.	R26.2	Minimal
Vector as TSO	Corrections for failed lab test results not computed or applied until several months after lab results.	R26.2	Temporary. 23 GJs at Mt Maunganui corrected at final. 183 GJs at Tauranga corrected at final.
Trustpower as retailer	Error in 'as billed' data submitted to the allocation agent for the last four months (June to September 2015).	R26.2	Nil
Genesis as retailer	Under reporting of consumption for one TOU site resulting from change in raw file format.	R26.2	2,555 GJs at Mt Maunganui
Trustpower as retailer	Sites with incorrect status codes in the registry.	R26.5	Nil

Genesis as retailer	Sites with incorrect status codes in the registry.	R26.5	Nil
Trustpower as retailer	An error in the set-up of two new customers led to missing initial consumption, corrected at interim.	R26.2	Temporary. 520 GJs in July 15 initial, corrected in interim.
Genesis as retailer	Two ICP's switched to Genesis at the beginning of July not included in the initial submission volumes, but were in the interim.	R26.2	Temporary. 555 GJs in July 15 initial, corrected in interim.

It is recommended that retailers establish a risk based programme of ensuring meters continue to be correctly sized for the ICP.

When reviewing the draft report Vector submitted a response in relation to this recommendation.

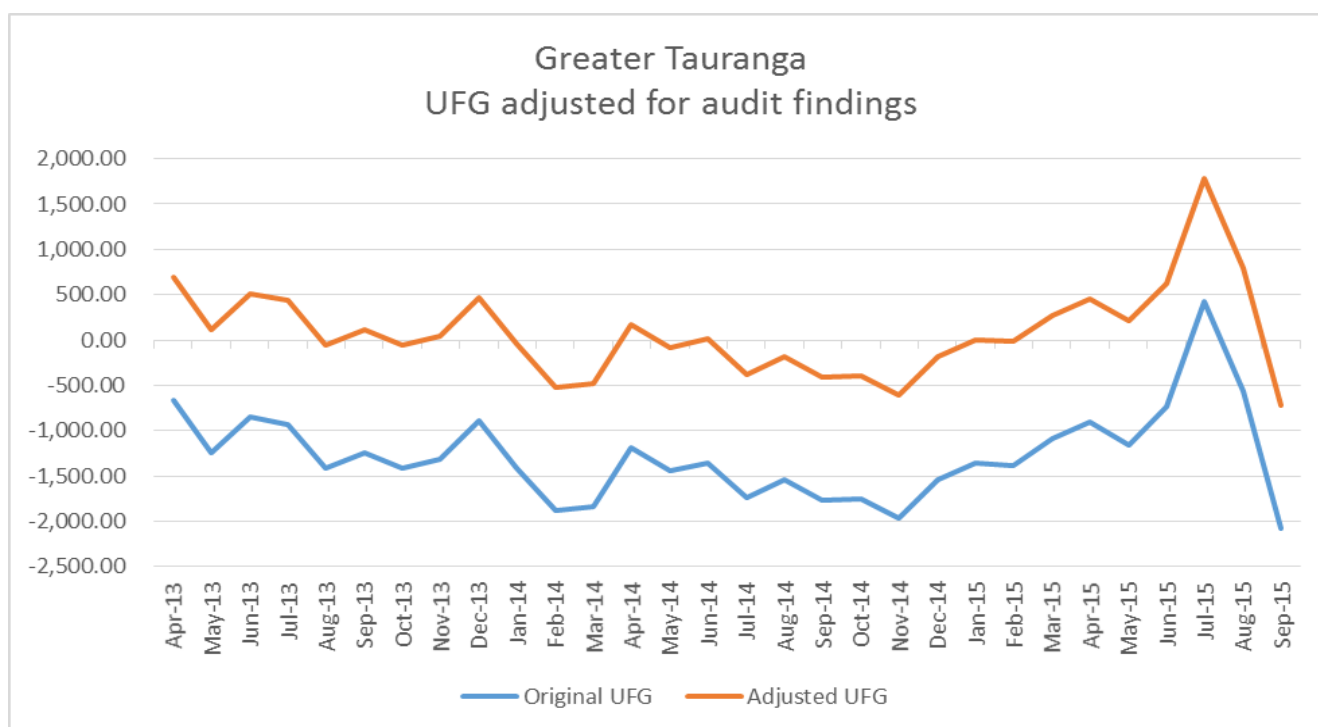
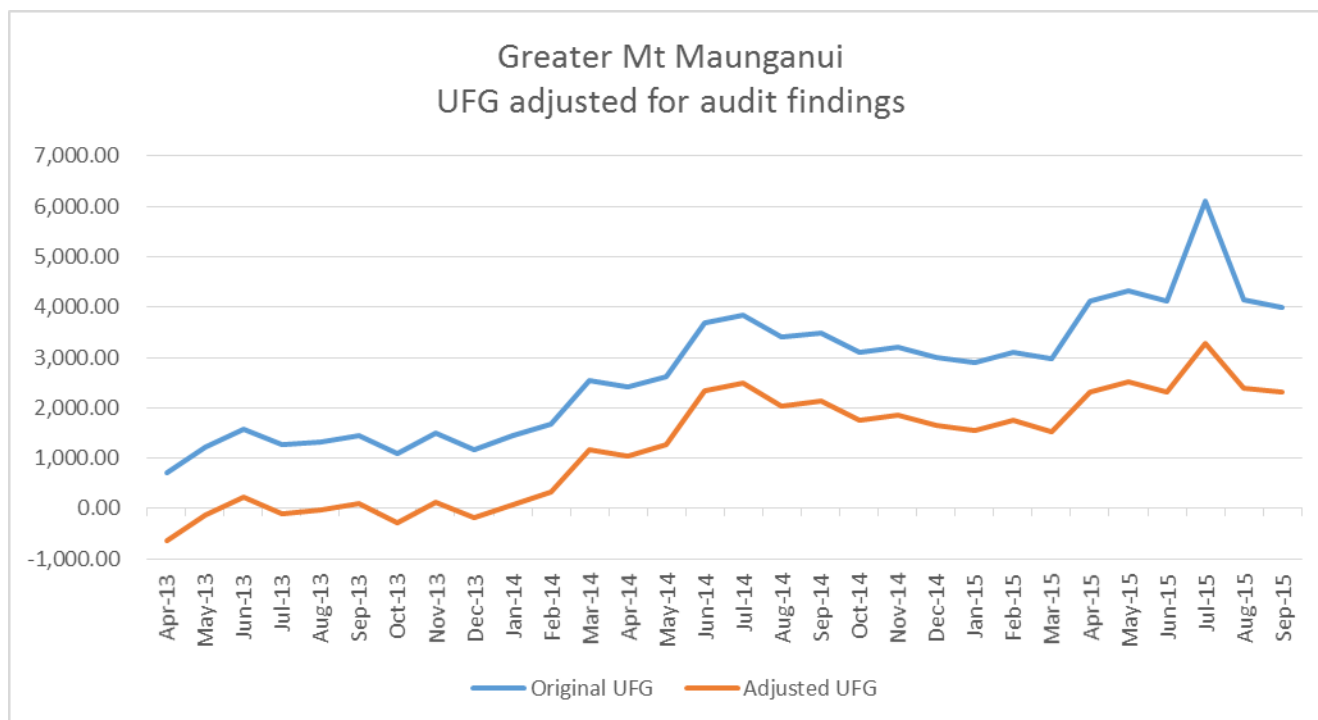
Gas Measurement Systems (GMS) are generally sized for the maximum hourly gas usage for an installation. Therefore, inferring the required capacity of the GMS from a customer's monthly invoiced usage requires making a number of assumptions, including the hours of use and appliance utilisation at these times.

Where a load has changed significantly, undersized or oversized meters would become apparent to a customer.

Meters still record gas flow outside of the range (Q_{\min} to Q_{\max}), just not at the accuracy required by NZS5259. AMS does not consider incorrect sizing of meters would have any significant impact on UFG.

When reviewing the draft report Contact, in the light of breaches arising from non-retailer participants in this report, proposed a recommendation that non-retailer participants undertake regular performance audits. The auditor was happy to endorse this recommendation.

6. Effect of audit findings on UFG



The graphs above show the effect of the audit findings, with UFG being moved substantively towards zero for both gates.

Please note that the original UFG is the UFG prior to the commencement of the audit, as available in October 2015. This means that only the months up to and including August 2014 were final; the months September 2014 to June 2015 were interim and July to September 2015 were initial. The adjusted UFG is adjusted for specific audit findings only, other changes will also arise as a result of the normal movement between allocations. Some of the adjustments involve estimation.

7. Conclusion

In preparing the audit report, the auditor must determine whether material issues have been raised in relation to compliance with the rules. The allocation participants to which the material issues relate must pay a proportion of the costs of the auditor that reflects their contribution to those material issues, as determined by the auditor.

For this audit the auditor has identified that Vector as distributor and Genesis as retailer have breached the rules and that the UFG consequence of those breaches is what gave rise to a significant portion of the UFG which led to the event audit. The auditor therefore determines that Vector and Genesis should pay the auditor costs.

The estimate of Vector's effect on UFG was 1,349 GJs/month at Mt Maunganui and 1,349 GJs/month at Tauranga, plus another 10 GJs/month for the out of region assignment errors. The errors in assignment occurred throughout the 30 months being reviewed, so a reasonable estimate of the total error at the two gates of the incorrect assignment across the period of the audit would be 81,240 GJs (2,708 for 30 months). The total effect of Genesis' UFG was 2,555 GJs. The auditor therefore determines that the audit costs should be split proportionately between the two parties so Vector as distributor should pay 97% of the audit costs and Genesis 3%.

Appendix A – Terms of Reference

Event audit: GMM08001 Greater Mt Maunganui and GTT07701 Greater Tauranga gas gates

Background

Under the Gas (Downstream Reconciliation) Rules 2008 (Rules), the industry body may commission event audits in respect of one or more gas gates.

These gas gates have been chosen for audit because:

Greater Mt Maunganui

1.0622; the highest among gates with ToU load

10% of positive UFG volumes

4,242

1.6%

5

8

Annual UFG factor for 2015/16

UFG volumes

Number of ICPs

% of all ACTC ICPs

Number of ToU retailers

Number of mass market retailers

Greater Tauranga

0.9326, the lowest among gates with over 1,000 ICPs

18% of negative UFG volumes

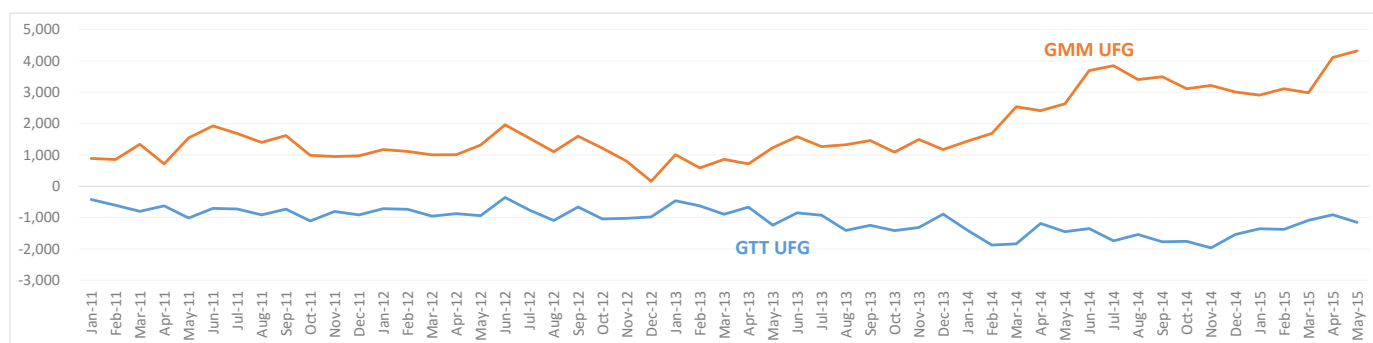
4,643

1.7%

2

8

The chart below shows the volumes of UFG recorded at both gas gates, using latest available interim and final allocation data.



At Greater Mt Maunganui, UFG historically averaged about 1,100 GJ and peaked in the winter at about 2,000 GJs. This pattern appears to have changed from about January 2014. Since that date, UFG has averaged about 3,000 GJs and experienced a peak of 4,300 GJs.

There also appears to be an increase in negative UFG at Greater Tauranga from about this time. At that gas gate, UFG historically averaged about -900 GJ. Since January 2014, negative UFG has increased to about -1,500 GJ per month.

All these factors are sufficient themselves to warrant a gas gate audit. Additionally, the fact that there is significant negative UFG at Greater Tauranga and significant positive UFG at Mt Maunganui, a neighbouring gas gate, as well as the step change in UFG experienced at both gates from about January 2014, suggests the possibility that some ICPs have been mapped against the incorrect gas gate.

Services for event audit

There are several possible causes of the high UFG volumes that the auditor may need to investigate, including:

- For medium to large commercial or industrial sites:
 - Metering equipment malfunction, including the possibility that meters at customer sites may be systematically under- or over-recording consumption volumes;
 - Metering set-up errors in billing and reconciliation systems (which may have their origins, for example, in switching processes where the winning retailer may not have loaded the new information correctly or in incorrect setup of new customer sites);
 - 'Orphan' sites not billed by any retailer; and
 - Incorrect status (sites that consume gas but that are incorrectly flagged as de-energised or decommissioned).
- Retailers' systematic under- or over-submission of consumption for non-ToU allocation groups 4 and 6.
- Gate metering equipment malfunction, including the possibility that such meters may be over- or under-stating actual gas gate injection volumes.
- ICPs mapped to the incorrect gas gate.

There may be other causes that are identified as a result of the audit.

Without limitation to the auditor's full range of investigatory tools under the Rules, it is expected the auditor will, primarily, utilise the following approach:

- Gather data from allocation participants (meter owners, retailers, and distribution and transmission system owners) as well as from the gas registry and the allocation system and cross-check so as to identify any discrepancies. For example, there may be variations between:
 - Metering parameters in meter owners' systems and the corresponding parameters in retailers' systems;
 - Meter size and measured consumption, where low usage on a large meter can signal a billing factor problem or a metering failure;
 - Aggregate as-billed volumes for a retailer compared with submission quantities; and
 - Where appropriate, transmission nominations over the course of an allocation period and consumption submissions over the same period.

- Examine meter owners' maintenance records to ensure consistency with NZS5259 requirements for meter testing, inspection, and maintenance.
- Obtain daily consumption quantities for ToU sites and identify and investigate any that exhibit significant changes in consumption patterns.
- Examine and document participant systems and processes directly associated with the completeness and quality of submission information and provide qualitative assessments.
- If warranted, request information that would allow volumes submitted to the allocation agent to be reconciled with volumes invoiced to customers.
- Where considered necessary, arrange site visits where analysis indicated potential anomalies that warrant site investigation to confirm metering set up information and/or malfunction.
- Obtain maps of ICP locations and distribution systems located downstream of gas gates MMU08001 and PPA33201 (Mt Maunganui and Papamoa, the constituent gates of Greater Mt Maunganui) and PYE36601 and TRG07701 (Pyes Pa and Tauranga, the constituent gates of Greater Tauranga), to identify and investigate possible errors in the assignment of ICPs to gas gates as recorded in the registry.

The auditor will prepare a draft report of the audit findings and provide it to the parties listed in rule 70 for comment. The auditor is required to take any comments received on the draft into account in preparing the final audit report.

In preparing the draft and final reports, the auditor is to use the processes set out in the guideline note issued on 1 June 2013: *Guideline note for rules 65 to 75: the commissioning and carrying out of performance audits and event audits, version 3.0* (<http://www.gasindustry.co.nz/dmsdocument/2858>).

Information regarding allocation of audit costs

In preparing the draft and final reports, the auditor must determine whether material issues have been raised in relation to compliance with the Rules. The allocation participants to which the material issues relate must pay a proportion of the costs of the auditor that reflects their contribution to those material issues, as determined by the auditor.