VERITEK

Gas Downstream Reconciliation Performance Audit Final Report

For

MegaTEL

megatel

Prepared by Tara Gannon & Steve Woods – Veritek Ltd

Date of Audit: 27 May 2020

Date Audit Report Complete: 5 November 2020

Executive Summary

This Performance Audit was conducted at the request of the Gas Industry Company (GIC) in accordance with Rule 65 of the Gas (Downstream Reconciliation) Rules 2008 effective from 14 September 2015.

The purpose of this audit is to assess the systems, processes and performance of MegaTEL in terms of compliance with these rules. MegaTEL began supplying gas to non-TOU customers from 01/06/2019. Nova Energy holds the ICP information within its Orion system, and completes all reconciliation activities on MegaTEL's behalf. Billing information is generated within Orion and provided to MegaTEL who generate the physical invoices. MegaTEL data and submissions are subject to the same data validation processes as other Nova non-TOU data.

The audit was conducted in accordance with terms of reference prepared by the GIC, and in accordance with the "Guideline note for rules 65 to 75: the commissioning and carrying out of performance audits and event audits, V3.0" which was published by GIC in June 2013.

The summary of report findings in the table below shows that MegaTEL's control environment is "effective" for 17 of the areas evaluated and the other two areas related to TOU ICPs which are not supplied by MegaTEL. There were no areas that were considered "not adequate".

14 of the 17 areas evaluated were found to be compliant. Non conformance is recorded in relation to:

1. The GAS070 report selecting data based on the billing period rather than the invoice date.
2. Application of conversion factors when calculating historic estimate. Monthly conversion factors are applied to normalised data, instead of applying the conversion factors for the read period, and then profiling consumption between the reconciliation periods. This does not ensure that the conversion factors that applied at the time the gas was consumed are used, and can result conversion factors outside permissible errors, and create differences between the total allocated consumption for a read to read period, and the total consumption for the read to read period.
3. Treatment of short gaps in supply, and continuous supply in the GAS080 report.

Alleged breaches have been raised in relation to the first two non conformances. No alleged breach has been raised for the GAS080 issues because the treatment of continuous supply was a technical issue which was resolved during the audit, and I did find any MegaTEL ICPs affected by the short gaps in supply.

Summary of Report Findings

Issue	Section	Control Rating (Refer to Appendix 1 for definitions)	Compliance Rating	Comments
Transmission methodology and audit trails	1.6	Effective	Compliant	Effective transmission and audit trail processes are in place.
ICP set up information	2.1	Effective	Compliant	No late updates or inaccurate information was identified. I recommend that network pressures and altitudes should be checked for reasonableness.
Metering set up information	2.2	Effective	Compliant	Robust validation processes are in place for all metering fields. I recommend that inconsistencies between register content codes and TOU metering details should be investigated and corrected.
Billing factors	2.3	Effective	Compliant	Up to 31/12/19 Nova calculated and applied ground temperatures based on NIWA's 30 year monthly averages. Nova used regression analysis to estimate the monthly ground temperature based on the relationship between air and ground temperature in other regions. From 01/01/2020 Nova has applied the ground temperatures published on the GIC's website for all allocated gas gates.. The Joule-Thomson effect is applied.
Archiving of reading data	3.1	Effective	Compliant	Effective practices are in place for archiving of register reading data.

Issue	Section	Control Rating (Refer to Appendix 1 for definitions)	Compliance Rating	Comments
Meter interrogation requirements	3.2	Effective	Compliant	Processes are in place to identify ICPs with potentially incorrect allocation groups, and process corrections as needed. When establishing continuous supply dates, the GAS080 report considered periods of supply by any of Nova's participant codes rather than only the code the report was being generated for. The report was corrected during the audit, and due to the technical nature of the non conformance no alleged breach is raised. No ICPs have TOU metering installed, or use over 10,000 GJ pa. All ICPs had a value recorded in their allocation group on the registry which was consistent with the metering type and profile code.
Meter reading requirements	3.3	Effective	Non compliant	Meter reading attainment processes are robust. I recommend that all gaps in supply are identified by the GAS080 report and correctly reported. Currently, where a gap in supply occurs but is less than a whole calendar month, the ICP is treated as if it has been continuously supplied.
Non-TOU validation	3.4	Effective	Compliant	A robust validation process is in place before and after invoicing.
Non-TOU error correction	3.5	Effective	Compliant	Effective correction processes are in place, and no corrections occurred during the audit period.
TOU validation	3.6	Not applicable	Not applicable	No TOU ICPs are supplied.

Issue	Section	Control Rating (Refer to Appendix 1 for definitions)	Compliance Rating	Comments
Energy consumption calculation	4	Effective	Compliant	The process to convert consumption to energy is compliant for non-TOU ICPs.
TOU estimation and correction	5.1	Not applicable	Not applicable	No TOU ICPs are supplied.
Provision of retailer consumption information	5.2	Effective	Compliant	The process for preparing consumption information files is compliant.
Initial submission accuracy	5.3	Effective	Compliant	Nova uses historic seasonal adjustment daily shape values to improve the accuracy of forward estimates.
Forward estimates	5.4	Effective	Compliant	Nova uses historic seasonal adjustment daily shape values to improve the accuracy of forward estimates.
Historic estimates	5.5	Effective	Not compliant	Compliance was achieved for all of the scenarios provided during the audit. Nova applies monthly conversion factors to normalised data, instead of applying the conversion factors for the read period, and then profiling consumption between the reconciliation periods. This does not ensure that the conversion factors that applied at the time the gas was consumed are used, and can result conversion factors outside permissible errors, and create differences between the total allocated consumption for a read to read period, and the total consumption for the read to read period.
Proportion of HE	5.6	Effective	Compliant	Reporting has been provided as required.

Issue	Section	Control Rating (Refer to Appendix 1 for definitions)	Compliance Rating	Comments
Billed vs consumption comparison	5.7	Adequate	Not compliant	The relationship between billed and submitted data appears reasonable, and the differences are explainable. The GAS070 report should reflect the quantities in GJ billed in the previous invoice month. Invoices are selected for inclusion based on the billing period, not the invoice date.
Gas Trading Notifications	5.8	Effective	Compliant	Processes are in place to ensure that trading notifications are issued where required.

Persons Involved in This Audit

Auditors:

Tara Gannon
Veritek Limited

Steve Woods
Veritek Limited

Nova personnel assisting in this audit were:

Name	Title
Natasha Dauphin	Retail Operations Manager, Nova Energy
Neill Deppe	Team Leader Reconciliation, Nova Energy
Somesh Pattekar	Energy Analyst, Nova Energy
Vibhu Sharma	Energy Analyst, Nova Energy
Ria Na	Operations Manager, MegaTEL

Service providers assisting with processes within the audit scope:

Company	Processes
Meter Reading Services	Gathering and storing raw meter data
Wells Instrument & Electrical Services Ltd	Gathering and storing raw meter data

Contents

1.   Pre-Audit and Operational Infrastructure Information

1.1   Scope of Audit

This Performance Audit was conducted at the request of the Gas Industry Company (GIC) in accordance with Rule 65 of the Gas (Downstream Reconciliation) Rules 2008 effective from 14 September 2015. Rule 65 is inserted below:

65.   Industry body to commission performance audits
   65.1   The industry body must arrange at regular intervals performance audits of the allocation agent and allocation participants.
   65.2   The purpose of a performance audit under this rule is to assess in relation to the allocation agent or an allocation participant, as the case may be, -
       65.2.1   The performance of the allocation agent or that allocation participant in terms of compliance with these rules; and
       65.2.2   The systems and processes of the allocation agent or that allocation participant that have been put in place to enable compliance with these rules.

The audit was conducted in accordance with terms of reference prepared by the GIC, and in accordance with the "Guideline note for rules 65 to 75 and 80: the commissioning and carrying out of performance audits and event audits, V3.0" which was published by GIC in June 2013.

The audit was completed via video conference on 27/05/20, 28/05/20 and 29/09/20, and by a site visit to the Auckland office on 30/06/20 and 01/07/20.

The scope of the audit includes "downstream reconciliation" only, as shown in the diagram below. Switching, metering ownership and data collection functions are not within the audit scope.
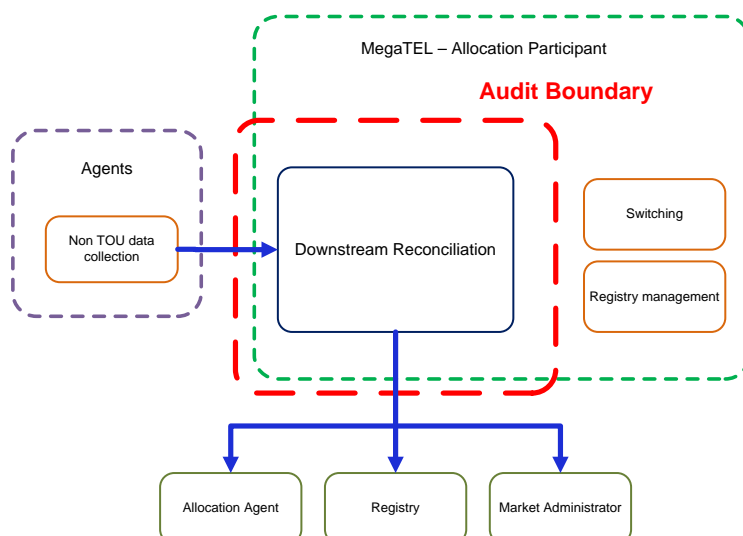
1.2   Audit Approach

As mentioned in **section 1.1** the purpose of this audit is to assess the performance of MegaTEL in terms of compliance with the rules, and the systems and processes that have been put in place to enable compliance with the rules.

This audit has examined the effectiveness of the controls MegaTEL has in place to achieve compliance, and where it has been considered appropriate, sampling has been undertaken to determine compliance.

Where sampling has occurred, this has been conducted using the Auditing Standard 506 (AS-506) which was published by the Institute of Chartered Accountants of New Zealand. I have used my professional judgement to determine the audit method and to select sample sizes, with an objective of ensuring that the results are statistically significant.[1]

Where calculations are performed by MegaTEL's systems, the algorithm has been checked by using one or two examples as a "sample". Multiple examples are not required because they will not introduce any different variables.

Where compliance is reliant on manual processes, manual data entry for example, the sample size has been increased to a magnitude that, in my judgement, ensures the result has statistical significance.

Where errors have been found or processes found not to be compliant the materiality of the error or non conformance has been evaluated.

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[1] In statistics, a result is considered statistically significant if it is unlikely to have occurred by chance. (Wikipedia)

1.3   General Compliance

1.3.1   Summary of Previous Audit

This is the first gas performance audit for MegaTEL.

1.3.2   Breach Allegations

MegaTEL has had no alleged breaches relevant to the scope of this audit recorded by the market administrator.

As noted in the Summary of Report Findings, this audit recorded non conformance in three sections and two alleged breaches as shown in the table below.

Breach Allegation	Rule	Section in this report
The GAS070 report should reflect the quantities in GJ billed in the previous invoice month. Invoices are selected for inclusion based on the billing period, not the invoice date.	52.2.1	5.7
Nova applies monthly conversion factors to normalised data, instead of applying the conversion factors for the read period, and then profiling consumption between the reconciliation periods. This does not ensure that the conversion factors that applied at the time the gas was consumed are used, and can result conversion factors outside permissible errors, and create differences between the total allocated consumption for a read to read period, and the total consumption for the read to read period.	35	5.5

A breach is not alleged for the non conformance relating to the GAS080 report because it was a technical breach and corrected during the audit.

1.4   Provision of Information to the Auditor (Rule 69)

In conducting this audit, the auditor may request any information from MegaTEL, the allocation agent and any allocation participant. Information was provided by MegaTEL and Nova in a timely manner in accordance with this rule.

1.5   Draft Audit Report Comments

A draft audit report was provided to the industry body (GIC), the allocation agent, and allocation participants that I considered had an interest in the report. In accordance with rule 70.3 of the 2015 Amendment Version of the Gas (Downstream Reconciliation) Rules 2008, those parties were given an

opportunity to comment on the draft audit report and indicate whether they would like their comments attached as an appendix to the final audit report. The following responses were received:

Party	Response	Comments provided	Attached to report
Megatel	Yes	Yes	Yes

No changes were made to the report. Megatel's comments are included in each section where non-conformance is recorded.

1.6   Transmission Methodology and Audit Trails (Rule 28.4.1)

The audit trail was evaluated for all data gathering, validation and processing functions. This rule requires that "The consumption information supplied to the allocation agent in accordance with rules 29 to 40 is transferred in such a manner that it cannot be altered without leaving a detailed audit trail..."

MegaTEL's GAS040 reports are created and submitted by Nova. A sample of GAS040 reports submitted on the Allocation Portal were checked against the original reports on Nova's network. This check confirmed that the original files were still available, and that they had not been edited after the submission date and time.

Audit trails are created in Orion when data used to create the GAS040 reports is changed.

2. Set-up and Maintenance of Information in Systems (Rule 28.2)

Every retailer must ensure the conversion of measured volume to volume at standard conditions and the conversion of volume at standard conditions to energy complies with NZS 5259:2015, for metering equipment installed at each consumer installation, for which the retailer is the responsible retailer.

Compliance with this rule has been examined in relation to the set-up of ICP, metering and billing information. I have also considered the Gas (Downstream Reconciliation) Rules 2008 Billing factors guideline note v1.0 (Billing Factors Guideline) published by GIC on 30/11/2015 when examining the set up and maintenance of information.

2.1   ICP Set Up Information

2.1.1   New Connections Process

The process was examined for the connection and activation of new ICPs.

New connections are managed via the networks' portals. Progress notifications are automatically generated, and the relevant details are manually loaded into IP BMS (MegaTEL's database) and into Orion.

There was only one new connection during the audit period, and it was claimed within two business days. There are no ICPs at "Ready" where MegaTEL is the proposed retailer.

Nova validates MegaTEL's data, and identifies and resolves metering, altitude, and status discrepancies daily. I checked the discrepancy reports for 27/03/20, specifically those where errors could lead to incorrect submission of consumption information to the allocation agent. The validation process compares Orion data to registry data for all relevant fields, including:

- meter number,

- meter owner,

- meter pressure,

- meter digits,

- multiplier,

- register content code/TOU metering,

- ICP status, and

- altitude.

No discrepancies were identified for MegaTEL data, and no ICPs with an ACTC ICP status code had metering indicated to be removed on the registry.

There is no specific check to identify ICPs where the network pressure is lower than the meter pressure, but no anomalies were identified during the audit.

Recommendation	Audited party comment
Identify any ICPs where the network pressure is less than the meter pressure to confirm whether both values are correct.	Response: Acknowledge Comments: • Nova have reporting in place that identifies network v meter pressure misalignments • Data integrity reporting will be improved and implemented September 2020

Aggregation factors (including gas gates) are checked against registry information prior to each submission. The pre submission checks are discussed further in **section 5.2**.

2.1.2   Altitude Information

It is a distributor's responsibility to populate the registry with correct altitude information to support compliance with NZS 5259:2015, and it is a retailer responsibility to comply with NZS 5259:2015 for the conversion of volume to energy.

NZS 5259:2015, which was published in November 2015, contains the following requirements regarding the way that altitude information should be managed.

1. The maximum permissible error is ± 1.0% where the meter pressure is less than or equal to 100kPa, and ±0.5% where the meter pressure is greater than 100kPa.

2. The following note is also included "Altitude should be determined within 10m where practicable."

A random sample of non-TOU ACTC or ACTV ICPs per distributor from the registry list as at 14/04/20 were checked against "google earth" data. The sample was selected by choosing all ICPs with altitudes under 11m and all ICPs with altitudes over 100m, then choosing a sample of ICPs with altitudes between 11m and 100m to make up a sample of 25 (or all) ICPs for each distributor. The "google earth" data is based on the "Shuttle Radar Topography Mission" (SRTM) results and a number of recent studies indicate an accuracy of ± 10m for altitude. An evaluation against this data is considered an appropriate test for "reasonableness". Altitude figures that are within approximately 90m of the actual altitude will ensure an accuracy of ± 1.0%.

Point 2 above recommends altitude figures are determined to within 10m where practicable. An evaluation of altitude data on the registry was conducted to check whether this recommendation had been met. As noted above, the margin of error of the "google earth" data appears to be approximately ± 10m, therefore, to allow for this margin, I have checked that the registry data is within 20m of "google earth" data.

As shown in the table below the altitude data on the registry for non-TOU ICPs appears to be very accurate in most areas.

Distributor	Total ACTC and ACTV non-TOU ICPs	ICPs checked	Quantity outside 20m	Quantity outside 90m
UNLG	852	25	1	-
NGCD	39	25	1	-
POCO	5	5	1	-
GNET	1	1	-	-
Total	897	56	3	-

No ICPs had a zero altitude recorded on the registry.

I have considered whether distributors have potentially breached any rules by populating the registry with inaccurate altitude information. Distributors have responsibility for populating the registry with altitude figures[2] and for maintaining the accuracy of this information. Distributors must also comply with rule 26.5 of the Gas (Downstream Reconciliation) Rules 2008, which requires them to ensure that any information on the registry is accurate and complete and supports compliance with NZS 5259:2015. There were no altitude discrepancies resulting in the accuracy of consumption information being outside the threshold allowed by NZS 5259:2015.

Altitude is stored as a fixed factor in Orion, and reconciled to the registry daily. Any discrepancies are investigated and corrected.

Recommendation	Audited party comment
Identify any ICPs where altitudes appear unusually high or low, relative to other ICPs at the gas gate. If review of topography data for the discrepancies confirms the altitude is likely to be inaccurate, it should be queried with the network and updated if necessary.	Response: Recommendation not accepted Comments: • Nova believes the recommendation places an inefficient burden on gaining retailers who are switching in existing ICPs whose altitudes can more efficiently be validated once at ICP creation. The recommendation would see each retailer re-checking altitudes for each ICP on an on-going basis each time the ICP switches retailers, potentially each implementing their own GIS solution to map and validate each distributor's data. • Nova's recommendation would be to ensure retailer compliance with rule 28.2 (insofar as it relates to altitude) by ensuring distributor compliance via the distributor

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[2] Gas (Switching Arrangements) Rules 2008, Part A, ICP parameters maintained by Distributors and rules 41 and 58.

Recommendation	Audited party comment
	audit or breach process, with respect to the distributor obligations under Gas (Downstream Reconciliation) Rules 26.5.1 and 26.5.4 or Gas (Switching Arrangements) Rules 58.1 and 62.1.

Non-TOU gas conversion was checked for a sample of six ICPs, and I confirmed that the altitude factors were correctly calculated and applied.

2.2   Metering Set-up Information

Nova compares MegaTEL's metering fields against registry metering fields on a daily basis.

Meter pressure

Meter pressure is a static field in Orion. The recorded meter pressure value will be used in the pressure factor calculation for all invoices and reconciliation submissions created after the date and time Orion pressure is updated. This includes any wash up submissions created for earlier periods.

Where a pressure change occurs without a physical meter change, or a correction is required from a certain date, Nova processes a system meter change and updates the pressure on the new version of the meter. The end date for the old version of the meter is the day before the pressure change was effective, and the start date for the new version of the meter is the day the pressure change becomes effective. Any reads on or after the date of the pressure change are recorded against the new meter.

If a correction is required for the entire period that the meter was installed, the pressure on the current version of the meter can be updated.

No meter pressure discrepancies or corrections were identified.

Meter numbers and digits

The meter reading processes are designed to identify meter number or digit discrepancies.

The meter number is stored in the hand held device. If the meter reader's hand held device is expecting more digits than the number of dials, then the reading is entered as normal and notification is made in the "readers notes" field for investigation. If the hand held is expecting fewer digits than the number of dials, then the reading is entered into the "readers notes" field and once again an investigation is conducted. This "safety net" appears to be robust and meter dials are checked against the registry on a daily basis.

No meter number or digit discrepancies were identified.

Meter multipliers

No meter multiplier discrepancies were identified.

Meter types and content codes

All MegaTEL meters are non-TOU with an uncorrected register content, and no discrepancies were identified. Register content codes are not checked for reasonableness against meter content codes for non-TOU ICPs.

Recommendation	Audited party comment
Identify any ICPs where register content codes and non-TOU metering details are inconsistent, to confirm which values are correct.	Response: Recommendation accepted Comments: • All Megatel meters are non-TOU • Nova will review, update and where required implement improved reporting • Implementation September 2020

2.3   Billing Factors

2.3.1   Temperature Information

For ICPs where the actual temperature is not measured NZS 5259:2015 states that temperature may be estimated and four methodologies are provided. These are listed below in order of decreasing preference.

(a) Gas temperature records for the GMS location under flowing conditions. Historic records can be used if similarity is preserved.

(b) Records of actual gas temperature in similar installations at similar locations over corresponding periods.

(c) For compact installations directly connected to short risers and well shaded from direct sunlight, the average ground temperature at 300mm depth. NOTE – Reliable and relevant climatic temperature data may be used as a basis for estimating average 300mm ground temperatures. This may include published data.

(d) For installations where the inlet pipes are exposed to ambient air conditions the temperature may be estimated from the mean temperature obtained at reliable and relevant weather recording stations. The installation should be shielded from direct sunlight.

Temperatures are held in the Orion billing system, and managed by Nova on MegaTEL's behalf. Nova has chosen option (c) and records an average daily temperature for each month. They apply the daily weighted average temperature for the period which consumption is being calculated for. Option (c) seems to be the most logical choice because it matches the majority of GMS installations.

Up to 31/12/19 Nova calculated and applied ground temperatures based on NIWA's 30 year monthly averages. Nova used regression analysis to estimate the monthly ground temperature based on the relationship between air and ground temperature in other regions.

From 01/01/2020 Nova has applied the ground temperatures published on the GIC's website for all allocated gas gates. I compared the published ground temperatures for January to December to the Orion ground temperatures recorded for January 2020 to December 2020 for all allocated gas gates and confirmed that they matched.

I reviewed all temperature information recorded in Orion for January 2019 to December 2020. Data for all allocated gas gates which MegaTEL has ICPs connected to appeared reasonable.

NZS 5259:2015 states that correction for temperature drop due to Joule-Thomson effect of pressure reduction is applicable if temperature methodologies (b), (c) or (d) are used, provided the reduction is made in the same installation and immediately upstream of the GMS. "In other cases or for large pressure drops or high flow rates the actual temperature drop should be measured. For natural gas the temperature drop is about 0.5° per 100kPa of pressure drop." This indicates that adjustment for the Joule-Thomson effect is desirable.

The Billing Factors Guideline contains the following expectations by GIC:

- network owners ensure nominal operating pressures are correctly populated in the registry for all ICPs on their networks, and

- once network pressures are correctly populated, retailers ensure that they account for the Joule-Thomson effect by using the network pressure in the registry in their conversions of metered volumes to standard volume, particularly in situations where failure to do so will result in conversion errors greater than those allowed in Table 3 of NZS 5259:2015.

Nova applies the Joule-Thomson effect adjustment and the formula was checked and confirmed correct.

The accuracy of the Joule-Thomson adjustment is dependent on correct inputs, including network pressure and gas gate. No network pressure or gas gate discrepancies were identified, and no meter pressures are greater than or equal to the network pressure.

2.3.2   Calorific Values

Calorific value information is managed by Nova on MegaTEL's behalf.

Open Access Transmission Information System (OATIS) gas composition data is imported into EnergyMarket daily, and a copy of the file is added to the O:\ drive for manual import into Orion.

An automated email is sent to the billing and reconciliation teams if calorific values or temperature information has not been added for the previous day. Each day is initially populated with an average value, which is the same for all gas types, before replaced by the actual figures from OATIS once they are available.

The accuracy of the Orion information was confirmed by comparing an OATIS file with the contents of Orion for March to May 2020.

3.   Meter Reading and Validation

3.1   Archiving of Register Reading Data (Rule 28.4.2)

Retailers are required to keep register reading data for a period of 30 months. Data was examined during the audit and it is confirmed that Nova securely archives data for a period in excess of 30 months.

Some data provided by MegaTEL's meter reading contractor was checked, and it was found that the readings matched the data in Orion. This proves the end-to-end process.

3.2   Retailer to Ensure Certain Metering Interrogation Requirements are Met (Rule 29)

This rule requires that for consumer installations where the actual or expected consumption is greater than 10TJ, a TOU meter will be installed and the installation will be assigned to allocation group 1 or 2. For consumer installations where the actual or expected consumption is between 250GJ and 10TJ a non-TOU meter will be installed and the installation will be assigned to allocation group 4. Other installations should be assigned to allocation group 6.

Allocation groups are assigned based on the expected or actual annual load for the ICP and their metering type. No ICPs have TOU metering installed, or use over 10,000 GJ pa. All ICPs had a value recorded in their allocation group on the registry which was consistent with the metering type and profile code.

Daily reporting is in place based on consumption bands to identify ICPs with the incorrect allocation group. Review of the April 2020 allocation group analysis found all ICPs had the correct allocation group assigned for their consumption band and metering.

3.3   Meter Reading Requirements (Rules 29.4.3, 29.5 & 40.2)

Each month, retailers must report the number and percentage of validated meter readings obtained in accordance with rules 29.4.3 and 29.5 in the GAS080 report.

The GAS080 report is created in EnergyMarket using raw data which is imported from Orion.

I compared the April 2020 GAS080 ICP level detail report to the registry list with history for 01/01/19 to 14/04/20, and reviewed a sample of discrepancies.

1.   Where an ICP had switched from GNVG to MEGA, or MEGA to GNVG the ICP would be included in the GAS080 for the responsible retailer at the end of the period being reported, but the continuous period of supply would count days where the ICP was supplied by GNVG or MEGA, instead of only the current retailer. The GIC requested that this be raised as non-conformance, but because it is a technical non-conformance with no material impact a breach will not be raised.

     During the audit, Nova updated the GAS080 report logic so that it only considered periods of supply by the responsible retailer code when determining continuous periods of supply, not

GNVG and MEGA. I reviewed before and after reports and confirmed that this change was processed as expected. There was no change to total ICP numbers, but the number of ICPs continuously supplied and read each correctly dropped by two ICPs for GNVG.

April 2020 new totals – old totals				
Total ICPs	4 month ICPs	4 month read	12 month ICPs	12 month read
0	-28	-27	-63	-63

2. Continuous supply is calculated at a monthly level. Where a gap in supply occurs but is less than a whole calendar month, the ICP is treated as if it has been continuously supplied. This issue did not affect any MegaTEL ICPs during the period reviewed, but I recommend that it is resolved to prevent future non conformance.

Non-Conformance	Description	Audited party comment
Regarding: Rule 40.2 **Control Rating**: Effective	When establishing continuous supply dates, the GAS080 report considered periods of supply by any of Nova's participant codes rather than only the code the report was being generated for. The report was corrected during the audit, and due to the technical nature of the non conformance no alleged breach is raised.	**Response:** Acknowledge **Comments:** • A gap in the period of supply is treated as continuously supplied (meaning that the counts of whether the ICP has been read or not is included rather than excluded from the 4 month/12 month meter reading surveillance report) in the scenario where an ICP switches out to another retailer then switches back to Nova either during the same month or in the following month. • This is due to the Nova GAS080 report treating an ICP as continuously supplied (satisfying the criteria for inclusion in the report) when supply has occurred over consecutive months, as opposed to requiring supply for each consecutive day within each of those months. • Nova will look into increasing the granularity of this inclusion criteria in the report from monthly to daily supply, which would remove the counts of whether ICPs in this scenario have been read or not read from the report.

Recommendation	Audited party comment
Ensure that all gaps in supply are identified by the GAS080 report and correctly reported. Currently, where a gap in supply occurs but is less than a whole calendar month, the ICP is treated as if it has been continuously supplied.	**Response:** Recommendation accepted **Comments:** • As per above Non-Conformance

All consumer installations with non-TOU meters must have validated register readings recorded at least once every 12 months unless exceptional circumstances prevent such an interrogation. 90% of consumer installations with non-TOU meters must have a validated reading every four months.

All ICPs are read monthly and various methods are employed to obtain readings in instances where a reading is not obtained on the first attempt. Estimation processes are used as a last resort. All commercial ICPs are read as close as possible to the end of the month. MegaTEL's meter reading processes appear robust and reduce the reliance on forward estimates to ensure submission accuracy.

To confirm compliance with the meter reading frequency rules, MegaTEL provided a copy of the GAS080 report for December 2019 to February 2020.

Target	Rolling 4 months (target 90%)	12 months (target 100%)
Dec 2019	99.16%	100%
Jan 2020	98.60%	100%
Feb 2020	98.67%	100%

As described above, some MEGA ICPs which were previously supplied by GNVG have their period being continuously supplied by either code included in the GAS080 report totals. I analysed the impact of these errors, as it was not possible to re-run corrected versions of these reports because data has changed in the meantime.

- Compliance with the 12 month reading target (29.4.2) is confirmed; MEGA began supplying ICPs in June 2019 and no ICPs have been supplied for 12 months or more.

- Compliance with the four month reading target (29.4.3) is confirmed. Based on comparison between the old and new versions of the reports for April 2020, the report logic error did not result in read attainment rates for any individual ICP being over stated. The number of ICPs affected was relatively small in relation to the customer base, and I consider it unlikely that exclusion of these ICPs would cause the read attainment percentage to drop below 90%.

3.4 Non-TOU Validation

Meter reading validation occurs at multiple levels.

At source, the handheld data input devices perform a localised validation, to ensure that the reading is within expected high-low parameters. These parameters are set as a "high/low" limit, based on an agreed setting with MegaTEL.

Readings that fail this initial validation must be re-entered, and if the second reading is the same, it will be accepted; if it is different (indicating an error with the first reading) then it must be re-entered. Once the same reading has been entered twice consecutively, it will be accepted.

The second level of validation occurs when the data reaches MegaTEL. This validation includes the following checks:

- meter not found for a premise,

- high reading,

- low reading,

- meter reading already present in the system,

- another reading exists for the same day,

- meter could not be read, and

- meter reading date is earlier than existing billed reads.

Readings that fail validation are manually investigated and any issues resolved.

Readings are then subject to "billing validation". Each bill produced is subject to a number of individual validation checks. Bills that fail validation end up on an "exceptions" list and any issues are investigated and resolved prior to sending the bill. These validation checks include:

- high dollar amount,

- negative dollar amount,

- long billing days,

- short billing days,

- high percentage variation from previous bill, and

- electricity consumption without gas consumption.

Meter readings are not edited during this process. If a reading fails validation and an incorrect meter reading is suspected then a check reading will be performed.

3.5   Non-TOU Error Correction

Corrections are completed by Nova on MegaTEL's behalf. The process for error correction was examined and walked through to ensure that corrected consumption is included in the revision process and provided to the allocation agent.

Stopped or faulty meters

Where a meter is found to have stopped an estimated removal reading is entered which adds the estimated unrecorded volume to the removal reading recorded on the meter. This process results in consumption information appearing in the relevant revision files.

No examples of stopped or faulty meters were identified during the audit.

Meter pressure corrections

As recorded in **section 2.2**, when meter pressure corrections are made, the corrected value will be used in the pressure factor calculation for all invoices and reconciliation submissions created after the date and time Orion pressure is updated. This includes any wash up submissions created for earlier

periods. Pressure changes often occur due to data correction, but there may be a genuine pressure upgrade or downgrade on a specific date. To achieve this, Nova "replaces" the meter in Orion effective from the required date and enters the corrected pressure against the new meter. Reads are transferred to the correct version of the meter as necessary.

No examples of meter pressure corrections were identified during the audit.

Inactive status corrections

Consumption is reported for all ICPs which have a metered status. No MegaTEL ICPs currently have inactive statuses, and no consumption while inactive was identified.

3.6   TOU Validation

MegaTEL does not supply TOU ICPs.

4.   Energy Consumption Calculation (Rule 28.2)

To evaluate energy consumption calculations, a spreadsheet was prepared which converts volume between meter readings to volume at standard conditions and then to energy consumption. The relevant information for some non-TOU ICPs was entered into the spreadsheet and the resulting energy value was compared to that calculated by Orion. This comparison confirmed the accuracy of the Orion calculation and confirmed compliance with NZS 5259:2015.

When non-TOU reconciliation submissions are prepared, a conversion factor for the submission month, rather than the read period is applied. This is discussed further in **section 5.5**.

Non-TOU Energy Consumption Calculation

Testing confirmed that the Orion system is calculating pressure, altitude, and temperature factors correctly for non-TOU ICPs. However, if any inputs into these calculations are incorrect, including Orion static data, errors will occur.

I checked the non-TOU conversion process by reperforming the conversion process for a sample of six ICPs with different meter pressures, network pressures, gas gates, and altitudes. Because the Orion conversion data provided did not include the temperature factor, I verified the temperature factor by working backwards from the total conversion factor to calculate it. In all cases, I confirmed that the factors calculated by Orion were within the maximum permissible errors set out in NZS 5259:2015.

At the time of the 2017 audit, Nova had set meter pressure bands, and all ICPs within the band had the same compressibility factor applied. Compressibility correction now occurs for ICPs with meter pressure over 50kPa as recommended by NZS 5259:2015, and is calculated individually for each ICP. I checked the compressibility factor calculations for six TOU ICPs, including five with pressures above 50 kPa and confirmed that the compressibility factors calculated by Orion were within the maximum permissible error of ± 0.25% set out in table 3 of NZS 5259:2015.

Compressibility factors are validated using a daily exception report, which recalculates the factor and reports any ICPs with meter pressure over 50 kPa where the recalculated value differs from Orion. Any ICPs appearing on this report are reviewed and resolved, and I note that no MegaTEL ICPs have meter pressure over 35 kPa.

5. Estimation and Submission Information

5.1 TOU Estimation and Correction (Rule 30.3)

MegaTEL does not supply TOU ICPs, and does not intend to in the immediate future.

5.2 Provision of Retailer Consumption Information (Rules 30 to 33)

MegaTEL's compliance with rules 30 to 33 was examined by a "walk through" of their processes and controls to confirm compliance.

GAS040 non-TOU energy submissions

Nova validates MegaTEL's non-TOU consumption at gas gate and ICP level prior to submission along with its own consumption, including:

- high consumption detail and negative consumption detail reports are worked through daily and prior to submission; anomalies are investigated and corrected as necessary,

- a LIS discrepancy report is worked through to correct aggregation factor discrepancies, and any ICPs which have been incorrectly included in or excluded from the submission,

- a node summary history compares the previous month, initial submission, and previous revision (if available) for each gas gate; any exceptions are investigated by reviewing the data at ICP level,

- an ICP summary history compares the previous month, initial submission, billed submission, and previous revision (if available) for each gas gate; the 100-150 largest differences are checked,

- the full ICP level result set is reviewed, and checked to identify ICPs missing from the GAS040 submission or registry, allocation group discrepancies, ICPs with inactive status, ICPs with vacant consumption, and pricing discrepancies, and

- a RP wash up change report checks differences between submissions, ensures that the correct version of the GAS040 report is submitted and detects any zero lines which need to be imported.

GAS040 consumption and customer numbers for January, February and March 2020 were examined and compared to the data in Nova's system at ICP level for a sample of gas gates; the totals matched which confirms compliance. This also proves that Nova's consumption information provided to the allocation agent is calculated at ICP level and then aggregated.

Vacant ICPs

The matter of "vacant consumption" was also examined. When an ICP is vacant but still active (ACTV on the registry), meter reading still occurs and any volume that is recorded is converted into validated consumption and is then included in the allocation process. A sample of active vacant ICPs were reviewed and found to be correctly included in the GAS040 submissions.

When an ICP is vacant, a "dummy" customer is "moved in" to the account to ensure credit processes continue as expected and to ensure the consumption information is identified, validated, and submitted. A sample of vacant ICPs with consumption were reviewed. In cases where the consumption was genuine, consumption was reported and the status updated. Where consumption occurred due to an error (e.g. misread or incorrectly recorded opening read) no consumption was reported.

5.3 Initial Submission Accuracy (Rule 37.2)

MegaTEL began supplying gas from June 2019 and no final submissions have been completed to date.

Nova monitors variances at gas gate and ICP level on MegaTEL's behalf, and this reporting showed large variances were investigated and most differences resulted in seasonal fluctuations.

5.4 Forward Estimates (Rules 34 & 36)

The rules do not prescribe how forward estimates are to be calculated. Nova has uses historic seasonal adjustment daily shape values based on gas gate DDR (daily delivery report) data to produce MegaTEL's forward estimate. This model enables Nova to achieve a more accurate result than a "flat" estimate would.

5.5 Historic Estimates (Rules 34 & 35)

Historic estimates are calculated by Nova within the EnergyMarket database using validated readings, permanent estimate readings, conversion factors, and seasonal adjusted shape values.

At midnight each night, a copy of Orion production data is automatically taken, and is restored to the Orion reporting database. The Orion reporting database is used for exception and ad hoc reporting on Orion's database, and reading and gas conversion data is provided to the EnergyMarket database each night.

Seasonal Adjusted Daily Shape Values (SADSV) are downloaded from the allocation when allocation results are published, and are uploaded directly into EnergyMarket.

The historic estimate process first normalises the read to read CM (cubic metres) using the most recent SADSV profiles available for the period. The normalised CM data is then converted to GJ by applying the average conversion factor for the ICP for the month. According to rule 35.2, read to read period consumption should be converted to GJ, then normalised using the SADSV. This ensures that sum of consumption apportioned to each month matches the total consumption for the read to read period. If different monthly conversion factors are applied, the total CM apportioned to each month will be consistent with the total, but the GJ may differ.

The altitude and pressure factors are expected to be static for non-TOU ICPs, and the compressibility factor, temperature factor, and calorific value are expected to change. I reviewed the potential impact of these changes on conversion.

- The 2020 annual temperature variance at each gas gate is 9.8-12.7 degrees. Excluding the Joule Thomson effect, based on these temperature variances the temperature factors could

vary by up to 4.31% across a year. As most ICPs are read regularly is expected that temperature differences across read periods are likely to be small, as read periods are likely to cover one or two months.

- The annual CV variance for each gas type for the year ending 21/05/2020 is 0.119-3.39. The CV values applied could vary by up to 3.39% across a year.
- Compressibility factors vary significantly based on meter pressure. According to the registry list as at 14/04/20, all MegaTEL's ICPs have a maximum meter pressure of 35 kPa, and 99.8% have meter pressures of 7 kPa or less resulting in compressibility factors which are very close to 1. Because meter pressure is static for non-TOU ICPs, it is expected that use of monthly conversion factors is unlikely to result in differences outside the maximum permissible errors for non-TOU ICPs.

I recalculated the conversion factors that would have applied had conversion occurred for the read to read period, and compared these to the monthly conversion factors applied for each historic estimate scenario. No differences over the threshold were identified for MegaTEL ICPs.

Recommendation	Audited party comment
MegaTEL should apply the conversion factors for the read period, and then profile consumption between the reconciliation periods. This will ensure that the conversion factors that applied at the time the gas was consumed are used, and will increase consistency where read periods span more than one reconciliation period.	**Response:** Recommendation acknowledged **Comments:** • Nova will align the calculation of the CV to the read period • Implementation Q4 2020

To assist with determining compliance of the historic estimate processes, Nova was supplied with a list of scenarios. For each scenario, a manual calculation was performed using the relevant seasonal adjustment shape file, and this was compared to the calculation performed in Nova's system. This test also proves that the correct shape file is used in each case. Compliance is confirmed for all historic estimate scenarios.

Test	Scenario	Test expectation	Result
a	ICP becomes Active part way through a month	Consumption is only calculated for the Active portion of the month.	Correct
b	ICP becomes Inactive part way through a month.	Consumption is only calculated for the Active portion of the month.	Correct
c	ICP's become Inactive then Active within a month.	Consumption is only calculated for the Active portion of the month.	Correct
d	ICP switches in part way through a month on an estimated switch event reading	Consumption is calculated to include the 1st day of responsibility.	Correct
e	ICP switches out part way through a month on an estimated switch event reading.	Consumption is calculated to include the last day of responsibility.	Correct
f	ICP switches out then back in within a month	Consumption is calculated for each day of responsibility.	Correct
g	Continuous ICP with a read during the month	Consumption is calculated assuming the readings are valid until the end of the day	Correct

Test	Scenario	Test expectation	Result
h	Continuous ICP without a read during the month	Consumption is calculated assuming the readings are valid until the end of the day	Correct
i	Rollover Reads	Consumption is calculated correctly in the instance of meter rollovers.	Correct
j	ICP has a multiplier or fixed factor (if any)	Consumption is calculated including the multiplier or fixed factor.	No examples available

5.6   Proportion of Historic Estimates (Rule 40.1)

This rule requires retailers to report to the allocation agent the proportion of historic estimates contained within the consumption information for the previous initial, interim, and final allocations. A sample of files were examined and compliance is confirmed.

5.7   Billed vs Consumption Comparison (Rule 52)

GAS070 reports are generated by Nova, using invoice information calculated by Orion.

All MegaTEL ICPs are billed up to the last day of the calendar month, and a file of the billing information produced by Orion is provided to MegaTEL. MegaTEL issues the invoices the month following the consumption period.

Invoice data is included in the GAS070 if the billing period end date occurs within the period being reported. Because MegaTEL dates invoices in the month following the bill period, the GAS070 data does not reflect what was invoiced during the submission month.

The content of the GAS070 files was proved by selecting some gas gates and checking the invoicing data for all ICPs connected to the gas gate against the GAS070 file for April 2020. The totals reflected all consumption included in billing periods up to the end of the month, rather than what was physically invoiced during the month.

Non-Conformance	Description	Audited party comment
Regarding: Rule 52.2.1 **Control Rating**: Effective	The GAS070 report should reflect the quantities in GJ billed in the previous invoice month. Invoices are selected for inclusion based on the billing period, not the invoice date.	**Response:** Acknowledge **Comments:** • The GAS070 report was overstating billed volumes by counting rebills of installations, without the corresponding offsetting reversal, where the reversal was in a historical billing period. • GAS070 wash up submissions have been made to the Allocation Agent for March 2015 onwards and will continue to be made in order to include any reversals in historically dated billing periods, until

Non-Conformance	Description	Audited party comment
		the report is changed to select invoices based on invoice date.

The chart below shows a comparison between rolling annual quantities billed and rolling annual consumption information submitted to the allocation agent for a 10-month period using the GAR080 report. It should be noted that each data point reflects only part of a year, because MegaTEL began trading in June 2019. Although the figures cannot be directly compared, as the submitted data is normalised, they can provide a useful indicator of whether under or over reporting of consumption is occurring.

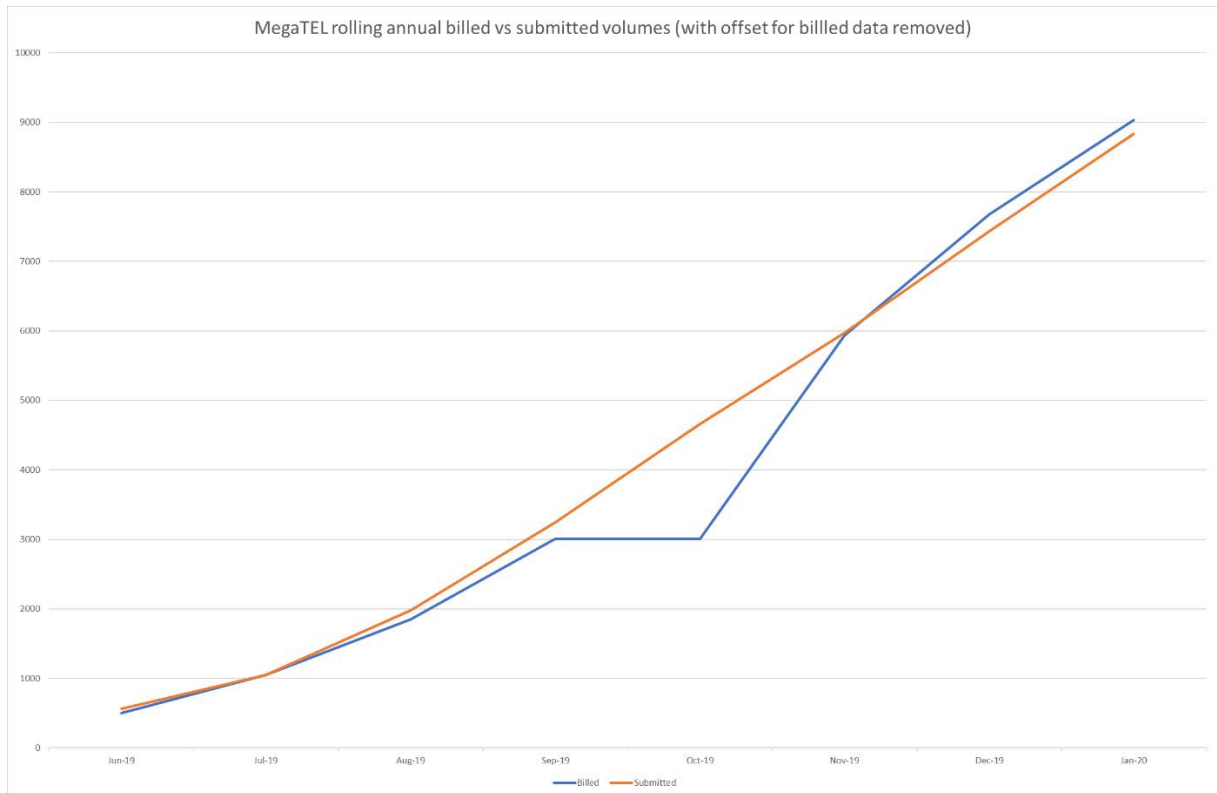**Comparison between Rolling Annual Submitted Volumes and Gas Supplied**
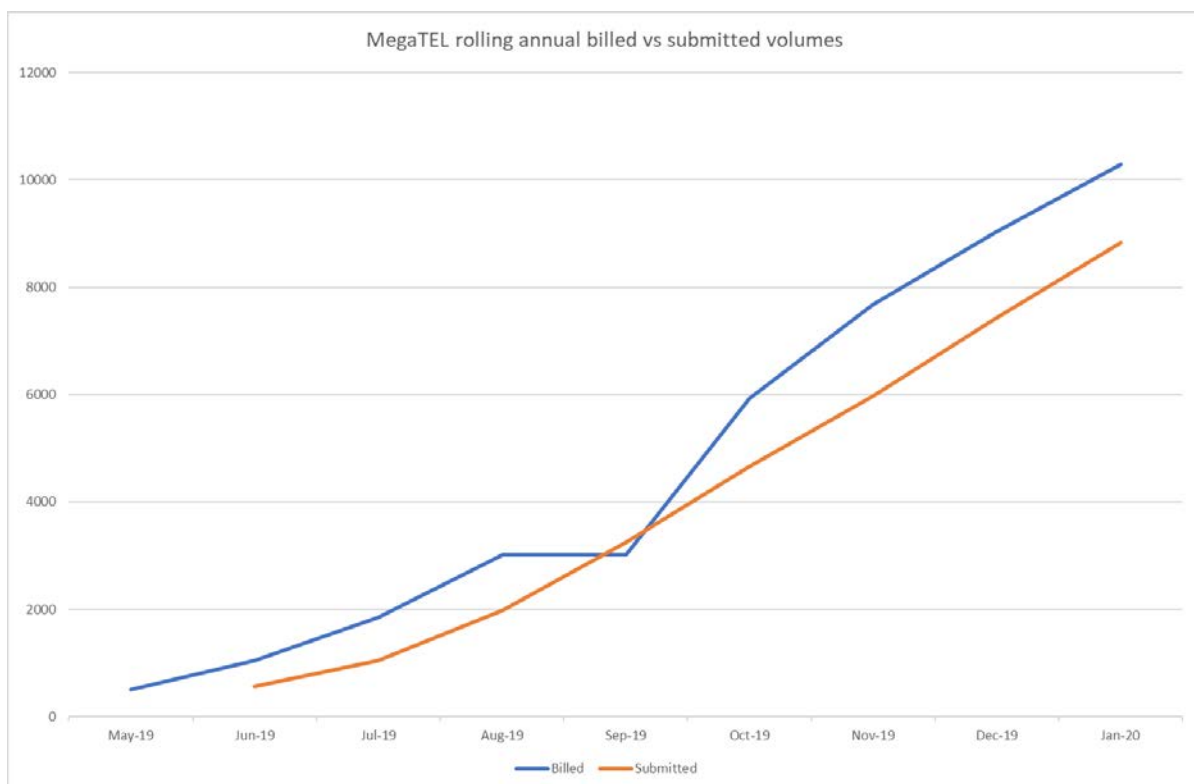
The GAR080 annual billed and submitted volumes for the part of the year available are shown on the table below.

Year ending	Annual Billed GJ	Annual Submitted GJ	GJ difference	Percentage Difference
May-2019	505.265		505.265	
Jun-2019	1047.548	563.175	484.373	86.01%
Jul-2019	1853.353	1049.111	804.242	76.66%

Year ending	Annual Billed GJ	Annual Submitted GJ	GJ difference	Percentage Difference
Aug-2019	3011.057	1981.646	1029.411	51.95%
Sep-2019	3011.057	3241.897	-230.84	-7.12%
Oct-2019	5931.861	4661.12	1270.741	27.26%
Nov-2019	7674.646	5973.669	1700.977	28.47%
Dec-2019	9030.047	7433.355	1596.692	21.48%
Jan-2020	10288.992	8835.51	1453.482	16.45%

When the GAR080 report is created, an offset is applied based on the assumption that data billed in one month (e.g. June 2019) will relate to consumption that occurred in the previous month (e.g. May 2019). As stated above, data is selected for inclusion in the GAS070 based on the billing period, which is the same as the consumption period. Once the periods were aligned the difference between billed and submitted data is smaller. The difference in October 2019 occurred because no billing data was produced that month, but data was submitted. Billing caught up the following month. The comparison does not indicate issues with under or over reporting.

MegaTEL rolling annual billed vs submitted volumes (with offset for billled data removed)

The aligned GAR080 annual billed and submitted volumes for the part of the year available are shown on the table below.

Year ending	Annual Billed GJ	Annual Submitted GJ	GJ difference	Percentage Difference
Jun-2019	505.265	563.175	-57.91	-10.28%
Jul-2019	1047.548	1049.111	-1.563	-0.15%
Aug-2019	1853.353	1981.646	-128.293	-6.47%
Sep-2019	3011.057	3241.897	-230.84	-7.12%
Oct-2019	3011.057	4661.12	-1650.063	-35.40%
Nov-2019	5931.861	5973.669	-41.808	-0.70%
Dec-2019	7674.646	7433.355	241.291	3.25%
Jan-2020	9030.047	8835.51	194.537	2.20%

5.8   Gas Trading Notifications (Rule 39)

A retailer must give notice to the Allocation Agent where they commence or cease to supply gas under a supplementary agreement to a transmission services agreement, or amend information required to be provided under the supplementary agreement under rule 39.2.

Nova manages this process on MegaTEL's behalf. Nova confirmed that processes exist to ensure that the trading team informs the reconciliation team where there are changes to supplementary agreements for allocated gas gates. There are currently no supplementary agreements in place for any allocated gas gates.

6.   Recommendations

As a result of this performance audit recommendations are made below in relation to MegaTEL.

- Identify any ICPs where the network pressure is less than the meter pressure to confirm whether both values are correct.
- Identify any ICPs where altitudes appear unusually high or low, relative to other ICPs at the gas gate. If review of topography data for the discrepancies confirms the altitude is likely to be inaccurate, it should be queried with the network and updated if necessary.
- Identify any ICPs where register content codes and TOU metering details are inconsistent, to confirm which values are correct.
- Ensure that all gaps in supply are identified by the GAS080 report and correctly reported. Currently, where a gap in supply occurs but is less than a whole calendar month, the ICP is treated as if it has been continuously supplied.
- MegaTEL should apply the conversion factors for the read period, and then profile consumption between the reconciliation periods. This will ensure that the conversion factors that applied at the time the gas was consumed are used, and will increase consistency where read periods span more than one reconciliation period.

Appendix 1 – Control Rating Definitions

Control Rating	Definition
Control environment is not adequate	Operating controls designed to mitigate key risks are not applied, or are ineffective, or do not exist.
	Controls designed to ensure compliance are not applied, or are ineffective, or do not exist.
	Efficiency/effectiveness of many key processes requires improvement.
Control environment is adequate	Operating controls designed to mitigate key risks are not consistently applied, or are not fully effective.
	Controls designed to ensure compliance are not consistently applied, or are not fully effective.
	Efficiency/effectiveness of some key processes requires improvement.
Control environment is effective	Isolated exceptions identified when testing the effectiveness of operating controls to mitigate key risks.
	Isolated exceptions identified when testing the effectiveness of controls to ensure compliance.
	Isolated exceptions where efficiency/effectiveness of key processes could be enhanced.

Appendix 2 – MegaTEL Comments

Megatel would like to thank Veritek Ltd for conducting the 2020 audit.