



VERITEK

Gas Downstream Reconciliation Performance Audit Final Report

For

Nova Energy Limited

Prepared by Tara Gannon & Steve Woods – Veritek Ltd

Date of Audit: 27 May 2020

Date Audit Report Complete: 11 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 Nova Energy Limited (Nova) in terms of 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: 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 Nova's control environment is "effective" for 17 of the areas evaluated and "adequate" for the other two. There were no areas that were considered "not adequate".

Ten of the 19 areas evaluated were found to be compliant. 11 breach allegations are made in relation to the remaining areas. They are summarised below.

1. The registry was populated late for at least five new connections resulting in submission information not being provided for the initial allocation.
2. For ICP 1000579992PG543 the altitude used to calculate the altitude factor matches the registry, but does not match the actual altitude of the ICP. The difference resulted in the altitude factor applied being outside of the maximum permissible error under NZS 5259:2015.
3. TOU metering has not been installed within three months of becoming aware of actual or expected rolling consumption over 10,000 GJ per annum for nine ICPs.
4. Six ICPs with TOU metering have allocation group 4 or 6 applied.
5. 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 on the GAS080 report.
6. Exceptional circumstances not demonstrated for four ICPs not read in the 12 months ending February 2020.
7. Three meter pressure corrections were processed from incorrect dates, resulting in pressure factors outside the maximum permissible errors set out in NZS 5259:2015.
8. The initial submission accuracy did not meet the required accuracy percentage for some gas gates for the period January 2017 to January 2019.
9. Meter G418267X for ICP 0001730550PGB3E does not have a closing read entered on 02/05/2019, which resulted in forward estimate being calculated invalidly from 02/05/2019 onwards.
10. 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. ICP 1001261127QT65E had a CV difference outside the maximum permissible error for NZS 5259:2015 for its 25/04-25/05/19 read period.

11. 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. In almost all cases, the bill period and invoice date are the same.

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	Not compliant	<p>For ICP 1000579992PG543 the altitude used to calculate the altitude factor matches the registry, but does not match the actual altitude of the ICP. The difference resulted in the altitude factor applied being outside of the maximum permissible error under NZS 5259:2015.</p> <p>I recommend that:</p> <ul style="list-style-type: none"> • network pressures and altitudes should be checked for reasonableness, and • a network pressure discrepancy not identified through the validation process should be investigated to determine why it was not detected.
Metering set up information	2.2	Effective	Compliant	<p>Robust validation processes are in place for all metering fields. I recommend that:</p> <ul style="list-style-type: none"> • a meter pressure discrepancy not identified through the validation process should be investigated to determine why it was not detected, and • inconsistencies between register content codes and TOU metering details should be investigated and corrected.

Issue	Section	Control Rating (Refer to Appendix 1 for definitions)	Compliance Rating	Comments
Billing factors	2.3	Effective	Compliant	<p>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.</p> <p>I recommend that a gas gate discrepancy not identified through the submission validation process should be investigated to determine why it was not detected.</p>
Archiving of reading data	3.1	Effective	Compliant	Effective practices are in place for archiving of register reading data.
Meter interrogation requirements	3.2	Adequate	Not compliant	<p>Processes are in place to identify ICPs with potentially incorrect allocation groups, and process corrections and meter upgrades as needed. I found that ICPs connected to Nova bypass networks using over 10,000 GJ pa are not consistently upgraded to TOU, and ICPs with TOU metering consuming less than 10,000 GJ may remain in allocation group 4 or 6.</p> <ul style="list-style-type: none"> • TOU metering has not been installed within three months of becoming aware of actual or expected rolling consumption over 10,000 GJ per annum for nine ICPs. • Six ICPs with TOU metering have allocation group 4 or 6 applied.

Issue	Section	Control Rating (Refer to Appendix 1 for definitions)	Compliance Rating	Comments
Meter reading requirements	3.3	Effective	Not compliant	<p>Meter reading attainment processes are robust.</p> <p>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.</p> <p>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 on the GAS080 report.</p> <p>Exceptional circumstances not demonstrated for four ICPs not read in the 12 months ending February 2020.</p>
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	Not compliant	Effective correction processes are in place. Three meter pressure corrections were processed from incorrect dates, resulting in pressure factors outside the maximum permissible errors set out in NZS 5259:2015.
TOU validation	3.6	Effective	Compliant	Robust TOU validation processes are in place.
Energy consumption calculation	4	Effective	Compliant	The process to convert consumption to energy is compliant for TOU and non-TOU ICPs.

Issue	Section	Control Rating (Refer to Appendix 1 for definitions)	Compliance Rating	Comments
TOU estimation and correction	5.1	Effective	Compliant	<p>Nova's processes achieve compliance with the requirement to provide its "best estimate of consumption information".</p> <p>I recommend that workings for TOU estimates are retained.</p>
Provision of retailer consumption information	5.2	Effective	Not compliant	<p>The process for preparing consumption information files is compliant.</p> <p>The registry was populated late for five new connections resulting in submission information not being provided for the initial allocation.</p>
Initial submission accuracy	5.3	Effective	Not compliant	<p>Nova uses historic seasonal adjustment daily shape values to improve the accuracy of forward estimates. Although compliance has not been achieved, the process is robust.</p>
Forward estimates	5.4	Effective	Not compliant	<p>Nova uses historic seasonal adjustment daily shape values to improve the accuracy of forward estimates.</p> <p>One ICP had forward estimate calculated invalidly because a closing reading was not entered on meter removal.</p>

Issue	Section	Control Rating (Refer to Appendix 1 for definitions)	Compliance Rating	Comments
Historic estimates	5.5	Effective	Not compliant	<p>Compliance was achieved for all of the scenarios provided during the audit.</p> <p>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.</p> <p>ICP 1001261127QT65E had a CV difference outside the maximum permissible error for NZS 5259:2015 for its 25/04-25/05/19 read period.</p>
Proportion of HE	5.6	Effective	Compliant	Reporting has been provided as required.
Billed vs consumption comparison	5.7	Adequate	Not compliant	<p>The relationship between billed and submitted data appears reasonable, and the differences are explainable.</p> <p>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. In almost all cases, the bill period and invoice date are the same.</p>
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:

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Veritek Limited

Steve Woods
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Nova personnel assisting in this audit were:

Name	Title
Abdul Osman	Billing Manager TOU Gas
Christina Ah Mann	Metering & New Connections Team Leader
Jason Mills	Industrial Relationship Manager
Neill Deppe	Team Leader Reconciliation
Somesh Pattekar	Energy Analyst
Vibhu Sharma	Energy Analyst

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 and TOU downloads
Powerco	TOU downloads
Vector Metering	TOU downloads

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1. Pre-Audit and Operational Infrastructure Information

1.1 Scope of Audit

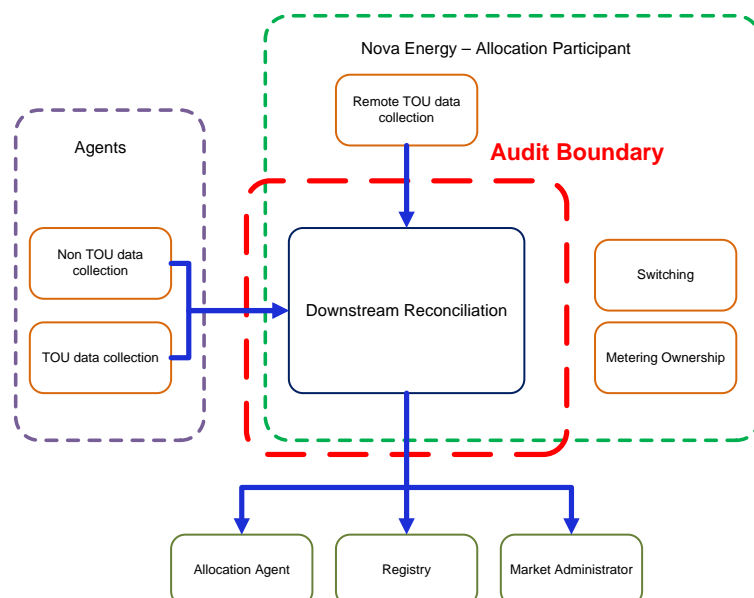
This Performance Audit was conducted at the request of the Gas Industry Company (GIC) in accordance with Rule 65 of the Gas (Downstream Reconciliation) Rules 2008 effective from 14 September 2015. Rule 65 is inserted below:

- 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 and 28/05/20, 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 Nova 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 Nova 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 Nova'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.

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

Nova provided a copy of their previous audit conducted in 2017 by Veritek Ltd. Seven breach allegations were made, and resolution of these matters is summarised in the table below:

Breach Allegation	Rule	Section in this report	Resolution
One GAS050 report submitted to the allocation agent for December 2015 was not retained, and no audit trail was available.	28.4.1	1.5	No further issues were identified. The issue appears to have been isolated and a process change will prevent recurrence.
The registry was populated late for two new connections resulting in submission information not being provided for the initial allocation.	28.3	2.1.1	No further issues were identified.
TOU metering has not consistently been installed within three months of becoming aware of actual or expected rolling consumption over 10,000GJ per annum. I note that in some cases there have been 7-10 month delays between Nova requesting upgrades to TOU from meter owners, and the metering being installed.	29.1	3.2	This issue is still existing.
82 ICPs appear likely to have an incorrect allocation group currently recorded.	29.1-29.3	3.2	There is now regular validation of allocation groups. The only issues identified are where 11 ICPs consuming over 10TJ have AG4 recorded.
The GAS080 report included incorrect ICP counts and reading percentages, as some ICPs not continuously supplied with gas were included in the report.	40.2	3.3	Some issues are still existing.
The initial submission accuracy did not meet the required accuracy percentage for some gas gates for the period August 2014 to November 2015.	37.2	5.3	This issue is still existing.

Breach Allegation	Rule	Section in this report	Resolution
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	I confirmed that invoices are normally dated very close to the end of the billing period, or on the last day of the month for commercial and industrial customers.

1.3.2 Breach Allegations

Nova has 28 alleged breaches recorded by the Market Administrator between 1 March 2017 and 20 April 2020 excluding the seven alleged breaches raised in relation to the 2017 performance audit. These are summarised as follows:

Breach Allegation	Breach No.	Rule	Section in this report	Outcome
Alleged breaches raised by EMS for initial vs final allocation variances				
Initial vs final allocation variances.	27 between 2017-041 and 2019-046	37.2	5.3	The Market Administrator did not raise any material issues.
Alleged breaches raised by Nova				
Incorrect volumes were submitted for WST03610 between May 2013 and June 2018 due to incorrect application of a multiplier.	2018-159	26.2	5.2	The alleged breach remains open pending the GIC's calculation of market impact, and determination of whether an industry agreed settlement is required.

Seven alleged breaches were recorded in relation to the 2017 performance audit, and the outcomes are recorded in the table below.

Breach Allegation	Breach No.	Rule	Section in this report	Outcome
One GAS050 report submitted to the allocation agent for December 2015 was not retained, and no audit trail was available.	2017-103	28.4.1	1.5	The Market Administrator did not raise any material issues.
The registry was populated late for two new connections resulting in submission information not being provided for the initial allocation.	2017-104	28.3	2.1.1	The Market Administrator did not raise any material issues.
TOU metering has not consistently been installed within three months of becoming aware of actual or expected rolling consumption over 10,000GJ per annum. I note that in some cases there have been 7-10 month delays between Nova requesting upgrades to TOU from meter owners, and the metering being installed.	2017-105	29.1	3.2	The Market Administrator did not raise any material issues.
82 ICPs appear likely to have an incorrect allocation group currently recorded.	2017-106	29.1-29.3		The Market Administrator did not raise any material issues.
The GAS080 report included incorrect ICP counts and reading percentages, as some ICPs not continuously supplied with gas were included in the report.	2017-107	40.2	3.3	The Market Administrator did not raise any material issues.
The initial submission accuracy did not meet the required accuracy percentage for some gas gates for the period August 2014 to November 2015.	2017-108	37.2	5.3	The Market Administrator did not raise any material issues.
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.	2017-109	52.2.1	5.7	The Market Administrator did not raise any material issues.

As noted in the Summary of Report Findings, this audit recorded non conformance in eight sections leading to 11 breach allegations, as shown in the table below.

Breach Allegation	Rule	Section in this report
<p>For ICP 1000579992PG543 the altitude used to calculate the altitude factor matches the registry, but does not match the actual altitude of the ICP. The difference resulted in the altitude factor applied being outside of the maximum permissible error under NZS 5259:2015.</p>	28.2	2.1.2
<p>TOU metering has not been installed within three months of becoming aware of actual or expected rolling consumption over 10,000 GJ per annum for the following ICPs:</p> <ul style="list-style-type: none"> • 1001287625NG7A2 - in progress • 0001788311QTA6F- in progress • 001152000QT0BD - in progress • 1001290576QTA2E - awaiting approval • 002320611QT6F6 - awaiting approval • 001269290QT725 - awaiting approval • 0000073238NAF5B - bypass network • 000071569NA754 - bypass network • 000073568NA851 - bypass network <p>I note that in some cases there have been delays between Nova requesting upgrades to TOU from meter owners, and the metering being installed.</p>	29.1	3.2
<p>ICPs 0001406092QTBB7, 0001411878QTF10, 0008000037NG731, 0001033930NG351, and 0004206692NGE42 have TOU metering and consume more than 250 GJ pa but have allocation group 4 assigned.</p> <p>ICP 1000527270PG7C6 has TOU metering and consumes more than 250 GJ pa but has allocation group 6 assigned.</p>	29.2	3.2
<p>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 on the GAS080 report.</p>	26.2.1	3.3
<p>Exceptional circumstances not demonstrated for four ICPs not read in the 12 months ending February 2020.</p>	29.4.3	3.3

Breach Allegation	Rule	Section in this report
<p>The following ICPs had incorrect pressure factors applied:</p> <ul style="list-style-type: none"> • 0002000627NG33E (01/06/19-26/06/19: applied pressure 35 kPa correct pressure 2.5 kPa), • 0002003184NGA03 (04/10/19-08/10/19: applied pressure 35 kPa correct pressure 2.75 kPa), and • 0002254911QT1AC (19/12/18-12/05/19: applied pressure 2.5 kPa correct pressure 7 kPa). <p>The differences resulted in the pressure factors being outside of the maximum permissible error under NZS 5259:2015.</p>	26.2.1 and 26.5.4	3.5
<p>The registry was populated late for at least five new connections resulting in submission information not being provided for the initial allocation.</p>	26.2.1 and 28.3	5.2
<p>The initial submission accuracy did not meet the required accuracy percentage for some gas gates for the period January 2017 to January 2019.</p>	37.2	5.3
<p>Meter G418267X for ICP 0001730550PGB3E does not have a closing read entered on 02/05/2019, which resulted in forward estimate being calculated invalidly from 02/05/2019 onwards.</p>	26.2	5.4
<p>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.</p> <p>As a result of this process, ICP 1001261127QT65E had a CV difference outside the maximum permissible error for NZS 5259:2015 for its 25/04-25/05/19 read period.</p>	26.5.4	5.5
<p>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. In almost all cases, the bill period and invoice date are the same.</p>	52.2.1	5.7

A breach allegation is also raised for one distributor in relation to an incorrect altitude recorded on the registry:

Breach Allegation	Participant	Rule	Section in this report
For ICP 1000579992PG543 the altitude used to calculate the altitude factor matches the registry, but does not match the actual altitude of the ICP. The difference resulted in the altitude factor applied being outside of the maximum permissible error under NZS 5259:2015.	POCO	26.5.1 and 26.5.4	2.1.2

1.4 Provision of Information to the Auditor (Rule 69)

In conducting this audit, the auditor may request any information from Nova, the allocation agent and any allocation participant.

Information was provided by Nova in a timely manner in accordance with this rule.

Information was requested from metering equipment owners and was provided within the requested timeframe. I consider that all parties have complied with the requirements of this rule.

1.5 Draft Audit Report Comments

A draft audit report was provided to the industry body (GIC), the allocation agent, Powerco, 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
Nova	Yes	Yes	Yes

No changes were made to the report. Nova'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..."

A sample of GAS040 and GAS050 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 or GAS050 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 Orion.

One of the main issues with the new connections process is that the physical connection is made at the property when the ICP is still at the "Ready" status. At this point the consumer has not always registered with a retailer, even though gas is being consumed. Because networks will create ICPs based on a request from the customer, the retailer is not always included in the communication process. For reconnections, some customers do not sign up with a retailer until a "vacant disconnection" letter is sent.

Because of the potential delays with the registry update, for some ICPs where the status has changed to ACTC, consumption information may not be provided to the allocation agent for the initial allocation. I checked five ICPs where the update to the registry was later than 30 business days and I found that submission of consumption information to the allocation agent occurred at the beginning of the following month for all five. Whilst the ICPs were made "Ready", consumption did not occur for some weeks after the "Ready" date. This is discussed further in Section 5.2.

The "Maintenance Breach History Report (RET breaches)" report was examined for the period January 2019 to April 2020. This report contained 144 ICPs where the initial registry update was later than two business days out of a total of 1,077 new connections. I checked the records for 21 ICPs where the registry update was more than five business days late. 16 examples were populated late due to the "ready" status update being delayed by Powerco. The design of Powerco's new connection process means that ICPs are not changed to "ready" and the retailer is not notified until the ICP is connected and metered. Once Nova was notified that these ICPs were connected, customer contact was made, and the registry was populated within two business days of confirming all relevant details.

Five of the 21 examples had corrections made to the registry data, making them appear as late updates, but the initial update was within two business days of agreement with the customer.

The “RSREADY” report contained three ICPs at the ready status where Nova was the expected retailer. By the time of the on-site audit, all three had been changed to ACTC. Nova has a daily report to identify ICPs at “new” or ready” where they are the proposed retailer.

Nova identifies and resolves metering, altitude, and status discrepancies daily. I checked Nova’s 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.

There is no specific check to identify ICPs where the network pressure is lower than the meter pressure, but no invalid meter pressures were identified during the audit. ICP 0000182881QTF18 had a network pressure of 400 kPa recorded on the registry, and 275 kPa recorded in Orion. The ICP has been supplied by Nova since 2013, and had network pressure of 400 kPa recorded on the registry since it was initially populated in 2009. The difference was not detected and investigated because the ICP was not included in the exception reporting. The pressure difference did not result in any factors being outside the maximum permissible errors under NZS 5259:2015.

Recommendation	Audited party comment
Identify any ICPs where the network pressure is less than the meter pressure to confirm whether both values are correct.	<p>Response: Acknowledge</p> <p>Comments:</p> <ul style="list-style-type: none"> • Nova have reporting in place that identifies network v meter pressure misalignments • Data integrity reporting will be improved and implemented September 2020
Investigate to determine why the network pressure discrepancy for ICP 0000182881QTF18 was not identified through the network pressure validation process.	<p>Comments:</p> <ul style="list-style-type: none"> • ICP 0000182881QTF18 was identified in Nova’s current reporting suite. • Discrepancies outside NZS 5259 thresholds are reported on and investigated.

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**.

No ICPs with an ACTC ICP status code had metering indicated to be removed on the registry.

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 $\pm 1.0\%$ where the meter pressure is less than or equal to 100kPa, and $\pm 0.5\%$ 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 five ICPs with altitudes under 11m and five ICPs with altitudes over 140m per distributor, then choosing a further ten ICPs with altitudes between 11m and 140m per 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 $\pm 10m$ 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 $\pm 1.0\%$.

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 $\pm 10m$, 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 accurate in most areas.

Distributor	Total ACTC and ACTV non-TOU ICPs	ICPs checked	Quantity outside 20m	Quantity outside 90m
UNLG	7,254	20	-	-
NGCD	6,537	20	-	-
POCO	21,487	20	1	-
GNET	623	20	-	-
Total	35,995	80	1	-

Non Conformance	Description	Audited party comment
<p>Regarding: Rule 28.2</p> <p>Control Rating: Effective</p>	<p>For ICP 1000579992PG543 the altitude used to calculate the altitude factor matches the registry, but does not match the actual altitude of the ICP. The difference resulted in the altitude factor applied being outside of the maximum permissible error under NZS 5259:2015.</p>	<p>Response: Acknowledge</p> <p>Comments:</p> <ul style="list-style-type: none"> In alignment with - Gas (Switching Arrangements) Rules 2008, Part A, ICP parameters maintained by Distributors and rules 41 and 58, Nova relied on the information to be accurate and complete.

A further evaluation was conducted of ICPs where the altitude was zero on the registry. This data appears to be less accurate than when a figure other than zero is populated. The results are shown in the table below. 12 of the 74 ICPs have an altitude difference of more than 20m.

Distributor	Total ACTC and ACTV non-TOU ICPs	ICPs with altitude of zero	ICPs checked ²	Quantity outside 20m	Quantity outside 90m
UNLG	7,295	-	-	-	-
NGCD	6,559	28	27	-	-
POCO	21,513	46	45	12	1
GNET	628	-	-	-	-
Total	35,995	74	72	12	1

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 figures³ 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 was one altitude discrepancy which resulted in an altitude factor which was outside the threshold allowed by NZS 5259:2015.

ICP	Meter Pressure	ICP Altitude	Google Earth Altitude	Altitude factor based on reg	Altitude factor based on Google Earth	Difference in altitude factors
1000579992PG543	2.5	0	105	1.000000	0.987945	1.2%

² Two ICP altitudes were not checked, because they were located in new subdivisions and could not be located in Google Maps or Google Earth to check their altitudes.

³ Gas (Switching Arrangements) Rules 2008, Part A, ICP parameters maintained by Distributors and rules 41 and 58.

Altitude is stored as a fixed factor in Orion for non-TOU ICPs, and reconciled to the registry daily. Any discrepancies are investigated and corrected. Nova does not check whether the altitude values recorded by networks are reasonable.

Recommendation	Audited party comment
<p>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.</p>	<p>Response: Recommendation not accepted</p> <p>Comments:</p> <ul style="list-style-type: none"> • 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 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.

Altitude adjustments are applied for TOU ICPs, except where the metering system corrects for absolute pressure. TOU gas conversion was checked for five ICPs with TA, TG or TGS register content codes and I confirmed that the altitude factors were correctly calculated and applied.

2.2 Metering Set-up Information

Nova compares their 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.

I compared the Orion and registry meter information as at 27/03/2020. I found ICP 0002310741QT6D6 had a pressure of 1.5 kPa recorded on the registry and 2.5 kPa recorded in Orion. The pressure difference did not result in any factors being outside the maximum permissible errors under NZS 5259:2015. The pressure was corrected in Orion prior to the audit by processing a system meter change, and I confirmed that all consumption had the correct pressure factor applied following this change. The error occurred because the pressure was manually loaded incorrectly following a meter change in 2018, but was not resolved until 2020.

Recommendation	Audited party comment
Investigate to determine why the meter pressure discrepancy for ICP 0002310741QT6D6 was not identified and resolved through the meter pressure validation process.	<p>Response: Recommendation accepted</p> <p>Comments:</p> <ul style="list-style-type: none">Nova will review, update and where required implement reportingImplementation September 2020

The 2017 audit found a large proportion of meter pressure changes populated on the registry by the meter owner (NGCM) had the same event date as the data entry date, but the meter serial numbers were the same, which suggests the errors may have been in existence since the meters were first installed. I recommended Nova evaluate meter pressure changes in the previous 12 months, and they found that the issues occurred because NGCM populated the event date with the same date as their update date due to a user processing error by NGCM. I compared the pressure changes provided by Nova to the event detail report, and found that the event and update dates were spread throughout the period. 17 of the 84 records checked had an update date which matched the event dates.

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.

Comparison of Orion and registry information as at 27/03/20 found two meter number discrepancies for active ICPs, and no meter digit discrepancies. Both meter number discrepancies were timing differences, and corrections were processed prior to the audit.

Meter multipliers

Comparison of Orion and registry information as at 27/03/20 found one meter multiplier discrepancy for ICP 0000064501QT38B. Orion recorded a multiplier of 1, and the registry recorded a multiplier of 6. The MEP had incorrectly recorded the multiplier details, and the multiplier was corrected to 1 on the registry prior to the audit.

Meter types and content codes

I compared the register content codes recorded in Orion for active ICPs (excluding gas gates) to the profile and TOU metering status recorded on the registry as at 27/03/20 and found the following discrepancies. TOU ICPs consuming under 10,000 GJ pa are sometimes read and settled as non-TOU. This is recorded as non conformance in **section 3.2**.

ICP	Orion register content code	Expected content code	Comment
0000073432NABCC	TG	U	Allocation group 6 with non-TOU metering, the register content code has been corrected to U in Orion.
0002028780NGB22	S	U	Allocation group 6 with non-TOU metering, the register content code has been corrected to U in Orion.
0001406092QTBB7	U	TG	Allocation group 4 with TOU metering
0004206692NGE42	U	TG	Allocation group 4 with TOU metering
1000527270PG7C6	U	TG	Allocation group 6 with TOU metering
0001411878QTF10	TG	TG	Allocation group 4 with TOU metering
0008000037NG731	TG	TG	Allocation group 4 with TOU metering

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 TOU metering details are inconsistent, to confirm which values are correct.	<p>Response: Recommendation accepted</p> <p>Comments:</p> <ul style="list-style-type: none"> • Review register content codes across TOU metered sites will be completed September 2020 • Reporting will be implemented 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.

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 appeared reasonable. Data for direct connect gas gates BRO36301 and

RAG33401 had been entered in duplicate for January 2020 due to a data processing error. I confirmed that this has no impact on reconciliation because these are direct connect gas gates and both affected ICPs have TOU metering with temperature correction, so the Orion temperature data is not used.

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.

Network pressure

Nova validates the network pressure in Orion against the registry. Pressure for ICP 0000182881QTF18 was incorrectly recorded in Orion as 275 kPa instead of 400 kPa, and the discrepancy was not detected because the ICP was not included in the exception reporting. Because the network pressure and meter pressure were the same, the Joule Thomson temperature adjustment was not applied. The incorrect network pressure did not result in the temperature factor being outside the threshold allowed by NZS 5259:2015. I have raised a recommendation in **section 2.1.1** to investigate why the discrepancy was not detected.

There are nine ICPs where the network pressure and the meter pressure are the same (three of these have the "operating at network pressure" flag set to yes), and 11 ICPs where the network pressure is less than the meter pressure. No invalid meter pressures were identified during the audit.

Gas gate

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**.

I compared the Orion and registry meter information as at 27/03/2020, and found one gas gate discrepancy. ICP 0001440509QT1D4 was recorded in Orion with gas gate WST03610, but should have been recorded with WTK33901. The temperatures used to calculate the temperature factor vary by gas gate. To determine the impact of the error, I recalculated the temperature factor for ICP 0001440509QT1D4 for each month between January 2019 and December 2020 using the WTK33901

and WST03610 temperatures. I did not find any differences outside the maximum permissible error under NZS 5259:2015.

Recommendation	Audited party comment
Investigate to determine why the gas gate discrepancy for ICP 0001440509QT1D4 was not identified and resolved through the pre-submission validation process.	<p>Response: Recommendation accepted</p> <p>Comments:</p> <ul style="list-style-type: none"> • Nova developed data integrity reporting to identify gas gate discrepancies • Implemented August 2020

2.3.2 Calorific Values

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 Nova’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.

All ACTC and ACTV ICPs had a value recorded in their allocation group on the registry. Allocation groups are assigned based on the expected or actual annual load for the ICP and their metering. Daily reporting is in place based on consumption bands to identify ICPs with the incorrect allocation group.

The April 2020 analysis by Nova found the following:

- three allocation group 6 ICPs had estimated annual consumption exceeding 250GJ; all were corrected to allocation group 4 prior to the audit,
- six allocation group 4 ICPs had estimated consumption under 250GJ per annum; all were corrected to allocation group 6 prior to the audit, and
- ten allocation group 4 ICPs connected to allocated gas gates have consumption greater than 10TJ per annum.

ICP(s)	Status of upgrade	Comments
1001287625NG7A2 0001788311QTA6F 1001152000QT0BD	In progress – awaiting corrector installation	Upgrades are approved and in progress, pending corrector installation. The process has been delayed by COVID-19 restrictions.
1001290576QTA2E 0002320611QT6F6 1001269290QT725	In progress – awaiting approval or work to be completed before corrector installation	Upgrades are in the process of being approved, or work needs to be completed on the installation before a corrector can be installed. The process has been delayed by COVID-19 restrictions.
0000073238NAF5B 0000071569NA754 0000073568NA851	Upgrades will not be completed because the ICPs are connected to Nova bypass networks	The ICPs are connected to Nova bypass network gas gates TWB24810, FLB15601 or HST05203. Nova does not intend to upgrade the metering, because all consumption at these gates is allocated to Nova. This is technically non-compliant with rule 29.1, although there is no impact on allocation.
0004206692NGE42	Complete, but still reconciled as non-TOU in allocation group 4.	The meter was upgraded in 2018, but the ICP is still read and settled as non-TOU. This is non-compliant, and the ICP is also included in the list below.

Allocation groups were checked against the metering type for consistency. I found five ICPs with TOU metering which are read and settled as non-TOU. Under rule 29.2.1 all ICPs with TOU metering installed are required to be settled as TOU in allocation groups 1 or 2:

ICP	Orion register content code	Expected content code	Comment
0001406092QTBB7	U	TG	Allocation group 4 with TOU metering
0004206692NGE42	U	TG	Allocation group 4 with TOU metering
1000527270PG7C6	U	TG	Allocation group 6 with TOU metering
0001411878QTF10	TG	TG	Allocation group 4 with TOU metering

ICP	Orion register content code	Expected content code	Comment
0008000037NG731	TG	TG	Allocation group 4 with TOU metering
0001033930NG351	U	TG	Allocation group 4 with TOU metering

Late installation of TOU metering is alleged as a breach of rule 29.1, and incorrect allocation groups are alleged as a breach of rules 29.2.1.

Non Conformance	Description	Audited party comment
<p>Regarding: Rule 29.1</p> <p>Control Rating: Adequate</p>	<p>TOU metering has not been installed within three months of becoming aware of actual or expected rolling consumption over 10,000 GJ per annum for the following ICPs:</p> <ul style="list-style-type: none"> • 1001287625NG7A2 - in progress • 0001788311QTA6F - in progress • 001152000QT0BD - in progress • 1001290576QTA2E - awaiting approval • 002320611QT6F6 - awaiting approval • 001269290QT725 - awaiting approval • 0000073238NAF5B - bypass network • 000071569NA754 - bypass network • 000073568NA851 - bypass network <p>I note that in some cases there have been delays between Nova requesting upgrades to TOU from meter owners, and the metering being installed.</p>	<p>Response: Acknowledge</p> <p>Comments:</p> <ul style="list-style-type: none"> • Exception reporting was implemented post 2017 audit then adjusted in 2018 • The process for TOU metering to be installed has improved however several factors impact the speed in which these can be delivered on. <ul style="list-style-type: none"> • Customer decision making particularly when exploring options to manage load to lower levels • Service provider changing corrector supplier, • Challenges associated with scheduling/space for installation • On-going engagement with customers and suppliers will continue and Nova are committed to improving the overall timeline of TOU installation
<p>Regarding: Rule 29.2</p> <p>Control Rating: Adequate</p>	<p>ICPs 0001406092QTBB7, 0001411878QTF10, 0008000037NG731, 0001033930NG351, and 0004206692NGE42 have TOU metering and consume more than 250 GJ pa but have allocation group 4 assigned.</p> <p>ICP 1000527270PG7C6 has TOU metering and consumes more than 250 GJ pa but has allocation group 6 assigned.</p>	<p>Response: Acknowledge</p> <p>Comments:</p> <ul style="list-style-type: none"> • Nova has a process that reviews allocation groups against usage however this has identified room for improvement. • Nova will review all allocation groups across TOU metered sites to be completed by September 2020. <ul style="list-style-type: none"> • 4 ICPs in progress for corrector removals <ul style="list-style-type: none"> ○ 1 ICP – unable to remove corrector as not enough space around the GMS to

Non Conformance	Description	Audited party comment
		<p>install a regulator. Site will be moved to TOU with allocation group updated to 2</p> <ul style="list-style-type: none"> o 3 ICPs will have their correctors removed • 2 ICPs in progress for compliance upgrade <p>Reporting and development of an improved process will be implemented September 2020</p>

Allocation groups are recorded on the registry and hard coded into the GAS040 and GAS050 reports to ensure that the correct code is applied. I compared the allocation group and profile codes on the registry and identified the following discrepancies:

- all allocation group 1 and 2 ICPs have TOU metering recorded as expected, 77 of the ICPs had a GGRP profile recorded, instead of XTOU as expected; all were corrected during the audit, and
- ICP 0001004342NG9CF (allocation group 6) and 0011003117PGC1C (allocation group 4) have XTOU profile assigned instead of GGRP as expected; both were corrected during the audit.

The previous audit recommended Nova confirm the annual consumption for ICP 1001154173QT5E4, and I confirmed that this has been completed and the allocation group is correctly assigned based on the current annual consumption.

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.

At the time of the 2017 audit, the Orion GAS080 report relied on responsibility end dates being populated for customer accounts to determine the period of supply, but this field was not consistently populated. Following the audit, Nova revised the logic to rely on the responsible retailer code and ICP status. Any day that the ICP has a metered status with GNVG as the responsible retailer will be considered a day of supply.

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. I found that the issues relating to inaccurate periods of supply caused by reliance on responsibility end dates had been resolved, but the following issues were identified:

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.

2. ICP 0000396641QT845 was treated as if it had been continuously supplied by GNVG for the previous four months, but had a gap in supply between 13/03/20 and 21/04/20. Nova confirmed that because continuous supply is calculated at month level, and the ICP was supplied for part of March 2020 and part of April 2020 the gap in supply was not identified. This is recorded as non-conformance.
3. ICP 0001730550PGB3E was correctly reported in the aggregated submission, but appeared twice on the detailed submission with two different meter numbers. This was because an old removed meter G418267X had been updated to a removed meter status in Orion but a closing read had not been entered. The GAS080 report was compliant, but non conformance exists in **section 5.4** because forward estimate was calculated for periods after the meter was removed. A closing read should have been entered on 02/05/2019 when the meter was replaced with meter G418267 as part of a correction.

Non Conformance	Description	Audited party comment
<p>Regarding: Rule 26.2.1</p> <p>Control Rating: Effective</p>	<p>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.</p> <p>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.</p>	<p>Response: Acknowledge</p> <p>Comments:</p> <ul style="list-style-type: none"> • 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

Non Conformance	Description	Audited party comment
		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

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. Nova'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, Nova 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	99.57%	99.96%
Jan 2020	99.59%	99.96%
Feb 2020	99.54%	99.95%

As described above, some GNVG ICPs which were previously supplied by MEGA 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 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. Two ICPs were affected, and I consider it unlikely that exclusion of these ICPs would cause the read attainment percentage to drop below 90%.
- Compliance with the 12 month reading target (29.4.2) was checked using the GAS080, GAS080 ICP level detail, and a list of ICPs known not to have received an actual read for the last 12 months. I checked all 13 ICPs which were unread in the 12 months ending February 2020. I found that there were three vacant ICPs which were incorrectly excluded from the meter reading follow up processes. One ICP was placed in a "do not read" round in June 2018, which meant it didn't appear on the "consecutive estimate" list for remedial action. The other nine ICPs were not read because exceptional circumstances were present, such as blocked access or dogs. I do not consider that exceptional circumstances exist for the three vacant ICPs or the ICP placed in a "do not read" round.

Non Conformance	Description	Audited party comment
<p>Regarding: Rule 29.4.3</p> <p>Control Rating: Effective</p>	<p>Exceptional circumstances not demonstrated for four ICPs not read in the 12 months ending February 2020.</p>	<p>Response: Acknowledge</p> <p>Comments:</p> <ul style="list-style-type: none"> • Nova accept that exceptional circumstances were not proven • Historically the sources used to identify opportunities to improve read attainment were complex and relied on multiple data sources. • The read attainment process is actively under review • Nova have identified a phased improvement approach that will: <ul style="list-style-type: none"> • Identify the discrepancies • Design single source of reliable data • Implement automated workflow mechanisms • Further enhance and utilise SMS capabilities to mitigate read attainment issues at the on-set • Implement improved communication messaging with consumers using various mediums • Optimise Wells & MRS' service offerings • Nova anticipate full implementation of all phases to be completed by Q4

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 Nova.

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 Nova. 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

The process for error correction was examined 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.

Error correction was examined by a “walk through” of the process and by examining a typical sample of 13 ICPs where meters had stopped recording. I identified five ICPs where the process described above was not followed; however, Nova has an alternative process for scenarios where the customer is not billed for the consumption. For this scenario, “The New Occupant” is moved in to the account and the consumption is allocated to this “consumer” to ensure submission occurs.

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.

Error correction was examined by a “walk through” of the process and by examining an extreme case sample of the five largest positive and five largest negative differences where the meter pressure was corrected. For all meter pressure corrections provided, Orion was updated to match the registry meter pressure. I found that three corrections were not made from the correct date:

ICP	Pressure change applied date	Pressure change expected date
0002000627NG33E	27/06/2019	01/06/2019
0002003184NGA03	9/10/2019	04/10/2019
0002254911QT1AC	13/05/2019	19/12/2018

Non Conformance	Description	Audited party comment
<p>Regarding: Rule 26.2.1 and 26.5.4</p> <p>Control Rating: Effective</p>	<p>The following ICPs had incorrect pressure factors applied:</p> <ul style="list-style-type: none"> 0002000627NG33E (01/06/19-26/06/19: applied pressure 35 kPa correct pressure 2.5 kPa) 0002003184NGA03 (04/10/19-08/10/19: applied pressure 35 kPa correct pressure 2.75 kPa) 0002254911QT1AC (19/12/18-12/05/19: applied pressure 2.5 kPa correct pressure 7 kPa) <p>The differences resulted in the pressure factors being outside of the maximum permissible error under NZS 5259:2015.</p>	<p>Response: Acknowledge</p> <p>Comments:</p> <ul style="list-style-type: none"> Nova have used the date the MEP has confirmed the pressure and not the date Nova become responsible for the ICP Nova to make further corrections to apply the correct date covering the period of responsibility Updates completed August 2020

Inactive status corrections

Consumption is reported for all ICPs which have a metered status. Nova provided eight examples of ICPs with inactive consumption, and I confirmed that consumption during the inactive period was correctly reported.

3.6 TOU Validation

Nova supplies 57 AG1 ICPs and 139 AG2 ICPs.

Nova’s TOU data is collected remotely for AG1 ICPs. Data is collected manually for all AG2 ICPs. The files are imported through a validation system, then directly loaded into Orion. A check of clock time occurs in the field and is checked as part of the periodic accuracy checks.

TOU validation checks occur manually each month in the Auckland office and include 50 individual checks, including the following:

- file formats,
- invalid dates and times,
- status,
- missing data, including temperature and pressure data,
- negative corrected volume,
- minimum and maximum pressure,
- minimum and maximum temperature, and
- uncorrected data calculation vs corrected data.

Prior to submission of the GAS050 report, consumption is reviewed. Refer to **section 5.2** for an explanation of the checks completed. Compliance is confirmed.

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 TOU and 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**.

TOU Energy Consumption Calculation

Raw TOU data is converted to energy within Orion, and differs based on the register content code. All Nova's TOU meters have TA (temperature and absolute pressure corrected), TG (temperature and gauge pressure corrected) or TGS (temperature, gauge pressure and supercompressibility corrected) register content codes. Register content codes are not checked for non-TOU ICPs. A recommendation is made in the registry report that this field should be included as a validation.

- An altitude factor is calculated for all TOU ICPs, but only applied in the conversion process where the register content code is not TA.
- A compressibility factor is calculated and applied for all TOU ICPs where the register content code is not TGS.
- Pressure and temperature factors of 1 are applied for all TOU ICPs, because the data is already corrected for temperature and pressure.

I checked the TOU conversion process by reperforming the conversion process for a sample of five ICPs with a mix of TA, TG, and TGS register content codes for March and April 2020. In all cases, I

confirmed that the factors calculated by Orion were within the maximum permissible errors set out in NZS 5259:2015.

The 2017 audit raised a recommendation relating to calculation of average daily temperature and pressure for TOU ICPs. Where a zero consumption day occurred, Orion summed the total pressure and temperature for the day rather than averaging it. This is because Orion normally calculates a weighted average daily temperature and pressure, based on the consumption that occurred in each hour. This can make it difficult to identify pressure and temperature anomalies. A fix has been implemented and I confirmed that average rather than total pressure and temperature are applied to zero consumption days in the Orion production system.

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. Non conformance is recorded in **sections 2.1** and **3.5** because some incorrect altitudes and network pressures resulted in factors outside the maximum permissible errors set out in NZS 5259:2015.

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 $\pm 0.25\%$ 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.

5. Estimation and Submission Information

5.1 TOU Estimation and Correction (Rule 30.3)

This rule requires that retailers must provide the best estimate of consumption information to the allocation agent in situations where actual data is not available. Estimation and correction activities are conducted by the Account Managers and the data is appropriately labelled.

Various methods are used depending on the nature of the issue. If data is missing and a register reading is available then a profile is created by using a similar previous period. The customer may be consulted if the profile is unclear. If data and register readings are missing then consumption history

over the past 24 months, recent usage patterns and consultation with the customer are used to determine a likely profile and usage.

Five temporary and five permanent estimates were compared to historic metering data and actual data for the estimated period (for temporary estimates), because working files are not retained. I conclude Nova’s processes achieve compliance with the requirement to provide its “best estimate of consumption information” for all ICPs. There was one temporary estimate where the difference between the estimate and the actual was quite high and this was due to the ICP’s consumption history being highly variable and no register readings being available to base the estimates on. Compliance is confirmed.

Recommendation	Audited party comment
Retain workings for TOU estimates to confirm the estimation method applied.	<p>Response: Recommendation accepted</p> <p>Comments:</p> <ul style="list-style-type: none"> Nova currently save the daily estimate values and the estimate reason and will implement a process to retain “workings” from August 2020

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

Nova’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 non-TOU consumption at gas gate and ICP level prior to submission:

- 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. In **section 2.3.1**, I found ICP 0001440509QT1D4 was recorded in Orion with gas gate WST03610, but should have been recorded with WTK33901. The error did not result in any differences outside the maximum permissible error under NZS 5259:2015, and I have raised a recommendation to identify why the gas gate discrepancy was not identified.
- 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.
- 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.

As mentioned in **section 2.1.1**, when there is a delay in populating the registry for new connections, the consumption information is not always included for the initial allocation. I checked five ICPs where the registry update was backdated. The table below shows the results.

ICP	Event date	Claim date	Date of first submission
1001296286NG63D	31/07/2018	16/01/2019	Initial (02/2019)
1000576065PG8F7	13/11/2018	5/02/2019	Initial (02/2020)
1000578054PGB8A	13/12/2018	12/03/2019	Initial (11/2018)
1000583395PG95F	22/07/2019	25/09/2019	Initial (09/2019)
1000577946PG1CB	16/10/2019	18/12/2019	Initial (12/2019)

Non Conformance	Description	Audited party comment
<p>Regarding: Rule 26.2.1 and 28.3</p> <p>Control Rating: Effective</p>	<p>The registry was populated late for at least five new connections resulting in submission information not being provided for the initial allocation.</p>	<p>Response: Acknowledge</p> <p>Comments:</p> <ul style="list-style-type: none"> • In all 5 instances the 5 ICPs were late as a result of delays receiving the information from MEPs • Some networks process regarding new connections hinders our ability to achieve full compliance • On-going operational meetings occur with MEPs and Networks, Nova raise these issues and impacts • Nova continue to focus on achieving updates to the registry within two business days of confirming all relevant details with MEP’s, Networks and Consumers

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.

GAS050 TOU energy submissions

GAS050 submissions are generated directly from the Orion production system.

Nova validates TOU consumption prior to submission. The GAS050 data is added to an Excel template, which is used to review the data including:

- counts to determine whether any ICPs are missing, or days are missing for the ICP,
- comparison to a registry list, to identify any ICPs which have been incorrectly included in or excluded from the submission, and check aggregation factors including network and gas gate,
- for initial submissions, the total volume for the ICP is compared to the previous month, the current year’s consumption pattern and the last year’s consumption pattern, then each ICP is reviewed, and conditional formatting is applied to highlight the ten highest positive and ten highest negative differences, and
- for revisions, the GAS050 data is compared to the previous revision, and any differences are checked to confirm that they are as expected.

GAS050 files were checked for March and April 2020, including tracing data from the source read files through the Orion conversion process into the GAS050 submissions. The GAS050 submissions were correctly aggregated for the sample of ICPs checked.

5.3 Initial Submission Accuracy (Rule 37.2)

Rule 37.2 requires that the accuracy of consumption information, for allocation groups 3 to 6, for initial allocation must be within a certain percentage of error published by the industry body.

Nova did not meet this requirement for some gas gates during the 25 month period shown. The results are summarised in the table below.

Month	Total Gas Gates	Number Within 10%	% Compliant	Within ±10% or < 200 GJ	% Compliant or immaterial
Jan-17	74	54	73%	70	95%
Feb-17	73	61	84%	71	97%

Month	Total Gas Gates	Number Within 10%	% Compliant	Within ±10% or < 200 GJ	% Compliant or immaterial
Mar-17	73	57	78%	72	99%
Apr-17	74	47	64%	67	91%
May-17	75	47	63%	61	81%
Jun-17	75	55	73%	67	89%
Jul-17	74	55	74%	70	95%
Aug-17	74	57	77%	71	96%
Sep-17	75	57	76%	70	93%
Oct-17	75	50	67%	70	93%
Nov-17	75	51	68%	71	95%
Dec-17	75	46	61%	70	93%
Jan-18	75	52	69%	74	99%
Feb-18	75	60	80%	74	99%
Mar-18	75	55	73%	75	100%
Apr-18	75	48	64%	66	88%
May-18	76	40	53%	68	89%
Jun-18	75	55	73%	70	93%
Jul-18	75	63	84%	73	97%
Aug-18	75	58	77%	71	95%
Sep-18	75	53	71%	74	99%
Oct-18	76	50	66%	69	91%
Nov-18	76	56	74%	72	95%
Dec-18	76	46	61%	68	89%
Jan-19	76	53	70%	73	96%

The table below shows the difference between consumption information for initial and final submissions at an aggregated level for all gas gates.

Month	Initial Submission All Gas Gates (GJ)	Final Submission All Gas Gates (GJ)	Percentage Variation
Jan-17	277,082.0	278,163.2	-0.39%
Feb-17	262,722.8	262,539.7	0.07%

Month	Initial Submission All Gas Gates (GJ)	Final Submission All Gas Gates (GJ)	Percentage Variation
Mar-17	313,129.0	310,456.3	0.85%
Apr-17	327,796.9	316,314.5	3.50%
May-17	444,277.7	447,775.9	-0.79%
Jun-17	485,365.4	484,486.9	0.18%
Jul-17	521,312.8	524,708.1	-0.65%
Aug-17	458,815.3	472,320.2	-2.94%
Sep-17	407,302.8	414,250.8	-1.71%
Oct-17	345,517.6	354,168.1	-2.50%
Nov-17	300,119.7	304,317.8	-1.40%
Dec-17	247,936.5	238,661.5	3.74%
Jan-18	222,804.8	219,938.9	1.29%
Feb-18	221,476.6	224,130.5	-1.20%
Mar-18	266,959.0	260,845.3	2.29%
Apr-18	307,426.7	308,352.8	-0.30%
May-18	386,943.1	385,135.9	0.47%
Jun-18	449,570.2	451,386.3	-0.40%
Jul-18	454,235.8	459,285.3	-1.11%
Aug-18	435,771.1	440,177.3	-1.01%
Sep-18	384,912.1	392,458.6	-1.96%
Oct-18	342,049.9	343,266.1	-0.36%
Nov-18	297,583.0	302,254.6	-1.57%
Dec-18	250,604.8	243,635.2	2.78%
Jan-19	218,341.7	215,885.8	1.12%

The tables above show that the consumption information submitted to the allocation agent for the initial submission was sometimes over estimated and at other times under estimated. This analysis does not show any specific trends that cause concern.

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

Non Conformance	Description	Audited party comment
<p>Regarding: Rule 37.2</p> <p>Control Rating: Effective</p>	<p>The initial submission accuracy did not meet the required accuracy percentage for some gas gates for the period January 2017 to January 2019.</p>	<p>Response: Acknowledge</p> <p>Comments:</p> <ul style="list-style-type: none"> Nova Energy's performance in respect of rule 37.2 is effective. There are processes in place to resolve these breaches across all industry participants

5.4 Forward Estimates (Rules 34 & 36)

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

In **section 3.3** I found that ICP 0001730550PGB3E had forward estimate invalidly produced on removed meter G418267X. The meter had a removed status but did not have a closing reading entered, resulting in forward estimate being calculated after the removal date. A closing read should have been entered on 02/05/2019 when the meter was replaced with meter G418267 as part of a correction. Historic and forward estimate was being produced as required for active meter register 18P6102.

Non Conformance	Description	Audited party comment
<p>Regarding: Rule 26.2</p> <p>Control Rating: Effective</p>	<p>Meter G418267X for ICP 0001730550PGB3E does not have a closing read entered on 02/05/2019, which resulted in forward estimate being calculated invalidly from 02/05/2019 onwards.</p>	<p>Response: Acknowledge</p> <p>Comments:</p> <ul style="list-style-type: none"> User error has caused the issue due to a missing closing read being entered which is not part of the defined and documented process Nova has Identified a reporting enhancement opportunity which will be implemented September 2020

5.5 Historic Estimates (Rules 34 & 35)

Historic estimates are calculated 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 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, and 98.6% of Nova's active non-TOU ICPs have meter pressures below 50 kPa 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. I found one CV difference which was outside the maximum permissible error ($\pm 0.5\%$) set out in NZS 5259:2015, all other differences were within the permissible errors for their factor type.

ICP	Read to read period	Applied CV (based on April 2019 values)	Correct CV (based on the read period)	Percentage difference
1001261127QT65E	25/04-25/05/19	39.96443	39.69510	-0.68%

Non Conformance	Description	Audited party comment
<p>Regarding: Rule 26.5.4</p> <p>Control Rating: Adequate</p>	<p>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</p>	<p>Response: Acknowledge</p> <p>Comments:</p> <ul style="list-style-type: none"> • Nova will align the calculation of the CV to the read period • Implementation Q4 2020

Non Conformance	Description	Audited party comment
	<p>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.</p> <p>ICP 1001261127QT65E had a CV difference outside the maximum permissible error for NZS 5259:2015 for its 25/04-25/05/19 read period.</p>	

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
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. The relevant files were examined, and compliance is confirmed.

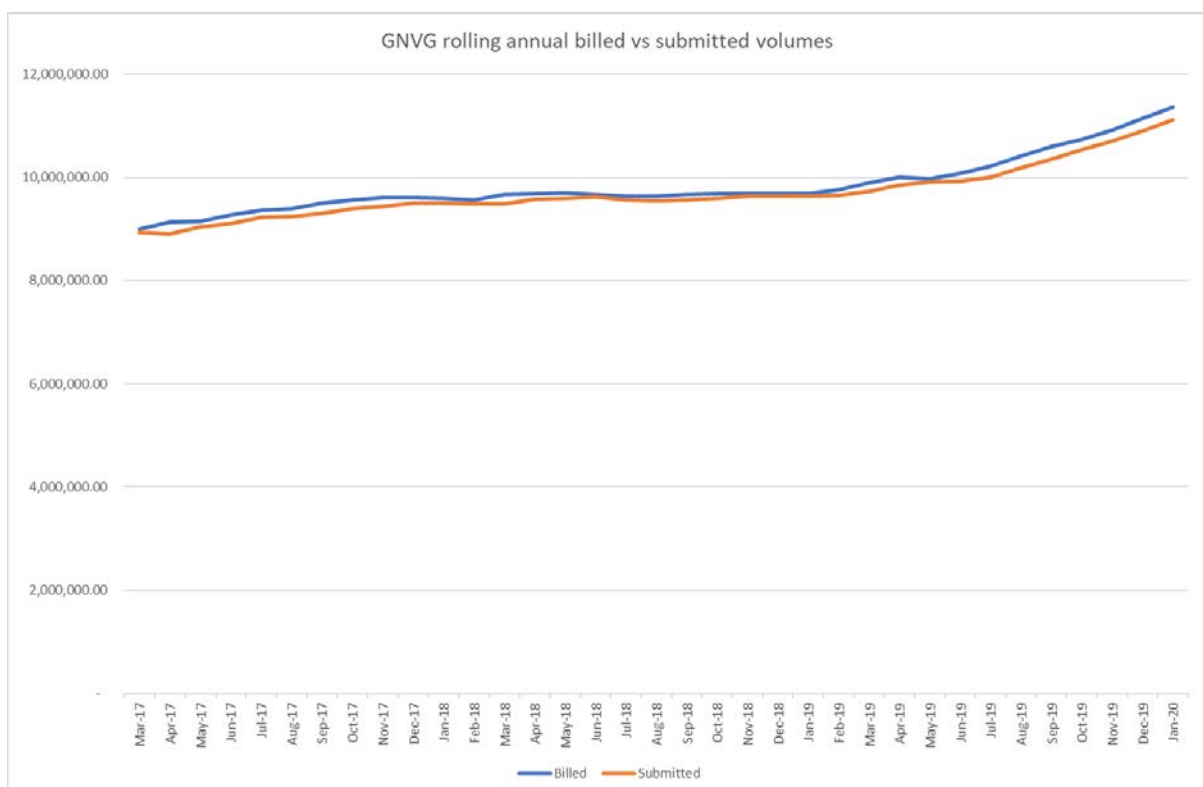
5.7 Billed vs Consumption Comparison (Rule 52)

GAS070 reports are generated using invoice information calculated by Orion. Invoice data is included in the GAS070 if the billing period end date occurs within the period being reported. TOU invoices have an invoice date of the last day of the consumption month, therefore the GAS070 reporting has this consumption in the correct month.

The content of the GAS070 files was proved by selecting some gas gates and checking the invoice data for all ICPs connected to the gas gate against the GAS070 file for April 2020. This confirmed the accuracy of the data, and all the invoices included had invoice dates within April 2020.

The chart below shows a comparison between rolling annual quantities billed and rolling annual consumption information submitted to the allocation agent for a 35-month period. 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



Year ending	Annual Billed GJ	Annual Consumption GJ	GJ difference	Percentage Difference
Jul-2017	9,356,647.45	9,216,965.15	139,682.29	1.52%
Jan-2018	9,589,017.36	9,491,407.59	97,609.77	1.03%
Jul-2018	9,640,511.70	9,556,177.91	84,333.78	0.88%
Jan-2019	9,685,486.70	9,640,664.35	44,822.35	0.46%
Jul-2019	10,212,688.17	9,998,246.12	214,442.05	2.14%
Jan-2020	11,348,962.72	11,111,509.79	237,452.93	2.14%

The gap between billed and submitted volumes is primarily caused by:

- A step change due to an increase in the volume of TOU data due to customer acquisitions from August 2019. Because there is an offset between the GAS070 end period and the GAS040+GAS050 end period, the difference is expected to wash out after August 2020, when the 12 month data comparison will include the TOU customer acquisitions in all months for both the billed and submitted data.
- Billed consumption is included in the GAS070 report based on the billing period, rather than invoice date. Each invoice generated in Orion is assigned to a billing period. In most cases, the billing period date and invoice date will fall within the same calendar month, as they did in the sample checked. However, it is possible for the invoice and billing period dates to fall in different months, most commonly around month end, or when an ICP is billed late. This is recorded as non conformance.
- When an invoice is reversed (or credited) and rebilled, it is possible for the operator to manually select the billing period for the reversal. Because only one invoice is allowed per billing period, the billing team create reversals in older billing periods, so that re-invoicing could occur in later periods. This can result in reversals being assigned to periods which have already had GAS070 submissions created and therefore not being reported, with re-bills included in future GAS070 reports. To minimise the impact of this, Nova provides GAS070 revisions.

Non Conformance	Description	Audited party comment
<p>Regarding: Rule 52.2.1</p> <p>Control Rating: Effective</p>	<p>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. In almost all cases, the bill period and invoice date are the same.</p>	<p>Response: Acknowledge</p> <p>Comments:</p> <ul style="list-style-type: none"> 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 the report is changed to select invoices based on invoice date.

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 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 the following recommendations are made in relation to Nova:

- identify any ICPs where the network pressure is less than the meter pressure to confirm whether both values are correct,
- investigate to determine why the network pressure discrepancy for ICP 0000182881QTF18 was not identified through the network pressure validation process,
- 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,
- investigate to determine why the meter pressure discrepancy for ICP 0002310741QT6D6 was not identified and resolved through the meter pressure validation process,
- identify any ICPs where register content codes and TOU metering details are inconsistent, to confirm which values are correct,
- investigate to determine why the gas gate discrepancy for ICP 0001440509QT1D4 was not identified and resolved through the pre-submission validation process, and
- retain workings for TOU estimates to confirm the estimation method applied.

Appendix 1 – Control Rating Definitions

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

Appendix 2 – Nova Energy Comments

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