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Gas Downstream Reconciliation Performance Audit Draft Report

For

Contact Energy Limited

Prepared by

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Executive Summary

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

The purpose of this audit is to assess the systems, processes and performance of Contact Energy (Contact) 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 and 80: the commissioning and carrying out of performance audits and event audits, V3.0" which was published by the GIC in June 2013.

The summary of report findings in the table below shows that Contact's control environment is "effective" for ten of the areas evaluated, "adequate" for three areas and "not adequate" for four areas.

Nine of the seventeen areas evaluated were found to be compliant. Eight breach allegations are made in relation to the remaining areas. They are summarised as follows:

- Failure to validate meter pressures against the registry has resulted in the use of incorrect meter pressures, resulting in inaccurate energy conversion. There was also an instance of incorrect altitude factor being applied.
- Contact hasn't corrected submission data for incorrect meter pressures errors identified between 1 and 4 kPa
- For one TOU site the estimate of consumption provided was not based on the best information available
- Some consumption at inactive ICPs was not included in submitted data
- Initial allocations were not within 10% of the final allocation figures for some gas gates in October 2014, May 2015 and June 2015
- Some forward estimates remained in final data when historical estimates were possible
- Some "as billed" data in GAS070 has been estimated and some as billed volumes have been omitted from the GAS070 altogether

Summary of Report Findings

Issue	Section	Control Rating (Refer to Appendix 1 for definitions)	Compliance Rating	Comments
ICP set up information	2.1.2	Effective	Not Compliant	An alleged breach has been made against Contact for failure to comply with NZS5259 when converting volume to energy, r 28.2 because of incorrect altitude, but generally the processes reviewed were effective.
Metering set up information	2.2	Not adequate	Not Compliant	Contact's processes for validating their system data against the registry do not check the meter pressure field. Several inaccurate meter pressures were found which would lead to inaccurate energy conversion.
Billing factors	2.3.1	Effective	Compliant	These processes were reviewed and found robust. There were however several observations and recommendations about Contact's process and the general industry approach to the analysis and provision of temperature data, which it is recommended should be done centrally for the whole industry.
Archiving of reading data	3.1	Effective	Compliant	Robust controls are in place for the security of meter reading data.
Meter interrogation requirements	3.2	Effective	Compliant	Validation occurs to ensure allocation groups are correct.
Meter reading targets	3.3	Effective	Compliant	Meter reading attainment processes are robust.

Non TOU validation	3.4	Effective	Compliant	Validation processes are robust.
Non TOU error correction	3.5	Not Adequate	Not compliant	Consumption information was not submitted for some ICPs recorded as disconnected. Contact has a policy of only correcting meter pressure errors over 4 kPa. Meter pressure errors between 1kPa and 4 kPa have not been corrected.
TOU validation	3.6	Effective	Compliant	Validation processes were reviewed and found to be robust.
Energy consumption calculation	4	Effective	Compliant	Processes were reviewed and found to be accurate. We recommend Contact proceed with its plans to apply Joule-Thomson adjustment.
TOU estimation and correction	5.1	Adequate	Not compliant	Of 3 TOU corrections reviewed, one was found to be non-compliant as the best available information wasn't used
Provision of retailer consumption information	5.2	Adequate	Not compliant	The process for preparing consumption information files is compliant; however, there are some issues which have led to the submission of incorrect consumption information to the allocation agent. The specific issues are as follows: • Over recording of consumption due to incorrect altitude information. • Consumption information is not submitted for disconnected ICPs with consumption recorded. • No validation of meter pressures, not correcting all meter pressure inaccuracies

Initial submission accuracy	5.3	Adequate	Not compliant	Alleged breaches have been made for initial allocations not being within 10% of the final allocation figures, for October 2014, May 2015 and June 2015 due to a mixture of unusually cold months and system errors
Historic estimates	5.4	Effective	Compliant	Compliance was achieved for all scenarios
Proportion of HE	5.5	Effective	Compliant	SAP correctly calculates and reports the proportion of HE.
Forward Estimates	5.6	Not adequate	Not compliant	Two system bugs caused forward estimate data to remain at the final allocation stage
Billed vs consumption comparison	5.7	Not adequate	Not compliant	A mixture of transition issues and system issues has resulted in estimated data being included in 'as billed' files, and billed quantities being omitted from 'as billed' files altogether.

Contents

1. Pre-Audit and Operational Infrastructure Information

1.1 Scope of Audit

This Performance Audit was conducted at the request of the Gas Industry Company (GIC) in accordance with rule 65 of the 2015 Amendment Version of the Gas (Downstream Reconciliation) Rules 2008.

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 the GIC in June 2013.

The audit was carried out on 26 and 27 October 2016 at Contact's offices in Wellington.

The scope of the audit includes "downstream reconciliation" only. Switching and registry management functions are included in a separate report.

1.2 Audit Approach

As mentioned in Section 1.1, the purpose of this audit is to assess the performance of Contact 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 Contact 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. We have used professional judgement to determine the audit method and to select sample sizes, with an objective of ensuring that the results are statistically significant.[1]

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

Where calculations are performed by Contact'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 the auditors' 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-compliance has been evaluated.

1.3 General Compliance

1.3.1 Summary of Previous Audit

Contact provided a copy of their previous audit conducted in 2014 by Veritek Ltd. This concluded that Contact's control environment was "effective" for 12 of the areas evaluated and "adequate" for five areas. There were no areas that were considered "not adequate".

Ten of the 17 areas evaluated were found to be compliant. Seven breach allegations were made in relation to the remaining areas. The resolution of these matters is summarised in the table below.

Breach Allegation	Rule	Section in this report	Resolution
Some altitude discrepancies have led to the provision of incorrect consumption information to the allocation agent. Consumption information for eight ICPs with altitude figure errors of over 90m will be high by between 1.1% and 2.65%.	28.2	2.1.2	Contact runs twice monthly checks against the registry for altitude and network pressure discrepancies. They do still have some known discrepancies between SAP and the registry. Of these 338 are for altitudes greater than 50m and none are differences of more than 10metres.

679 meter discrepancies exist between Contact's data and meter owners' data. Consumption information submitted to the allocation is incorrect for at least 21 ICPs.	28.2	2.2	Contact is doing regular mismatch reporting. This produces a worklist for historical correction where required, although this audit identified that meter pressure was not one of the fields being checked and not all historical corrections are being done for meter pressure discrepancies.
Monitoring of consumption vs allocation group does not occur routinely and there are approx. 300 ICPs with incorrect allocation groups recorded on the registry.	29	3.2	Contact now run a report on this which is reviewed and appropriate changes made.
Estimated TOU consumption information has been provided on a number of occasions from April 2010 until June 2013. Contact's processes achieve compliance with the requirement to provide its "best estimate of consumption information"; however, the existence of estimated information is considered a matter of non-compliance. This issue was addressed on a monthly basis and historic breach allegations are listed in Section 5.1.	30.3	5.1	There were only 3 TOU corrections in the period, one of which was found to be non-compliant.
Some GAS040 files were not compliant during the transition from Gentrack to SAP.	31.4	5.2	The new SAP processes have now been embedded.
Contact's initial submission accuracy did not meet the 10% requirement for some gas gates for the period June 2012 to May 2013.	37.2	5.3	This was still an issue and is discussed later.
The May 2014 energy quantities billed file was estimated during the transition from Gentrack to SAP.	52.2.1	5.7	This was still an issue and is discussed later.

1.3.2 Breach Allegations

Contact has 591 alleged breaches recorded by the Market Administrator in the two years October 2014 to September 2016. They are summarised as follows:

Nature of Breach	Rule	Quantity	Section in this Report
Initial vs final allocation variances more than the allowable threshold	37.2	583	5.3
Energy conversion not compliant with NZS5259 Altitude discrepancies Meter discrepancies	28.2	2	2.1.2 2.2
Incorrect allocation groups	29	1	3.2
Historical corrections for pressure discrepancies	26.2	3	3.5
GAS040 files not compliant during the transition from Gentrack to SAP	31.4	1	5.2
Energy quantities billed file was estimated during the transition from Gentrack to SAP	52.2.1	1	5.7

As noted in the Summary of Report Findings, this audit has found the following nine areas of non-compliance. The following breach allegations are made in relation to these matters.

Breach Allegation	Rule(s)	Section in this report
Contact has failed to comply with NZS5259 when converting volume to energy because of incorrect altitude factors	28.2	2.1.2
Failure to validate meter pressures against the registry has resulted in the use of incorrect meter pressures, resulting in inaccurate energy conversion	28.2	2.2
Contact hasn't ensured that conversion of volume complies with NZS5259	28.2	3.5

For one TOU the estimate of consumption provided was not based on the best information available	30.3	5.1
Consumption at inactive ICPs was not included in consumption data	26.2.1	5.2
Forward estimates remaining in final data when historical estimates were possible	36.1	5.6
As billed data in GAS070 has been estimated	52.2.1	5.7
Missing as billed volumes from the GAS070 data across various report periods	52.2.1	5.7

We have also made breach allegations against one distributor in relation to incorrect altitude figures on the registry, shown in the table below.

Breach Allegation	Participant Identifier	Rule(s)	Section in this report
NGCD for 2 ICPs on the register with incorrect altitude, which will result in inaccurate calculation of submission volumes outside of the NZS5259 accuracy level	NGCD	26.5.1 & 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 Contact, the allocation agent and any allocation participant.

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

We 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) and allocation participants. In accordance with rule 70.3 parties were given an opportunity to comment and indicate whether they would like their comments attached as an appendix to the final audit report. The table below summarises the responses.

Party	Response	Comments provided	Attached as appendix
Contact Energy	Yes	Yes	Yes

Metrix	Yes	No	No
GIC	Yes	Yes	No

The following table records the changes made to the report following consideration of the comments.

Report Section	Change to report
2.2	Clarification that some of the meter pressure discrepancies are due to incorrect information populated in the registry by meter owners.

1.6 Transmission Methodology and Audit Trails (Rule 28.4.1)

A complete audit trail was viewed for all data gathering, validation and processing functions. Compliance is confirmed with this rule.

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. We have also considered the "Gas (Downstream Reconciliation) Rules 2008 Billing factors guideline note, V2.0" (Billing Factors Guideline) published by GIC on 30/11/15 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 loaded into SAP.

As reported in 2014, 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, and at this point the consumer hasn't necessarily registered with a retailer. Several customers do not sign into ICP's until a "vacant disconnection" letter is sent. This is also seen with reconnections. SAP now prompts the call centre to check for dual supply with all new customers.

Consumption information may not be provided to the allocation agent until the registry is updated, which means that for some ICPs where the status has changed to ACTC, consumption information has not been provided to the allocation agent for the initial allocation. We checked 18 ICPs where the update to the registry was later than 50 business days and we found that submission of consumption information to the allocation agent occurred at the beginning of the following month for 15 of 18 and for three ICPs, submission information was not provided for the initial allocation but was provided by the time of the interim allocation. A system issue caused late updates for nine of the 18 ICPs; late field notification caused four late updates and processing issues caused the remaining five issues.

The "Maintenance Breach History Report (RET breaches)" report was examined for the period April 2015 to September 2016. This report contained 1,463 ICPs where the initial registry update was later than two business days.

We also examined the event detail report for the period January to September 2016. The table below summarises the registry population timeframes for new connection status changes.

New Connections					
Status	**Total ICPs**	**Update greater than 2 days**	**Update greater than 30 days**	**Average update days**	**Percentage compliant**
ACTC	700	699	46	15.1	0.1%
ACTV	10	10	7	30.4	1.0%

The list file contains 434 ICPs at the ready status where Contact is the expected retailer. 87 of these were created prior to 2016 and 35 of the 87 were created prior to 2015. We checked a sample of ten ICPs in SAP and none of them have current customers. Although these ICPs are monitored by the distributors, We recommend Contact analyses the list of 87 older ICPs to confirm whether they are still required.

Retailers must use "reasonable endeavours" to maintain current and accurate information in the registry (Rule 58) and, if a responsible retailer becomes aware that information is incorrect or requires updating, they must correct or update the information "as soon as practicable" (Rule 61). The Rules do not therefore define a specific time period but for this audit, updates that occurred more than 30 business days after the event have been considered an alleged breach.

Analysis of status events was undertaken to determine whether the registry was populated within a reasonable timeframe. The table below shows the results of the analysis and confirms that not all updates were within a reasonable timeframe. These have been reported in the associated switching audit report.

Status	**Total ICPs**	**Update greater than 5 days**	**Update greater than 30 days**	**Average update days**	**Percentage compliant**

ACTC	764	322	44	8.9	94.2%
ACTV	2,273	103	16	0.8	99.3%
INACT	770	11	1	1.7	99.9%
INACP	1	1	1	71	0.0%

2.1.2 Altitude Information

It is a distributor 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 contains the following points, which affect the way altitude information should be managed:

1. The maximum permissible error is ± 1.0% where the meter pressure is below 100kPa and ±0.5% where the meter pressure is greater than 100kPa.
2. The following note is also included "To minimise uncertainty due to altitude factor the aim should be to determine the altitude to within 10m where practicable."
3. The altitude factor can be assumed to be 1 where meters are situated at an elevation less than 50m above sea level.

Contact provided a registry list file and a random sample of ICPs per distributor was checked against "google earth" data. The sample was selected by firstly looking for obvious outliers and then increasing the sample size through random selection. The "google earth" data is based on the "Shuttle Radar Topography Mission" (SRTM) results and a number of recent studies indicate an accuracy of ± 10m for altitude. An evaluation against this data is considered an appropriate test for "reasonableness". Altitude figures that are within approximately 90m of the actual altitude will ensure an accuracy of ± 1.0%. Point 2 above recommends altitude figures are determined to within 10m where practicable. An evaluation of altitude data on the registry was conducted to check whether this recommendation had been met. As noted above, the margin of error of the "google earth" data appears to be approximately ± 10m, therefore, to allow for this margin, we have checked that the registry data is within 20m of "google earth" data.

The altitude data on the registry appears to be very accurate. NGCD has two ICPs where the altitude figure differs by more than 90m. ICP 0001033648NGB17 shows on the registry as 10m but Google Earth has an altitude of 286m. ICP 1001286693NG53Fshows on the registry as 40m but Google Earth has an altitude of 401m. These ICPs are in Rotorua and Taupo and an altitude higher than 250m would be expected. There were no other differences greater than 20m for any of the other ICPs checked.

A further evaluation was conducted of ICPs where the altitude figure was zero on the registry. This data appears to be slightly less accurate than when a figure other than zero is populated. The results are shown in the table below. There are eight of 43 ICPs with an altitude difference of more than 20m but no ICPs with an altitude difference of more than 90m.

Distributor	Total ICPs	ICPs with altitude of zero	ICPs checked	Quantity within 20m	Quantity within 90m
UNLG	34,387	3	3	1	3
NGCD	7,685	0	0	N/A	N/A
POCO	19,984	40	40	34	40
GNET	893	0	0	N/A	N/A
Total	**62,949**	**43**	**43**	**35**	**43**

We have considered whether distributors have potentially breached any rules by populating the registry with inaccurate altitude information. Distributors have responsibility for populating the registry with altitude figures[2] and for maintaining the accuracy of this information. Distributors must also comply with rule 26.5 of the Gas (Downstream Reconciliation) Rules 2008, which requires them to ensure that any information on the registry is accurate and complete and supports compliance with NZS 5259:2015. There are two ICPs where the incorrect altitude has resulted in consumption information being high, and outside the threshold allowed by NZS 5259:2015, by between 1.1% and 10%. We have alleged a breach of rules 26.5.1 and 26.5.4 by NGCD. Contact is not in breach of the same rules but is in breach of rule 28.2, which requires retailers to comply with NZS 5259:2015 when converting volume to energy.

Contact is required to correct the altitude factors in their systems and they must ensure corrections are made for at least those ICPs where the altitude difference is greater than 90m. These corrections are required to flow through to the relevant revision files.

- An alleged breach has been made against NGCD for 2 ICPs on the register with incorrect altitude, which will result in inaccurate calculation of submission volumes outside of the NZS5259 accuracy level, r 26.5.1 and r 26.5.4
- An alleged breach has been made against Contact for failure to comply with NZS5259 when converting volume to energy for the same 2 ICPs, r 28.2

2.2 Metering Set-up Information

Contact has a set of validation processes and reports to identify and resolve discrepancies; which was demonstrated during the audit. The validation compares SAP data to registry data for relevant fields, except meter pressure and meter serial number. Contact intends to add these two fields to their validation process.

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

We compared Contact's meter pressure data in SAP to the meter pressure field in the registry. There were 102 ICPs with a difference greater than 0.1 kPa. 65 of the 102 discrepancies will result in conversion errors greater than the 1.0% allowed by Table 3 of NZS 5259. Further analysis of this data following the preparation of the draft audit report identified that 12 of the 102 ICPs had a meter pressure on the registry of zero. All 12 ICPs were represented in the 65 ICPs where conversion errors were greater than 1.0%, therefore this number should be 53 because zero is not a valid meter pressure and we have concluded that the meter owner data is incorrect.

Contact's approach to performing historic corrections for incorrect meter pressure was to make a correction where the impact of the incorrect meter pressure resulted in the combined error of all factors exceeding 1.5%. This generally occurred where the meter pressure mismatch exceeded 4 kPa. This policy resulted in corrections occurring for meter pressure conversion errors greater than approx. 4% but correction did not occur for meter pressure conversion errors between 1% and 4%. Meter pressure errors were identified by the "Registry Amendments Implementation Group" (RAIG) in late 2014. Contact had a total of 1,020 errors, but correction only occurred for 41 ICPs where the error was greater than 4kPA. There were a further 189 ICPs with errors between 1kPa and 4 kPa. Contact has changed their threshold to 1.0% since the date of the audit.

- A breach has been alleged for the use of incorrect meter pressures resulting in inaccurate energy conversion, r 28.2

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) Temperature records of the station under flowing conditions. Historical records can be used if similarity is preserved.

(b) Records of actual gas temperature in similar installations over similar periods at similar locations may serve to estimate the value of gas temperature in the installation.

(c) For compact installations directly connected to short risers and well shaded from direct sunlight, where the temperature of the gas is in the vicinity of ground temperature, the temperature may be estimated from 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. For installations with seasonal use only, the data for the relevant season or seasons should be used.

(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. For installations with seasonal use only, the data for the relevant season or season should be used. The installation should be shielded from direct sunlight.

Contact uses option (c) for its process and uses a temperature data table that was provided to the auditor. This table provides a monthly temperature for each of five geographical areas across the system. Each gas gate is then allocated to a geographical area, which determines which monthly temperature is used for that gate. The Contact data represented data averaged over a 5-year period. A sample of data points was reviewed against data available from NIWA in the tables below.

Month	NIWA area	NIWA average	Contact Area	Contact average	NIWA factor	Contact Factor	Difference	% difference
Aug-16	Te Puke 30cm	10.22	BOP	10.4	1.0169	1.0162	0.0006	0.06%
Aug-16	Hamilton Aws 10cm	9.61	WAI	10.41	1.0191	1.0162	0.0029	0.28%
Aug-16	Auckland Motat 20cm	11.46	AKL	11.31	1.0124	1.0130	(0.0005)	-0.05%
Aug-16	Whangarei 20cm	12.45	AKL	11.31	1.0089	1.0130	(0.0040)	-0.40%
Aug-16	Rotorua 20cm	8.9	CEN	8.3	1.0216	1.0238	(0.0022)	-0.21%
Aug-16	Gisborne 10cm	10.67	ENI	9.3	1.0153	1.0202	(0.0049)	-0.49%
Aug-16	Wellington 20cm	8.95	WEL	9.4	1.0214	1.0198	0.0016	0.16%
Aug-16	Upper Hutt 20cm	8.34	WEL	9.4	1.0237	1.0198	0.0038	0.38%
Aug-16	Parapapaumu	9.19	WEL	9.4	1.0206	1.0198	0.0008	0.07%

Month	NIWA area	NIWA average	Contact Area	Contact average	NIWA factor	Contact Factor	Difference	% difference
Feb-16	Te Puke 30cm	23.04	BOP	21.71	0.9729	0.9772	(0.0044)	-0.45%
Feb-16	Hamilton Ruakura 20cm	22.7	WAI	20.69	0.9740	0.9806	(0.0067)	-0.68%
Feb-16	Auckland Motat 20cm	23.92	AKL	21.1	0.9700	0.9793	(0.0093)	-0.96%
Feb-16	Whangarei 20cm	25.39	AKL	21.1	0.9652	0.9793	(0.0141)	-1.46%
Feb-16	Rotorua 20cm	20.08	CEN	19.31	0.9827	0.9853	(0.0026)	-0.26%
Feb-16	Gisborne 10cm	23.16	ENI	21.37	0.9725	0.9784	(0.0059)	-0.61%
Feb-16	Wellington 20cm	20.28	WEL	19.52	0.9820	0.9846	(0.0026)	-0.26%
Feb-16	Upper Hutt 20cm	22.68	WEL	19.52	0.9740	0.9846	(0.0105)	-1.08%
Feb-16	Parapapaumu	21.7	WEL	19.52	0.9773	0.9846	(0.0073)	-0.74%

It is acknowledged that the NIWA data we compared Contact's data against is not an average over several years, but for a specific month. However, it helps demonstrate how much variance in the factor to be applied in the energy conversion that can come about depending on the source data used.

The Contact process was assessed as compliant, but the auditor made the following observations and recommendations.

OBSERVATIONS

1. This table is now 5 years old and Contact have it under review.
2. The geographical areas are very large leading to places as far apart as Wellington and New Plymouth, or Auckland and Whangarei, being allocated the same temperature.
3. There are significant challenges in getting historical data for a long period at sufficient locations, at 30 cm ground temperature or that can be used to approximate to 30cm ground temperature. Any process will require compromises in the approach to estimation.

RECOMMENDATIONS

1. That Contact's temperature data table should be replaced by a table using more recent data, preferably with greater geographical precision
2. That the industry produces a single temperature data table that could be used by all retailers. This would be both more efficient (retailers are likely to each replicate a significant amount of effort undertaking analysis to land on the best approach to establishing compliant temperature data) and produce a more consistent result across retailers.

2.3.2 Calorific Values

Gas composition data is sourced from the Open Access Transmission Information System (OATIS) using web services. Data is collected each day for the last 40 days to pick up any changes made in recent historical data. A sample check of the Calorific Value, CO2, N2, and SG as well as the table of gas types used by gas gate was checked back against the OATIS source. No issues arose.

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. Contact's meter reading data is still available in SAP even after archiving. SAP also holds the change history. Data was examined during the audit and it is confirmed that meter reads are available 30 months after their date of origin.

Sample meter read data was also verified against the data used in SAP as the meter read input for the energy calculation. 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. Contact has a threshold of 200GJ rather than 250GJ and any ICPs with consumption over that threshold are changed to allocation group 4.

Contact conducts analysis of consumption on a regular basis to ensure ICPs are in the correct allocation groups. The most recent reporting was reviewed, which showed that 83 ICPs needed to be changed to allocation group 4 and 39 ICPs needed to be changed to allocation group 6. We checked a sample of the ICPs on the registry and found that two of the ICPs had not been changed to allocation group 4, although SAP was correct. Meter reading and submission processes are compliant for these two ICPs but the registry change did not occur automatically. Contact is investigating this matter. An alleged breach has been raised in this regard in the registry audit so is not raised again here, as Contact's SAP system is correct and this drives the metering interrogation activities.

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

All consumer installations with non-TOU meters must have register readings recorded at least once every 12 months unless exceptional circumstances prevent such an interrogation.

Contact provided a list of ICPs not read in the previous 12 months. The list contained 180 ICPs, 73 were connected and 107 were disconnected.

Contact revised its meter reading process during the audit period. The automated "Meter Reading Compliance" process is used for all ICPs. The process starts after the first estimated reading. The stages of the process are detailed in the table below:

Read Frequency codes:	Initiate MRC process after:	Letter 1	letter 2	High Priority meter service order	Escalation
M – Monthly	Day 1	day 160	day 230	day 300	day 350
B – Bi Monthly	Day 1	day 130	day 200	day 270	day 330

The process meets the requirements of the rules.

The table below shows the GAS080 results for August and September 2016.

Target	Reading Percentage (GAS080) August 2016	Reading Percentage (GAS080) September 2016
Rolling 4 months (target 90%)	98.39%	98.43%
12 months (target 100%)	99.60%	99.60%

Contact achieved compliance with rule 40.2, which is the requirement to report the number and percentage of validated register readings obtained in accordance with rules 29.4.3 and 29.5.

3.4 Non TOU Validation

Contact validates meter reading information for implausible reads using BPEM (Business Process Exception Management). Exceptional scenarios are investigated, for example new customers with very high consumption or negative volumes after an actual read.

Readings are also 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:

- Short read period

- Long read period
- High dollar amount
- Zero consumption
- Negative consumption
- Consumption on inactive and vacant premises. The registry status checked in these instances and is updated as required.

Validation staff have access to Contact's CRM system containing customer contact information, they also contact customers directly and initiate control reads where there are concerns. They can also escalate issues by making referrals to the field services team.

3.5 Non TOU Error Correction

The process for error correction was examined to ensure that consumption information for prior consumption periods is included in the revision process and provided to the allocation agent.

Error correction was examined by a "walk through" of the process and by examining five examples where meters had stopped recording and five examples where the meter pressure was corrected.

If the corrected consumption is going to be invoiced to the customer, a "reverse and rebill" process is employed, which ensures the consumption information flows through to the correct revision files.

If the corrected consumption is not going to be invoiced to the customer, the correction is made at an ICP level directly to the consumption information for submission purposes. An appropriate audit trail records the date and time and the reason for the change.

Corrected consumption flows through to the appropriate revision files as long as issues are identified prior to the final allocation. Two of the stopped meter examples and one of the meter pressure examples were for a period longer than 12 months, but consumption information was only provided to the allocation agent for the 12 month allocation period.

Discussion with Contact established that when the retailer identified that a meter pressure is incorrect, they correct the pressure going forwards but they only perform a historical correction for changes in meter pressure greater than 4 kPa. However, the NZS5259 requirement is for accuracy of +/- 1.1% which means that correction should be done for differences greater then 1 kPa.

- Contact hasn't ensured that conversion of volume complies with NZS5259 (Rule 28.2)

3.6 TOU Validation

Contact's TOU data is collected every morning and reviewed in time for the new D+1 trial deadlines for 3 ICPs.

SAP uses colours to show exceptions such as missing data, zeros and unexpected highs/lows. Temperature and pressure data is reviewed as well as corrected volumes. There is an additional check against meter readings. No concerns arose from the review of the TOU validation process.

4. Energy Consumption Calculation (Rule 28.2)

The energy calculation completed by Contact's SAP system was verified manually using an Excel spreadsheet which converts volume between meter readings to volume at standard conditions and then to energy consumption. The relevant information for a sample non TOU ICP was identified from source and the conversion factors for temperature, pressure, altitude and compressibility were all calculated manually in the spreadsheet. Meter readings were then entered and the energy conversion for a billing period computed. It was not possible to compare the individual conversion factors against those used by SAP as these are not calculated or displayed independently, but the outcome energy quantity could be compared and was correct. This was then pro-rated to move from the billing quantity to the submission quantity. These manually calculated energy figures reconciled back to those produced by SAP.

It is noted that Contact do not currently adjust for Joule-Thomson, but they are planning to with the system change currently in test.

RECOMMENDATION This audit recommends that Contact go ahead with the implementation of the Joule-Thomson adjustment to improve the accuracy of their energy conversion calculation.

A sample TOU ICP was also selected and the energy conversion replicated manually. No issues arose from this replication.

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.

Three examples were examined, all examples of battery failure. Two of these were considered compliant and one not compliant.

The non-compliant example, due to the pressure of time requirements for the D+1 industry trial, had been estimated using data from the previous week. However, once the battery was replaced uncorrected data had become available from the site which showed this estimate to be overstated, but the correction was not replaced with this more accurate information. The affected month was January 2016, so Contact will replace the estimate with a correction using the actual uncorrected data from site, which will be included on the final data for January 2016.

- For one TOU estimate of consumption provided was not based on the best information available (rule 30.3)

Contact report that they have now completed the revised estimation which identified the previous estiamtion was an overstatement of 66 GJs.

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

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

A GAS040 file for a recent month was examined and compared to the data in SAP at ICP level; the totals matched which confirms compliance. This also proves that consumption information provided to the Allocation Agent is calculated at ICP level and then aggregated.

Other than the issue of not doing historic corrections for meter pressure changes of between 1 and 4 kPa, noted in section 3.5, no other issues arose from this process review.

A list of inactive ICPs with recorded consumption was provided as a part of the audit. This identified 231 records of ICPs registered as inactive but with consumption. These were further investigated by Contact and at the time of drafting this report the investigation was on-going. However, Contact was able to report the following with regard to this investigation:

> *78 of the 231 records have been investigated giving the following root causes:*
>
> > *32 (41%) exceptions related to failed registry events – 19 have already been corrected. We have reporting for this and are now improving this so these can be resolved faster.*
> >
> > *29 (37%) exceptions relate to meter reading misreads – these have been corrected.*
> >
> > *5 (6%) exceptions relate to the user error with the SAP disconnection process – these have been sent back to the relevant teams to correct.*
> >
> > *5 (6%) exceptions relate to illegal reconnections which are under investigation with our theft and fraud team – we will make the necessary adjustments once the investigation is complete.*
> >
> > *2 (3%) exceptions relate to a SAP defect which our ICT team are investigating*
> >
> > *Plus a few other miscellaneous exceptions.*
>
> *The volume impact (excluding the meter reader misreads) across 2015 and 2016 is 1,849 GJ.*

This impact is for all 231 records, except for those where the investigation to date has already established that the consumption is incorrect.

- Consumption at inactive ICPs not included in consumption data (rule 26.2.1 and 26.3)

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. The published percentage for the months analysed is 10%.

Contact did not meet this requirement for a number of gas gates during the 12-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
August 2014	73	47	64%	72	99%
September 2014	76	25	33%	69	91%
October 2014	76	34	45%	68	89%
November 2014	76	37	49%	69	91%
December 2014	76	33	43%	75	99%
January 2015	74	26	35%	72	97%
February 2015	75	35	47%	71	95%
March 2015	75	40	53%	72	96%
April 2015	75	41	55%	73	97%
May 2015	75	24	32%	65	87%
June 2015	75	26	35%	62	83%
July 2015	72	46	64%	69	96%

The following table 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
August 2014	265,624	278,040	4.5%
September 2014	227,588	215,277	-5.7%

October 2014	186,406	181,466	-2.7%
November 2014	149,868	152,119	1.5%
December 2014	120,605	120,612	0%
January 2015	98,298	93,733	-4.9%
February 2015	97,609	95,319	-2.4%
March 2015	118,567	114,231	-3.8%
April 2015	134,692	140,339	4.0%
May 2015	188,099	213,925	12.1%
June 2015	235,740	263,218	10.4%
July 2015	276,981	300,388	7.79%

The results for the worst month, June 2015, were discussed with Contact. They do meter reads once every 2 months, so need to do estimates for inbetween months. Contact acknowledges that May and June are the most difficult months to estimate and for these months in 2015 their estimation processes were caught out by unseasonal weather.

The variances in a sample of gas gates with the largest differences was reviewed with Contact. This sample check showed up that Contact had had an issue with a system bug. This had arisen from updates made in the middle of a billing period which SAP had not managed correctly. Contact described this bug as follows:

> *"April 2015 altitude updates causing failure to submit accurately for some ICPs on WAG21501 and GTA03610 gas gates. SAP failed to handle a small number of altitude updates where these were applied mid bill period. SAP applied a default consumption value as a consequence for these affected ICPs. SAP issue has now been resolved and additionally we now apply updates such as altitude updates as at the last actual read date to ensure timeslices are complete. We have completed wash ups from July 2015. Impact of issue is in the region of 1,000 GJ per month for WAG21501 and less than 100 GJ per month for GTA03610".*

This bug will account for some of the estimates remaining in the final data, in May and June 2015, discussed in section 5.5, as well as some of the differences between initial and final figures for months where this issue was corrected in wash ups, from July 2015 onwards. July 2015 is however below the 10% threshold so a breach has not been alleged for this month.

5.4 Historic Estimates (Rules 34 & 35)

To assist with determining compliance of the historic estimate processes, Contact 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 Contact's system. This test also proves that the correct shape file is used in each case.

HE 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.	Compliant
b	ICP becomes Inactive part way through a month.	Consumption is only calculated for the Active portion of the month.	Compliant
c	ICP's become Inactive then Active within a month.	Consumption is only calculated for the Active portion of the month.	Compliant
d	ICP switches in part way through a month	Consumption is calculated to include the 1st day of responsibility.	Compliant
e	ICP switches out part way through a month	Consumption is calculated to include the last day of responsibility.	Compliant
f	ICP switches out then back in within a month	Consumption is calculated for each day of responsibility.	No example found
g	Continuous ICP with a read during the month	Consumption is calculated assuming the readings are valid until the end of the day	Compliant
h	Continuous ICP without a read during the month	Consumption is calculated assuming the readings are valid until the end of the day	Compliant
i	Rollover Reads	Consumption is calculated correctly in the instance of meter rollovers.	Compliant

Contact's processes were verified as compliant for all scenarios, except for scenario F where no example could be found.

5.5 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. SAP correctly calculates and reports the proportion of HE.

5.6 Forward Estimates (Rules 34 & 36)

The rules do not prescribe how forward estimates are to be calculated. Contact's forward estimate process is based on the following theory:

I. Daily average consumption with temperature adjustment from an average at the same time the previous year, or if this isn't available then;

II. Daily average consumption from the previous read to read period with temperature adjustment, or if this isn't available then;

III. The average daily consumption for the billing class

By the time of the final allocation, forward estimates should have been replaced with historic estimates. A sample of data was reviewed to establish why forward estimates were still included in 'final' data. This identified an issue with Contact's systems whereby a default value of 1.647 had been used for group 6 ICPs despite there being meter reads available. This defect was known to Contact and they described the issue as follows:

> *"Phantom meters appearing in final submission files causing irrelevant FE values appearing in our GAS040 submission data. Where a meter install is reversed for any reason then SAP struggles to recognise that the meter is no longer at the ICP so attempts to submit volume to the actual meter at the ICP and also applies a default estimation (FE) value to our GAS040 submission. We are now applying a work around to strip this erroneous consumption from our submission files and a formal fix is scheduled to be implemented in SAP in Feb 2017."*

This bug is partly the cause for the forward estimate data remaining at the final allocation stage. The bug described at the end of section 5.3 where default consumption values were applied to gas gates WAG21501 and GTA03610 will have also caused some of this remaining estimated data.

- An alleged breach has been raised for forward estimates remaining in final data when historical estimates were possible (Rule 36.1)

5.7 Billed vs Consumption Comparison (Rule 52)

A sample reconciliation of GAS070 data in June 2016 and billing data at an ICP level in SAP was completed to prove that the file included data for all the ICPs at the sample gas gate. No issues arose from this check.

The tables below show a comparison between quantities billed and consumption information submitted to the allocation agent for a three year period. The consumption information submitted is higher than quantities billed for all three years.

Billed vs Consumption				
Year ending	**Billed GJ**	**Submission GJ**	**Difference GJ**	**% Difference**
June 2014	3,143,063	3,271,808	128,745	3.9%
June 2015	3,159,797	3,240,002	80,205	2.5%
June 2016	2,148,098	2,156,732	8,634	0.4%
Total	**8,450,958**	**8,668,542**	**217,584**	**2.5%**

The largest discrepancy was in the year ending June 2014.

The June 2014 data was reviewed on site and a problem was found with the "as billed" which contained estimated data. This was an issue arising with the transition to SAP reported in the last audit relating on examination of May 2014 data and resulting in a breach allegation. As this estimation has continued into the current audit period this alleged breach is reported again.

- As billed data in GAS070 has been estimated (rule 52.2.1)

A review of data in the Bay of Plenty area showed up an ICP that had GAS040 data without any corresponding GAR070 data. Contact have subsequently undertaken an analysis of GAS070 data to look for missing invoices to establish the number of instances and to assess the root cause of this issue. They report the following:

> *"Contact has piggy backed its GAS070 report off our network reporting functionality as the same data source is used for both reports. However, if a set up issue or other data related issue prevents an ICP from being included in network reporting (GIEP 1) then it also will not be included in the GAS070 report. 864 invoices have not been included in GAS070 reports since April 2014.*
>
> *ICP Count*
>
> *78 Invoice reversal missing from GAS070*
>
> *727 UNLG / NGCD changes for Waitoki B gas gate*

29 Set up issue – Missing POD group

30 Still investigating

864

We are applying a manual fix for the 727 invoices relating to the change in network owner for Waitoki B gas gate that occurred in the middle of a bill period – SAP did not cope with a change in distributor in the middle of a bill period as it could not decide which distributor it should be reporting for.

The 29 set up issues are already being manually corrected – should be completed by the end of the month.

The 78 invoice reversals missing - we are looking into what SAP is doing here as the original invoice reported correctly. ICT are investigating.

We still have 30 more to investigate."

As there is no revision process for GAS070 files the information is not able to be revised even though accurate information may now be available.

- Missing as billed volumes from the GAS070 data across various report periods (rule 52.2.1)

6. Conclusion

The audit found that Contact's control environment is "effective" for ten of the areas evaluated, "adequate" for three areas and "not adequate" for four areas.

Nine of the seventeen areas evaluated were found to be compliant. Nine breach allegations are made in relation to the remaining areas. They are summarised as follows:

- Incorrect meter pressures, resulting in inaccurate energy conversion.
- Contact hasn't corrected submission data for incorrect meter pressures identified between 1 and 4 kPa
- For one TOU site the estimate of consumption provided was not based on the best information available
- Some consumption at inactive ICPs was not included in submitted data
- Initial allocations were not within 10% of the final allocation figures for some gas gates in October 2014, May 2015 and June 2015
- Some forward estimates remained in final data when historical estimates were possible
- Some "as billed" data in GAS070 has been estimated and some as billed volumes have been omitted from the GAS070 altogether

In addition to recommending that Contact address the above alleged breaches the report also makes the following recommendations:

- That Contact apply Joule-Thomson to the energy conversion process, as planned
- That Contact's temperature data table should be replaced by a table using more recent data, preferably with greater geographical precision
- That the industry produces a single temperature data table that could be used by all retailers. This would be both more efficient (retailers are likely to each replicate a significant amount of effort undertaking analysis to land on the best approach to establishing compliant temperature data) and produce a more consistent result across retailers.

Appendix 1 – Control Rating Definitions

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

Appendix 2 – Contact Energy comments on draft report

Summary of report findings – issue - Forward Estimates

Contact does not agree with the control rating assessment of not adequate relating to our forward estimation process. The two system issues that are described in section 5.6 were identified by Contact prior to the audit and mitigations have been implemented until a more formal system fix is implemented. As the auditor looked at previous report periods they also identified these issues. However no recent reporting period was assessed to determine how effective our mitigations are in ensuring forward estimates are being correctly applied. System defects can occur at any time when integrated billing and settlement systems such as ours undergoes significant changes – unfortunately the audit does not recognise the ability and capacity of the system users to identify these issues as they arise and the implementation of workarounds until formal fixes can be implemented. Additionally the Audit did not identify any fundamental issue with Contacts Forward Estimate methodology. Contact believes the correct control rating for this area is adequate.

Section 2.2 Metering set up information

Contact's review of the exceptions to support your findings includes a number of instances where the meter pressure recorded on the registry is zero. Contact believes the registry value is incorrect and in these instances our meter pressure is correct. Can you please update for number of exceptions you have identified as Contact being in breach for. Additionally can you please include an appropriate comment highlighting that some of the meter pressure exceptions identified in this performance are attributable to incorrect meter owner information.

Section 4 Energy consumption calculation

Contact has begun its implementation of applying Joule Thomson Effect factor to its non TOU ICPs. Just under 50% of ICPS now have this additional factor being applied. Contact is transitioning ICPs across once actual reads have been received to ensure the read to read periods have consistent conversion factors applied.

Section 5.1 TOU estimation and correction

Contact has implemented an extra step in our process to ensure initial estimations are reviewed and replaced with more accurate assessments once additional information is available