ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

TAURANGA CITY COUNCIL AND TRUSTPOWER LIMITED

Prepared by: Steve Woods

Date audit commenced: 19 November 2018

Date audit report completed: 27 November 2018

Audit report due date: 1 December 2018

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EXECUTIVE SUMMARY

This audit of the Tauranga City Council (TCC) DUML database and processes was conducted at the request of Trustpower Limited (Trustpower) in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

TCC has made significant improvements to the database contents since the last audit. The field audit confirmed the database was accurate to within 0.1%. Only a very small number of discrepancies were identified, which have a minor impact on settlement accuracy.

The improvements to the new connection process appear to have been successful because no errors were identified with new areas.

The future risk rating of five indicates that the next audit be completed in 24 months. This timeframe seems reasonable give the improvements made during the audit period.

The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Deriving submission information	2.1	11(1) of Schedule 15.3	Under submission of approx. 81.3 kWh per annum has occurred due to three incorrect ballast wattages.	Strong	Low	1	
Capacity of load	2.4	11(2)(b) of Schedule 15.3	Discrepancies in the database as follows: • two 250-watt SON records had the incorrect ballast wattage, one had 20 and one had 18 when they should be 28 • one 60-watt cosmopolis had 5 instead of 6 for ballast wattage.	Strong	Low	1	
All load recorded in database	2.5	11(2A) of Schedule 15.3	The field audit identified three lamps which were not recorded in the database.	Strong	Low	1	
Database accuracy	3.1	15.2 and 15.37B(b)	Under submission of approx. 81.3 kWh per annum has occurred	Strong	Low	1	

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			due to three incorrect ballast wattages.				
Volume information accuracy	3.2	15.2 and 15.37B(c)	Under submission of approx. 81.3 kWh per annum has occurred due to three incorrect ballast wattages.	Strong	Low	1	
					Future Risk Rating	5	

Future risk rating	1-3	4-6	7-8	9-17	18-26	27+
Indicative audit frequency	36 months	24 months	18 months	12 months	6 months	3 months

RECOMMENDATIONS

Subject	Section	Description	Recommendation
		Nil	

ISSUES

Subject	Section	Description	Issue
		Nil	

1. ADMINISTRATIVE

1.1. Exemptions from Obligations to Comply with Code

Code reference

Section 11 of Electricity Industry Act 2010.

Code related audit information

Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.

Audit observation

The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

There are no exemptions in place relevant to the scope of this audit.

1.2. Structure of Organisation

Trustpower provided a copy of their organisational structure.

1.3. Persons involved in this audit

Auditor:

Steve Woods

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Robbie Diederen	Reconciliation Analyst	Trustpower
Alan Miller	Commercial Account Manager	Trustpower
Michael Jones	Traffic Systems Engineer	TCC

1.4. Hardware and Software

The RAMM database used for the management of DUML is managed by TCC.

The database back up is in accordance with standard industry procedures. Access to the database is secure by way of password protection.

1.5. Breaches or Breach Allegations

There are no breach allegations relevant to the scope of this audit.

1.6. ICP Data

ICP Number	Description	NSP	Number of items of load	Database wattage (watts)
0000001002UHFFF	Tuihana	GRE0111	127	11,936
0001264711UNDB5	Tauranga District Council Streetlights (TGA11)	TGA0111	2,929	342,667
1000559933PC0F9	Tauranga District Council Streetlights (KMO)	KMO0331	1,554	160,105
1000559934PCD33	Tauranga District Council Streetlights (TGA33)	TGA0331	3,858	484,290
1000559935PC176	Tauranga District Council Streetlights (MTM)	MTM0331	5,022	562,156
Total			**13,490**	**1,561,153**

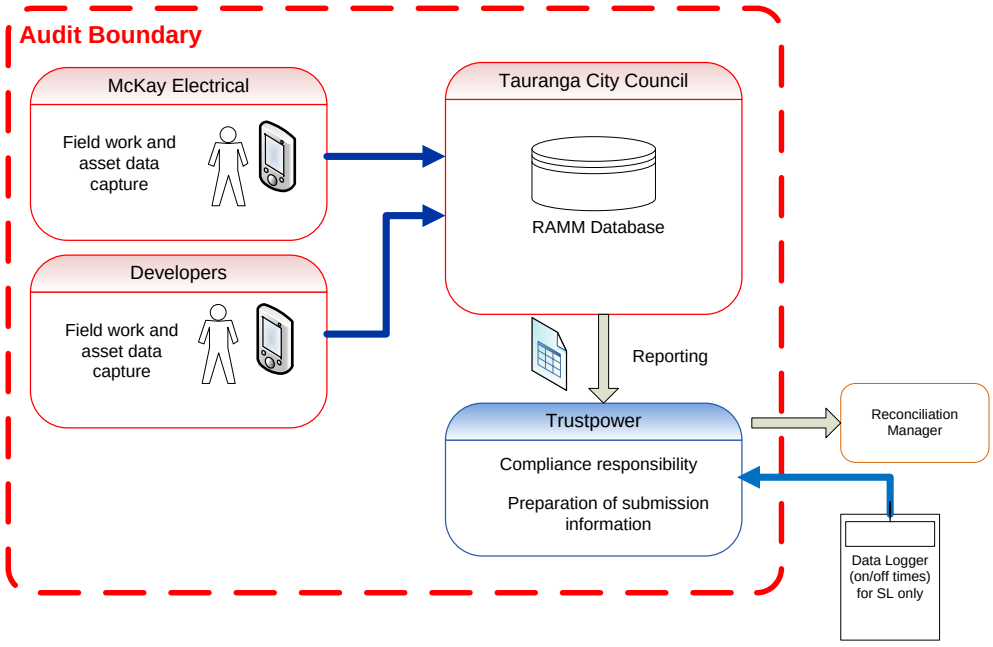
1.7. Authorisation Received

All information was provided directly by Trustpower and TCC.

1.8. Scope of Audit

The database used for submission is managed by TCC. The field work and asset data capture is conducted by McKay Electrical and they update the TCC RAMM database using "Pocket RAMM". Reporting is provided to Trustpower on a monthly basis.

The diagram below shows the current flow of information and the audit boundary for clarity.



The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

1.9. Summary of previous audit

The previous audit was completed in May 2018 by Steve Woods of Veritek. Nine non-compliances were identified, and one recommendation was made. The table below shoes the status of the issues raised.

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	The database contains some incorrect and missing information. The field data was 105.1% of the database data for the sample checked, indicating the database is not up to date.	Cleared
ICP identifier	2.2	11(2)(a) and (aa) of Schedule 15.3	27 items of load do not have an ICP identifier.	Cleared
Location of each item of load	2.3	11(2)(b) of Schedule 15.3	334 items of load do not have a street address or GPS coordinates recorded.	Cleared
Capacity of load	2.4	11(2)(b) of Schedule 15.3	Discrepancies in the database as follows: • blank or zero wattage – 16 • blank lamp description – 5 • blank gear wattage – all records • Unknown lamp make and model – 14.	Cleared
All load recorded in database	2.5	11(2A) of Schedule 15.3	The field audit identified 73 lamps which were not recorded in the database. A further 174 lamps on new streets were not recorded in the database.	Cleared
Tracking of load changes	2.6	11(3) of schedule 15.3	The tracking of load changes is not occurring in a timely manner for new connections.	Cleared
Database accuracy	3.1	15.2 and 15.37B(b)	The database contains some incorrect and missing information. The field data was 105.1% of the database data for the sample checked, indicating the database is not up to date.	Cleared
Deriving submission information	3.2	15.2 and 15.37B(c)	The database contains some incorrect and missing information. The field data was 105.1% of the database data for the sample checked, indicating a potential estimated under submission of 215,600 kWh per annum.	Cleared

Subject	Section	Clause	Recommendation	Status
Description of load type	2.4	11(2)(c) of schedule 15.3	Populate gear wattage in the TAURANGA CITY COUNCIL databases.	Cleared

1.10. Distributed unmetered load audits (Clause 16A.26 and 17.295F)

Code reference

Clause 16A.26 and 17.295F

Code related audit information

Retailers must ensure that DUML database audits are completed:

1. *by 1 June 2018 (for DUML that existed prior to 1 June 2017)*
2. *within three months of submission to the reconciliation manager (for new DUML)*
3. *within the timeframe specified by the Authority for DUML that has been audited since 1 June 2017.*

Audit observation

Trustpower have requested Veritek to undertake this DUML audit.

Audit commentary

This audit report confirms that the requirement to conduct an audit has been met for this database within the required timeframe. Compliance is confirmed.

2. DUML DATABASE REQUIREMENTS

2.1. Deriving submission information (Clause 11(1) of Schedule 15.3)

Code reference

Clause 11(1) of Schedule 15.3

Code related audit information

The retailer must ensure the:

- *DUML database is up to date*
- *methodology for deriving submission information complies with Schedule 15.5.*

Audit observation

The process for calculation of consumption was examined.

Audit commentary

Trustpower reconciles this DUML load using the STL profile. The on and off times are derived from a logger which records the streetlight on/off signals sent by the Distributor.

I recalculated the submissions for September and October 2018 using the on/off times and database information. I confirmed that the calculation method was correct and reflected the totals from the database.

Section 3.1 records that the database is accurate to within 0.1%, therefore compliance is achieved for the database with regard to deriving submission information.

The RAMM database was found to contain a small number of discrepancies which did not form part of the field audit but will have an impact on submission accuracy. The issues are as follows:

- two 250-watt SON records had the incorrect ballast wattage, one had 20 and one had 18 when they should be 28
- one 60-watt cosmopolis had 5 instead of 6 for ballast wattage.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Jun-18 To: 25-Nov-18	Under submission of approx. 81.3 kWh per annum has occurred due to three incorrect ballast wattages. Potential impact: High Actual impact: Low Audit history: Multiple times Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are rated as strong because they have recently been improved and have led to a much more accurate database. The impact is rated as low because of the small variance.

Actions taken to resolve the issue	Completion date	Remedial action status
Trustpower will work with TCC to update correct ballast for end of month submission.	30 November	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Check that correct ballast wattages are used by TCC	December 2018	

Audit outcome

Compliant

2.2. ICP identifier and items of load (Clause 11(2)(a) and (aa) of Schedule 15.3)

Code reference

Clause 11(2)(a) and (aa) of Schedule 15.3

Code related audit information

The DUML database must contain:

- *each ICP identifier for which the retailer is responsible for the DUML*
- *the items of load associated with the ICP identifier.*

Audit observation

The RAMM database was checked to confirm an ICP is recorded for each item of load.

Audit commentary

An ICP is recorded for each item of load. The previous audit recorded that 27 records in the database had blank ICPs; this matter is now resolved.

Audit outcome

Compliant

2.3. Location of each item of load (Clause 11(2)(b) of Schedule 15.3)

Code reference

Clause 11(2)(b) of Schedule 15.3

Code related audit information

The DUML database must contain the location of each DUML item.

Audit observation

The RAMM database was checked to confirm the location is recorded for all items of load.

Audit commentary

The database contains fields for GPS coordinates and the nearest street address. This data is complete and accurate; there are no blanks and the field audit confirmed the accuracy of location information.

During the previous audit, there were 338 records without GPS coordinates and without a street number; this matter is now resolved.

Audit outcome

Compliant

2.4. Description and capacity of load (Clause 11(2)(c) and (d) of Schedule 15.3)

Code reference

Clause 11(2)(c) and (d) of Schedule 15.3

Code related audit information

The DUML database must contain:

- *a description of load type for each item of load and any assumptions regarding the capacity*
- *the capacity of each item in watts.*

Audit observation

The RAMM database was checked to confirm that it contained a field for lamp type and wattage capacity and included any ballast or gear wattage.

Audit commentary

The database contains fields for lamp description, wattage and gear wattage. The entire database was checked and there were only a very small number of discrepancies, as follows:

- two 250-watt SON records had the incorrect ballast wattage, one had 20 and one had 18 when they should be 28
- one 60-watt cosmopolis had 5 instead of 6 for ballast wattage.

This level of accuracy is considered high.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.4 With: Clause 11(2)(b) of Schedule 15.3 From: 01-Jun-18 To: 25-Nov-18	Discrepancies in the database as follows: • two 250-watt SON records had the incorrect ballast wattage, one had 20 and one had 18 when they should be 28 • one 60-watt cosmopolis had 5 instead of 6 for ballast wattage. Potential impact: Medium Actual impact: Low Audit history: Once Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**

Low	Controls are rated as strong because all database data was reviewed and improved, leaving only three minor errors. The impact is rated as low because of the low numbers.

Actions taken to resolve the issue	**Completion date**	**Remedial action status**
Trustpower will work with TCC to update correct ballast for end of month submission.	December 2018	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Check that correct ballast wattages are used by TCC	December 2018	

2.5. All load recorded in database (Clause 11(2A) of Schedule 15.3)

Code reference

Clause 11(2A) of Schedule 15.3

Code related audit information

The retailer must ensure that each item of DUML for which it is responsible is recorded in this database.

Audit observation

A field audit of a statistical sample of 375 items of load recorded in the RAMM database was undertaken. The total population was divided into four strata, based on the five NSPs, with two of the smaller NSPs being combined into one.

Audit commentary

The field audit findings are detailed in the table below.

Wattages for lamps found in the street but not the database were based on lamp label information where available and estimated based on physical characteristics and other surrounding lamps where unlabelled.

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
GRE0111 and TGA0111					
BRAITHWAITE LANE	3	3			
CHADWICK ROAD/GREERTON ROAD RAB	2	2			
CONNISTON WAY	7	7			
COVENTRY STREET	3	3			
CRATER CLOSE	2	2			
LAURENCE STREET	3	3			
MERLOT DRIVE	9	9			
MIRANDA STREET	1	1			
MUNRO STREET	4	4			

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
NEWARK CLOSE	3	3			
POOLES ROAD	12	12		1	70SON recorded as 80MV
ROXANNE PLACE	6	6		2	2x100SON recorded as LED
TANGMERE PLACE	2	2			
WAIOROI PLACE	2	2		1	29LED recorded as 27LED
WINDERMERE DRIVE	31	31		2	70SON recorded as 150SON 30.5LED recorded as 23.5
KMO0331					
BAYVISTA CLOSE	3	3			
CRAM COURT	2	2			
ESMERALDA STREET	12	12		1	70SON recorded as 150SON
ILA PLACE	4	4			
MERVYN PLACE	5	6	+1		1 light not in database
OHAUITI ROAD HLA (#242 - #254)	3	3			
PUTAKA PLACE	4	4			
SAPPHIRE DRIVE	17	18	+1		1 light not in database
MTM0331					
ALICE WAY (GORDON SPRATT RESERVE ACCESS)	4	4			
CASSINIA CLOSE	8	8			
GLOUCESTER ROAD	40	40			
GOLDEN COURIE CLOSE	2	2			
GRENADA STREET/SANDHURST DRIVE RAB	6	6			
MADELEINE TERRACE	2	2			
MOOREA PLACE	2	2			
OCEANVIEW ROAD	20	20			
OKA STREET	4	4			
ORETI CRESCENT	7	7			
PALM SPRINGS BOULEVARD/SELLIERA PLACE RAB	2	2			
PIHA CLOSE	2	2			
PITAU ROAD	12	12			
POMPANO KEY HAMMERHEAD	6	6			
RAINEY CRESCENT	10	10			
REEFTON PLACE	3	3			
SANTA MARIA KEY	2	2			
TORBIN PLACE	3	3			
WEYMOUTH PLACE	2	2			
YORK AVENUE	6	6			

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
TGA0331					
ANDREW PLACE	4	4			
BEAUMARIS BOULEVARD/HARLECH GLEN RAB	3	3			
BETHLEHEM ROAD	34	32	-2		2 lights in database not in field
CAMERON ROAD/NINTH AVENUE RAB	2	2			
CHERRYWOOD DRIVE	13	14	+1		1 additional PedX light
KENMURE PLACE	2	2			
Otumoetai service lane	1	1			
PAINE STREET	7	7			
PAMELA PLACE	3	3			
SALTWOOD LANE	3	3			
SIXTEENTH AVENUE WEST	8	8			
TE PAEROA ROAD	10	10			
WEKA STREET	3	3			
WEMBURY GROVE	2	2			
Total	**375**	**376**	**5**	**7**	

I found one more lamp in the field than recorded in the database (net difference). There were three additional lamps found and two lights were recorded in the database but not found in the field.

Non-compliance is recorded for the three lamps not recorded in the database.

The 26 lamp wattage differences are recorded as non-compliance in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 01-Jun-18 To: 25-Nov-18	The field audit identified three lamps which were not recorded in the database. Potential impact: High Actual impact: Low Audit history: Twice Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as strong because they have been recently improved, leading to a much higher level of compliance. The impact is rated as low because of the low numbers of discrepancies.

Actions taken to resolve the issue	Completion date	Remedial action status
Trustpower to work with TCC to update database.	December 2018	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Trustpower to work with TCC to update database.	December 2018	

2.6. Tracking of load changes (Clause 11(3) of Schedule 15.3)

Code reference

Clause 11(3) of Schedule 15.3

Code related audit information

The DUML database must track additions and removals in a manner that allows the total load (in kW) to be retrospectively derived for any given day.

Audit observation

The process for tracking of changes in the TCC database was examined.

Audit commentary

Any changes that are made during any given month take effect from the beginning of that month. The information is available which would allow for the total load in kW to be retrospectively derived for any day. On 20 September 2012, the Authority sent a memo to retailers and auditors advising that tracking of load changes at a daily level was not required if the database contained an audit trail. : I have interpreted this to mean that the production of a monthly "snapshot" report is sufficient to achieve compliance.

McKay Electrical has the maintenance contract for streetlights and data is entered directly into the RAMM database via pocket RAMM. McKay Electrical submits Service Orders immediately after the work has been completed and this is in turn checked by Tauranga City Council to validate the claims. This provides incentive to McKay Electrical to ensure all changes are recorded. TCC recently improved the new connections process. New streetlights are now checked and recorded at the time the subdivision is inspected prior to "vesting". This ensures updates are made in a timelier manner. During the last audit there were many streets not recorded in the database. These have now all been updated. I did not identity any new lights not recorded in the database.

Audit outcome

Compliant

2.7. Audit trail (Clause 11(4) of Schedule 15.3)

Code reference

Clause 11(4) of Schedule 15.3

Code related audit information

The DUML database must incorporate an audit trail of all additions and changes that identify:

- *the before and after values for changes*
- *the date and time of the change or addition*
- *the person who made the addition or change to the database.*

Audit observation

The database was checked for audit trails.

Audit commentary

The RAMM database contains a complete audit trail of all additions and changes.

Audit outcome

Compliant

3. ACCURACY OF DUML DATABASE

3.1. Database accuracy (Clause 15.2 and 15.37B(b))

Code reference

Clause 15.2 and 15.37B(b)

Code related audit information

Audit must verify that the information recorded in the retailer's DUML database is complete and accurate.

Audit observation

The DUML Statistical Sampling Guideline was used to determine the database accuracy. The table below shows the survey plan.

Plan Item	Comments
Area of interest	Tauranga City Council region
Strata	The database contains items of load in the Tauranga City area. The processes for the management of all TCC items of load are the same, but I decided to place the items of load into four strata, as follows: 1. GRE0111 and TGA0111 2. KMO0331 3. MTM0331 4. TGA0331
Area units	I created a pivot table of the roads in each area and I used a random number generator in a spreadsheet to select a total of 56 sub-units.
Total items of load	375 items of load were checked.

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority.

Audit commentary

A statistical sample of 375 items of load found that the field data was 100.1% of the database data for the sample checked. This is within the required database accuracy of ± 2.5%. The statistical sampling tool reported with 95% confidence the precision of the sample was 4.2% and the true load in the field will be between 97.8% to 102.0% of the load recorded in the database. The sample is sufficiently precise to be able to determine the database accuracy and indicates that the database accuracy is likely to cause under submission.

The tool indicated that there is potentially 4,300 kWh per annum (based on annual burn hours of 4,271 as detailed in the DUML database auditing tool) of under submission. The statistical sampling tool reported with 95% confidence that there is a potential estimated submission variance range of between 145,300 kWh over submission and 131,800 kWh under submission. This is recorded as non-compliance.

The RAMM database was found to contain a small number of discrepancies which will have an impact on database accuracy. The issues are as follows:

- two 250-watt SON records had the incorrect ballast wattage, one had 20 and one had 18 when they should be 28
- one 60-watt cosmopolis had 5 instead of 6 for ballast wattage.

Wattages for all items of load were checked against the published standardised wattage table produced by the Electricity Authority and found to be correct.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Jun-18 To: 25-Nov-18	Under submission of approx. 81.3 kWh per annum has occurred due to three incorrect ballast wattages. Potential impact: High Actual impact: Low Audit history: Multiple times Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are rated as strong because they have recently been improved and have led to a much more accurate database. The impact is rated as low because of the small variance.

Actions taken to resolve the issue	Completion date	Remedial action status
Trustpower will work with TCC to maintain database.	Ongoing	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Trustpower will work with TCC to maintain database.	Ongoing	

3.2. Volume information accuracy (Clause 15.2 and 15.37B(c))

Code reference

Clause 15.2 and 15.37B(c)

Code related audit information

The audit must verify that:

- *volume information for the DUML is being calculated accurately*
- *profiles for DUML have been correctly applied.*

Audit observation

The submission was checked for accuracy for the month the database extract was supplied. This included:

- checking the registry to confirm that all ICPs have the correct profile and submission flag
- checking the database extract combined with the burn hours against the submitted figure to confirm accuracy.

Audit commentary

Trustpower reconciles this DUML load using the STL profile. The on and off times are derived from a logger which records the streetlight on/off signals sent by the Distributor.

I recalculated the submissions for September and October 2018 using the on/off times and database information. I confirmed that the calculation method was correct and reflected the totals from the database.

Section 3.1 records that the database is accurate to within 0.1%, therefore compliance is achieved for the database with regard to deriving submission information.

The RAMM database was found to contain a small number of discrepancies which did not form part of the field audit but will have an impact on submission accuracy. The issues are as follows:

- two 250-watt SON records had the incorrect ballast wattage, one had 20 and one had 18 when they should be 28
- one 60-watt cosmopolis had 5 instead of 6 for ballast wattage.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 15.2 and 15.37B(c) From: 01-Jun-18 To: 25-Nov-18	Under submission of approx. 81.3 kWh per annum has occurred due to three incorrect ballast wattages. Potential impact: High Actual impact: Low Audit history: Multiple times Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are rated as strong because they have recently been improved and have led to a much more accurate database. The impact is rated as low because of the small variance.

Actions taken to resolve the issue	Completion date	Remedial action status
Trustpower will work with TCC to maintain database.	Ongoing	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Trustpower will work with TCC to maintain database.	Ongoing	

CONCLUSION

TCC has made significant improvements to the database contents since the last audit. The field audit confirmed the database was accurate to within 0.1%. Only a very small number of discrepancies were identified, which have a minor impact on settlement accuracy.

The improvements to the new connection process appear to have been successful because no errors were identified with new areas.

The future risk rating of five indicates that the next audit be completed in 24 months. This timeframe seems reasonable give the improvements made during the audit period.

PARTICIPANT RESPONSE

Trustpower will continue to work with TCC and monitor the database when monthly updates come in for reconciliation.