ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

TAURANGA NZTA AND TRUSTPOWER LIMITED

Prepared by: Steve Woods

Date audit commenced: 19 November 2019

Date audit report completed: 29 November 2019

Audit report due date: 1 December 2019

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EXECUTIVE SUMMARY

This audit of the Tauranga NZTA 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.

Tauranga City Council manages a RAMM database, including the Tauranga NZTA data.

The field work and asset data capture is conducted by McKay Electrical and they provide updates to Tauranga City Council.

There were some database discrepancies found, mainly where major roadworks are being undertaken and the database has not been updated in a timely fashion.

The future risk rating of 14 indicates that the next audit be completed in 12 months. This seems a reasonable timeframe given the report findings.

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	In absolute terms, total annual consumption is estimated to be 35,500 kWh lower than the DUML database indicates.	Moderate	Medium	4	Investigating
ICP identifier	2.2	11(2)(a) and (aa)	20 metered items of load are recorded against the unmetered ICPs.	Moderate	Low	2	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	In absolute terms, total annual consumption is estimated to be 35,500 kWh lower than the DUML database indicates. 20 items of load have the incorrect ICP	Moderate	Medium	4	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Volume information accuracy	3.2	15.2 and 15.37B(c)	In absolute terms, total annual consumption is estimated to be 35,500 kWh lower than the DUML database indicates.	Moderate	Medium	4	Investigating
Future Risk Rating						14	

Future risk rating	0	1-4	5-8	9-15	16-18	19+
Indicative audit frequency	36 months	24 months	18 months	12 months	6 months	3 months

RECOMMENDATIONS

Subject	Section	Clause	Recommendation

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	Tauranga City Council

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)
1000524102PCBD0	Tauranga City State H/Way TGA 0331	TGA0331	263	66,385
1000524101PC710	SH 2 & SH 29 SH 36 Outgoing TGA0111	TGA0111	128	34,546
1000524103PC795	Tauranga Eastern SH's KMO0331	KMO0331	113	29,827
0001264706UNAD2	Mt Maunganui/Papamoa area MTM0331	MTM0331	212	47,041
Total			**716**	**177,799**

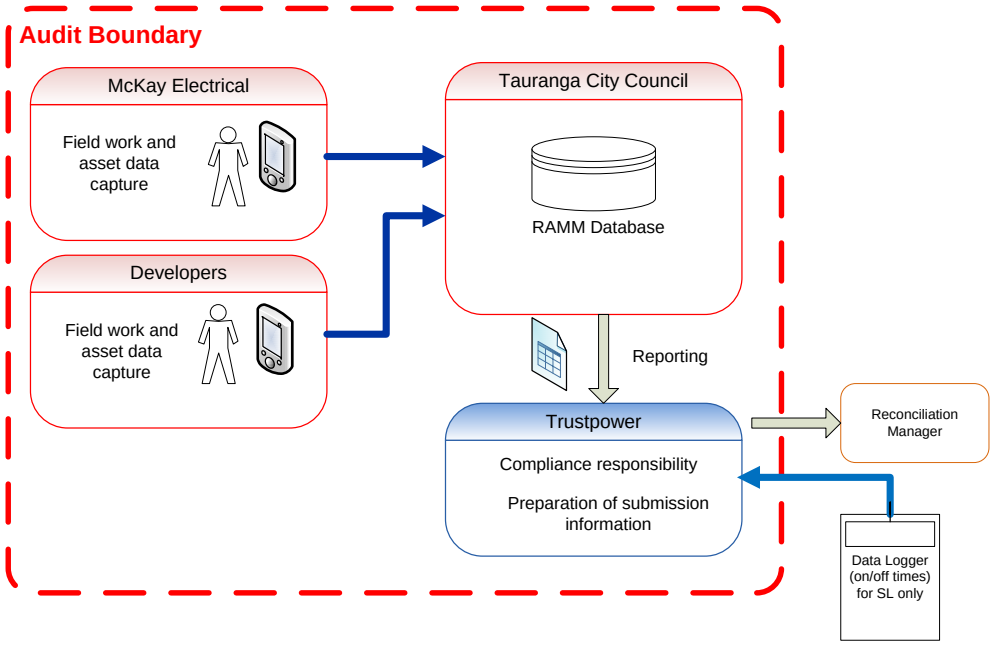
1.7. Authorisation Received

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".

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 November 2018 by Steve Woods of Veritek. Four non-compliances were identified. The statuses of the non-compliances are described below.

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	Submission totals different to database totals indicating over submission of 116,385 kWh per annum.	Still existing
ICP identifier	2.2	11(2)(a) and (aa)	ICP identifiers incorrect in the database.	Still existing
All load recorded in database	2.5	11(2A) of Schedule 15.3	The field audit identified two lamps which were not recorded in the database.	Cleared
Volume information accuracy	3.2	15.2 and 15.37B(c)	Submission totals different to database totals indicating over submission of 116,385 kWh per annum.	Still existing

Subject	Section	Clause	Recommendation	Status
			Nil	

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 data logger information. Trustpower uses the wattage figures recorded in RAMM.

I recalculated the submissions for July 2019 using the data logger and database information. I confirmed that the calculation method and result was correct. Trustpower had previously been using their own database, which was found to be inaccurate.

In absolute terms, total annual consumption is estimated to be 35,500 kWh lower than the DUML database indicates.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: 11(1) of Schedule 15.3 From: 01-Dec-18 To: 25-Nov-19	In absolute terms, total annual consumption is estimated to be 35,500 kWh lower than the DUML database indicates. Potential impact: Medium Actual impact: Medium Audit history: Three times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. The impact on settlement is moderate; therefore the audit risk rating is medium.

Actions taken to resolve the issue	Completion date	Remedial action status
Trustpower & NZTA will schedule a meeting to discuss the process for new connections and removals. Major construction is the main cause of this non-compliance.	Meeting before Christmas.	Investigating

Preventative actions taken to ensure no further issues will occur	Completion date	
Trustpower will work with NZTA to formulate a process plan to ensure timely entries into the RAMM database by all contractors.	End of March	

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

The database contains the NZTA ICPs. 20 metered items of load are recorded against the unmetered ICPs.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.2 With: 11(2)(a) and (aa) From: 01-Dec-18 To: 25-Nov-19	20 metered items of load are recorded against the unmetered ICPs. Potential impact: Medium Actual impact: Low Audit history: Three times Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	There is now a process to ensure ICPs are populated, however 20 items of load have the incorrect ICP. The impact is rated as low because there is a minor impact of not being able to confirm if the database contains the correct information.

Actions taken to resolve the issue	Completion date	Remedial action status
The lights in question will be allocated to the correct ICP and will be marked within the database as “Metered’ by Tga City Council.	15 December	Identified

Preventative actions taken to ensure no further issues will occur	Completion date	
The Contractors will be advised of their error and instructed on correct procedure by Tga CC.	15 December	

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 coordinates for the location of items of load, along with road names. No blanks or errors were identified.

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 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 a field for lamp wattage and these were confirmed as correct in relation to the description. All records now include gear wattage and the gear wattages are correct.

Audit outcome

Compliant

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 131 items of load was undertaken.

Audit commentary

The field audit findings are detailed in the table below.

Wattages for lamps found in the field 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
29A-0008/00.28 (2529	18	18	-	1	1 x 250W HPS recorded as 150W HPS
002-0157 (MAUNGANUI RD: FLYOVER TO BAYPARK)	11	9	-2	-	2 x 250W HPS not found
002-0157-D (HEWLETTS RD WESTBOUND) (761	15	15	-	2	2 x 400W HPS recorded as LED
002-0159-R4 (MANUGANUI TO AERODROME) (2724)	9	9	-	1	1 x 212W LED recorded as 150W HPS
002-0163-W (2632)	2	0	-2	-	2 x 250W HPS not found
002-0164-R1 (7057)	3	1	-2	-	2 x 250W HPS not found
29A-0000/00.16-D (2709)	4	3	-1	-	1 x 150W HPS not found
29A-0000/00.19-I (2708)	3	2	-1	-	1 x 250W HPS not found
29A-0000-D (2629)	3	2	-2	-	1 x 250W HPS not found
29A-0000-I (MAUNGANUI TO BAYPARK) (2630)	3	2	-1	-	1 x 250W HPS not found
29A-0001-W (2631)	6	4	-4	-	3 x 250W HPS not found 1 x 400W HPS not found

This clause relates to items of load in the field not recorded in the database. No additional items of load were found. The other findings are recorded as non-compliance in **Section 3.1**.

Audit outcome

Compliant

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 ability of the database to track changes was assessed and the process for tracking of changes in the database was examined.

Audit commentary

The database functionality achieves compliance with the code.

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 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 NZTA
Strata	The database contains items of NZTA load in the Tauranga region. The processes for the management of all items of load are the same, but I decided to place the items of load into four strata, based on ICPs, as follows: 0001264706UNAD2 1000524101PC710 1000524102PCBD0 1000524103PC795
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 26 sub-units.
Total items of load	131 items of load were checked.

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

Audit commentary

A field audit was conducted of a statistical sample of 131 items of load. The "database auditing tool" was used to analyse the results, which are shown in the table below.

Result	Percentage	Comments
The point estimate of R	95	Wattage from survey is lower than the database wattage by 5.0%
R_L	89.2	With a 95% level of confidence it can be concluded that the error could be between -10.8% and +1.4%
R_H	101.4	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 01/02/19 and the table below shows that Scenario C (detailed below) applies.

The conclusion from Scenario C is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between 10.8% lower and 1.4% higher than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

In absolute terms the installed capacity is estimated to be 8.0 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 18 kW lower than the database and 2.0 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 35,500 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 76,900 kWh p.a. lower to 10,200 kWh p.a. higher than the database indicates.

Scenario	Description
A - **Good accuracy, good precision**	This scenario applies if: (a) R_H is less than 1.05; and (b) R_L is greater than 0.95 The conclusion from this scenario is that: (a) the best available estimate indicates that the database is accurate within +/- 5 %; and (b) this is the best outcome.
B - **Poor accuracy, demonstrated with statistical significance**	This scenario applies if: (a) the point estimate of R is less than 0.95 or greater than 1.05 (b) as a result, either R_L is less than 0.95 or R_H is greater than 1.05. There is evidence to support this finding. In statistical terms, the inaccuracy is statistically significant at the 95% level
C - **Poor precision**	This scenario applies if: (a) the point estimate of R is between 0.95 and 1.05 (b) R_L is less than 0.95 and/or R_H is greater than 1.05 The conclusion from this scenario is that the best available estimate is not precise enough to conclude that the database is accurate within +/- 5 %

Lamp description and capacity accuracy

There were no lamp description and capacity discrepancies found.

ICP accuracy

20 metered items of load are recorded against the unmetered ICPs.

Location accuracy

The database contains fields for the street address and also GPS coordinates.

Change management process findings

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. It doesn't appear that changes due to major roadworks are being populated in a timely fashion.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Dec-18 To: 25-Nov-19	In absolute terms, total annual consumption is estimated to be 35,500 kWh lower than the DUML database indicates. 20 items of load have the incorrect ICP. Potential impact: Medium Actual impact: Medium Audit history: None Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. The impact on settlement is moderate; therefore the audit risk rating is medium.

Actions taken to resolve the issue	Completion date	Remedial action status
The lights in question will be allocated to the correct ICP and will be marked within the database as "Metered' by Tga City Council.	15 December	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
The Contractors will be advised of their error and instructed on correct procedure by Tga CC.	15 December	

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 data logger information. Trustpower uses the wattage figures recorded in RAMM.

I recalculated the submissions for July 2019 using the data logger and database information. I confirmed that the calculation method and result was correct. Trustpower had previously been using their own database, which was found to be inaccurate.

In absolute terms, total annual consumption is estimated to be 35,500 kWh lower than the DUML database indicates.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: 11(1) of Schedule 15.3 From: 01-Dec-18 To: 25-Nov-19	In absolute terms, total annual consumption is estimated to be 35,500 kWh lower than the DUML database indicates. Potential impact: Medium Actual impact: Medium Audit history: Three times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. The impact on settlement is moderate; therefore the audit risk rating is medium.
Actions taken to resolve the issue	**Completion date** / **Remedial action status**

Trustpower & NZTA will schedule a meeting to discuss the process for new connections and removals. Major construction is the main cause of this non-compliance.	Meeting before Christmas	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Trustpower will work with NZTA to formulate a process plan to ensure timely entries into the RAMM database by all contractors.	31 March	

CONCLUSION

Tauranga City Council manages a RAMM database, including the Tauranga NZTA data.

The field work and asset data capture is conducted by McKay Electrical and they provide updates to Tauranga City Council.

There were some database discrepancies found, mainly where major roadworks are being undertaken and the database has not been updated in a timely fashion.

The future risk rating of 14 indicates that the next audit be completed in 12 months. This seems a reasonable timeframe given the report findings.

PARTICIPANT RESPONSE

We have addressed the issue of allocation of Metered lights in the DUML database. We are actively working with NZTA Tauranga in ensuring that the RAMM Database is updated when major reconstruction projects are undertaken. This is one of the few NZTA regions in which we have been able to get good engagement with NZTA and believe that a 12-month Audit is an appropriate response to the issues raised in this Audit.