ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

OTOROHANGA DISTRICT COUNCIL
AND TRUSTPOWER

Prepared by: Rebecca Elliot

Date audit commenced: 20 February 2018

Date audit report completed: 18 May 2018

Audit report due date: 1 June 2018

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EXECUTIVE SUMMARY

This audit of the Otorohanga District Council (ODC) DUML database and processes was conducted at the request of Trustpower (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, which became effective on 1 June 2017.

ODC use a RAMM database to manage this DUML load. New connection, fault and maintenance work is completed by The Lines Company contract division (TLC). Monthly reports are received by Trustpower.

The field audit found inaccuracies in the database indicating an estimated over submission of 16,000 kWh per annum. ODC is currently undertaking an LED roll out and most of the differences found in the field related to LED light changes that would not have been reflected in the database extract used (provided part way through the month) and therefore the database variance will be overstated. Overall the processes in place to manage this DUML database were robust

The future risk rating of seven indicates that the next audit be completed in 18 months and I agree with this recommendation. Four non-compliances were identified, and no recommendations were raised. 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	The database used to prepare submissions contains some inaccurate information. The database accuracy is assessed to be 95.5% indicating an estimated over submission of 13,000 kWh per annum. Incorrect ballasts recorded in RAMM.	Moderate	Low	2	Identified
Location of each item of load	2.3	11(2)(b) of Schedule 15.3	Three items of load with insufficient details to locate them.	Strong	Low	1	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	The database used to prepare submissions contains some inaccurate information. The database accuracy is assessed to be 95.5% indicating an estimated over submission of 13,000 kWh per annum. Incorrect ballasts recorded in RAMM.	Moderate	Low	2	Identified
Volume information accuracy	3.2	15.2 and 15.37B(c)	The database used to prepare submissions contains some inaccurate information. The database accuracy is assessed to be 95.5% indicating an estimated over submission of 13,000 kWh per annum. Incorrect ballasts recorded in RAMM.	Moderate	Low	2	Identified
Future Risk Rating						7	

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:

Rebecca Elliot

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Alan Miller	Corporate Account Manager	Trustpower
Delwyn Jeffrey	Commercial and Industrial Billing Manager	Trustpower
Cameron Senior	Asset Information Engineer	Waikato Road Asset Technical Accord

1.4. Hardware and Software

The SQL database used for the management of DUML is remotely hosted by RAMM Software Ltd. The database is commonly known as "RAMM" which stands for "Roading Asset and Maintenance Management". The specific module used for DUML is called RAMM Contractor.

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	Profile	Number of items of load	Database wattage (watts)
0000400332WA74B	Te Kawa	TMU0111	STL	15	3,252
0000400337WAA04	OPARAU/AOTEAS/LTS	TMU0111	STL	9	736
0000400341WAED6	Kawhia	TMU0111	STL	112	10,596
0001111170WMD3F	State Highway Urban	HTI0331	STL	119	21,218

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0008807415WMBD6	Local Authority Streetlights	HTI0331	STL	338	31,891

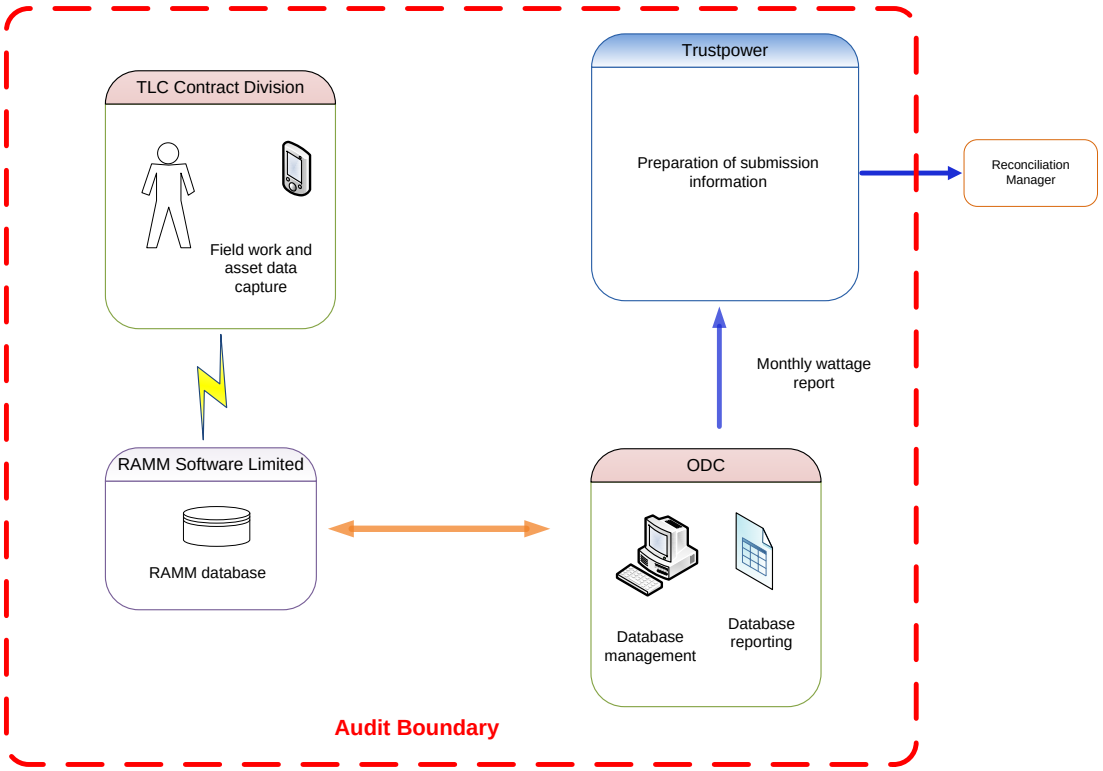
1.7. Authorisation Received

All information was provided directly by Trustpower and ODC.

1.8. Scope of Audit

ODC use a RAMM database to manage this DUML load. New connection, fault and maintenance work is completed by The Lines Company contract division (TLC). Monthly reports are received by Trustpower.

The scope of the audit encompasses the collection, security and accuracy of the data, including the preparation of submission information based on the database reporting. The diagram below shows the audit boundary for clarity.



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

The field audit was undertaken of a statistical sample of 124 items of load on 23rd March 2018.

1.9. Summary of previous audit

The previous audit was completed in March 2017 by Allan Miller of Trustpower. The current status of that audit's findings is detailed below:

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
Database Contents	2.2	11(2)(a)	ICP Numbers not compliant	Cleared
Database Contents	2.3	11(2)(b)	Location of each item of load	Still existing for 3 items of load
Database Contents	2.4	11(2)©	Description of each item of load	Cleared
Database Contents	2.4	11(2)(d)	Capacity of each item of load	Cleared

Table of Recommendations

Subject	Section	Clause	Recommendation for Improvement	Status
Database Contents	2.1		Update database within 2 months	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 streetlight 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 receive a monthly database extract and this is used to derive submission.

I recalculated the submissions for March 2018 using the data logger and the database information. I confirmed that the calculation method was correct but found a minor difference of 182.14 kWh. This is because the ballasts recorded in RAMM are incorrect and Trustpower add the correct ballasts outside of the database, therefore Trustpower's submission is correct. The correct ballast should be recorded in the database and this is recorded as non-compliance in **section 3.1**.

There is some inaccurate data within the database used to calculate submissions. This is recorded as non-compliance and discussed in **3.1** and **3.2**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: unknown To: 30-Apr-18	The database used to prepare submissions contains some inaccurate information. The database accuracy is assessed to be 95.5% indicating an estimated over submission of 13,000 kWh per annum. Incorrect ballasts recorded in RAMM. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate, because they are sufficient to ensure that lamp information is correctly recorded most of the time. The impact is assessed to be low, as the differences found in the field will be flowing through to submission as expected.

Actions taken to resolve the issue	Completion date	Remedial action status
TRUS adds ballast to lamp wattages as standard procedure when calculating submission data. TRUS will work with ODC to update the ballast information in the RAMM database	31/07/18	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
TRUS will work with ODC to update the ballast information in the RAMM database and will review new items to ensure the ballast is correct.	Ongoing	

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

Audit commentary

All items of load had an ICP recorded as required by this clause.

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

Audit commentary

The database contains the nearest street address, pole numbers and Global Positioning System (GPS) coordinates for each item of load with the exception of three items of load which had no GPS co-ordinates or street number to locate these.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.3 With: Clause 11(2)(b) of Schedule 15.3 From: unknown To: 30-Apr-18	Three items of load with insufficient details to locate them. Potential impact: Low Actual impact: None Audit history: None Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as strong as the RAMM database has good controls in place to manage load location. The impact is assessed to be low, as only three items of load had insufficient details to locate these.

Actions taken to resolve the issue	Completion date	Remedial action status
TRUS will work with ODC to update the missing location details for the 3 items	31/07/18	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
The current RAMM database has good controls in place, TRUS will review new items added to the database to ensure locations are included	Ongoing	

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 two fields for wattage, firstly the manufacturers rated wattage and secondly the "ballast wattage". The ballast wattage is expected to be a calculated figure which accounts for any variation from the input wattage and includes losses associated with ballasts. This was recorded for all items of load. The accuracy of the ballast wattages is discussed in **section 3.1.**

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

The field audit was undertaken of a statistical sample of 294 items of load on 5th March 2018.

Audit commentary

The field audit findings are detailed in the table below:

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
Amenity					
HAEREHUKA STREET	1	1			
HARBOUR ROAD	1	1			
JERVOIS STREET	2	2			
MAIN NORTH ROAD (SH3)	1	1			
ORAHIRI TERRACE	1	1			
OTOROHANGA ROAD (SH 3)	2	2			
ODC Rural					
MAIN NORTH ROAD (SH3)	4	4			
ROTOITI ROAD	4	4			
STATE HIGHWAY NO.31	1	1			
TE KAWA STREET	5	5			
ODC Urban					
AMOPO STREET	1	1			
GLENVIEW AVENUE	3	3			

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
HAEREHUKA STREET	18	18		8	8x LEDs found in the field but are recorded as HPS in the database
HINEWAI STREET	22	22			
HUIPUTEA DRIVE	13	13			
MATIRE STREET	1	1			
OLD TE KUITI ROAD	6	6			
TAINUI STREET	4	4			
TUHORO STREET	1	1			
WAGON LINE ROAD	1	1			
WHITTINGTON LANE	4	4			
NZTA					
HUIPUTEA DRIVE	3	3			
STATE HIGHWAY NO.31	8	8			
TE KANAWA STREET (SH31)	18	16	2		2x 100W HPS not found in the field
WHAREPUHUNGA ROAD	1	1			
Grand Total	126	124	2	8	

No additional items of load were found in the field. The field audit variances found 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 process for tracking of changes in the 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 provision of a copy of the report to Trustpower each month is sufficient to achieve compliance.

ODC use a RAMM database to manage this DUML load. New connection, fault and maintenance work is completed by The Lines Company contract division (TLC). They use RAMM contractor to track load changes. This includes any new individual lights that are added to the streetlight circuits. All changes made during a month are included in the monthly report provided to Trustpower for submission. No new streetlight circuits have been added during the audit period. If these are required, ODC would liaise with TLC to get these connected and recorded in the database and then these are added into RAMM once they are electrically connected.

ODC have commenced an LED roll out and this accounts for the LEDs found in the field audit that had not yet been updated in the database as we received the database extract mid-month.

Outage patrols are in place. The frequency of these is being reviewed as the failure rate of LED lighting is much less than traditional streetlights.

No festive lighting is connected to the ODC unmetered streetlight network.

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

A complete audit trail of all additions and changes to the database information.

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	Otorohanga district
Strata	The database contains items of load in Otorohanga area. The area has three distinct sub groups of urban, rural, NZTA. The processes for the management of ODC items of load are the same, but I decided to place the items of load into four strata, as follows: 1. Amenities 2. ODC Rural 3. ODC Urban 4. NZTA
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 21 sub-units.
Total items of load	126 items of load were checked.

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

Audit commentary

The database was found to contain some inaccuracies and missing data.

The field data was 94.4% of the database data for the sample checked. The total wattage recorded in the database for the sample was 14,336 watts. The estimated total wattage found in the field for the sample checked was 13,628 watts, a difference of 708 watts. This will result in an estimated over submission of 16,000 kWh per annum (based on annual burn hours of 4,271 as detailed in the DUML database auditing tool). As detailed in **section 2.6**, ODC is currently undertaking an LED roll out and most of the differences found in the field related to LED light changes that would not have been reflected in the database extract used (provided part way through the month) and therefore the database variance will be overstated.

Wattages for all items of load were checked against the published standardised wattage table produced by the Electricity Authority and found the ballasts recorded in RAMM are incorrect. Trustpower add the correct ballasts outside of the database, therefore Trustpower's submission is correct however the correct ballast should be recorded in the database and this is recorded as non-compliance. The volume differences are discussed in **sections 2.1** and **3.2**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: unknown To: 30-Apr-18	The database accuracy is assessed to be 94.4% indicating an estimated over submission of 16,000 kWh per annum if these changes don't flow through in the monthly report. Incorrect ballasts recorded in RAMM. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate, because they are sufficient to ensure that changes to the database are correctly recorded most of the time. The impact is assessed to be low, as the differences found in the field will be flowing through to submission as expected.

Actions taken to resolve the issue	Completion date	Remedial action status
ODC is currently undertaking a LED roll out and will ensure these are updated to the database as the lights are changed. TRUS adds ballast to lamp wattages as standard procedure when calculating submission data. TRUS will work with ODC to update the ballast information in the RAMM database	Ongoing 31/07/18	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
ODC is currently undertaking a LED roll out and will ensure these are updated to the database as the lights are changed.	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 data logger information. Trustpower receive a monthly database extract and this is used to derive submission.

I recalculated the submissions for March 2018 using the data logger and the database information. I confirmed that the calculation method was correct but found a minor difference of 182.14 kWh. This is because the ballasts recorded in RAMM are incorrect and Trustpower add the correct ballasts outside of the database, therefore Trustpower's submission is correct. The correct ballast should be recorded in the database and this is recorded as non-compliance as non-compliance in **section 3.1**.

There is some inaccurate data within the database used to calculate submissions. This is recorded as non-compliance and discussed in **2.1** and **3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: unknown To: 30-Apr-18	The database accuracy is assessed to be 94.4% indicating an estimated over submission of 16,000 kWh per annum if these changes don't flow through in the monthly report. Incorrect ballasts recorded in RAMM. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate, because they are sufficient to ensure that lamp information is correctly recorded most of the time. The impact is assessed to be low, as the differences found in the field will be flowing through to submission as expected.

Actions taken to resolve the issue	Completion date	Remedial action status
ODC is currently undertaking a LED roll out and will ensure these are updated to the database as the lights are changed. TRUS adds ballast to lamp wattages as standard procedure when calculating submission data. TRUS will work with ODC to update the ballast information in the RAMM database	Ongoing 31/07/18	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
ODC is currently undertaking a LED roll out and will ensure these are updated to the database as the lights are changed.	Ongoing	

CONCLUSION

ODC use a RAMM database to manage this DUML load. New connection, fault and maintenance work is completed by The Lines Company contract division (TLC). Monthly reports are received by Trustpower.

The field audit found inaccuracies in the database indicating an estimated over submission of 16,000 kWh per annum. ODC is currently undertaking an LED roll out and most of the differences found in the field related to LED light changes that would not have been reflected in the database extract used (provided part way through the month) and therefore the database variance will be overstated. Overall the processes in place to manage this DUML database were robust

The future risk rating of seven indicates that the next audit be completed in 18 months and I agree with this recommendation. Four non-compliances were identified, and no recommendations were raised.

PARTICIPANT RESPONSE

Trustpower will work with ODC to correct the ballasts and missing locations in the RAMM database.

All historic issues with ballast and location data in the DUML database are expected to be resolved once the LED role-out is completed.