ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

NZTA NAPIER AND MERIDIAN ENERGY

Prepared by: Steve Woods

Date audit commenced: 15 April 2019

Date audit report completed: 29 May 2019

Audit report due date: 1 June 2019

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This audit of the NZTA Napier (NZTA) DUML database and processes was conducted at the request of Meridian Energy (Meridian) 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.

This RAMM database is managed by Power Solutions. New connection, fault and maintenance work is completed by Pope Electrical. Monthly reports are received by Meridian.

The database accuracy is high with regard to kW, but the ICP information is incorrect, which could lead to future submission inaccuracy. The ICP details in the database need to be corrected and all manual manipulation of data needs to cease.

The future risk rating of six indicates that the next audit be completed in 18 months.

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	Process to derive submission information includes manipulation of the data by PSL to select by lamp owner not by ICP. Submission information appears correct, but it doesn't match the data base. Gear wattage not derived from the database.	Weak	Low	3	Identified
ICP identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	Items of load against incorrect ICPs in the database.	Weak	Low	3	Identified
Future Risk Rating						6	

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	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

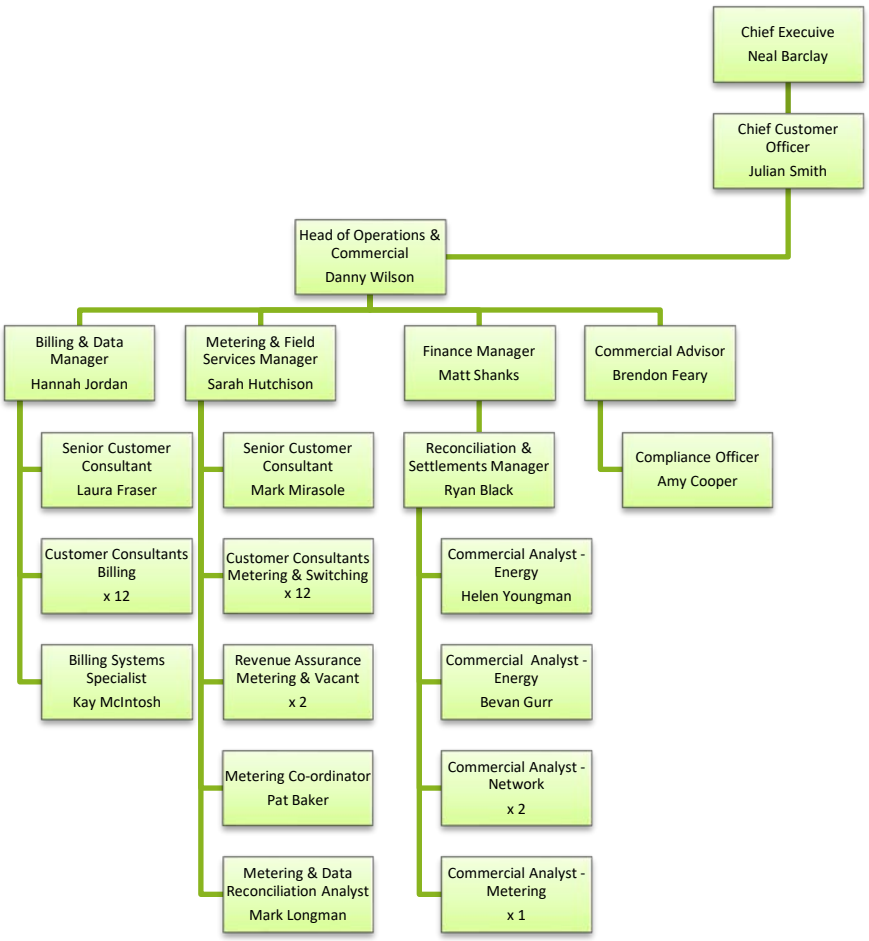
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

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

1.2. Structure of Organisation

Meridian Energy 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
Jon Stevens	Projects Engineer	Power Solutions
Amy Cooper	Compliance Officer	Meridian Energy

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.

Power Solutions confirmed that 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

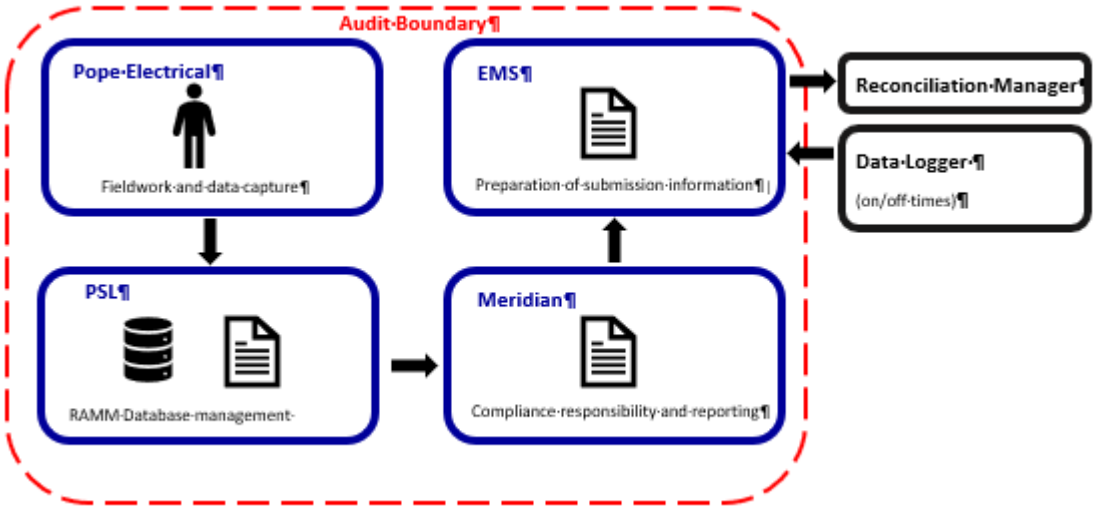
ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0000939905HB23E	TRANSIT STREET LIGHTS	FHL0331	DST	651	122,813

1.7. Authorisation Received

All information was provided directly by Meridian and Power Solutions.

1.8. Scope of Audit

The database is remotely hosted by RAMM Software Ltd and is managed by Power Solutions Limited (PSL), on behalf of Napier NZTA, who is Meridian's customer. Reporting is provided by PSL to Meridian on a monthly basis. The fieldwork and asset data capture are conducted by Pope Electrical. 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 257 items of load.

1.9. Summary of previous audit

The previous audit was completed in May 2018 by Rebecca Elliot of Veritek Limited. The table below shows the findings.

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
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 102.6% indicating an estimated under submission of 11,500 kWh per annum. Incorrect profile is recorded on the registry.	Issues recorded are resolved, new issue present regarding incorrect ICP information and ballast wattage added outside the database

Subject	Section	Clause	Non-compliance	Status
All load recorded in the database	2.5	11(2A) of Schedule 15.3	All load is not recorded in the database.	Cleared
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 102.6% indicating an estimated under submission of 11,500 kWh per annum. The database is not complete as ballasts are not recorded in the RAMM database.	Cleared
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 102.6% indicating an estimated under submission of 11,500 kWh per annum. Incorrect profile is recorded on the registry.	Cleared

Table of Recommendations

Subject	Section	Clause	Recommendation for Improvement	Status

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

Meridian 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

Meridian reconciles this DUML load using the DST profile. The on and off times are derived from a data logger read by EMS and are used to create a shape file. Meridian supplies EMS with the capacity information and EMS calculates the kWh figure for each ICP and includes this in the relevant AV080 file. This process was audited during EMS's agent audit, and its accuracy and compliance was confirmed.

I compared the database output file to the capacity information Meridian supplied to EMS in March 2019 and found a significant problem. PSL uses the "Light Owner" field rather than the ICP field when they prepare the monthly report. When I filtered by ICP, the result included 17 records (6,535 kW) that were not related to NZTA but were related to Napier CC and should have a different ICP. Whilst these items of load are included in the report for Napier CC, the incorrect ICPs can lead to significant submission errors and non-compliance because the submission total does not match the database. Meridian used 115.69 kW for March 2019, but the database contains 122.81 kW for ICP 0000939905HB23E. This is recorded as non-compliance. The output of the database should not be manipulated by PSL prior to sending the report to Meridian.

The database was confirmed to fall within the database accuracy threshold. There are a small number of discrepancies which PSL intends to rectify.

The gear wattage is recorded in the database; however, it is not used for submission, ballast wattage is added to the monthly report. Whilst the gear wattage is correct, it should be derived from the database not added separately.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-May-18 To: 13-May-19	Process to derive submission information includes manipulation of the data by PSL to select by lamp owner not by ICP. Submission information appears correct, but it doesn't match the data base. Gear wattage not derived from the database. Potential impact: Medium Actual impact: Low Audit history: Once Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as weak, because they don't adequately manage the risk of future incorrect submission. The actual impact is assessed to be low, because submission appears to be accurate.

Actions taken to resolve the issue	Completion date	Remedial action status
We are working with NZTA and PSL to resolve the issues of the incorrect ICP being recorded against some items of load in the database and gear wattage being manually entered to the report rather than being extracted from the database. We note that neither issue has impacted accuracy of submission information.	Oct 2019	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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

An ICP is recorded for each item of load but there are errors as recorded in **section 2.1**. 17 items of load are recorded against the NZTA ICP, which are actually Napier CC items of load.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.2 With: Clause 11(2)(a) and (aa) of Schedule 15.3 From: 01-May-18 To: 15-May-19	Items of load against incorrect ICPs in the database. Potential impact: Medium Actual impact: Low Audit history: None Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as weak, because they don't adequately manage the risk of future incorrect submission. The actual impact is assessed to be low, because submission appears to be accurate.

Actions taken to resolve the issue	Completion date	Remedial action status
We are working with NZTA and PSL to resolve the issues of the incorrect ICP being recorded against some items of load in the database and gear wattage being manually entered to the report rather than being extracted from the database. We note that neither issue has impacted accuracy of submission information.	Oct 2019	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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, and users in the office and field can view these locations on a mapping system.

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

Lamp make, model, lamp wattage and ballast wattage are included in the database and all were populated which meets the requirements of this clause.

The gear wattage is recorded in the database which meets the requirements of this clause; however, it is not used for submission, ballast wattage is added to the monthly report. This is recorded as non-compliance in **section 2.1**.

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 257 items of load.

Audit commentary

The field audit discrepancies are detailed in the table below.

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
BURNESS UNDERPASS					Total wattage appears to be approximately correct, but five 36 watt fluorescents have been replaced with an LED panel
TARADALE ROAD SH 50 EAST	44	43	1	-	One light not found in the field
TARADALE ROAD SH 50 WEST	56	56	-	2	Two 150 HPS have been replaced with LED

No examples were found of additional lights in the field.

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 Meridian each month is sufficient to achieve compliance.

The processes were reviewed for new lamp connections and the tracking of load changes due to faults and maintenance. All fault and maintenance work is controlled by PSL and conducted by Pope Electrical through "RAMM Contractor". Once each job is completed the database is updated via field PDA's. Paperwork is also provided to note materials used, and this is compared with the data in the database for each job. The monthly outage patrols also involve a check of database accuracy.

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

PSL demonstrated 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	NZTA Napier region
Strata	The database contains items of load in Napier urban area. The processes for the management of all NZTA items of load are the same, and I decided to place the items of load into four strata, as follows: 1. City 2. North 3. South 4. West.
Area units	I created a pivot table of the roads and I used a random number generator in a spreadsheet to select a total of 21 sub-units.
Total items of load	257 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. The field audit found:

- one additional lamp in the database, not found in the field,
- two lamp wattage differences; and
- different lights in an underpass compared to the database

A statistical sample of 257 items of load found that the field data was 99.3% of the database data for the sample checked. The statistical sampling tool reported with 95% confidence that the precision of the sample was 6.2% and the true load in the field will be between 97.4% to 100.3% of the load recorded in the database. This is within the required database accuracy of +/- 5%, therefore the database is accurate.

There will be potentially 3,400 kWh per annum (based on annual burn hours of 4,271 as detailed in the DUML database auditing tool) of over submission. The statistical sampling tool reported with 95% confidence the estimated impact will be between 13,400 kWh per annum over submission and 1,600 kWh per annum under submission.

Audit outcome

Compliant

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; and
- checking the database extract combined with the burn hours against the submitted figure to confirm accuracy.

Audit commentary

Meridian reconciles this DUML load using the DST profile. The on and off times are derived from a data logger read by EMS and are used to create a shape file. Meridian supplies EMS with the capacity information and EMS calculates the kWh figure for each ICP and includes this in the relevant AV080 file. This process was audited during EMS's agent audit, and its accuracy and compliance was confirmed.

I compared the database output file to the capacity information Meridian supplied to EMS in March 2019 and found a significant problem. PSL uses the "Light Owner" field rather than the ICP field when they prepare the monthly report. When I filtered by ICP, the result included 17 records (6,535 kW) that were not related to NZTA but were related to Napier CC and should have a different ICP. Whilst these items of load are included in the report for Napier CC, the incorrect ICPs can lead to significant submission errors and non-compliance because the submission total does not match the database. Meridian used 115.69 kW for March 2019, but the database contains 122.81 kW for ICP 0000939905HB23E. This is recorded as non-compliance in **section 2.1**, but compliance is achieved in this section because volume information is correct.

Audit outcome

Compliant

CONCLUSION

This RAMM database is managed by Power Solutions. New connection, fault and maintenance work is completed by Pope Electrical. Monthly reports are received by Meridian.

The database accuracy is high with regard to kW, but the ICP information is incorrect, which could lead to future submission inaccuracy. The ICP details in the database need to be corrected and all manual manipulation of data needs to cease.

The future risk rating of six indicates that the next audit be completed in 18 months.

PARTICIPANT RESPONSE