ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

NZTA MAINPOWER AND CONTACT ENERGY

Prepared by: Steve Woods

Date audit commenced: 25 April 2018

Date audit report completed: 30 April 2018

Audit report due date: 1 June 2018

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EXECUTIVE SUMMARY

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

Four non-compliances were identified, and no recommendations were made.

The main issues found were that the submission information is incorrect because of incorrect daily kWh figures on the registry and two lamps in the database were not present in the field.

The incorrect daily kWh figures lead to over submission by 3,290 kWh. The database accuracy is assessed to be 98.5% indicating an estimated over submission of 10,400 kWh per annum, on top of the 3,290 kWh mentioned above.

The future risk rating of 13 indicates that the next audit be completed in 12 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	Incorrect daily kWh figures leading to over submission by 3,290 kWh The database accuracy is assessed to be 98.5% indicating an estimated over submission of 10,400 kWh per annum, on top of the 3,290 kWh mentioned above.	Moderate	Medium	4	Identified
Location of items of load	2.3	11(2)(b) of Schedule 15.3	Location information insufficient to locate at least 308 items of load	Weak	Low	3	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	The database accuracy is assessed to be 98.5% indicating an estimated over submission of 10,400 kWh per annum	Strong	Medium	2	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)	Incorrect daily kWh figures leading to over submission by 3,290 kWh The database accuracy is assessed to be 98.5% indicating an estimated over submission of 10,400 kWh per annum, on top of the 3,290 kWh mentioned above	Moderate	Medium	4	Identified
					Future Risk Rating	**13**	

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

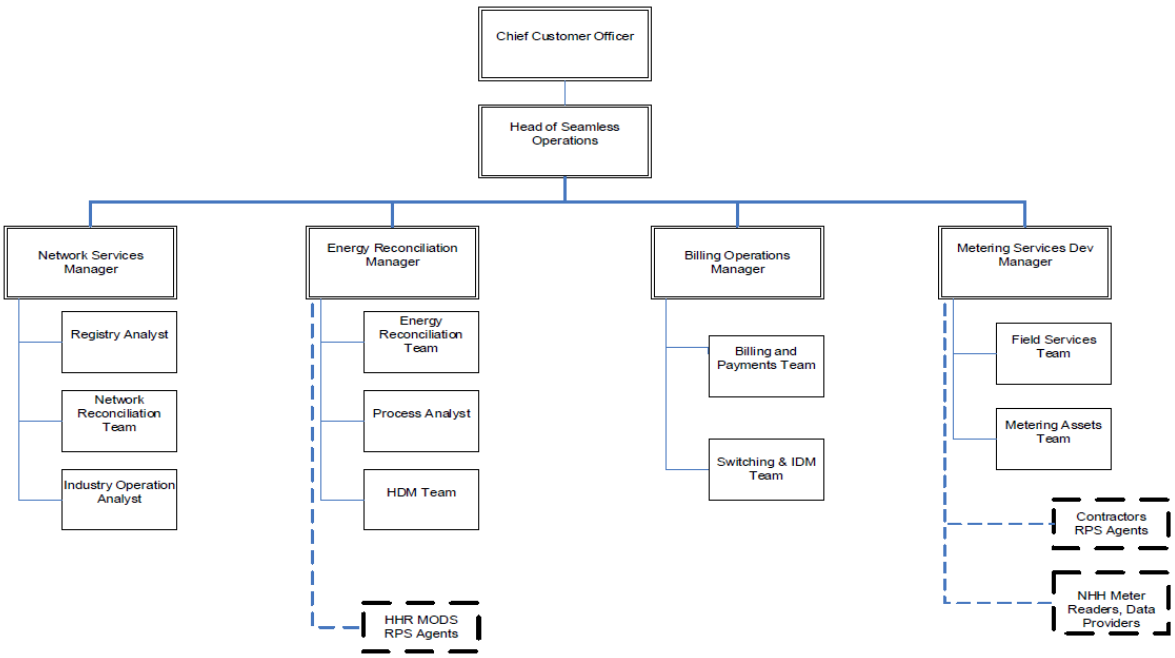
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

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

1.2. Structure of Organisation

Contact 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
Bernie Cross	Energy Reconciliation Manager	Contact Energy
Sarah Barnes	Regulatory Manager	Mainpower
Neil O'Loughlin	Surveyor/ Pricing Co-ordinator	Mainpower
Joel Hung	Commercial Analyst	Mainpower

1.4. Hardware and Software

Section 1.8 shows that Mainpower maintains an Access databases for the management of the DUML information. Backup and restoration procedures are in accordance with normal industry protocols.

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)
0000366461MPAD4	CUL0331 STREET LIGHTS	CUL0331	RPS	54	9,750
0000366463MPA51	KKA0331 STREET LIGHTS	KKA0331	RPS	115	18,847
0000366462MP614	KAI0111 STREET LIGHTS	KAI0111	RPS	374	95,801
0000366464MP79B	SBK0331 STREET LIGHTS	SBK0331	RPS	32	6,061

0000366465MPBDE	WPR0331 STREET LIGHTS	WPR0331	RPS	91	21,099
0000366466MP71E	STREETLIGHTS WPR0661	WPR0661	RPS	61	14,512
Total				**727**	**166,070**

1.7. Authorisation Received

All information was provided directly by Contact and Mainpower.

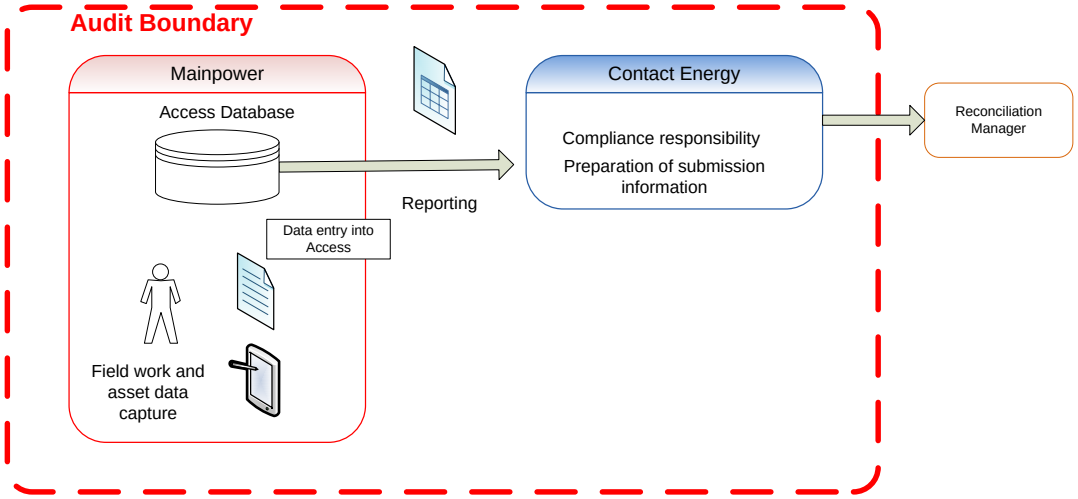
1.8. Scope of Audit

This audit of the NZTA Mainpower DUML database and processes was conducted at the request of Contact, 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.

The items of load are located on the Mainpower network. Mainpower is engaged as the streetlighting maintenance contractor and they maintain a database, which is used by Contact to populate the daily kWh in the registry and in SAP in order to calculate submission information. Mainpower provides reporting to Contact on a monthly basis.

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



The field audit was undertaken of a statistical sample of 115 items of load on 25 April 2018.

1.9. Summary of previous audit

This is the first audit conducted by Veritek.

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 3 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

Contact 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

Contact reconciles this DUML load using the RPS profile. Consumption information is derived from the daily kWh figure on the registry, which is maintained based on monthly reporting from Mainpower.

I compared the daily kWh figures to those calculated from the database, the table below show a slight difference between the daily kWh from the database and those in the registry used for submission purposes. The kW, hours and number of fittings figures in the registry are correct; however the daily kWh figures appear slightly high, leading to over submission by 3,290.11 kWh per annum.

The database accuracy is assessed to be 98.5% indicating an estimated over submission of 10,400 kWh per annum, on top of the 3,290 kWh mentioned above

ICP Number	Database Daily kWh	Registry Daily kWh	Annual over submission
0000366461MPAD4	117.00	117.53	193.45
0000366462MP614	1,149.61	1,154.80	1,893.62
0000366463MPA51	226.16	227.19	374.49
0000366464MP79B	72.73	73.06	121.18
0000366465MPBDE	253.19	254.34	420.48
0000366466MP71E	174.14	174.93	286.89
		Total	**3,290.11**

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Apr-17 To: 30-Apr-18	Incorrect daily kWh figures leading to over submission by 3,290 kWh The database accuracy is assessed to be 98.5% indicating an estimated over submission of 10,400 kWh per annum, on top of the 3,290 kWh mentioned above 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 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 medium because the difference is between 10,000 kWh and 50,000 kWh per annum.

Actions taken to resolve the issue	Completion date	Remedial action status
Mainpower uses an annual burn hours value of 4300 hours annually. In our last update of the daily kWh our derivation of daily hours was incorrect. Contact has now refreshed its daily Kwh values to reflect a daily hours of operation vale of 11.78 hours	Resolved	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.

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 street, a description of the location and GPS coordinates.

356 of 727 records don't have coordinates. In many cases, the items of load can be found from the location description, for example street numbers, distance or number of lights from a corner, etc. There are 308 records where the location description is not unique, meaning the location information is insufficient to physically identify the item of load.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.3 With: Clause 11(2)(b) of Schedule 15.3 From: 01-Apr-17 To: 30-Apr-18	Location information insufficient to locate at least 308 items of load Potential impact: Low Actual impact: Low Audit history: None Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as weak because they don't mitigate risk most of the time. The impact is minor; therefore the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
The database owner (Mainpower) have advised that they intend to update location information using their GIS mapping system	July 2018	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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.

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 115 items of load on 24 April 2018.

Audit commentary

The field audit findings are detailed in the table below.

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
Rural					
FERNSIDE ROAD	1	1	-	-	
LINESIDE RD	9	9	-	-	
LINESIDE ROAD	3	3	-	-	
OLD MAIN NORTH RD	1	1	-	-	
STATE HIGHWAY 1	15	15	-	-	
WAIKUKU BEACH RD	1	1	-	-	

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
WILLIAMS STREET	2	2	-	-	
Urban					
CAM RD OVERPASS	4	4	-	-	
CAM RIVER OVERPASS	1	1	-	-	
CHINNERYS RD	1	1	-	-	
EDERS RD	1	1	-	-	
LINESIDE RD	7	7	-	-	
MOTORWAY ON RAMP	3	3	-	-	
MOTORWAY ON-RAMP	14	14	-	-	
OHOKA RD OVERPASS	9	7	-2	-	Two lamps recorded in the database not present in the field.
PARSONAGE RD	1	1	-	-	
REVELLS RD	1	1	-	-	
SANDHILLS RD	1	1	-	-	
SMITH STREET	34	34	-	-	
TE POUAPATUKI RD	1	1	-	-	
TRAM RD OVERPASS	3	3	-	-	
WOODEND BEACH RD	1	1	-	-	
WOODEND RD	1	1	-	-	
Total	**115**	**113**	**-2**	**0**	

I found two less lamps in the field than were recorded in the database.

The database accuracy is assessed to be 98.5% indicating an estimated over submission of 10,400 kWh per annum.

These differences are recorded as non-compliance in **sections 2.1 and 3.1**. I did not identify any load missing from the database.

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 Contact each month is sufficient to achieve compliance.

Outage patrols are conducted on a regular basis and this process identifies potential discrepancies.

New connections require a proposed plan to be provided and an "as built" plan once the development is complete. Once installed, the information is passed to Mainpower and processed within two days of receipt. Mainpower adds the records to their database immediately as 'proposed' and they are updated within a day of livening.

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

This audit report confirms that the requirement to conduct an audit has been met for this particular database.

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 Mainpower
Strata	The database contains items of load for NZTA lighting on the Mainpower network The processes for the management of all NZTA lighting is the same, but I decided to create two strata, urban and rural.
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 22 subunits.
Total items of load	115 items of load were checked.

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

Audit commentary

Only two errors were found. Two lights were missing from the field in an area where considerable development is being undertaken.

The database accuracy is assessed to be 98.5% indicating an estimated over submission of 10,400 kWh per annum.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Apr-17 To: 03-Apr-18	The database accuracy is assessed to be 98.5% indicating an estimated over submission of 10,400 kWh per annum. Potential impact: Medium Actual impact: Medium Audit history: None Controls: Strong Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as strong, because they are sufficient to ensure that lamp information is correctly recorded most of the time. The impact is assessed to be medium because the difference is between 10,000 kWh and 50,000 kWh per annum.

Actions taken to resolve the issue	Completion date	Remedial action status
The region covering NZTA streetlights is still recovering from the Kaikoura earthquake and the count differences relates to an intersection currently being rebuilt as part of earthquake repairs. The removal of these lights was undertaken by the earthworks contractors and not advised to Mainpower who manage the DUML DB. The two missing lights will be reinstated once the intersection has been rebuilt. The accuracy of the DUML DB for NZTA is high considering the devastation experienced in this region from the earthquake.	Dec 2018	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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

I compared the daily kWh figures to those calculated from the database, the table below show a slight difference between the daily kWh from the database and those in the registry used for submission purposes. The kW, hours and number of fittings figures in the registry are correct; however the daily kWh figures appear slightly high, leading to over submission by 3,290.11 kWh per annum.

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Audit risk rating	**Rationale for audit risk rating**
Medium	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 medium because the difference is between 10,000 kWh and 50,000 kWh per annum.

Actions taken to resolve the issue	Completion date	Remedial action status
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Preventative actions taken to ensure no further issues will occur	**Completion date**	

CONCLUSION

Four non-compliances were identified, and no recommendations were raised.

The main issues found were that the submission information is incorrect because of incorrect daily kWh figures on the registry and two lamps in the database were not present in the field.

The incorrect daily kWh figures lead to over submission by 3,290 kWh. The database accuracy is assessed to be 98.5% indicating an estimated over submission of 10,400 kWh per annum, on top of the 3,290 kWh mentioned above.

PARTICIPANT RESPONSE