ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

NEW PLYMOUTH DISTRICT COUNCIL AND CONTACT ENERGY LIMITED

Prepared by: Rebecca Elliot

Date audit commenced: 8 June 2020

Date audit report completed: 1 September 2020

Audit report due date: 1 September 2020

TABLE OF CONTENTS

Executive summary 3
Audit summary 4

Non-compliances 4
Recommendations 5
Issues 5

1. Administrative 6

1.1. Exemptions from Obligations to Comply with Code 6
1.2. Persons involved in this audit 6
1.3. Structure of Organisation 7
1.4. Hardware and Software 7
1.5. Breaches or Breach Allegations 7
1.6. ICP Data 8
1.7. Authorisation Received 8
1.8. Scope of Audit 8
1.9. Summary of previous audit 9
1.10. Distributed unmetered load audits (Clause 16A.26 and 17.295F) 12

2. DUML database requirements 13

2.1. Deriving submission information (Clause 11(1) of Schedule 15.3) 13
2.2. ICP identifier and items of load (Clause 11(2)(a) and (aa) of Schedule 15.3) 16
2.3. Location of each item of load (Clause 11(2)(b) of Schedule 15.3) 16
2.4. Description and capacity of load (Clause 11(2)(c) and (d) of Schedule 15.3) 17
2.5. All load recorded in database (Clause 11(2A) of Schedule 15.3) 17
2.6. Tracking of load changes (Clause 11(3) of Schedule 15.3) 19
2.7. Audit trail (Clause 11(4) of Schedule 15.3) 20

3. Accuracy of DUML database 21

3.1. Database accuracy (Clause 15.2 and 15.37B(b)) 21
3.2. Volume information accuracy (Clause 15.2 and 15.37B(c)) 26

Conclusion 29

Participant response 30

EXECUTIVE SUMMARY

This audit of the **New Plymouth District Council (NPDC)** DUML database and processes was conducted at the request of **Contact Energy Limited (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. The scope of the audit encompasses the collection, security and accuracy of the data, including the preparation of submission information.

Streetlight load is determined by wattages held within NPDC's RAMM database. Fault, maintenance and upgrade work is managed by NPE Tech. The database is updated in the field using PDAs, or from the office by the NPE Tech administration team. Power Solutions Limited provides monthly reports from RAMM to Contact, including private and NZTA lighting.

Contact reconciles this DUML load as HHR using the HHR profile, in accordance with exemption number 177. On and off times are derived from data logger information.

The field audit confirmed that the database accuracy is within the allowable +/-5% and is confirmed as compliant.

Festive lighting has largely been decommissioned and the remaining lights are being added to RAMM prior to the next festive season from the excel spreadsheet that were recorded in.

In the last audit it was noted that there were private lights that were not recorded with a valid ICP number and were excluded from the monthly wattage figures. I was unable to confirm if this has been addressed during the audit period, so I have re-recorded this in this audit. I recommend that this is investigated to confirm whether these items of load are being reconciled elsewhere.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed, and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

The current monthly report is provided as a snapshot and is non-compliant, and Contact completes revision submissions where corrections are required. Contact has not yet updated their processes to be consistent with the Authority's memo.

The future risk rating of eight indicates that the next audit be completed in 18 months. I have taken this into consideration along with Contact's comments and agree with this recommendation.

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	Four lights recorded against the incorrect NSP. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in RAMM at the time that the change occurs.	Moderate	Low	2	Investigating
All load recorded in database	2.5	11(2A) of Schedule 15.3	For the sample of lights checked, there were three additional lights found in the field.	Moderate	Low	2	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	Four lights recorded against the incorrect ICP. Livening dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in RAMM at the time that the change occurs.	Moderate	Low	2	Investigating
Volume information accuracy	3.2	15.2 and 15.37B(c)	An incorrect profile is recorded on the registry for 0008807417WMB53. Four lights recorded against the incorrect NSP. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in RAMM at the time that the change occurs.	Moderate	Low	2	Investigating

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Future Risk Rating						8	

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	Recommendation
Deriving submission information	2.1	Confirm with the network that private lights are being reconciled elsewhere.
Database accuracy	3.1	Confirm the correct lamp and gear wattages for the potential discrepancies described in **section 3.1**.
Database accuracy	3.1	Check ICP number assignment for streets which unexpectedly have lights connected to more than one NSP.

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 is one exemption in place relevant to the scope of this audit:

Exemption No. 177: Exemption to clause 8(g) of schedule 15.3 of the Electricity Industry Participation Code 2010 ("Code") in respect of providing half-hour ("HHR") submission information instead of non half-hour ("NHH") submission information for distributed unmetered load ("DUML"). This exemption expires at the close of 31 October 2023.

1.2. Persons involved in this audit

Auditor:

Rebecca Elliot

Veritek Limited

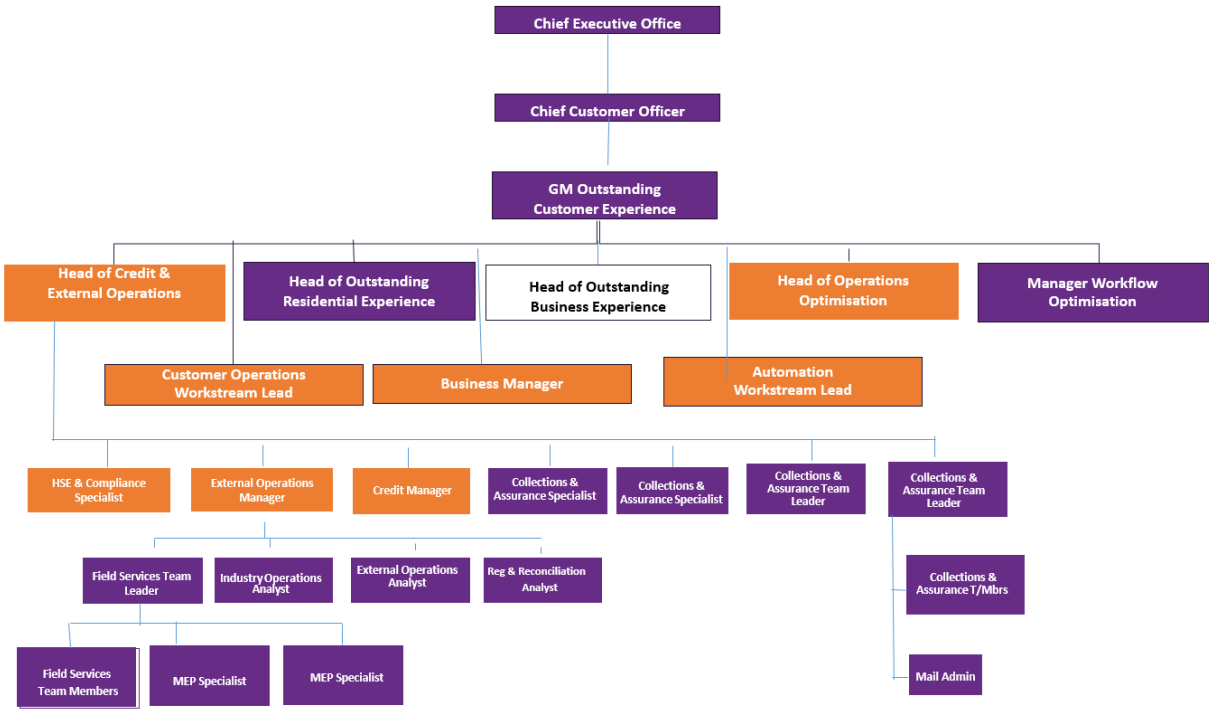
Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Bill Shera	Infrastructure Project Manager	New Plymouth District Council
Kevin Munisamy	Transportation Project Manager	New Plymouth District Council
Aaron Wall	Reconciliation Analyst	Contact Energy
Luke Cartmell-Gollan	Commercial Operations Manager	Contact Energy
Rosanna Tongilava	HDM Team Member	Contact Energy

1.3. Structure of Organisation

Contact provided a copy of their organisational structure.



1.4. Hardware and Software

RAMM

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.

RAMM Software Limited backs up the database and assists with disaster recovery as part of their hosting service. Nightly backups are performed. As a minimum, daily backups are retained for the previous five working days, weekly backups are retained for the previous four weeks, and monthly backups are retained for the previous six months.

Access to the database is secure by way of password protection.

Systems used by the trader to calculate submissions are assessed as part of their reconciliation participant audits.

Festival lights

A database of festival lights is maintained in the form of an Excel spreadsheet. The database is maintained by NPDC and Power Solutions Limited. The spreadsheet is saved on the network, which requires a login and password. Files on the network are backed up.

1.5. Breaches or Breach Allegations

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

1.6. ICP Data

All load is correctly recorded against the ICP in the NPDC RAMM database. All the decommissioned ICPs have been removed from the database so Contact Energy no longer have to aggregate the information to the active ICPs. The festival lights were recorded separately in an Excel spreadsheet. They have largely been decommissioned and the remaining lights in use are being added to the RAMM database.

ICP Number	Description	ICP status	NSP	Profile	Number of items of load	Database wattage (watts)
0008807417WMB53	STREETLIGHTS NEW PLYMOUTH DISTRICT COUNCIL TONGAPORUTU	2,0	HTI0331	RPS HHR	9	1041
1000542569PC16D	NPDC Roading SL - TARAHUA ROAD	2,0	CST0331	HHR	7,727	381,119.4
1000542572PC514	NPDC Roading SL - Waitara Road	2,0	HUI0331	HHR	2,128	79,241
1000542575PC8DE	NPDC Roading SL - EAST ROAD	2,0	SFD0331	HHR	9	1,511
Total					**10,101**	**486,510.9**

1.7. Authorisation Received

All information was provided directly by Contact or NPDC.

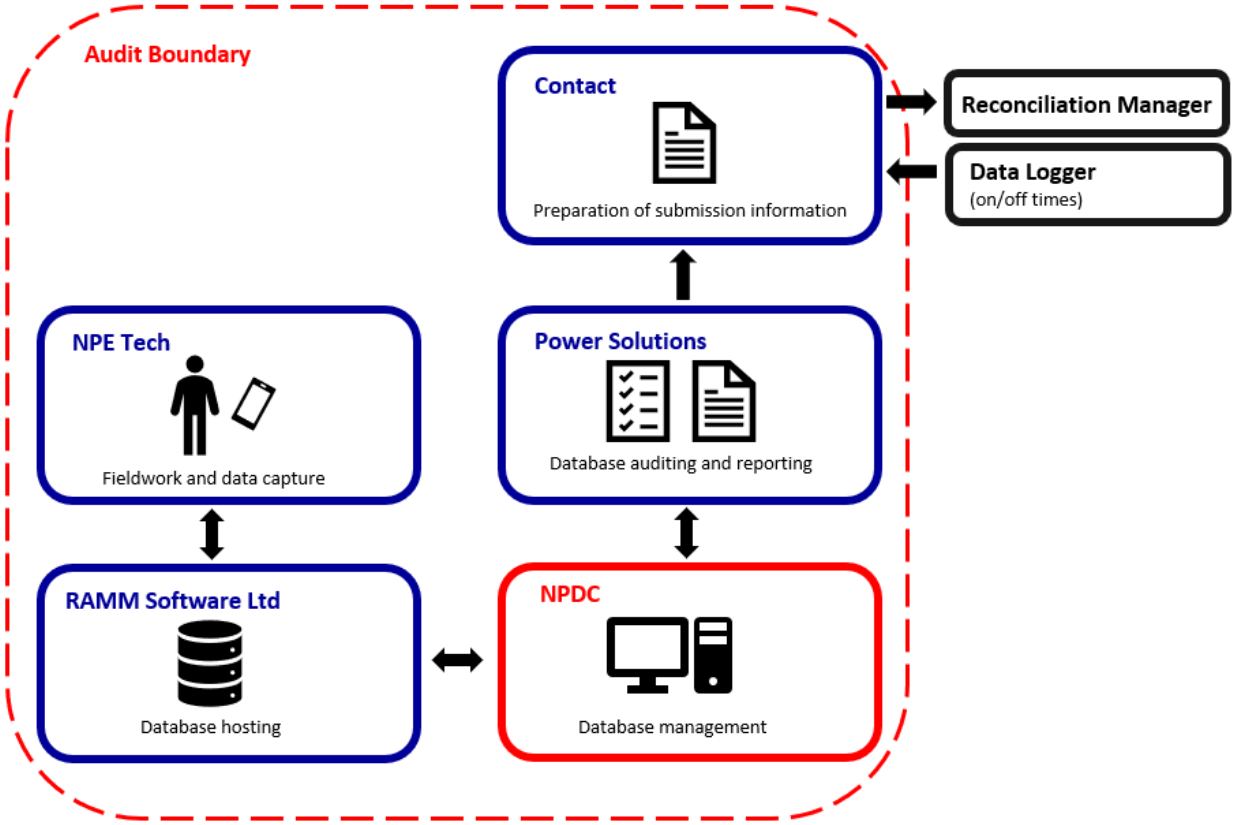
1.8. Scope of Audit

This audit of the NPDC 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.

Streetlight load is determined by wattages held within NPDC's RAMM database. Fault, maintenance and upgrade work is managed by NPE Tech. The database is updated in the field using PDAs, or from the office by the NPE Tech administration team. Power Solutions Limited provides monthly reports from RAMM to Contact, including private and NZTA lighting.

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 field audit was undertaken of a statistical sample of 299 items of load on 25 August 2020.

1.9. Summary of previous audit

The previous audit of this database was undertaken by Tara Gannon of Veritek Limited in November 2019. The summary table below shows the statuses of the non-compliances and recommendation raised in the previous audit. Further comment is made in the relevant sections of this report.

Table of Non-compliance

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	The database is not confirmed as accurate with a 95% level of confidence as recorded in **section 3.1**. Livening dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in RAMM at the time that the change occurs. The Excel spreadsheet of festival lights does not record light install, livening, or change dates. There are normally no changes during the period of connection each year, and connection and disconnection dates are provided.	Cleared Still existing Cleared

Subject	Section	Clause	Non-compliance	Status
			One 70W Metal Halide (G12 base) was recorded with a gear wattage of 0 instead of 13. Private lights are not recorded with valid ICP numbers and are excluded from submission information. For 1,324 items of load, the ICP numbers recorded in the database are decommissioned and differ from the ICP that load is submitted against.	Cleared Made a recommendation to confirm if this load is associated with NPDC Cleared
ICP identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	Private lights do not have a valid ICP number recorded in the database. For 1,324 items of load, the ICP numbers recorded in the database are decommissioned and differ from the ICP that load is submitted against.	Made a recommendation to confirm if this load is associated with NPDC Cleared
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	One 70W Metal Halide light had an invalid zero gear wattage recorded.	Cleared
All load recorded in database	2.5	11(2A) of Schedule 15.3	For the sample of lights checked, there was one less light in the database than was present in the street.	Still existing
Audit trail	2.7	11(4) of Schedule 15.3	The festival lights Excel spreadsheet does not record an audit trail.	Cleared
Database accuracy	3.1	15.2 and 15.37B(b)	The database is not confirmed as accurate with a 95% level of confidence. Livening dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in RAMM at the time that the change occurs. The Excel spreadsheet of festival lights does not record light install, livening, or change dates. There are normally no changes during the period of connection each year, and connection and disconnection dates are provided.	Cleared Still existing Cleared

Subject	Section	Clause	Non-compliance	Status
			One 70W Metal Halide (G12 base) was recorded with a gear wattage of 0 instead of 13.	Cleared
			Private lights are not recorded with valid ICP numbers and are excluded from submission information.	Made a recommendation to confirm if this load is associated with NPDC.
Volume information accuracy	3.2	15.2 and 15.37B(c)	An incorrect profile is recorded on the registry for 0008807417WMB53.	Still existing
			The database is not confirmed as accurate with a 95% level of confidence.	Cleared
			Livening dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in RAMM at the time that the change occurs.	Still existing
			The Excel spreadsheet of festival lights does not record light install, livening, or change dates. There are normally no changes during the period of connection each year, and connection and disconnection dates are provided.	Cleared
			One 70W Metal Halide (G12 base) was recorded with a gear wattage of 0 instead of 13.	Cleared
			Private lights are not recorded with valid ICP numbers and are excluded from submission information.	Made a recommendation to confirm if this load is associated with NPDC
			For 1,324 items of load, the ICP numbers recorded in the database are decommissioned and differ from the ICP that load is submitted against.	Cleared

Table of Recommendations

Subject	Section	Recommendation	Status
Database accuracy	3.1	Confirm the correct lamp and gear wattages for the potential discrepancies described in **section 3.1**.	Still existing
		Check ICP number assignment for streets which unexpectedly have lights connected to more than one NSP.	Still existing

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

Contact 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.

Audit outcome

Compliant

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 and the application of profiles was checked. The database was checked for accuracy.

Audit commentary

Contact reconciles this DUML load as HHR using the HHR profile, in accordance with exemption number 177. This exemption is discussed further in **section 1.1**. Monthly wattage reports are provided by Power Solutions to Contact Energy. Data logger information and on and off times are derived from data logger information. I reviewed the submission information for May 2020 and confirmed that it was calculated accurately based on the database.

Festive lights have been largely decommissioned. Any remaining festive lights are being added to the RAMM database.

Examination of the database found:

Issue	Estimated volume information impact (annual kWh)
Three additional lights found in the field audit	The database accuracy was found to be within the allowable +/- threshold so there is no impact to submission.
Four lights connected to the incorrect ICP	No impact on submission

In the last audit it was noted that there were private lights that were not recorded with a valid ICP number and were excluded from the monthly wattage figures. I was unable to confirm if this has been addressed during the audit period, so I have re-recorded this in this audit. This is potentially resulting in an estimated annual under submission of up to 21,188 kWh per annum if these lights should be reconciled under the NPDC ICPs. I recommend that this is investigated to confirm whether these items of load are being reconciled elsewhere.

Recommendation	Description	Audited party comment	Remedial action
Deriving submission information	Confirm with the network that private lights are being reconciled elsewhere.	Contact will liaise with Powerco to determine how these private lights are reconciled/submitted.	Identified

The field audit against the database quantities found that the database is confirmed as accurate with a 95% level of confidence. This is detailed in **section 3.1**.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed, and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

As reported in the last audit, the current monthly report is provided as a snapshot and this practice is non-compliant. When a wattage is changed in the database due to a physical change or a correction, only the record present at the time the report is run is recorded, not the historical information showing dates of changes. Contact completes revision submissions where corrections are required and have not yet updated their processes to be consistent with the Authority's memo.

The RAMM database records an installation date, which typically records the livening date for the light. There is no separate livening date.

Change dates are automatically generated by RAMM when records change; but cannot be selected by the user. Where a change is entered using Pocket RAMM at the time of the change, this date will reflect the correct date on which the change occurred, however if a change or correction is processed by NPE Tech administration staff at a later date, the change date may be incorrect.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Oct-19 To: 01-Aug-20	Four lights recorded against the incorrect NSP. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in RAMM at the time that the change occurs. Potential impact: Low Actual impact: Low Audit history: Three times Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls over the database are rated as moderate, as the processes to manage change will ensure accuracy most of the time. The audit risk rating is assessed to be low as the database accuracy was found to be high with only a minor number of discrepancies.

Actions taken to resolve the issue	Completion date	Remedial action status
Contact will work with NPDC to update the existing data to be the correct NSP. Contact is continuing to work with the customer to ensure that they are setup to deliver their data for any given time, as required by the EA Contact will work with NPDC to ensure that their process for New Connections reflects actual usage	Ongoing	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Contact will continue to attempt to perform quarterly checks on the database to find any possible issues to ensure these are resolved in a timely fashion	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 the correct ICP was recorded against each item of load.

Audit commentary

The analysis found that all items of load had ICP numbers recorded against them.

Where private lights connected to streetlight circuits are identified, they are recorded in RAMM and assigned to one of the "private" ICP groups. These groups are included in the report to Contact but excluded from submission information. Owners are asked to connect the lights to their own metered circuit, or to request a separate ICP through their retailer. NPDC is often not aware of the outcome of this process and the lights remain in the private group in the database, unless the ICP number is known. I recommend in **section 2.1**, that these lights are confirmed as being reconciled elsewhere.

ICP number accuracy is discussed in **sections 2.1** and **3.1**.

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 fields for road names, house numbers, pole numbers and GPS coordinates. 9,674 (98%) of lamps have GPS coordinates recorded. The lamps without GPS coordinates all have sufficient road name, pole number, distance from the end of the road and/or house number information recorded to enable them to be located.

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 light type and wattage capacity,
- wattage capacities include any ballast or gear wattage, and
- each item of load has a light type, light wattage, and gear wattage recorded.

Audit commentary

The database contains fields for lamp make and model, lamp wattage and gear wattage.

No lamp wattages were invalidly recorded as zero, but one lamps which is disconnected validly had a lamp wattage of zero.

The accuracy of the recorded 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 299 items of load on 25 August 2020. The sample was selected from three strata, as follows:

1. Parks and NZTA
2. Roading (road names A-K); and
3. Roading (road names L-Z).

Audit commentary

The field audit discrepancies are detailed in the table below:

Street	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
PEBBLE BEACH COURT	9	12	+3	-	3 x additional LEDs found in the field.
TUPUHI PLACE	3	2	-1	-	1x LED not found in the field
WRIGHTS LANE (SERVICE LANE)	3	2	-1	-	1 x LED not found in the field
Grand Total	**299**	**300**	**5**	**-**	

Three additional lights were found in the field. This is recorded as non-compliance above.

Database accuracy is detailed 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-Oct-19 To: 31-Aug-20	For the sample of lights checked, there were three additional lights found in the field. Potential impact: Low Actual impact: Low Audit history: Once previously Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are rated as moderate, the process in place has sufficient controls to ensure that all items of load are recorded in the database most of the time. The audit risk rating is assessed to be low as the overall database accuracy is within the acceptable range.

Actions taken to resolve the issue	Completion date	Remedial action status
Contact will work with NPDC and their agent to get the database updated with the correct values and attributes. Contact will also back date this correction and also adjust our submission volumes to ensure all consumption volume is accounted for since the previous audit.	31/12/2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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

The change management process and the compliance of the database reporting provided to Contact is detailed in **sections 3.1** and **3.2**.

RAMM

The RAMM 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

RAMM

The database has a complete audit trail.

Festival lights

These are largely being decommissioned and any remaining festive lights are going to be recorded in RAMM prior to the next festive season.

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

Contact's submissions are based on a monthly extract from the RAMM database. A RAMM database extract was provided in May 2020 and I assessed the accuracy of this by using the DUML Statistical Sampling Guideline. The table below shows the survey plan.

Plan Item	Comments
Area of interest	New Plymouth District Council streetlights
Strata	The database contains the NPDC items of load for the DUML ICPs in the New Plymouth Region. The processes for the management of all NPDC items of load are the same, but I decided to place the items of load into three strata: 1. Parks and NZTA 2. Roading (road names A-K); and 3. Roading (road names L-Z).
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 47 sub-units.
Total items of load	299 items of load were checked, making up 3% of the total database wattage.

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority against the database or in the case of LED lights against the LED light specification.

The change management process and timeliness of database updates was evaluated.

Audit commentary

Field audit findings

A field audit was conducted of a statistical sample of 299 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	100.0	Wattage from survey was found to be accurate
R_L	99.2	With a 95% level of confidence it can be concluded that the error could be between -0.8% and -1.8%
R_H	101.8	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 01/02/19. The table below shows that Scenario A (detailed below) applies, and the database was found to be within the acceptable accuracy range of within ±5.0%.

In absolute terms the installed capacity is estimated to be the same as the database indicates.

There is a 95% level of confidence that the installed capacity is between 4 kW lower to 8 kW higher than the database.

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

There is a 95% level of confidence that the annual consumption is between 15,900 and 35,700 kWh p.a. lower than the database indicates.

Compliance is confirmed.

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 %

Light description and capacity accuracy

As discussed in **section 2.4**, all lights have a lamp and gear wattage recorded. Lamp and gear wattages were compared to the expected values.

515 potential wattage discrepancies were identified, and specifications were requested to confirm that the correct wattage values had been recorded in the database. These have been passed to NPDC to confirm that the correct wattage has been applied but this information was not provided prior to the completion of this report and I repeat the recommendation from the last audit that the potential discrepancies are checked, and the database is updated as necessary.

Lamp make model	Qty	Database lamp wattage	Expected lamp wattage	Database gear wattage	Expected gear wattage
3202 Lucerna LED	8	30	33 or 43	0	0
ITALO 1 STAN1 4.7-4M	257	69.5	Unknown	0	0
ITALO 2 STAN1 4.5-7M	136	94	Unknown	0	0
LED Ropelight	1	10	Unknown	0	0
LED Stela Long 14NRN	64	21	Unknown	0	0
SPWP-24-50 RGBW 30 Degree Spot	16	50	Unknown	0	0
11W Compact Fluorescent	25			0	Unknown
18W Compact Fluorescent	6			0	2
20W PL Fluorescent	2			0	9

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	Confirm the correct lamp and gear wattages for the potential discrepancies described in **section 3.1**.	Contact will work with NPDC to review and either correct the data or provide additional information to support the database values.	Identified

ICP number accuracy

As reported in the last audit, there were 76 private streetlights (4,961 W) that did not have a valid ICP number recorded. Some of these were expected to be metered through the customer's installation or to have standard unmetered load created by the network. I was unable to confirm if this has been addressed during the audit period, so I have recommended in **section 2.1**, that this is investigated to ensure that these lights are being reconciled elsewhere.

In the last audit, the auditor found 19 streets with lights connected to more than one NSP that required investigation. These streets were compared against the Powerco LIS file and found two streets (four lights) below that are fed by one NSP therefore the highlighted cells indicate that these lights are recorded against the incorrect NSP and therefore ICP. These ICPs are in the same balancing area so there is no impact on submission. These lights are still recorded against the incorrect ICP. This is recorded as non-compliance.

Street	CST0331	HTI0331	HUI0331	SFD0331	Total
NELSON STREET	2		21		23
WEST QUAY	2		50		52

Change management process findings

Fault, maintenance and upgrade work is completed by NPE Tech. The RAMM database is either updated in the field using PDAs, or paper records are provided to the NPE Tech administration staff who update the database directly.

The ITS Contracts Manager – Transportation Team exports data from RAMM and validates changes to the database in the previous 90 days. This check includes identifying missing fields, and incorrect or inconsistent data including wattages, gear wattages, makes, and models. Power Solutions Limited also complete a monthly review of the data prior to reporting to Contact; and follow up any discrepancies with NPDC.

The process for new connections remains unchanged. NPDC is only responsible once the subdivision is "vested" in council. As soon as the electrical certificate is provided and the subdivision is complete, NPDC's development engineers check the lights and then advise NPE Tech to update the database. Development engineers regularly check new developments to monitor compliance and progress, which can help them to identify when streetlights are connected. In some cases, there may be a small delay between lights being connected and added to the database. NPDC notes that most subdivisions have less than 12 lights, and larger subdivisions are completed in stages, so the impact of any delays is minimal.

LED upgrades for NPDC lights have been completed, NZTA lights are still to be upgraded.

The RAMM database records an installation date. This is the date of vesting to the council which is when NPDC have assumed responsibility of the light. This is expected to the same date as livening but if vesting is delayed and the Distributor has livened the streetlights no volume will be submitted for that period. Powerco are reviewing their streetlight connection process to close this gap.

As recorded in the last audit, the change dates are automatically generated by RAMM when records change but cannot be selected by the user. Where a change is entered using Pocket RAMM at the time of the change, this date will reflect the correct date on which the change occurred, however if a change or correction is processed by NPE Tech administration staff at a later date, the change date may be incorrect.

Outage patrols are conducted monthly for the downtown NZTA lights. Reliance is placed on the faults process to identify issues with other lights.

Festival lights

Festival lights have largely been decommissioned. The remaining lights are planned to be recorded in RAMM before the next festive season.

Private lights

In the last audit it was noted that there were private lights that were not recorded with a valid ICP number and were excluded from the monthly wattage figures. I was unable to confirm if this has been addressed during the audit period, so I have re-recorded this in this audit. This is potentially resulting in an estimated annual under submission of up to 21,188 kWh per annum if these lights should be reconciled under the NPDC ICPs. I recommend in **section 2.1**, that this is investigated to confirm whether these items of load are being reconciled elsewhere. The lights are detailed in the table below:

ICP Group	Qty	Lamp W	Gear W	Total W
Private-Moturoa	42	2,128	340	2,468
Private-Carringt	24	1,735	310	2,045
Private-Huirangi	10	448	0	448
Private-Stratfor	0	0	0	0
Total	**76**	**4,311**	**650**	**4,961**

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Oct-19 To: 04-Sep-20	Four lights recorded against the incorrect ICP. Livening dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in RAMM at the time that the change occurs. Potential impact: Low Actual impact: Low Audit history: Three times Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are rated as moderate, as they are sufficient to mitigate the risk most of the time but there is room for improvement. The impact is assessed to be low as the overall database accuracy is high and the volume of errors found was low.

Actions taken to resolve the issue	Completion date	Remedial action status
Contact will work with NPDC to update the existing data to be the correct ICP.	31/12/2020	Investigating
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 the ICP has the correct profile and submission flag, and
- checking the database extract combined with the on hours against the submitted figure to confirm accuracy.

Audit commentary

Contact reconciles this DUML load as HHR using the HHR profile, in accordance with exemption number 177. This exemption is discussed further in **section 1.1**. Monthly wattage reports are provided by Power Solutions to Contact Energy. Data logger information and on and off times are derived from data logger information. I reviewed the submission information for May 2020 and confirmed that it was calculated accurately based on the database.

ICP 0008807417WMB53 has the RPS HHR profile recorded instead of HHR in the registry. The correct profile is applied for submission. This is recorded as non-compliance below.

Festive lights have been largely decommissioned. Any remaining festive lights are being added to the RAMM database.

Examination of the database found:

Issue	Estimated volume information impact (annual kWh)
Three additional lights found in the field audit	The database accuracy was found to be within the allowable +/- threshold so there is no impact to submission.
Four lights connected to the incorrect ICP	No impact on submission

In the last audit it was noted that there were private lights that were not recorded with a valid ICP number and were excluded from the monthly wattage figures. I was unable to confirm if this has been addressed during the audit period, so I have re-recorded this in this audit. This is potentially resulting in an estimated annual under submission of up to 21,188 kWh per annum if these lights should be reconciled under the NPDC ICPs. I recommend in **section 2.1**, that this is investigated to confirm whether these items of load are being reconciled elsewhere.

The field audit against the database quantities found that the database is confirmed as accurate with a 95% level of confidence. This is detailed in **section 3.1**.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed, and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

As reported in the last audit, the current monthly report is provided as a snapshot and this practice is non-compliant. When a wattage is changed in the database due to a physical change or a correction, only the record present at the time the report is run is recorded, not the historical information showing dates of changes. Contact completes revision submissions where corrections are required and have not yet updated their processes to be consistent with the Authority's memo.

The RAMM database records an installation date, which typically records the livening date for the light. There is no separate livening date.

Change dates are automatically generated by RAMM when records change but cannot be selected by the user. Where a change is entered using Pocket RAMM at the time of the change, this date will reflect the correct date on which the change occurred, however if a change or correction is processed by NPE Tech administration staff at a later date, the change date may be incorrect.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 01-Oct-19 To: 01-Aug-20	An incorrect profile is recorded on the registry for 0008807417WMB53. Four lights recorded against the incorrect NSP. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are recorded as the installation date for new connections, and change dates may not reflect the date of the change if they are not processed in RAMM at the time that the change occurs. Potential impact: Low Actual impact: Low Audit history: Three times Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls over the database are rated as moderate, as the processes to manage change will ensure accuracy most of the time. The audit risk rating is assessed to be low as the database accuracy was found to be high with only a minor number of discrepancies.

Actions taken to resolve the issue	Completion date	Remedial action status
Contact will correct the profile recorded against 0008807417WMB53. Contact is continuing to work with the customer to ensure that they are setup to deliver their data for any given time, as required by the EA. Contact will work with NPDC to ensure that their process for New Connections reflects actual usage.	Ongoing	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	

CONCLUSION

Streetlight load is determined by wattages held within NPDC's RAMM database. Fault, maintenance and upgrade work is managed by NPE Tech. The database is updated in the field using PDAs, or from the office by the NPE Tech administration team. Power Solutions Limited provides monthly reports from RAMM to Contact, including private and NZTA lighting.

The field audit confirmed that the database accuracy is within the allowable +/-5% and is confirmed as compliant.

Festive lighting has largely been decommissioned and the remaining lights are being added to RAMM prior to the next festive season from the excel spreadsheet that were recorded in.

In the last audit it was noted that there were private lights that were not recorded with a valid ICP number and were excluded from the monthly wattage figures. I was unable to confirm if this has been addressed during the audit period, so I have re-recorded this in this audit. I recommend that this is investigated to confirm whether these items of load are being reconciled elsewhere.

Contact reconciles this DUML load as HHR using the HHR profile, in accordance with exemption number 177. On and off times are derived from data logger information.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed, and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

The current monthly report is provided as a snapshot and is non-compliant, and Contact completes revision submissions where corrections are required. Contact has not yet updated their processes to be consistent with the Authority's memo.

The future risk rating of eight indicates that the next audit be completed in 18 months. I have taken this into consideration along with Contact's comments and I agree with this recommendation.

PARTICIPANT RESPONSE

Contact have reviewed this report and their comments are recorded in the report. No further comments were provided.