ELECTRICITY INDUSTRY PARTICIPATION CODE DISTRIBUTED UNMETERED LOAD AUDIT REPORT

Provera

For

CARTERTON DISTRICT COUNCIL AND MERCURY ENERGY LIMITED

NZBN: 9429037705305

Prepared by: Tara Gannon

Date audit commenced: 1 March 2024

Date audit report completed: 22 May 2024

Audit report due date: 1 June 2024

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This audit of the **Carterton District Council (CDC)** DUML database and processes was conducted at the request of **Mercury Energy Limited (Mercury)** 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.

A RAMM database is held by CDC. **Power Services Wairarapa (PSW)** are responsible for all field work including new connections, removals, repairs, and maintenance. Fulton Hogan inspect the work completed by PSW and provide support as necessary. PSW update RAMM using mobile devices in the field, and the information is then downloaded onto Fulton Hogan's PC.

The field audit found that the best available estimate indicates that the database is not accurate within ±5.0%. In absolute terms, total annual consumption is estimated to be 4,400 kWh higher than the DUML database indicates. A small number of exceptions were found, and if we take into account that the Pembroke SL lights are to be removed from the database soon and exclude them from the analysis, the database is considered to be accurate within ±5.0%.

Mercury reconciles this DUML load using the HHR profile. Mercury was granted exemption No. 233, which allowed them to provide HHR submission information instead of NHH submission information for DUML. Clause 8(g) of schedule 15.3 of the Code, which the exemption related to was removed from the Code in 2018, and the exemption is no longer valid. Mercury is planning to apply for a new profile which will allow them to continue to submit the DUML load as HHR.

Wattages are derived from monthly database extracts provided by CDC, and on and off times are derived from a data logger. I checked the submission information for March 2024 and confirmed that the process to calculate submission volumes was operating as expected, but an error was made when determining the kW for submission for ICP 0020903000WRADA. Mercury had applied the wattage for all ICPs in the extract (30,355W) instead of only DUML ICP 0020903000WRADA (27,775W) resulting in over submission of 2,580 W or 941 kWh. Mercury intends to correct and wash up corrected submission information.

Mercury confirmed that accurate revised submission data was provided within the 14-month submission window for the previous audit issue relating to load for Waka Kotahi lights being incorrectly submitted against ICP 0020903000WRADA. I confirmed that the database extract provided for submission excludes Waka Kotahi lights.

The audit found five non-compliances, and the future risk rating of eight indicates that the next audit be completed in 18 months. Given the low impact of the non-compliances, that the submission inaccuracy from the previous audit has been cleared, and that the submission inaccuracy from the current audit is in the process of being cleared, I 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	The DUML load is submitted using HHR profile, without an exemption in place. The field audit found that the best available estimate indicates that the database is not accurate within ±5.0%. In absolute terms, total annual consumption is estimated to be 4,400 kWh higher than the DUML database indicates. If we take into account that the Pembroke SL lights are to be removed from the database soon and exclude them from the analysis, the database is considered to be accurate within ±5.0%. An error was made when determining the kW for submission for ICP 0020903000WRADA for March 2024. Mercury had applied the wattage for all ICPs in the extract (30,355W) instead of only DUML ICP 0020903000WRADA (27,775W) resulting in over submission of 2,580 W or 941 kWh. Mercury intends to correct and wash up corrected submission information. Asset ID 1406 has a lamp wattage of zero but 100W was expected, resulting in potential under submission of 427.10 kWh per annum. 14 L500 150W have a 14W gear wattage but 18W is expected, resulting in potential under submission of 239.2 kWh per annum. Asset ID 660 has make and model = Vizulo Mini Martin but a lamp wattage of 70W and gear wattage of 13W. Other lights of the same type are recorded in the database with lamp wattage of 28W and gear wattage of zero. This results in potential over submission of 234.9 kWh per annum. The monthly database extract is provided as a snapshot.	Moderate	Low	2	Identified
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	Asset ID 1406 has a lamp wattage of zero but 100W was expected.	Strong	Low	1	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
All load recorded in database	2.5	11(2A) of Schedule 15.3	One L27 opposite the boundary of 8 Endelave Way was not recorded in the database.	Strong	Low	1	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	The field audit found that the best available estimate indicates that the database is not accurate within ±5.0%. In absolute terms, total annual consumption is estimated to be 4,400 kWh higher than the DUML database indicates. If we take into account that the Pembroke SL lights are to be removed from the database soon and exclude them from the analysis, the database is considered to be accurate within ±5%. Asset ID 1406 has a lamp wattage of zero but 100W was expected, resulting in potential under submission of 427.10 kWh per annum. 14 L500 150W have a 14W gear wattage but 18W is expected, resulting in potential under submission of 239.2 kWh per annum. Asset ID 660 has make and model = Vizulo Mini Martin but a lamp wattage of 70W and gear wattage of 13W. Other lights of the same type are recorded in the database with lamp wattage of 28W and gear wattage of zero. This results in potential over submission of 234.9 kWh per annum.	Moderate	Low	2	Identified
Volume information accuracy	3.2	15.2 and 15.37B(c)	The DUML load is submitted using HHR profile, without an exemption in place. The field audit found that the best available estimate indicates that the database is not accurate within ±5.0%. In absolute terms, total annual consumption is estimated to be 4,400 kWh higher than the DUML database indicates. If we take into account that the Pembroke SL lights are to be removed from the database soon and exclude them from the analysis, the database is considered to be accurate within ±5.0%. An error was made when determining the kW for submission for ICP 0020903000WRADA for March 2024. Mercury had applied the wattage for all ICPs in the extract (30,355W) instead of only DUML ICP 0020903000WRADA (27,775W) resulting in over submission	Moderate	Low	2	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			of 2,580 W or 941 kWh. Mercury intends to correct and wash up corrected submission information. Asset ID 1406 has a lamp wattage of zero but 100W was expected, resulting in potential under submission of 427.10 kWh per annum. 14 L500 150W have a 14W gear wattage but 18W is expected, resulting in potential under submission of 239.2 kWh per annum. Asset ID 660 has make and model = Vizulo Mini Martin but a lamp wattage of 70W and gear wattage of 13W. Other lights of the same type are recorded in the database with lamp wattage of 28W and gear wattage of zero. This results in potential over submission of 234.9 kWh per annum. The monthly database extract is provided as a snapshot.				
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
		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

Current code exemptions were reviewed on the Electricity Authority website.

Audit commentary

Mercury were granted exemption No. 233, which allowed them to provide half-hour ("HHR") submission information instead of non-half-hour ("NHH") submission information for distributed unmetered load ("DUML"). Clause 8(g) of schedule 15.3 of the Code, which the exemption related to was removed from the Code in 2018, therefore the exemption is no longer valid.

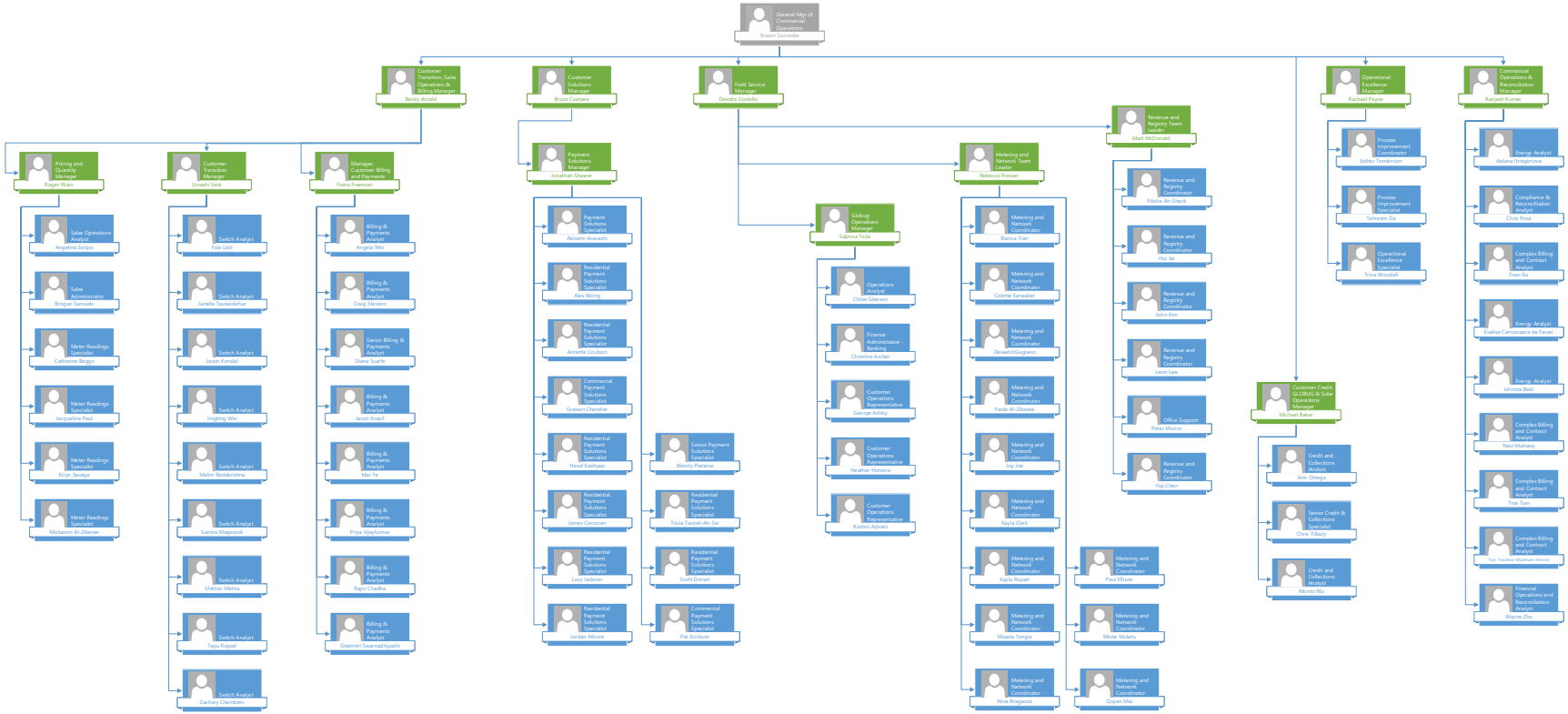
Mercury currently submits the DUML load as HHR, which is non-compliant with clause 8(5) of schedule 15.3 of the Code, because the DUML load does not meet the requirements for use of the HHR profile:

> *For any unmetered load at an ICP for which it is responsible, regardless of the category of any metering installation at the ICP, a reconciliation participant must provide non-half-hour submission information to the reconciliation manager unless—*
>
> *(a) the Authority has approved a profile for the unmetered load that allows the reconciliation participant to provide half hour submission information to the reconciliation manager for the unmetered load; and*
>
> *(b) the reconciliation participant provides half hour submission information in accordance with the profile.*

Mercury is planning to apply for a new profile which will allow them to continue to submit the DUML load as HHR.

1.2. Structure of Organisation

Mercury provided their current organisational structure:



1.3. Persons involved in this audit

Auditor:

Name	Title	Company
Tara Gannon	Lead auditor	Provera
Brett Piskulic	Supporting auditor	Provera

Other personnel assisting in this audit were:

Name	Title	Company
Chris Posa	Compliance Reconciliation Analyst	Mercury Energy
Graham Carson	Roading Asset Management Officer	Carterton District Council

1.4. Hardware and Software

RAMM

The SQL database used for the management of DUML is remotely hosted by thinkproject New Zealand Limited. The database is commonly known as "RAMM" which stands for "Road Assessment and Maintenance Management". The specific data used for DUML is held in the Streetlight tables. thinkproject New Zealand Limited backs up the database and assists with disaster recovery as part of their hosting service.

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

Mercury systems

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

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)*
0020903000WRADA	CDC Streetlights MST0331	MST0331	HHR	648	27,775

*The totals exclude Waka Kotahi lights. The database also contains metered ICPs 0063024000WR98D, 0063068001WR5DD and 0666003741PC35F and 12 solar powered lights.

1.7. Authorisation Received

All information was provided directly by Mercury and CDC.

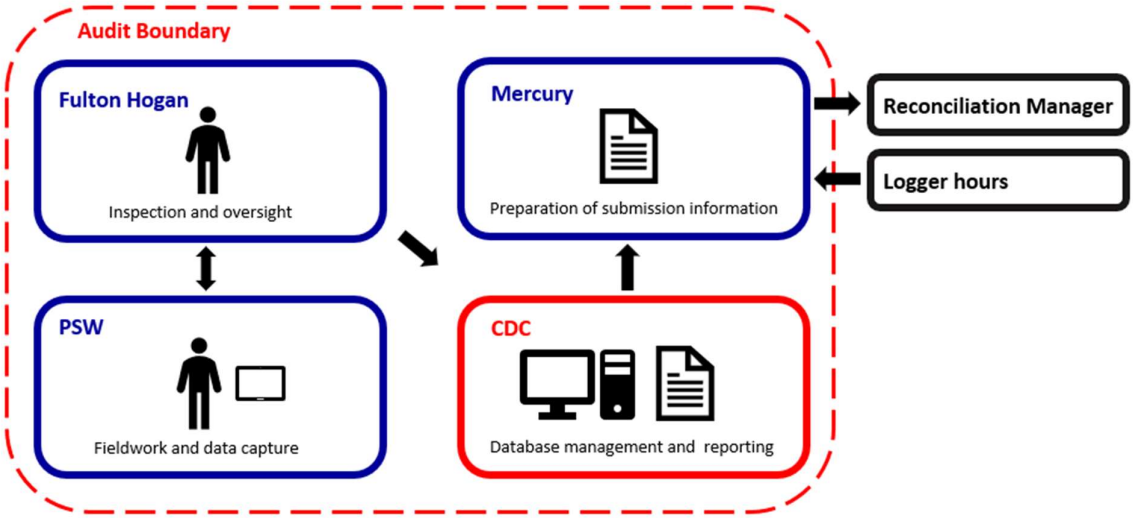
1.8. Scope of Audit

This audit of the CDC DUML database and processes was conducted at the request of Mercury 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.

A RAMM database is held by CDC. PSW are responsible for all field work including new connections, removals, repairs, and maintenance. Fulton Hogan inspect the work completed by PSW and provide support as necessary. PSW update RAMM using mobile devices in the field, and the information is then downloaded onto Fulton Hogan's PC.

Mercury reconciles this DUML load using the HHR profile, and the volume is calculated using wattages from a monthly RAMM extract from CDC and on hours from a data logger. Mercury was granted exemption No. 233, which allowed them to provide HHR submission information instead of NHH submission information for DUML. Clause 8(g) of Schedule 15.3 of the Code, which the exemption related to was removed from the Code in 2018, and the exemption is no longer valid. Mercury is planning to apply for a new profile which will allow them to continue to submit the DUML load as HHR.

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 113 items of load on 9 May 2024.

1.9. Summary of previous audit

The previous audit of this database was undertaken by Tara Gannon of Veritek Limited in May 2023. The summary table below shows the statuses of the non-compliances raised in the previous audit. Further comment is made in the relevant sections of this report.

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	Waka Kotahi lights in the Carterton district have historically been submitted by both Waka Kotahi's trader and Mercury Energy resulting in estimated annual over submission of 56,394 kWh per annum. The Waka Kotahi lights need to be excluded from revision submissions from June 2021 onwards, and corrected revision submissions need to be provided. The monthly database extract is provided as a snapshot.	Cleared Still existing
Volume information accuracy	3.2	15.2 and 15.37B(c)	Waka Kotahi lights in the Carterton district have historically been submitted by both Waka Kotahi's trader and Mercury Energy resulting in estimated annual over submission of 56,394 kWh per annum. The Waka Kotahi lights need to be excluded from revision submissions from June 2021 onwards, and corrected revision submissions need to be provided. The monthly database extract is provided as a snapshot.	Cleared 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

Mercury have requested Provera 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

Submission data accuracy

Mercury reconciles this DUML load using the HHR profile. Mercury was granted exemption No. 233, which allowed them to provide HHR submission information instead of NHH submission information for DUML. Clause 8(g) of schedule 15.3 of the Code, which the exemption related to was removed from the Code in 2018, and the exemption is no longer valid. Mercury is planning to apply for a new profile which will allow them to continue to submit the DUML load as HHR.

Wattages are derived from monthly database extracts provided by CDC, and on and off times are derived from a data logger. I checked the submission information for March 2024 and confirmed that the process to calculate submission volumes was operating as expected, but an error was made when determining the kW for submission for ICP 0020903000WRADA. Mercury had applied the wattage for all ICPs in the extract (30,355W) instead of only DUML ICP 0020903000WRADA (27,775W) resulting in over submission of 2,580 W or 941 kWh. Mercury intends to correct and wash up corrected submission information.

Mercury confirmed that accurate revised submission data was provided within the 14-month submission window for the previous audit issue relating to load for Waka Kotahi lights being incorrectly submitted against ICP 0020903000WRADA. I confirmed that the database extract provided for submission excludes Waka Kotahi lights.

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.

Mercury is able to produce submissions with different kW values for different days (including to account for festive lights when connected) and produces revision submissions where required. The monthly report is provided as a snapshot reflecting the current details for each light on the day the report is generated, but CDC supplies dates that festive lights are connected, so that they can be correctly included in submission data for the days they are connected. For any other lights which have changes

during a month, only the current value when the extract is run is provided in the extract and included in submissions.

Database accuracy

The database contains some inaccurate information:

Discrepancy	Potential impact on submission
The field audit found that the best available estimate indicates that the database is not accurate within ±5.0%. If we take into account that the Pembroke SL lights are to be removed from the database soon and exclude them from the analysis, the database is considered to be accurate within ±5.0%.	Under submission 4,400 kWh per annum
Asset ID 1406 has a lamp wattage of zero but 100W was expected.	Under submission of 427.10 kWh per annum
14 L500 150W have a 14W gear wattage but 18W is expected.	Under submission of 239.2 kWh per annum.
Asset ID 660 has make and model = Vizulo Mini Martin but a lamp wattage of 70W and gear wattage of 13W. Other lights of the same type are recorded in the database with lamp wattage of 28W and gear wattage of zero.	Over submission of 234.9 kWh per annum.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3	The DUML load is submitted using HHR profile, without an exemption in place. The field audit found that the best available estimate indicates that the database is not accurate within ±5.0%. In absolute terms, total annual consumption is estimated to be 4,400 kWh higher than the DUML database indicates. If we take into account that the Pembroke SL lights are to be removed from the database soon and exclude them from the analysis, the database is considered to be accurate within ±5.0%. An error was made when determining the kW for submission for ICP 0020903000WRADA for March 2024. Mercury had applied the wattage for all ICPs in the extract (30,355W) instead of only DUML ICP 0020903000WRADA (27,775W) resulting in over submission of 2,580 W or 941 kWh. Mercury intends to correct and wash up corrected submission information. Asset ID 1406 has a lamp wattage of zero but 100W was expected, resulting in potential under submission of 427.10 kWh per annum. 14 L500 150W have a 14W gear wattage but 18W is expected, resulting in potential under submission of 239.2 kWh per annum. Asset ID 660 has make and model = Vizulo Mini Martin but a lamp wattage of 70W and gear wattage of 13W. Other lights of the same type are recorded in the database with lamp wattage of 28W and gear wattage of zero. This results in potential over submission of 234.9 kWh per annum. The monthly database extract is provided as a snapshot.

From: 01-Mar-24 To: 09-May-24	Potential impact: Low Actual impact: Low Audit history: Multiple times Controls: Moderate Breach risk rating: 2

Audit risk rating	Rationale for audit risk rating
Low	The controls are moderate because they ensure most information is accurate. The impact is low based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
We are in the process of drafting profile applications that once approved by the EA will allow us to submit HHR for DUML without being non-compliant. Plan to submit the applications to the EA before the end of June 2024 Mercury is correcting and doing a washup for the ICP error. Carterton plan to carry out their own full field audit to ensure that the database is 100% accurate. For Carterton providing a snapshot is the only practical way at this stage.	June 2024	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Following their own checks to ensure that the database is 100% accurate, Carterton plans to implement a new process to ensure that any changes in the field are recorded in the database.	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 was recorded against each item of load.

Audit commentary

All connected items of load that CDC is responsible for have a valid ICP number recorded in the database.

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 locations for all items of load, and I checked the count of items recorded on the RAMM maps against the total number of items of load.

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

RAMM records luminaire make, model, lamp wattage and gear wattage.

All items of load connected to DUML ICP 0020903000WRADA have a valid lamp and gear model description, and a non-zero lamp wattage and a valid gear wattage except asset ID 1406 which has lamp wattage of zero, but 100W is expected. The other lamp details were accurately recorded including description and gear wattage.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.4 With: Clause 11(2)(c) and (d) of Schedule 15.3 From: 09-May-24 To: 09-May-24	Asset ID 1406 has a lamp wattage of zero but 100W was expected. Potential impact: Low Actual impact: Low Audit history: None Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are strong, because only one missing lamp wattage was identified. The impact is low, because the error is expected to result in under submission of 427.10 kWh per annum.

Actions taken to resolve the issue	Completion date	Remedial action status
Carterton advised that this item will be getting removed from the database as the council is no longer the owner of that particular site and the lights will be physically removed.	June 2024	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
As above.	N/A	

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 113 items of load on 9 May 2024. The sample was selected from two strata, as follows:

- road names A to Main Road Urban North, and
- road names A to Main Road Urban South to Z.

Audit commentary

The following differences were identified during the field audit.

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
ENDELAVE WAY	7	8	1	2	Two L27 near the corner of Takahe Drive were recorded in the database as 33W Windsor Trafalgar. One L27 opposite the boundary of 8 Endelave Way was not recorded in the database.
PEMBROKE SL	3	3	-	1	One Windsor 100W was recorded in the database as a 28W LED. CDC advised that they believed the light details were correctly recorded and all three lights at Pembroke SL are expected to move to being privately owned with their own ICPs in the near future.
Total	**113**	**114**	**1**	**3**	

The field audit found one item of load not recorded in the database for the 113 items sampled. This is recorded as non-compliance below. The other database inaccuracies are recorded as non-compliance in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 09-May-24 To: 09-May-24	One L27 opposite the boundary of 8 Endelave Way was not recorded in the database. Potential impact: Low Actual impact: Low Audit history: None Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are strong, and the impact is low because only one missing light was identified.

Actions taken to resolve the issue	Completion date	Remedial action status
Carterton confirmed that they will be updating the database to include this item.	June 2024	Identified

Preventative actions taken to ensure no further issues will occur	Completion date	
Following their own checks to ensure that the database is 100% accurate, Carterton plans to implement a new process to ensure that any changes in the field are recorded in the database.	Ongoing	

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 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 records audit trail information of changes made.

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

Mercury's submissions are based on a monthly extract from the RAMM database. A database extract was obtained from RAMM in May 2024, 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	Carterton DC streetlights
Strata	The database contains 746 items of load in the Carterton DC region. The management process is the same for all lights. I created two strata: • road names A to Main Road Urban North, and • road names A to Main Road Urban South to 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 19 sub-units.
Total items of load	113 items of load were checked, making up 10% of the 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 113 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	102.5%	Wattage from survey is higher than the database wattage by 2.5%
R_L	100.0%	With a 95% level of confidence, it can be concluded that the error could be between 0.00 and 10.9%
R_H	110.9%	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 1 February 2019. The table below shows that Scenario C (detailed below) applies, and the best available estimate indicates that the database is not accurate within ± 5.0%.

- In absolute terms, the wattage is estimated to be 1 kW higher than the database indicates.

- There is a 95% level of confidence that the installed capacity is between 0 and 5 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 4,400 kWh per annum higher than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between zero and 19,300 kWh per annum higher than the database indicates.

If we take into account that the Pembroke SL lights are to be removed from the database soon and exclude them from the analysis, the database is considered to be accurate within ±5%.

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 items of load connected to DUML ICP 0020903000WRADA have a valid lamp and gear model description, and a non-zero lamp wattage and a valid gear wattage except asset ID 1406 which has lamp wattage of zero, but 100W is expected. The other lamp details were accurately recorded including description and gear wattage.

Lamp and gear wattages for all other lamps were compared to the expected values for ICP 0020903000WRADA. All were as expected except:

- 14 GL500 150W which have a 14W gear wattage but 18W is expected, resulting in under submission of 56W or 239.2 kWh per annum, and
- asset ID 660 has make and model = Vizulo Mini Martin but a lamp wattage of 70W and gear wattage of 13W; other lights of the same type are recorded in the database with lamp wattage of 28W and gear wattage of zero so over submission of 55W or 234.9 kWh is occurring.

Change management process findings

PSW are responsible for all field work including new connections, removals, repairs, and maintenance. Fulton Hogan inspect the work completed by PSW and provide support as necessary. PSW update RAMM using mobile devices in the field, and the information is then downloaded onto Fulton Hogan's PC.

For new connections, CDC is only responsible once the subdivision is "vested" in council. Developers install the lights and provide "as built" plans and request a section 224 subdivision certification. Once the roading team receives the light details as part of this process they are updated in RAMM. The roading team has asked developers not to liven the lights until this process is complete, and staff periodically check pending new connections at night to determine whether they have been connected early. Most new subdivisions in the region are rural and do not have streetlights, and it is estimated that two or three new subdivisions are connected per annum.

LED upgrades are complete apart from a small number of amenities, parks, community housing and a small number of roading lights. There are no plans to use dimming.

Outage patrols are conducted every four months by Fulton Hogan, and patrols in Carterton, Featherston, Greytown and Martinborough are completed on a rolling basis. They do not check that lights present in the field match the database as part of this process. Outages are also reported by residents within the CDC region and work orders are raised with PSW as required.

Festive lights

A small number of festive lights are recorded in the database against ICP 0020903000WRADA. They are attached to existing streetlight poles each festive season on instruction from the CDC parks team. They are switched on and off by PSW, and the festive light wattages, connection and disconnection dates are added to the database extract provided to Mercury during months where the festive lights are connected.

Private lights

To the best of CDC's knowledge, all unmetered streetlights are recorded in the database. Some lights recorded in the database are owned by private organisations such as Salvation Army housing and are included in extracts and submissions.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b)	The field audit found that the best available estimate indicates that the database is not accurate within ±5.0%. In absolute terms, total annual consumption is estimated to be 4,400 kWh higher than the DUML database indicates. If we take into account that the Pembroke SL lights are to be removed from the database soon and exclude them from the analysis, the database is considered to be accurate within ±5%. Asset ID 1406 has a lamp wattage of zero but 100W was expected, resulting in potential under submission of 427.10 kWh per annum. 14 L500 150W have a 14W gear wattage but 18W is expected, resulting in potential under submission of 239.2 kWh per annum. Asset ID 660 has make and model = Vizulo Mini Martin but a lamp wattage of 70W and gear wattage of 13W. Other lights of the same type are recorded in the database

From: 01-Mar-24 To: 09-May-24	with lamp wattage of 28W and gear wattage of zero. This results in potential over submission of 234.9 kWh per annum. Potential impact: Low Actual impact: Low Audit history: Multiple times Controls: Moderate Breach risk rating: 2

Audit risk rating	Rationale for audit risk rating
Low	The controls are moderate because they ensure most information is accurate. The impact is low based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Carterton plan to carry out their own full field audit to ensure that the database is 100% accurate.	June 2024	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Following their own checks to ensure that the database is 100% accurate, Carterton plans to implement a new process to ensure that any changes in the field are recorded in the database	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 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

Submission data accuracy

Mercury reconciles this DUML load using the HHR profile. Mercury was granted exemption No. 233, which allowed them to provide HHR submission information instead of NHH submission information for

DUML. Clause 8(g) of schedule 15.3 of the Code, which the exemption related to, was removed from the Code in 2018, and the exemption is no longer valid. Mercury is planning to apply for a new profile which will allow them to continue to submit the DUML load as HHR.

Wattages are derived from monthly database extracts provided by CDC, and on and off times are derived from a data logger. I checked the submission information for March 2024 and confirmed that the process to calculate submission volumes was operating as expected, but an error was made when determining the kW for submission for ICP 0020903000WRADA. Mercury had applied the wattage for all ICPs in the extract (30,355W) instead of only DUML ICP 0020903000WRADA (27,775W) resulting in over submission of 2,580 W or 941 kWh. Mercury intends to correct and wash up corrected submission information.

Mercury confirmed that accurate revised submission data was provided within the 14-month submission window for the previous audit issue relating to load for Waka Kotahi lights being incorrectly submitted against ICP 0020903000WRADA. I confirmed that the database extract provided for submission excludes Waka Kotahi lights.

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.

Mercury is able to produce submissions with different kW values for different days (including to account for festive lights when connected) and produces revision submissions where required. The monthly report is provided as a snapshot reflecting the current details for each light on the day the report is generated, but CDC supplies dates that festive lights are connected, so that they can be correctly included in submission data for the days they are connected. For any other lights which have changes during a month, only the current value when the extract is run is provided in the extract and included in submissions.

Database accuracy

The database contains some inaccurate information:

Discrepancy	Potential impact on submission
The field audit found that the best available estimate indicates that the database is not accurate within ±5.0%. If we take into account that the Pembroke SL lights are to be removed from the database soon and exclude them from the analysis, the database is considered to be accurate within ±5.0%.	Under submission 4,400 kWh per annum
Asset ID 1406 has a lamp wattage of zero but 100W was expected.	Under submission of 427.10 kWh per annum
14 L500 150W have a 14W gear wattage but 18W is expected.	Under submission of 239.2 kWh per annum.
Asset ID 660 has make and model = Vizulo Mini Martin but a lamp wattage of 70W and gear wattage of 13W. Other lights of the same type are recorded in the database with lamp wattage of 28W and gear wattage of zero.	Over submission of 234.9 kWh per annum.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 01-Mar-24 To: 09-May-24	The DUML load is submitted using HHR profile, without an exemption in place. The field audit found that the best available estimate indicates that the database is not accurate within ±5.0%. In absolute terms, total annual consumption is estimated to be 4,400 kWh higher than the DUML database indicates. If we take into account that the Pembroke SL lights are to be removed from the database soon and exclude them from the analysis, the database is considered to be accurate within ±5.0%. An error was made when determining the kW for submission for ICP 0020903000WRADA for March 2024. Mercury had applied the wattage for all ICPs in the extract (30,355W) instead of only DUML ICP 0020903000WRADA (27,775W) resulting in over submission of 2,580 W or 941 kWh. Mercury intends to correct and wash up corrected submission information. Asset ID 1406 has a lamp wattage of zero but 100W was expected, resulting in potential under submission of 427.10 kWh per annum. 14 L500 150W have a 14W gear wattage but 18W is expected, resulting in potential under submission of 239.2 kWh per annum. Asset ID 660 has make and model = Vizulo Mini Martin but a lamp wattage of 70W and gear wattage of 13W. Other lights of the same type are recorded in the database with lamp wattage of 28W and gear wattage of zero. This results in potential over submission of 234.9 kWh per annum. The monthly database extract is provided as a snapshot. Potential impact: Low Actual impact: Low Audit history: Multiple times Controls: Moderate Breach risk rating: 2

Audit risk rating	Rationale for audit risk rating
Low	The controls are moderate because they ensure most information is accurate. The impact is low based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
We are in the process of drafting profile applications that once approved by the EA will allow us to submit HHR for DUML without being non-compliant. Plan to submit the applications to the EA before the end of June 2024 Mercury is correcting and doing a washup for the ICP error. Carterton plan to carry out their own full field audit to ensure that the database is 100% accurate. For Carterton providing a snapshot is the only practical way at this stage.	June 2024	Identified

Preventative actions taken to ensure no further issues will occur	Completion date	
Following their own checks to ensure that the database is 100% accurate, Carterton plans to implement a new process to ensure that any changes in the field are recorded in the database	Ongoing	

CONCLUSION

The field audit found that the best available estimate indicates that the database is not accurate within ±5.0%. In absolute terms, total annual consumption is estimated to be 4,400 kWh higher than the DUML database indicates. A small number of exceptions were found, and if we take into account that the Pembroke SL lights are to be removed from the database soon and exclude them from the analysis, the database is considered to be accurate within ±5.0%.

Mercury reconciles this DUML load using the HHR profile. Mercury was granted exemption No. 233, which allowed them to provide HHR submission information instead of NHH submission information for DUML. Clause 8(g) of schedule 15.3 of the Code, which the exemption related to, was removed from the Code in 2018, and the exemption is no longer valid. Mercury is planning to apply for a new profile which will allow them to continue to submit the DUML load as HHR.

Wattages are derived from monthly database extracts provided by CDC, and on and off times are derived from a data logger. I checked the submission information for March 2024 and confirmed that the process to calculate submission volumes was operating as expected, but an error was made when determining the kW for submission for ICP 0020903000WRADA. Mercury had applied the wattage for all ICPs in the extract (30,355W) instead of only DUML ICP 0020903000WRADA (27,775W) resulting in over submission of 2,580 W or 941 kWh. Mercury intends to correct and wash up corrected submission information.

Mercury confirmed that accurate revised submission data was provided within the 14-month submission window for the previous audit issue relating to load for Waka Kotahi lights being incorrectly submitted against ICP 0020903000WRADA. I confirmed that the database extract provided for submission excludes Waka Kotahi lights.

The audit found five non-compliances, and the future risk rating of eight indicates that the next audit be completed in 18 months. Given the low impact of the non-compliances, that the submission inaccuracy from the previous audit has been cleared, and that the submission inaccuracy from the current audit is in the process of being cleared, I agree with this recommendation.

PARTICIPANT RESPONSE

Thank you to Tara for her work on the audit. We're pleased to see an improvement in compliance since the last audit. Based on our discussions with Carterton DC we are confident that they have a good handle on it, are conscious of compliance and we will continue to see improvement.