

ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT



For

NZTA ROTORUA AND MERCURY NZ LTD

Prepared by: Steve Woods Veritek Limited

Date audit commenced: 26 July 2024

Date audit report completed: 2 August 2024

Audit report due date: 05 August 2024

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EXECUTIVE SUMMARY

This audit of the **Rotorua - NZTA (NZTA Rotorua)** DUML database and processes was conducted at the request of **Mercury NZ 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 data in this database was previously in the Rotorua Lakes District Council database but was transferred to a new database on 1 April 2024. The first submission occurred on 5 May 2024; therefore, the audit is due three months following that date, which is 5 August 2024.

Mercury reconciles this DUML load using the HHR profile. Mercury had Exemption 233 that allowed them to provide non-half-hour (“NHH”) submission information instead of half-hour (“HHR”) submission information for distributed unmetered load (“DUML”). This exemption expired on 31st October 2023. Mercury is in the process for applying for a new exemption. The use of the HHR profile is recorded as non-compliance. kWh figures are based on a monthly report supplied by NZTA.

The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 100,900 kWh per annum.

The field audit identified 124 discrepancies, which is a 33% error rate. The discrepancies are summarised as follows. A detailed spreadsheet has been supplied to Mercury and NZTA.

Discrepancy	Quantity
Lights in the field not in the database	3
Lights in the database not in the field	5
Incorrect wattage	116

I recommend a full audit is conducted to ensure submission and invoicing is accurate.

This audit found four non-compliances and three recommendations are made. The future risk rating of 30 indicates that the next audit be completed in three months. I have considered this in conjunction with the comments from Mercury, and I recommend the next audit is conducted in six months to allow sufficient time for Mercury to engage with NZTA and to arrange for a full field audit.

The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Deriving submission information	2.1	11(1) of schedule 15.3	The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 100,900 kWh per annum.	Weak	High	9	Identified
All load recorded in database	2.5	11(2A) and (d) of schedule 15.3	Three additional items of load found in the field.	Weak	Low	3	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 100,900 kWh per annum.	Weak	High	9	Identified
Volume information accuracy	3.2	15.2 and 15.37B(c)	The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 100,900 kWh per annum.	Weak	High	9	Identified
Future Risk Rating						30	

Future risk rating	1-3	4-6	7-8	9-17	18-26	27+
Indicative audit frequency	36 months	24 months	18 months	12 months	6 months	3 months

RECOMMENDATIONS

Subject	Section	Recommendation
Database Accuracy	3.1	Conduct a full audit of the database to improve accuracy.
		Review quality control processes to ensure database updates are accurate.
		Mercury to liaise with relevant networks for NZTA new connections.

ISSUES

Subject	Section	Description	Issue
		Nil	

1.3. Persons involved in this audit

Auditor:

Steve Woods

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Chris Posa	Compliance and Reconciliation Analyst	Mercury
Kara Atkinson	Consultant	NZ Streetlighting
Denys Taylor	Network Manager - Bay of Plenty East	NZTA
Andreas Senger		NZTA

1.4. Hardware and Software

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.

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)
0000043655HR678	STREETLIGHTING - GXP ROT0331	ROT0331	HHR	519	94,492
0000043659HR566	STREETLIGHTING - GXP OWH0111	OWH0111	HHR	277	38,032
0000043662HRC4A	STREETLIGHTING - GXP TRK0111	TRK0111	HHR	60	9,286
0001264719UNFA1	STREETLIGHTING - GXP ROT0111	ROT0111	HHR	319	71,880

1.7. Authorisation Received

All information was provided directly by Mercury and NZTA.

1.8. Scope of Audit

This audit of the Rotorua - NZTA (NZTA Rotorua) 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.

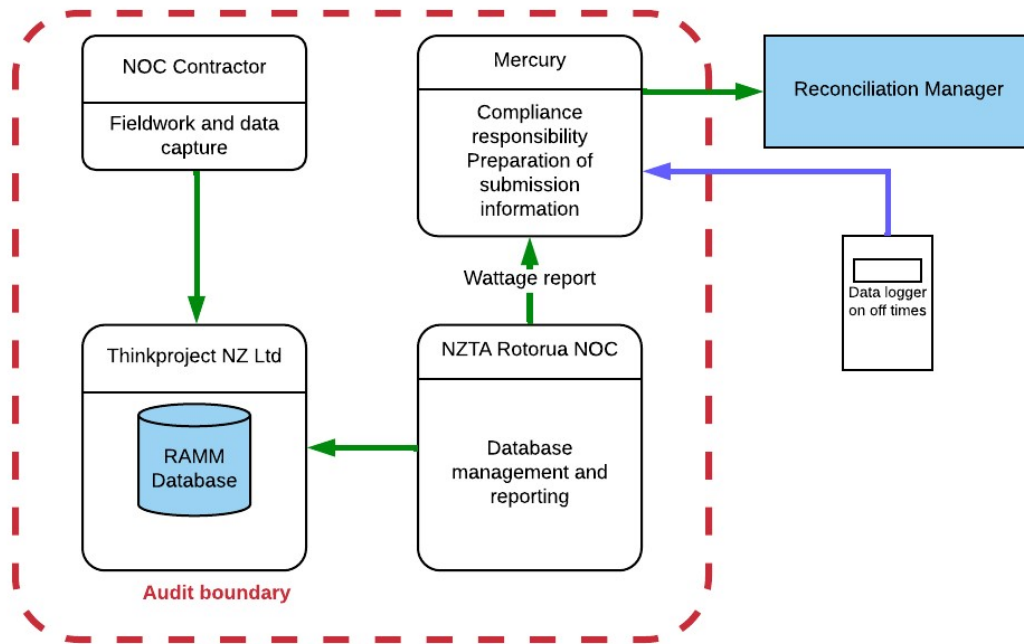
The data in this database was previously in the Rotorua Lakes District Council database but was transferred to a new database on 1 April 2024. The first submission occurred on 5 May 2024; therefore, the audit is due three months following that date, which is 5 August 2024.

Mercury uses the HHR profile for submission and the kWh figures are based on a monthly report supplied by NZTA.

NZTA requires the NOC to maintain the RAMM database as part of their contract for maintenance carried out on the network. Contractors use pocket RAMM to track changes. Claims are submitted by the 28th of each month for all work carried out for the month prior. Install dates are being used by contractors when tracking changes in RAMM. Reporting of this activity is in development but is expected to provide Mercury with a monthly wattage report that tracks changes at a daily level.

The NOC contractor is required to have an internal quality control process to ensure that updates are accurate.

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.



A field audit was undertaken of a sample of 374 items of load on 26 and 27 July 2024.

1.9. Summary of previous audit

This is the first audit undertaken of this database by Mercury.

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 Veritek to undertake this streetlight audit.

Audit commentary

Provision of this report confirms compliance is achieved.

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.

Audit commentary

Mercury reconciles this DUML load using the HHR profile. Mercury had Exemption 233 that allowed them to provide non-half-hour (“NHH”) submission information instead of half-hour (“HHR”) submission information for distributed unmetered load (“DUML”). This exemption expired on 31st October 2023. Mercury is in the process for applying for a new exemption. The use of the HHR profile is recorded as non-compliance. kWh figures are based on a monthly report supplied by NZTA.

I checked the submissions for June 2024, and they matched the database.

The field audit found that in absolute terms, total annual consumption is estimated to be 100,900 kWh lower than the DUML database indicates.

Audit outcome

Non-compliant

Non-compliance	Description	
Audit Ref: 2.1 With: Clause 11(1) of schedule 15.3 From: 01-Apr-24 To: 31-Jul-24	The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 100,900 kWh per annum. HHR profile used without an exemption. Potential impact: High Actual impact: High Audit history: None Controls: Weak Breach risk rating: 9	
Audit risk rating	Rationale for audit risk rating	
High	The controls are recorded as weak because they do not ensure the database is updated with changes made in the field. The audit risk rating is high because of the impact on annual kWh.	
Actions taken to resolve the issue	Completion date	Remedial action status

We will discuss the audit results with the customer and recommend that they carry out a full audit of the database to improve the accuracy.	August 2024	Identified
Preventative actions taken to ensure no further issues will occur	Completion date	
As above.	N/A	

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

An ICP is recorded for each item of load.

Audit outcome

Compliant

2.3. Location of each item of load (Clause 11(2)(b) of Schedule 15.3)

Code reference

Clause 11(2)(b) of schedule 15.3

Code related audit information

The DUML database must contain the location of each DUML item.

Audit observation

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

Audit commentary

The database contains GPS coordinates for all 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 lamp type and wattage capacity and included any ballast or gear wattage.

Audit commentary

Lamp make, model and lamp wattage are included in the database.

Audit outcome

Compliant

2.5. All load recorded in database (Clause 11(2A) of Schedule 15.3)

Code reference

Clause 11(2A) of schedule 15.3

Code related audit information

The retailer must ensure that each item of DUML for which it is responsible is recorded in this database.

Audit observation

A field audit was undertaken of a sample of 374 items of load on 26 and 27 July 2024.

Audit commentary

The field audit findings are detailed in the table below.

Discrepancy	Quantity
Lights in the field not in the database	3
Lights in the database not in the field	5
Incorrect wattage	116

I found three more lamps in the field than were recorded in the database. This is recorded as non-compliance. The database accuracy is discussed in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 2.5 With: Clause 11(2A) and (d) of Schedule 15.3 From: 01-Apr-24 To: 31-Jul-24	Three additional items of load found in the field. Potential impact: High Actual impact: Low Audit history: None Controls: Weak Breach risk rating: 3		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are recorded as weak because they do not ensure the database is updated with changes made in the field. The audit risk rating is low because of the small impact on annual kWh.		
Actions taken to resolve the issue		Completion date	Remedial action status
We will discuss with the customer and recommend that the necessary fixes to the database are made (potentially coinciding with a full audit of the database).		August 2024	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
As above		N/A	

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 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 DUMML 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 contains a complete audit trail of all additions and changes to the database information.

Audit outcome

Compliant

3. ACCURACY OF DUML DATABASE

3.1. Database accuracy (Clause 15.2 and 15.37B(b))

Code reference

Clause 15.2 and 15.37B(b)

Code related audit information

Audit must verify that the information recorded in the retailer's DUML database is complete and accurate.

Audit observation

A field audit was undertaken of 374 items of load. 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	NZTA Rotorua area
Strata	The database contains the NZTA items of load for four ICPs in the Rotorua region. The processes for the management of all NZTA items of load are the same, but I decided to place the items of load into four strata: <ul style="list-style-type: none"> • OWH0111, • ROT0111, • ROT0331#1, and • ROT0331+TRK0111.
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	374 items of load were checked.

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

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

Audit commentary

A field audit was conducted of a statistical sample of 374 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	88.9%	Wattage from survey is lower than the database wattage by 11.1%
R _L	84.7%	With a 95% level of confidence, it can be concluded that the error could be between -15.3% and -6.7%
R _H	93.3%	

These results were categorised in accordance with the “Distributed Unmetered Load Statistical Sampling Audit Guideline”, effective from 1 February 2019 and the table below shows that Scenario B (detailed below) applies. The conclusion from Scenario B is that the database is inaccurate with statistical significance at the 95% level.

In absolute terms the installed capacity is estimated to be 24 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 6 kW to 58 kW lower than the database.

In absolute terms, total annual consumption is estimated to be 100,900 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 60,800 kWh p.a. to 139,800 kWh pa. lower than the database indicates.

Scenario	Description
A - Good accuracy, good precision	<p>This scenario applies if:</p> <ul style="list-style-type: none"> (a) R_H is less than 1.05; and (b) R_L is greater than 0.95 <p>The conclusion from this scenario is that:</p> <ul style="list-style-type: none"> (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	<p>This scenario applies if:</p> <ul style="list-style-type: none"> (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. <p>There is evidence to support this finding. In statistical terms, the inaccuracy is statistically significant at the 95% level</p>
C - Poor precision	<p>This scenario applies if:</p> <ul style="list-style-type: none"> (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 <p>The conclusion from this scenario is that the best available estimate is not precise enough to conclude that the database is accurate within +/- 5 %</p>

The field audit identified 124 discrepancies, which is a 33% error rate. The discrepancies are summarised as follows. A detailed spreadsheet has been supplied to Mercury and NZTA.

Discrepancy	Quantity
Lights in the field not in the database	3
Lights in the database not in the field	5
Incorrect wattage	116

I recommend a full audit is conducted to ensure submission and invoicing is accurate.

Description	Recommendation	Audited party comment	Remedial action
Database accuracy	Conduct a full audit of the database to improve accuracy.	We will recommend this to the customer.	Identified

Lamp description and capacity accuracy

Lamp make, model and lamp wattage are included in the database.

ICP Accuracy

All NSPs have an ICP, and no discrepancies were identified.

Change management process findings

NZTA requires the NOC to maintain the RAMM database as part of their contract for maintenance carried out on the network. Contractors use pocket RAMM to track changes. Claims are submitted by the 28th of each month for all work carried out for the month prior. Install dates are being used by contractors when tracking changes in RAMM. Reporting of this activity is in development but is expected to provide Mercury with a monthly wattage report that tracks changes at a daily level.

The NOC contractor is required to have an internal quality control process to ensure that updates are accurate. The audit findings indicate that this process is not working as expected and I recommended that this is reviewed.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	Review quality control processes to ensure database updates are accurate.	We will recommend this to the customer.	Identified

The new connection process is managed on a project basis. Much like new Council lights, NZTA only accepts the assets at the end of project and the contractor controls the livening of new lights with the relevant networks. This will be resulting in lights being on and burning before they are being reconciled. I recommend that Mercury work with the relevant networks to ensure there are robust processes in place to ensure new connections are reconciled from the time they are electrically connected.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	Mercury to liaise with relevant networks for NZTA new connections.	Definitely a problem, we will start by contacting Unison to discuss.	Identified

Outage patrols are undertaken on a three-monthly basis.

There are no private or festive lights connected to the NZTA load.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Apr-24 To: 31-Jul-24	The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 100,900 kWh per annum. Potential impact: High Actual impact: High Audit history: None Controls: Weak Breach risk rating: 9		
Audit risk rating	Rationale for audit risk rating		
High	The controls are recorded as weak because they do not ensure the database is updated with changes made in the field. The audit risk rating is high because of the impact on annual kWh.		
Actions taken to resolve the issue		Completion date	Remedial action status
We will discuss the audit results with the customer and recommend that they carry out a full audit of the database to improve the accuracy.		August 2024	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
As above		N/A	

3.2. Volume information accuracy (Clause 15.2 and 15.37B(c))

Code reference

Clause 15.2 and 15.37B(c)

Code related audit information

The audit must verify that:

- volume information for the DUML is being calculated accurately,
- profiles for DUML have been correctly applied.

Audit observation

The submission was checked for accuracy for the month the database extract was supplied. This included:

- checking the registry to confirm that all ICPs have the correct profile and submission flag, and
- checking the database extract combined with the burn hours against the submitted figure to confirm accuracy.

Audit commentary

Mercury reconciles this DUML load using the HHR profile. Mercury had Exemption 233 that allowed them to provide non-half-hour (“NHH”) submission information instead of half-hour (“HHR”) submission information for distributed unmetered load (“DUML”). This exemption expired on 31st October 2023. Mercury is in the process for applying for a new exemption. The use of the HHR profile is recorded as non-compliance. kWh figures are based on a monthly report supplied by NZTA.

I checked the submissions for June 2024, and they matched the database.

The field audit found that in absolute terms, total annual consumption is estimated to be 100,900 kWh lower than the DUML database indicates.

Audit outcome

Non-compliant

Non-compliance	Description	
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 01-Apr-24 To: 31-Jul-24	The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 100,900 kWh per annum. Potential impact: High Actual impact: High Audit history: None Controls: Weak Breach risk rating: 9	
Audit risk rating	Rationale for audit risk rating	
High	The controls are recorded as weak because they do not ensure the database is updated with changes made in the field. The audit risk rating is high because of the impact on annual kWh.	
Actions taken to resolve the issue	Completion date	Remedial action status
We will discuss the audit results with the customer and recommend that they carry out a full audit of the database to improve the accuracy.	August 2024	Identified
Preventative actions taken to ensure no further issues will occur	Completion date	
As above	N/A	

CONCLUSION

The data in this database was previously in the Rotorua Lakes District Council database but was transferred to a new database on 1 April 2024. The first submission occurred on 5 May 2024; therefore, the audit is due three months following that date, which is 5 August 2024.

Mercury uses the HHR profile for submission and the kWh figures are based on a monthly report supplied by NZTA.

The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 100,900 kWh per annum.

The field audit identified 124 discrepancies, which is a 33% error rate. The discrepancies are summarised as follows. A detailed spreadsheet has been supplied to Mercury and NZTA.

Discrepancy	Quantity
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Incorrect wattage	116

I recommend a full audit is conducted to ensure submission and invoicing is accurate.

This audit found four non-compliances and three recommendations are made. The future risk rating of 30 indicates that the next audit be completed in three months. I have considered this in conjunction with the comments from Mercury, and I recommend the next audit is conducted in six months to allow sufficient time for Mercury to engage with NZTA and to arrange for a full field audit.

PARTICIPANT RESPONSE

Thanks to Steve for his work on the audit. This is the first audit for this database and it's apparent that improvement is required, we will liaise with the customer on this.