

ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT



For

NZTA SOUTH CANTEBURY AND MERIDIAN
ENERGY LIMITED

NZBN: 9429037696863

Prepared by: Steve Woods

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Date audit report completed: 24 May 2022

Audit report due date: 1 June 2022

TABLE OF CONTENTS

Executive summary	3
Audit summary	4
Non-compliances	4
Recommendations	4
Issues 4	
1. Administrative	5
1.1. Exemptions from Obligations to Comply with Code	5
1.2. Structure of Organisation	5
1.3. Persons involved in this audit.....	6
1.4. Hardware and Software	6
1.5. Breaches or Breach Allegations.....	6
1.6. ICP Data	6
1.7. Authorisation Received	7
1.8. Scope of Audit	7
1.9. Summary of previous audit	8
1.10. Distributed unmetered load audits (Clause 16A.26 and 17.295F)	8
2. DUML database requirements	9
2.1. Deriving submission information (Clause 11(1) of Schedule 15.3)	9
2.2. ICP identifier and items of load (Clause 11(2)(a) and (aa) of Schedule 15.3)	10
2.3. Location of each item of load (Clause 11(2)(b) of Schedule 15.3)	11
2.4. Description and capacity of load (Clause 11(2)(c) and (d) of Schedule 15.3)	11
2.5. All load recorded in database (Clause 11(2A) of Schedule 15.3)	11
2.6. Tracking of load changes (Clause 11(3) of Schedule 15.3)	12
2.7. Audit trail (Clause 11(4) of Schedule 15.3).....	12
3. Accuracy of DUML database	14
3.1. Database accuracy (Clause 15.2 and 15.37B(b))	14
3.2. Volume information accuracy (Clause 15.2 and 15.37B(c))	16
Conclusion	18
Participant response	19

EXECUTIVE SUMMARY

This audit of the **NZTA South Canterbury (ADC)** DUML database and processes was conducted at the request of **Meridian Energy Limited (Meridian)** in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

The database is remotely hosted by thinkproject New Zealand Ltd. The RAMM database is held by **Ashburton District Council (ADC)**, who is Meridian's customer. The field work and asset data capture is conducted by **Electricity Ashburton (EA Networks)**. A monthly report from RAMM is provided to Meridian to calculate the kW value.

Meridian reconciles the DUML load as NHH using the UNM profile. Wattages are derived from the trader daily unmetered kWh details on the registry. These are calculated using the wattage recorded in the registry trader unmetered load details (which is updated based on the database extracts received from ADC) and the on hours, which are set to 11.8 hours per day.

I compared the RAMM extract provided for NZTA ICPs 0000033381EAF01 and 0000033382EA3C1 to the registry values used for submission and I confirm the submission is accurate.

The field audit was undertaken of a statistical sample of 124 items of load on 5th May 2022. The field audit confirmed that the database accuracy is within the allowable +/-5% threshold.

This audit found two non-compliances. The future risk rating of four indicates that the next audit be completed in 24 months. I have considered this in conjunction with Meridian's comments and recommend that the next audit be in 24 months.

The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Deriving submission information	2.1	11(1) of Schedule 15.3	The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Moderate	Low	2	Investigating
Volume information accuracy	3.2	15.2 and 15.37B(c)	The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Moderate	Low	2	Investigating
Future Risk Rating						4	

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

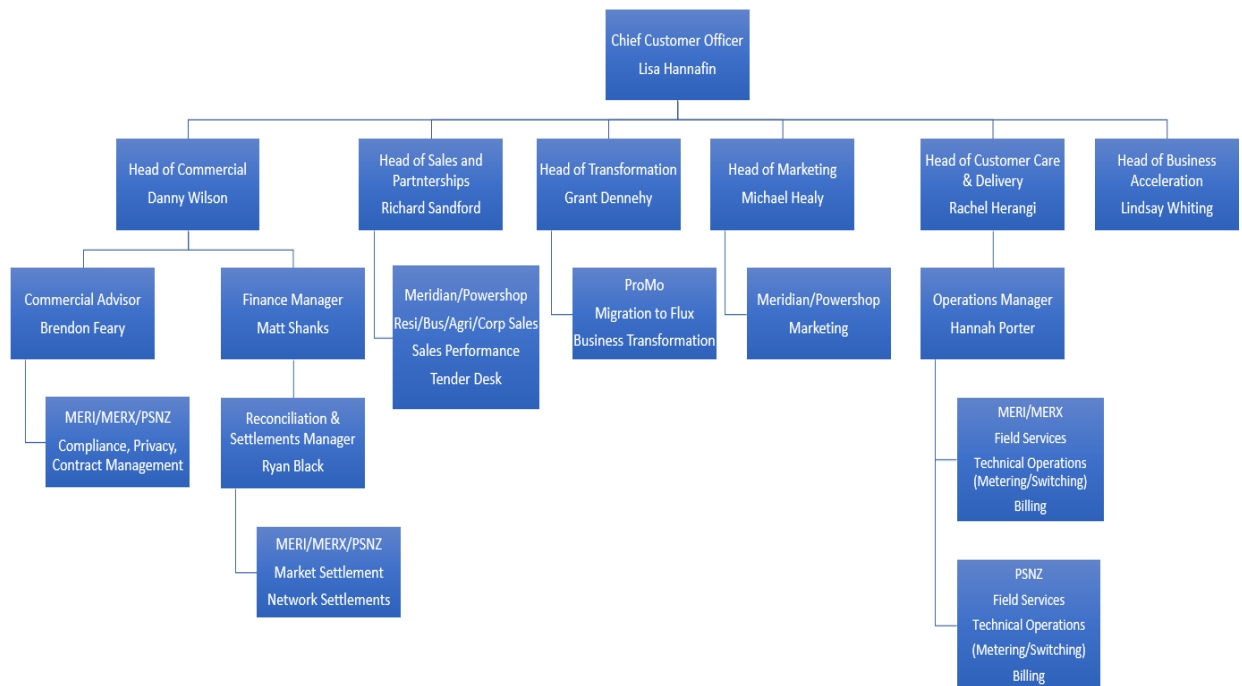
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

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

1.2. Structure of Organisation

Meridian provided the relevant organisational structure:



1.3. Persons involved in this audit

Auditor:

Name	Title	Company
Steve Wood	Auditor	Veritek
Claire Stanley	Supporting Auditor	Veritek

Other personnel assisting in this audit were:

Name	Title	Company
Deborah Barron	Asset Management Officer – Transportation	Ashburton District Council
Daniel Lau	Energy Data Analyst	Meridian Energy Limited
Wayne Watson	Overhead Manager	Electricity Ashburton Network
Andrew Crofts	Senior Network Manager	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 and their agent 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)
0000033381EAF01	NZTA Streetlights Methven, Methven	ASB0661	UML	55	6,474
0000033382EA3C1	NZTA Streetlights Not Methven	ASB0661	UML	382	63,961
Total				437	70,435

1.7. Authorisation Received

All information was provided directly by Meridian, ADC or EA Networks.

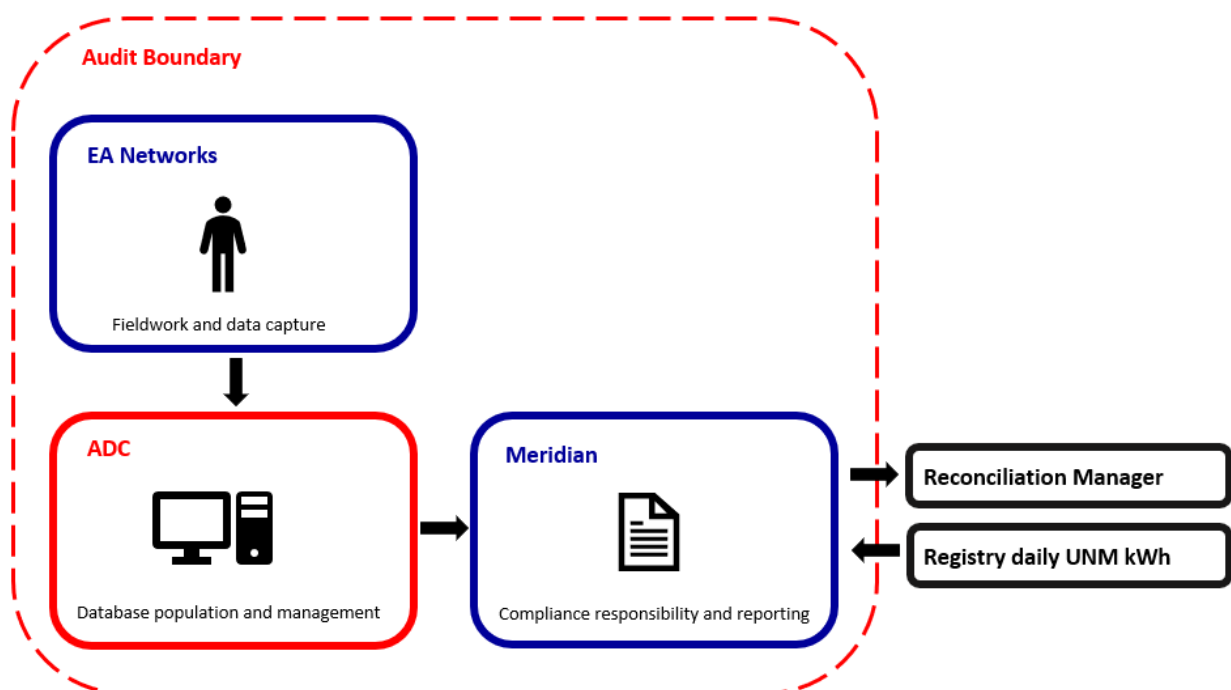
1.8. Scope of Audit

This audit of the NZTA South Canterbury DUML database and processes was conducted at the request of Meridian in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

A RAMM database is held by ADC, who is Meridian's customer. EA Networks are responsible for new connections, fault, maintenance, and upgrade work, and maintain the database. Monthly reporting is provided to Meridian from RAMM, this is sent by ADC.

Meridian reconciles the DUML load for NZTA South Canterbury ICPs 0000033381EAF01 and 0000033382EA3C1 as NHH using the UNM profile. Wattages are derived from the trader daily unmetered kWh details on the registry. These are calculated using the wattage recorded in the registry trader unmetered load details (which is updated based on the database extracts received from ADC) and the on hours, which are set to 11.8 hours per day.

The scope of the audit encompasses the collection, security, and accuracy of the data, including the preparation of submission information based on the database reporting. The diagram below shows the audit boundary for clarity.



The audit was largely conducted in accordance with the audit guidelines for DUML audits version 1.1

The field audit was undertaken of a statistical sample of 124 items of load on 5th May 2022.

1.9. Summary of previous audit

The previous audit for Meridian Energy Limited was undertaken by Tara Gannon of Veritek Limited in May 2020. 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.

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still existing
Volume information accuracy	3.2	15.2 and 15.37B(c)	The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	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

Meridian have requested Veritek to undertake this streetlight audit.

Audit commentary

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

Audit outcome

Compliant

2. DUMML 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:

- *DUMML 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

Meridian reconciles the DUMML load for NZTA South Canterbury ICPs 0000033381EAF01 and 0000033382EA3C1 as NHH using the UNM profile.

Wattages are derived from the trader daily unmetered kWh details recorded on the registry. These are calculated using the wattage recorded in the registry trader unmetered load details (which is updated based on the database extracts received from ADC) and the on hours, which are set to 11.8 hours per day.

I compared the RAMM extract provided for NZTA ICPs 0000033381EAF01 and 0000033382EA3C1 to the registry values used for submission and I confirm the submission is accurate.

The review of database accuracy in **section 3.1** found that the database is likely to be accurate within $\pm 5\%$.

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 DUMML load and volumes.

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

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 29-Feb-20 To: 29-Mar-22	<p>The data used for submission does not track changes at a daily basis and is provided as a snapshot.</p> <p>Potential impact: Medium</p> <p>Actual impact: Low</p> <p>Audit history: Multiple times previously</p> <p>Controls: Moderate</p> <p>Breach risk rating: 2</p>		
Audit risk rating	Rationale for audit risk rating		
Low	<p>The controls are rated as moderate, because change dates are recorded accurately within the database itself, but the database extract provided is a snapshot.</p> <p>The impact is assessed to be low, because it is likely only part of a month's data will be affected where a change occurs.</p>		
Actions taken to resolve the issue		Completion date	Remedial action status
We are considering how we can redesign our processes to incorporate the calculation of volumes at a daily level rather than a monthly snapshot.		Ongoing	Investigating
Preventative actions taken to ensure no further issues will occur		Completion date	
We are considering how we can redesign our processes to incorporate the calculation of volumes at a daily level rather than a monthly snapshot.		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 DUMML database must contain:

- *each ICP identifier for which the retailer is responsible for the DUMML*
- *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 all items 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 DUMML database must contain the location of each DUMML item.

Audit observation

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

Audit commentary

The RAMM database contains house numbers, opposite house numbers, road names, road IDs, and GPS coordinates.

All items of load have GPS coordinates recorded and are locatable.

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 DUMML 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

A description of each light is recorded in the make and model fields, wattages are recorded in the lamp wattage and gear wattage fields.

All items of load have a lamp model, lamp wattage and gear wattage populated. No items of load have invalid zero lamp or gear wattages.

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 124 items of load on 5th May 2022 using the statistical sampling methodology.

Audit commentary

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
SH 77 RS 0 ASHBURTON TO BRAEMAR	81	80	-1	1	1 x 150W SON recorded in the database but 1 x 250W SON located in the field 1 x 150W SON recorded in the database but not located in the field

The field audit did not find any additional lamps in the field.

Audit outcome

Compliant

2.6. Tracking of load changes (Clause 11(3) of Schedule 15.3)

Code reference

Clause 11(3) of Schedule 15.3

Code related audit information

The DUML database must track additions and removals in a manner that allows the total load (in kW) to be retrospectively derived for any given day.

Audit observation

The process for tracking of changes in the database was examined.

Audit commentary

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

A database extract was provided, 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	South Canterbury NZTA region
Strata	The database contains items of load in South Canterbury NZTA region The processes for the management of South Canterbury NZTA items of load are the same, but I decided to place the items of load into two strata, as follows: <ol style="list-style-type: none"> 1. Ashburton 2. Rural
Area units	I created a pivot table of the roads in each, and I used a random number generator in a spreadsheet to select a total of 26 sub-units (roads).
Total items of load	124 items of load were checked.

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 124 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	99.8	Wattage from survey is lower than the database wattage by 0.2%
R _L		See comment below *
R _H		

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 A (detailed below) applies, and the best available estimate indicates that the database is accurate within $\pm 5.0\%$.

In absolute terms, total annual consumption is estimated to be 7,000 kWh lower than the DUML database indicates.

*The database auditing tool was not able to return a result as there is a very low margin of error. The result from the field audit indicated high a level of accuracy.

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 $\pm 5\%$; 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 $\pm 5\%$</p>

Light description and capacity accuracy

As discussed in **section 2.4**, all items of load have a lamp model and lamp wattage populated. No lights had invalid zero lamp or gear wattages.

Lamp and gear wattages were compared to the expected values and no discrepancies were identified.

Change management process findings

EA Networks are responsible for new connections, fault, maintenance, and upgrade work, and maintain the database. Jobs are returned from the contractor to EA Networks and are entered into Pocket RAMM.

Outage patrols are conducted on an ad hoc basis when staff are working in an area at night. Outages are reported by Downer staff and also reported by residents within the ADC region and work orders are raised with EA Networks as required.

Audit outcome

Compliant

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

Code reference

Clause 15.2 and 15.37B(c)

Code related audit information

The audit must verify that:

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

Audit observation

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

- checking the registry to confirm that 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

Meridian reconciles the DUML load for NZTA South Canterbury ICPs 0000033381EAF01 and 0000033382EA3C1 as NHH using the UNM profile.

Wattages are derived from the trader daily unmetered kWh details recorded on the registry. These are calculated using the wattage recorded in the registry trader unmetered load details (which is updated based on the database extracts received from ADC) and the on hours, which are set to 11.8 hours per day.

I compared the RAMM extract provided for NZTA ICPs 0000033381EAF01 and 0000033382EA3C1 to the registry values used for submission and I confirm the submission is accurate.

The review of database accuracy in **section 3.1** found that the database is likely to be accurate within \pm 5%.

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. Meridian completes revision submissions where corrections are required. Meridian has not updated their processes to be consistent with the Authority's memo.

Audit outcome

Non-compliant

Non-compliance	Description		
<p>Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 29-Feb-20 To: 29-Mar-22</p>	<p>The data used for submission does not track changes at a daily basis and is provided as a snapshot. Potential impact: Medium Actual impact: Unknown Audit history: Multiple times previously Controls: Moderate Breach risk rating: 2</p>		
Audit risk rating	Rationale for audit risk rating		
<p>Low</p>	<p>The controls are rated as moderate, because change dates are recorded accurately within the database itself, but the database extract provided is a snapshot. The impact is assessed to be low, because it is likely only part of a month's data will be affected where a change occurs.</p>		
Actions taken to resolve the issue		Completion date	Remedial action status
<p>We are considering how we can redesign our processes to incorporate the calculation of volumes at a daily level rather than a monthly snapshot.</p>		<p>Ongoing</p>	<p>Investigating</p>
Preventative actions taken to ensure no further issues will occur		Completion date	
<p>We are considering how we can redesign our processes to incorporate the calculation of volumes at a daily level rather than a monthly snapshot.</p>		<p>Ongoing</p>	

CONCLUSION

This audit of the **NZTA South Canterbury (ADC)** DUMML database and processes was conducted at the request of **Meridian Energy Limited (Meridian)** in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

The audit was conducted in accordance with the audit guidelines for DUMML audits version 1.1.

The database is remotely hosted by thinkproject New Zealand Ltd . The field work and asset data capture is conducted by **Electricity Ashburton (EA Networks)**. A monthly report from RAMM is provided to Meridian to calculate the kW value.

Meridian reconciles the DUMML load as NHH using the UNM profile. Wattages are derived from the trader daily unmetered kWh details on the registry. These are calculated using the wattage recorded in the registry trader unmetered load details (which is updated based on the database extracts received from ADC) and the on hours, which are set to 11.8 hours per day.

I compared the RAMM extract provided for NZTA ICPs 0000033381EAF01 and 0000033382EA3C1 to the registry values used for submission and I confirm the submission is accurate.

The field audit was undertaken of a statistical sample of 124 items of load on 5th May 2022. The field audit confirmed that the database accuracy is within the allowable +/-5% threshold.

This audit found two non-compliances. The future risk rating of four indicates that the next audit be completed in 24 months. I have considered this in conjunction with Meridian's comments and recommend that the next audit be in 24 months.

PARTICIPANT RESPONSE

Meridian has reviewed this report and their comments are contained within the report.