ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

MACKENZIE DISTRICT COUNCIL AND GENESIS ENERGY LIMITED

Prepared by: Tara Gannon

Date audit commenced: 9 April 2019

Date audit report completed: 29 April 2019

Audit report due date: 1 June 2019

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EXECUTIVE SUMMARY

This audit of the **Mackenzie District Council (MDC)** DUML database and processes was conducted at the request of **Genesis Energy Limited (Genesis)**, 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 RAMM database used for submission is held by **Timaru District Council (TDC)**, on behalf of MDC who is Genesis' customer. All new connection, fault, upgrade and maintenance work is completed by NETcon.

NETcon provides confirmation of any work completed on MDC lights to TDC, and TDC updates RAMM.

TDC provide a monthly report from the database to Genesis, which is used to calculate submissions. Genesis submits the DUML load as NHH using the SST profile. On hours are derived using data logger information.

One non-compliance was identified. The future risk rating of two indicates that the next audit be completed in 24 months. Based on the findings and comments received, I recommend that the next audit is completed in 36 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
All load recorded in database	2.5	11(2A) of Schedule 15.3	Two 27W LEDs were missing from the database.	Moderate	Low	2	Identified
					Future Risk Rating		**2**

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	Description	Recommendation
		Nil	

ISSUES

Subject	Section	Description	Issue
		Nil	

1. ADMINISTRATIVE

1.1. Exemptions from Obligations to Comply with Code

Code reference

Section 11 of Electricity Industry Act 2010.

Code related audit information

Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.

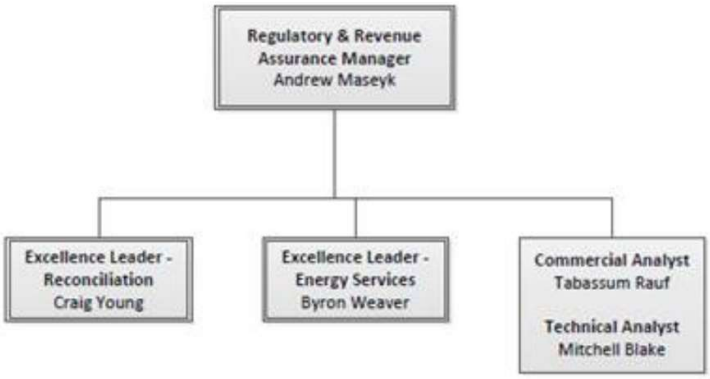
Audit observation

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

Audit commentary

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

1.2. Structure of Organisation



1.3. Persons involved in this audit

Auditor:

Tara Gannon

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Anthony Bacon	Road Engineering Technician	Timaru District Council
Craig Young	Excellence Leader - Reconciliation	Genesis Energy
Grace Hawken	Technical Specialist - Reconciliation Team	Genesis Energy

1.4. Hardware and Software

The SQL database used for the management of DUML is remotely hosted by RAMM Software Ltd. The database is commonly known as "RAMM" which stands for "Roading Asset and Maintenance Management".

Database back-up is in accordance with standard industry procedures. Access to the database is secure by way of password protection.

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)
0000000007ALB68	Streetlighting	TKA0331	SST	373	17,273
0000000008AL4B6	Streetlighting	TWZ0331	SST	472	21,217
0000000003ALA62	Streetlighting	ABY0111	SST	211	21,013
Total				1,056	59,503

1.7. Authorisation Received

All information was provided directly by Genesis and TDC.

1.8. Scope of Audit

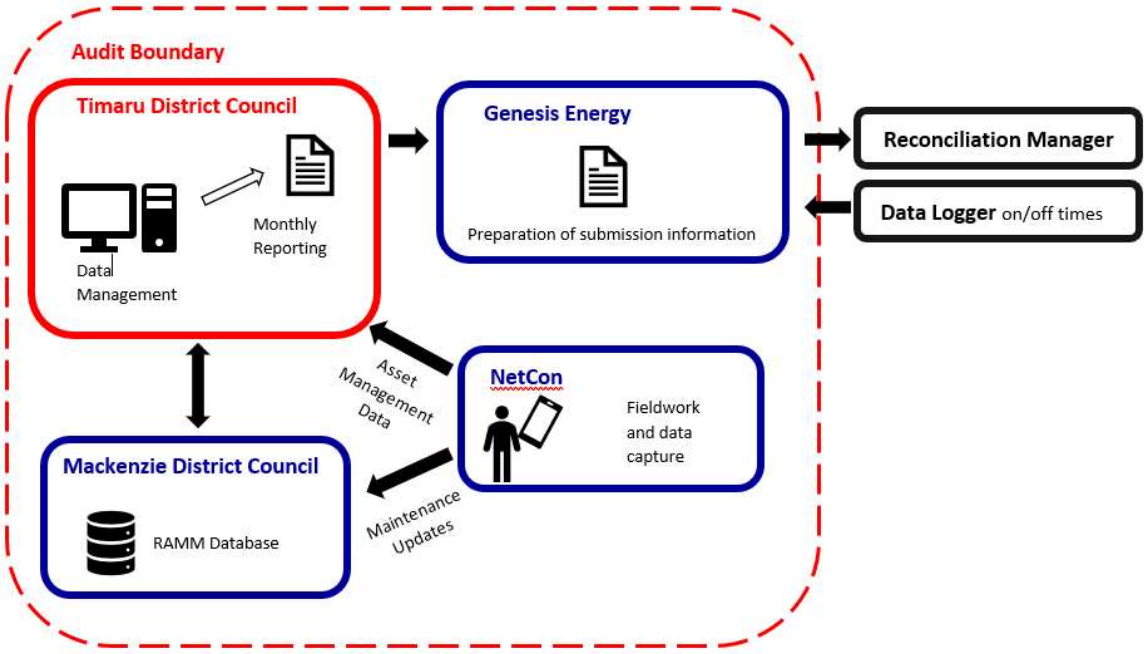
This audit of the MDC DUML database and processes was conducted at the request of Genesis in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied. The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

The RAMM database used for submission is held by TDC on behalf of MDC who is Genesis' customer. All new connection, fault, upgrade and maintenance work is completed by NETcon.

NETcon provides confirmation of any work completed on MDC lights to TDC, and TDC updates RAMM.

TDC provide a monthly report from the database to Genesis, which is used to calculate submissions. Genesis submits the DUML load as NHH using the SST profile. On hours are derived using data logger information.

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 126 items of load on 9 April 2019.

1.9. Summary of previous audit

The previous audit was completed in May 2018 by Steve Woods of Veritek Limited. Six non-compliances was identified. The status of the non-compliances is described below.

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	Inaccurate information in the database: • 47 items of load without an ICP, under submission of 9,580 kWh pa; • 2 lamp type and wattage errors, over submission of 1,610 kWh pa; and • 5 field audit errors identified, over submission of 128 kWh pa.	Cleared Cleared Some field audit errors exist
ICP Identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	There are 47 items of load that do not have an ICP number recorded against them. Estimated under submission of 9,580 kWh per annum.	Cleared
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	There are two lamp types with incorrect wattage values in the database. There are 302 lamps affected with an estimated over submission of 1,610 kWh per annum.	Cleared

Subject	Section	Clause	Non-compliance	Status
All load recorded in the database	2.5	11(2A) of Schedule 15.3	The field audit discovered two additional lamps and two missing lamps in the field than were recorded in the database, and one lamp wattage difference. Result in estimated over submission of 128 kWh per annum.	Some field audit errors exist
Database accuracy	3.1	15.2 and 15.37B(b)	Database checks identified two lamp type and wattage differences, affecting 302 lamps an estimated over submission of 1,610 kWh per annum. The field audit discovered two additional lamps and two missing lamps in the field than were recorded in the database, and one lamp wattage difference. Result in estimated over submission of 128 kWh per annum.	Cleared Some field audit errors exist
Deriving submission information	3.2	15.2 and 15.37B(c)	Inaccurate information in the database • 47 items of load without an ICP, under submission of 9,580 kWh pa • 2 lamp type and wattage errors, over submission of 1,610 kWh pa • 5 field audit errors identified, over submission of 128 kWh pa	Cleared Cleared Some field audit errors exist

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

Genesis have requested Veritek to undertake this streetlight audit.

Audit commentary

This audit report confirms that the requirement to conduct an audit has been met for this database within the required timeframe. Compliance is confirmed.

2. DUML DATABASE REQUIREMENTS

2.1. Deriving submission information (Clause 11(1) of Schedule 15.3)

Code reference

Clause 11(1) of Schedule 15.3

Code related audit information

The retailer must ensure the:

- *DUML database is up to date*
- *methodology for deriving submission information complies with Schedule 15.5.*

Audit observation

The process for calculation of consumption was examined and the application of profiles was checked. The database was checked for accuracy.

Audit commentary

This clause requires that the distributed unmetered load database must satisfy the requirements of schedule 15.5 regarding the methodology for deriving submission information. Genesis reconciles this DUML load as NHH using the NST profile, and on hours are derived using data logger information.

I checked the February 2019 submission data for ICPs 0000000007ALB68, 0000000008AL4B6 and 0000000003ALA62, and compliance is confirmed.

The review of database accuracy in **section 3.1** found that the best available estimate indicates that the database is accurate within ±5%.

Audit outcome

Compliant

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 whether an ICP is recorded for each item of load.

Audit commentary

The analysis found that all items of load had an ICP number recorded.

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

All items of load have addresses and GPS coordinates recorded.

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

All items of load have a lamp model, lamp wattage and gear wattage populated.

The non-compliance recorded in the 2018 audit relating to incorrect lamp and gear wattages has been cleared.

Audit outcome

Compliant

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

Code reference

Clause 11(2A) of Schedule 15.3

Code related audit information

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

Audit observation

The field audit was undertaken of a statistical sample of 126 items of load on 9 April 2019.

Audit commentary

The following differences were identified during the field audit.

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
0000000008AL4B6					
OSTLER ROAD	20	20	-	1	One 150W SON was recorded in the database as 55w x2 Low Pressure Sodium
SEFTON STREET	12	12	-	1	One 35W LPS was recorded in the database as a 17W LED
000000003ALA62					
ALLOWAY STREET	10	10	-	1	One 150W SON was recorded in the database as 70W SON
AYR STREET	3	5	2	-	Two L27 lights were missing from the database
Total	**126**	**128**	**2**	**3**	

The field audit found one two lamps on Ayr Street that were missing from the database, and are recorded as non-compliance below. The lamp wattage differences are recorded as non-compliance in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clauses 11(2A) of Schedule 15.3 From: 09-Apr-18 To: 09-Apr-19	Two 27W LEDs were missing from the database. Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate, because of the small number of missing lamps identified. The impact is low because the combined wattage of the missing lamps is 54W.

Actions taken to resolve the issue	Completion date	Remedial action status
Liaised with Anthony Bacon (Roading technician) who advised these had already been populated after they were Identified by the auditor.	20/05/2019	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis is currently requesting a review of the control in place to capture missing assets.	20/05/2019	

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

On 20th September 2012 the Authority sent a memo to Retailers and auditors advising that tracking of load changes at a daily level was not required as long as the database contained an audit trail. I have interpreted this to mean that the production of a "snapshot" report is sufficient to achieve compliance. The database tracks additions and removals as required by this clause.

Processes to track changes to the database were reviewed.

All new connection, fault, upgrade and maintenance work is completed by NETcon. NETcon provides confirmation of any work completed on MDC lights to TDC, and TDC updates RAMM.

Notification of work completed is normally provided in writing (typically as laid plans), or via telephone and subsequent invoicing data where maintenance work to replace a lamp with another of the same type has occurred.

New subdivisions require a proposed plan to be provided and an "as built" plan once the development is complete. The councils and network have approval processes in place, and once the connection is approved NETconn connects the lights and advises TDC. Where new lamps are installed, TDC visits the site to confirm that the correct details have been provided and to confirm the GPS coordinates and ensures RAMM is updated from the livening date.

There have been a small number of new connections during the audit period, all were extensions to existing subdivisions.

Due to the remoteness of the streetlights, outage patrols are completed by NETcon if maintenance work is being carried out in the area. Outages are also reported by residents within the MDC region and work orders are raised with NETcon as required. Any changes resulting from this maintenance are communicated to TDC and updated in RAMM.

The Mackenzie district is International Dark-Sky Association accredited. MDC's LED upgrade project has been delayed while they work with the International Dark-Sky Association to find lights with a suitable

colour temperature and wattage which will allow them to upgrade to LEDs and retain their accreditation. In the meantime, NETcon continues to replace lamps with another of the same type when maintenance occurs. TDC is unable to source more low pressure sodium bulbs, and moves bulbs from outside the accredited area as required.

All private lights in the MDC area are metered, and no festive lights are used.

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

The DUML Statistical Sampling Guideline was used to determine the database accuracy. The table below shows the survey plan.

Plan Item	Comments
Area of interest	Mackenzie region
Strata	The database contains 1,056 items of load in the Mackenzie region. The processes for the management of all items of load are the same, and strata were created for each of the three ICPs.
Area units	I created a pivot table of the roads in each strata and used a random number generator in a spreadsheet to select a total of 16 sub-units making up approximately 10% of the entire database wattage.
Total items of load	126 items of load were checked.

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

Audit commentary

Database accuracy based on the field audit

The field data was 103.3% of the database data for the sample checked. This is within the required database accuracy of ±5%. The statistical sampling tool reported with 95% confidence the precision of the sample was 5.1%, and the true load in the field will be between 100.9% to 106.0% of the load recorded in the database. The sample is not sufficiently precise to be able to determine the database accuracy because the upper limit is greater than 105% but indicates that the database is likely to be accurate.

The tool indicated that there is potentially 8,500 kWh per annum (based on annual burn hours of 4,271 as detailed in the DUML database auditing tool) of under submission. The statistical sampling tool reported with 95% confidence that there is a potential estimated submission variance range of between 2,400 kWh and 15,200 kWh of under submission but as the accuracy is within the 5% threshold compliance is recorded.

Wattage accuracy

The database was checked against the published standardised wattage table, and manufacturer's specifications where available. No lamp or gear wattage inaccuracies were identified.

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 burn hours against the submitted figure to confirm accuracy.

Audit commentary

This clause requires that the distributed unmetered load database must satisfy the requirements of schedule 15.5 regarding the methodology for deriving submission information. Genesis reconciles this DUML load as NHH using the NST profile, and on hours are derived using data logger information. The correct profile and submission type is recorded on the registry for all three ICPs.

I checked the February 2019 submission data for ICPs 0000000007ALB68, 0000000008AL4B6 and 0000000003ALA62, and compliance is confirmed.

The review of database accuracy in **section 3.1** found that the best available estimate indicates that the database is accurate within ±5%.

Audit outcome

Compliant

CONCLUSION

The RAMM database used for submission is held by TDC, on behalf of MDC who is Genesis' customer. All new connection, fault, upgrade and maintenance work is completed by NETcon.

NETcon provides confirmation of any work completed on MDC lights to TDC, and TDC updates RAMM.

TDC provide a monthly report from the database to Genesis, which is used to calculate submissions. Genesis submits the DUML load as NHH using the SST profile. On hours are derived using data logger information.

One non-compliance was identified. The future risk rating of two indicates that the next audit be completed in 24 months. Based on the findings and comments received, I recommend that the next audit is completed in 36 months.

The matters raised are detailed below:

PARTICIPANT RESPONSE

Genesis has reviewed the report with the customer, who has already added the two missing assets to the database. Genesis has requested a review of the control/process to help prevent future reoccurrences.