ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

WAIMATE DISTRICT COUNCIL AND GENESIS ENERGY LIMITED

Prepared by: Steve Woods

Date audit commenced: 30 August 2019

Date audit report completed: 10 September 2019

Audit report due date: 01-Oct-19

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EXECUTIVE SUMMARY

This audit of the Waimate District Council (**WDC**) 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.

WDC manages the streetlight data in RAMM. Reporting is provided to Genesis and this is used to update the registry daily kWh field, which is used for submission purposes.

The audit found the database and submission was reasonably accurate. There are a small number of corrections to data and processes required to achieve compliance

The audit found four non-compliances and makes one recommendation.

The future risk rating of 16 indicates that the next audit be completed in 18 months and 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	Estimated over submission of 1,542 kWh p.a. due to use of the registry daily kWh field instead of the database total kW. The field audit results indicate the total annual consumption is estimated to be 3,400 kWh higher than the DUML database indicates. 4 incorrect ballasts. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Festive lighting is connected but the volume is not recorded.	Moderate	Low	2	Investigating
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	1 additional light in the field not recorded in the database.	Strong	Low	1	Investigating

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Database accuracy	3.1	15.2 and 15.37B(b)	In absolute terms, total annual consumption is estimated to be 3,400 kWh higher than the DUML database indicates. 4 incorrect ballasts. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Festive lighting is connected but the volume is not recorded.	Moderate	Low	2	Investigating
Volume information accuracy	3.2	15.2 and 15.37B(c)	Estimated over submission of 1,542 kWh p.a. due to use of the registry daily kWh field instead of the database total kW. The field audit results indicate the total annual consumption is estimated to be 3,400 kWh higher than the DUML database indicates. 4 incorrect ballasts. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Festive lighting is connected but the volume is not recorded.	Moderate	Low	2	Investigating
Future Risk Rating						7	

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	Clause	Recommendation
Location of items of load	2.3	11(2)(b) of Schedule 15.3	Populate GPS coordinates for 9 items of load.

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

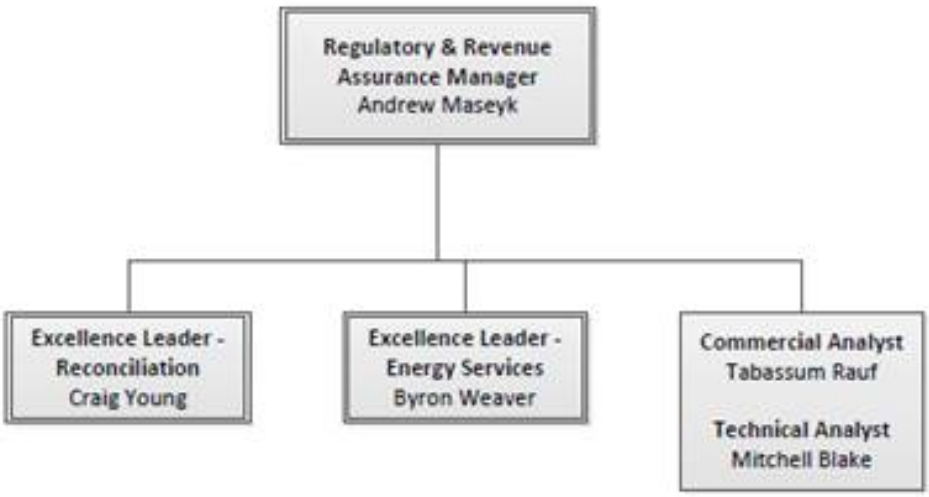
Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.

Audit commentary

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

1.2. Structure of Organisation

Genesis provided a copy of their organisational structure:



1.3. Persons involved in this audit

Auditor:

Name	Title
Steve Woods	Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Grace Hawken	Technical Specialist – Reconciliation Team	Genesis Energy
Rob Moffatt	Roading Manager	Waimate District Council
Shelley Wilson	Roading Assistant	Waimate District Council

1.4. Hardware and Software

The kW value for this DUML load is calculated using the registry kW figure.

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

WDC confirmed that the 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

The following ICPs are relevant to the scope of this audit:

ICP Number	Description	NSP	Profile	Number of items of load	Total Database wattage (watts)
0000000002AL627	Streetlighting	STU0111	UNM	602	68,304
0000175690WT219	Hakataramea Streetlights	WTK0111	RPS	3	249
TOTAL				605	68,553

1.7. Authorisation Received

All information was provided directly by Genesis and WDC.

1.8. Scope of Audit

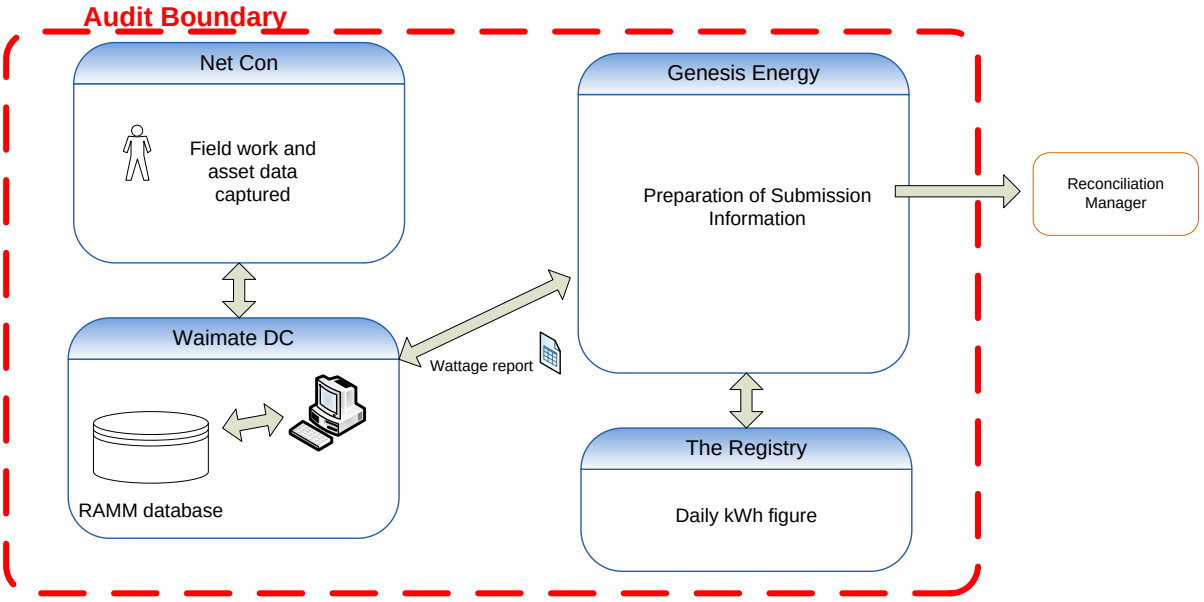
This audit of the WDC DUML database and processes was conducted at the request of Genesis, in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

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

The distributor for the majority of the Waimate region is Alpine Energy with a very small number of items recorded on Network Waitaki. The field work is undertaken by NetCon.

WDC now manage their streetlight data in RAMM. Genesis uses the RAMM output to update the registry daily kWh figure.

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

The field audit was undertaken of a statistical sample of 82 items of load.

1.9. Summary of previous audit

The last audit was undertaken by Rebecca Elliot of Veritek Limited in December 2018. The results are shown below.

Table of Non-Compliance

Subject	Section	Clause	Non-Compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	Historic unmetered load value held on the Registry is being used to calculate monthly submissions. The difference calculated to be an under submission of 2,696 kWh for the September period. Approx. 32,352 kWh per annum. One item of load recorded with no model and zero wattage, estimated to be 717.5 kWh per annum. Festive lighting is connected but the volume is not recorded.	Still existing
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	One item of load recorded with no model and zero wattage, estimated to be 717.5 kWh per annum.	Still existing

Subject	Section	Clause	Non-Compliance	Status
Database accuracy	3.1	15.2 and 15.37B(b)	The database accuracy is assessed to be 80.4% indicating potential over submission of 62,200 kWh per annum if the database were used for submission. One item of load recorded with no model and zero wattage, estimated to be 717.5 kWh per annum. Festive lighting is connected but the volume is not recorded.	Still existing
Volume information accuracy	3.2	15.2 and 15.37B(c)	Historic unmetered load value held on the Registry is being used to calculate monthly submissions. The difference calculated to be an under submission of 2,696 kWh for the September period. Approx. 32,352 kWh per annum. One item of load recorded with no model and zero wattage, estimated to be 717.5 kWh per annum. Festive lighting is connected but the volume is not recorded.	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

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

Genesis reconciles this DUML load using the UNM and RPS profiles. The daily unmetered kW value on the registry is used for submission and it is similar to the database kW value. The table below shows the minor difference.

ICP Number	Registry kW July 2019	RAMM kW July 2019	Estimated annual over submission
0000000002AL627	68.553	68.304	1,058
0000175690WT219	0.363	0.249	484
Total	68.916	68.553	1,542

Genesis bill and submit based on the information on the registry and use the average burn hours for the whole year. I confirmed the calculation was correct.

Festive lights are managed by the Information Centre. A contractor from Oamaru is used to install and then remove the lights. WDC are advised of the period the lights are active, but no changes are made to the database. Genesis is not advised of the additional load. It is WDC's intention to capture the festive lights in the RAMM database. I was unable to determine the items of load associated with this festive lighting, but it is small.

Four items of load have incorrect ballasts, leading to under submission of 176 kWh p.a.

The field audit results indicate the total annual consumption is estimated to be 3,400 kWh higher 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-Jan-19 To: 08-Sep-19	Estimated over submission of 1,542 kWh p.a. due to use of the registry daily kWh field instead of the database total kW. The field audit results indicate the total annual consumption is estimated to be 3,400 kWh higher than the DUML database indicates. 4 incorrect ballasts. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Festive lighting is connected but the volume is not recorded. Potential impact: Medium Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. The daily kWh figure from the registry is based on the database output and was updated recently, but there is a slight difference. The impact on settlement and participants is minor; therefore, the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has requested monthly asset extractions to assist with the validation of asset information and daily reconciliation for any given period.	01/03/2020	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will be able to assist WDC with database accuracy once monthly database reporting is established.	01/03/2020	

2.2. ICP identifier and items of load (Clause 11(2)(a) and (aa) of Schedule 15.3)

Code reference

Clause 11(2)(a) and (aa) of Schedule 15.3

Code related audit information

The DUML database must contain:

- *each ICP identifier for which the retailer is responsible for the DUML*
- *the items of load associated with the ICP identifier.*

Audit observation

The database was checked to confirm the correct ICP was recorded against each item of load.

Audit commentary

All items of load have 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 a road name and location (displacement) recorded. The majority of items also have a pole number and GPS co-ordinates recorded to assist with the location of the items. All but nine items of load have GPS coordinates. I recommend these are populated to assist with future audits.

Clause	Description	Audited party comment	Remedial action
11(2)(b) of Schedule 15.3	Populate GPS coordinates for 9 items of load.	Requested WDC add the required GPS information pertaining to the assets in question.	Identified

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 and that each item of load had a value recorded in these fields.

Audit commentary

The database has fields for both 'lamp make model' and 'model' as well as wattage and gear wattage. There are no blanks, but some information is not accurate, as recorded in **section 3.1**.

Audit outcome

Compliant

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

Code reference

Clause 11(2A) of Schedule 15.3

Code related audit information

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

Audit observation

The field audit was undertaken of a statistical sample of 82 items of load.

Audit commentary

The field audit discrepancies are shown in the table below.

Street/Area	Database Count	Field Count	Lamp no. difference	No of incorrect lamp wattage	Comments
PAREORA RIVER ROAD	2	2	-	1	1 x 150W HPW recorded as 70W HPS
RUANE STREET	5	4	-1	-	1 x 70W HPS not found
HUNTER CRESCENT	3	4	+1		1 x additional 70W HPS
Grand Total			**0**	**1**	

One additional light was found in the field on Hunter Crescent. This is recorded as non-compliance. The other discrepancies are recorded in Section 3.1.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 01-Jan-19 To: 08-Sep-19	1 additional light in the field 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 recorded as strong because they mitigate risk to an acceptable level. The impact on settlement and participants is minor; therefore, the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has requested the assets to be verified and added/removed from the database.	01/03/2020	Investigating

Preventative actions taken to ensure no further issues will occur	Completion date	
Genesis has requested monthly asset extractions to assist with the validation of asset information and daily reconciliation for any given period.	01/03/2020	

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.

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

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	Waimate District Council region
Strata	The database contains items of load in Waimate District Council area. The processes for the management of WDC items of load are the same, but I decided to place the items of load into three strata, based on pole owner, as follows: 1. Council Road Lighting 2. Line Company 3. NZTA.
Area units	I created a pivot table of the roads in each area and I used a random number generator in a spreadsheet to select a total of 23 sub-units.
Total items of load	82 items of load were checked.

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

Audit commentary

A field audit was conducted of a statistical sample of 82 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	101.2	Wattage from survey is higher than the database wattage by 1.2%
R_L	98.4	With a 95% level of confidence it can be concluded that the error could be between -1.6% and 5.4%
R_H	105.4	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 01/02/19 and the table below shows that Scenario C (detailed below) applies.

The conclusion from Scenario C is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between 1.6% lower and 5.43% higher than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

In absolute terms the installed capacity is estimated to be 1.0 kW higher than the database indicates.

There is a 95% level of confidence that the installed capacity is between 1.0 kW higher to 4.0 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 3,400 kWh higher than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 4,700 kWh p.a. lower to 15,800 kWh p.a. higher than the database indicates.

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 %

Lamp description and capacity accuracy

The database was found to contain inaccuracies when matched to the published standardised wattage table. These are listed below.

Quantity	Issue	Volume information impact (annual kWh)
2	150W HPS without ballast populated	-154
1	250W HPS with 18W ballast instead of 28W	-43
1	70W HPS with 18W ballast instead of 13W	+21
	Total	-176

Location accuracy

The field audit did not identify any location discrepancies.

ICP number and owner accuracy

The field audit did not identify any ICP discrepancies.

Change management process findings

The current monthly report is provided as a snapshot and this practice is non-compliant. The database contains a "light install date" which can be used as the start date for any newly installed or changed lights. Reporting would need to be developed to show relevant details for replaced or removed lights.

The processes were reviewed for ensuring that changes in the field are captured. Alpine Energy's contracting company, NetCon remains the contractor for streetlight maintenance and new connections.

There are not a lot of new streetlight connections in the WDC area. All new streetlight connections or removals follow the "new connections" process and a "streetlight movements" form is required to be completed. Waimate DC add new lights to the RAMM database, within the month they are received, once the street has been vested to the council.

Monthly outage patrols are carried out by NetCon, and if required maintenance is completed as a result of this any changes made are communicated to WDC and captured in RAMM.

Festive lights are managed by the Information Centre. A contractor from Oamaru is used to install and then remove the lights. WDC are advised of the period the lights are active, but no changes are made to the database. Genesis is not advised of the additional load. It is WDC's intention to capture the festive lights in the RAMM database. I was unable to determine the items of load associated with this festive lighting, but it is small.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Dec-18 To: 08-Sep-19	In absolute terms, total annual consumption is estimated to be 3,400 kWh higher than the DUML database indicates. 4 incorrect ballasts. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Festive lighting is connected but the volume is not recorded. Potential impact: High Actual impact: Low Audit history: Twice Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. The impact on settlement and participants is minor; therefore, the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has requested monthly asset extractions to assist with the validation of asset information and daily reconciliation for any given period.	01/03/2020	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will be able to assist WDC with database accuracy once monthly database reporting is established.	01/03/2020	

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

Genesis reconciles this DUML load using the UNM and RPS profiles. The daily unmetered kW value on the registry is used for submission and it is similar to the database kW value. The table below shows the minor difference.

ICP Number	Registry kW July 2019	RAMM kW July 2019	Estimated annual over submission
0000000002AL627	68.553	68.304	1,058
0000175690WT219	0.363	0.249	484
Total	68.916	68.553	1,542

Genesis bill and submit based on the information on the registry and use the average burn hours for the whole year. I confirmed the calculation was correct.

Festive lights are managed by the Information Centre. A contractor from Oamaru is used to install and then remove the lights. WDC are advised of the period the lights are active, but no changes are made to the database. Genesis is not advised of the additional load. It is WDC's intention to capture the festive lights in the RAMM database. I was unable to determine the items of load associated with this festive lighting, but it is small.

Four items of load have incorrect ballasts, leading to under submission of 176 kWh p.a.

The field audit results indicate the total annual consumption is estimated to be 3,400 kWh higher 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-May-18 To: 23-Oct-18	Estimated over submission of 1,542 kWh p.a. due to use of the registry daily kWh field instead of the database total kW. The field audit results indicate the total annual consumption is estimated to be 3,400 kWh higher than the DUML database indicates. 4 incorrect ballasts. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Festive lighting is connected but the volume is not recorded. Potential impact: Medium Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. The daily kWh figure from the registry is based on the database output and was updated recently, but there is a slight difference. The impact on settlement and participants is minor; therefore, the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has requested monthly asset extractions to assist with the validation of asset information and daily reconciliation for any given period.	01/03/2020	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will be able to assist WDC with database accuracy once monthly database reporting is established.	01/03/2020	

CONCLUSION

WDC manages the streetlight data in RAMM. Reporting is provided to Genesis and this is used to update the registry daily kWh field, which is used for submission purposes.

The audit found the database and submission was reasonably accurate. There are a small number of corrections to data and processes required to achieve compliance

The audit found four non-compliances and makes one recommendation.

The future risk rating of 16 indicates that the next audit be completed in 18 months and I agree with this recommendation.

PARTICIPANT RESPONSE

Genesis is working with WDC to provide monthly extractions regardless of whether there has been any change within the period. This will enable Genesis to move away from using the registry information for the calculation purposes as its received monthly. It will also enable Genesis to consistently validate the data set to verify its accuracy against any given period.