ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

CENTRAL OTAGO DISTRICT COUNCIL RAMM DATABASE AND GENESIS ENERGY

Prepared by: Rebecca Elliot

Date audit commenced: 2 September 2019

Date audit report completed: 18 November 2019

Audit report due date: 01-Dec-19

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EXECUTIVE SUMMARY

This audit of the Central Otago District Council (**CODC**) Unmetered Streetlights DUML RAMM 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.

This audit includes all streetlight for CODC load as recorded in RAMM. Genesis commenced using the CODC RAMM database in June 2019. Previously they used a combination of CODC for the OtagoNet area and the Aurora networks streetlight database.

The RAMM database is managed by CODC and is remotely hosted by RAMM Software Ltd. The field work, asset data capture and database population is conducted by CODC. CODC have robust processes in place to manage the database.

The field audit was undertaken of the 190 items of load. The field audit found a small number of errors but due to the wattage differences found between LED and HPS lights differences found in the field the database check found that the database accuracy threshold was not met.

CODC have no central management system in place and no plans to install one but they have hard wired dimming for all Betacom lights (83% of all lights) installed on their network. This was part of the night sky initiative in the area. The lights reduce their power consumption to 60% between the hours of midnight to 5am year-round. Currently this is not reflected in the submission volumes. This will be resulting in an estimated annual over submission of 25,236 kWh. I recommend that Genesis apply for an ICP per NSP for these lights and for a profile to reconcile these lights against.

The audit found five non-compliances and makes two recommendations. The future risk rating of 22 indicates that the next audit be completed in three months. I have considered this in conjunction with Genesis' comments and recommend that the next audit is in nine months to allow sufficient time to address the maters raised in this 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	A discrepancy between the submission volume and the database resulting in an estimated annual under submission of 7,176 kWh. Database is not confirmed as accurate with a 95% level of confidence. 25 LED lights with the incorrect wattage applied resulting in a very minor over submission of an estimated 30 kWh per annum. Over submission of an estimated 25,236 kWh per annum due to the hard-wired dimming LED lamps for 83% of the total lamps installed. The data used for submission does not track changes at a daily basis and is provided as a snapshot.	None	Medium	8	Investigating
Description and capacity of load	2.4	11(2)(c) of Schedule 15.3	37 items of load with no lamp description recorded. Four items of load with no ballast value recorded resulting in a very minor amount of under submission.	Moderate	Low	2	Identified
All load recorded in database	2.5	11(2A) of Schedule 15.3	Three additional lights found in the field.	Moderate	Low	2	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	Database is not confirmed as accurate with a 95% level of confidence. One 70W HPS lamp with no ballast applied.	Moderate	Low	2	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			25 LED lights with the incorrect wattage applied over submission of an estimated 30 kWh per annum.				
Volume information accuracy	3.2	15.2 and 15.37B(c)	A discrepancy between the submission volume and the database resulting in an estimated annual under submission of 7,176 kWh. Database is not confirmed as accurate with a 95% level of confidence. 25 LED lights with the incorrect wattage applied resulting in a very minor over submission of an estimated 30 kWh per annum. Over submission of an estimated 25,236 kWh per annum due to the hard-wired dimming LED lamps for 83% of the total lamps installed. The data used for submission does not track changes at a daily basis and is provided as a snapshot.	None	Medium	8	Investigating
					Future Risk Rating	**22**	

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	Action
Deriving submission accuracy	2.1	Apply for an ICP per NSP for these lights and a profile to correctly reflect the hardwire dimmed Betacom LEDs installed in the field	Genesis have spoken with CODC in relation to assets installed. CODC have been requested to supply Genesis with the relevant manufacturer's specifications supporting the assets installed. Genesis will be reviewing options pertaining to new ICP's for these assets.
Database accuracy	3.1	LED light specifications to be provided for next audit to confirm the correct wattage is recorded in the database.	Genesis will request then lamp descriptions to be updated.

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

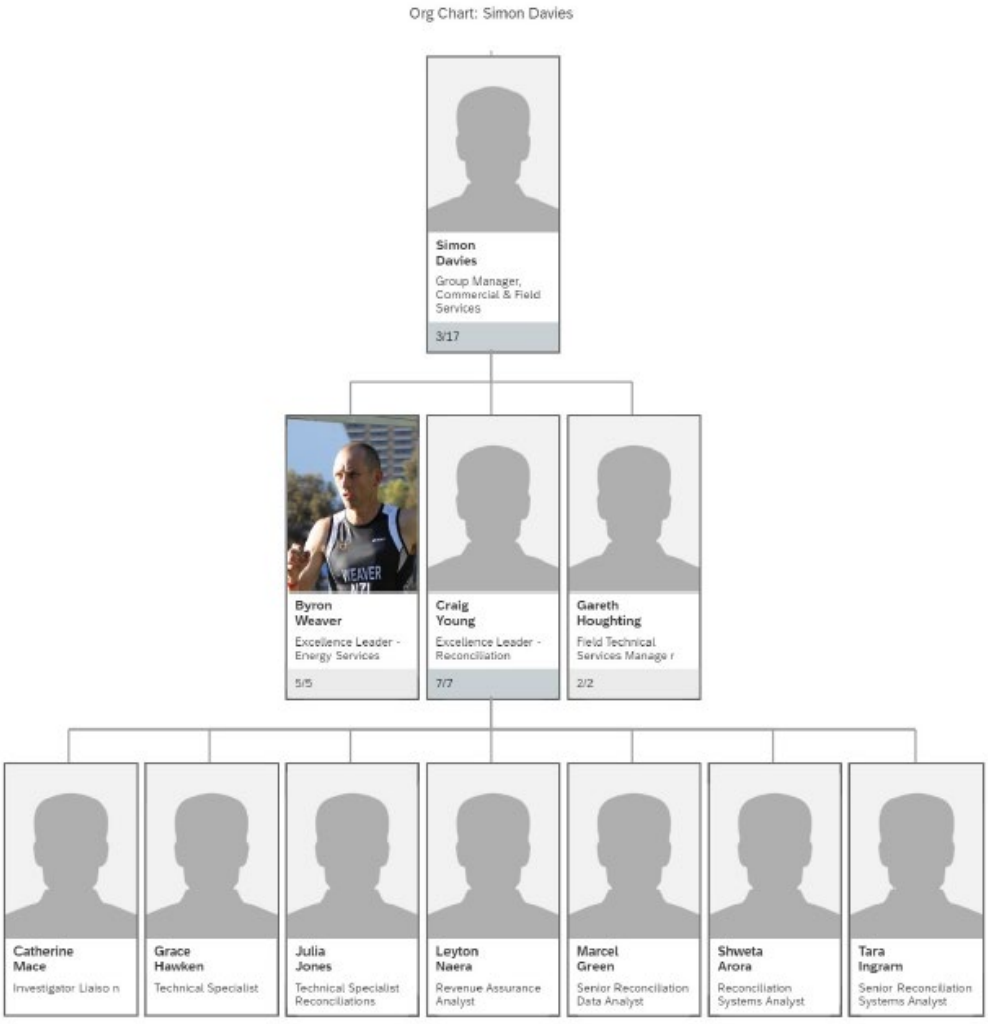
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

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

1.2. Structure of Organisation

Genesis provided a copy of their organisational structure.



1.3. Persons involved in this audit

Auditor:

Rebecca Elliot

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Craig Young	Excellence Leader - Reconciliation	Genesis Energy
Grace Hawken	Technical Specialist - Reconciliation Team	Genesis Energy
Andy Bartlett	Asset Engineer	Central Otago DC

1.4. Hardware and Software

The RAMM database used for the management of DUML is remotely hosted by RAMM Software Ltd.

CODC 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

ICP Number	Description	Profile	Number of items of load	Database wattage (watts)
0000481144CEF63	CROMWELL GXP	SST	909	20,889
0000002553CE07F	CLYDE GXP	SST	967	34,079
0001982630TG886	OTPOGXP	SST	229	6,818
		TOTAL	2,105	61,786

1.7. Authorisation Received

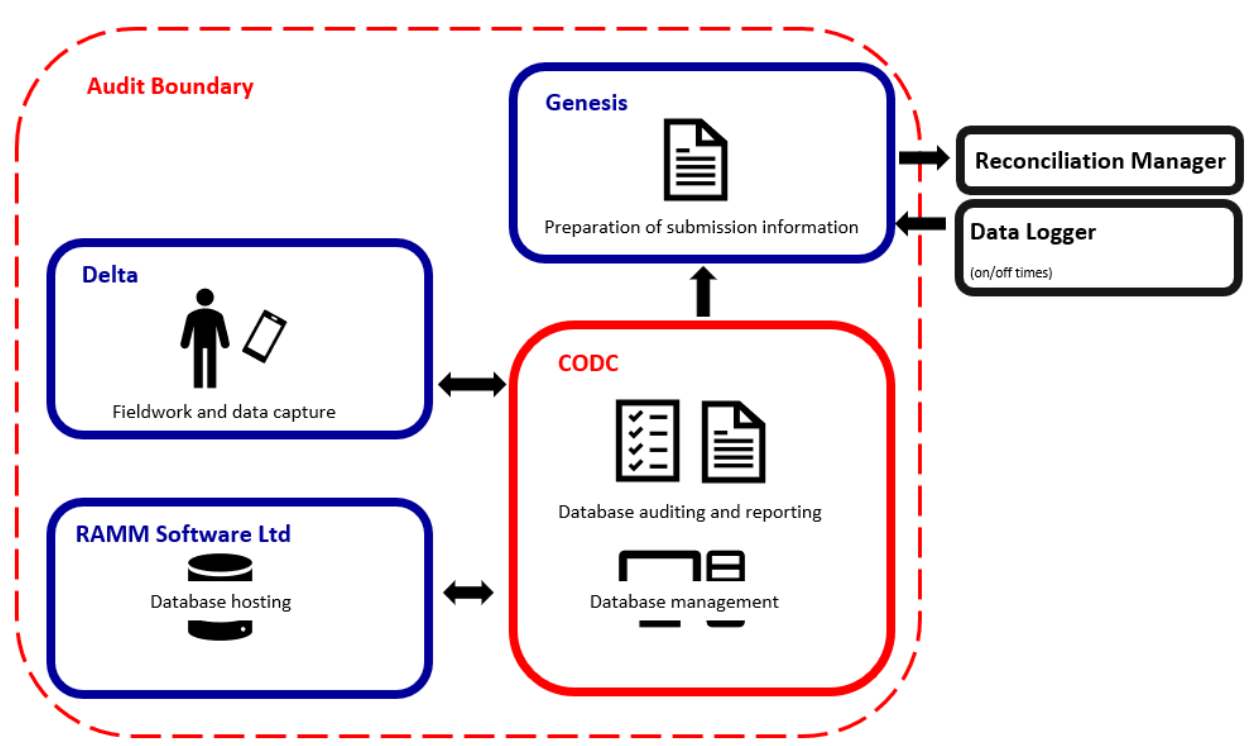
All information was provided directly by Genesis or CODC.

1.8. Scope of Audit

This audit of the CODC DUML RAMM 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.

This audit includes all streetlight for CODC load as recorded in RAMM. Genesis commenced using the CODC RAMM database in September 2018. Previously they used a combination of spreadsheet data from OtagoNet and the Aurora networks streetlight database.

The RAMM database is managed by CODC and is remotely hosted by RAMM Software Ltd. The field work is carried out by Delta. The asset data capture and database population are conducted by CODC. The scope of the audit encompasses the collection, security and accuracy of the data, including the preparation of submission information. 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 carried out on 2nd October 2019. The field audit was undertaken of 190 items of load.

1.9. Summary of previous audit

The previous audit was completed in October 2018 by Rebecca Elliot of Veritek Limited. The current status of that audit's findings is detailed below:

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
DUML Audit	1.10	17.295F of part 17	Audit not completed within 12 months of Part 16A coming into effect.	Cleared
Deriving submission information	2.1	11(1) of Schedule 15.3	The database accuracy is assessed to be 95.1% indicating a potential over submission of approximately 3,500 kWh per annum.	Still existing
All load recorded in database	2.5	11(2A) of Schedule 15.3	Four lights not included in the database extract used for submission, estimated 705 kWh of under submission per annum.	Still existing
Database accuracy	3.1	15.2 and 15.37B(b)	The database accuracy is assessed to be 95.1% indicating an estimated over submission of approximately 3,500 kWh per annum.	Still existing
Volume information accuracy	3.2	15.2 and 15.37B(c)	The database accuracy is assessed to be 95.1% indicating a potential over submission of approximately 3,500 kWh per annum.	Still existing

Table of Recommendations

Subject	Section	Recommendation for Improvement	Status
Location of each item of load	2.3	Update sub-area field to better reflect location of the item of load.	Cleared

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.

Audit outcome

Compliant

2. DUML DATABASE REQUIREMENTS

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

Code reference

Clause 11(1) of Schedule 15.3

Code related audit information

The retailer must ensure the:

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

Audit observation

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

Audit commentary

Genesis reconciles this DUML load using the SST profile.

The total volume submitted to the Reconciliation Manager is based on a monthly database report derived from RAMM and the "burn time" which is sourced from data loggers. The methodology is compliant.

I checked the submission calculation provided by Genesis for August 2019 and confirmed it to be correct for two of the three ICPs. The volume calculation for the ICP 0000481144CEF63 (Cromwell GXP) was incorrect as detailed in the table below:

ICP	Fittings number from July submission	Fittings number from database extract	Differences	kWh value submitted	Calculated kWh value from database	Differences kWh
0000481144CEF63	967	967	-	14,019	14,617	-598

This error has been present since June 2019. Genesis is correcting this through the revision process. Annualised this will result in an estimated under submission of 7,176 kWh per annum. This is recorded as non-compliance below.

The field audit against the database quantities found that the database is not confirmed as accurate with a 95% level of confidence as recorded in **section 3.1**.

A check of the wattages applied identified a small number of lights with the incorrect wattage applied resulting in an estimated very minor over submission of 179 kWh as detailed in **section 3.1**.

CODC have no central management system in place and no plans to install one but they have hard wired dimming for all Betacom lights (1,739 items of load or 83% of all lights) installed on their network. This was part of the night sky initiative in the area. The lights reduce their power consumption to 60% between the hours of midnight to 5am year-round. Currently this is not reflected in the submission volumes. This will be resulting in an estimated annual over submission of 25,236 kWh. I recommend that Genesis apply for an ICP per NSP for these lights and for a profile to reconcile these lights against.

Recommendation	Description	Audited party comment	Remedial action
Deriving submission accuracy	Apply for an ICP per NSP for these lights and a profile to correctly reflect the hardwire dimmed Betacom LEDs installed in the field	Genesis have spoken with CODC in relation to assets installed. CODC have been requested to supply Genesis with the relevant manufacturer's specifications supporting the assets installed. Genesis will be reviewing options pertaining to new ICP's for these assets.	Investigating

On 18 June 2019, the Electricity Authority issued a memo confirming that 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 this practice is non-compliant. The database contains a "lamp install date" but there is not a field for "livening date" for newly connected lights. When a wattage is changed in the database due to a physical change or a correction, only the record present at the time the report is run is recorded, not the historical information showing dates of changes.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 17-Oct-18 To: 31-Oct-19	A discrepancy between the submission volume and the database resulting in an estimated annual under submission of 7,176 kWh. Database is not confirmed as accurate with a 95% level of confidence. 25 LED lights with the incorrect wattage applied resulting in a very minor over submission of an estimated 30 kWh per annum. Over submission of an estimated 25,236 kWh per annum due to the hard-wired dimming LED lamps for 83% of the total lamps installed. The data used for submission does not track changes at a daily basis and is provided as a snapshot. Potential impact: Medium Actual impact: Medium Audit history: Once Controls: None Breach risk rating: 8
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as none as there is no process in place to submit the correct consumption volumes for the hard-wired dimming which represents 83% of the lights in the CODC area. The impact is assessed to be medium, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis had not been informed that the LED assets install had hard wired dimming preprogramed. CODC had not advised as they were happy to absorb the extra costs associated. Genesis has advised that this is a compliance issue and discussions were held as to how we could proceed to meet compliance.	unknown	Investigating
Preventative actions taken to ensure no further issue will occur	**Completion date**	
Genesis can only monitor the information held within the database. Genesis are reliant on the customer to divulge any relative information pertaining to asset variations.		

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 recorded against them.

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 fields for the street identifier (street name), displacement and GPS coordinates which are populated 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 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 contains the lamp make, model, wattage and the ballast wattage. All were populated with the exception of:

- 37 items of load that have an "unknown" lamp type recorded; all had a wattage recorded but this cannot be confirmed to be correct;
- four items of load had no ballast wattage recorded, three of these were LED lights so the zero would be the correct value to be recorded and one 70W HPS lamp was missing the 13W ballast which will result in a very minor amount of under submission.

The accuracy of the lamp description, capacity and ballasts recorded is discussed in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.4 With: Clause 11(2)(c) of Schedule 15.3 From: 17-Oct-18 To: 31-Oct-19	37 items of load with no lamp description recorded. Four items of load with no ballast value recorded resulting in a very minor amount of under submission. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate because they ensure most information is accurate. The impact is assessed to be low due to the small number of lights affected.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis will work with the council to correct the ballast exceptions found in the database	01/03/2020	Identified
Preventative actions taken to ensure no further issue will occur	**Completion date**	
Continue to revise the information being provided by the council, with the expectation the council makes the necessary corrections	01/03/2020	

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 all 190 items of load on 2nd October 2019.

Audit commentary

The field audit findings for the sample of lamps was accurate with the exception of the streets detailed in the table below:

Street/Area	Database Count	Field Count	Lamp no. difference	No of incorrect lamp wattage	Comments
GAIR AVE	23	21	-2		2x LED lights missing in the field
HATTERS LANE	3	3		3	3x Incorrect wattage applied to LED light type "BRP711 LED23/NW 4000K Optic-DW LED"
HORACE STREET	4	5	1		1x additional 70W HPS found in the field
LEVEN STREET	7	7		1	1x incorrect lamp wattage recorded in the database – compact fluorescent in the field recorded as an LED
LIMERICK STREET	3	5	2		2x additional 75W LED pedestrian crossing lights found in the field
PARKBURN LANE	2	2		2	1x Incorrect wattage applied to LED light type "BRP711 LED23/NW 4000K Optic-DW LED"
Grand Total	**190**	**192**	**5**	**6**	

This clause relates to lights in the field that are not recorded in the database. The field audit found three additional lights in the field. This is recorded as a non-compliance below.

The database accuracy is discussed in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 17-Sep-18 To: 31-Oct-19	Three additional lights found in the field. 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 they ensure most information is accurate. The impact is assessed to be low due to the small number of additional lights found in the field in relation to the overall count of the items of load.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis will work with the council to verify the field findings and clear the exceptions found in the database.	01/03/2020	Identified
Preventative actions taken to ensure no further issue will occur	**Completion date**	
Continue to revise the information being provided by the council, with the expectation the council makes the necessary corrections	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

The database has a complete audit trail.

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	Central Otago District Council area
Strata	The database contains items of load in the Central Otago district area. The area has two distinct sub regions of urban and rural. The processes for the management of all CODC items of load are the same, but I decided to place the items of load into four strata: 1. Cromwell A-L 2. Cromwell M-Z 3. Alexandra 4. Rural
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 44 sub-units.
Total items of load	190 items of load were checked.

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority or LED light specifications where available against the DUML database.

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

Audit commentary

Field audit findings

A statistical sample of 190 items of load found that the field data was 104.8% of the database data for the sample checked.

Result	Percentage	Comments
The point estimate of R	104.8%	Wattage from survey is higher than the database wattage by 4.8%
R_L	99.2%	With a 95% level of confidence it can be concluded that the error could be between -0.8% and +18.9%
R_H	118.9%	

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 0.8% lower to 18.9% 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 3.0 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 1 kW lower to 12 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 12,700 kWh higher than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 2,200 kWh p.a. lower to 49,800 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

I checked the wattages being applied in the database and found:

- 25 items of load that have an "unknown" lamp type recorded, all had a wattage recorded but this cannot be confirmed to be correct;
- four items of load had no ballast wattage recorded, three of these were LED lights so zero would be the correct value to be recorded and one 70W HPS lamp was missing the 13W ballast which will result in a very minor amount of under submission and is recorded as non-compliance.
- the check of LED wattages found insufficient light descriptions recorded for 104 items:

	Wattage applied																		
Light make and model	**13**	**17**	**20**	**22**	**23**	**27**	**29**	**33**	**35**	**40**	**45**	**58**	**70**	**75**	**83**	**103**	**149**	**172**	**Grand Total**
LED (13W, 13 watts)																			
(blank)	8																		8
LED (103W, 103 watts)																			
TECEO 1 103W 48XPL 5118 Optic																2			2
LED (22W, 22 watts)																			
NANO1 22W				13															13
(blank)						20													20
LED (33W, 33 watts)																			
BPP616 LED 30 WRN NW 4000								1											1
Unknown								10											10
(blank)								5											5
LED (35W, 35 watts)																			
BPP616 LED 30 WRN NW 4000									10										10
LED (40W, 40 watts)																			
MegaBright 40WA130GES8										6									6
LED (45W, 45 watts)																			
Unknown											11								11
(blank)											7								7
LED (58W, 58 watts)																			
Unknown												4							4
(blank)												7							7
Grand Total	**8**	**0**	**0**	**13**	**0**	**20**	**0**	**16**	**10**	**6**	**18**	**11**	**0**	**0**	**0**	**2**	**0**	**0**	**104**

I recommend that the light specifications are checked and provided for the next audit to confirm that the correct wattage has been applied.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	LED light specifications to be provided for next audit to confirm the correct wattage is recorded in the database.	Genesis will request then lamp descriptions to be updated.	Identified

- LED light specifications checked found that 25 items of load have the incorrect lamp wattage applied:

	Wattage applied																
Light make and model	**13**	**17**	**22**	**23**	**27**	**29**	**33**	**35**	**40**	**45**	**58**	**70**	**83**	**103**	**149**	**172**	**Grand Total**
LED (35W, 35 watts)																	
GL520 40W 7022								4									4
LED (23W, 23 watts)																	
BRP711 LED23/NW 4000K Optic-DW				13													13
LED (70W, 70 watts)																	
TECEO 1 70 W 48 XP-G2 5144 Op												8					8
Grand Total				**13**				**4**	**4**			**8**					**25**

I have calculated that there is a very minor annual over submission of 30 kWh of over submission per annum. This is recorded as non-compliance below.

Change management process findings

The processes were reviewed for new lamp connections and the tracking of load changes due to faults and maintenance. All fault and maintenance work is conducted by Delta and as each job is completed and invoiced, the database is updated by council staff from the invoice details to ensure database accuracy. The contract between CODC and Delta has expired, and the maintenance agreement is rolled month by month. CODC intend to put a maintenance contract in place.

The new subdivision process requires developers to install LED lights. These must be selected from the approved LED light types specified by NZTA. CODC accept responsibility of these assets upon the 224C being issued. As built plans are expected to be submitted to CODC as part of this process. Upon receipt of these CODC do a field check using pocket RAMM to confirm that the assets are recorded in RAMM correctly. Currently it can take up to three months post the 224C being issued before the "as built" plans are provided. The electrical connection of new streetlights is controlled by Aurora and CODC are not advised of when this occurs. The new lights are recorded in the database from the date of vesting. This will be resulting in no submission occurring for the period between electrical connection and vesting of the assets to council. CODC are working are reviewing these processes and are having discussions with the two networks across which their district covers to improve the timeliness of new light information being added.

Lamp outages are predominately notified to CODC by residents from which work requests are made to Delta, there are no outage patrols due to the low failure rate of LED lights.

Their LED rollout project is complete. 92% of all lighting is now LED. The remaining 8% of lights will be replaced on a fail process as these lights were deemed uneconomic to replace as part of the LED rollout.

There are no festive lights connected to the unmetered streetlight circuits. Private lights are not held in the database.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 17-Oct-18 To: 31-Oct-19	Database is not confirmed as accurate with a 95% level of confidence. One 70W HPS lamp with no ballast applied. 25 LED lights with the incorrect wattage applied resulting in a very minor over submission of an estimated 30 kWh per annum. 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 field audit indicated the controls are robust but there is room for errors to occur. The impact is assessed to be low due to the small number of errors in the field and the small number of LED lights with the incorrect wattage applied.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis will work with the council to verify and clear the exceptions found in the database.	01/03/2020	Identified
Preventative actions taken to ensure no further issue will occur	**Completion date**	
Continue to revise the information being provided by the council, with the expectation the council makes the necessary corrections	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

I checked the submission calculation provided by Genesis for August 2019 and confirmed it to be correct for two of the three ICPs. The volume calculation for the ICP 0000481144CEF63 (Cromwell GXP) was incorrect as detailed in the table below:

ICP	Fittings number from July submission	Fittings number from database extract	Differences	kWh value submitted	Calculated kWh value from database	Differences kWh
0000481144CEF63	967	967	-	14,019	14,617	-598
Total month kWh difference under submission						598

This error has been present since June 2019. Genesis is correcting this through the revision process. Annualised this will result in an estimated under submission of 7,176 kWh per annum. This is recorded as non-compliance below.

The field audit against the database quantities found that the database is not confirmed as accurate with a 95% level of confidence as recorded in **section 3.1**.

A check of the wattages applied identified a small number of lights with the incorrect wattage applied resulting in an estimated very minor over submission of 30 kWh as detailed in **section 3.1**.

CODC have no central management system in place and no plans to install one but they have hard wired dimming for all Betacom lights (1,739 items of load or 83% of all lights) installed on their network. This was part of the night sky initiative in the area. The lights reduce their power consumption to 60% between the hours of midnight to 5am year-round. Currently this is not reflected in the submission volumes. This will be resulting in an estimated annual over submission of 25,236 kWh. I recommend that Genesis apply for an ICP per NSP for these lights and for a profile to reconcile these lights against.

On 18 June 2019, the Electricity Authority issued a memo confirming that 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 this practice is non-compliant. The database contains a "lamp install date" but there is not a field for "livening date" for newly connected lights. When a wattage is changed in the database due to a physical change or a correction, only the record present at the time the report is run is recorded, not the historical information showing dates of changes.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 Clause 15.2 and 15.37B(c) From: 17-Oct-18 To: 31-Oct-19	A discrepancy between the submission volume and the database resulting in an estimated annual under submission of 7,176 kWh. Database is not confirmed as accurate with a 95% level of confidence. 25 LED lights with the incorrect wattage applied resulting in a very minor over submission of an estimated 30 kWh per annum. Over submission of an estimated 25,236 kWh per annum due to the hard-wired dimming LED lamps for 83% of the total lamps installed. The data used for submission does not track changes at a daily basis and is provided as a snapshot. Potential impact: Medium Actual impact: Medium Audit history: Once Controls: None Breach risk rating: 8
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as none as there is no process in place to submit the correct consumption volumes for the hard-wired dimming which represent 83% of the lights in the CODC area. The impact is assessed to be medium, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis had not been informed that the LED assets install had hard wired dimming preprogramed. CODC had not advised as they were happy to absorb the extra costs associated. Genesis has advised that this is a compliance issue and discussions were held as to how we could proceed to meet compliance.	unknown	Investigating
Preventative actions taken to ensure no further issue will occur	**Completion date**	
Genesis can only monitor the information held within the database. Genesis are reliant on the customer to divulge any relative information pertaining to asset variations.		

CONCLUSION

The field audit was undertaken of the 190 items of load. The field audit found a small number of errors but due to the wattage differences found between LED and HPS lights differences found in the field the database check found that the database accuracy threshold was not met.

CODC have no central management system in place and no plans to install one but they have hard wired dimming for all Betacom lights (83% of all lights) installed on their network. This was part of the night sky initiative in the area. The lights reduce their power consumption to 60% between the hours of midnight to 5am year-round. Currently this is not reflected in the submission volumes. This will be resulting in an estimated annual over submission of 25,236 kWh. I recommend that Genesis apply for an ICP per NSP for these lights and for a profile to reconcile these lights against.

The audit found five non-compliances and makes two recommendations. The future risk rating of 22 indicates that the next audit be completed in three months. I have considered this in conjunction with Genesis' comments and recommend that the next audit is in nine months to allow sufficient time to address the maters raised in this audit.

PARTICIPANT RESPONSE

Genesis have spoken with CODC in relation to assets installed. CODC have been requested to supply Genesis with the relevant manufacturer's specifications supporting the assets installed. Genesis will be reviewing options pertaining to new ICP's for these assets. Genesis were not advised of the preprogramed assets when initially working with CODC to collectively cleanse their data. Due to a potential profile required along with new ICP's per NSP, Genesis will need to continue to reconcile total lamp wattage until means otherwise allow.