ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

GORE DISTRICT COUNCIL AND MERIDIAN ENERGY

Prepared by: Steve Woods

Date audit commenced: 11 November 2020

Date audit report completed: 8 December 2020

Audit report due date: 08-Dec-20

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EXECUTIVE SUMMARY

This audit of the **Gore District Council (GDC)** 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, which became effective on 1 June 2017.

The database is remotely hosted by RAMM Software Ltd. The field work and asset data capture is conducted by Powernet using Pocket RAMM.

The field audit was undertaken of a statistical sample of 121 items of load on 11th November 2020. The main findings are as follows:

- in absolute terms, total annual consumption is estimated to be 8,000 kWh lower than the DUML database indicates, and
- overall, the processes in place to manage the database are robust.

This audit found three non-compliances. The future risk rating of six indicates that the next audit be completed in 18 months. I have considered this in conjunction with Meridian's comments and I agree with the 18-month recommendation.

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Deriving submission information	2.1	Clause 11(1) of Schedule 15.3	In absolute terms, total annual consumption is estimated to be 8,000 kWh lower than the DUML database indicates.	Moderate	Low	2	Identified
Database accuracy	3.1	Clause 15.2 and 15.37B(b)	In absolute terms, total annual consumption is estimated to be 8,000 kWh lower than the DUML database indicates.	Moderate	Low	2	Identified
Volume information accuracy	3.2	Clause 15.2 and 15.37B(c)	In absolute terms, total annual consumption is estimated to be 8,000 kWh lower than the DUML database indicates.	Moderate	Low	2	Identified
Future Risk Rating						6	

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

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. Persons involved in this audit

Auditor:

Steve Woods

Veritek Limited

Electricity Authority Approved Auditor

Claire Stanley

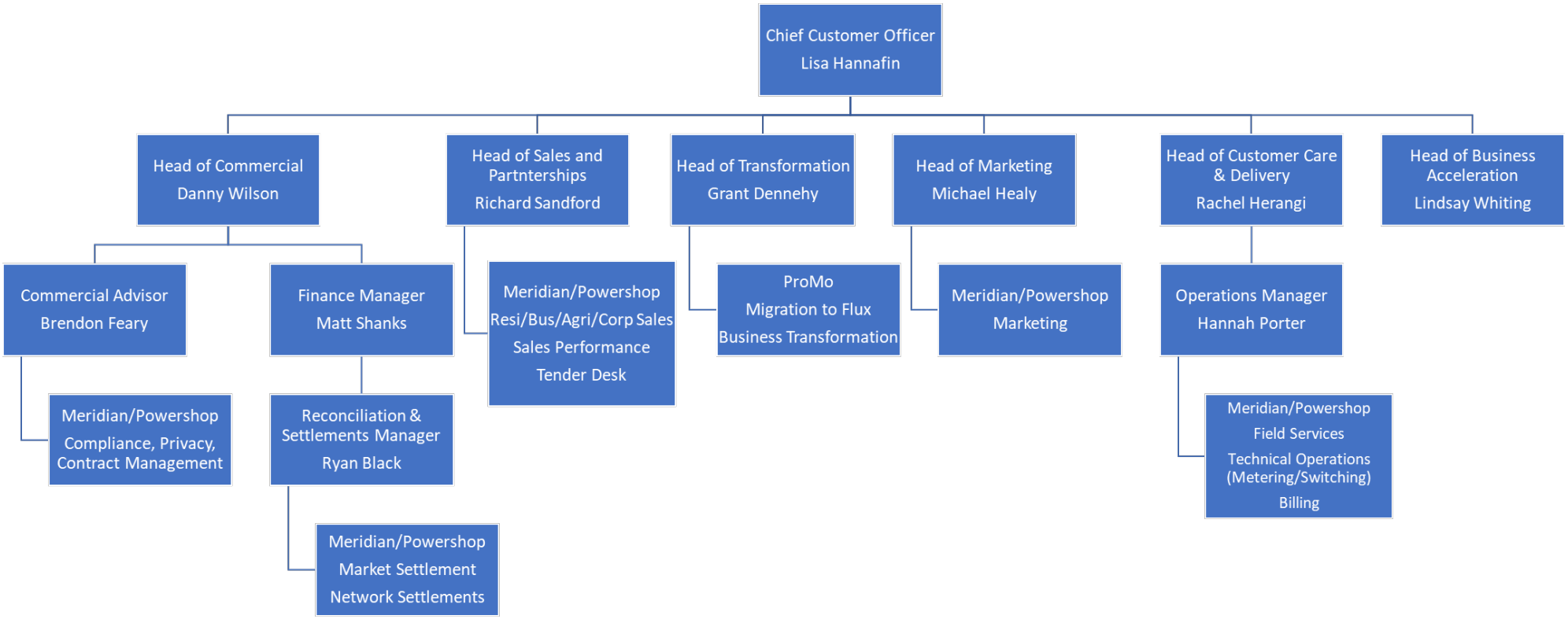
Supporting Auditor Veritek Limited

Other personnel assisting in this audit were:

Name	Title	Company
Peter Standring	Transportation Manager	Gore District Council
Amy Cooper	Compliance Officer	Meridian Energy
Helen Youngman	Energy Data Analyst	Meridian Energy

1.3. Structure of Organisation

Meridian provided a copy of their organisational structure:



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".

GDC confirmed that the database back-up is in accordance with standard industry procedures. 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	Number of items of load	Database wattage (watts)
0008801002TP3AD	GDC LIGHTS - URBAN	GOR0331	187	7,192
0008801019TP7D4	GDC LIGHTS - NZTA	GOR0331	300	58,090
0008801020TPE7D	GDC LIGHTS - URBAN	GOR0331	50	2,001
Total			537	67,283

1.7. Authorisation Received

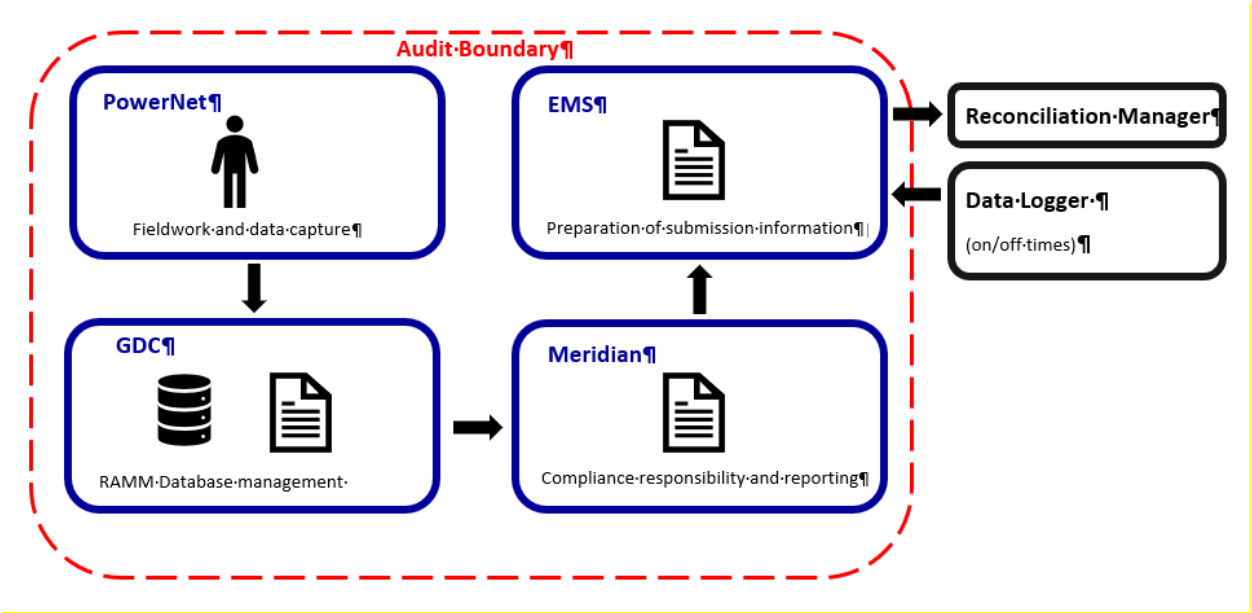
All information was provided directly by Meridian and GDC.

1.8. Scope of Audit

The database used for submission is the GDC RAMM database. This database includes NZTA lighting. PowerNet have created an ICP for these lights during the audit period.

Field work is conducted by PowerNet as a contractor.

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 121 items of load on 11th November 2020.

1.9. Summary of previous audit

The previous audit was completed in April 2019 by Rebecca Elliot of Veritek Limited. Five non-compliances were identified, and one recommendation was made. The current statuses of the non-compliances recorded are detailed below.

Table of Non-Compliance

Subject	Section	Clause	Non-Compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	The database accuracy is assessed to be 90.2% of the database for the sample checked indicating a potential over submission of approximately 28,300 kWh per annum. Estimated potential minor over submission of 214 kWh per annum due to incorrect ballasts being used. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still existing
Description and capacity of load	2.4	11(2)(c) of Schedule 15.3	Seven items of load with an "unknown" light description recorded.	Cleared
All load recorded in the database	2.5	11(2A) of Schedule 15.3	One additional light found in the field.	Cleared

Subject	Section	Clause	Non-Compliance	Status
Database accuracy	3.1	15.2 and 15.37B(b)	The database accuracy is assessed to be 90.2% of the database for the sample checked indicating a potential over submission of approximately 28,300 kWh per annum. Estimated potential minor over submission of 214 kWh per annum due to incorrect ballasts being used.	Still existing
Volume information accuracy	3.2	15.2 and 15.37B(c)	The database accuracy is assessed to be 90.2% of the database for the sample checked indicating a potential over submission of approximately 28,300 kWh per annum. Estimated potential minor over submission of 214 kWh per annum due to incorrect ballasts being used. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still existing

Table of Recommendations

Subject	Section	Non-Compliance	Status
Database accuracy	3.1	Confirm the correct wattage has been applied to the LED lights outside of the NES dairy factory	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

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 within the required timeframe.

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

Meridian reconciles this DUML load using the DST profile. Meridian is using the GDC RAMM database for reconciliation. The on and off times are derived from a data logger read by EMS and are used to create a shape file. Meridian supplies EMS with the capacity information and EMS calculates the kWh figure for each ICP and includes this in the relevant AV080 file. This process was audited during Meridian's reconciliation participant audit and EMS' agent audit. Compliance was confirmed for both parties.

I compared the RAMM database provided to the capacity information Meridian supplied to EMS for the month of October 2020 and found it matched.

There is some inaccurate data within the database used to calculate submissions. This is recorded as non-compliance and is discussed in **section 3.1** and **3.2**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 07-Mar-20 To: 04-Nov-20	In absolute terms, total annual consumption is estimated to be 8,000 kWh lower than the DUML database indicates. Potential impact: Medium Actual impact: Low Audit history: Multiple times Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate. The processes in place are robust for the calculation of submission. Powernet send through changes to GDC to load into the database, but errors can sometimes still occur. The impact is assessed to be low, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Audit findings will be provided to GDC for correction of the database.	Dec 2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Existing processes and controls for database management are considered adequate		

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

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

Audit outcome

Compliant

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

Code reference

Clause 11(2)(b) of Schedule 15.3

Code related audit information

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

Audit observation

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

Audit commentary

The database contains the nearest street address, pole numbers and Global Positioning System (GPS) coordinates for each item of load and users in the office and field can view these locations on a mapping system.

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 contains two records for wattage, firstly the lamp wattage and secondly the gear wattage, which represents ballast losses. The database correctly records the lamp and gear wattage.

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 121 items of load on 11th November 2020.

Audit commentary

The field audit discrepancies are detailed in the table below:

Street/Area	Database Count	Field Count	Lamp no. difference	No of incorrect lamp wattage	Comments
SELBOURNE ST - SOUTH	1	0	-1		1x 150W HPS not found in the field
SELBOURNE ST - NORTH	2	1	-1		1 x 24 LED not found in the field
GRAND TOTAL	121	119	-2		

There were no additional items of load found 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.

The change management process and the compliance of the database reporting provided to Meridian 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 RAMM database was checked for audit trails.

Audit commentary

The RAMM database has a complete audit trail of all additions and changes to the database information.

Audit outcome

Compliant

3. ACCURACY OF DUML DATABASE

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

Code reference

Clause 15.2 and 15.37B(b)

Code related audit information

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

Audit observation

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	Gore District Council region
Strata	The database contains items of load in Gore district area. The processes for the management of GDC items of load are the same, but I decided to place the items of load into three strata of a similar size, as follows: 1. A-L, 2. M-W, and 3. State Highway
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 28 sub-units.
Total items of load	121 items of load were checked.

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

Audit commentary

Field Audit Findings

A field audit was conducted of a statistical sample of 121 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	97.2	Wattage from survey is higher than the database wattage by 2.8%
R_L	86.5	With a 95% level of confidence it can be concluded that the error could be between -13.5% and 0%.
R_H	100.00	

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 -13.5% lower and 0% 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 2kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 9 kW lower and 0 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 8,000 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between -38,700 kWh and 0 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 contains two records for wattage, firstly the lamp wattage and secondly the gear wattage, which represents ballast losses.

NZTA lighting

NZTA lighting is included in the database and was checked as part of the field audit.

ICP accuracy

All items of load have the correct ICP recorded.

Location accuracy

The location details were found to be accurate.

Change management process findings

The processes were reviewed for new lamp connections and the tracking of load changes due to faults and maintenance.

GDC have no new subdivisions in progress so new streetlight connections are few and far between. There were no new connections found during the audit period.

The fault and maintenance work continues to be undertaken by PowerNet contracting division. PowerNet provide GDC with details of all changes made in the field and these are updated in RAMM.

No private lights have been identified in the GDC database.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 07-Mar-20 To: 04-Nov-20	In absolute terms, total annual consumption is estimated to be 8,000 kWh lower than the DUML database indicates. Potential impact: Medium Actual impact: Low Audit history: Four times Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate Powernet send through changes to GDC to load into the database, but errors can sometimes still occur. The impact is assessed to be low, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Audit findings will be provided to GDC for correction of the database.	Dec 2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

Existing processes and controls for database management are considered adequate		

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, against the submitted figure to confirm accuracy.

Audit commentary

Meridian reconciles this DUML load using the DST profile. Meridian moved to using the GDC RAMM database for reconciliation in April 2019. The on and off times are derived from a data logger read by EMS and are used to create a shape file. Meridian supplies EMS with the capacity information and EMS calculates the kWh figure for each ICP and includes this in the relevant AV080 file. This process was audited during Meridian's reconciliation participant audit and EMS' agent audit. Compliance was confirmed for both parties.

I compared the RAMM database provided to the capacity information Meridian supplied to EMS for the month of October 2020 and found it matched.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 07-Mar-20 To: 04-Nov-20	In absolute terms, total annual consumption is estimated to be 8,000 kWh lower than the DUML database indicates. Potential impact: Medium Actual impact: Low Audit history: Three times Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate. The processes in place are robust for the calculation of submission. Powernet send through changes to GDC to load into the database, but errors can sometimes still occur. The impact is assessed to be low, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Audit findings will be provided to GDC for correction of the database.	Dec 2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Existing processes and controls for database management are considered adequate		

CONCLUSION

The database is remotely hosted by RAMM Software Ltd. The field work and asset data capture is conducted by Powernet using Pocket RAMM.

The field audit was undertaken of a statistical sample of 121 items of load on 11th November 2020. The main findings are as follows:

- in absolute terms, total annual consumption is estimated to be 8,000 kWh lower than the DUML database indicates, and
- overall, the processes in place to manage the database are robust.

This audit found three non-compliances. The future risk rating of six indicates that the next audit be completed in 18 months. I have considered this in conjunction with Meridian's comments and I agree with the 18-month recommendation.

PARTICIPANT RESPONSE