

ELECTRICITY INDUSTRY PARTICIPATION CODE  
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

SELWYN DISTRICT COUNCIL  
AND MERIDIAN ENERGY LIMITED

Prepared by: Steve Woods (assisted by Deborah Anderson)

Date audit commenced: 23 April 2018

Date audit report completed: 11 May 2018

Audit report due date: 01-Jun-18

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## EXECUTIVE SUMMARY

This audit of the Selwyn District Council (**SDC**) 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 managed by Orion; the Distributor for parts of the Canterbury area. The streetlight data is held in Orion's GIS and an SQL database, which interfaces with the GIS.

This audit found four non-compliances and makes no recommendations.

The field audit found some potential inaccuracies lamp wattage. Orion are investigating these. Overall, Orion have robust controls and management in place.

The database accuracy is assessed to be 99.3% indicating an estimated over submission of 16,639 kWh per annum.

The future risk rating of 14 indicates that the next audit be completed in 12 months. The database accuracy issues are now resolved, therefore I recommend the next audit is conducted in 18 months.

## 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	Over submission by approximately 14,871 kWh per annum	Moderate	Medium	4	Identified
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	Four lamp types have incorrect lamp wattage recorded. The wattage expected under reporting is 1,768 kWh per annum.	Moderate	Low	2	Cleared
Database accuracy	3.1	15.2 and 15.37B(b)	The database accuracy is assessed to be 99.3% indicating an estimated over submission of 16,639 kWh per annum	Moderate	Medium	4	Cleared
Volume information accuracy	3.2	15.2 and 15.37B(c)	Over submission by approximately 14,871 kWh per annum	Moderate	Medium	4	Identified
<b>Future Risk Rating</b>						<b>14</b>	

<b>Future risk rating</b>	0	1-4	5-8	9-15	16-18	19+
<b>Indicative audit frequency</b>	36 months	24 months	18 months	12 months	6 months	3 months

**RECOMMENDATIONS**

<b>Subject</b>	<b>Section</b>	<b>Description</b>	<b>Recommendation</b>

**ISSUES**

<b>Subject</b>	<b>Section</b>	<b>Description</b>	<b>Issue</b>

## 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.

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

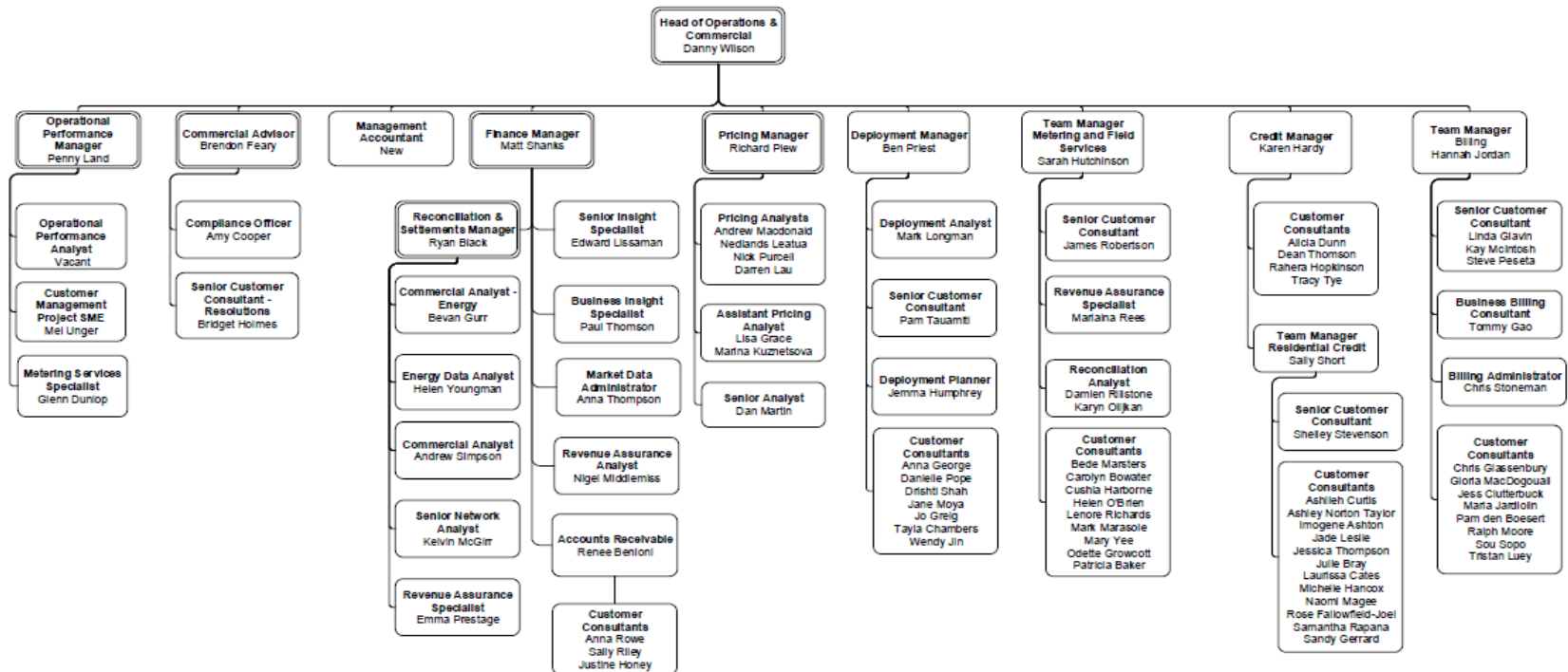
#### **Audit commentary**

Compliance is confirmed.

## 1.2. Structure of Organisation

Meridian provided a copy of their organisational structure.

### Operations and Commercial



### 1.3. Persons involved in this audit

Auditor:

**Steve Woods**

**Veritek Limited**

**Electricity Authority Approved Auditor**

Other personnel assisting in this audit were:

Name	Title	Company
Helen Youngman	Energy Data Analyst	Meridian Energy
Amy Cooper	Compliance Officer	Meridian Energy
Penny Lawrence	Operations Services	Orion

### 1.4. Hardware and Software

Orion use a purpose-built Oracle system for the management of the DUML information. Backup and restoration procedures are in accordance with normal industry protocols.

### 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	Profile	Number of items of load	Database wattage (watts)
0007111131RN649	APS0111	DST	34	5,158
0007111132RNA89	CLH0111	DST	51	5,595
0007111133RN6CC	COL0111	DST	41	3,146
0007111134RNB06	HOR0331	DST	661	67,365
0007131637RN109	HOR0661	DST	9	785
0007111135RN743	ISL0331	DST	636	57,329
0007131640RN99E	ISL0661	DST	4,492	402,361
0007152475RN996	KBY0661	DST	130	14,805
0007111136RNB83	SPN0331	DST	0	0
0007131408RN328	SPN0661	DST	0	0

### 1.7. Authorisation Received

All information was provided directly by Meridian or Orion.

## 1.8. Scope of Audit

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

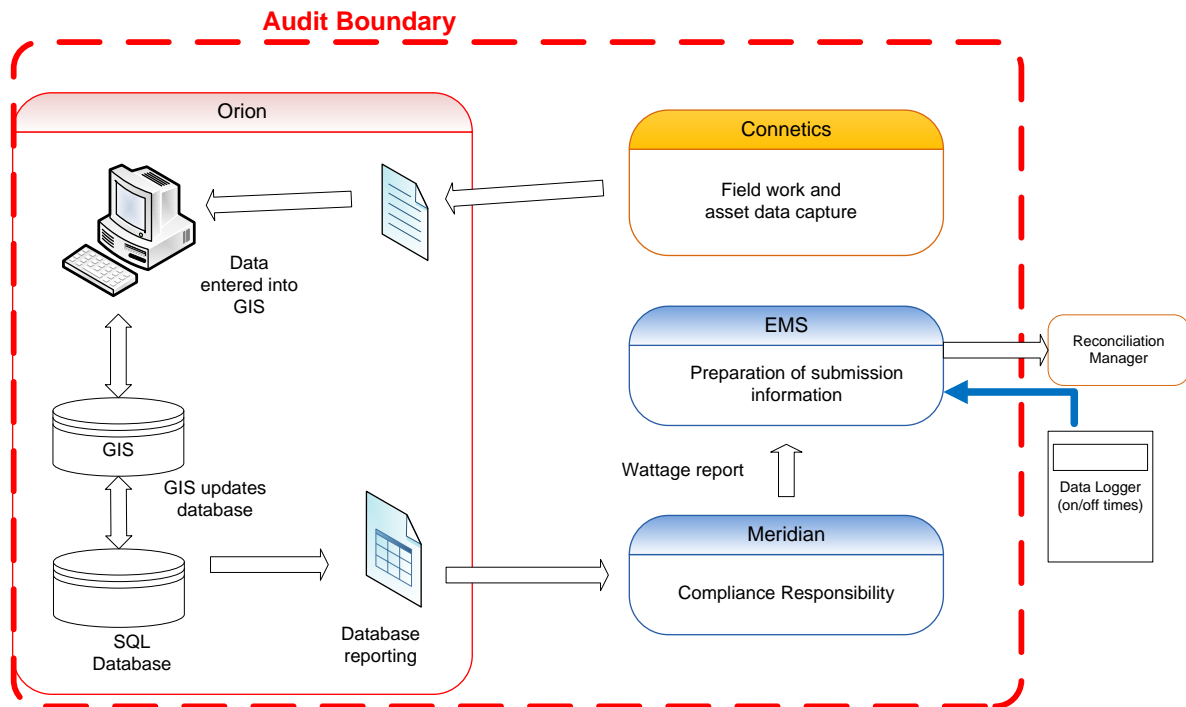
The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1, which became effective on 1 June 2017.

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 SDC boundary is part of the Orion Network. Orion manage their own database for SDC. Monthly reporting is supplied to Meridian by Orion.

This audit covers the Orion database. The database is managed by Orion; the Distributor for parts of the Canterbury area. The streetlight data is held in Orion's GIS and an SQL database. There is an interface between the SQL database and GIS. Orion engages Connetics for the fieldwork and asset data capture. They use a RAMM database. Orion has a well-defined process to manage any additions/changes. Once the work is complete, the data is manually entered into the GIS, which then populates the database.

The diagrams below show the audit boundaries for clarity.



The field audit was undertaken of a statistical sample of 301 items of load on 24–25th April 2018.



### 1.9. Summary of previous audit

Meridian provided a copy of the previous audit report for SDC DUML, conducted in April 2017 by Rebecca Elliot of Veritek. One non-compliance was recorded.

The table below records the findings.

### Table of Non-Compliance

Subject	Section	Clause	Non compliance	Status
Tracking of load changes	2.3	11(3) of schedule 15.3	Database is not accurate.	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 3 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 the Orion 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

Meridian reconciles this DUML load using the DST profile. The on and off times are derived from a data logger read by EMS. This information is 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 has been audited to confirm its accuracy and compliance. Compliance is confirmed.

I checked the March 2018 extract provided by Orion against the submission totals supplied by Meridian and found that submission matched the database for all ICPs.

The audit found some inaccuracy, as recorded in the table below.

Issue	Impact on submission
Incorrect lamp wattage	Under reporting of 1,768 kWh per annum.
The database accuracy is assessed to be 99.3%	Over submission of 16,639 kWh per annum
Net impact	14,871 over submission

#### Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3  From: 01-Apr-17 To: 30-Apr-18	Over submission by approximately 14,871 kWh per annum  Potential impact: High Actual impact: Medium  Audit history: Once Controls: Moderate Breach risk rating: 4
Audit risk rating	Rationale for audit risk rating

<b>Medium</b>	The controls are recorded as Moderate because they mitigate risk most of the time The impact on settlement and participants is moderate; therefore the audit risk rating is medium.	
<b>Actions taken to resolve the issue</b>	<b>Completion date</b>	<b>Remedial action status</b>
All inaccuracies identified in this audit have been corrected in the database. We will liaise with our agent to determine confirm whether information is available that would enable historic submissions to be revised.	28/05/2018 30/06/2018	Identified
<b>Preventative actions taken to ensure no further issues will occur</b>	<b>Completion date</b>	
The standardised wattage table has been provided to Orion to ensure all lamp types have the correct wattage applied going forward. The relatively small number of errors identified in a database of this size indicates existing controls are sufficient to mitigate risk to an acceptable level.	28/05/2018 Ongoing	

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

### Code reference

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

### Code related audit information

*The DUMML database must contain:*

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

### Audit observation

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

### Audit commentary

All Orion 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 DUMML database must contain the location of each DUMML item.

#### Audit observation

The databases were checked to confirm the location is recorded for all items of load.

#### Audit commentary

The Orion database contains fields for the street address and also GPS coordinates. There are 128 records that do not have a Street number but in the majority of cases that is not possible and in all cases there is GPS information.

#### Audit outcome

Compliant

### 2.4. Description and capacity of load (Clause 11(2)(c) and (d) of Schedule 15.3)

#### Code reference

Clause 11(2)(c) and (d) of Schedule 15.3

#### Code related audit information

The DUMML database must contain:

- a description of load type for each item of load and any assumptions regarding the capacity
- the capacity of each item in watts.

#### Audit observation

The databases were checked to confirm that they 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

Orion's database contains the manufacturers rated wattage and the ballast wattage. The extract provided has a field for 'Lamp Type' and an additional table was provided which contained more detail for each lamp type – description, amps, wattage (incl ballast) & lamp type category.

The Orion database was found to contain some inaccuracies when matched to the published standardised wattage table. The differences found were four lamp type and wattage differences, affecting 261 lamps with an overall wattage difference of 414 W, which equates to 1,768 kW per annum. This is recorded as a non-compliance.

Lamp Type	Description	Wattage	Lamp Type Category	Orion database	Correct wattage	Lamps affected	wattage difference	total difference
1*20W FF	1*20W FF	30	Fluorescent	1*20W FF	29	8	-1	-8
2*20W FF	2*20W FF	55	Fluorescent	2*20W FF	50	2	-5	-10
2*30W FF	2*30W FF	75	Fluorescent	2*30W FF	77	246	2	492
90W LED	90W LED	102	LED	90W LED	90	5	-12	-60

261		414W
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## Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 2.4 With: Clauses 11(2)(c) and (d) of Schedule 15.3  From: unknown To: 23-Apr-18	Four lamp types have incorrect lamp wattage recorded. 261 lamps affected with expected under reporting of 1,768 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		
<b>Low</b>	The controls are rated as moderate because four lamp types in the database had incorrect wattage information.  The impact is low, the expected wattage under reporting of 1,768 kWh per annum.		
Actions taken to resolve the issue		Completion date	Remedial action status
The wattages for the identified lamp types have been updated in the database.		28/05/2018	Cleared
Preventative actions taken to ensure no further issues will occur		Completion date	
The standardised wattage table has been provided to Orion to ensure all lamp types have the correct wattage applied going forward.		28/05/2018	

## 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 301 items of load on 24 - 25<sup>th</sup> April.

### Audit commentary

The field audit findings for the Orion sample are detailed in the table below:

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
Darfield					
Holmes St	3	3	-	-	
Horndon St	42	42	-	-	
West Melton					
Barewood Gr	4	4	-	-	
Kingsdowne Dr	11	11	-	-	
Burnham					
Burnham Rd	5	5	-	-	
Rolleston					
Bavaria Dr	3	3	-	-	
Cameron Cr	10	10	-	-	
Cameron Cr Walkway	2	2	-	-	
Chaucer St opp	2	2	-	-	
Chert St	7	7	-	-	
Christie Pl	5	5	-	-	
Elizabeth St	6	6	-	-	
Greenstone St	8	8	-	-	
Greenstone St Walkway	2	2	-	-	
Hannover Pl	8	8	-	-	
Hungerford Dr	15	15	-	-	
Kingsley Pl	5	5	-	4	
Manor Dr	11	11	-	-	
Moore St	31	31	-	-	
Oak Tree Ln	34	34	-	4	
Rolleston Rec Centre	10	10	-	-	
Selwyn Rd	12	12	-	-	
Stoneleigh Dr	28	28	-	-	
Prebbleton					
Bellvue Dr	7	7	-	-	
Logan Cl	3	3	-	-	
Taylor Pl	4	4	-	-	
Lincoln					
Dylan Cl	2	2	-	-	
Langer Rd	3	3			
Leeston					
Barley Mow	4	4	-	-	
Cassini Pl	4	4	-	-	
Da Vinci Av	6	6	-	-	
Fleming Dr	3	3	-	-	
Galipoli St	1	1	-	-	
<b>Total</b>	<b>301</b>	<b>301</b>		<b>8</b>	

The field audit found eight wattage errors across 301 items of load checked.

The field data was 99.3% of the database data for the sample checked, and database accuracy is assessed to be 99.3%. This will result in estimated over submission of 16,639 kWh per annum (based on annual burn hours of 4,271 as detailed in the DUMML database auditing tool). This is recorded as a non-compliance in **section 3.1**.

**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 DUMML 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 process was reviewed for new lamp connections and the tracking of load changes due to faults and maintenance. Connetics is the maintenance contractor for SDC region. Outage patrols are conducted on a regular basis. Lamp outages are also notified to SDC by residents and work requests are made to Connetics personnel.

New subdivisions require a proposed plan to be provided and an “as built” plan once the development is complete. The Council has an acceptance process for new subdivisions. Once installed, the receipt of this information is passed to Orion, for the entire project, and processed within the month that it is received. Orion update the status as at the day of livening.

On September 20<sup>th</sup> 2012, the Authority sent a memo to Retailers and auditors advising that tracking of load changes at a daily level was not required as long as the database contained an audit trail. I have interpreted this to mean that the production of a monthly “snapshot” report is sufficient to achieve compliance.

**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**

Orion demonstrated 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	Selwyn District Council Street Lights
Strata	<p>The database contains 6369 items of load in Selwyn District Council area.</p> <p>The processes for the management of all SDC items of load is the same. The database has been treated as three strata for the street lights.</p> <ul style="list-style-type: none"> <li>• Darfield &amp; West Melton</li> <li>• Rolleston</li> <li>• Prebbleton, Lincoln &amp; others</li> </ul>
Area units	I created a pivot table of the roads in the database and used a random number generator in each spreadsheet to select a total of 32 subunits.
Total items of load	<p>301 items of load were checked.</p> <ul style="list-style-type: none"> <li>• Darfield &amp; West Melton                      65</li> <li>• Rolleston    199</li> <li>• Prebbleton, Lincoln &amp; others                      37</li> </ul>

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

##### Audit commentary

The Orion database was found to contain some inaccuracies when matched to the published standardised wattage table. These are recorded as a non-compliance in **section 2.4**.

The field audit found a lamp wattage difference, see **section 2.5**.

The field data was 99.3% of the database data for the sample checked. This will result in estimated over submission of 16,639 kWh per annum (based on annual burn hours of 4,271 as detailed in the DUML database auditing tool).

##### Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Apr-17 To: 30-Apr-18	The database accuracy is assessed to be 99.3% indicating an estimated over submission of 16,639 kWh per annum Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 4		
Audit risk rating	Rationale for audit risk rating		
<b>Medium</b>	The controls are rated as moderate, because they are sufficient to ensure that changes to the database are correctly recorded most of the time, but there are still some errors.  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
All inaccuracies identified in this audit have been corrected in the database.		28/05/2018	Cleared
Preventative actions taken to ensure no further issues will occur		Completion date	
The relatively small number of errors identified in a database of this size indicates existing controls are sufficient to mitigate risk to an acceptable level.		Ongoing	

### 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
- checking the database extract combined with the burn hours against the submitted figure to confirm accuracy.

### Audit commentary

Meridian reconciles this DUML load using the DST profile. The on and off times are derived from a data logger read by EMS. This information is 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 has been audited to confirm its accuracy and compliance. Compliance is confirmed.

I checked the March 2018 extract provided by Orion against the submission totals supplied by Meridian and found that submission matched the database for all ICPs.

The audit found some inaccuracy, as recorded in the table below.

Issue	Impact on submission
Incorrect lamp wattage	Under reporting of 1,768 kWh per annum.
The database accuracy is assessed to be 99.3%	Over submission of 16,639 kWh per annum
Net impact	14,871 over submission

### Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 2.1 With: Clause 15.2 and 15.37B(c) From: 01-Apr-17 To: 30-Apr-18	Over submission by approximately 14,871 kWh per annum Potential impact: High Actual impact: Medium Audit history: Once Controls: Strong Breach risk rating:		
Audit risk rating	Rationale for audit risk rating		
<b>Medium</b>	The controls are recorded as strong because they mitigate risk to an acceptable level. The impact on settlement and participants is moderate; therefore the audit risk rating is medium.		
Actions taken to resolve the issue		Completion date	Remedial action status
All inaccuracies identified in this audit have been corrected in the database. We will liaise with our agent to determine confirm whether information is available that would enable historic submissions to be revised.		28/05/2018 30/06/2018	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	

<p>The standardised wattage table has been provided to Orion to ensure all lamp types have the correct wattage applied going forward.</p> <p>The relatively small number of errors identified in a database of this size indicates existing controls are sufficient to mitigate risk to an acceptable level.</p>	<p>28/05/2018</p> <p>Ongoing</p>	
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## CONCLUSION

This audit found four non-compliances and makes no recommendations.

The field audit found some potential inaccuracies lamp wattage. Orion are investigating these. Overall, Orion have robust controls and management in place.

The database accuracy is assessed to be 99.3% indicating an estimated over submission of 16,639 kWh per annum.

The future risk rating of 14 indicates that the next audit be completed in 12 months. The database accuracy issues are now resolved, therefore I recommend the next audit is conducted in 18 months.

## PARTICIPANT RESPONSE