ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

NZTA NORTHLAND DISTRIBUTED UNMETERED LOAD

GENESIS ENERGY

Prepared by: Rebecca Elliot

Date audit commenced: 27 May 2018

Date audit report completed: 16 July 2018

Audit report due date: 01-Jun-18

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EXECUTIVE SUMMARY

This audit of the NZTA Northland Streetlight DUML database and processes was conducted at the request of Genesis Energy (**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, which became effective on 1 June 2017.

The Northland NZTA DUML ICPs are managed in excel spreadsheets by Top Energy and a report is sent to Genesis in spreadsheet form each month.

The field audit was undertaken of a statistical sample of 166 items of load on 27th May 2018.

The audit found five non-compliances and makes no recommendations.

Under submission is occurring of approximately 164,688 kWh per annum.

The future risk rating of 32 indicates that the next audit be completed in three months. The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
DUML Audit	1.10	17.295F of part 17	Audit not completed within 12 month of Part 16A coming into effect.	Moderate	Low	2	
Deriving submission information	2.1	11(1) of Schedule 15.3	Net estimated under submission of 164,688 kWh per annum.	Weak	High	9	Investigating
Description and capacity of load	2.4	Clause 11(2)(c) and (d) of Schedule 15.3	163 lights with no input wattage being recorded resulting in under submission of an estimated 100,219 kWh.	Weak	High	9	Investigating
Database accuracy	3.1	11(2A) of Schedule 15.3	413 items of load with incorrect ballasts being applied resulting in over submission of an estimated 7,120 kWh per annum. The field data was 99.4% of the database data indicating over submission of 1,849 kWh per annum.	Weak	Low	3	Investigating
Volume information accuracy	3.2	15.2 and 15.37B(c)	Net estimated under submission of 164,688 kWh per annum.	Weak	High	9	Investigating
Future Risk Rating						32	

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

RECOMMENDATIONS

Subject	Section	Description	Recommendation
		Nil	

ISSUES

Subject	Section	Description	Issue
		Nil	

1. ADMINISTRATIVE

1.1. Exemptions from Obligations to Comply with Code

Code reference

Section 11 of Electricity Industry Act 2010.

Code related audit information

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

Audit observation

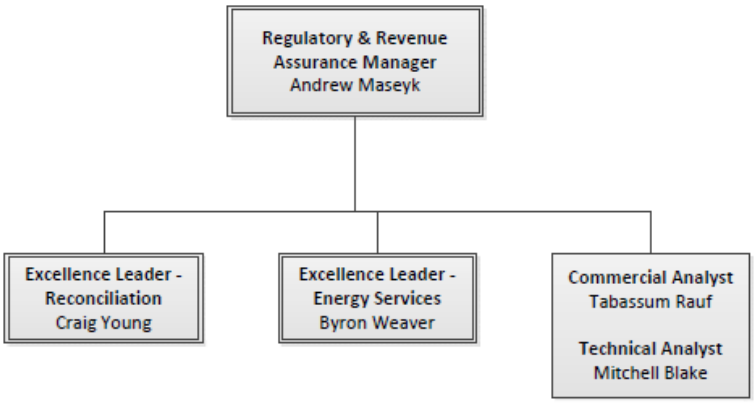
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

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

1.2. Structure of Organisation

Genesis provided the relevant organisational structure:



1.3. Persons involved in this audit

Auditors:

Rebecca Elliot – Lead Auditor

Brett Piskulic – Supporting Auditor

Veritek Limited

Electricity Authority Approved Auditors

Other personnel assisting in this audit were:

Name	Title	Company
Craig Young	Excellence Leader - Reconciliation	Genesis Energy
Grace Hawken	Technical Specialist - Reconciliations Team	Genesis Energy
Esther Delamain	Business Analyst	Top Energy

1.4. Hardware and Software

The streetlight data is held in excel spreadsheets. These are backed up in accordance with standard industry procedures. Access to the spreadsheets is restricted by way of user log into the computer drive.

1.5. Breaches or Breach Allegations

There are no breach allegations relevant to the scope of this audit.

1.6. ICP Data

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0000912700TEF16	TRANSIT UNMETERED STREETLIGHTS	KOE1101	NST	2	344
0000004228TE76E	DOUBLE HEAD STREETLIGHT FNDC	KOE1101	NST	6	1246
0000911600TE4F2	TRANSIT STREETLIGHTS UNMETERED - FNDC	KOE1101	NST	2	344
0000913800TE1B9	UNMETERED STREETLIGHTS	KOE1101	NST	429	50662
0000913600TE7B2	STREETLIGHTS ON TE POLES	KOE1101	NST	142	19160

1.7. Authorisation Received

All information was provided directly by Genesis and Top Energy.

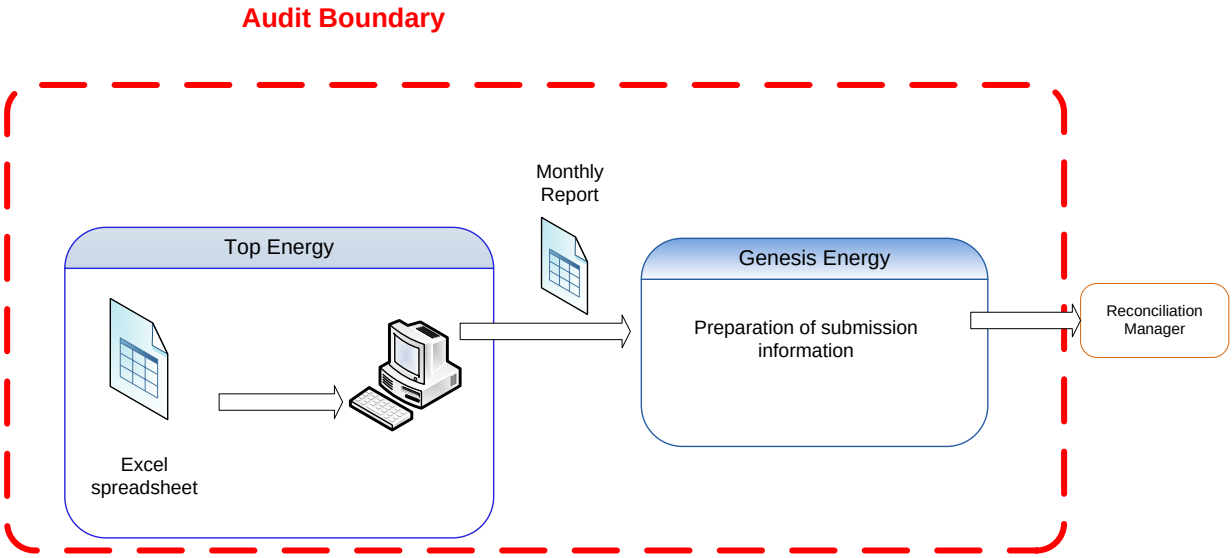
1.8. Scope of Audit

This audit of the NZTA Northland area DUML database and processes was conducted at the request of Genesis Energy (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, which became effective on 1 June 2017.

The ICPs are each managed in a database held by Top Energy and a report is sent to Genesis in spreadsheet form each month.

The scope of the audit encompasses the collection, security and accuracy of the data, including the preparation of submission information based on the database reporting. The diagram below shows the audit boundary for clarity.



The field audit was undertaken of a statistical sample of 166 items of load on May 27th, 2018.

1.9. Summary of previous audit

Genesis provided a copy of the last audit report undertaken by Rebecca Elliot of Veritek Limited in May 2017. This audit report was undertaken for Genesis as part of their 2017 reconciliation participant audit. This audit wasn't submitted due to the audit regime change that occurred on 1st June 2017. For completeness I have included the findings for reference below:

Table of Non-Compliance

Subject	Section	Clause	Non compliance	Status
Submission accuracy	2.1	11(1) of schedule 15.3	Over submission of an estimated 7,139 kWh per annum due to incorrect ballasts being applied.	Still existing
			Under submission of an estimated 96,949 kWh due to no input wattage being recorded for 168 lights.	Still existing
Lamp Capacities	2.2.4	11(2)(d) of Schedule 15.3	Incorrect ballasts being applied resulting in an estimated over submission of an estimated 7,139 kWh per annum.	Still existing
			168 lights no input wattage being recorded resulting in an estimated under submission of an estimated 96,949 kWh.	Still existing

Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Status
Data Transmission	1.9	20 of schedule 15.2	Add password protection to wattage report.	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. Genesis were unable to complete this audit by the required timeframe as the database extract was not provided within time for audit to be completed by 1st June 2018.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 1.10 Clause 17.295F of part 17 From: 01-Jun-18 To: 31-Jul-18	Audit not completed within 12 month of Part 16A coming into effect. 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, as Genesis are reliant on the database provider to supply the data and in this case the delay caused this report to be late. The impact is assessed to be low, as this has no direct impact on reconciliation.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis have begun to establish communications with NZTA Northland database owner and have started to acquire the information required to Audit/bill and settle	01/07/2018	Cleared
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis now have the essential contact information for the parties whom administer the information in the NZTA database. Genesis will continue to work with NZTA Northland on the continued efforts improve data quality.	01/07/2018	

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 NST profile. The total volume submitted to the Reconciliation Manager is based on a spreadsheet report that is sent to Genesis each month and the "burn time" is 11.9 hours as recorded by the Distributor on the registry.

I checked the May 2018 extract provided by Top Energy against the submission totals supplied by Genesis and found the following variances:

ICP	Genesis kWh submission figure	Database calculated figure	May kWh submission difference
0000912700TEF16	369.93	1,269.02	899.09
0000004228TE76E	337.9	459.65	121.75
0000911600TE4F2	201.5	1,269.02	1,067.52
0000913800TE1B9	14,554.5	18,689.21	4,134.71
0000913600TE7B2	7,171.33	7,068.12	-103.21
0000004228TE76E	337.9	459.65	121.75
		Net under submission difference	6,119.86

The incorrect submission calculations will be resulting in an estimated annual under submission of 74,438.29 kWh per annum.

Volume inaccuracy is present due to a small number of database errors, as follows:

Issue	Estimated volume information impact (annual kWh)
Submission calculation errors.	73,438 under submission
163 lights with no input wattage being recorded resulting in under submission.	100,219 under submission
413 items of load with incorrect ballasts being applied resulting in over submission of an estimated 7,120 kWh per annum.	7,120 over submission
The field data was 99.4% of the database data indicating over submission of 1,849 kWh per annum (based on annual burn hours of 4,271 as detailed in the DUML database auditing tool).	1,849 over submission
Net impact	**164,688 under submission**

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 24-May-17 To: 31-May-18	Net estimated under submission of 164,688 kWh per annum. Potential impact: High Actual impact: High Audit history: Once Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	Controls are rated as weak as the database is has a high level of inaccuracy. The impact is assessed to be high, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis Energy are currently receiving monthly information from TOPE relating to the NZTA Northland ICP's. We note that we also believe that this information is incomplete. Genesis has reviewed the data received and will be requesting further details to validate these findings.	01/12/2018	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis has enquired if the database owner is in fact TOPE or whether this is maintained by a third party. Genesis has also requested that the received reporting of monthly volumes by TOPE be reviewed and addition information added.	01/12/2018	

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 analysis found that all items of load had the correct ICP recorded against them for the five ICPs recorded in the database.

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 location of each item of load was recorded in the database. The street address and pole number are recorded for each location. Top Energy were able to supply GPS coordinates for 60% of the locations. The database records numbers of each type of lamp at each location.

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 the manufacturers rated wattage and the ballast wattage. There are 163 lights in the database with no input wattage recorded, this results in no kWh consumption being recorded against these lights. I estimate the resulting under submission at 100,219 kWh.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.4 With: Clause 11(2)(c) and (d) of Schedule 15.3 From: 24-May-17 To: 31-May-18	163 lights with no input wattage being recorded resulting in under submission of an estimated 100,219 kWh. Potential impact: High Actual impact: High Audit history: Once Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	Controls are rated as weak as the database has not been updated to reflect the field information. The risk is high due to the impact on submission.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis have enquired to TOPE as to the database accuracy and to investigate the missing lamps.	01/12/2018	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
As Genesis are not the database owner, Genesis rely on the data provided by contracted parties to ensure accuracy. Genesis will work with the data supplier (Distributor) to ensure the data provided is complete and accurate.	01/12/2018	

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 166 items of load on 27 May 2018 using the statistical sampling methodology.

Audit commentary

The field audit findings are detailed in the table below:

Street/Area	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
0000004228TE76E, 0000911600TE4F2, 0000912700TEF16					
SH 10 Taipa	2	2	-	-	
Marsden Rd Paihia	2	2	-	-	
0000913600TE7B2					
SH 12	13	13	-	-	
SH 1F	2	2	-	-	
SH 1	12	12	-	-	
SH 10	7	7	-	-	
SH 11	2	2	-	-	
0000913800TE1B9					
SH 1	66	66	-	-	
SH 10	2	2	-	-	
SH 11	31	31	-	-	
SH 12	7	7	-	-	
SH 1F	20	19	1	-	1 light removed at 6568 SH1 F

All load checked was recorded in the database. There was one light in the database that was no longer in the field, this is recorded as 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 DUML database must track additions and removals in a manner that allows the total load (in kW) to be retrospectively derived for any given day.

Audit observation

The process for tracking of changes in the database was examined.

Audit commentary

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

Updates of any changes made are provided to Top Energy by the contractors who complete the work.

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 spreadsheet was checked for audit trails.

Audit commentary

Top Energy has demonstrated a complete audit trail of all additions and changes to the spreadsheet 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

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

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	NZTA Northland Streetlights
Strata	The database contains items of load on the Northland state highway network. The processes for the management of NZTA items of load are the same, but I decided to place the items of load into three strata based on the ICP numbers, as follows: 1. 0000004228TE76E, 0000911600TE4F2, 0000912700TEF16 2. 0000913600TE7B2 3. 0000913800TE1B9
Area units	I created a pivot table of the roads under each ICP and I used a random number generator in a spreadsheet to select a total of 22 sub-units.
Total items of load	166 items of load were checked.

Audit commentary

The database was found to contain some inaccuracies when matched to the published standardised wattage table. I found that 413 items of load had a discrepancy. This is detailed in the table below:

Lamp Type	Database Total Wattage	EA Standardised Wattage	Variance	Database Quantity	Estimated Annual kWh effect on consumption
125w MV Lamp	142	136	+6	6	+154
250w MV Lamp	275	270	+5	1	+21
70w HPSV Lamp	90	83	+7	27	+807
150w HPSV Lamp	172	168	+4	356	+6,082
250w HPSV Lamp	279	278	+1	21	+90
400w HPSV Lamp	434	438	-4	2	-34
Total estimated annual effect on submission					7,120

The field data was 99.4% of the database data for the sample checked. This will result in estimated over submission of 1,849 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 11(2A) of Schedule 15.3 From: 24-May-17 To: 31-May-18	413 items of load with incorrect ballasts being applied resulting in over submission of an estimated 7,120 kWh per annum. The field data was 99.4% of the database data indicating over submission of 1,849 kWh per annum. Potential impact: Medium Actual impact: Low Audit history: Once Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as weak as the database has not been updated to reflect the field information. 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
Genesis have enquired to TOPE as to the database accuracy and to investigate the missing lamps.	01/12/2018	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
As Genesis are not the database owner, Genesis rely on the data provided by contracted parties to ensure accuracy. Genesis will work with the data supplier (Distributor) to ensure the data provided is complete and accurate.	01/12/2018	

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

Genesis reconciles this DUML load using the NST profile. The total volume submitted to the Reconciliation Manager is based on a spreadsheet report that is sent to Genesis each month and the "burn time" is 11.9 hours as recorded by the Distributor on the registry.

I checked the May 2018 extract provided by Top Energy against the submission totals supplied by Genesis and found the following variances:

ICP	Genesis kWh submission figure	Database calculated figure	May kWh submission difference
0000912700TEF16	369.93	1,269.02	899.09
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		Net under submission difference	6,119.86

The incorrect submission calculations will be resulting in an estimated annual under submission of 74,438.29 kWh per annum.

Volume inaccuracy is present due to a small number of database errors, as follows:

Issue	Estimated volume information impact (annual kWh)
Submission calculation errors	73,438 under submission
163 lights with no input wattage being recorded resulting in under submission.	100,219 under submission
413 items of load with incorrect ballasts being applied resulting in over submission of an estimated 7,120 kWh per annum.	7,120 over submission
The field data was 99.4% of the database data indicating over submission of 1,849 kWh per annum (based on annual burn hours of 4,271 as detailed in the DUML database auditing tool).	1,849 over submission
Net impact	**164,688 under submission**

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 24-May-17 To: 31-May-18	Net estimated under submission of 164,688 kWh per annum. Potential impact: High Actual impact: High Audit history: None Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	Controls are rated as weak as the database is has a high level of inaccuracy indicating controls are weak. The impact is assessed to be high, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis have enquired to TOPE as to the database accuracy. Genesis will be working with the distributor to move forward with meeting the requirements outlined in the DUML guidelines.	01/12/2018	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
As Genesis are not the database owner, Genesis rely on the data provided by contracted parties to ensure accuracy. Genesis will work with the data supplier (Distributor) to ensure the data provided is complete and accurate.	01/12/2018	

CONCLUSION

The Northland NZTA DUML ICPs are managed in excel spreadsheets by Top Energy and a report is sent to Genesis in spreadsheet form each month.

The field audit was undertaken of a statistical sample of 166 items of load on 27th May 2018.

The audit found five non-compliances and makes no recommendations.

Under submission is occurring of approximately 164,688 kWh per annum.

The future risk rating of 32 indicates that the next audit be completed in three months.

PARTICIPANT RESPONSE

Genesis have made enquiries after receiving this audit. Genesis agree that the level of accuracy needs addressing. Genesis also points out that the distributor is the source of the information that is being used to settle and bill.