METROLOGY PROCEDURE: PART B: METERING DATA VALIDATION, SUBSTITUTION AND ESTIMATION ~~PROCEDURE FOR METERING TYPES 1 – 7~~

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~~METROLOGY PROCEDURE:~~

~~PART B: METERING DATA VALIDATION, SUBSTITUTION AND ESTIMATION PROCEDURE FOR METERING TYPES 1 – 7~~

~~PREPARED BY:~~	~~Market Development~~
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PREFACE

THE METROLOGY PROCEDURE HAS BEEN PREPARED BY THE AUSTRALIAN ENERGY MARKET OPERATOR (AEMO) IN ACCORDANCE WITH THE REQUIREMENTS OF THE RULESNER.

THIS VERSION OF THE METROLOGY PROCEDURE: PART B HAS BEEN UPDATED TO INCLUDE THE METHODOLOGY FOR THE PREPARATION OF CALCULATED METERING DATA RELATED TO DIMMING OF TRAFFIC SIGNAL THAT HAVE BEEN CLASSIFIED AS MARKET LOADS,INTRODUCTION OF TYPE 65 SUBSTITUTIONS AND OTHER TEXT CORRECTIONS .

AEMO ACKNOWLEDGES THE ASSISTANCE OF INDUSTRY PARTICIPANTS WHO CONTRIBUTED TO THE FINAL FORM OF THE METROLOGY PROCEDURE THROUGH THE METROLOGY REFERENCE GROUP.

THE EFFECTIVE DATE OF THE METROLOGY PROCEDURE IS 15 MAY 2015TBC, IN ACCORDANCE WITH THE RULESNER.

AEMO MAINTAINS A DEVELOPMENT PROGRAM IN RELATION TO THE METROLOGY PROCEDURE. PLEASE ADDRESS ANY COMMENTS TO ROY KAPLAN, SPECIALIST METROLOGY REGULATION AT: (ROY.KAPLAN@AEMO.COM.AU).

~~IMPORTANT NOTICE~~

~~THIS METROLOGY PROCEDURE (PART B) IS MADE BY AEMO UNDER CLAUSES 7.1416.3, 7.16.4 AND 7.16.5 OF THE NATIONAL ELECTRICITY RULES (RULES), AND HAS EFFECT ONLY FOR THE PURPOSES SET OUT IN THE RULES. THE RULES AND THE NATIONAL ELECTRICITY LAW PREVAIL OVER THIS PROCEDURE TO THE EXTENT OF ANY INCONSISTENCY.~~

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VERSION RELEASE HISTORY~~DOCUMENT HISTORY~~

Version	Date	Author	Comments
1.00	June 1997	Multi – Jurisdictional Working Group	Original procedure – *Nomenclature, Guidelines and procedures for National Metering Identifier, Registration and Transfer, Data Substitution, Data validation and Transmission Node Identifiers*.
	September 1997	AEMO	Incorporated as part of the *Service Level Requirements for Metering Data Agents.*
2.00	August 2000	MSWG	*NEM Data Substitution and Validation Procedure* published as a procedure.
3.00	August 2001	MSWG	Procedure updated to include estimation and *substitution* for *metering* types 5, 6 and 7.
4.00	March 2008	MSWG	Procedure updated to include clarifications and the process by which accumulated data and *unmetered loads* are converted into *trading intervals*. Procedure to become Part B of the *metrology procedure*.
4.01	April 2009	AEMO	~~Uppdated~~Updated to incorporate Victorian jurisdictional metrology material to support Victorian AMI rollout
4.01a	15 July 2011	AEMO	The extension of retail contestability to business customers consuming between 50 – 150 MWh per annum in Tasmania.
5	31 October 2011	AEMO	Updated to incorporate provisions of ~~*Rules*~~NER Change: Provision of Metering Data Services and Clarification of Existing Metrology Requirements.
5.10	1 January 2014	AEMO	Introduction of FRC in Tasmania
5.20	1 March 2014	AEMO	Updated to incorporate provisions of ~~*Rules*~~NER Change: National Electricity Amendment (Small Generation Aggregator Framework) Rule 2012 ERC 0141 and text corrections
5.30	15 May 2015	AEMO	Updated to incorporate traffic signal dimming, introduce type 65 *substitutions* and text corrections.
6.00	1 December 2017	AEMO	Updated to ~~include MC rule changeto~~ incorporate provisions of NER Change: National Electricity Amendment (Expanding competition in metering and related services) Rule 2015 No. 12

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1. INTRODUCTION

1.1. PDefintions and Interpretationurpose and Scope

This is the Metrology Procedure: Part B made under clause 7.16.3, 7.16.4 and 7.16.5 of the NER (Procedure), which addresses the Validation, Substitution and Estimation of *metering data*.

This Procedure has effect only for the purposes set out in the NER. The NER and the *National Electricity Law* prevail over this Procedure to the extent of any inconsistency.

The Retail Electricity Market Procedures – Glossary and Framework is incorporated into and forms part of this document.

Refer to the Retail Electricity Market Procedures – Glossary and Framework to understand the definitions and rules of interpretation that apply to this document.

1.1.2. GeneralDefinitions and Interpretation

1.1. IntroductionLegal and Regulatory Framework

This Metrology Procedure (Part B) is made in accordance with clauses 7.16.3, 7.16.4 and 7.16.5 of the NER.

The Retail Electricity Market Procedures – Glossary and Framework:

(a) is incorporated into and forms part of this Procedure; and

(b) should be read with this Procedure.

1.3. Related Documents

Reference	Title	Location
	Retail Market Procedures – Glossary and Framework	
	Metrology Procedure Part A: National Electricity Market	

This Metrology Procedure (Part B) has effect only for the purposes set out in the NER.

More detailed background on this and other procedures relevant to this Procedure, see the Retail Electricity Market Procedures – Glossary and Framework.

Purpose

1.1.1. The *Rules*NER define the obligations and responsibilities of *Registered*

Participants in the *National Electricity Market* relating to the provisioning and operation of a *metering installation* and to the processes involved in the collection of *metering data*.

1.1.2. This document specifies the:

*Metering Data Provider*MDP's obligations concerning the Validation, Substitution and forward Estimation of *metering data* to satisfy the *Rules*NER and *metrology procedure* obligations of *AEMO* and the *responsible person* . These relate to all *metering installations* for *first-tier loads* and *second-tier loads* for which the *Metering Data Provider*MDP has an obligation, as specified in *AEMO's* Market Settlement and Transfer Solution (MSATS); and

The process of collating or determining type 6 and 7 *metering installation* data into *trading intervals*.

1.1.3. These requirements must be read in conjunction with the relevant *AEMO service level procedures* for *Metering Data* ProviderMDPs.

1.1.4. As part of any *substitution* and forward *estimation* data quality analysis, *AEMO* will be undertaking periodical performance monitoring and benchmarking of all accredited *Metering Data Provider*MDPs.

1.2. References

1.2.1. Metrology Procedure: Part B makes reference to the documents listed in this section:

Metrology procedure: Part A National Electricity Market.

Service Level Procedure: Metering Data Provider Services Category D and C for Metering Installation Types 1, 2, 3, 4, 5, 6 and 7.

Meter Data File Format Specification (ME_MA001).

Meter Churn Data Management Procedure (ME_MA1818).

1.3. Definitions

1.3.1. A reference to a document or a provision of a document includes an amendment or supplement to, or replacement or novation of, that document or that provision of that document.

1.3.2. Words in this document and in Metrology Procedure: Part A that are shown in *italics* have the meaning specified in clause 1.7 of Metrology Procedure: Part A or, if they are not specified in this clause, they have the meaning specified in the *Rules*NER.

2. PRINCIPLES FOR DATA VALIDATION, SUBSTITUTION AND FORWARD ESTIMATION

1.4.2.1. General data Validation, Substitution and forward Estimation Requirements

1.4.1. The principles to be applied to *metering data* Validation, Substitution and forward Estimation tasks for in all areas of the *National Electricity Market*NEM include the following:

The *responsible person* MC or AEMO (as appropriate) must ensure that the *metering data* associated withfrom a *metering installation,* accurately reflects the *energy* flow within through the respective *metering installation.*

The *Metering Data Provider*MDP must authenticate all Validation failures to ensure *metering data* accurately reflects the *energy* flow.

The *Metering Data Provider*MDP must Validate all Substitutions and forward Estimations before *metering data* is delivered to *AEMO* and *Registered Participants*.

The *responsible person*MC must coordinate the resolution of issues arising from the non-performance of *metering systems*, including any liaison with associated *retailers*, Local Network Service Provider(s)LNSPs, *Metering Provider*MP(s) and *Metering Data Provider*MDP(s). The *responsible person* MC must respond promptly to requests for remedial action from the *Metering Data Provider*MDP or *AEMO.*

The timeliness of an *Metering Data Provider*MDP's detection of *metering data* errors and the *responsible person*MC's response to *metering installation* malfunctions may place *retailers* at in financial risk. The *responsible person*MC must, therefore, co-ordinate a response within the time-frames required by the *Rules*NER and the *metrology procedure* this Procedure and accordingly inform the affected *Market Participants*, so that they might implement remedial action to minimise their trading risks.

The *Metering Data Provider*MDP must notify all affected *Registered Participants* of any *metering data* Substitution or forward Estimation carried out.

The *Metering Data Provider*MDP must identify *metering data* errors resulting from data collection and processing operations using *metering data* Validation processes in accordance with the *metrology procedure*this Procedure. The *Metering Data Provider*MDP must apply metering data Substitution processes in accordance with this Procedure, these procedures including any default Substitution procedures agreed to with the *responsible person* MC necessary to ensure that *metering data* is delivered to *AEMO* and *Registered Participants*.

2.2. ~~Metering data s~~Substitution requirement

~~1.5.~~

~~1.5.1.~~ The ~~*Metering Data Provider*~~MDP must undertake Substitutions on behalf of AEMO or the ~~*responsible person*~~MC, as appropriate, in a manner that is consistent with ~~the *metrology procedure*~~this Procedure. Substitutions may be required in the following circumstances:~~;~~

(a) Where the system or equipment that supports the remote or manual collection of *metering data* has failed or is faulty.

(b) Where the *metering installation* for a *connection point* has failed or is removed from service.

(c) To enable timely provision of *metering data* to *AEMO* for *settlements* purposes.

(d) In situations where *metering data* has been irretrievably lost.

(e) Where the *metering data* obtained is found to be erroneous or incomplete.

(f) Where *metering data* has not completed Validation ~~within~~ as part of the registration or transfer of a *connection point*~~process with the *Metering Provider*~~MP ~~as detailed in clause 108~~.

(g) Where *metering data* has failed or has not completed the Validation process.

(h) Where *metering data* cannot be obtained in the performance time~~-~~frames required for the data period in question:

(i) ~~Type 1, 2, 3 and 4~~ *metering data* for *metering installations* with *remote acquisition* must be Substituted if *metering data* cannot be obtained to meet either *settlements* time~~-~~frames or the required performance of the applicable S~~s~~ervice L~~l~~evel P~~p~~rocedures~~s~~ (MDP).

(ii) ~~Type 4A, 5 and 6~~ *metering data* for manually read *metering installations* must be Substituted if *metering data* cannot be obtained on or within the expected time frame of the next Scheduled Reading Date for a *connection point*. Any historical or previous ~~*forward*~~ *estimated metering data* must be replaced with *substituted metering data*.

(i) When an inspection or test on the *metering installation* establishes that a measurement error exists due to a *metering installation* fault.

(j) When the FRMP, LR, and LNSP~~affected parties~~ have all agreed and subsequently direct the ~~*Metering Data Provider*~~MDP that a previous Substitution ~~is~~ was in error and that a re-Substitution of *metering data* is required. Where they ~~parties~~ cannot reach agreement, the ~~*Rules*~~NER~~'~~ dispute resolution procedures apply, and the existing *substituted metering data* should remain until ~~the~~ resolution of the dispute ~~is achieved~~.

(k) When an inspection or test on the respective algorithms, Inventory Table, Load Table or On/Off Table for type 7 *metering data* establishes that an error exists in the *metering data* calculation or when a more accurate Inventory Table becomes available.

(l) Where the *metering data* calculation has failed the Validation tests for a *metering installation* type 7.

(m) In situations involving Meter Churn ~~as required by the Meter Churn Data Management Procedure~~.

(n) In response to End User~~Customer~~ transfers authorised by a *participating jurisdiction* or ~~*retailer of last resort*~~ RoLR Events~~, as outlined in clause 175~~.

2.3. ~~Metering data forward e~~Estimation requirement

~~1.6.~~

~~1.6.1.~~ The ~~*Metering Data Provider*~~MDP must undertake ~~forward~~ Estimations on behalf of the ~~*responsible person*~~ MC in a manner that is consistent with this Procedure~~the *metrology procedure*~~. ~~Forward~~ Estimations may be required in the following circumstances:~~;~~

(a) Routinely for a period that is equal to or just greater than the period to the next Scheduled Reading Date or another forward period.

(b) In response to End User~~customer~~ transfers authorised by a ~~participating~~ Jurisdiction or ~~*retailer of last resort*~~ RoLR ~~e~~Events, as outlined in ~~clause~~ section 17~~5~~.

~~**1.6.2.**~~ Where the current published Scheduled Reading Date has changed due to a revised scheduled reading route, the ~~*Metering Data Provider*~~MDP must replace any existing forward *estimated metering data* with new ~~forward~~ *estimated metering data* related to the revised next Scheduled Reading Date.

~~**1.6.3.**~~ This ~~clause~~ section only applies to the~~a~~ Jurisdiction ~~as~~ specified in the following table:

Jurisdiction	Variation in accordance with jurisdictional policy
Victoria	~~Despite Clause 1.6.1(a) and 1.6.2, w~~Where *metering data* for a type 5 *metering installation* is collected more frequently than required by Metrology Procedure Part A Clause 3.3.9 (as allowed by Metrology Procedure Part A Clause 3.8.4A [Vic]), Estimations need not be provided routinely or as a result of a change to the current published Scheduled Reading Date. Estimations must, however, be provided where necessary to meet the data requirements of Schedule 8 of the Service Level Requirements for Metering Data Collection, Processing and Delivery Services for Metering Provider category 5D, 6D and 7D, but are not required to be for a period to the next Scheduled Reading Date

Note: The effective date of this Jurisdictional provision is 1 July 2009. The review date of this Jurisdictional provision is 31 December 2017.

2.4. Metering data quality flags

~~**1.7.**~~

~~3.4.1 *Metering Data Provider*~~MDPs must assign the relevant *metering data* quality flags to *metering data* as follows:

Quality Flag	Description
A	For Validated and accepted *accumulated metering data* or *interval metering data* recovered from the *metering installation*.
S	For any *substituted metering data* that is considered temporary and may be replaced by *accumulated metering data* or *interval metering data* at some time. Substitutions apply to historical date/time periods at the time of Substitution.
E	For any *estimated metering data* that is considered temporary and may be replaced by *accumulated metering data* or *interval metering data* or *substituted metering data* at some time. Estimations apply to a period that has an end date/time in the future.
F	For Substitutions that are of a permanent or final nature and subject to section 3.7.3, the *metering data* would not be replaced by *accumulated metering data* or *interval metering data* at any time.
N	This quality flag is only utilised within the *interval metering data* file for instances where no *metering data* exists in the *metering data services database* for the periods concerned.

~~**1.7.1.**~~

~~A - For Validated and accepted Actual *metering data* recovered from the *metering installation*.~~

~~S – For any *substituted metering data* that is considered temporary and may be replaced by **Actual** Metering Data at some time. *Metering data* Substitutions apply to historical date/time periods at the time of Substitution.~~

~~E – For any forward *estimated metering data* that is considered temporary and may be replaced by **Actual** Metering Data or *substituted metering data* at some time. *Metering data* forward Estimations apply to a period that has an end date/time in the future.~~

~~F – For *substitutions* that are of a permanent or final nature and subject to clause 3.7.31.7.3, the *metering data* would **not** be replaced by **Actual** Metering Data at any time.~~

~~N – This quality flag is only utilised within the participant *interval metering data* file for instances where no *metering data* exists within the *metering data service database* for the periods concerned.~~

1.7.2. 3.4.2 Unless specified otherwise within this Procedurethe *metrology procedure*, *Metering Data Provider*MDPs must apply the following quality flag rules in the *metering data services database*management of *metering data*::

A *metering data* can only be replaced with A, **S** or **F** *metering data.*

S *metering data* can only be replaced with **A**, **S** or **F** *metering data.*

E *metering data* can only be replaced with **A**, **E, S** or **F** *metering data*.

F *metering data* can only be replaced with **F** *metering data* as per clause section 31.7.3 3.4.3(f) or A *metering data* as per clause section 3.4.33.7.3(b)1.7.3(b) or 31.7.33.4.3(h).

1.7.3. 3.4.3 The *Metering Data Provider*MDP must manage undertake final Substitutions as in the following circumstances:

(a) The *Metering Data Provider*MDP must undertake **final** *metering data* Substitutions in the instance wWhere a notice has been received from either the *responsible* personMC or the *Metering Provider*MP detailing a failure of the *metering installation* and that affects the quality of the *energy data***Actual** Metering Data cannot be obtained.

(b) In the rare instance whereIf Validated *accumulated metering data* or *interval metering data* **Actual** Metering Data is unexpectedly recovered from the *metering installation* and a final Substitution has been undertaken in accordance with clause 3.7.3(a) 1.7.3(a)paragraph (a), the *Metering Data Provider*MDP must replace the final *substituted metering data* with the *accumulated metering data* or *interval metering data* Actual Metering Data and maintain a record of the reason and instance.

(c) In the instance wWhere the *Metering Data Provider*MDP must undertake final *metering data* Substitutions as identified within thefollowing a Meter Churn Data Management Procedure.

(d) In the instance wWhere the *Metering Data Provider*MDP has received a notice that the *financially responsible Market* ParticipantFRMP, the *Local* RetailerLR and the *Local Network Service Provider* LNSP have all agreed that the *metering data* is erroneous and that a final *metering data* Substitution is required.

(e) In the instance ofAs a result of a *retailer of last resort*RoLR Event or where a Jurisdiction has requested *AEMO* to undertake authorised End UserCustomer transfers requiring the provision of *metering data* Substitutions and final Meter Readings, in accordance with clause 175.

(f) The *Metering Data Provider*MDP may undertake to replace an existing final *substituted metering data* *substitution* with a new **final** *substituted metering data* *substitution* in accordance with this Procedurethe *metrology procedure*.

(g) In the instance wWhere the *Metering Data Provider*MDP has found previous Validated *accumulated metering data* or *interval metering data* Actual Metering Data to be erroneous, then the Actual Metering Data must be replaced with a final *metering data* Substitution.

(h) The *Metering Data Provider*MDP may replace type 6 final *substituted metering data* *substitutions* with *accumulated metering data* or *interval metering data* Actual Metering Data that spans consecutive Metering Readings on by agreement with the *financially responsible Market* ParticipantFRMP, the *Local* RetailerLR and the LNSP *Local Network Service Provider*.

1.8.2.5. Summary table of Substitution and forward Estimation Types

Type	EST or SUB	Short Descriptor	Page
Type 11	SUB	Check	19171514
Type 12	SUB	Calculated	20171514 15
Type 13	SUB	SCADA	20171514 15

Type	EST or SUB	Short Descriptor	Page
Type 14	SUB	Like Day	20~~181~~ ~~61415~~
Type 15	SUB	Ave Like Day	21~~191~~ ~~71516~~
Type 16	SUB	Agreed	21~~201~~ ~~81517~~
Type 17	SUB	Linear	21~~201~~ ~~81517~~
Type 18	SUB	Alternate	21~~201~~ ~~81617~~
Type 19	SUB	Zero	21~~201~~ ~~81617~~
Type 20	SUB	Churn Correction (Like Day)	
Type 51	SUB or EST	Previous Year	23~~222~~ ~~01719~~
Type 52	SUB or EST	Previous Read	23~~222~~ ~~01719~~
Type 53	SUB	Revision	24~~232~~ ~~11920~~
Type 54	SUB	Linear	24~~232~~ ~~11920~~
Type 55	SUB	Agreed	24~~232~~ ~~11920~~
Type 56	SUB or EST	Prior to First Read - Agreed	24~~232~~ ~~11920~~
Type 57	SUB or EST	Customer Class	24~~232~~ ~~11921~~
Type 58	SUB or EST	Zero	25~~232~~ ~~11921~~
Type 61	SUB or EST	Previous Year	26~~262~~ ~~42123~~
Type 62	SUB or EST	Previous Read	26~~262~~ ~~42123~~
Type 63	SUB or EST	Customer Class	27~~262~~ ~~42124~~
Type 64	SUB	Agreed	27~~272~~ ~~52124~~
Type 65	SUB or EST	ADL	27~~272~~ ~~52124~~
Type 66	SUB	Revision	27~~272~~ ~~52124~~
Type 67	SUB	Customer Read	27~~272~~ ~~52224~~
Type 68	SUB or EST	Zero	27~~272~~ ~~52225~~
Type 71	SUB	Recalculation	29~~292~~ ~~72327~~
Type 72	SUB	Revised Table	29~~292~~ ~~72327~~
Type 73	SUB	Revised Algorithm	29~~292~~ ~~72427~~
Type 74	SUB	Agreed	29~~292~~ ~~72427~~
Type 75	EST	Existing Table	29~~292~~ ~~72427~~

2.3. SUBSTITUTION FOR METERING INSTALLATIONS WITH REMOTE ACQUISITION OF METERING DATA TYPES 1 - 4

2.1.3.1. Application of clause section 342

2.1.1. The requirements of clause 4.22.2 and clause 4.32.3 are applicable to all jurisdictions within the *National Electricity Market* and apply to *metering installation* types 1, 2, 3 and 4.

2.1.2. The requirements of clause 4.22.2 and clause 4.32.3 are applicable to all *metering data* Substitution types to be undertaken by *Metering Data Provider*MDPs accredited for the collection, processing and delivery of *metering data* from *metering installation* types 1, 2, 3 and 4.

2.1.3. For all *metering data* Substitutions undertaken under clause Sections 43.222.2 and clause 43.332.3, for *metering installations* types 1, 2, 3 and 4with *remote acquisition* of *metering data*, the *Metering Data Provider*MDP must ensure the selected *metering data* Substitution values correctly align with the adjoining intervals of *metering data* and that any intervals of *metering data* adjacent to the Substituted period are valid.

3.2. Type 1 - 4 Substitution Rules

2.2.

2.2.1. The *Metering Data Provider*MDP must carry out all *metering data* Substitutions in accordance with the *metrology procedure*.

2.2.2. The *Metering Data Provider*MDP must obtain clear and concise identification as to the cause of any missing or erroneous *metering data* for which Substitutions are required.

2.2.3. The *Metering Data Provider*MDP must undertake to do a type 11 Substitution and use *metering data* obtained from any *che*e*ck metering installation* associated with the *connection point* as the first choice considered for the source of *metering data* for any Substitutions undertaken.

2.2.4. Subject to clause 4.2.52.2.5, SCADA *metering* data, where available, may be used by the *Metering Data Provider*MDP as *check metering data* for Substitutions.

2.2.5. *Metering Data Provider*MDPs may only undertake Substitution type 13 where Substitution types 11 and type 12 are not applicable or cannot be carried out.

2.2.6. For *connection points* where athe FRMP is either a *Generator* or MSGAclassified as *Generators* or *Market Small Generation Aggregators*:

(a) *Metering Data Provider*MDP*s* may directly undertake type 11, type 12 or type 13 Substitutions as a consequence ofif missing or erroneous *metering data* that has failed Validation.

(b) *Metering Data Provider*MDPs may undertake type 16 (Agreed Method) or Type 18 (Alternate) Substitutions following consultation and agreement with the affected *Generator* or *Market Small Generation Aggregator* MSGA that the *substituted metering data* is an accurate reflection of the *interval metering data* concerned.

(c) In the situation wherelf *metering data* cannot be recovered collected from the a *metering installation* or Substituted in accordance with this clause 42.2.6 within the required *metering data* delivery performance time frames, the *Metering Data Provider*MDP must undertake type 19 Substitutions as an interim until *metering data* can be recovered collected from the *metering installation* or Substituted.

2.2.7. *Metering Data Provider*MDPs may only undertake Substitution types 14, 15, 16, 17, 18, or 19 or 20 where Substitution types 11, 12 and 13 are not applicable or cannot be carried out.

~~2.2.8.~~ ~~*Metering Data Provider*~~MDPs may perform all ~~*metering data*~~ Substitution types except type 16 or ~~type~~ 18 without ~~prior~~ the agreement ~~from the affected parties~~of all affected FRMPs, LNSPs or MPs. ~~*Metering Data Provider*~~MDPs may ~~however undertake to~~ change the quality flag to an existing type 16 or ~~type~~ 18 Substitution without seeking further agreement from those ~~affected~~ parties.

~~2.2.9.~~ The ~~*Metering Data Provider*~~MDP must notify the ~~*Local Network Service* Provider~~LNSP, ~~*Local* Retailer~~LR and the ~~*financially responsible Market* Participant~~FRMP for the *connection point* of any ~~*metering data*~~ Substitution within two *business days* of ~~the *metering data substitution*~~ being carried out ~~by the *Metering Data Provider*MDP~~. Notification is to be achieved via the participant *metering data* file as detailed ~~with~~in the *service level procedures*.

W~~W~~here there is a *metering installation malfunction* ~~is a failure of the *remote acquisition* system,~~ and the ~~*responsible person*~~MC and ~~*Metering Provider*~~MP cannot repair the *metering installation* ~~the data communications~~ within the periods specified in the ~~*Rules*~~NER, (two *business days* for type 1, 2 and 3 *metering installations* and 10 *business days* for other~~type 4~~ *metering installation* types~~*ns*~~) ~~then~~ the ~~*Metering Data Provider*~~MDP must:

~~2.2.10.~~

(a) Where the *metering installation malfunction* is due to a failure of the *meter* to correctly record *interval energy data* and the MC has been granted an exemption to repair the *metering installation*, the MDP must Substitute the missing *metering data* in accordance with this Procedure;

(b) For type 1-3 *metering installations* and other *instrument transformer* connected *metering installations*, and where a *metering installation malfunction* is due to a failure of the *remote acquisition* system, arrange for an alternative method for the collection of~~Request from the *responsible person*MC, the provision of a manual download of~~ *metering data* from the *metering installation*, in a timeframe which ensures the MDP complies with ~~within the time frames to meet *m*~~*metering data* delivery requirements; or

(c) For non-*instrument transformer* connected *metering installations*, and where a *metering installation malfunction* is due to a failure of the *remote acquisition* system, the MDP must ~~Substitue~~Substitute the missing *metering data* in accordance with this Procedure.~~; and~~

~~Where the *metering installation malfunction* includes a failure of the *meter* to correctly record *interval energy data* and the *responsible person*MC has acquired been granted an exemption to repair the *metering installation*, then the *Metering Data Provider*MDP must Substitute for the missing *metering data* in accordance with this Procedurethe *metrology procedure*.~~

~~The MDP must ensure that all *substituted metering data* are replaced with *accumulated metering data* or *interval metering data* when it becomes available.~~

The ~~*Metering Data Provider*~~MDP must ensure that all *substituted metering data* ~~*substitutions*~~ are replaced with *accumulated metering data* or *interval metering data* ~~Actual Metering Data~~ when ~~that Metering Data~~it becomes available.

~~2.2.11.~~

3.3. ~~Type 1 - 4~~ Substitution Types

~~2.3.~~

~~2.3.1.~~ Type 11 - Check Data

The ~~Metering Data Provider~~MDP must use interval metering data obtained from ~~another metering installation that has been identified by the Metering Provider~~MP ~~as being~~ the check metering installation for that metering point . ~~The metering data used must be for the same trading intervals as the trading intervals that are being Substituted. Metering installations of this type include~~ where~~but are not limited to~~:

(a) ~~T~~the metering installation and check metering installation are installed at the same connection point~~.~~;

(b) t~~T~~he metering installation and check metering installation are installed on different ends of a transmission line where the difference due to transmission line losses can be accurately determined; or~~.~~

(c) the metering installation~~s~~ and the check metering installation are installed across a parallel set of feeders having similar line impedances between a common set of busbars.

~~2.3.2.~~ Type 12 - Calculated

The ~~*Metering Data Provider*~~MDP must calculate the *interval metering data* ~~values~~ to be Substituted where they relate to a single unknown feed to a node~~,~~ based on the other known *energy* flows to or from that node.

Type 13 ~~-~~ – SCADA

~~2.3.3.~~

(a) The ~~*Metering Data Provider*~~MDP must use ~~EMS or~~ SCADA data~~, as~~ provided by AEMO in the agreed format~~,~~ for Substitution purposes, which originates from a similar measurement point as the *meter*.

(b) ~~EMS or~~ SCADA data ~~may be data which is~~might be inferior in accuracy or resolution and ~~which is~~ in a dissimilar format to the *metering data*, (e.g. 30 Min. demand values). The ~~*Metering Data Provider*~~MDP may have to adjust the data in both magnitude and form ~~in order~~so that the Substitution is valid ~~acceptable~~.

(c) ~~In any instance w~~Where SCADA data is to be used for Substitution, both the provided E channel and B channel SCADA Data~~-~~Streams must be used.

~~2.3.4.~~ Type 14 - Like Day

The ~~*Metering Data Provider*~~MDP must Substitute ~~for the~~ missing or erroneous *metering data* using the nearest equivalent day or like day method, as detailed in Table 1~~ below~~.

Table 1

TYPE 14	~~Table 1~~
Substitution Day	**Nearest Equivalent Day or Like Day (in order of availability)**
Monday	Monday ##
Tuesday	Tuesday## Wednesday## Thursday## Wednesday# Thursday#
Wednesday	Wednesday## Tuesday# Thursday## Thursday# Tuesday##
Thursday	Thursday## Wednesday# Tuesday# Wednesday## Tuesday##
Friday	Friday##
Saturday	Saturday##
Sunday	Sunday##
~~*Metering data* s~~Substitutions for **like day** to be as detailed above, unless:	
(a) No *metering data* is available on the first listed day, ~~then~~ the next listed preferred day is to be used. If there is no other suitable listed day, or no *metering data* is available on any of the listed days ~~then~~ type 15 Substitution must be used.	
(b) The Substitution day was a public holiday, in which case the most recent Sunday is to be used.	
(c) The Substitution day was not a public holiday and the listed day is a public holiday, then the next listed preferred day that is not a public holiday is to be used.	
# Occurring in the same week as the Substitution day.	
## Occurring in the week preceding that in which the Substitution day occurs.	

~~2.3.5.~~ Type 15 - Average Like Day

The ~~*Metering Data Provider*~~MDP may *substitute* for the missing or erroneous *metering data* using the average like day method, as detailed in Table 2~~ below~~.

Table 2

TYPE 15	~~Table 2~~
The *interval metering data* to be Substituted will be calculated using an average of the *metering data* from each corresponding ~~*interval*~~ TI from the preceding four weeks, or any part ~~thereof~~of those. This averaging technique may be applied in either of the following ways: (a) Where the averaged *interval metering data* is used to provide the value for the *metering ~~data~~~~interval(s)~~ ~~requiring~~data requiring* Substitution. (b) Where the averaged *interval metering data* is used to provide the *profile* and is scaled to a pre-determined consumption value for the *metering data~~interval(s)~~* to be Substituted. Type 15 Substitutions must not be used for public holidays.	

~~2.3.6.~~ Type 16 - Agreed Method

Where the ~~*Metering Data Provider*~~MDP is required to undertake ~~a *metering data*~~ Substitution for any period greater than seven *days* for type 1-3 *metering installations* or greater than fifteen~~15~~ *days* for other ~~type 4~~ *metering installation* types~~s~~, the MDP must make reasonable ~~endeavours~~endeavours to consult~~ation~~ and reach an agreement ~~must be obtained from~~with the ~~*financially responsible Market* Participant~~FRMP, ~~the *Local* Retailer~~LR and the ~~*Local Network Service Provider*~~ LNSP for the *connection point*~~ as to the *metering data substitution* to be performed~~. This may include changes to existing ~~*metering data*~~ Substitutions for any period ~~which were carried out~~ where those affected parties have directed that as a result of Site or End User~~Customer~~ ~~specific~~ information, the original ~~*metering data*~~ Substitutions are in error and a correction is required.

~~2.3.7.~~ Type 17 - Linear Interpolation

The ~~*Metering Data Provider*~~MDP may Substitute *metering data* for consecutive ~~*interval* period~~TIs up to, but not exceeding two hours, by using simple linear interpolation.

~~2.3.8.~~ Type 18 - Alternative

The ~~*Metering Data Provider*~~MDP may use an alternative method of ~~*metering data*~~ Substitution subject to ~~an~~ agreement ~~between~~ with the ~~*financially responsible Market* Participant~~FRMP, the ~~*Local* Retailer~~LR and the ~~*Local Network Service Provider*~~ LNSP for the *connection point*. The specifics of this Substitution type may involve a globally applied method or a method where an adjusted *profile* is used to take into account local conditions ~~which~~ that affect consumption (e.g. local holiday or End User~~Customer~~ shutdown), or where alternative *metering data* may be able ~~to be used~~ for quality checks and minor adjustments of an estimated *profile*, such as using *meter~~ing~~ register* data.

~~2.3.9.~~ Type 19 - Zero

The ~~*Metering Data Provider*~~MDP must undertake ~~*metering data*~~ Substitutions of ‘zero’ where:

(a) Either the ~~Local Network Service Provider~~ LNSP or the ~~Metering Provider~~MP has informed the ~~Metering Data Provider~~MDP of a de-energised connection point or an inactive meter and where the consumption is known to be zero; ~~or~~

(b) Following ~~As specified within the~~~~a result of~~ a Meter Churn, where the Current MDP has no access ~~to Historical~~to Historical Data and the ~~previous MDP~~previous MDP has yet to provide *metering data* for the start of the Meter Churn day. ~~Data Management Procedure~~; or

Metering data Substitutions are applicable for connection points where the FRMP is either a Generator or MSGA classified as Generators or Market Small Generation **Aggregators in accordance with clause 42.2.6(c).**

Type 20 – Churn correction

Where a MDP applies a type 19 substitution following a Meter Churn and the previous MDP has not provided metering data for the start of the Meter Churn day, the Current MDP may use the nearest equivalent day or like day, as detailed in table 1, and apply that *metering data* retrospectively to the start of the Meter Churn day.

For *metering installations* installed under 9.9A, 9.9B and 9.9C of the NER, the MDP may also use Substitution types 51 and 52, which are detailed in section 4 of this Procedure.

3.4. SUBSTITUTION AND FORWARD ESTIMATION FOR MANUALLY READ INTERVAL METERING INSTALLATIONN TYPES 4AS AND& 5

3.1.4.1. Application of clause section 543

3.1.1. The requirements of clause 5.23.2 and clause 5.33.3 apply to the jurisdictions of Victoria, New South Wales, South Australia, Australian Capital Territory, Queensland, and *Tasmania*.

3.1.2. The Substitution and forward Estimation types, as detailed within clause 5.23.2 and clause 5.33.3, are to be undertaken by *Metering Data Provider*MDPs accredited for the collection, processing and delivery of *metering data* from a *metering installation* type 5.

For all *metering data* Substitutions and forward Estimations undertaken under clause sections 54.23.2 and clause 54.33.3, for *metering installations* type 5, the *Metering Data Provider*MDP must ensure the selected *substituted metering data* is consistent with the *interval metering data* from the periods *substitution* values correctly align with the adjoining *interval metering data* and that any *interval metering data* adjacent to the substituted period of the *substituted metering data*is valid.

3.1.3. The Substitution and Estimation requirements in this section 4 are only to be used for *metering installations* where *interval metering data* is manually collected as a Scheduled Meter Reading. In the case that *remote acquisition* of *metering data* has failed at the *metering installation* and manual collection of *interval metering data* is required, the SubstituionSubstitution requirements specified in section 3 of this Procedure apply.

3.2.4.2. Type 4A and 5 Substitution and forward Estimation Rules

3.2.1. The *Metering Data Provider*MDP must carry out all *metering data* Substitutions and forward Estimations in accordance with the *metrology procedure*.

3.2.2. The *Metering Data Provider*MDP must ensure that all *metering data* Substitutions*substituted metering data* and *forward Estimations*estimated *metering data* are replaced with *accumulated metering data* or *interval metering data* Actual Metering Data if and when that *metering data*it becomes available.

The *Metering Data Provider*MDP must obtain clear and concise identification as to the cause of any missing or erroneous *metering data* for which *metering data* Substitutions are required.

3.2.3. Where there is a *metering installation* *malfunction* and*malfunction* and the MC and MP cannot repair the *metering* *installation* within*installation* within the periods specified in the NER, the MDP must SubstitueSubstitute the missing *metering data* in accordance with this Procedure.

3.2.4. The *Metering Data Provider*MDP must only use type 56 or type 57 Substitutions or forward Estimations where the historical *metering data* does not support the application of a type 51 or type 52 Substitution or forward Estimation.

~~**3.2.5.** Subject to clause 5.2.43.2.4 t~~The ~~*Metering Data Provider*~~MDP must only apply the following Substitution and ~~forward~~ Estimation types:

(a) Substitutions: ~~may be~~ type 51, 52, 53, 54, 55, 56, 57 or 58.

(b) ~~Forward~~ Estimations: ~~may be~~ type 51, 52, 56, 57 or 58.

The MDP must only use type 56 or 57 Substitutions or Estimations where the historical *metering data* does not support the application of a type 51 or 52 Substitution or Estimation.

~~**3.2.6.**~~ The ~~*Metering Data Provider*~~MDP must notify the ~~*Local Network Service* Provider~~LNSP, LR ~~*Local Retailer*~~ and ~~the~~FRMP ~~*financially responsible Market Participant*~~ for the *connection point* of any ~~*metering data*~~ Substitution or ~~forward~~ Estimation within two *business days* of the ~~Substitution~~ Substitution~~*metering data* Substitution or forward Estimation being carried out by the *Metering Data Provider*~~MDP. Notification is achieved via the participant *metering data* file as detailed within the *service level procedures*.

~~*Metering Data Provider*~~MDPs ~~may~~ must not perform type 53 or ~~type~~ 55 Substitutions or type 56 Substitutions or ~~forward~~ Estimations without ~~prior~~ the agreement ~~with~~ of the ~~the~~ LNSP, LR and FRMP for the *connection point*~~affected parties~~. ~~*Metering Data Provider*~~MDPs may ~~however undertake to~~ change the quality flag to an existing type 53 or ~~type~~ 55 Substitution or type 56 Substitution or ~~forward~~ Estimation without seeking further agreement from those ~~affected~~ parties.

~~**3.2.7.**~~

~~3.3.~~4.3. ~~Type 4A and 5~~ Substitution and ~~forward~~ Estimation Types

~~3.3.1.~~ Type 51 - Previous Years Method (Nearest Equivalent Day or Like Day)

The ~~*Metering Data Provider*~~MDP must provide a Substitution or ~~forward~~ Estimation ~~for the *metering data*~~ using the *metering data* from the nearest equivalent day or like day from the same, or similar, *meter* reading period in the previous year. The nearest equivalent day or like day is to be determined from Table 3 ~~below~~.

~~**3.3.2.**~~ Type 52 - Previous Meter Reading Method (with the Nearest Equivalent Day or Like Day method)

The ~~*Metering Data Provider*~~MDP must ~~provide a~~ Substitut~~ion~~e or ~~forward~~ Estimat~~ion~~e ~~for the *metering data*~~ using the *metering data* from the nearest equivalent day or like day from the previous *meter* reading period. The nearest equivalent day or like day is to be determined from Table 3 ~~below~~.

Table 3

Type 51 or 52	~~Table 3~~
Substitution or ~~Forward~~ Estimation Day	**Nearest Equivalent Day or Like Day (in order of availability)**
Monday	Monday## Monday #
Tuesday	Tuesday## Wednesday## Tuesday# Wednesday#
Wednesday	Wednesday## Tuesday## Thursday## Wednesday# Thursday# Tuesday#
Thursday	Thursday## Wednesday## Tuesday## Thursday# Wednesday# Tuesday#
Friday	Friday## Friday#
Saturday	Saturday## Saturday#
Sunday	Sunday## Sunday#
~~*Metering data*~~ Substitutions or ~~forward~~ Estimations for like day to be as detailed above, unless:	
~~(a)~~ No *metering data* is available on the first listed day, ~~then~~ the next listed preferred day is to be used. If there is no other suitable day, or no *metering data* is available on any of the listed days ~~then~~ type 52 must be used.	
~~(b)~~ The Substitution or ~~forward~~ Estimation day was a public holiday, in which case the most recent Sunday is to be used.	
~~(c)~~ The Substitution or ~~forward~~ Estimation day was not a public holiday and the listed day is a public holiday, ~~then~~ the next listed preferred day that is not a public holiday, Saturday or Sunday is to be used.	

##	For type 51 utilise *metering data* from the corresponding week in the previous year.
##	For type 52 utilise *metering data* from the corresponding week of the previous *meter* reading period.
#	For type 51 utilise *metering data* from the week preceding the corresponding week in the previous year.
#	For type 52 utilise *metering data* occurring in the week preceding the corresponding week of the previous *meter* reading period.

Alternatively, the ~~*Metering Data Provider*~~MDP must provide ~~*substitution*~~ *substituted metering data* or ~~forward~~ *estimated~~ion~~ metering data* using the average like day method, as detailed in Table 4.

Table 4

TYPE 52 (Alternative) Table 4
The *interval metering data*~~,~~ for which ~~a~~ Substitution or ~~forward~~ Estimation is to be ~~provided~~carried out~~,~~ will be calculated using an average of the *metering data* from each corresponding ~~*interval*~~ TI from the preceding four weeks, or part ~~thereof~~of those. This averaging technique may be applied in either of the following ways:
~~(a)~~ Where the averaged *interval metering data* is used to provide the value for the ~~*interval*~~ *metering data* requiring Substitution or ~~forward~~ Estimation.
~~(b)~~ Where the averaged *interval metering data* is used to provide the *profile* and are scaled to a pre-determined consumption value for the *metering data* ~~*interval(s)*~~ that are the subject of Substitution or ~~forward~~ Estimation.
Type 52 Substitutions or ~~forward~~ Estimations must not be used for public holidays

~~3.3.3.~~ Type 53 - Revision of Substituted Metering Data

The ~~*Metering Data Provider*~~MDP must re-Substitute or change previously Substituted *metering data* prior to the Actual Meter Reading or prior to the second revision ~~in the *AEMO* settlements~~of the *timetable* (whichever occurs first), where the ~~*financially responsible Market Participant*~~*FRMP*, the ~~*Local Retailer*~~*LR* and the ~~*Local Network Service Provider*~~ *LNSP* have agreed, on the basis of Site or End User~~Customer~~ ~~specific~~ information~~,~~ that the original *substituted metering data* is in error and a correction is required.

~~3.3.4.~~ Type 54 - Linear Interpolation

The ~~*Metering Data Provider*~~MDP may Substitute *metering data* for ~~consecutive *interval*~~TIs ~~periods~~ up to, but not exceeding two hours, by using simple linear interpolation.

~~3.3.5.~~ Type 55 - Agreed Substitution Method

The ~~*Metering Data Provider*~~MDP may undertake to use another method of ~~*metering data*~~ Substitution (which may be a modification of an existing Substitution type), where none of the existing Substitution types ~~is applicable~~apply, subject to using reasonable endeavours to form an ~~an~~ agreement ~~between~~ with the ~~*financially responsible Market* Participant~~FRMP, ~~the *Local* Retailer~~LR and ~~the *Local Network Service Provider*~~ LNSP for the *connection point.* The specifics of this Substitution type may involve a globally applied method.

~~3.3.6.~~ Type 56 - Prior To First Reading - Agreed Method

Prior to the first Actual Meter Reading and where no previous *metering data* history exists for the *connection point*, the ~~*Metering Data Provider*~~MDP may provide a Substitution or ~~forward~~ Estimation for the *interval metering data* using a method agreed between the FRMP ~~*financially responsible Market Participant*~~, the LR ~~*Local Retailer*~~ and the LNSP ~~*Local Network Service Provider*~~.

~~3.3.7.~~ Type 57 - Prior to First Reading - Customer Class Method

Prior to the first Actual Meter Reading and where no previous *metering data* history exists for the *connection point*, the ~~*Metering Data Provider*~~MDP may provide a Substitution or ~~forward~~ Estimation for the *metering data* based on the given ADL~~*average daily load*.~~ The *interval metering data* must be *profiled* to suit the relevant End User~~customer~~ class. ~~*Metering Data Provider*~~MDP*s* electing to undertake this type of Substitution or ~~forward~~ Estimation must develop a suite of *profiles* acceptable to the ~~*responsible person*~~MC for use and application.

~~3.3.8.~~ Type 58 - Zero

The ~~*Metering Data Provider*~~MDP must undertake ~~*metering data*~~ Substitutions or ~~forward~~ Estimations of 'zero' where:

(a) Either the ~~*Local Network Service Provider*~~ LNSP or the ~~*Metering Provider*~~MP has informed the ~~*Metering Data Provider*~~MDP of a de-energised *connection point* or an inactive *meter* and where the consumption is known to be zero; or

(b) ~~As specified within the~~Following a Meter Churn ~~Data Management Procedure~~.

~~4.~~5. SUBSTITUTION AND ~~FORWARD~~ ESTIMATION FOR METERING INSTALLATIONS WITH ACCUMULATED METERING DATA ~~TYPE 6~~

~~4.1.~~5.1. Application of ~~clause~~ section 5~~6~~4

~~4.1.1. The requirements of clause 6.24.2 and clause 6.34.3 apply to the jurisdictions of Victoria, New South Wales, South Australia, Australian Capital Territory, Queensland, and *Tasmania*.~~

~~4.1.2.~~ The ~~*metering data*~~ Substitution and ~~forward~~ Estimation types ~~as~~ detailed ~~within~~ ~~clause~~ sections ~~6~~5.2~~4.2~~ and ~~clause 6~~5.3~~4.3~~ are to be undertaken by ~~*Metering Data Provider*~~MDPs accredited for the collection, processing and delivery of *accumulated metering data* ~~from a *metering installation* type 6~~.

5.2. ~~Type 6~~ Substitution and ~~forward~~ Estimation Rules

~~4.2.~~

~~4.2.1. The *Metering Data Provider*MDP must carry out all *metering data* Substitutions and forward Estimations in accordance with the *metrology procedure*.~~

~~4.2.2.~~ The ~~Metering Data Provider~~MDP must replace all estimated metering data ~~forward estimations~~ with either *accumulated metering data* or *interval metering data* ~~Actual~~ or substituted *metering data*:

(a) When *accumulated metering data* or *interval metering data* ~~Actual Metering Data~~ covering all or part of the ~~forward~~ Estimation period is obtained; or

(b) When the next Scheduled Meter Reading ~~was unable to~~could not be undertaken, the ~~*Metering Data Provider*~~MDP must replace the ~~forward~~ *estimated metering data* with *substituted metering data* with a quality flag of F (final Substitution).

Any final *substituted metering data* provided by the ~~*Metering Data Provider*~~MDP must be re-Validated, updated or recalculated by the ~~*Metering Data Provider*~~MDP when:

~~4.2.3.~~

(a) The value of the *metering data* obtained at the next Actual Meter Reading is found to be less than the previous final Substitution; or

(b) The final Substituted value is disputed and following consultation and agreement ~~from~~ with the ~~*financially responsible Market* Participant~~FRMP, ~~the *Local* Retailer~~LR and the ~~*Local Network Service Provider*~~ LNSP for the *connection point*, the ~~a~~ new agreed value will be determined ~~as per clause 64.3.4 (~~ using type 64 Substitution~~) must be provided~~.

The ~~*Metering Data Provider*~~MDP must obtain clear and concise identification as to the cause of any missing or erroneous *metering data* for which ~~*metering data*~~ Substitutions are required.

The MDP may apply the following Substitution and Estimation types:

(a) Substitutions: type 61, 62, 63, 64, 65, 66, 67 or 68.

(b) Estimations: type 61, 62, 63, 65 or 68.

4.2.4.

4.2.5. Where the Scheduled Meter Reading cycle frequency is less frequent than monthly, the *Metering Data Provider*MDP may only use a type 62 Substitution or forward Estimation method when *metering data* from the same, or similar, *meter* reading period last year (i.e. type 61) is not available.

4.2.6. The *Metering Data Provider*MDP may use type 63 Substitutions or forward Estimations only when the *metering data* from the same, or similar, *meter* reading period last year and *metering data* from the previous *meter* reading period is not available (i.e. when type 61 and type 62 Substitution or forward Estimation methods cannot be used).

4.2.7. The *Metering Data Provider*MDP may use type 65 Substitutions or forward Estimations only when the *metering data* from the same, or similar, *meter* reading period last year or the *metering data* from the previous *meter* reading period is not available (i.e. when type 61 and type 62 Substitution or forward Estimation methods cannot be used).

The *Metering Data Provider*MDP must only use a type 67 Substitution when:

4.2.8.

(a) Directed by the *responsible person*MC*;* and

(b) Not expressly disallowed in the Jurisdiction concerned; and

(c) The *end-use* End UserCustomer provided *meter* reading meets the Validation rules for that Data sStream*;* and

(d) The *Metering Data Provider*MDP has no *accumulated metering data* or *interval metering data data actual metering data* for the Scheduled Reading Date for this *connection point*.

4.2.9. Subject to clause 64.2.5, clause 64.2.6, clause 64.2.7 and clause 4.2.8 the *Metering Data Provider*MDP may apply the following Substitution and forward Estimation types:

Substitutions may be type 61, 62, 63, 64, 65, 66, 67 or 68.

Forward Estimations may be type 61, 62, 63, 65 or 68.

4.2.10. *Metering Data Provider*MDPs may ,ustmust not perform type 64 or type 66 Substitutions without prior the agreement with of the FRMP *financially responsible Market Participant*, theLR *Local Retailer* and the LNSP *Local Network Service Provider* for the *connection point*. *Metering Data Provider*MDPs may, however, undertake to change the quality flag to an existing type 64 or type 66 Substitution without seeking further agreement from those parties *financially responsible Market Participant*, the *Local Retailer* and the *Local Network Service Provider* for the *connection point*.

4.2.11. The *Metering Data Provider*MDP must notify the LNSP *Local Network Service Provider*, LR *Local Retailer* and theFRMP *financially responsible Market Participant* for the *connection point* of any *metering data* Substitution or forward Estimation within two *business days* of the *metering data* Substitution or forward Estimation being carried out by the *Metering Data Provider*MDP. Notification is achieved via the participant *metering data* file as detailed within the *service level procedures*.

4.3.5.3. Type 6 Substitution and forward Estimation Types

4.3.1. Type 61 - Previous Year Method (Average Daily Consumption method)

The *Metering Data Provider*MDP must provide a Substitution or forward Estimation of the *meter* reading by calculating the *energy* consumption as per the following formula:

Energy Consumption = ADC_{LY} * number of days required

where

ADC_{LY} = average daily consumption from the same or similar *meter* reading period last year.

4.3.2. Type 62 - Previous Meter Reading Method (Average Daily Consumption Method)

The ~~*Metering Data Provider*~~MDP must provide a Substitution or ~~forward~~ Estimation of the *meter* reading by calculating the *energy* consumption as per the following formula:

Energy Consumption = ADC_{PP} * number of days required.

where

ADC_{PP} = average daily consumption from the previous *meter* reading period.

~~4.3.3.~~ **Type 63 Customer Class Method**

The ~~*Metering Data Provider*~~MDP must provide a Substitution or ~~forward~~ Estimation ~~*of the meter reading*~~ by calculating the *energy* consumption as per the following formula:

Energy Consumption = ADC_{CC} * number of days required

where

ADC_{CC} = average daily consumption for this End User~~Customer~~ class with the same type of usage.

~~4.3.4.~~ **Type 64 - Agreed Method**

The ~~*Metering Data Provider*~~MDP may undertake to use another method of ~~*metering data*~~ Substitution (which may be a modification of an existing Substitution type), where none of the existing Substitution types ~~is~~ are applicable, subject to making reasonable endeavours to form an ~~an~~ agreement ~~between~~ with the FRMP ~~*financially responsible Market Participant*~~, ~~the~~ LR ~~*Local Retailer*~~ and ~~the~~LNSP ~~*Local Network Service Provider*~~ for the *connection point*. The specifics of this Substitution type may involve a globally applied method.

~~4.3.5.~~ **Type 65 – ADL Method**

The ~~*Metering Data Provider*~~MDP must provide a Substitution or ~~forward~~ Estimation ~~of the *meter* reading~~ by calculating the *energy* consumption in accordance with the following formula:

Energy Consumption = *Average Daily Load* * number of days required

~~4.3.6.~~ **Type 66 - Revision of Substituted Metering Data**

The ~~*Metering Data Provider*~~MDP must re-Substitute or change previously Substituted *metering data*~~,~~ prior to an Actual Meter Reading or prior to the second revision in the ~~*AEMO settlements timetable*~~ (whichever occurs first), where the FRMP~~*financially responsible Market Participant*~~, ~~the~~ LR ~~*Local Retailer*~~ and ~~the *Local Network Service Provider*~~LNSP for the *connection point* have agreed to revise the original *substituted metering data*, on the basis of Site or End User ~~Customer~~ -specific information.

~~4.3.7.~~ **Type 67 ~~– End-use c~~Customer Reading**

~~Subject to clause 6~~4.2.8Unless the MDP is required to employ a type 68 Substitution, the ~~*Metering Data Provider*~~MDP must Substitute any previously *substituted metering data* or ~~forward~~ *estimated metering data* based directly on ~~an *end-use customer* provided~~a *meter reading* provided by ~~a~~an End User.

Type 68 ~~-~~ – Zero

~~4.3.8.~~

The ~~*Metering Data Provider*~~MDP must undertake ~~data~~ Substitutions or ~~forward~~ Estimations of 'zero' where:

(a) Either the LNSP ~~*Local Network Service Provider*~~ or ~~the *Metering Provider*~~MP has informed the ~~*Metering Data Provider*~~MDP of a de-energised *connection point* or an inactive *meter* and where the consumption is known to be zero; or

(b) As ~~specified within the~~a result of a Meter Churn in accordance with the Service Level Procedures (MDP~~)~~)~~Data Management Procedure~~.

~~5.~~6. SUBSTITUTION AND ~~FORWARD~~ ESTIMATION FOR CALCULATED METERING ~~INSTALLATION TYPE 7~~DATA

~~5.1. Application of clause 75~~

~~**5.1.1. The requirements of clause 7.25.2 and clause 7.35.3 apply to the jurisdictions of Victoria, New South Wales, South Australia, Australian Capital Territory, Tasmania and Queensland.**~~

~~**5.1.2. The Substitution and forward Estimation types detailed in clause 7.25.2 and clause 7.35.3 are to be undertaken by *Metering Data Provider*MDPs accredited for the calculation and delivery of *metering data* from a *metering installation* type 7.**~~

6.1. ~~Type 7~~ Substitution Rules

~~**5.2.**~~

~~**5.2.1.** The *Metering Data Provider*MDP must carry out all *metering data* Substitutions and forward *estimations* in accordance with the *metrology procedure*.~~

~~**5.2.2.**~~ The ~~*Metering Data Provider*~~MDP must obtain clear and concise identification as to the cause of any missing or erroneous *calculated metering data* for which ~~*metering data substitutions*~~ *substituted metering data* are required.

The ~~*Metering Data Provider*~~MDP must ensure that all *substituted* *metering data* ~~*substitutions*~~ and ~~forward *estimations*~~ *estimated metering data* are based on *calculated metering data* and not on any previous Substitutions or Estimations (as applicable).

The MDP may apply the following Substitution and Estimations types:

(a) Substitutions: type 71, 72, 73, or 74.

(b) Estimations: type 75.

The ~~Metering Data Provider~~MDP must base calculated metering data for type 7 metering installations on Inventory Table data as follows:

~~**5.2.3.**~~

(a) Where the Inventory Table has not been updated for the period concerned, *calculated metering data* must be based on the most recent available information and provided as an ~~forward~~ Estimate~~d value~~; and

(b) Where the Inventory Table has been updated ~~is correct~~ for the period concerned, the *calculated metering data* must be flagged as A *metering data* ~~provided as an actual value~~, however, when the Inventory Table is subsequently updated for the period concerned, the *calculated metering data* must be flagged as S *metering data* ~~provided as a Substituted value~~; and

~~**Where the Inventory Table in (b) above has a subsequent update for the period concerned, the *calculated metering data* must be provided as a Substituted value.**~~

~~**5.2.4. Subject to clause 7.2.45.2.4, the *Metering Data Provider*MDP may apply the following Substitution and forward Estimations types:**~~

~~**Substitutions may be type 71, 72, 73, or 74.**~~

~~**Forward *Estimations* must be type 75.**~~

~~**5.2.5.**~~ The ~~Metering Data Provider~~MDP must notify the LNSP ~~Local Network Service Provider~~, LR ~~Local Retailer~~ and ~~the financially responsible Market Participant~~FRMP for the connection point of any Substituted calculated metering data ~~substitution by the Metering Data Provider~~MDP within two business days of ~~the calculated metering data~~the Substitution ~~being carried out by the Metering Data Provider~~MDP. Notification is achieved via the participant metering data file as detailed within the ~~sevice~~service level procedures.

~~5.2.6.~~ The ~~*Metering Data Provider*~~MDP must flag all *calculated metering data* Substitutions as **final** (F).

~~5.2.7.~~ ~~*Metering Data Provider*~~MDPs ~~may~~ must not perform a type 74 Substitution without ~~prior~~ the agreement with the FRMP, LR and LNSP. ~~affected parties.~~

~~5.3.~~6.2. ~~Type 7~~ Substitution and ~~forward~~ Estimation Types

~~5.3.1.~~ Type 71 - Recalculation

The ~~*Metering Data Provider*~~MDP must Substitute *calculated metering data* with the *calculated metering data* obtained by a recalculation based on the current Inventory Tables, Load Tables and On/Off Tables.

~~5.3.2.~~ Type 72 - Revised Tables

Where the error in the *calculated metering data* is due to errors in the Inventory Table, Load Table or On/Off Table, the ~~*Metering Data Provider*~~MDP must Substitute *calculated metering data* ~~obtained~~ by a recalculation based on the most recent Inventory Tables, Load Tables and On/Off Tables in which there were no errors.

~~5.3.3.~~ Type 73 - Revised Algorithm

Where the error in the *calculated metering data* is due to an error in ~~the~~ its calculation ~~of that *metering data*~~algorithm~~,~~ the ~~*Metering Data Provider*~~MDP must Substitute the most recent *calculated metering data* for which there was no error.

~~5.3.4.~~ Type 74 - Agreed Method

The ~~*Metering Data Provider*~~MDP may use another method of *calculated metering data* Substitution (which may be a modification of an existing Substitution type), where none of the existing Substitution types is applicable, subject to making reasonable endeavours to form an ~~an~~ agreement between the FRMP~~*financially responsible Market Participant*~~, ~~the *Local Retailer*~~LR and ~~the *Local Network Service Provider*~~ LNSP for the *connection point.* The specifics of this Substitution type may involve a globally applied method.

~~5.3.5.~~ Type 75 – Existing Table

The ~~*Metering Data Provider*~~MDP must provide an ~~forward~~ Estimate for the *calculated metering data* based on the most recent Inventory Table ~~information~~ until such time as an updated Inventory Table is received for the period concerned.

~~6.~~7. GENERAL DATA VALIDATION REQUIREMENTS

7.1. Validation requirements for all metering installations ~~types 1 – 7~~

~~6.1.~~

~~6.1.1.~~ ~~Metering Data Providers~~MDPs ~~are requested to~~must assume and manage systems and processes on the basis that:

~~Registration information given may might not be inherently correct;~~

(a) Stored *metering data* held in the *meter* buffer ~~may~~ might be subject to installation measurement error;

(b) Data delivered by reading systems, (e.g. remote reading systems, hand-~~-~~held readers and conversion software) ~~may~~ might not be recovered from the ~~field~~ *meters* without corruption.

~~6.1.2.~~ ~~The market use of a~~Auditable Validation procedures ~~is~~ are of critical importance and ~~may~~ can have a direct impact on disputes. It is essential that ~~*Metering Data Provider*~~MDPs comply with these Validation procedures and that all *metering data* is subject~~ed~~ to Validation prior to delivery to AEMO and *Registered Participants*.

7.2. Validation of interval metering data alarms ~~for metering installation types 1 – 5~~

~~6.2.~~

~~6.2.1.~~ The ~~*Metering Data Provider*~~MDP must Validate *interval metering data* ~~from *metering installation* types 1, 2, 3, 4 and 5~~ against the following ~~significant~~ Meter~~ing~~ ~~data~~ Alarms when these are provided in the *meter*:

(a) ~~•~~ power failure / meter loss of supply for instrument transformer connected metering installations only~~,~~

(b) ~~•~~ VT or phase failure,

(c) ~~•~~ pulse overflow,

(d) ~~•~~ c~~C~~yclic r~~R~~edundancy c~~C~~heck error, and

(e) ~~•~~ time tolerance.

Where *interval metering installations* assign alarms to the data channel and ~~or~~ the *interval metering data* concerned, the ~~*Metering Data Provider*~~MDP must process the alarm along with the *metering data* as part of the required ~~*metering data*~~ Validation process.

~~As a minimum requirement, the Metering Data ProviderMDP must have systems and processes in place that capture metering data alarms and process them by exception reporting.~~

~~The Metering Data ProviderMDP must retain all metering data alarm exception reports for audit purposes.~~

The ~~Metering Data Provider~~MDP must ensure that all *metering data* alarm reports are signed off and dated by the person actioning the data exception report review as part of the Validation process.

The ~~*Metering Data Provider*~~MDP must Validate all *interval metering data* with all *metering data* alarms prior to despatch to AEMO or *Registered Participants*.

All ~~*Metering Data Provider*~~MDP exception reports must provide, for all instances where the *interval metering data* was found to be corrupted ~~e.g. intervals *substituted,*~~ an indication of the subsequent actions undertaken by the ~~*Metering Data Provider*~~MDP.

~~7.~~8. VALIDATION WITHIN THE METER READING PROCESS

~~7.1. Application of clause 97~~

~~**7.1.1. The requirements of clause 9.27.2 are applicable to *Metering Data Provider*MDPs accredited for the provision of *metering data services* for type 4A and 5 *metering installations*.**~~

~~**7.1.2. The requirements of clause 9.37.3 are applicable to *Metering Data Provider*MDPs accredited for the provision of *metering data services* for type 6 *metering installations*.**~~

8.1. Validations to be performed ~~for~~ during collection of metering data from manually read interval ~~type 4A and 5~~ metering ~~data collection~~installations

~~7.2.~~

~~7.2.1.~~ The Validations to be performed by ~~*Metering Data Provider*~~MDPs responsible for the collection of *interval metering data* from ~~type 4A and 5~~manually read *metering installations* ~~must undertake the following Validations within the *meter* reading process~~are as follows:

(a) The *meter* serial number is correct against the recorded *meter* serial number~~.~~;

(b) The security of the *metering installation* is intact, e.g. *meter* seals in place and in good order~~.~~; and

(c) The time synchronisation of the *metering installation* is correct to *EST* inclusive of any *load* control devices.

8.2. Validations to be performed for during collection of accumulated metering data from type 6 metering data collectioninstallations

7.3.

7.3.1. The Validations to be performed by *Metering Data Provider*MDPs responsible for the collection of *accumulated* *metering data* from type 6 *metering installations* must undertake the following Validations within the *meter* reading processare as follows:

(a) The value of *metering data* from the current *meter* reading ≥ the value of *metering data* from the previous *meter* reading;.

(b) The value of *metering data* from the current *meter* reading is valid against an expected minimum value;.

(c) The value of *metering data* from the current *meter* reading is valid against an expected maximum value;.

(d) The *meter* serial number is correct against the recorded *meter* serial number;.

(e) The security of the *metering installation* is intact, e.g. *meter* seals in place and in good order;.

(f) The time synchronisation of the *metering installation* is correct to *EST* inclusive of any *load* control devices; and.

(g) The dial capacity is checked against the recorded dial capacity.

8.9. VALIDATION WITHIN AS PART OF THE REGISTRATION PROCESS

8.1. General

8.1.1. This clause 108 relates to the Validation of the *NMI* and respective *metering data* within the registration and *connection point* transfer process. This clause 108 is also applicable to current registered *connection points* which have a change of metrology and/or *Metering Data Provider*MDP.

8.2. Application of clause 108

8.2.1. The requirements of clause 10.38.3 are applicable to *Metering Data Provider*MDPs accredited for the provision of *metering data services* for type 1, 2, 3 and 4 *metering installations*.

8.2.2. The requirements of clause 10.48.4 are applicable to *Metering Data Provider*MDPs accredited for the provision of *metering data services* for type 4A and 5 *metering installations*.

8.2.3. The requirements of clause 10.58.5 are applicable to *Metering Data Provider*MDPs accredited for the provision of *metering data services* for type 6 *metering installations*.

8.2.4. The requirements of clause 10.68.6 are applicable to *Metering Data Provider*MDPs accredited for the provision of *metering data services* for type 7 *metering installations*.

9.1. Validation in the registration process for type 1 – 4 metering installations with remote acquisition of metering data

8.3.

MDPs must carry out the following Validations following any installation or change changesto a to a type 1, 2, 3 and 4 *metering installation* with *remote acquisition* of *metering data*, prior to the distribution of any *interval metering data* to AEMO or *Registered Participants* for the purposes of *settlements*:

8.3.1. The *Metering Data Provider*MDP must Validate the *metering data* on registration of all type 1, 2, 3 and 4 *metering installations* to verify:

(a) That the *metering data* *metering installation* that has been installed or changed is recording *metering data* correctlycorrectly pertains to the registered *metering installation*, in conjunction with the *Metering Provider*MP.

That the magnitude and *profile* of the *metering data* is correct for the primary *energy*, in conjunction with the *Metering Provider*MP.

(b) That all Data Streams are captured, in conjunction with the *Metering Provider*MP.

(c) That the *NMI* is registered in MSATS.

(d) That the *NMI* is correct and is within the range allocated for that *Network Service Provider*the relevant NSP.

(e) the MDP may also That the *metering data* acquired is of an expected magnitude and *profile* for the End User type.

For whole current *metering* ~~*installaitons*~~*installations* installed under 9.9A, 9.9B and 9.9C of the NER, MDPs must carry out the following Validation prior to the distribution of any *interval metering data* to AEMO or *Registered Participants* for the purposes of *settlements*.

(a) That the *metering data* correctly pertains to the registered *metering installation*.

(b) That the *metering data* acquired is of an expected magnitude and *profile* for the End User type.

(c) That all Datastreams are captured.

(d) That the *NMI* is registered in MSATS.

(e) That the *NMI* is within the range allocated for the relevant LNSP.

8.3.2. The *Metering Data Provider*MDP must undertake all Validations as detailed in clause 10.3.18.3.1 following any changes to the *metering installation* (e.g. a *meter* change or *current transformer (CT)* ratio change).

8.3.3. The Validations performed by the *Metering Data Provider*MDP as detailed in clause 10.3.18.3.1, must be carried out prior to the distribution of any actual *interval metering data* to AEMO or *Registered Participants* for the purposes of *market settlements* or billing.

9.2. Validation in the registration process for manually read interval type 4A and 5 metering installations

8.4.

The MDP must carry out the following Validations on the CT for type 4A and 5manually read interval *metering installations* after any changes to a *metering installation* prior to the distribution of any *interval metering data* to AEMO or *Registered Participants* for the purposes of *settlements*:

8.4.1. The *Metering Data Provider*MDP must Validate the *metering data* on registration of all *current transformer* type 4A and 5 *metering installations* to verify:

(a) That the *metering data* correctly pertains to the registered *metering installation*, in conjunction with the *Metering Provider*MP.

(b) That the magnitude and *profile* of the *metering data* is correct for the primary *energy*, in conjunction with the *Metering Provider*MP.

(c) That all Data-streams are captured, in conjunction with the *Metering Provider*MP.

(d) That the *NMI* is registered in MSATS.

(e) That the *NMI* is within the range allocated for thatthe relevant LNSP *Local Network Service Provider*.

8.4.2. The *Metering Data Provider*MDP must undertake all Validations as detailed in clause 10.4.18.4.1 following any changes to the *metering installation* (such as a *meter* change or *current transformer (CT)* ratio change).

8.4.3. The Validations performed by the *Metering Data Provider*MDP, as detailed in clause 10.4.18.4.1, must be carried out prior to the distribution of any actual *interval metering data* to *AEMO* or *Registered Participants* for the purposes of *market settlements* or billing.

MDPs must carry out the following Validation of all whole current type 4A and 5manually read interval *metering installations* prior to the distribution of any *interval metering data* to AEMO or *Registered Participants* for the purposes of *settlements*.

8.4.4. The *Metering Data Provider*MDP must Validate the *metering data* on registration of all whole current type 4A and 5 *metering installations* to verify:

(a) That the *metering data* correctly pertains to the registered *metering installation*.

(b) That the *metering data* acquired is of an expected magnitude and *profile* for the End UserCustomer type.

(c) That all Data-streams are captured.

(d) That the *NMI* is registered in MSATS.

(e) That the *NMI* is within the range allocated for that *Local Network Service Provider*the relevant LNSP.

~~**8.4.5. The Validation performed by the *Metering Data Provider*MDP, as detailed in clause 10.4.48.4.4, must be carried out prior to the distribution of any actual *interval metering data* to *AEMO* or *Registered Participants* for the purposes of *market settlements* or billing.**~~

9.3. Validation ~~in the registration process~~ for ~~type 6~~ metering installations with accumulated metering data

~~**8.5.**~~

MDPs must carry out the following Validation following any changes to a ~~type 6~~ *metering installation* prior to the distribution of any *accumulated metering data* ~~or *interval metering data*~~ to AEMO or *Registered Participants* for the purposes of *settlements*.

~~**8.5.1.** The *Metering Data Provider*MDP must Validate the *metering data* on registration of all type 6 *metering installations* to verify:~~

(a) That the *metering data* correctly pertains to the registered *metering installation*.

(b) That all Data-streams are captured.

(c) That the *NMI* is registered in MSATS.

(d) That the *NMI* is within the range allocated for ~~that *Local Network Service Provider*.~~the relevant LNSP.

~~**8.5.2. The *Metering Data Provider*MDP must undertake all Validations, as detailed in clause 10.5.18.5.1, following any changes to the *metering installation* (such as a *meter* change or *current transformer (CT)* ratio change).**~~

~~**8.5.3. The Validations performed by the *Metering Data Provider*MDP, as detailed in clause 10.5.18.5.1, must be carried out prior to the distribution of any actual *metering data* to *AEMO* or *Registered Participants* for the purposes of *market settlements* or billing.**~~

9.4. Validation ~~in the registration process~~ for ~~type 7~~ metering installations with calculated metering data

~~**8.6.**~~

~~**8.6.1.** The *Metering Data Provider*~~MDPs must Validate the *calculated metering data* on registration of all ~~type 7~~ *metering installations* ~~metered sites~~ to verify ~~:~~

~~T~~that the Inventory Tables, Load Tables and On/Off Tables are complete and correct for the specifics of the ~~type 7~~ *metering installation*.

~~9.~~10. VALIDATION OF METERING DATA ~~TYPE 1 - 4~~

10.1. General

~~9.1.~~

~~9.1.1.~~ For *connection points* where AEMO is required to appoint an ~~*Metering Data Provider*~~MDP to provide *metering data services,* AEMO may also request the ~~respective *Metering Data Provider*~~MDP to perform additional ~~data~~ Validations ~~(e.g. *busbar* or nodal Validation)~~ to further ensure the quality and completeness of the *metering data*.

~~9.1.2. (a) Type 1 and 2 metering installations must have a check metering installation in accordance with the Rules~~NER~~.~~

~~9.1.3. (b) Type 3, 4, 5 and 6 metering installations are not required to have (but may have) a check metering installation in accordance with the Rules~~NER~~.~~

~~9.2. Application of clause 119~~

~~**9.2.1. The requirements of clause 11.39.3 are applicable to all *Metering Data Provider*MDPs accredited for the provision of *metering data services* for *metering installation* types 1, 2, 3 and 4.**~~

~~**9.2.2. The requirements of clause 11.49.4 are applicable to *Metering Data Provider*MDPs accredited for the provision of *metering data services* for *metering installation* types 1, 2, 3 and 4 that have associated *check metering installations* or partial *check metering installations*.**~~

10.2. Validations to be performed for all metering installations

~~9.3.~~

~~9.3.1.~~ ~~The *Metering Data Provider*~~MDPs must, as a minimum, undertake the following Validations ~~on *metering data*~~ within the *metering data services database* for~~rom~~ *metering installation* types ~~1, 2, 3 and 4~~with *remote acquisition* of *metering data*:

(a) A check of all *interval metering data* against a nominated maximum value.

~~i.~~(i) This Validation is to ensure that erroneous *interval metering data* spikes are trapped and Substituted.

~~ii.~~(ii) This check may additionally be performed in the polling software.

(b) A check of the maximum value of *active energy* and *reactive energy*.

~~i.~~(i) For ~~*current transformer* (~~CT~~)~~ *metering installations*, the maximum value is to be initially determined ~~defined~~ by the connected ~~applied *current transformer* (~~CT~~)~~ ratio of the *metering installation*.

(ii) For whole current *metering installations* the maximum rating of the *meter* is to be used.

(c) Check against a nominated minimum value or, alternatively, a 'zero' check ~~which~~ that tests for an acceptable number of zero ~~interval~~ TI values per day to be derived from the Site's historical *metering data*.

(d) Check for null (no values) *metering data* in the *metering data services database* for all ~~*metering*~~ Data~~-~~streams.

~~i.~~(i) The aim of this check is to ensure that there is a 100% *metering data* set (and Substitution for any missing *interval metering data* is undertaken).

(ii) The minimum check required is to ensure that there is at least one non-null *active energy* or *reactive energy* value per ~~interval~~ TI per ~~*metering*~~ Data~~-~~stream.

(e) Check for ~~significant~~ Meter Alarms ~~(power failure, *voltage transformer (VT)* or phase failure, pulse overflow, CRC error and time tolerance)~~.

~~i.~~(i) A process must be in place that captures these ~~significant~~ Meter Alarms within the ~~*metering data*~~ Validation process and ensures that any Meter Alarm occurrences are retained as part of the *metering data* audit trail. ~~Refer to clause 6.2.~~

(ii) The ~~*Metering Data Provider*~~MDP must provide the occurrences of these alarms to relevant *Registered Participants* within the *metering data* file ~~that has a format compliant with the Meter Data File Format Specification~~in MDFF.

~~**Where supported by the *meter(s)*, Validation, for a given period, of *interval metering data* by comparison of the totalised *interval energy data* values (accumulation register reading)and the change in the *meter* cumulative registers (*energy* tolerance). It is acknowledged that this check would not identify *current transformer (CT)* ratio changes that have occurred after initial commissioning and have not been advised to the *Metering Data Provider*MDP.**~~

10.3. Validations to be performed for metering installations with check metering or partial check metering

~~**9.4.**~~

~~**9.4.1.**~~ ~~The *Metering Data Provider*~~MDPs must ~~undertake~~ carry out the following Validations by comparis~~e~~ing ~~of~~ the *metering data* and *check metering data* for all *metering installations* that have associated *check metering installations* or partial *check metering installations*:

(a) For metering installations where the check metering installation duplicates the metering installation accuracy ~~level~~, the ~~Metering Data Provider~~MDP must Validate the metering installation Data-streams and check metering Data-streams on a per ~~interval~~ TI basis. The average of the two Validated metering data sets will be used to determine the energy measurement.

(b) For installations where the check metering data Validation requires a comparison based on nodal balance (comparing the sum energy flow to the busbar against energy flow from the busbar), the ~~Metering Data Provider~~MDP must construct a Validation algorithm within the metering data services database that will facilitate this test:

~~i.~~(i) The ~~*Metering Data Provider*~~MDP must construct a Validation algorithm within the *metering data services database* that will facilitate comparison of *interval metering data* for each *energy* flow on a per ~~interval~~ TI basis.

(ii) The ~~*Metering Data Provider*~~MDP must conduct an analysis of the historical *metering data* for each *connection point* to ascertain whether error differences in nodal balance are acceptable.

(iii) The ~~*Metering Data Provider*~~MDP should use this information to refine its Validation algorithms to minimise the error difference ~~value~~ for each *connection point*, based on historical *metering data*.

(iv) The maximum error difference considered acceptable for any *connection point* is 1% on a per ~~interval~~ TI basis. The ~~*Metering Data Provider*~~MDP should minimise this ~~value~~ for each *connection point*, based on historical data.

(c) Where the *check metering installation* is remote from the *metering installation* (e.g. at the other end of a *transmission line* or the other side of a *transformer*)~~, the Validation system must employ the following functionality~~:

~~i.~~(i) The ~~*Metering Data Provider*~~MDP must construct a Validation algorithm within the *metering data services database* that will facilitate comparison of *interval metering data* from the *metering installation* and the *check metering installation* on a per ~~interval~~ TI basis with adjustment for respective *transformer* or *transmission line* losses.

(ii) The ~~*Metering Data Provider*~~MDP must conduct an analysis of the historical *metering data* for each *connection point* to ascertain whether the error differences between the *metering data* from the *metering installation* and *check metering installation* ~~is~~ are acceptable.

(iii) The ~~*Metering Data Provider*~~MDP should use this information to refine its Validation algorithms to minimise the error difference ~~value~~ for each *connection point*, based on historical *metering data*.

(iv) The maximum error difference considered acceptable for any *connection point* is 5% on a per ~~interval~~ TI basis. The ~~*Metering Data Provider*~~MDP should minimise this ~~value~~ for each *connection point*, based on historical data.

(d) For ~~installation~~ *connection points* where SCADA ~~*metering*~~ data is made available by AEMO for the purposes of ~~*metering data*~~ Validation, the ~~*Metering Data Provider*~~MDP must Validate the *metering data* by comparison of the *interval metering data* against the SCADA ~~*metering*~~ data as provided by AEMO in the agreed format~~. The Validation system must employ the following functionality~~:

~~i.~~(i) The ~~*Metering Data Provider*~~MDP must construct a Validation algorithm within the *metering data services database* that will facilitate comparison of *interval metering data* from the *metering installation* and the SCADA ~~*metering*~~ data on a per ~~interval~~ TI basis.

(ii) The ~~*Metering Data Provider*~~MDP must conduct an analysis of the historical *metering data* for each *connection point* to ascertain whether error differences between the *interval metering data* from the *metering installation* and the SCADA ~~*metering*~~ data ~~is~~ are acceptable.

(iii) The ~~*Metering Data Provider*~~MDP should use this information to refine its Validation algorithms to minimise the error difference value for each *connection point*, based on historical *metering data*.

(iv) The ~~*Metering Data Provider*~~MDP must construct an appropriate Validation algorithm as the SCADA ~~*metering*~~ data may be derived from a different measurement point, have a different interval collection period ~~and/~~or have a different base unit of measurement, (e.g. power not *energy* value) with allowances for a larger error of measurement.

(v) The ~~*Metering Data Provider*~~MDP is only required to undertake Validation of *metering data* against the SCADA ~~*metering*~~ data on the primary data channel i.e. only 'B' channel Validation ~~for~~ where FRMP is either a *Generator* or MSGA ~~*Generators or Market Small Generation Aggregators*~~ and only 'E' channel Validation for *loads*, such as pumps.

10. VALIDATION OF METERING DATA TYPE 4A AND 5

10.1. Application of clause 120

10.1.1. *Metering Data Provider*MDPs accredited for the provision of *metering data services* for type 4A and5 *metering installations* must apply the requirements of:

Clause 120.2 for current transformer (CT) connected type 4A and 5 *metering installations*.

Clause 120.3 for whole current type 4A and 5 *metering installations*.

10.4. Validations to be performed for type 4A and 5manually read interval metering installations with CTs

10.2.

10.2.1. The *Metering Data Provider*MDPs must, as a minimum, undertake the following Validations on *metering data* from manually read interval *metering installation* types 4A and 5 with CTs within the *metering data services database*:

(a) Check of all *interval metering data* against a nominated maximum value.

i.(i) This Validation is to ensure that erroneous *interval metering data* spikes are trapped and Substituted.

(ii) This check may additionally be performed in the collection software.

(iii) A check of the maximum value of *active energy*. (Maximum *reactive energy* checks may also be performed as an option) which must initially be , subject to thedetermined- by the connected CT ratio of the *metering installation* (maximum *reactive energy* checks may also be performed as an option) folloiwng:.

The maximum value in 120.2.1(a)(iii) is to be initially defined by the applied *current transformer (CT)* ratio of the *metering installation*.

On a per *metering installation* basis, the maximum value in 120.2.1(a)(iii) may be increased to cater for situations where the *responsible person* MC has confirmed that the *current transformer (CT)* is overloaded on a short-term basis.

(b) Check against a nominated minimum value or, alternatively, a 'zero' check which that tests for an acceptable number of zero interval TI values per day to be derived from the Site's historical *metering data*.

(c) Check for null (no values) *metering data* in the *metering data services database* for all *metering* Data-streams.

i.(i) The aim of this check is to ensure that there is a 100% *metering data* set (and Substitution for any missing *interval metering data* is undertaken).

(ii) The minimum check required is to ensure that there is at least one non-null *active energy* or *reactive energy* value per interval TI per *metering* Data-stream.

(d) Check for significant Meter Alarms (power outage or power failure, VT or phase failure, pulse overflow, CRC error and time tolerance).

i.(i) A process must be in place that captures these significant Meter Alarms within the *metering data* Validation process and ensures that any Meter Alarm occurrences are retained as part of the *metering data* audit trail. Refer to clause 86.2.

(ii) The *Metering Data Provider*MDP must provide notify the occurrences of these *meter* alarms to relevant *Registered Participants* of the occurrences of these Meter Alarms within the *metering data* file that has a format compliant with the Meter Data File Format Specificationin MDFF.

(e) Where supported by the *meter(s)*, Validation~~,~~ for a given period~~,~~ of *interval metering data* by comparison of the totalised *interval energy data* ~~values~~ (accumulation register reading) and the change in the *meter* cumulative registers (*energy* tolerance). It is acknowledged that this check would not identify ~~*current transformer*~~ (CT~~)~~ ratio changes that have occurred after initial commissioning and have not been advised to the ~~*Metering Data Provider*~~MDP.

(f) A check of the *metering data* for continuity and reasonability over the *meter* reading period.

~~i.~~(i) Check that no gaps in the *metering data* exist.

~~ii.~~(ii) Check that *metering data* for the expected period has been delivered based on the ~~expected~~ Scheduled Meter Reading date.

10.5. Validations to be performed for whole current ~~type 4A and 5~~manually read interval metering installations

~~10.3.~~

~~10.3.1.~~ ~~The *Metering Data Provider*~~MDPs must, as a minimum, undertake the following Validations on *metering data* from whole current ~~type 4A and 5~~manually read interval *metering installations* within the *metering data services database*:

(a) Check of all *interval metering data* against a nominated maximum value.

~~i.~~(i) This Validation is to ensure that erroneous *interval metering data* spikes are trapped and Substituted.

~~ii.~~(ii) This check may additionally be performed in the collection software.

~~iii.~~(iii) A check of maximum value of *active energy*. (Maximum *reactive energy* checks may also be performed as an option). The maximum value is to be initially set to the rating of the *meter*.

(b) Check for null (no values) *metering data* in the *metering data services database* for all ~~*metering*~~ Data~~-~~streams.

~~i.~~(i) The aim of this check is to ensure that there is a 100% *metering data* set (and Substitution for any missing *metering data* is undertaken).

(ii) The minimum check required is to ensure that there is at least one non-null *active energy* or *reactive energy* value per ~~interval~~ TI per ~~*metering*~~ Data~~-~~stream.

(c) Check for ~~significant~~ Meter Alarms ~~(voltage transformer (VT) or phase failure, pulse overflow, CRC error and time tolerance)~~. The ~~*Metering Data Provider*~~MDP is not required to Validate the *interval metering data* for power outage or power failure alarms.

~~i.~~(i) A process must be in place that captures these ~~significant~~ Meter Alarms within the ~~*metering data*~~ Validation process and ensures that any Meter Alarm occurrences are retained as part of the *metering data* audit trail. ~~Refer to clause 86.2.~~

~~ii.~~(ii) The ~~*Metering Data Provider*~~MDP must ~~provide~~ notify ~~the occurrences of these *meter* alarms (inclusive of the occurrences of power outage or power failure alarms) to~~ relevant *Registered Participants* the occurrences of these Meter Alarms within the *metering data* file ~~that has a format compliant with the~~in ~~Meter Data File Format~~MDFF ~~Specification~~.

(d) Where supported by the *meter(s)*, Validation, for a given period, of *interval metering data* by comparison of the totalised *interval energy data* values (accumulation register reading) and the change in the *meter* cumulative registers (*energy* tolerance).

(e) A check of the *metering data* for continuity and reasonability over the *meter* reading period.

~~i.~~(i) Check that no gaps in the *metering data* exist.

~~ii.~~(ii) Check that *metering data* for the expected period has been delivered based on the expected reading date.

~~11. VALIDATION OF METERING DATA TYPE 6~~

~~11.1. Application of clause 131~~

~~**11.1.1. The requirements of clause 13.211.2 are applicable to *Metering Data Provider*MDPs accredited for the provision of *metering data services* for *metering installations* type 6.**~~

10.6. Validations to be performed for ~~type 6~~ metering installations with accumulated metering data

~~**11.2.**~~

~~**11.2.1.** The Metering Data Provider~~MDPs must undertake the following Validations ~~on metering data~~ within the *metering data services database* for ~~*type 6*~~ *metering installations* with *accumulated metering data*:

(a) Check against a nominated minimum value of *metering data* collected from the *metering installation*.

(b) Check against a nominated maximum value of *metering data* collected from the *metering installation*. This is to be applied to both the *metering data* collected from the *metering installation* and the calculated *energy* consumption values.

(c) The current value of *metering data* collected from the *metering installation* ≥ previous value of *metering data* collected from the *metering installation*.

(d) The current value of *metering data* collected from the *metering installation* is numeric and ≥ 0.

(e) The current date that *metering data* is collected from the *metering installation* > the previous date that *metering data* was collected from the *metering installation*.

(f) Check for null (no values) *metering data* in the *metering data services database* for all ~~*metering*~~ Data-streams. The aim of this check is to ensure that there is a 100% *metering data* set (and Substitution for any missing *metering data* is undertaken.

~~**i. The aim of this check is to ensure that there is a 100% *metering data* set (and *substitution* for any missing *metering data* is undertaken).**~~

~~12. VALIDATION OF METERING DATA TYPE 7~~

~~12.1. Application of clause 142~~

~~**12.1.1. The requirements of clause 14.212.2 are applicable to *Metering Data Providers* accredited for provision on *metering data services* for type 7 *metering installations*.**~~

10.7. Validations to be performed for ~~type 7~~ metering installations with calculated metering data

~~**12.2.**~~

~~**12.2.1.** The Metering Data Provider~~MDPs must undertake the following Validations o~~n~~f *calculated metering data* within the *metering data services database*:

(a) Check against a nominated maximum *calculated metering data* value.

(b) *Calculated metering data* value is numeric and ≥ 0.

(c) Check for null (no values) *calculated metering data* ~~in the *metering data services database*~~ for all ~~*metering*~~ Data-streams. The aim of this check is to ensure that there is a 100% *calculated metering data* set (and Substitution for any missing *calculated metering data* has been undertaken).

~~i. The aim of this check is to ensure that there is a 100% *calculated metering data* set (and *substitution* for any missing *calculated metering data* has been undertaken).~~

(d) Check the Inventory Tables, Load Tables and On/Off Tables ~~with~~ using a process approved by the ~~*responsible person*~~MC to ensure that the correct version of ~~ths~~these tables is being used for the production of *calculated metering data*.

(e) Check against a nominated minimum value, or alternatively, a 'zero' check ~~which~~ that tests for an acceptable number of zero ~~interval~~ TI values per day.

(f) *Calculated metering data* date > previous *calculated metering data* date.

11. LOAD PROFILING – CONVERSION OF ACCUMULATED METERING DATA

~~13.~~

~~13.1. Application of clause 153~~

~~**13.1.1. A Load Profiling requirement for the conversion of *accumulated metering data* into *trading intervals* applies to the jurisdictions of Victoria, New South Wales, Queensland, South Australia, Australian Capital Territory, and Tasmania.**~~

11.1. Requirements for load profiling

~~13.2.~~

~~13.2.1.~~ Load Profiling is required ~~in order~~ to determine ~~*trading*~~ *interval metering data*, for ~~wholesale market~~ *settlements* ~~purposes,~~ for type 6 *metering installations*. The requirements vary from Jurisdiction to Jurisdiction.

~~13.2.2.~~ The requirements for Load Profiling in Victoria, ~~Australian Capital Territory~~ACT, and Tasmania are to:

(a) Determine an estimate of the average Load Profile for a Profile Area over a given period of time (Profile Preparation Service); and

(b) Allocate that Load Profile to ~~*end-use*~~ End Users ~~Customer~~s in that Profile Area (Basic Meter Profiler).

The requirements for Load Profiling in NSW and Queensland are to:

~~13.2.3.~~

(a) Determine an estimate of the average Load Profile for F~~f~~irst-T~~t~~ier Controlled Loads and S~~s~~econd-T~~t~~ier C~~c~~ontrolled L~~l~~oads for a *Profile Area* over a given period of time (Profile Preparation Service – Controlled Load Profile);

(b) Allocate that *profile* to both *first-tier* and *second-tier* Controlled Loads *metering data* (Basic Meter Profiler – Controlled Load Profile);

(c) Determine an estimate of the average Load Profile of the remaining *first-tier loads* and *second-tier loads* for a Profile Area (that is, excluding the *first-tier* and *second-tier* Controlled Loads) over a given period of time (Profile Preparation Service – Net System Load Profile); and

(d) Allocate that Load Profile to *second-tier* non-Controlled Loads in that Profile Area *(*Basic Meter Profiler – Net System Load Profile*).*

~~**13.2.4.**~~ The requirements for Load Profiling in South Australia are to:

(a) Determine an estimate of the average Load Profile for *first-tier* and *second-tier* Controlled Loads for a Profile Area over a given period of time (Profile Preparation Service – Controlled Load Profile);

(b) Allocate that *profile* to *second-tier* Controlled Loads in that Profile Area (Basic Meter Profiler – Controlled Load Profile);

(c) Determine an estimate of the average Load Profile of the remaining *first-tier loads* and *second-tier loads* for a Profile Area (that is, excluding the *first-tier* and *second-tier* Controlled Loads) over a given period of time (Profile Preparation Service – Net System Load Profile); and

(d) Allocate that Load Profile to *second-tier* non-Controlled Loads in that Profile Area *(*Basic Meter Profiler – Net System Load Profile*).*

~~13.3.~~11.2. Profile Preparation Service - Controlled Load Profile

11.2.1. NSW

~~**13.3.1. Clause 15.313.3 applies to the *Profile Preparation Service – Controlled Load*. The requirements for the *Profile Preparation Service - Controlled Load* and the actions to be undertaken in each applicable jurisdiction are as specified in the following sub-clauses.**~~

~~**13.3.2. *Profile Preparation Service – Controlled Load* does not apply to the jurisdictions of the Australian Capital Territory, Tasmania and Victoria.**~~

~~**13.3.3.**~~ Profile Preparation Service - Controlled Load is applied in ~~the jurisdiction of **New South Wales**~~NSW as follows:

(a) In accordance with ~~clause~~ section 5.9.2 ~~3.10.2~~ of Metrology Procedure: Part A, ~~*controlled load profile(s) (*~~CLP~~*)*~~s for each Profile Area must be prepared by *AEMO* using *interval metering data* from a samples ~~(or samples)~~ of C~~c~~ontrolled L~~l~~oad *interval meters* in accordance with ~~clause~~ section 15.4.3~~53.3.7~~ and ~~sub-clauses 153.3.3~~paragraphs (b) and (c).

(b) The sample *meters*~~, which will~~to be installed by the LNSPs ~~NSW *Local Network Service Providers*~~, must be a type 4 *metering installation*.

(c) Two *NMIs* must be allocated to each sample *meter*.

~~i.~~(i) One *NMI* must be used for the *interval metering data* from the sample *meter* that is used to prepare the CLP ~~in accordance with this clause 15.3.313.3.3~~; and

(ii) Where the *metering installation* ~~that~~ has a sample *meter* and the FRMP for the ~~*maket*~~*market load* in MSATS is not the LR~~is second-tier,~~ a second *NMI* must be used to transfer the *accumulated metering data* to which the CLP is applied ~~in accordance with clause 15.3.613.3.6~~.

(d) The requirements for one CLP ~~*controlled load profile*~~ are:

~~i.~~(i) There shall be at least one CLP in each Profile Area.

(ii) A ~~*Local Network Service Provider*~~ LNSP may ~~choose to~~ introduce a second CLP in its Profile Area.

(iii) If the ~~*Local Network Service Provider*~~ LNSP ~~chooses~~ does not ~~to~~ introduce a second CLP, one CLP must be calculated for all C~~c~~ontrolled L~~l~~oads in a Profile Area, which is based on a sample of Controlled Load Interval Meters.

(iv) For each ~~half hourly *trading interval*~~TI, the CLP must be calculated by Profile Area as follows:

CLP for a Profile Area for ~~a *trading interval*~~TI ~~-~~j

$$= \sum_{n=1}^{N} (\text{sample } \textit{meter load} \text{ in } \cancel{\textit{trading interval}}\ \text{TI j})_n * (\text{wf})_n$$

where:
N = represents the set of sample *NMIs* in the Profile Area
wf = is the weighting factor associated with the *NMI*s.

(e) The requirements for two ~~*controlled load profiles*~~ CLPs are:

~~i.~~(i) If the ~~*Local Network Service Provider*~~ LNSP ~~chooses to~~ introduces a second CLP, it must ~~provide a written notice advising of~~ notify the commencement date of the second CLP in writing to AEMO and all *retailers*~~:~~

- ~~*AEMO*, and~~
- ~~*All* retailers.~~

(ii) The commencement date must be at least six months after the date of the notice.

(iii) From the commencement date, ~~two~~ CLPs must be calculated for each~~the~~ Profile Area

~~:~~

- ~~One for controlled loads in the Profile Area based on a sample of controlled load interval meters on the controlled load 1 network tariff; and~~
- ~~One for controlled loads in the Profile Area based on a sample of controlled load interval meters on the controlled load 2 network tariff.~~

(f) For each ~~half hourly trading interval~~TI, the CLPs must be calculated by Profile Area as follows:

~~i.~~(i) CLP for *loads* on the Controlled Load 1 network tariff

$$= \sum_{n=1}^{N} \begin{pmatrix} \text{load for sample meter on the controlled} \\ \text{load 1 network tariff in trading interval j} \end{pmatrix}_n * (\text{wf})_n$$

where:
N = represents the set of sample *NMI*s on the Controlled Load 1 network tariff~~,~~ in the Profile Area.
wf = weighting factor associated with the *NMIs.*

(ii) *CLP* for *loads* on the Controlled Load 2 network tariff

$$= \sum_{m=1}^{M} \begin{pmatrix} \text{load for sample meter on the controlled} \\ \text{load 2 network tariff in trading interval j} \end{pmatrix}_m * (\text{wf})_m$$

where:
M = represents the set of sample *NMI*s on the Controlled Load 2 network tariff~~,~~ in the Profile Area
wf = weighting factor associated with the *NMIs.*

11.2.2. Queensland

~~**13.3.4.** The requirements for the~~ Profile Preparation Service - Controlled Load is applied in Queensland as follows~~are~~:

(a) In accordance with ~~clause~~ section 5.9.2~~3.10.2~~ of Metrology Procedure: Part A, ~~*controlled load profiles* (~~CLPs~~)~~ for the Profile Area must be prepared by AEMO using *interval metering data* from a sample (or samples) of Controlled Load Interval Meters in accordance with ~~clause~~ section 15~~3~~.3.7 and ~~sub-clauses 153.3.4~~ paragraphs (b) and (c).

(b) The sample *meters*~~,~~ ~~which will~~to be installed by the LNSP ~~*Local Network Service Provider*,~~ must be type 4 *metering installations*.

(c) Two *NMI*s may need to be allocated to each sample *meter*.

~~i.~~(i) One *NMI* must be used for the *interval metering data* from the sample *meter* that is used to prepare the CLP ~~in accordance with this clause~~ 15.3.413.3.4; and

~~ii.~~(ii) Where the *metering installation* that has a sample *meter* is second-tier, a second *NMI* must be used to transfer the *accumulated metering data* to which the CLP is applied ~~in accordance with clause~~ 15.3.613.3.6.

(d) Two CLPs must be calculated for the Profile Area:

~~i.~~(i) One for Controlled Loads in the Profile Area based on a sample of Controlled Load Interval Meters on the Controlled Load 1 network tariff; and

~~ii.~~(ii) One for Controlled Loads in the Profile Area based on a sample of Controlled Load Interval Meters on the Controlled Load 2 network tariff.

(e) For each ~~half hourly *trading interval*~~TI, the CLPs must be calculated by Profile Area as follows:

~~i.~~(i) *CLP* for *loads* on the Controlled Load 1 network tariff

$$= \sum_{n=1}^{N} \begin{pmatrix} \text{load for sample meter on the controlled} \\ \text{load 1 network tariff in trading interval j} \end{pmatrix}_n * (\text{wf})_n$$

where:
N = represents the set of sample *NMI*s on the Controlled Load 1 network tariff~~,~~ in the Profile Area.
wf = weighting factor associated with the *NMIs.*

~~ii.~~(ii) *CLP* for *loads* on the *controlled load* 2 network tariff

$$= \sum_{m=1}^{M} \begin{pmatrix} \text{load for sample meter on the controlled} \\ \text{load 2 network tariff in trading interval j} \end{pmatrix}_m * (\text{wf})_m$$

where:
M = represents the set of sample *NMI*s on the Controlled Load 2 network tariff~~,~~ in the Profile Area
wf = weighting factor associated with the *NMIs.*

11.2.3. South Australia

~~**13.3.5.** The requirements for the~~ Profile Preparation Service - Controlled Load is applied in South Australia ~~are~~as follows:

(a) In accordance with ~~clause~~ section 5.9.2~~3.10.2~~ of Metrology Procedure: Part A, a single ~~*controlled load profile* (~~CLP~~)~~ for all Controlled Loads for each Profile Area must be prepared by AEMO using *interval metering data* from a sample of Controlled Load Interval Meters in accordance with ~~clause~~ section 15~~3~~.3.7 and ~~clauses 153.3.5~~paragraphs (b) and (c).

(b) The sample *meters*~~, which will~~ to be installed by the LNSP ~~South Australian *Local Network Service Provider,*~~ must be a type 4 *metering installation*.

(c) Two *NMIs* may need to be allocated to each sample *meter*.

~~i.~~(i) One *NMI* must be used for the *interval metering data* from the sample *meter* that is used to prepare the CLP~~ in accordance with this clause 153.3.5~~; and

~~ii.~~(ii) Where the *metering installation* that has a sample *meter* is second-tier, ~~then~~ a second *NMI* must be used to transfer the *accumulated metering data* to which the CLP is applied~~ in accordance with clause 15.3.613.3.6.~~.

(d) For each ~~half hourly *trading interval*~~TI, the CLP ~~*controlled load profile*~~ must be calculated by Profile Area as follows:

~~i.~~(i) CLP for a profile area for a ~~trading interval~~TI~~-~~j

$$= \sum_{n=1}^{N} (\text{sample } \textit{meter load} \text{ in } \cancel{\textit{trading interval}}\ \text{TIj})_n * (\text{wf})_n$$

where:
N = represents the set of sample *NMI*s in the Profile Area
wf = is the weighting factor associated with the *NMI*s.

11.3. Basic Meter Profiler – Controlled Load

~~**13.3.6.** For the **Basic Meter Profiler – Controlled Load**, actions are to be undertaken in each jurisdiction as specified in the following sub-clauses:~~

11.3.1. ~~The requirements for Basic Meter Profiler – Controlled Load in New South Wales~~NSW ~~and~~ & Queensland

~~are:~~

Basic Meter Profiler - Controlled Load is applied in NSW & Queensland as follows:

~~i.~~(a) In accordance with ~~clause~~ section 5.9.2~~3.10.2~~ of Metrology Procedure: Part A, AEMO must apply the appropriate CLP~~,~~ for the Profile Area to which the *NMI* is connected, to

the *accumulated metering data* for all *first-tier* and *second-tier* Controlled Loads~~,~~ in order to obtain ~~*trading*~~ *interval metering data*.

~~ii.~~(b) The requirements for one ~~*controlled load profile*~~ CLP are:

~~*1.1.1…1*~~(i) For NMIs in a Profile Area with one CLP, the CLP must be applied as follows:

Half hourly metering data for ~~trading interval~~ TIj for a NMI Data~~-~~stream

$$= \frac{(\text{Accumulation energy data between start date and end date}) * (\text{CLP j})}{\sum_{i=startdate}^{enddate} CLP_i}$$

where:
CLPj = the calculated ~~controlled load profile~~ CLP energy for ~~trading interval~~ TIj

$\sum_{i=startdate}^{enddate} CLP_i$ = the sum of CLP ~~controlled load profile~~ energy between the start date and the end date and;

'start date' and 'end date' ~~have the meanings given~~are defined in ~~clause~~ Section 15.~~5~~7~~13.5~~.

~~iii.~~(c) The requirements for two ~~*controlled load profiles*~~ CLPs are:

~~*(1)*~~(i) In a Profile Area where the ~~Local Network Service Provider~~ LNSP has ~~chosen to~~ introduced a second CLP, the CLPs shall be applied as follows:

~~*1.1.1…1.1*~~ Loads on the Controlled Load 1 network tariff (CLP1) must be applied to the accumulated metering data for all first tier and second-tier Controlled Loads, which are on the Controlled Load 1 network tariff:

Interval ~~Half hourly~~ metering data for ~~trading interval~~ TIj for a NMI Data~~-~~stream on the Controlled Load 1 network tariff

$$= \frac{(\text{Accumulation energy data between start date and end date}) * (\text{CLP1}_j)}{\sum_{i=startdate}^{enddate} \text{CLP1}_i}$$

where:
CLP1_j = the calculated ~~controlled loadpProfile~~CLP energy for ~~trading interval~~ TIj

$\sum_{i=startdate}^{enddate} \text{CLP1}_i$ = the sum of ~~controlled load profile~~ CLP energy between the start date and the end date and;

'start date' and 'end date' ~~have the meanings given~~are defined in ~~clause~~ Section 15.~~5~~7~~13.5~~.

~~*1.1.1…1.2*~~ Loads on the Controlled Load 2 network tariff (CLP2) must be applied to the accumulated metering data for all first-tier and second-tier Controlled Loads, which are on the Controlled Load 2 network tariff:

Interval ~~Half hourly~~ metering data for ~~trading interval~~ TIj for a NMI Data~~-~~stream on the Controlled Load 2 network tariff

$$= \frac{(\text{Accumulation energy data between start date and end date}) * (\text{CLP2}_j)}{\sum_{i=startdate}^{enddate} \text{CLP2}_i}$$

where:

$CLP2_j$ = the calculated ~~controlled load profile~~ CLP energy for ~~trading interval~~ TIj

$\sum_{i=startdate}^{enddate} CLP2_i$ = the sum of ~~controlled load profile~~ CLP energy between the start date and the end date and;

'start date' and 'end date' ~~have the meanings given~~are defined in ~~clause~~ Section 15.~~5~~7~~13.5~~.

~~iv.~~(d) The resulting ~~*half hourly*~~ *interval metering data* produced by applying the CLP ~~*controlled load profile*~~ is at the *NMI* Data~~-~~stream level. The total of these Data~~-~~streams is used in the calculation of the Net System Load Profile~~ as explained in clause~~ 15.4.2~~13.4.2~~.

11.3.2. South Australia

Basic Meter Profiler - Controlled Load is applied in South Australia as follows:

~~The requirements for *Basic Meter Profiler – Controlled Load* in **South Australia** are:~~

~~i.~~(a) In accordance with ~~clause~~ section 5.9.2~~3.10.2~~ of Metrology Procedure: Part A, AEMO must apply the CLP~~,~~ for the Profile Area to which the *NMI* is connected, to the *accumulated metering data* for all *first-tier* and *second-tier* Controlled Loads, in order to obtain ~~*trading*~~ *interval metering data*.

(b) The *accumulated metering data* for *first-tier loads* is represented by a weekly load scaling factor that is transferred to AEMO in accordance with ~~clause~~ section 5.9.4~~3.10.5~~ of Metrology Procedure: Part A.

(c) The *profile* must be applied as follows:

(i) Interval ~~Half hourly~~ metering data for ~~trading interval~~ TIj for a NMI Data~~-~~stream

$$= \frac{(\text{Accumulation energy data between start date and end date}) * (\text{CLP}_j)}{\sum_{i=startdate}^{enddate} \text{CLP}_i}$$

where:
CLPj = the calculated ~~controlled load profile~~ CLP energy for ~~trading interval~~ TIj

$\sum_{i=startdate}^{enddate} CLP_i$ = the sum of ~~controlled load profile~~ CLP energy between the start date and the end date and;

'start date' and 'end date' ~~have the meanings given~~are defined in ~~clause~~ Section 15.~~5~~7~~13.5~~.

(ii) If the *accumulated metering data* is based on an Actual Meter Reading:

~~*1.1.1...2*~~(A) Start date = 00:00 on the day of the previous meter reading.

~~*1.1.1...3*~~(B) End date = the end of the ~~trading interval~~ TI commencing at 23:30 on the day prior to the current meter reading date.

(iii) If the accumulated metering data is ~~a forward~~ Estimated:

~~*(1)*~~(A) Start date = 00:00 on the first day of the billing period, or 00:00 on the previous meter reading date (whether actual or ~~forward~~ Estimate), or 00:00 on the first day that the load becomes second-tier, whichever is the later.

~~*1.1.1...4*~~(B) End date = the end of the ~~trading interval~~ TI commencing at 23:30 on the last day of the billing period, or the end of the ~~trading interval~~ TI commencing at 23:30 on the ~~forward~~ Estimated meter reading date, whichever is the earlier.

(iv) The resulting ~~half hourly~~ *interval metering data* produced by applying the CLP ~~*controlled load profile*~~ is at the *NMI* Data~~-~~stream level. The total of these Data streams is used in the calculation of the ~~*Net System Load Profile* as explained in clause 15.4.2~~13.4.2NSLP.

11.3.3. Sample Meters~~:~~

~~13.3.7.~~

(a) Where *metering* equipment to sample Controlled Loads is installed, the ~~*responsible person*~~ MC must ensure that:

~~i.~~(i) At least 200 Controlled Load sample *meters* are installed for the purposes of calculating each ~~*controlled load profile*~~ CLP within a *profile area* unless otherwise agreed by *AEMO*; and

(ii) The method it adopts for selecting sample sites is statistically sound.

(b) This ~~sub-clause (b) relating to sample size and selection~~paragraph (b) only applies to ~~the jurisdiction of~~ South Australia.

~~i.~~(i) The ~~*Local Network Service Provider*~~ *LNSP* must ensure that at least 200 Controlled Load sample *meters* are installed for the purposes of calculating the ~~*controlled load profile*~~CLP.

(ii) The method of selecting sample *meter* sites adopted by the ~~*Local Network Service Provider*~~ LNSP must be approved by *AEMO*.

(iii) The ~~*Local Network Service Provider*~~ LNSP must use reasonable endeavours to ensure that sample *meter* sites:

~~*1.1.1...5*~~(A) Are occupied sites;

~~*1.1.1...6*~~(B) Have historical annual energy consumption with a lower range exceeding 1,000kWh and an upper range not exceeding two standard deviations of the mean Controlled Load annual consumption;

~~*1.1.1...7*~~(C) Subject to sub-~~clause pragraph~~paragraph (4), must be randomly selected such that each site which meets the other criteria has an equal chance of being included in the sample; and

~~*1.1.1...8*~~(D) New sample metering sites are selected to maintain a sample distribution that is representative of the Controlled Load in accordance with ~~clause~~ section 15~~3~~.3.7(b)(ii).

(iv) ~~In the event that~~If an existing sample *meter* site becomes inappropriate for a sample *meter*, the sample *meter* must be removed or relocated to an appropriate site selected in accordance with ~~clause~~ section 15~~3~~.3.7~~-~~(b)~~-~~(iii).

(v) The ~~*Local Network Service Provider*~~ *LNSP* must ensure that a *meter* which is a sample interval *meter* installed for the purposes of calculating the ~~*controlled load profile*~~ CLP is not removed without the consent of *AEMO*.

(c) The weighting factor assigned to each sample *meter NMI* in the calculation of the ~~*controlled load profile*~~ CLP should be proportional to 1/n, where n is the number of sample *meters* contributing to the calculation of the ~~*controlled load profile*~~ CLP in the respective ~~*Local Network Service Provider*~~ LNSP *area*.

$$\text{Weighting Factor} = \frac{(\text{sf}) * (\text{dlf})}{n}$$

where :

sf = scaling factor (for South Australia = 200)

dlf = *distribution loss factor* applicable to the sample *meter* site

n = number of sample *meters* used in the calculation of the CLP ~~*controlled load profile*~~

(d) ~~This sub-clause (d) relating to Weekly Load Scaling Factor~~Paragraph (d) only applies to the jurisdiction of South Australia.

~~i.~~(i) *AEMO* must approve the calculation of the *load* scaling factor for the ~~*controlled load profile*~~ CLP ~~at a frequency which is~~ at least once every six months.

(ii) For each week, the ~~*Local Network Service Provider*~~ *LNSP* must calculate the *load* scaling factor as follows:

$$(\text{Weekly Load Scaling Factor}) = X * \frac{(\text{Weekly Sample Energy}) * (\text{Annual CL Energy})}{(\text{Annual Sample Meter CL Energy})}$$

where:

Weekly Load Scaling Factor (MWh) = a value calculated to be the total *energy* consumed for a one week period by Accumulation Metered Controlled Loads ~~end-use customers~~ that are *first-tier loads*.

X = the estimated proportion of Accumulation Metered Controlled Loads ~~*end-use customers*~~ that are *first tier loads* determined for the six month period beginning 1 July and 1 January respectively.

Annual CL Energy (MWh) = the annual Controlled Load *energy* of all End ~~-~~Users ~~*customers*~~ for the whole calendar year preceding the regulatory year t.

Annual Sample Meter CL Energy (MWh) = total annual sample *meter* Controlled Load *energy* for the whole calendar preceding regulatory year t.

Weekly Sample Energy (MWh) = the value representing the actual *energy* consumption recorded by the sample *meters* in a one week period.

~~ii.~~(iii) The ~~*Local Network Service Provider*~~ LNSP must send the *load* scaling factor to *AEMO* as an active *first-tier load accumulation metered NMI data stream*, with the Actual Meter Read Date~~*actual reading date*~~ as the last day in the settlement week, at a frequency which is at least once per week.

11.4. Profile Preparation Service - Net System Load Profile

~~**13.4.**~~

~~**13.4.1.** Clause 15.413.4 applies to the jurisdictions of Victoria, New South Wales, South Australia, Queensland, the Australian Capital Territory, and Tasmania.~~

~~**13.4.2.** The requirements for the~~ Profile Preparation Service – Net System Load Profile ~~are~~is to be applied as follows:

(a) In accordance with ~~clause~~ section 5.9.2~~3.10.2~~ of Metrology Procedure: Part A, the form of *profiling* that *AEMO* must use for the *metering installations* to which the *metrology procedure* applies, excluding *metering installations* for Controlled Loads where applicable to a Jurisdiction, is the ~~*Net System Load Profile* (~~NSLP~~)~~.

(b) The NSLP must be calculated by Profile Area as follows:

NSLP for a Profile Area for a ~~*trading interval*~~ TI

$$= \sum_{i=1}^{j} (\text{Energy inflows to the profile area at the TNI level})_i * MLF_i$$

$$+ \sum_{m=1}^{n} (\text{Energy generated within profile area from embedded generation})_m * MLF_m * DLF_m$$

$$- \sum_{s=1}^{t} (\text{Half hourly load in profile area})_s * MLF_s * DLF_s$$

where

MLF = *marginal loss factor* applicable for the *NMI* that is stored in MSATS

DLF = *distribution loss factor* applicable for the *NMI* that is stored in MSATS

i = Each TNI with *energy* inflows to Profile Area

m = Each ~~*Embedded Generator* with~~ *energy generated* by *embedded generating units* within Profile Area

s = Half hourly *loads* in Profile Area except *interval metering data* in respect of *loads* at *child connection points* in an *embedded network*~~, which include:~~

~~• *interval metered second-tier loads;*~~

~~• *interval metered first-tier loads* in accordance with clause 3.6.4 of Metrology Procedure: Part A;~~

~~• unmetered *first-tier* and *second-tier loads*;~~

- *interval metered market loads* that are not *first-tier* or *second-tier loads*;
- where applicable to a participating Jurisdiction, *interval metering data* for *first-tier* and *second-tier controlled loads*; and
- but exclude *child interval metered loads* in an Embedded Network.

11.5. Basic Meter Profiler - Net System Load Profile

13.4.3. The requirements for the Basic Meter Profiler – Net System Load Profile is to be applied as followsare:

(a) In accordance with clause section 5.9.23.10.2 of Metrology Procedure: Part A, AEMO must apply the NSLP, for the Profile Area to which the *NMI* is connected, to the *metering data* for type 6 *metering installations*, in order to obtain *interval metering data*.

(b) The *profile* must be applied as follows:

Half-hourlyInterval metering data for trading interval TIj for NMI Data-stream

$$= \frac{(\text{Accumulation energy data between start date and end date}) * NSLP_j}{\sum_{i=\text{start date}}^{\text{end date}} NSLP_i}$$

(i) where the *accumulated metering data* is based on an Actual Meter Reading, then

start date = 00:00 on the day of the previous *meter* reading, and

end date = the end of the *trading interval* TI commencing at 23:30 on the day prior to the current *meter* reading date.; or

(ii) and where the *accumulated metering data* is an forward Estimate, then:

start date = 00:00 on the first day of the *billing period*, or 00:00 on the day of the previous *meter* reading date (whether actual or forward Estimate), or 00:00 on the first day that the *load* becomes a *second-tier load*, whichever is the later,; and

end date = the end of the *trading interval* TI commencing at 23:30 on the last day of the *billing period*, or the end of the *trading interval* TI commencing at 23:30 on the forward Estimate *meter* reading date, whichever is the earlier.

(c) The resulting half-*hourly*interval *metering data* produced by applying the NSLP is at the *NMI* Data-stream level.

11.6. Start Dates and End Dates

13.5.

13.5.1. For the purpose of clause 153.3.6:

i.(a) (a) If the *accumulated metering data* is based on an Actual Meter Reading:

1.1.1...9(i) The start date is 00.00 on the *day* of the previous mMeter rReading; and

(ii) (2) The end date is the end of the *trading interval* TI commencing at 23.30 on the *day* prior to the current mMeter rReading date; and

(b) (b) If the *accumulated metering data* is based on an forward Estimate where the *estimated metering data* ends on a date in the future:

(i) The start date is the later of:

(A) (A) 00.00 on the first *day* of the *billing period* related to the *profile* period; and

(B) 00.00 on the previous mMeter rReading date (i.e. the start of the *estimated metering data* period).whether actual or forward Estimated; and

(1)(B) (C) 00.00 on the first day on which the load becomes a second-tier load:

The end date is the earlier of:

(ii) (A) the end of the TI trading interval commencing at 23.30 on the last *day* of the *billing period* related to the *profile* period.; and

(A) (B) the end of the TI trading interval commencing at 23.30 on the forward Estimate meter reading date.

14.12. UNMETERED LOADS – DETERMINATION OF METERING DATA

14.1. Application of clause 164

14.1.1. The requirements of clause 1614 apply to the jurisdictions of Victoria, New South Wales, Queensland, South Australia, Tasmania and Australian Capital Territory.

14.2.12.1. Requirement to produce calculated metering data

12.1.1. Agreed Market Loads

14.2.1.

(a) In accordance with clauses S7.36 and S7.42 of the *Rules*NER, half-hourly *trading interval data* is required to be calculated by *NMI* Data-stream for those *loads* that have been classified aswith type 7 *metering installations* in accordance with S7.42 of the *Rules*NER that, subject to clause 164.2.1 (d), are able under relevant legislation or regulation to be classified as *market loads* as agreed between a *Minister* and *AEMO*.

(b) AEMO will *publish* a list of the *loads* that have beenare classified, in accordance with clause 164.2.1 (a), as *market loads* and any amendments to these *loads*will keep this list up to date.

Loads that have been classified, in accordance with clause 164.2.1 (a), as *Market loads* may be either a "controlled *unmetered load*" (for which the *market load* is controlled) or "other *unmetered load*" (for which the *market load* is not controlled).

(c) If there is a Load Table, under clause 164.2.4, an Inventory Table under clause 164.3.3 or clause 164.4.3 and for controlled *unmetered loads*or an On/Off Table, under clause 164.3.4, then a type 7 *metering installation* may be classified as a *market load* in accordance with clause 164.2.1 (a).

12.1.2. Application to Unmetered Devices types

14.2.2.

The agreedA *market load* that is published by *AEMO* can result from the operation of an Unmetered Device. The only *market loads* in the *NEM* where Unmetered Devices are being used are:

- street lights; and
- traffic lights in NSW and SA.

There are two types of Unmetered Devices: Controlled Unmetered Devices and Uncontrolled Unmetered Devices.

will be generic in nature (for example, street lighting). For each agreed *market load* there may be one or more Unmetered dDevice types that are listed in the Load Table developed in accordance with clause 164.2.4.

14.2.3.12.1.3. Application of NMI

(a) *Metering data* for an unmetered *load* is calculated by *NMI* Data-stream. A *NMI* is assigned for each unique combination of:

i.(i) Financially responsible Market ParticipantFRMP;

(ii) End- User Customer;

(iii) Local Network Service ProviderLNSP;

(iv) ~~Transmission Node Identity~~TNI; and

(v) Distribution loss factor.

~~The~~ An unmetered *load NMI* may contain different ~~agreed~~ *market loads* ~~and/~~or different Unmetered ~~d~~Device types, but they must have the same ~~*financially responsible Market* Participant~~FRMP, End ~~-~~User ~~Customer~~, ~~*Local Network Service* Provider~~LNSP, *TNI* and *distribution loss factor*.

~~Where permitted by the *Rules*NER or guidelines issued by *AEMO*, an unmetered *load* may be included in the *NMI* for a related metered *load*, where the number of Unmetered Devices is small, for example watchman lights, and the *energy* consumption of those Unmetered Devices is immaterial relative to the total *energy* consumption for that *NMI*, and the *financially responsible Market* ParticipantFRMP, End- User Customer, *Local Network Service* ProviderLNSP, *TNI* and *distribution loss factor* are the same.~~

12.1.4. Load Table

~~14.2.4.~~

(a) The Load Table must set out:

~~i.~~(i) For each ~~The~~Controlled Unmetered D~~d~~evice, its *load* (which includes any associated control gear, ~~(~~in watts) ~~for controlled unmetered *loads*~~ for use in calculating *interval metering data* ~~for each device type~~ in accordance with ~~clause~~ section 15~~6~~4.3~~. The *load* per device type must be the wattage of the device and associated control gear~~; and

(ii) For each Uncontrolled Unmetered Device, its~~The~~ annual *energy* consumption ~~for other unmetered *loads* by device type~~ in accordance with ~~clause~~ section 16~~4~~.4.1. The annual *energy* consumption is used to calculate the calculated device wattage (in watts) which is used to calculate the *interval metering data* for each device type as follows:

$$(\text{Calculated device wattage})_i = \frac{(\text{device annual energy consumption})_i}{365 * 24}$$

Where *i* = Uncontrolled Unmetered ~~d~~Device type *i*.

(b) AEMO must maintain ~~develop the initial~~ Load Tables ~~in accordance with the *Rules consultation procedures*~~ by:

(i) deleting redundant data; or

(ii) upon request from an interested party to include a new Unmetered Device,

and *publish* updated Load Tables.

~~The initial *load table* must be published by *AEMO*. Changes to the Load Table must be *published* by AEMO. AEMO should remove redundant device types from the published Load Table.~~

(c) No *Registered Participant* may use an Unmetered Device for which there is no *load* data in a Load Table.

(d) Any interested party may request AEMO to consider updating a Load Table in accordance with the Unmetered Device Guideline.

(e) AEMO must consider and *publish* proposals from interested parties to add Unmetered ~~d~~Devices ~~types~~ to ~~the~~ a Load Table.

(f) AEMO must determine ~~whether to add the new device type and its corresponding device *load* or annual *energy* consumption~~whether to update the Load Table taking into account the views of other interested parties. ~~Agreement of device *load* to be added to the NEM Load Table does not replace any obligation for an interested party to obtain appropriate approvals related to the performance and acceptance of use of the device.~~

12.2. Controlled Unmetered Loads

~~CNew device types must be included in the Load Table prior to installation of the device.~~

~~AEMO must develop and publish a guideline for the determination of a *load table* device *load* or annual *energy* consumption. The guideline must be prepared, revised and published by *AEMO* in accordance with the *Rules consultation procedures*.~~

~~Proposals to add a new *load* value for an unmetered device type to the Load Table must be accompanied by a relevant unique description of the device and evidence of the device *load* or *energy* consumption whichever the case may be. Wherever possible, the device *load* should be determined from measurement tests conducted by a *NATA* accredited laboratory or overseas equivalent.~~

~~14.3. Controlled Unmetered Loads~~

~~14.3.1. This clause 16.314.3 is applicable to all agreed "controlled *unmetered loads*".~~

~~14.3.2.~~12.2.1. Metering Data Calculation

(a) The ~~*responsible person*~~ MC must ensure that the *interval metering data* for controlled unmetered *loads*~~, which have been~~ classified as a type 7 *metering installation*~~,~~ are calculated in accordance with the following algorithm:

~~Half-hourly~~Interval metering data for ~~trading interval~~TI~~-~~j for NMI (in watt hours)

$$= \frac{\sum_{i=1}^{n}(k)*(\text{Device wattage})_i*(\text{Device count for NMI})_i*(\text{Period load is switched on})_j*(\text{Trading interval})}{60}$$

where:~~;~~

i = Unmetered Device type

j = ~~*trading interval*~~TI

k = proportion of Unmetered ~~d~~Device attributable to that *NMI*

~~*Trading interval*~~TI is ~~period~~ in minutes

Unmetered Device wattage is determined from the Load Table.

Unmetered Device count is determined from the Inventory Table.

Period load is switched on is determined from the On/Off Table.

12.2.2. Inventory Table

~~14.3.3.~~

(a) For each *NMI*, a separate Inventory Table is required that identifies each Unmetered Device type ~~which~~ that forms part of the ~~*NMI*~~ *load* and for each Unmetered Device type lists:

~~i.~~(i) The Unmetered Device type;

(ii) The form of on/off control – photoelectric cell control, timer control, ripple control or other control;

(iii) If timer control or ripple control, the on/off times for the timer control or the ripple control system ~~controlling device;~~

(iv) If other control, the on/off times;

(v) If a Unmetered Device is shared with another *NMI*, the proportion of *load* that is agreed by affected *Registered Participants* to be attributable to that *NMI* (k). Each k factor will be less than 1. The sum of the k factors for a shared Unmetered Device across each respective *NMI* must be equal to 1;

(vi) If an Unmetered Device is not shared with another *NMI*, the k factor must be equal to 1.

(vii) Number of such Unmetered Devices installed;

(viii) Effective start date – the first day on which that record in the Inventory Table is to be included in the calculation of *metering data* for that *NMI*;

(ix) Effective end date – the last day on which that record in the Inventory Table is to be included in the calculation of *metering data* for that *NMI*; and

(x) Last change date – the date that record in the Inventory Table was most recently created or modified.

(b) Each Unmetered Device in the Inventory Table is a unique combination of physical hardware, time control classification and shared portion. For example, if a Unmetered Device is shared with another *NMI*, the individual portions of the Unmetered Device(s) must be included in the Inventory Table as a separate Unmetered Device type on each *NMI*.

(c) Each ~~*responsible person*~~MC must develop the initial Inventory Table for the *NMI*s for which it is responsible. The initial Inventory Table must be agreed by ~~the~~ each affected *Registered Participant~~s~~*, AEMO and the relevant End ~~-~~User ~~Customer~~.

(d) Each ~~*responsible person*~~ MC must use ~~reasonable endeavours to~~ update the Inventory Table~~,~~ for the *NMI*s for which it is responsible~~,~~ on at least a monthly basis ~~for any additions, deletions and modifications~~ to ensure that the accuracy requirements in ~~clause~~ section 5.6.4~~3.7.7~~ of Metrology Procedure: Part A are met. ~~Such additions, deletions or modifications~~Any changes to the Inventory Table may only be made on a retrospective basis where:

~~i.~~(i) Agreed by the ~~responsible person~~ MC and the affected *Registered Participants*; or

(ii) Necessary to comply with clause 7.9.4~~5~~ of the ~~*Rules*~~NER.

(e) The ~~*responsible person*~~ MC must communicate any material changes to the Inventory Table to the affected *Registered Participants*.

(f) The ~~*responsible person*~~ MC must provide the Inventory Table to relevant *Registered Participants* when requested.

12.2.3. On/Off Table

~~14.3.4.~~

(a) The form of on/off control may be:

~~i.~~(i) Photoelectric cell control;

(ii) Timer control, or ripple control; or

(iii) Other control.

12.2.4. Photoelectric cell control

~~14.3.5.~~

(a) If the on/off times for an Unmetered Device ~~is~~ are controlled by a photoelectric cell~~, then~~:

~~i.~~(i) On time = sunset time + ON delay

(ii) Off time = sunrise time + OFF delay.

The ON delay and OFF delay are set out in ~~clause~~ section 16.5~~14.5~~.

(b) The ~~responsible person~~ MC must ensure that the appropriate sunset times and sunrise times are obtained from the Australian Government Geoscience website

(www.ga.gov.au/geodesy/astro/sunrise.jsp), based on the longitude and latitude of the relevant town as specified below~~, and *Eastern Standard Time*~~:

Jurisdiction	LNSP	Town	Latitude	Longitude
Victoria	CitiPower Pty ~~Ltd~~	Melbourne	37 deg 49 min S	144 deg 58 min E
Victoria	Jemena Electricity Networks (Vic) Ltd	Essendon	37 deg 44 min S	144 deg 54 min E
Victoria	Powercor Australia Ltd	Ballarat	37 deg 30 min S	143 deg 47 min E
Victoria	AusNet Electricity Services Pty Ltd	Morwell	38 deg 13 min S	146 deg 25 min E
Victoria	United Energy Distribution Pty Ltd	Dandenong	38 deg 01 min S	145 deg 12 min E
NSW	Ausgrid	Sydney	33 deg 52 min S	151 deg 12 min E
NSW	Endeavour Energy	Cecil Park	33 deg 52 min S	150 deg 50 min E
NSW	Essential Energy	Armidale	30 deg 31 min S	151 deg 40 min E
NSW	Essential Energy	Broken Hill	31 deg 57 min S	141 deg 27 min E
NSW	Essential Energy	Dubbo	32 deg 15 min S	148 deg 36 min E
NSW	Essential Energy	Wagga Wagga	35 deg 06 min S	147 deg 22 min E
SA	SA Power Networks	Adelaide	34 deg 55 min S	138 deg 35 min E
ACT	~~ActewAGL~~ Actew Distribution Ltd and Jemena Networks (ACT) Pty Ltd trading as ActewAGL Distribution	Canberra	35 deg 20 min S	149 deg 10 min E
Queensland	Energex Limited	Brisbane	27 deg 28 min S	153 deg 01 min E
Queensland	Ergon Energy Corporation Limited	Townsville	19 deg 15 min S	146 deg 48 min E
Queensland	Ergon Energy Corporation Limited	Toowoomba	27 deg 33 min S	151 deg 57 min E
Tasmania	~~Aurora Distribution~~Tasmanian Networks Pty Ltd	Ross	42 deg 01 min S	147 deg 29 min E

(c) The ~~*responsible* person~~MC must ensure that the period that the *load* is switched on during a TI ~~*trading interval*~~ is calculated as follows:

Trading interval	Period load is switched on
For the TIs ~~*trading intervals*~~ commencing after sunset and finishing prior to sunrise	Period *load* is switched on = 1
For the TIs ~~*trading intervals*~~ commencing after sunrise and finishing prior to sunset	Period *load* is switched on = 0
For the TI ~~*trading interval*~~ during which the sunset occurs	$(\text{Period load is switched on}) = \frac{(\text{End time of trading interval}) - (\text{Time of sunset})}{30}$

Trading interval	Period load is switched on
For the TI ~~*trading interval*~~ during which the sunrise occurs	$(\text{Period load is switched on}) = \frac{(\text{Time of sunrise}) - (\text{Start time of trading interval})}{30}$

(d) Should testing on the operation of photoelectric cells by an independent party, agreed to by the ~~*responsible person*~~ MC, affected *Registered Participants*, AEMO and relevant End ~~-~~User ~~Customer~~, indicate that the on/off times for an Unmetered Device controlled by a photoelectric cell are influenced materially and consistently by other variables, ~~then~~ *AEMO* shall revise this Procedure ~~the *metrology procedure*~~ accordingly.

12.2.5. Timer control

~~14.3.6.~~

(a) If the on/off times for an Unmetered Device is controlled by a timer or ripple injection system~~, then~~:

~~i.~~(i) On time = ON time set on timer or ripple injection system

(ii) Off time = OFF time set on timer or ripple injection system.

(b) The ~~*responsible person*~~*MC* must ensure that the period that the *load* is switched on during a *trading interval* is calculated as follows:

Trading interval	Period load is switched on
For the TIs ~~*trading intervals*~~ commencing after on time and finishing prior to off time	Period *load* is switched on = 1
For the TIs ~~*trading intervals*~~ commencing after off time and finishing prior to on time	Period *load* is switched on = 0
For the TI ~~*trading interval*~~ during which the on time occurs	$(\text{Period load is switched on}) = \frac{(\text{End time of trading interval}) - (\text{On time})}{30}$
For the TI ~~*trading interval*~~ during which the off time occurs	$(\text{Period load is switched on}) = \frac{(\text{Off time}) - (\text{Start time of trading interval})}{30}$

12.2.6. Other control

~~14.3.7.~~

(a) Where the on/off times for an Unmetered Device are not in accordance with ~~clause~~ section 16.3.5~~14.3.5~~ or ~~clause~~ 16.3.6~~14.3.6~~, ~~then~~ the following alternative forms of control may be used:~~.~~

~~i.~~(i) On time = sunset time + ON delay or ON time set on timer or ripple injection system.

(ii) Off time = sunrise time + OFF delay or OFF time set on timer or ripple injection system or a fixed duration after ON time.

(b) Where sunrise or sunset times are used, the time is determined in accordance with ~~clause~~ section 16.3.5(b) ~~14.3.5(b)~~.

(c) The ~~*responsible person*~~*MC* must ensure that the period that the *load* is switched on during a *trading interval* is calculated as follows:

Trading interval	Period load is switched on
For the TIs ~~*trading intervals*~~ commencing after on time and finishing prior to off time	Period *load* is switched on = 1
For the TIs ~~*trading intervals*~~ commencing after off time and finishing prior to on time	Period *load* is switched on = 0
For the TI ~~*trading interval*~~ during which the on time occurs	$(\text{Period load is switched on}) = \frac{(\text{End time of trading interval}) - (\text{On time})}{30}$
For the TI ~~*trading interval*~~ during which the off time occurs	$(\text{Period load is switched on}) = \frac{(\text{Off time}) - (\text{Start time of trading interval})}{30}$

~~14.4.~~12.3. Other unmetered loads

~~14.4.1. This clause 16.414.4 is applicable to all agreed "other *unmetered loads*".~~ Other unmetered *loads*~~"~~ do not have a constant *load* and, therefore, the *energy* ~~is~~ calculat~~ed~~ion is based on an annual *energy* consumption determined by AEMO in accordance with ~~clause~~ section 16~~4~~.2.4.

12.3.1. Energy calculation

~~14.4.2.~~

(a) The ~~*responsible person*~~ *MC* must ensure that the *interval metering data* for other unmetered *loads*~~, which have been~~ classified as a type 7 *metering installation*~~,~~ ~~is~~ are calculated in accordance with the following algorithm~~.~~:

~~Half-hourly~~Interval metering data for ~~trading interval~~ TIj for NMI (in watt hours)

$$= \frac{\sum_{i=1}^{n}(k)*(\text{Device wattage})_i*(\text{Device count for NMI})_i*(\text{Period load is switched on})_j*(\text{Trading interval})}{60}$$

where:~~;~~

i = Unmetered Device type

j = ~~*trading interval*~~ TI

k = proportion of Unmetered Device attributable to that *NMI*

~~*Trading* interval~~TI is ~~period~~ in minutes

Unmetered Device wattage is determined from the Load Table.

Unmetered Device count is determined from the Inventory Table.

Period *load* is switched on is determined from the On/Off Table.

12.3.2. Inventory Table

~~14.4.3.~~

(a) For each *NMI*, a separate Inventory Table is required that identifies each Unmetered Device type ~~which~~ that forms part of the *NMI load* and for each Unmetered Device type lists:

~~i.~~(i) The Unmetered Device type;

~~ii.~~(ii) The form of on/off control (24 hours per day);

~~iii.~~(iii) If a Unmetered Device is shared with another *NMI*, the proportion of *load* that is agreed by affected *Registered Participants* to be attributable to that *NMI* (k). Each k factor will be less than 1. The sum of the k factors for a shared Unmetered Device across each respective *NMI* must be equal to 1;

~~iv.~~(iv) If an Unmetered Device is not shared with another *NMI*, the k factor must be equal to 1.

~~v.~~(v) Number of such Unmetered Devices installed;

~~vi.~~(vi) Effective start date – the first day on which that record in the Inventory Table is to be included in the calculation of *metering data* for that *NMI*;

~~vii.~~(vii) Effective end date – the last day on which that record in the Inventory Table is to be included in the calculation of *metering data* for that *NMI*; and

~~viii.~~(viii) Last change date – the date that record in the Inventory Table was most recently created or modified.

(b) Each Unmetered Device in the Inventory Table is a unique combination of physical hardware, time control classification and shared portion. For example, if an Unmetered Device is shared with another *NMI*, the individual portions of the Unmetered Device(s)

shall be included in the Inventory Table as a separate Unmetered Device type on each *NMI*.

(c) Each *responsible person* MC must develop the initial Inventory Table for the *NMI*s for which it is responsible. The initial Inventory Table must be agreed by with the affected *Registered Participants, AEMO* and the relevant End -User Customer.

(d) Each *responsible* personMC must use reasonable endeavours to update the Inventory Table, for the *NMI*s for which it is responsible, on at least a monthly basis for any additions, deletions and modifications to ensure that the accuracy requirements in clause section 5.6.43.7.7 of Metrology Procedure: Part A are met. Such additions, deletions or modificationsAny changes to the Inventory Table may only be made on a retrospective basis where:

i.(i) Agreed by the responsible person *MC* and the affected *Registered Participants*; or

(ii) Necessary to comply with clause 7.9.45 of the *Rules*NER.

(e) The *responsible person* *MC* must communicate any material changes to the Inventory Table to the affected *Registered Participants*.

(f) The *responsible person*MC must provide the Inventory Table to relevant *Registered Participants* when requested.

12.3.3. On/Off Table

14.4.4.

(a) Other unmetered *loads* are assumed to operate 24 hours per day.

(b) For each *trading* intervalTI:

Period *load* is switched on = 1.

12.4. ON delay and OFF delay

14.5.

This clause 16.514.5 applies only to the jurisdiction of the Australian Capital Territory. For the jurisdictions ofIn Victoria, New South WalesNSW, Queensland, Tasmania and South Australia the ON and OFF delays are zero.

14.5.1. In the ACT:

(a) The *responsible person* MC must use the ON delay and OFF delay for each day of the year as provided in the following tables, when determining the on time and off time of photoelectric cells in accordance with clause section 16.3.514.3.5.

January

Day	ON delay (minutes)	OFF delay (minutes)	Day	ON delay (minutes)	OFF delay (minutes)
January 1	20	21	January 16	19	20
January 2	19	20	January 17	19	20
January 3	19	20	January 18	19	20
January 4	19	20	January 19	19	20
January 5	19	20	January 20	19	20
January 6	19	20	January 21	19	20
January 7	19	20	January 22	19	20
January 8	19	20	January 23	19	20
January 9	19	20	January 24	19	20
January 10	19	20	January 25	18	20
January 11	19	20	January 26	18	20
January 12	19	20	January 27	18	20
January 13	19	20	January 28	18	20
January 14	19	20	January 29	18	20
January 15	19	20	January 30	18	20
			January 31	18	20

February

Day	ON delay (minutes)	OFF delay (minutes)	Day	ON delay (minutes)	OFF delay (minutes)
February 1	18	20	February 15	18	20
February 2	18	20	February 16	17	20
February 3	18	20	February 17	17	20
February 4	18	20	February 18	17	20
February 5	18	20	February 19	17	20
February 6	18	20	February 20	17	20
February 7	18	20	February 21	17	20
February 8	18	20	February 22	17	20
February 9	18	20	February 23	17	20
February 10	18	20	February 24	17	20
February 11	18	20	February 25	17	20
February 12	18	20	February 26	17	20
February 13	18	20	February 27	17	20
February 14	18	20	February 28	17	20
			February 29	17	20

March

Day	ON delay (minutes)	OFF delay (minutes)	Day	ON delay (minutes)	OFF delay (minutes)
March 1	17	20	March 16	16	19
March 2	17	20	March 17	16	19
March 3	17	20	March 18	16	19
March 4	17	19	March 19	16	19
March 5	17	19	March 20	16	19
March 6	17	19	March 21	16	19
March 7	17	19	March 22	16	19
March 8	17	19	March 23	16	19
March 9	17	19	March 24	16	19
March 10	17	19	March 25	16	19
March 11	16	19	March 26	16	19
March 12	16	19	March 27	16	19
March 13	16	19	March 28	16	19
March 14	16	19	March 29	16	19
March 15	16	19	March 30	16	19
			March 31	16	19

April

Day	ON delay (minutes)	OFF delay (minutes)	Day	ON delay (minutes)	OFF delay (minutes)
April 1	16	19	April 16	15	19
April 2	16	19	April 17	15	19
April 3	15	19	April 18	15	19
April 4	15	19	April 19	15	19
April 5	15	19	April 20	15	19
April 6	15	19	April 21	15	19
April 7	15	19	April 22	15	19
April 8	15	19	April 23	15	19
April 9	15	19	April 24	15	19
April 10	15	19	April 25	15	19
April 11	15	19	April 26	14	19
April 12	15	19	April 27	14	19
April 13	15	19	April 28	14	19
April 14	15	19	April 29	14	19
April 15	15	19	April 30	14	19

May

Day	ON delay (minutes)	OFF delay (minutes)	Day	ON delay (minutes)	OFF delay (minutes)
May 1	14	19	May 16	14	18
May 2	14	19	May 17	14	18
May 3	14	19	May 18	14	18
May 4	14	18	May 19	13	18
May 5	14	18	May 20	13	18
May 6	14	18	May 21	13	18
May 7	14	18	May 22	13	18
May 8	14	18	May 23	13	18
May 9	14	18	May 24	13	18
May 10	14	18	May 25	13	18
May 11	14	18	May 26	13	18
May 12	14	18	May 27	13	18
May 13	14	18	May 28	13	18
May 14	14	18	May 29	13	18
May 15	14	18	May 30	13	18
			May 31	13	18

June

Day	ON delay (minutes)	OFF delay (minutes)	Day	ON delay (minutes)	OFF delay (minutes)
June 1	13	18	June 16	12	18
June 2	13	18	June 17	12	18
June 3	13	18	June 18	12	18
June 4	13	18	June 19	12	18
June 5	13	18	June 20	12	18
June 6	13	18	June 21	12	18
June 7	13	18	June 22	12	18
June 8	13	18	June 23	12	18
June 9	13	18	June 24	12	18
June 10	12	18	June 25	12	18
June 11	12	18	June 26	12	18
June 12	12	18	June 27	12	18
June 13	12	18	June 28	12	18
June 14	12	18	June 29	12	18
June 15	12	18	June 30	12	18

July

Day	ON delay (minutes)	OFF delay (minutes)	Day	ON delay (minutes)	OFF delay (minutes)
July 1	12	18	July 16	12	18
July 2	12	18	July 17	12	18
July 3	12	18	July 18	12	18
July 4	12	18	July 19	12	18
July 5	12	18	July 20	12	18
July 6	12	18	July 21	13	18
July 7	12	18	July 22	13	18
July 8	12	18	July 23	13	18
July 9	12	18	July 24	13	18
July 10	12	18	July 25	13	18
July 11	12	18	July 26	13	18
July 12	12	18	July 27	13	18
July 13	12	18	July 28	13	18
July 14	12	18	July 29	13	18
July 15	12	18	July 30	13	18
			July 31	13	18

August

Day	ON delay (minutes)	OFF delay (minutes)	Day	ON delay (minutes)	OFF delay (minutes)
August 1	13	18	August 16	14	18
August 2	13	18	August 17	14	18
August 3	13	18	August 18	14	18
August 4	13	18	August 19	14	18
August 5	13	18	August 20	14	18
August 6	13	18	August 21	14	18
August 7	13	18	August 22	14	18
August 8	13	18	August 23	14	18
August 9	13	18	August 24	14	18
August 10	13	18	August 25	14	18
August 11	13	18	August 26	14	18
August 12	14	18	August 27	14	19
August 13	14	18	August 28	14	19
August 14	14	18	August 29	14	19
August 15	14	18	August 30	14	19
			August 31	14	19

September

Day	ON delay (minutes)	OFF delay (minutes)	Day	ON delay (minutes)	OFF delay (minutes)
September 1	14	19	September 16	15	19
September 2	14	19	September 17	15	19
September 3	14	19	September 18	15	19
September 4	15	19	September 19	15	19
September 5	15	19	September 20	15	19
September 6	15	19	September 21	15	19
September 7	15	19	September 22	15	19
September 8	15	19	September 23	15	19
September 9	15	19	September 24	15	19
September 10	15	19	September 25	15	19
September 11	15	19	September 26	15	19
September 12	15	19	September 27	16	19
September 13	15	19	September 28	16	19
September 14	15	19	September 29	16	19
September 15	15	19	September 30	16	19

October

Day	ON delay (minutes)	OFF delay (minutes)	Day	ON delay (minutes)	OFF delay (minutes)
October 1	16	19	October 16	16	19
October 2	16	19	October 17	16	19
October 3	16	19	October 18	16	19
October 4	16	19	October 19	16	19
October 5	16	19	October 20	17	19
October 6	16	19	October 21	17	19
October 7	16	19	October 22	17	19
October 8	16	19	October 23	17	19
October 9	16	19	October 24	17	19
October 10	16	19	October 25	17	19
October 11	16	19	October 26	17	19
October 12	16	19	October 27	17	20
October 13	16	19	October 28	17	20
October 14	16	19	October 29	17	20
October 15	16	19	October 30	17	20
			October 31	17	20

November

Day	ON delay (minutes)	OFF delay (minutes)	Day	ON delay (minutes)	OFF delay (minutes)
November 1	17	20	November 16	18	20
November 2	17	20	November 17	18	20
November 3	17	20	November 18	18	20
November 4	17	20	November 19	18	20
November 5	17	20	November 20	18	20
November 6	17	20	November 21	18	20
November 7	17	20	November 22	18	20
November 8	17	20	November 23	18	20
November 9	17	20	November 24	18	20
November 10	17	20	November 25	18	20
November 11	17	20	November 26	18	20
November 12	18	20	November 27	18	20
November 13	18	20	November 28	18	20
November 14	18	20	November 29	18	20
November 15	18	20	November 30	18	20

December

Day	ON delay (minutes)	OFF delay (minutes)	Day	ON delay (minutes)	OFF delay (minutes)
December 1	18	20	December 16	19	20
December 2	18	20	December 17	19	20
December 3	18	20	December 18	19	20
December 4	19	20	December 19	19	20
December 5	19	20	December 20	19	20
December 6	19	20	December 21	19	20
December 7	19	20	December 22	19	20
December 8	19	20	December 23	19	20
December 9	19	20	December 24	19	20
December 10	19	20	December 25	19	20
December 11	19	20	December 26	19	20
December 12	19	20	December 27	20	21
December 13	19	20	December 28	20	21
December 14	19	20	December 29	20	21
December 15	19	20	December 30	20	21
			December 31	20	21

~~14.6.~~12.5. Traffic signal dimming

~~14.6.1. Application of clause 164.6~~

(a) ~~This clause 164.6~~Section 15.5 applies from 1 July 2015~~only to Jurisdictions~~ where traffic signals are classified as a *market load*~~.~~ .

~~Traffic signals that are dimmed have characteristics of both "controlled *unmetered loads*" and "uncontrolled *unmetered loads*".~~ These ~~traffic signals~~ *loads* are similar to "controlled *unmetered loads*" as they have specifically defined periods that *calculated metering data* is based on full *load* values and dimmed *load* values. These *loads* are also similar to "uncontrolled *unmetered loads*" as they do not have a constant *load* and *calculated metering data* is based on an annual *energy* consumption for the *load.*

~~**(a) Note:**~~

~~**(b) The effective date of clause 164.6 is 1 July 2015.**~~

~~**(c) The methodology for production of *calculated metering data* for dimmed traffic signals must be applied to periods from the clause 164.6 effective date stated in (b).**~~

~~**(d) Revision of *calculated metering data* for periods before the clause 164.6 effective date stated in (b) must be undertaken in accordance with the methodology detailed in clause 164.4.**~~

12.5.1. Metering Data Calculation

~~1.1.2~~

(a) The ~~*responsible* person~~MC must ensure that the *interval metering data* for traffic signal unmetered *loads*~~, which have been~~ classified as a type 7 *metering installation* and can be dimmed, are calculated in accordance with the following algorithm:

(~~Half-*hourly*~~*Interval metering data* for full wattage ~~*trading interval*~~ TI*j* for *NMI* – in watt hours) + (*Interval* ~~Half-hourly~~ *metering data* for dimmed wattage ~~*trading interval*~~ TI*j* for *NMI* – in watt hours).

$$= \frac{\sum_{i=1}^{n}(k) * (\text{Unmetered Device full wattage})_i * (\text{Unmetered Device count for NMI})_i * (\text{Period full wattage switced on})_j * (\cancel{\text{Trading interval}}\text{TI})}{60}$$

$$+ \frac{\sum_{i=1}^{n}(k) * (\text{Unmetered Device dimmed wattage})_i * (\text{Unmetered Device count for NMI})_i * (\text{Period dimmed wattage on})_j * (\text{T}\cancel{\text{rading interval}}\text{I})}{60}$$

where;

i = Unmetered Device type

j = ~~*trading interval*~~TI

k = proportion of Unmetered Device attributable to that *NMI*

~~*Trading interval*~~ TI is ~~period~~ in minutes

Unmetered Device full wattage is determined from the Load Table.

Unmetered Device dimmed wattage is determined from the Load Table.

Unmetered Device count is determined from the Inventory Table.

Period full wattage switched on is determined from On/Off Table.

Period dimmed wattage switched on is determined from On/Off Table.

12.5.2. Inventory Table

~~1.1.3~~

(a) For each *NMI*, a separate Inventory Table is required that identifies each Unmetered Device type ~~which~~ that forms part of the *NMI load* and for each Unmetered Device type lists:

i.(i) The Unmetered Device type;

ii.(ii) The form of on/off control – photoelectric cell control or timer control;

iii.(iii) If photoelectric cell control, sunset and sunrise times;

iv.(iv) If timer control, the on/off times for the timer controlcontrolling device;

v.(v) If an Unmetered Device is shared with another *NMI*, the proportion of *load* that is agreed by affected *Registered Participants* to be attributable to that *NMI* (k). Each k factor will be less than 1. The sum of the k factors for a shared Unmetered Device across each respective *NMI* must be equal to 1;

vi.(vi) Number of such Unmetered Devices installed;

vii.(vii) Effective start date – the first *day* on which that record in the Inventory Table is to be included in the calculation of *metering data* for that *NMI*;

viii.(viii) Effective end date – the last *day* on which that record in the Inventory Table is to be included in the calculation of *metering data* for that *NMI*; and

ix.(ix) Last change date – the date that record in the Inventory Table was most recently created or modified.

(b) Each Unmetered Device in the Inventory Table is a unique combination of physical hardware, time control classification and shared portion, for example, if an Unmetered Device is shared with another *NMI*, the individual portions of the Unmetered Device(s) must be included in the Inventory Table as a separate Unmetered Device type.

(c) Each *responsible person* MC must develop the initial Inventory Table for the *NMI*s for which it is responsible. The initial Inventory Table must be agreed by the affected *Registered Participants*, *AEMO* and the relevant End- User Customer.

(d) Each *responsible* personMC must use reasonable endeavours to update the Inventory Table, for the *NMI*s for which it is responsible, on at least a monthly basis for any additions, deletions and modifications to ensure that the accuracy requirements in clause section 5.6.43.7.7 of Metrology Procedure: Part A are met. Such additions, deletions or modificationschanges to the Inventory Table may only be made on a retrospective basis where:

i.(i) Agreed by the responsible personMC and the affected Registered Participants; or

ii.(ii) Necessary to comply with clause 7.9.45 of the RulesNER.

(e) The *responsible person* MC must communicate any material changes to the *inventory table* to the affected *Registered Participants*.

(f) The *responsible* personMC must provide the Inventory Table to relevant *Registered Participants* when requested.

12.5.3. On/Off Table

14.6.2.

(a) The form of on/off control may be:

i.(i) Photoelectric cell control; or

(ii) Timer control.

12.5.4. Photoelectric cell control

14.6.3.

(a) If the on/off times for the dimming operation is controlled by a photoelectric cell, then:

i.(i) Dimming on time = sunset time

(ii) Dimming off time = sunrise time.

(b) The *responsible person* MC must ensure that the appropriate sunset times and sunrise times are obtained from the Australian Government Geoscience website

(www.ga.gov.au/geodesy/astro/sunrise.jsp), based on the longitude and latitude of the relevant town as specified in ~~clause~~ section 164.3.5(b)~~, and *Eastern Standard Time*~~:.

(c) The ~~*responsible person*~~ MC must ensure that the period that the *load* is operated at dimmed wattage during a ~~*trading interval*~~TI and the period that the *load* is operated at full wattage during a ~~*trading interval*~~ TI are calculated as follows:

Trading interval	Period load is switched on
For the TIs ~~*trading intervals*~~ commencing after sunset and finishing prior to sunrise	Period dimmed wattage is switched on = 1
For the TIs ~~*trading intervals*~~ commencing after sunrise and finishing prior to sunset	Period full wattage is switched on = 1
For the TI ~~*trading interval*~~ during which the sunset occurs	$(\text{Period dimmed wattage switched on}) = \frac{(\text{End time of trading interval}) - (\text{Time of sunset})}{30}$ $(\text{Period full wattage switched on}) = 1 - \left(\frac{(\text{End time of trading interval}) - (\text{Time of sunset})}{30}\right)$
For the TI ~~*trading interval*~~ during which the sunrise occurs	$(\text{Period dimmed wattage switched on}) = \frac{(\text{Time of sunrise}) - (\text{Start time of trading interval})}{30}$ $(\text{Period full wattage switched on}) = 1 - \left(\frac{(\text{Time of sunrise}) - (\text{Start time of trading interval})}{30}\right)$

(d) Should testing on the operation of photoelectric cells by an independent party, agreed to by the ~~*responsible person*~~ MC, affected *Registered Participants*, AEMO and relevant End ~~-~~User ~~Customer~~, indicate that the on/off times for an Unmetered Device controlled by a photoelectric cell are influenced materially and consistently by other variables, ~~then~~ AEMO shall revise this Procedure~~the *metrology procedure*~~ accordingly.

12.5.5. Timer control

~~**14.6.4.**~~

(a) If the on/off times for the dimming operation is controlled by a timer~~, then~~:

~~**i.**~~(i) On time = ON time set on timer (dimming operation ON)

~~**ii.**~~(ii) Off time = OFF time set on timer (dimming operation OFF)

(b) The ~~*responsible person*~~ MC must ensure that the period that the *load* is switched on during a *trading interval* is calculated as follows:

Trading interval	**Period load is switched on**
For the TIs ~~*trading intervals*~~ commencing after on time and finishing prior to off time	Period dimmed wattage is switched on = 1
For the TIs ~~*trading intervals*~~ commencing after off time and finishing prior to on time	Period full wattage is switched on = 1
For the TI ~~*trading interval*~~ during which the on time occurs	$(\text{Period dimmed wattage switched on}) = \frac{(\text{End time of } \cancel{\text{trading interval}}\text{TI}) - (\text{On time})}{30}$ $(\text{Period full wattage switched on}) = 1 - \left(\frac{(\text{End time of TI}\cancel{\text{trading interval}}) - (\text{On time})}{30}\right)$

Trading interval	Period load is switched on
For the TI ~~*trading interval*~~ during which the off time occurs	$(\text{Period dimmed wattage switched on}) = \frac{(\text{Off time}) - (\text{Start time of TI}\cancel{\text{trading interval}})}{30}$ $(\text{Period full wattage switched on}) = 1 - \left(\frac{(\text{Off time}) - (\text{Start time of }\cancel{\text{trading interval}}\text{TI})}{30}\right)$

~~15.~~13. SUBSTITUTION ~~READS~~ FOR TRANSFER

~~15.1.~~13.1. Application ~~of clause 15~~

~~15.1.1.~~ ~~The requirements of clause~~Sections 17~~5~~.2 and 17~~5~~.3 apply during a ~~*retailer of last resort*~~ RoLR Event or where a ~~participating~~ Jurisdiction has requested AEMO to undertake End ~~-~~Use ~~Customer~~ transfers requiring ~~*metering data*~~ Substitutions.

~~15.1.2. The requirements of clause 175.2 are applicable to all type 4A and 5 *metering installations* requiring the management of *metering data* Substitutions and forward Estimations for End-Use Customer transfer.~~

~~15.1.3. The requirements of clause 175.3 are applicable to all type 6 *metering installations* requiring the management of *metering data* Substitutions and forward Estimations for End-Use Customer transfer.~~

13.2. Manually read interval~~Type 4A and 5~~ metering installations

~~15.2.~~

~~15.2.1.~~ The ~~*Metering Data Provider*~~MDP must ensure the correct management of the *NMI* Data stream status ~~within MSATS~~ for the *connection points* concerned that meets Jurisdictional requirements for *settlements* and *profile* preparation.

~~15.2.2.~~ The ~~*Metering Data Provider*~~MDP must ensure that *metering data* is provided to the ~~old~~ Current ~~*financially responsible Market Participant*~~FRMP up to the transfer date.

~~15.2.3.~~ The ~~*Metering Data Provider*~~MDP must ensure that *metering data* is provided to the New ~~*financially responsible Market Participant*~~FRMP from the transfer date which may include provision of a new ~~forward~~ Estimation.

~~15.2.4.~~ The ~~*Metering Data Provider*~~MDP must ensure ~~forward~~ Estimations are undertaken in accordance with ~~clause~~ Section 4~~5~~3 ~~of Metrology Procedure: Part B~~.

~~15.2.5.~~ The ~~*Metering Data Provider*~~MDP may Substitute the *metering data* up to the transfer date in order to facilitate End ~~-~~User ~~Customer end~~ billing. Notification to the ~~*Local Network Service Provider*~~LNSP, ~~*Local Retailer*~~LR, the ~~old~~ Current FRMP and New ~~*financially responsible Market Participant*~~FRMP is ~~via the *metering data* file, that has a format compliant with the Meter Data File Format Specification~~in MDFF, with the following configuration:

(a) Utilise a reason code of “27”, with an entry in the free text field of “AEMO directed substitution”, and

(b) Utilise a transaction code of N.

~~15.2.6.~~ The ~~*Metering Data Provider*~~MDP must ensure that all *substituted metering data* is replaced by ~~actual~~ *metering data* based on Actual Meter Readings. ~~as per the normal manual *meter* reading processes.~~

13.3. Manually read accumulation ~~Type 6~~ metering installations

~~15.3.~~

~~**15.3.1.**~~ The ~~*Metering Data Provider*~~MDP must ensure the correct management of the *NMI* Data stream status ~~within MSATS~~ for the *connection points* concerned that meets Jurisdictional requirements for *settlements* and *profile* preparation.

~~**15.3.2.**~~ The ~~*Metering Data Provider*~~MDP must ensure that *metering data* is provided to the ~~old~~ Current ~~*financially responsible Market Participant*~~FRMP up to the transfer date.

~~**15.3.3.**~~ The ~~*Metering Data Provider*~~MDP must provide the necessary ~~type 6 *substitued*~~*substituted* ~~*tion*~~ *metering data* ~~*readings*~~ labelled with a 'F~~inal~~' quality flag.

~~**15.3.4.**~~ The ~~*Metering Data Provider*~~MDP must ensure that *metering data* is provided to the New ~~*financially responsible Market Participant*~~FRMP from the transfer date, which may include provision of a new ~~forward~~ Estimation.

~~**15.3.5.**~~ The ~~*Metering Data Provider*~~MDP must ensure ~~forward~~ Estimations are undertaken in accordance with ~~clause~~ section 5~~6~~4 ~~of Metrology Procedure: Part B~~.

~~**15.3.6.**~~ The ~~*Metering Data Provider*~~MDP must calculate the final *substituted metering data* ~~*ion reading value*~~ in accordance with ~~clause~~ section 5~~6~~4 ~~of Metrology Procedure: Part B~~.

~~**15.3.7.**~~ The ~~Metering Data Provider~~MDP must notify the ~~*Local Network Service* Provider~~LNSP, ~~*Local* Retailer~~LR, the ~~old~~ Current and New ~~*financially responsible Market Participant*~~FRMP for the *connection point* of the ~~data~~ Substitution ~~undertaken~~. Notification is via the *metering data* file ~~, that has a format compliant with the Meter Data File Format Specification,~~ in MDFF with the following configuration:

(a) Utilise a reason code of "27", with an entry in the free text field of "AEMO directed substitution"; and

(b) Utilise a transaction code of 'N'.

~~**15.3.8.**~~ The ~~*Metering Data Provider*~~MDP must Validate the final *s*~~*S*~~*ubstituted metering data* ~~readings,~~ recalculate and update the *metering data* ~~values~~ where:

(a) The final Substitution is found to be greater than the Actual Metering ~~*data*~~ Reading when next obtained; or

(b) Following consultation and agreement ~~from~~ with the ~~old~~ Current and New ~~*financially responsible Market Participant*~~FRMP, the ~~*Local Retailer*~~LR and ~~the *Local Network Service Provider*~~ LNSP for the *connection point* a new agreed value as per ~~clause~~ Section 6.4.3~~4.3.4~~ (type 64) must be provided.