

PUBLIC

Retail Manual

Retail Manual on Metering Standards and Procedures 1.0

Abstract	This manual presents the metering procedures and standards for the Retail Market.
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SECTION 1 INTRODUCTION**1.1 PURPOSE**

Pursuant to Clause 4.9 of the *Retail Rules*, the *Central Registration Body* shall formulate and *publish a market manual* that:

- a) Describes the class and accuracy requirements of *meters*;
- b) Defines the procedures that *Retail Metering Services Providers* must undertake to validate, estimate, correct or substitute erroneous meter data;
- c) Defines the information that must be contained in the *installation database* of a *Retail Metering Services Provider*, and
- d) Other relevant procedures to implement the metering provisions of the *Retail Rules*

As compiled, this Manual consolidates the pertinent metering procedures and standards applicable for *Contestable Customers* and for the reference of *Distribution Utilities*¹, *Suppliers*, *Retail Metering Services Providers*, other *WESM Members* and the public. More specifically, this Manual, in compliance to Clause 4.9 of the *Retail Rules*, will:

- a) Define the *metering installation* standards that a *Contestable Customer meter installation* must comply with to be eligible for registration in accordance with *Retail Rules* Clause 4.3.2;
- b) Describe the standard numbering system that *Retail Metering Services Providers* must follow when numbering and identifying their *metering installations*;
- c) Describe the procedures the *Central Registration Body*, *Contestable Customers*, and *Suppliers* must follow when registering *Contestable Customer metering installations* in the WESM in accordance with *Retail Rules* Clause 4.3.2.1;
- d) Describe the procedures that the *Central Registration Body* and the *Retail Metering Services Providers* must follow to ensure *Contestable Customer metering data* is collected in a timely and efficient manner;

¹ As the default Retail Metering Services Provider

- e) Describe the procedures of the *Central Registration Body* for the validation, estimation, and revision of *metering data* to make it settlement ready;
- f) Describe the reporting procedures in cases where there are errors associated with *metering data* or meter trouble; and
- g) Describe the procedures of the *Central Registration Body* for the measurement and monitoring of the annual performance of *Retail Metering Services Providers*.

1.2 SCOPE OF APPLICATION

This Manual covers the metering procedures and standards for *meters of Contestable Customers* only.

This Manual does not cover the procedure for the registration of *Retail Metering Services Providers*, which is covered by the Retail Manual on Registration Criteria and Procedures².

1.3 CONVENTIONS and DEFINITIONS

1.3.1 Conventions

The standard conventions to be followed in this Manual are as follows:

- a) The word ‘shall’ denotes a mandatory requirement;
- b) Unless otherwise defined or the context implies otherwise, the italicized terms used in this Manual which are defined in the *WESM Rules, Retail Rules, WESM Manual on Metering Standards and Procedures*³, *Grid Code* or *Distribution Code* will bear the same meaning as defined in the *WESM Rules, Retail Rules, WESM Manual on Metering Standards and Procedures Issue, Grid Code* or *Distribution Code*. Italicized terms that are used in this Manual but are not defined in the *WESM Rules, Retail Rules, WESM Manual on Metering Standards and Procedures Issue, Grid Code* or *Distribution Code* are defined in Section 1.3.2 of this Manual.
- c) Double quotation marks are used to indicate titles of publications, legislation, forms, and other documents; and
- d) Any procedure-specific convention(s) shall be identified within the specific document itself.

² DOCUMENT ID

³ Issue 7.0 WESM-MSDM-MM-07

1.3.2 Definition of Terms

American National Standards Institute (ANSI). A private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States.

End-to-End Test. A continuity test of data transfer from the *meter* to the Meter Data Retrieval System of the *Retail Metering Services Provider* and then to the Meter Data Collection System of the *Central Registration Body*.

International Electrotechnical Commission (IEC). A non-profit, non-governmental international standards organization that prepares and publishes International Standards for all electrical, electronic and related technologies – collectively known as "electrotechnology".

Institute of Electrical and Electronics Engineers (IEEE). A professional association that is dedicated to advancing technological innovation and excellence.

Instrument Transformers. A general term for current transformers and voltage transformers.

Meter Trouble. Any error associated with *metering data*.

Meter Trouble Report. A report issued by the *Central Registration Body* to a *Retail Metering Services Provider* for the correction of detected *metering data* errors.

1.4 RESPONSIBILITIES

1.4.1 Compliance and Implementation

- a) The *Central Registration Body* shall be responsible for the development, validation, maintenance, publication, and revision of this document in coordination with *WESM Members*;
- b) The *Retail Metering Services Provider* shall provide the necessary information and references for subsequent revisions and validation of this document;
- c) The *Rules Change Committee* shall be responsible for the initial approval of the subsequent revisions and issuances of this Manual;
- d) The *PEM Board* shall be responsible for the final approval of the subsequent revisions and issuances of this Manual;
- e) The *Dispute Resolution Administrator* shall be responsible for the investigation of any infraction by a *Retail Metering Services Provider* of

a *Contestable Customer*, cases where disputes involved *metering data*, and tampering of any *metering installation* that is detrimental to the integrity of the *metering data*; and

- f) Any other responsibilities of technical or legal committees or groups as stated in the *WESM Rules* and *Retail Rules*, the *Grid Code* or the *Distribution Code* which may affect the relevant provision of this Manual.

1.4.2 Amendments

Amendments to this Manual shall be submitted to the *WESM Rules Change Committee* and shall be acted upon pursuant to Chapter 8 of the *WESM Rules* and relevant market manuals.

1.5 EFFECTIVITY AND PUBLICATION

This Manual shall take effect upon approval by the *Department of Energy*. Thereafter, it shall be *published* in the *market information web site*⁴.

⁴www.wesm.ph

SECTION 2 METERING INSTALLATION STANDARDS**2.1 COVERAGE**

This section defines the *metering installation* standards that a *Contestable Customer meter installation* must comply with to be eligible for registration in the *Wholesale Electricity Spot Market*.

The section also covers certain electrical, dimensional, and mechanical characteristics and designs, and takes into consideration certain safety features of current and inductively-coupled voltage transformers of types generally used in the measurement of electricity associated with revenue metering.

2.2 OVERVIEW

- a) A *metering installation* shall be accurate in accordance with the *Retail Rules*, the *Grid Code*, the *Distribution Code*, the *WESM Rules* and this Manual⁵.
- b) A *metering installation* shall be secure⁶.
- c) A *metering installation* shall have facilities to enable metering data to be transmitted from the *metering installation* to the *Retail Metering Services Provider metering database*, and be capable of communicating with the *Retail Metering Services Provider metering database*⁷.
- d) A *metering installation* shall contain a device which has a visible or an equivalently accessible display of *metering data* or which allows the *metering data* to be accessed and read at the same time by portable computer or other equipment of a type or specification reasonably acceptable to all entities who are entitled to have access to that *metering data*⁸.
- e) A *metering installation* shall have electronic data recording facilities such that all *metering data* can be measured and recorded in *trading intervals*⁹.
- f) A *metering installation* shall, where bi-directional active energy flows occur, be capable of separately registering and recording flows in each direction¹⁰.

⁵ Retail Rules Clause 4.3.2.2

⁶ Retail Rules Clause 4.3.2.3

⁷ Retail Rules Clause 4.3.2.4

⁸ Retail Rules Clause 4.3.2.5

⁹ Retail Rules Clause 4.3.2.6

¹⁰ Retail Rules Clause 4.3.2.7

- g) A *metering installation* shall have a *meter* having an internal data logger capable of storing the *metering data* for at least sixty days and have a back-up storage facility enabling *metering data* to be stored for forty-eight hours in the event of external power failure¹¹.
- h) A *metering installation* shall have an active energy meter, and, if required in accordance with the *Grid Code* or *Distribution Code*, a reactive energy meter having an internal data logger¹².

2.3 GENERAL COMPLIANCE

This Manual supplements the minimum requirements in the *Distribution Code* for *metering installations* of *Contestable Customers*. Any *metering installation* of a higher level of accuracy or functionality than the standards in the *Distribution Code* and this standard may also be installed.

2.4 METERS

This section provides the standards for *meters* located within the *metering installation*. With adherence to these standards, a *metering installation* shall be able to fully or partially comply with the following clauses of the *Retail Rules*:

- a) Clause 4.3.2.2
- b) Clause 4.3.2.3
- c) Clause 4.3.2.4
- d) Clause 4.3.2.5
- e) Clause 4.3.2.6
- f) Clause 4.3.2.7
- g) Clause 4.3.2.8
- h) Clause 4.3.2.9
- i) Clause 4.3.3

2.4.1 Redundancy Requirement

¹¹ Retail Rules Clause 4.3.2.8

¹² Retail Rules Clause 4.3.2.9

A *metering installation* shall have a main and a backup revenue *meter* of different brands (i.e., different make and model).

2.4.2 Technical Requirements

Meters, both installed as the main revenue *meter* and backup revenue *meter*, shall meet the minimum requirements listed in Table 1.

Table 1. Minimum Technical Requirements for Main and Backup Revenue Meters.

ITEM	SPECIFICATIONS		REFERENCE DOCUMENTS
	MAIN METER	BACKUP METER	
Accuracy Class	IEC 687 Class 0.2 / ANSI 12.20 Class 0.3 or better	Same as the main meter	ANSI or IEC
No. of Stator	Corresponds to the service type and complying with Blondel's Theorem	Same as the main meter	<i>Distribution Code</i> ANSI
Voltage Rating	Corresponds to the secondary voltage rating of voltage transformers used	Same as the main meter	<i>Distribution Code</i>
Current Rating	Corresponds to the secondary current rating of current transformers used (typically 1A or 5A)	Same as the main meter	ANSI or IEC
Frequency	60 Hz	Same as the main meter	<i>Distribution Code</i>
Measurement	Unidirectional active metering (delivered and 2-quadrant reactive metering) or, where bi-directional energy flows, bi-directional active metering	Same as the main meter	<i>Distribution Code</i> <i>Retail Rules</i>
Interval Data	Programmable to 5, 15, 30 minute interval	Same as the main meter	<i>Distribution Code</i>
No. of Channels	At least four (4) channels: a. kWh (Delivered) b. kVARh (Delivered) c. kWh (Received) d. kVARh (Received)	Same as the main meter	<i>Distribution Code</i>
Mass Memory	Minimum of 60 day recording of a 15-minute time-stamped demand interval for 4 recording channels	Same as the main meter	<i>Distribution Code</i>
Recording Billing Quantities	Display and record TOU energy and power parameters (kWh, kVARh)	Same as the main meter	<i>Distribution Code</i>

ITEM	SPECIFICATIONS		REFERENCE DOCUMENTS
	MAIN METER	BACKUP METER	
Security	The meter shall have provisions for securing the meter data, meter configurations and programs by electronic means and/or passwords. It shall also be secured physically by way of security seals.	Same as the main meter	Retail Rules
Communication Capability	The meter shall have one (1) independent communication ports in addition to the optical port.	Same as the main meter	Retail Rules <i>Distribution Code</i>
Internal Clock/Battery	With long life lithium battery for clock/ calendar maintenance	Same as the main meter	Retail Rules <i>Distribution Code</i>
Time Synchronization	Shall be crystal synchronization time-based. The internal clock shall be capable of being reset/set by the data collection software during normal collection operations.	Same as the main meter	Retail Rules <i>Distribution Code</i>
Digital Display	The meter shall have a digital display with a minimum of 5 integer digits and 3 decimal digits.	Same as the main meter	
Codes and Standards Compliance	The meter shall adhere to established International Standards (e.g. IEC, ANSI, IEEE)	Same as the main meter	IEC, ANSI, IEEE
Enclosure	The meter shall be provided with the necessary cover to protect the internal component against the harmful elements of environment that may affect its measuring circuit and operation.	Same as the main meter	ANSI

2.4.3 Communication Links

The communication link to be installed shall be a dedicated line solely for the metering of the *Retail Metering Services Provider*.

2.5 INSTRUMENT TRANSFORMERS

This section provides the standards for *instrument transformers* located within the *metering installation*. With adherence to these standards, a *metering installation* shall be able to fully or partially comply with *Retail Rules* Clause 4.3.2.

2.5.1 General Requirement

A *metering installation* shall include *instrument transformers*.

2.5.2 Use of Instrument Transformers

Instrument transformers supplying the revenue *meter* shall be used solely for the purposes of revenue metering and not for any other purposes, such as, but not limited to, the attachment of other devices. Moreover, the following schemes shall not be allowed:

- a) The use of an *instrument transformer* for two or more metering points
- b) Paralleling of *current transformers*

2.5.3 Instrument Transformer Ratios

2.5.3.1 Selection of Current Transformer Ratios

Current transformer ratios shall be selected according to the following factors:

- a) The maximum sustained primary current in a *current transformer* shall not exceed the primary tap multiplied by the primary factor of the *current transformer*, and
- b) The minimum sustained primary current during normal operation shall not be less than 10% of the primary tap.

2.5.3.2 Selection of Voltage Transformer Ratios

Voltage transformer ratios shall be selected such that operation at the minimum or maximum sustained secondary voltage shall not affect meter *accuracy* or meter function.

2.5.4 Accuracy Requirements

2.5.4.1 Current Transformers

Current transformers shall conform to the IEC 44-1 Class 0.2 or ANSI C57.13 Class 0.3 or better of any *instrument transformer*.

2.5.4.2 *Voltage Transformers*

Voltage transformers shall conform to the IEC 6044-2 Class 0.2 or ANSI C57.13 Class 0.3 of any *instrument transformer*.

2.5.4.3 Accuracy Tests

2.5.4.3.1 Requirements

Where accuracy tests are required, they shall comply with the following requirements:

- a) Tests shall be carried out by a third-party testing agency using equipment traceable to International Standards;
- b) Tests shall be conducted with the suitable *burdens* connected to each *current transformer*;
- c) Additional tests shall be conducted at other suitable *burdens* if the existing *burden* is expected to change in the future;
- d) Tests shall include ratio and phase-angle error tests;
- e) Ratio and phase-angle tests of *current transformers* shall be measured over a range of secondary current from 1% of rated primary current up to and including the maximum current as defined by the rating factor; and
- f) Test results shall provide correction factors to be applied to both active and reactive power at each test point.

2.5.4.3.2 Instrument Transformer Burdens

Burdens shall include the following considerations:

- a) Every device connected to every *instrument transformer*;
- b) The *burden* imposed by each device; and
- c) The size of the conductors in the secondary cabling and the length of the path followed by the cabling.

2.5.4.3.2.1 Current Transformers Burden Calculation

The *burden* calculation for a *current transformer* shall include:

- a) The impedance of the secondary wiring;

- b) The impedance of all devices connected to the *current transformer*;
- c) The apparent impedance associated with the interconnection of *current transformer* secondaries;
- d) The apparent impedance associated with the sharing of a common current path through a measuring device with another *current transformer*;
- e) The apparent impedance associated with the sharing of an approved common-return conductor;
- f) The apparent impedance associated with the impedance of any other *current transformer(s)* connected in parallel with subject *instrument transformer*;
- g) *Burden* under balanced power system conditions; and
- h) Worst-case unbalance, including single-phase power

The measurement of calculation shall verify that actual *burdens* in service do not exceed the nameplate rated burden limits for the IEC 44-1 Class 0.2 or ANSI C57.13 Class 0.3 of any instrument transformer.

2.5.4.3.2.2 Voltage Transformers Burden Calculation

The *burden* calculation for a *voltage transformer* shall include the apparent power and power factor at the secondary terminals of the *instrument transformer*.

The measurement of calculation shall verify that actual *burdens* in service do not exceed the nameplate rated burden limits for IEC 6044-2 Class 0.2 or ANSI C57.13 Class 0.3 of any *instrument transformer*.

2.5.5 Safety Requirements and Grounding System

A *metering installation* shall conform to the requirements of:

- a) Philippine Electrical Code; and
- b) The IEC or ANSI/IEEE C57.13-1983 IEEE Guide for Grounding of *Instrument Transformer* Secondary Circuits and Cases.

2.5.6 Technical Specifications

This section provides the minimum technical specifications of *current transformers*, *voltage transformers* of the main *meter*, as well as the lightning arresters connected to the *meter*.

2.5.6.1 Current Transformer

Current transformer installed at the main *meter* shall meet the minimum requirements listed in Table 2.

Table 2. Minimum Technical Specifications for Current Transformers.

ITEMS	SPECIFICATIONS	REFERENCE DOCUMENTS
Type	Outdoor Type; Minimum oil filled, Dry Type or Gas-filled	
Cooling	Oil immersed, Self-cooled; Butyl, Cast resin	
Construction	Single phase, wound type, free standing	
Accuracy Class	IEC 44-1 Class 0.2 /ANSI C57.13 Class 0.3 or better	
Burden	Shall not exceed the rated burden limit of 12.5 VA for the IEC 44-1 Class 0.2 /ANSI C57.13 Class 0.3 (Refer to Table 1 of the Appendix of the WESM Manual on Metering Standards and Procedures ¹³)	
Rated Primary Current	The thermal rating factor shall not be less than 1.0.	
Secondary Current	1A or 5A	IEC 4.2 Standard values of rated secondary currents
Rating Factor	Minimum of 1.0 at 30°C	
Frequency	60 Hz	
Ambient Air Temperature	-5°C and 50°C for very hot climate	IEC 3.2.1 1996
BIL	Refer to Table 2 of the Appendix of the WESM Manual on Metering Standards and Procedures ¹³ for applicable BIL	
Creepage Distance	Refer to Table 3 of the Appendix of the WESM Manual on Metering Standards and Procedures ¹³ for applicable creepage distance	
Number of Core	At least two (2) metering core	

¹³ Issue 7.0 WESM-MSDM-MM-07

ITEMS	SPECIFICATIONS	REFERENCE DOCUMENTS
Mounting	Depend on the applications	
Grounding	Must have adequate grounding	
Security	Seal holder shall be provided to the CT secondary terminal box	

2.5.6.2 Voltage Transformer

Voltage transformer installed at the main *meter* shall meet the minimum requirements listed in Table 3.

Table 3. Minimum Specifications for Voltage Transformers.

ITEM	SPECIFICATIONS	REFERENCE DOCUMENTS
Type	Outdoor Type; Minimum oil filled, Dry Type or Gas-filled	
Cooling	Oil immersed, Self-cooled; Butyl, Cast resin	
Construction	Single phase, Inductive type, single bushing	
Termination	Line-to-ground	
Accuracy Class	IEC 6044-2 Class 0.2 / ANSI C57.13 Class 0.3 or better	
Burden	Shall not exceed the rated burden limit for the IEC 6044-2 Class 0.2 /ANSI C57.13 Class 0.3 or better. (Refer to Table 4 of the Appendix of the WESM Manual on Metering Standards and Procedures ¹⁴)	
Ratio	Refer to Table 5 of the Appendix of the WESM Manual on Metering Standards and Procedures ¹⁴	
Secondary Voltage	Refer to Table 5 of the Appendix of the WESM Manual on Metering Standards and Procedures ¹⁴	
Frequency	60 Hz	
Operating Temperature	55°C average ambient temperature, with max ambient temperature not exceeding 65°C	
BIL	Refer to Table 2 of the Appendix of	

¹⁴ Issue 7.0 WESM-MSDM-MM-07

	the WESM Manual on Metering Standards and Procedures ¹⁵ for applicable BIL	
Creepage distance	Refer to Table 3 of the Appendix of the WESM Manual on Metering Standards and Procedures ¹⁵ for applicable creepage distance	
Number of Core	At least two (2)	
Mounting	Depend on the applications	
Grounding	Must have adequate grounding	
Security	Seal holder shall be provided to the CT secondary terminal box	

2.5.6.3 Lightning Arrester

Lightning Arrester installed at the main *meter* shall meet the minimum requirements listed in Table 4.

Table 4. Minimum Requirements for Lightning Arresters.

Nominal System Voltage	Max. Rated Voltage	Standard Lightning Impulse Withstand Voltage	Max. Continuous Operating Voltage	Max. Nominal Discharge Current	Maximum Line Discharge Class		Long Duration Current Impulse Withstand Capability
					IEC	ANSI	
[KV]	[KV]	[KV]	[KV]	[KA]			[KVA]
13.8	15	95	12	10	CL 2	Station	100
34.5	36	170	29	10	CL 2	Station	100
69	72.5	325	58	10	CL 2	Station	100
115	123	550	98	10	CL 2	Station	100
138	145	650	116	10	CL 2	Station	100
230	245	900	196	10	CL 2	Station	100
500	525	1550	420	20	CL 4	Station	100

2.5.7 Primary Connections

2.5.7.1 Location of Primary Terminals

2.5.7.1.1 Current Transformer

The primary terminals of each *current transformer* shall be located as close as practicable to the *metering point*.

2.5.7.1.2 Voltage Transformer

The primary terminals of each *voltage transformer* shall be:

¹⁵ Issue 7.0 WESM-MSDM-MM-07

- a) At the same potential as the *current transformer*, and
- b) As close as practicable to the primary terminals of the *current transformer* of the same phase

2.5.7.2 Connection to Power System

With respect to any physical separation of the points at which the *voltage transformer* and the *current transformer* of each phase are connected to the power system, the *metering installation* shall:

- a) Minimize the voltage drop between the *voltage transformer* and the *current transformer*, and
- b) Minimize the leakage current between the *voltage transformer* and the *current transformer*.

2.5.7.3 Location/Arrangement of Instrument Transformers

With respect to the physical arrangement of the *instrument transformers*, the *current transformer* shall be located at the load side based on the normal flow of current (Refer to Figure 3 of the Appendix of the WESM Manual on Metering Standards and Procedures¹⁶).

2.5.7.4 Distances, clearances between Instrument Transformers

The distances between *instrument transformers* and the prescribed clearances shall follow the distances and clearances shown in Table 6 and Figure 4 of the Appendix of the WESM Manual on Metering Standards and Procedures¹⁶.

2.5.7.5 Primary Cable

2.5.7.5.1 Quality of Materials and Workmanship

The primary cable terminations connected to the high-voltage terminals of an instrument transformer shall be in good quality and of accepted workmanship.

2.5.7.5.2 Electrical Location of Primary Connections

Primary connections of the instrument transformer shall be located such that operation of power system equipment does not degrade the following elements:

- a) Accuracy of measurement;

¹⁶ Issue 7.0 WESM-MSDM-MM-07

- b) Data required for validation or settlement;
- c) Loss adjustment factors; and
- d) Monitoring of metering equipment condition.

2.5.8 Secondary Connections

2.5.8.1 Size of Secondary Cabling

2.5.8.1.1 Current Transformer

The secondary cabling between the *current transformers* and the meter test switch/block shall be of a sufficient size that the rated *burden* for the IEC 0.2 or ANSI 0.3 accuracy class is not exceeded when rated current flows in the secondary winding.

2.5.8.1.2 Voltage Transformer

The secondary cabling between the *voltage transformers* and the meter test switch/block shall be of correct size such that the voltage drop in each phase does not exceed 0.2 V.

2.5.8.2 Codes and Conditions

Instrument transformer secondary cabling and cabling accessories shall comply with the following codes and conditions:

- a) The Philippine Electrical Code;
- b) The main *meter* shall be supplied from dedicated *current transformers* used for no other purpose;
- c) *Voltage transformers* with one secondary winding shall be dedicated to the main *meter* and used for no other purpose;
- d) *Voltage transformers* with more than one secondary winding shall have one winding dedicated to the main *meter* and shall be used for no other purpose;
- e) Electrical connection to the *instrument transformer* secondary terminals shall not be outside of the meter box;
- f) Cabling from the *instrument transformers* to the meter enclosure shall be routed in dedicated conduit, and the route shall be visually traceable; and

- g) Each secondary terminal of each *instrument transformer* shall be brought to the test block on a separate conductor.

2.6 SECURITY OF METERING INSTALLATIONS AND DATA

This section provides the security standards for *metering installations* and its *metering data*. With adherence to these standards, a *metering installation* shall be able to fully or partially comply with *Retail Rules Clause 4.3.2.3*.

2.6.1 Physical Security

A *metering installation* shall be secure, tamper-proof, and conforms to the following applicable security requirements:

2.6.1.1 Instrument Transformers Connections

Secondary cabling shall be secured, tamper-proof, and compliant with the *Distribution Code* requirements on the security of registered revenue *metering installations* and *metering data*.

2.6.1.2 Conduit Systems

All wiring from the secondary terminal box of *instrument transformers* to the meter box shall be placed in a conduit, which is compliant with environmental requirements, to ensure that the cabling is secure, tamper-proof, and compliant with the *Central Registration Body Requirements*. Conduit joints (i.e., elbow, T-connector) shall be properly sealed and secured. No secondary cabling shall be exposed and accessible to unauthorized personnel.

2.6.1.3 Secondary Terminal Box

Secondary terminal boxes of the *current transformers* and *voltage transformers* shall be sealed and placed as far as practicable to ensure the detection of unauthorized access to the *instrument transformer* connections

2.9.1.4. Meter Enclosure

All *meters*, test links, and communication equipment shall be contained within a meter enclosure. The meter enclosure shall comply with the following requirements:

- a) The meter enclosure shall be secured by the *Retail Metering Services Provider*;
- b) The *Retail Metering Services Provider* shall have access to the meter enclosure at all times;

- c) Persons other than the *Retail Metering Services Provider* shall not be given access to the meter enclosure;
- d) The meter enclosure shall be padlocked and sealed as far as practicable in a manner approved by the *Central Registration Body*; and
- e) The meter enclosure shall be weatherproof.

2.6.1.4 Meter Test Block/Switch

Meter test block/switch shall be installed inside the meter enclosure to allow the current and voltage from each *instrument transformer* and *meter* to be individually determined. The meter test block/switch shall have the following technical description:

- a) Test Points: 10 points, (4 potential & 6 current Points)
- b) Pole Arrangement: P-CC-P-CC-P-CC-P
- c) Rating: 600 VAC, 20 Amperes
- d) Current carrying parts are made of non-tarnishing nickel silver
- e) Switches are of the open knife-blade type
- f) Current switch poles are provided with an auto- shorting jaw and the other has a shunted jack which is adaptable to a test plug
- g) Base is a one piece resistant moldings

The meter test block/switch shall also be provided with the standard cover: a one-piece molded high-impact styrene removable cover.

2.6.1.5 Meter Seals and Padlock

2.6.1.5.1 Meter Seal Requirements

The requirements for meter seals are:

- a) Seals shall have unique serial numbers
- b) Seals shall be traceable to the *Retail Metering Services Provider* or Energy Regulatory Commission personnel that installed the seals

- c) The *Retail Metering Services Provider* shall maintain a record of seal serial numbers and log subsequent changes, including reasons, for the seal change

2.6.1.5.2 Padlock Requirements

The requirements for padlocks are:

- a) Padlock shall be heavy duty;
- b) Padlock shall have only one security key and placed on a secured area;
- c) Security key shall be controlled by *Retail Metering Services Provider*, and
- d) Use of security key shall be documented and monitored.

2.6.1.6 Metering Perimeter

The *metering installation* shall be secured by a perimeter fence, if applicable, and its gate properly padlock, sealed and secured. Metering perimeter shall also be well-lighted and free from any unwanted materials, equipment, vegetation, and other entities.

2.6.2 Metering Data Security

- a) Each *Contestable Costumer*, through its *Retail Metering Service Provider*, shall ensure that the *metering data* recorded in each *metering installation* is protected from direct local or remote electronic access, including during the transfer of such *metering data* to the communication interface of the *metering database*. The *Retail Metering Service Provider* shall implement suitable passwords and other security controls.
- b) The *Retail Metering Service Provider* shall protect the *metering data* during delivery to the *Central Registration Body* other than electronic means and from access by persons other than itself regardless of the medium such as, but not limited to, diskettes, CDs or paper on or in which such *metering data* is transcribed, transferred or stored for purposes of such delivery.
- c) Each *Retail Metering Service Provider* shall keep all records of passwords for electronic access to *metering data* confidential.

- d) The *Retail Metering Service Provider* shall provide, for each *metering installation*, passwords to the *Central Registration Body* providing read-only access.
- e) The *Retail Metering Service Provider* may, or at the request of the *Central Registration Body* shall, change one or more of the passwords relating to a *metering installation* in which it is the *Retail Metering Service Provider*.

2.7 REDUNDANT METERING INSTALLATION

A *metering installation* shall have a redundancy which can be achieved in two ways:

- a) Dual *metering* using two independent sets of *instrument transformers* approved by the *Central Registration Body* where the main *instrument transformers* are connected to the main *meter* and the alternate *instrument transformers* are connected to the backup *meter*; or
- b) Partial redundant *metering* using a single set of *instrument transformers* approved by the *Central Registration Body* where both the main and backup *meters* are connected to either common or separate core.

2.7.1 Minimum Requirement

The minimum requirement is partial redundant *metering* using single set of *instrument transformer* approved by the *Central Registration Body* where the main and backup *meters* are in series or in parallel and connected to a common core.

2.7.2 Minimum Metering Data Deviation

The *metering data* recorded by the main and backup *meters* shall not deviate by more than $\pm 0.6\%$. In the event that the deviation exceeds this value, the *Retail Metering Service Provider* shall immediately investigate and correct the causes of such deviations.

2.8 EXISTING METERING INSTALLATIONS

An existing *metering installation* that does not fully comply with the requirements of this Manual shall be permitted by the *Central Registration Body* to remain in service subject to the following conditions:

- a) The *meter* has a mass memory capable of recording 15-minute demand interval and have communication ports for remote and manual data retrieval;

- b) The Energy Regulatory Commission has tested or verified and sealed the *meter*;
- c) All non-compliant *meters* shall be replaced within six (6) months from the effectivity of its registration in the *WESM*.
- d) All non-compliant *instrument transformers* shall be replaced within the period of two (2) years from the effectivity of registration in the *WESM*.

SECTION 3 SITE EQUIPMENT IDENTIFICATION NUMBER (SEIN)**3.1 COVERAGE**

This section describes the standard numbering system that *Retail Metering Services Providers* must follow when numbering and identifying their *metering installations* and its individual equipment.

3.2 OBJECTIVES

The objectives of establishing a standard numbering system for identifying and numbering *metering installations* and its individual equipment are:

- a) To facilitate the location of *metering installations* for administrative purposes by reflecting the geographical location of the *metering installation* in its Site Equipment Identification Number; and
- b) To facilitate the identification of *metering installations* whose details are recorded in the *metering database* administered by the *Central Registration Body* under *Retail Rules* Clause 4.5.2;

3.3 GUIDELINES

The *Retail Metering Services Providers* shall follow the procedures listed in this Section when numbering and identifying *metering installations* and its individual equipment.

3.3.1 Basis

The specific details of these guidelines are as prescribed in the following provisions of the *Distribution Code*:

- a) Provision 7.12.1.1
- b) Provision 7.12.1.2
- c) Provision 7.12.1.3
- d) Provision 7.12.2.1
- e) Provision 7.12.2.2
- f) Provision 8.3.1
- g) Provision 8.4.5

3.3.2 Metering Installation

A *metering installation* shall be numbered using the following convention:

WWW-XXXX-YY-CCCC-NN

Where:

- WWW shall be the Standard Site ID of the Substation where the *Contestable Customer* is drawing power from. Refer to Procedure No. 1 and Table 9 of the Appendix of the WESM Manual on Metering Standards and Procedures¹⁷ for the procedure on the designation and a sample list of Standard Site IDs, respectively. Note: the Standard Site ID of the Substation where the *Contestable Customer* is drawing power from also denotes the *Market Trading Node* that its *metering installation* shall be mapped to by the *Central Registration Body*.
- XXXX shall be the Metered Participant ID of the Associated Grid Connection Point. Refer to Procedure No. 2 and Table 10 of the Appendix of the WESM Manual on Metering Standards and Procedures¹⁷ for the procedure on the designation and a sample list of Metered Participant IDs of Associated Grid Connection Points, respectively.
- YY shall be a two (2) digit number designating the off-take grid meter.
- CCCC shall be the Metered Participant ID of the *Contestable Customer* as referenced to its short name ID. Refer to Appendix B for the procedure on the designation of Metered Participant IDs of *Contestable Customers*.
- NN shall be a two (2) digit number identifying the *metering installation* of the facility of the *Contestable Customer*.

Example:

ARA-MECO-01-PLDT-01

Where:

- | | |
|------|--|
| ARA | Standard Site ID of Araneta S/S |
| MECO | Metered Participant ID of Meralco |
| 01 | Grid Off-take Meter No. 1 |
| PLDT | Metered Participant ID of Philippine Long Distance Telephone Company |
| 01 | Metering Installation No. 1 of the Facility |

3.3.3 Meter

A *meter* shall be numbered using the following convention:

BY- (WWW-XXXX-YY-CCCC-NN)

¹⁷ Issue 7.0 WESM-MSDM-MM-07

Where:

- B shall be a one (1) letter initial designating the purpose of the *meter*. Refer to Table A-1 for the standard purpose designations of *meters*.
- Y shall be a one (1) digit number designating the function of the *meter*. The standard function designations are as follows: 1 – Delivered (OUT), 2 – Received (IN), 3 – Bi-directional (IN & OUT).
- (WWW-XXXX-YY-CCCC-NN) shall be the Standard Equipment Identification Number of the *metering installation* where the *meter* is located.

Example:

R3-ARA-MEC0-01-PLDT-01

Where:

- R Main *meter* purpose designation
- 3 Bi-directional function designation
- (WWW-XXXX-YY-CCCC-NN) Standard Equipment Identification Number of the *metering installation* where the *meter* is located (See sample in Section 3.3.2 for details)

3.3.4 Meter Box and Modem

A meter box or modem shall be numbered using the following convention:

DD-(B-WWW-XXXX-YY-CCCC-NN)

Where:

- DD shall be the two (2) letter initial designation for the relevant *metering* equipment, device, or auxiliary. Refer to Table A-2 for the standard designation of metering equipment, devices and auxiliaries.
- B shall be a one (1) letter initial designating the purpose of the *meter*. Refer to Table A-1 for the standard purpose designations of *meters*.
- (WWW-XXXX-YY-CCCC-NN) shall be the Standard Equipment Identification Number of the *metering installation* where the *meter* is located

Example:

MB-(R-ARA-MEC0-01-PLDT-01)

Where:

MB	Meter Box equipment, device, or auxiliary designation
R	Main <i>meter</i> purpose designation
(WWW- XXXX- YY- CCCC- NN)	Standard Equipment Identification Number of the <i>metering installation</i> where the <i>meter</i> is located (See sample in Section 3.3.2 for details)

3.3.5 Meter Test Switch

A meter test switch shall be numbered using the following convention:

DDYY-(B-WWW-XXXX-YY-CCCC-NN)

Where:

DD	shall be the two (2) letter initial designation for meter test switch. Refer to Table A-2 for the standard designations of metering equipment, devices and auxiliaries.
YY	shall be a two (2) digit number designating the off-take grid meter.
B	shall be a one (1) letter initial designating the purpose of the <i>meter</i> . Refer to Table A-1 Error! Reference source not found. for the standard purpose designations of <i>meters</i> .
(WWW- XXXX- YY- CCCC- NN)	shall be the Standard Equipment Identification Number of the <i>metering installation</i> where the <i>meter</i> is located

Example:

TS01-(R-ARA-MEC0-01-PLDT-01)

Where:

TS	Meter Test Switch equipment, device, or auxiliary designation
----	---

- 01 Grid Off-take Meter No. 1
- R Main *meter* purpose designation
- (WWW- Standard Equipment Identification Number of the *metering*
- XXXX- *installation* where the *meter* is located (See sample in Section 3.3.2
- YY- for details)
- CCCC-
- NN)

3.3.6 Current Transformer

A *current transformer* shall be numbered using the following convention:

PDD-(B-WWW-XXXX-YY-CCCC-NN)

Where:

- P shall be a one (1) letter initial designation for phase of the current transformer: A – Phase A, B – Phase B, C – Phase C
- DD Shall be the two (2) letter initial designation for the current transformer. Refer to Table A-2 for the standard designations of metering equipment, devices and auxiliaries.
- B shall be a one (1) letter initial designating the purpose of the *meter*. Refer to Table A-1 **Error! Reference source not found.** for the standard purpose designations of *meters*.
- (WWW- shall be the Standard Equipment Identification Number of the
- XXXX- *metering installation* where the *meter* is located
- YY-
- CCCC-
- NN)

Example:

ACT-(R-ARA-MEC0-01-PLDT)

Where:

- A Phase A of the current transformer
- CT Current transformer equipment, device, or auxiliary designation
- R Main *meter* purpose designation
- (WWW- Standard Equipment Identification Number of the *metering*
- XXXX- *installation* where the *meter* is located (See sample in Section 3.3.2
- YY- for details)
- CCCC-
- NN)

SECTION 4 METERING INSTALLATION REGISTRATION**4.1 COVERAGE**

Pursuant to *Retail Rules* Clause 4.3.2.1, a *metering installation* shall be registered in the *WESM* through the *Central Registration Body*.

This section provides the procedures to be followed by the *Central Registration Body*, *Contestable Customers*, *Suppliers*, and *Retail Metering Services Providers* for the registration of *metering installations* of *Contestable Customers* in the *WESM*.

4.2 OVERVIEW

In order for a *metering installation* to be successfully registered in the *WESM*, *Retail Metering Service Providers* must be able to demonstrate the following requirements to the *Central Registration Body*:

- a) *Metering installation* for registration are compliant with the *Retail Rules* and Section SECTION 2 of this Manual;
- b) *Metering installation* for registration has successfully undergone an *End-to-End Test*; and
- c) *Metering installation* for registration has successfully undergone commissioning tests.

4.3 METERS FOR REGISTRATION

Main and backup *meters*, of revenue quality and the same *accuracy class*, shall be registered.

4.4 REGISTRATION PROCEDURES**4.4.1 Submission of Application Form and Pertinent Documents**

To initiate the registration of a *metering installation* of a *Contestable Customer*, its *Retail Metering Services Provider*, on behalf of the *Supplier* or *Contestable Customer*, shall submit the following to the *Central Registration Body* by courier:

- a) Accomplished Metering Installation Registration Form as published in the *market information web site*¹⁸ signed by both *Retail Metering Services Provider* and *Contestable Customer*;
- b) Load Profile of the *metering installation* during the previous twelve (12) months as well as its maximum and minimum hourly demand;

¹⁸ www.wesm.ph

- c) Single Line Diagrams from the off-take meter or grid meter to the *metering point* of the *Contestable Customer*;
- d) Certification on Meter Test Results from the Energy Regulatory Commission with its corresponding seal;
- e) *Retail Metering Services Provider* test and calibration reports of *instrument transformers* and *meters*;
- f) Pro-forma Agreement between the *Contestable Customer* or *Supplier* and its *Retail Metering Services Provider*, and
- g) Documentation of other special features of the meter.

4.4.2 Validation of Documents

Upon receipt of the Metering Installation Registration Form, the *Central Registration Body* shall inspect and validate the submitted documents for completeness and conformance to the standards established in SECTION 2 of this Manual.

4.4.2.1 Conformance to Requirements

If the *Central Registration Body* deems that the submitted documents are conformant and indicates conformance to its requirements, the *Central Registration Body* shall notify the *Retail Metering Services Provider* of the conformance through fax, mail, or e-mail.

4.4.2.2 Non-conformance to Requirements

4.4.2.2.1 Notification

If the *Central Registration Body* deems that the submitted documents are non-conformant or indicates a non-conformance to its requirements, the *Central Registration Body* shall request the relevant *Retail Metering Service Provider* to provide further clarifications by sending a notification either through fax, mail, or e-mail.

4.4.2.2.2 Resubmission of Documents

To proceed with the registration process, the *Retail Metering Services Provider* shall resubmit all necessary documents requested by the *Central Registration Body* through mail or courier.

4.4.3 Testing

In addition to the transmittal of the notification of conformance to the *Retail Metering Services Provider*, the Central Registration Body shall also request the *Retail Metering Services Provider* to perform commissioning tests and subsequent *End-to-End Test* on the *metering installation* for registration.

Upon notification from the Central Registration Body, the *Retail Metering Services Provider* shall then conduct the required tests.

4.4.3.1 Ready for Operation

When the *metering installation* for registration satisfactorily passes all required tests, the *Retail Metering Services Provider* shall submit all relevant reports to the *Central Registration Body*. Upon receipt of the reports, the *Central Registration Body* shall deem the *metering installation* ready for operation.

4.4.3.2 Failure of Tests

If the *metering installation* for registration fails any of the required tests, the *Retail Metering Services Provider* shall be responsible for rectifying all uncovered problems on the *metering installation*. Upon correction of the uncovered problem, the *metering installation* shall again be subjected to the test that it failed until it passes all required tests.

4.4.4 Approval of Application

Upon receipt of all documents indicating the conformance of the *metering installation* for registration to the standards in this Manual and passing of all required tests, the Central Registration Body shall issue its approval to the *metering installation* for registration, update its registry, and *publish* the newly registered *metering installation* of the *Retail Metering Service Provider* in the *market information web site*¹⁹.

¹⁹ www.wesm.ph

SECTION 5 METERING DATA COLLECTION**5.1 COVERAGE**

Pursuant to *Retail Rules* Clause 4.4.2.1, the *Retail Metering Services Provider*, on behalf of its associated *Supplier* or *Contestable Customer*, shall retrieve the *metering data* from the *meter* and transmit the *metering data* to the *Central Registration Body*.

This section provides the procedures to be followed by the *Central Registration Body*, *Contestable Customers*, *Suppliers*, and *Retail Metering Services Providers* in the collection and submission of *metering data* to the *Central Registration Body*.

5.2 DATABASES**5.2.1 Metering Database**

Pursuant to *Retail Rules* Clause 4.5.2.1, the *Central Registration Body* shall create, maintain and administer a *metering database*, which shall include a metering register containing information for each *metering installation* registered with the *Central Registration Body*.

5.2.1.1 Data Inclusions

The *metering database* shall include *metering data*, energy data, data substituted in accordance with *Retail Rules* Section 4.6, and all calculations made for settlement purposes.²⁰

5.2.1.2 Storage Duration

Furthermore, data shall be stored in the *metering database*²¹:

- a) For sixteen (16) months in accessible format; and
- b) For ten (10) years in archive.

5.2.1.3 Access

The only entities²² entitled to have either direct or remote access to *metering data* on a read-only basis from the *metering database* or the metering register in relation to a *metering point* are:

- a) Each *Supplier* whose settlement amounts are determined by reference to quantities of energy flowing through that *metering point*,

²⁰ *Retail Rules* Clause 4.5.2.2

²¹ *Retail Rules* Clause 4.5.2.3

²² *Retail Rules* Section 4.5.3

- b) The *Retail Metering Services Provider* who is responsible for the *metering installation* at that *metering point*,
- c) The *Central Registration Body* and its authorized agents,
- d) The *Market Operator* and its authorized agents,
- e) Any *Contestable Customer* with respect to the metering data in relation to the *metering point* registered to it,
- f) Any *Distribution Utility* with respect to *Contestable Customers* whose facilities are located in its franchise area and for whom said *Distribution Utility* is not the *Retail Metering Services Provider*,
- g) The Market Surveillance Committee,
- h) The Enforcement and Compliance Office,
- i) The Market Assessment Group,
- j) The PEM Auditor,
- k) The Department of Energy, and
- l) The Energy Regulatory Commission.

5.2.2 Installation Database

Pursuant to *Retail Rules* Clause 4.5.1.1, a *Retail Metering Services Provider* shall create, maintain and administer an *installation database* in relation to all its *metering installations*.

5.2.2.1 Data Inclusions

The *installation database* shall include *metering data*, energy data, and, if necessary, data substituted.

5.2.2.2 Access

In accordance with *Retail Rules* Clause 4.5.1.2, a *Retail Metering Services Provider* shall ensure that each affected *Supplier*, *Distribution Utility*, and *Contestable Customer* as well as the *Central Registration Body* is given access to the information in its *installation database* at all reasonable times and:

- a) In the case of data sixteen (16) months old or less, within seven (7) working days of receiving written notice from the person or entity seeking access; and
- b) In the case of data more than sixteen (16) months old, within thirty (30) working days of receiving written notice from the person or entity seeking access.

5.3 COLLECTION AND SUBMISSION PROCEDURE

This section provides the process for the collection and submission to the Central Registration Body of *metering data*.

5.3.1 Requirements

5.3.1.1 Data

The *metering data* shall contain the following:

- a) Date and time, or time series, of the meter readings received for each *Contestable Customer* meter,
- b) Active energy (kWh), active power (kW), reactive energy (kVARh), and reactive power (kVAR) data in 15-minute resolution with assigned channel number, and
- c) Site Equipment Identification Number of the *meter*.

5.3.1.2 Format

The *Retail Metering Services Provider* shall submit the *metering data* in the meter data exchange format prescribed by the *Central Registration Body*.

5.3.1.3 Timing

Pursuant to *Retail Rules* Clause 4.3.8, all *meter* clocks shall be synchronized by the *Retail Metering Services Provider* to Philippine Standard Time (PST) to ensure accuracy of settlements.

5.3.2 Daily Process

5.3.2.1 Collection

At a fifteen-minute resolution, the *meter* at the *metering point* of a *Contestable Customer* continuously records *metering data*. Immediately at the end of the *trading day*, the *Retail Metering Services Provider* shall collect the *metering data* and event

log of the whole *trading day* from each *meter*, identified by its Recorder ID (SEIN) and Device ID (Serial Number), of all its associated *Contestable Customers*.

The *metering data* is automatically collected daily by the Meter Data Retrieval System of the *Retail Metering Services Provider* which is directly connected to the *meter*.

5.3.2.2 Submission

The *Retail Metering Services Provider* shall submit the collected *metering data* of the *trading day* to the *Central Registration Body* at 0400H of the succeeding *trading day*.

5.3.2.2.1 Normal

The Meter Data Retrieval System of the *Retail Metering Services Provider* automatically exports the *metering data* of all its associated *Contestable Customers* to the Meter Data Collection System of the *Central Registration Body* daily through file transfer protocol.

In the event that no *metering data* was received by 0800H, the *Central Registration Body* shall immediately call the *Retail Metering Services Provider* to resend the data through the same method.

Upon receipt, the Meter Data Collection System of the *Central Registration Body* converts the *metering data* to the required file format for use in settlement.

5.3.2.2.2 Communication Failure

In case of communication failure between a *meter* and its Meter Data Retrieval System, the *Retail Metering Services Provider* shall retrieve the *metering data* from the *meter* manually through a meter reader handheld device or laptop. The *metering data* shall then be uploaded to the Meter Data Retrieval System of the *Retail Metering Services Provider* for export to the Meter Data Collection System of the *Central Registration Body*.

5.3.3 Monthly Process

Not later than three (3) *business days* after the end of the *billing period*, the *Retail Metering Services Provider* shall submit a monthly preliminary CD containing all *metering data* of all *metering points* of its associated *Contestable Customers*. In addition to the CD, *Retail Metering Services Provider* shall also submit a transmittal letter that includes a tabulation of all associated *metering points* and their corresponding total *metered quantity* for the *billing period*.

In the event that *metering data* errors are detected by the *Central Registration Body* in accordance with Section SECTION 6 of this Manual, the *Retail Metering Services*

Provider shall be required to submit a final CD addressing the errors (see also Section 6.3.2).

5.4 EMERGENCY PROCEDURES

This section provides the procedural steps to be followed in case of a failure of the Meter Data Retrieval System of the *Retail Metering Services Provider* or an emergency situation that requires the transfer of the *metering data* processing operations of the *Central Registration Body* from the Main Server to the Emergency Back-up System (EBS).

5.4.1 Failure of the Meter Data Retrieval System

In case of a failure of the Meter Data Retrieval System of the *Retail Metering Services Provider*,

- a) The *Retail Metering Services Provider* shall:
 - i. Inform the *Central Registration Body* of the occurrence of a failure of its Meter Data Retrieval System;
 - ii. Perform emergency restoration of its Meter Data Retrieval System;
 - iii. While the Meter Data Retrieval System is out of service, retrieve all required *metering data* using alternative methods of retrieval and submit it within seven (7) days to the *Central Registration Body* in a file format that is compatible with the system of the *Central Registration Body*. For this purpose, the *Retail Metering Services Provider* may use a backup Meter Data Retrieval System, if it is available, or retrieve the *metering data* on-site or remotely using the appropriate software;
 - iv. Inform the *Central Registration Body* when its Meter Data Retrieval System is ready to resume normal operation; and
 - v. Resume normal retrieval and transmittal of *metering data* using the Meter Data Retrieval System.
- b) The Central Registration Body shall, upon receipt of the *metering data*, perform Validation, Estimation and Editing (refer to Section SECTION 6 of this Manual), process the *metering data* for billing and settlement, and upload the *metering data* to the *metering database*.

5.4.2 Transfer to Emergency Back-up System

In the event that an emergency situation that requires the transfer of the metering data processing operations of the *Central Registration Body* from the Main Server to the Emergency Back-up System (EBS),

- a) The Central Registration Body shall:
 - i. Inform the *Retail Metering Services Providers, Suppliers, and the Contestable Customers* of the need to transfer operations from the Main Server to the Emergency Back-up Site;
 - ii. Instruct *Retail Metering Services Providers* to transmit *metering data* to the Emergency Back-up Site;
 - iii. Activate the Emergency Back-up Site, upload the metering data, and perform Validation, Estimation and Editing process for billing and settlement;
 - iv. Perform emergency restoration of its Main Server;
 - v. When the operations are ready to resume at the Main Server, inform the *Retail Metering Services Providers* to resume *metering data* transmittal to the Main Server; and
 - vi. Resume operations at and upload the *metering data* to the Main Server, and perform Validation, Estimation and Editing process for billing and settlement.

- b) The *Retail Metering Services Provider* shall:
 - i. Transmit the *metering data* to the Emergency Back-up Site of the *Central Registration Body* when instructed; and
 - ii. Resume transmittal of *metering data* to the Main Server of the *Central Registration Body* when informed.

SECTION 6 DATA VALIDATION, ESTIMATION AND EDITING**6.1 COVERAGE**

Pursuant to *Retail Rules* Clause 3.3.5.3(c), the *Central Registration Body* shall develop and publish the methodologies and procedures for determining *metered quantity* by using historical load profiles.

This section provides the methodologies and procedures for validating, estimating, and editing *metering data* for the determination of the *metered quantity* of a *Contestable Customer* in accordance with *Retail Rules* Section 3.3.5.3.

Furthermore, this section discusses the obligations of the *Retail Metering Services Providers* in the validation, estimation, and editing of *metering data* as stipulated in *Retail Rules* Section 4.6.2.

6.2 GENERAL DESCRIPTION

All *metering data* received by the *Central Registration Body* shall be evaluated using the Validation, Estimate and Editing process described in this section. When *metering data* contains missing values, uncertain values, or exceeds the maximum or minimum of the daily hourly load profile values of the registered *meter*, such *metering data* shall undergo estimation and editing wherein substitutions of *metering data* shall be made using historical data.

The *Central Registration Body* shall issue a *Meter Trouble Report* for all *metering data* that fails the validation component of the Validation, Estimate and Editing process. When *Meter Trouble Reports* are issued, the *Central Registration Body* shall give instructions to the concerned *Distribution Utility* or *Retail Metering Service Provider* who shall investigate the *meter trouble* and subsequently provide a report to the *Central Registration Body*. The concerned *Retail Metering Services Provider* shall then correct the meter data. Procedures regarding *Meter Trouble Reports* are described in more detail in Section SECTION 7 of this Manual.

6.3 VALIDATION PROCEDURES

This section provides the procedures to be followed by the *Central Registration Body* and the *Retail Metering Service Providers* in the daily and monthly validation processes.

6.3.1 Daily Validation**6.3.1.1 Validation Error Categories**

The *Central Registration Body* shall perform several checks upon receipt of *metering data*. These checks are described further in Section 6.3.1.2. *Metering data* that fails the checks will be reported according to four (4) error categories:

- a) Uncertain Value
- b) Missing Values
- c) Outside Historical Min/Max
- d) Orphan values

6.3.1.2 Validation Checks

The following checks shall be performed by the *Central Registration Body* for the above validation error categories:

- a) Check for uncertain values.
- b) Check for missing values.
- c) Check for values in the *metering data* which fall outside the maximum and minimum range of the historical data. The historical data used in this check are as follows:
 - i. Value during the same hour last week,
 - ii. Value during the same hour the previous day, and
 - iii. Average of the values during the whole previous day.
- d) Check for values in the *metering data* whose *meter* is not registered in the *Central Registration Body*.

6.3.1.3 Meter Trouble Report

In cases where a *metering data* error is detected, the *Central Registration Body* shall issue a *Meter Trouble Report* to the concerned *Retail Metering Services Provider*. Further details are provided in Section SECTION 7 of this Manual.

6.3.1.4 Validation Reporting

The *Central Registration Body* shall prepare a daily validation report containing the errors encountered for the day and their respective category.

6.3.2 Monthly Validation

In addition to the daily validation, the *Central Registration Body* shall also validate the monthly *metering data* sent to the *Central Registration Body* by the *Retail Metering Services Providers*. The procedure for the monthly validation is as follows:

- a) The *Retail Metering Services Provider* shall submit a preliminary CD in accordance with Section 5.3.3 of this Manual. The preliminary CD must have no missing values;
- b) The *Central Registration Body* shall compare the values contained in the CD to the daily *metering data* of each *metering point* earlier submitted by the *Retail Metering Services Provider*. If there are discrepancies between the values, a *Meter Trouble Report* (refer to Section SECTION 7) shall be issued to the *Retail Metering Services Provider*;
- c) If issued a *Meter Trouble Report*, a *Retail Metering Services Provider* shall correct the *metering data* and submit a final CD not later than five (5) business days prior to the issuance of the final settlement statement; and
- d) All CDs shall be formally transmitted to the *Central Registration Body* with a cover letter identifying all the *metering points*, through their Standard Equipment Identification Number, in the CD and their respective total monthly *metering data*.

6.3.3 Validation of Off-Take Meters

The *Central Registration Body* shall, on a daily and monthly basis, validate the assignment of off-take meters to facilities of *Contestable Customers*. In this validation, the *metered quantity* of an off-take *meter* is checked against the aggregate *metered quantity* of all facilities of *Contestable Customers* assigned to the off-take *meter*. The *metered quantity* in the off-take *meter* shall be greater than the aggregate *metered quantity* of all facilities of *Contestable Customers* assigned to the off-take *meter*.

If the aggregate *metered quantity* of all facilities of *Contestable Customers* assigned to the off-take *meter* exceeds the *metered quantity* at that off-take *meter*, the *Central Registration Body* shall facilitate the re-assignment of off-take *meters*.

6.3.4 Metering Installation Validation Tests

Pursuant to *Retail Rules* Clause 4.6.2.1, in case of *metering data* error, the *Retail Metering Services Provider* shall perform validation, estimation and editing in order to derive corrected *metering data*. This section provides the validation tests that a *Retail Metering Services Provider* shall perform on its *metering installations*.

6.3.4.1 Current and Voltage Check

This indicator detects the loss of voltage and/or current input to the *meter* due to failure of the supply from one or more *instrument transformers* or tampering.

6.3.4.2 Load Profile vs. Meter Reading

These checks for corruption related to the *meter* multiplier.

6.3.4.3 Intervals Found vs. Interval Expected

Check for missing intervals.

6.3.4.4 Time Synchronization

Checks for synchronism of meter clock to Philippine Standard Time/Data Collection System time.

6.3.4.5 Number of Power Outage Intervals

This indicator allows periods of zero primary power to be identified.

6.3.4.6 Cyclic Redundancy Check / Read-Only Memory / Random Access Memory

This is part of the internal components of a *meter*, which is automatically flagged when failing.

6.3.4.7 Meter Clock Overflow

Flag generated by the *meter* indicating failure of internal electronics.

6.3.4.8 Hardware Reset

Flag generated by the meter indicating failure of internal electronics.

6.3.4.9 Time Reset

Indicates the interval in which the meter clock time has been changed creating either a shorter or longer interval.

6.3.4.10 Data Overflow on Interval

This indicates that the meter is creating more pulses than it can record in an interval or Data Collection System (DCS) can accommodate in an interval.

6.3.4.11 Number of Channels

The actual number of data channels from the meter does not match the number expected at the data collection System.

6.3.4.12 Changed Device ID

The internal device identifier does not match the value registered at the data collection system.

6.3.4.13 Watchdog Time Out

This is the failure of the meter to return data in response to a poll within the required time frame. This is reported by some recorders when a watchdog register is tripped or activated.

6.3.4.14 Parity Error

This indicator determined by a parity error bit that is set by a recorder on a channel of data during status check or read/write function.

6.3.4.15 Event Log Check

Checks error messages and alarms recorded by the meter.

6.4 ESTIMATION PROCEDURES

In accordance with *Retail Rules* Section 3.3.5.3(a), if no *metering data* is submitted by the relevant *Retail Metering Services Provider* in accordance with the billing and settlement timetable, the *Central Registration Body* shall determine the *metered quantity* of a facility of a *Contestable Customer* using the historical load profiles of that facility of a *Contestable Customer*.

6.4.1 Daily Process

The *Central Registration Body*, upon detection of a *metering error* in the daily *metering data* submitted by the *Retail Metering Services Providers*, shall estimate the *metering data* on a daily basis.

6.4.1.1 Uncertain Value Checking

Any value in the *metering data* that falls outside the maximum and minimum range of the *metering data* as recorded in the registry of the *Central Registration Body* metering system shall be marked with the status 'uncertain'. Metering data with values with 'uncertain' status are estimated using the following:

6.4.1.1.1 Historical Values

The values with 'uncertain' status may be replaced using the following historical data:

- a) Value during the same hour last week,

- b) Value during the same hour the previous day, and
- c) Average of the values during the whole previous day.

6.4.1.1.2 Backup Meter

The values with 'uncertain' status may be replaced with the values from the backup meter during the same hour.

6.4.1.1.3 Previous Hour Data

The values with 'uncertain' status may be replaced using the reading from the previous hour.

6.4.2 Monthly Process

This section details the procedures conducted monthly for estimating *metering data* for the determination of the *metered quantity* of a *Contestable Customer*.

6.4.2.1 Interpolation of Metering Data

If *metering data* are missing on one (1) to four (4) consecutive fifteen-minute intervals, *metering data* shall be estimated by means of interpolation between the available intervals.

6.4.2.2 Back-up Meter Data

If more than four (4) fifteen-minute intervals are missing, data from the backup *meter* can be directly substituted for the missing data from the main *meter* provided that the historical difference of *metering data* between the main and backup *meters* does not exceed more than $\pm 0.6\%$. If the average deviation exceeds $\pm 0.6\%$, a correction factor shall be applied using the historical difference between the main and backup *meters*.

6.4.2.3 From Grid Off-Take Meter

If both the main and backup *meters* fail, the *metering data* on the *metering point* of the facility of the *Contestable Customer* shall be estimated using the *metering data* from its grid off-take *meter*. The load profile of the grid off-take *meter* of the *Contestable Customer* shall be adjusted using a historical factor obtained through the comparison of the historical grid off-take *metering data* and historical main *metering data*. The following guidelines shall be followed in performing this estimation:

- a) The hourly equivalent *metering data* shall be computed proportionately according to the load profile obtained from available grid off-take

metering data corresponding to the *metering point* for the time covered by the register readings; and

- b) The *metering data* of the facility of the *Contestable Customer* shall be proportionate to the grid off-take meter using historical factor.

6.4.2.4 Scientific Method of Estimation

If there is a loss of one of the phase voltages and currents, estimation shall be performed through the scientific method of calculation using the average remaining phase voltages or currents of good data from the historical load profile.

6.4.2.5 Historical Meter Data

If the above methods do not provide reasonable values, the following historical data from the main *meter* may be used for estimating missing values:

- a) Values during the same hour of the previous day with the same day type (i.e., weekday or weekend),
- b) Values during the same hour of the same day last week recorded by the same *meter* (i.e. Saturday, Sunday, Holidays), and
- c) Average value of the values during the same hour of the same day of the three (3) previous weeks recorded by the same *meter*.

6.4.2.6 Other Technical Methods

Other technical methods proposed and submitted by the *Retail Metering Services Providers* may be considered by the *Central Registration Body*.

6.5 EDITING PROCEDURE

The *Central Registration Body* shall update the *metering data* in the *metering database* to correct the values submitted by the *Retail Metering Services Provider*. This update shall include actual *metering data* obtained as well as estimated *metering data* from the main and back-up *meters* within the required period.

6.6 APPROVAL AND EXPORTING

The *Central Registration Body* shall approve all received *metering data* before they are used in the settlement process. These *metering data* shall have been reviewed and verified using the methods discussed in Section 6.3 and 6.4. Settlement-ready *metering data* shall be exported to the settlement process and only approved data are transferrable.

SECTION 7 METER TROUBLE REPORT**7.1 COVERAGE**

This section provides the details and procedures in relation to the *Meter Trouble Report* and its issuance.

7.2 INITIATION

A Meter Trouble Report may be initiated due to the following:

- a) A *metering data* error is detected through the validation process described in Section 6.3 of this Manual; or
- b) A *Retail Metering Services Provider*, a *Contestable Customer*, or a *Supplier* requests the *Central Registration Body* to issue a *Meter Trouble Report* to the *Retail Metering Services Provider* due to difficulties in communicating with a *metering installation*, or validation of *metering data*. Where the *Central Registration Body* determines that a *Meter Trouble Report* is not required, it shall notify the *Retail Metering Services Provider*, *Contestable Customer*, or *Supplier* of its decision within twenty-four (24) hours.

7.3 ISSUANCE

The *Central Registration Body* shall issue a *Meter Trouble Report* to the concerned *Retail Metering Services Provider* and, for information, its associated *Contestable Customer or Supplier* within twenty-four (24) hours after detection or request.

7.4 RESOLUTION**7.4.1 Timeline**

Upon receipt of the *Meter Trouble Report*, a *Retail Metering Services Provider* shall submit the correct *metering data* to the *Central Registration Body* within two (2) *business days*.

7.4.2 Unresolved Meter Trouble Reports**7.4.2.1 Estimation**

If a *Meter Trouble Report* is still unresolved after the designated timeline in Section 7.4.1, the *Central Registration Body* shall implement the estimation and editing of *metering data* in accordance with Section SECTION 6 of this Manual.

7.4.2.2 Late Resolution

The *Retail Metering Services Provider* may still resolve a *Meter Trouble Report* and provide *metering data* acceptable to the *Central Registration Body* after the deadline set in Section 7.4.1. For late resolutions, the deadline to be reflected in the final settlement statement is five (5) *business days* prior to the issuance of the final settlement statement of the affected *trading day*.

7.4.2.2.1 Before Deadline

If the *Retail Metering Services Provider* resolves the *Meter Trouble Report* and submits *metering data* not later than five (5) business days prior to the issuance of the final settlement statement date of the affected *trading day*, the *Central Registration Body* shall use the submitted *metering data* for the final settlement of the *Supplier* or *Contestable Customer*.

7.4.2.2.2 After Deadline

If the *Retail Metering Services Provider* resolves the *Meter Trouble Report* and submits *metering data* later than five (5) business days prior to the issuance of the final settlement statement of the affected *trading day*, the *Central Registration Body* shall reflect the said adjustment in the succeeding *billing period*²³.

7.4.2.3 Certification

The *Retail Metering Services Provider* shall provide a certification on the adjusted *metering data* showing the agreement of all affected parties in accordance with *Retail Rules* Clause 4.6.2.3.

7.4.2.4 Meter Malfunction

In cases where there is an unintentional *meter* error (e.g., meter multiplier) that causes a *meter* malfunction, the *Retail Metering Services Provider* shall reconcile the *metering data* of the affected *trading intervals* within one (1) year after the date of discovery of such error.

²³ Retail Rules Clause 3.3.5.3(b)

SECTION 8 PERFORMANCE MANAGEMENT**8.1 COVERAGE**

This section provides the *Contestable Customers, Suppliers, Retail Metering Services Providers*, and the *Central Registration Body* the steps for the review, evaluation and measurement of the performance of a *Retail Metering Services Provider*.

8.2 OBLIGATIONS

The *Central Registration Body* shall conduct periodic monitoring and reporting of the ratings of *Retail Metering Services Providers* using the measures in this section.

The *Retail Metering Services Providers* shall, if requested, provide the *Central Registration Body* information necessary for the measurement of their performance.

8.3 OVERVIEW

The *Retail Metering Services Providers* shall be measured with respect to the following areas:

- a) The integrity of *metering data* provided by the *Retail Metering Services Provider* to the *Central Registration Body* and the *Contestable Customers*;
- b) The timeliness of daily and monthly *metering data* delivery with respect to the deadlines in this Manual;
- c) The timeliness in resolving the daily and monthly Meter Trouble Reports; and
- d) Customer satisfaction.

8.4 PERFORMANCE MEASURES

The Central Registration Body shall rate the performance of *Retail Metering Services Providers* against the standards set forth in this section.

8.4.1 Service Delivery**8.4.1.1 Daily Meter Data Delivery**

Daily Meter Data Delivery or Meter Retrieval Success is computed as the ratio of the number of *metering installations* with successfully communicated *metering data* to the total number of registered *metering installations* of the *Retail Metering Services*

Provider. Daily average of Daily Meter Data Delivery shall be greater than or equal to 95%.

8.4.1.2 Integrity of Metering Data

Integrity of Metering Data is computed as the ratio of the number of metering installations for which its *metering data* has passed the validation process to the total number of metering installation with successfully communicated *metering data*. Daily average of the Integrity of Metering Data shall be greater than or equal to 95%.

8.4.1.3 Timeliness and Percentage Resolution of Daily Meter Trouble Reports

Timeliness and Percentage Resolution of Daily Meter Trouble Reports is computed as the ratio of resolved Meter Trouble Reports, within two (2) *business days*, to the total number of *metering installations* for which a daily Meter Trouble Report was issued on. Average daily Timeliness and Percentage Resolution of Daily Meter Trouble Reports shall be greater than or equal to 90%.

8.4.1.4 Timeliness and Percentage Resolution of Monthly Meter Trouble Reports

Timeliness and Percentage Resolution of Monthly Meter Trouble Reports is computed as the ratio of resolved Meter Trouble Reports, not later than five (5) days prior to the issuance of the final settlement statement, to the total number of *metering installations* for which a monthly Meter Trouble Report was issued. Average daily Timeliness and Percentage Resolution of Monthly Meter Trouble Reports shall be greater than or equal to 90%.

8.4.1.5 Timeliness of Monthly Meter Data Delivery

Timeliness of Monthly Meter Data Delivery is computed as the ratio of the actual number of submitted *metering data* measured three (3) calendar days after the end of the *billing period* to the expected number of submitted *metering data* based on the number of *metering installations* of the *Retail Metering Services Provider*. Timeliness of Monthly Meter Data Delivery shall be 100% or complete delivery of *metering data*.

8.4.2 Customer Satisfaction

Customer Satisfaction shall be computed using inputs collected through a survey. The survey shall allow the customers of the *Retail Metering Services Provider* to rate their satisfaction with regard to the following areas:

- a) Corporate Image,
- b) Punctuality and Responsiveness,
- c) Safety, and

d) Behavior and General Impression.

To facilitate the survey, a *Retail Metering Services Provider* Customer Satisfaction Rating (CSR) Sheet shall be issued the customers of the *Retail Metering Services Provider*. Annual average Customer Satisfaction shall be greater than or equal to 90%.

8.4.3 Summary

The performance measures described above are summarized in Table 5.

Table 5. Summary of Retail Metering Services Provider Performance Measures.

Performance Category	Measure	Criteria	Percent Weight	Percent Passing
Service Delivery	Daily Meter Data Delivery	Ratio of metering installations with successfully communicated metering data to total number of metering installations	25	95
	Integrity of Meter Data	Ratio of the number of metering installations with valid metering to the total number of metering installation with successfully communicated metering data	25	95
	Timeliness and Percentage Resolution to the Daily Meter Trouble Report	Ratio of resolved Meter Trouble Reports to the total number of metering installations for which a daily Meter Trouble Report was issued on	15	90
	Timeliness and Percentage Resolution of Monthly Meter Trouble Reports	Ratio of resolved Meter Trouble Reports to the total number of metering installations for which a monthly Meter Trouble Report was issued on	10	90
	Timeliness of Monthly Meter Data Delivery	Ratio of the actual number of submitted metering data to the expected number of submitted metering data based on the number of metering installations	15	100
Customer Satisfaction	Customer Satisfaction Rating	Retail Metering Service Provider Performance Appraisal by their	10	90

		Customers		
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8.4.4 Computation of Overall Performance

The overall performance of the *Retail Metering Services Provider* shall be computed by summing the product of the rating of the *Retail Metering Services Provider* on each performance measure and the percent weight of the same performance measure as indicated in Table 5.

8.5 MONITORING PROCEDURES

The *Central Registration Body* shall calculate the performance measures and the overall performance score (Refer to Section 8.4 for details) of each *Retail Metering Services Provider* on a monthly, semi-annual and annual basis.

8.5.1 Monthly Performance Monitoring

After every *billing period*, the *Central Registration Body* shall release to concerned *Contestable Customers*, *Suppliers* and *Retail Metering Service Providers* the service delivery ratings (refer to Section 8.4.1) of their associated *Retail Metering Service Provider*. If requested, the *Central Registration Body* shall discuss the results of the performance monitoring with the concerned *Contestable Customer*, *Supplier*, or *Retail Metering Service Provider*. The results of the monthly performance monitoring shall be published in the *market information web site*²⁴.

8.5.2 Semi-Annual Customer Satisfaction Monitoring

Every six (6) months, the *Central Registration Body* shall determine the customer satisfaction rating of the *Retail Metering Services Providers* through the issuance of the Customer Satisfaction Rating Sheet to all direct *Contestable Customers* and *Suppliers*. The *Central Registration Body* shall require the direct *Contestable Customers* and *Suppliers* to accomplish and submit their issued Customer Satisfaction Rating Sheets back to the *Central Registration Body*.

The Customer Satisfaction Rating Sheets are to be accomplished every first week of July of the current year and January of the following year. The July rating shall determine the customer satisfaction performance of the *Retail Metering Services Provider* from January to June of the current year while the January rating shall determine the customer satisfaction performance of the *Retail Metering Services Provider* for the second half of the previous year (i.e., July to December).

8.5.3 Annual Performance Monitoring

The Annual Performance Monitoring of *Retail Metering Services Providers* covers the *billing periods* January to December of each year. It shall consist of:

²⁴ www.wesm.ph

- a) The annual rating of the performance measures under Section 8.4.1 computed by averaging the ratings during the twelve (12) *billing periods* of the year, and
- b) The Annual Customer Satisfaction Rating computed by averaging the ratings from the two (2) semi-annual surveys.

The Annual Performance of *Retail Metering Services Providers* shall be submitted by the *Central Registration Body* to the Philippine Electricity Market Corporation (PEMC) Management and published in the *market information web site*.

Appendix A Site Equipment Identification Number Tables
Table A-1. Meter Purpose Designations.

Designation	Meter
R	Main Meter
R1	Alternate Meter (Partial Redundant Metering)
B	Alternate Meter (Full Redundant Metering)
B1	Backup Meter

Table A-2. Metering Equipment, Devices and Auxiliaries Designations.

Designation	Description
CT	Current Transformer
LA	Lightning Arrester
MB	Meter Box
MD	Modem
MF	Multi-function Electronic Meter (Smart Meter)
PT	Potential Transformer
ST	Metering Structure
TS	Meter Test Switch

**Appendix B Guidelines for Designating Metered Participant ID to
Contestable Customers**

These guidelines shall be followed in the labeling and numbering of *metering installations* of a *Contestable Customers*.

1. The Metered Participant ID of *Contestable Customers* shall be identified by four (4) alpha-numeric characters except for cases cited in items 5 and 6 of these guidelines.
2. The Metered Participant ID of *Contestable Customers* whose full name corresponds to a three-letter abbreviation shall be that three-letter abbreviation appended by the zero (0) character.

Example:

Contestable Customer	Metered Participant ID
American Power Conversion	APC0
Bank of the Philippine Islands	BPI0
Cultural Center of the Philippines	CCP0

3. The Metered Participant ID of *Contestable Customers* whose corporate name is composed of only one or two words shall be the first letter of the first word, the succeeding two (2) consonants of the first word, and the first letter of the second word or the zero (0) character.

Example:

Contestable Customer	Metered Participant ID
Amerton, Inc.	AMRI
Ayala Corp.	AYLC
Lancaster	LNC0
Magic Mall	MGCM
TIMEX	TMX0

4. The Metered Participant ID of *Contestable Customers* whose name consists of four (4) letters or less shall be its name itself appended by the zero (0) character, if necessary.

Example:

Contestable Customer	Metered Participant ID
PHPC	PHPC

5. The Metered Participant ID of *Contestable Customers* that have numeric characters in its corporate name shall be the numeric characters and the abbreviation of the alphabetic characters.

Example:

Contestable Customer	Metered Participant ID
14-678 PROPERTY HOLDINGS INC.	146PH
1590 ENERGY CORPORATION	159EC
18-2 PROPERTY HOLDINGS INC	182PH
19-1 REALTY CORPORATION	191RC
6-24 PROPERTY HOLDINGS INC.	624PH
6-3 PROPERTY HOLDINGS INC.	63PHI
21ST CENTURY STEEL MILLS, INC.	21CSM

6. The Metered Participant ID of *Contestable Customers* that have several facilities in their name shall be composed of six (6) alpha-numeric characters. The Metered Participant ID shall be the combination of three (3) alpha-numeric characters corresponding to the abbreviation of their corporate name, two (2) numeric characters corresponding to the facility number, and one (1) numeric character corresponding to the metering installation in that location.

Example:

Contestable Customer	Metered Participant ID
ROBINSONS LAND CORP., Batangas	RLC011
ROBINSONS LAND CORP., Cavite	RLC021
ROBINSONS LAND CORP., Cavite	RLC022
ROBINSONS LAND CORP., Laguna	RLC031
ROBINSONS LAND CORP., Makati City	RLC041
ROBINSONS LAND CORP., Mandaluyong	RLC051
ROBINSONS LAND CORP., Mandaluyong	RLC052
ROBINSONS LAND CORP., Mandaluyong	RLC053
ROBINSONS LAND CORP., Mandaluyong	RLC054
ROBINSONS LAND CORP., Mandaluyong	RLC055
ROBINSONS LAND CORP., Mandaluyong	RLC056
ROBINSONS LAND CORP., Mandaluyong	RLC057
ROBINSONS LAND CORP., Manila	RLC061
ROBINSONS LAND CORP., Manila	RLC062
ROBINSONS LAND CORP., Manila	RLC063
ROBINSONS LAND CORP., Pasig City	RLC071
ROBINSONS LAND CORP., Quezon City	RLC081
ROBINSONS LAND CORP., Rizal	RLC091
ROBINSONS LAND CORP., Bacolod	RLC101
ROBINSONS LAND CORP., Cebu	RLC111