Philippine Electricity Market Corporation

WHOLESALE ELECTRICITY SPOT MARKET
RULES CHANGE COMMITTEE

RESOLUTION NO. 2014-05

Proposed Amendments to the WESM Rules and the Manual on the Management of Procedure for Load Shedding

WHEREAS, on 06 November 2013, the Rules Change Committee (RCC) received the Philippine Electricity Market Corporation's (PEMC) Proposed Amendments to the Manual on the Management of Procedure for Load Shedding (attached as ANNEX A);

WHEREAS, the Proposal is intended to improve the document with regard to context, process and governance in response to specific Audit findings and recommendations relative to the subject Manual;

WHEREAS, the Proposal was presented by PEMC to the RCC during the 80th RCC Meeting held on 06 November 2013;

WHEREAS, during the same meeting, the RCC approved the posting of the Proposal in the WESM Market Information Website, to solicit comments from Market Participants and other interested parties;

WHEREAS, the Proposal was posted in the public information website on 12 November 2013, with the notification-email requesting comments from interested parties issued the following day;

WHEREAS, during the 82nd RCC Meeting held on 08 January 2014, the RCC deliberated on the Proposal (ANNEX B) and after giving due course on the matter, on that same meeting, the RCC passed a Resolution approving the Proposed Amendment to the Manual on the Management of Procedure for Load Shedding, as discussed and thereafter revised, as well as the RCC-recommended proposed changes to the WESM Rules for its endorsement to the PEM Board;

NOW THEREFORE, we, the undersigned and in behalf of the sector we represent, hereby resolve as follows:

RESOLVED, that the Proposed Amendments to the WESM Rules (ANNEX C) and the Manual on the Management of Procedure for Load Shedding (attached as ANNEX D) are hereby adopted and approved;

RESOLVED FURTHER, that the attached Proposed Amendments to the WESM Rules and the Manual on the Management of Procedure for Load Shedding be endorsed to the PEM Board for its approval.

Done this 08 January 2014, Pasig City.

Approved by:
RULES CHANGE COMMITTEE

Rowena Cristina L. Guevara
Chairperson
University of the Philippines
(UP)

Members:

Concepcion I. Tanglao Independent	**Francisco L.R. Castro, Jr.** Independent Tensaiken Consulting
Maila Lourdes G. de Castro Independent	**Jose Ferlino P. Raymundo** Generation Sector SMC Global
Theo Cruz Sunico Generation Sector 1590 Energy Corporation (1590 EC)	**Joselyn D. Carabuena** Generation Sector Power Sector Assets and Liabilities Management Corporation (PSALM)
Gilbert A. Pagobo Distribution Sector (PDU) Mactan Electric Company (MECO)	**Ciprinilo C. Meneses** Distribution Sector (PDU) Manila Electric Company (MERALCO)
Jose P. Santos Distribution Sector (EC) Ilocos Norte Electric Cooperative, Inc. (INEC)	**Sulpicio C. Lagarde Jr.** Distribution Sector (EC) Central Negros Electric Cooperative, Inc. (CENECO)
Loreto H.Rivera Supply Sector Team Energy	**Isidro E. Cacho Jr.** Market Operator Philippine Electricity Market Corporation (PEMC).
Ambrocio R. Rosales Transmission Sector National Grid Corporation of the Philippines (NGCP)	
	Certified True and Correct: **Elaine D. Gonzales** RCC Secretary PEMC

ANNEX A

Wholesale Electricity Spot Market

WESM-WM-(Manual)-CN - RCC / ORCP-WM-13-14

REQUEST FOR AMENDMENTS OR CHANGES TO THE WESM MANUALS

Proposals made only under this prescribed form shall be accepted and considered as submitted:

This request for amendments to the WESM Rules can be submitted to:

PEM Board
Attention: **PEM Committee Secretariat**
Philippine Electricity Market Corporation
18/F Robinsons Equitable Tower
ADB Avenue, Ortigas Center
Pasig City, 1605 Philippines
Email address: rcc@wesm.ph
Fax Number: (+632) 395-2704

I. Proposer's Information

Name	**MELINDA L. OCAMPO**
Designation	President
Signature	
Company	Philippine Electricity Market Corporation
Company Address	18/F Robinsons Equitable Tower, ADB Avenue, Ortigas Center, Pasig City
Telephone No.	631 8734
Fax. No.	636 0802
Email Address	mlocampo@wesm.ph

II.WESM Manual Amendments Information

Title of WESM Manual being commented: **Management of Procedure for Load Shedding**

Nature of Request (please indicate with x)
☐ Addition ☒ Alteration ☒ Deletion ☐ Clarification ☐ Clerical Correction

III. Proposed Amendment

Title	Section	Provision	Proposed Amendment	Rationale
Section Renumbering		Original Section Numbers (Table of Contents) Section 1- Introduction Section 2- Definition of Terms Section 3-Objective Section 4- Scope Section 5- Responsibilities 5.1- System Operator 5.2 Market Operator 5.3 WESM Participants Section 6- Pre/Conditions/Pre-Requirements Section 7- ALD Procedure Section 8: MLD Procedure Attachment A: Load Shedding Allocation Program	New Section Numbers: (Table of Contents) Section 1- Introduction 1.1 Background 1.2 Purpose 1.3 Scope Section 2- Definition, References and Interpretation 2.1 Definitions 2.2 References 2.3 Interpretation Section 3- Responsibilities Section 4- Load Shedding Procedure 4.1 Pre/Conditions/Pre-Requirements to Load Shedding 4.2 MLD Procedure 4.3 ALD Procedure Section 5- Review, Revision and Amendments Section 6- Publication and Effectivity	The Manual has been restructured to adopt the procedure framework recommended by the PEMC Harmonization TWG.
New Section	**SECTION 3 RESPONSIBILITIES**	**Introduction** Load shedding, as defined in the WESM Rules, is reducing or disconnecting load from the system. This action is conducted by the System Operator in response to: a. An overall shortage of energy at a	Introduction 1.1 Background ~~Load shedding, as defined in the WESM Rules, is reducing or disconnecting load from the system. This action is conducted by the System Operator~~ 1.1.1***WESM Rules*** **Clause 3.9.1 state**	The purpose of these revisions is to reflect/cite the relevant clauses of the WESM Rules in managing and implementing load shedding.

Title	Section	Provision	Proposed Amendment	Rationale
		node or in a region specified in the market network model, or b. Other network conditions, as determined by the System Operator in accordance with the procedures established under the Grid Code and the Distribution Code. Load shedding is also implemented by the System Operator upon advice from the Market Operator in the event that: a. day ahead projections performed using the market dispatch optimization model, or b. dispatch optimization performed prior to commencement of each trading interval, indicate that nodal energy prices are expected to be equal to, or exceed nodal value of lost load (VoLL) at any customer nodes in the market network model.	**that the *System Operator* may direct a *WESM Member* to conduct *load shedding*** in response to **the following:** a) An overall shortage of energy at a node or in a region specified in the market network model; or b) Other network conditions, as determined by the System Operator's accordance with the procedures established under the Philippine Philippine Grid Code and Philippine Philippine Distribution Code. **1.1.2 WESM Rules 3.9.2 state that the Market Operator shall provide an load shedding** ~~is also implemented by the System Operator upon~~ advice ~~from the Market Operator in the event that:~~ **based on the results of** Day-Ahead projections ~~performed using the market dispatch optimization model, or dispatch optimization performed prior to commencement of each trading interval,~~ **and Real-Time Dispatch, particularly for nodes that** indicate that nodal energy prices expected to be equal to, or exceed, Nodal VoLL at any customer nodes in the market network model. **1.1.3 WESM Rules Clause 3.9.3 state that the System Operator shall consider the following criteria in initiating load shedding**	

Title	Section	Provision	Proposed Amendment	Rationale
			a) Initiate load shedding at the nodes advised by the Market Operator, or at other nodes after taking account of the load shedding targets from the relevant dispatch optimization, and any other considerations which they consider relevant under the Philippine Grid Code and Philippine Distribution Code and any other applicable regulatory instrument. b) Initiate load shedding in response to any other circumstances which it reasonably considers necessitates such action under the Philippine Grid Code and Philippine Distribution Code or any other applicable regulatory instrument.	

Title	Section	Provision	Proposed Amendment	Rationale
Responsibilities	3	**System Operator** **(b)** Declare an emergency when it determines the existence of a situation which has an adverse material effect on electricity supply or which poses as a significant threat to system security.	3.1 System Operator 3.1.2 ~~Declare an emergency~~ **Recognize the operating state to be in an *emergency* condition** when it determines the existence of a situation which has an adverse material effect on electricity supply or which poses as a significant threat to system security.	Reworded for clarity.
Responsibilities	3		**New Provision** Responsibilities of Market Operator a) xx b) xx c) **Issue market advisory to *WESM Members***	This responsibility is added to ensure that all WESM members are properly informed when load shedding occurs.
MLD Procedure	4	Implement measures as provided for in Clauses 7.6.1.4 Frequency Control and Voltage Control of the Grid Code, or Clause 6.5.2 Response to an Emergency and 6.6.5 Intervention due to System Security Threat of the WESM Rules	Implement measures as provided for in Clauses ~~7~~ **6** .6.1.4 **and 6.6.1.5 of the** Frequency Control and Voltage Control of the Philippine Grid Code, or Clause 6.5.2 Response to an Emergency and 6.6.5 Intervention due to System Security Threat of the WESM Rules	Cited the correct provision of the Philippine Grid Code.
Review, Revision and Amendment	New Section 5		**Amendments to this *Market Manual* shall be done in accordance with Chapter 8 of the WESM Rules and the provisions of the *Rules Change Manual*.**	Added as reference the WESM Rules Change Manual to document the process in amending and proposing changes to this Manual.
Publication and Effectivity	New Section 6		**This Manual shall take effect fifteen (15) days from its publication on the**	Added in accordance with the provisions of the Rules Change

Title	Section	Provision	Proposed Amendment	Rationale
			website, or as provided by the PEM Board, whichever comes earlier.	Manual.

Note: For convenience, please underline and put in bold letters the proposed changes to the WESM Manual.

IV. Proposed Scheme to Monitor the Effectiveness of the Proposed Changes to the WESM Manual

V. Referral

MAG Date Received: 06 November 2013 Monday

Proposed Amendment: ☐ Urgent ☐ Minor ☐ General

A. For Urgent Amendment (For the use of PEMC President only)

Date Referred to PEMC President	☐ Yes	☐ No
Certifies as urgent	☐ Yes	☐ No
Convene the RCC within 48 hrs.		
Remarks:		

B. For Minor and General Amendment (For the use of RCC only)

Date Referred to RCC:	06 November 2013
Remarks:	
Action taken:	
Request for comments:	☐ Yes ☐ No
	Request written comments from: ☐ DRG ☐ MSC ☐ PA ☐ MO ☐ ECO ☐ RCC ☐ TC ☐ Other PEM Board Committees ☐ Other Interested Parties
For further review of the Technical Sub-Committee:	☐ Yes Assigned to: ☐ SO Sub-Committee ☐ MO Sub-Committee ☐ Metering Sub-Committee ☐ Billing and Settlement Sub-Committee

Rsart

	☐ Legal and Regulatory Sub-Committee
	☐ No
For public consultation:	☐ Yes ☐ No
RCC Resolution:	☐ Approved ☐ Disapproved
RCC Resolution No.:	
Date of Resolution:	
RCC Meeting No.	
Date of endorsement to the PEM Board:	

ANNEX A

RCC/ ORCP-WRM-13-14

Wholesale Electricity Spot Market

Amendments to the WESM Manual on the Management Procedure for Load Shedding

Melinda L. Ocampo

October 2013

I. SUMMARY OF THE PROPOSED AMENDMENT

The proposed amendments discussed in this paper intend to address the Audit finding on the context, process, and governance, and improve the manual in terms of process documentation.

Description of Change	Highlights
New Structure for Market Manuals	Implementation of new guidelines for writing Market Manuals, which includes prescribed formats and guidelines for content
Context	❑ References to the WESM Rules ❑ References to the Philippine Grid Code and Philippine Distribution Code
Process	❑ Revised Responsibilities Section ❑ Revised Manual Load Dropping Procedure ▪ Revised Pre-Condition Requirements ❑ Revised Automatic Load Dropping Procedure ▪ No Pre-Condition Requirements
Governance	As prescribed through the new format for Market Manuals

II. BACKGROUND

As required under the WESM Rules, the second (2^{nd}) Independent Operational Audit of the systems and procedures on market operations was undertaken in 2011.

As part of the audit, a review of all Market Manuals on market operations was conducted, to assess whether the manuals are aligned with the WESM Rules and meet best practice standards as assessed through the auditor's evaluation framework.

The manuals were reviewed using the following criteria:

1. Compliance: Whether the manuals comply with the requirements of the WESM Rules
2. Context: Whether the manuals contain a descriptive introduction and contain reference to the appropriate procedures, WESM Rules, and other documents
3. Process: Whether the manuals contain a full description of the steps to be taken, the sources of data, and the storage locations for both data and outcomes

4. Timeline: Whether there is a full description of the timeline and deadlines required

5. Accountability: Whether there are provisions identifying the responsible entity/entities for each step of the procedure

6. Governance: Whether adequate document control and approval are practiced

In order to address the auditor's recommendations, PEMC committed to formulate a manual change proposal based on the suggestions made by the auditor, for submission to the Rules Change Committee. For your reference, please see attached summary of PA's findings on this Manual during the 2011 MO Audit.

III. THE PROPOSED AMENDMENTS

Please see attached form for the detailed amendments.

IV. BACKGROUND AND DESCRIPTION OF THE PROPONENT

Ms. Melinda L. Ocampo is the current President of PEMC. PEMC is a non-stock non-profit organization established in 2003 thru the EPIRA to operate the Philippine WESM. PEMC has been commercially operating the WESM since June 26, 2006.

V. CONCLUSIONS AND RECOMMENDATIONS

The proposed amendments to this Manual are necessary to address deficiencies in the documentation of the procedure. The revised manual is envisioned to provide better guidance to all users of the manual to ensure the efficient implementation of the procedure on load shedding.

VI. REFERENCES

A. WESM Rules
B. Procedure Review Report of PA Consulting

PUBLIC

WESM Manual

Management Procedure for Load Shedding Issue 2

Abstract	This document covers method and procedures in managing load shedding.

Document Identity: WESM-MPLS-002
Issue: 002
Reason for Issue: Audit Findings
Approval Date:
Publication Date:
Effective Date:

Document Change History

Issue No.	Proponent	Date of Effectivity	Reason for Amendment

Document Approval

Issue No.	RCC Approval	RCC Resolution No.	PEM Board Approval	PEM Board Resolution No.
0				
2				

Reference Documents

Document ID	Document Title
	WESM Rules
	Philippine Grid Code
	Philippine Distribution Code
WESM-DP	Dispatch Protocol Manual

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SECTION 1 INTRODUCTION

1.1. BACKGROUND

1.1.1. *WESM Rules* Clause 3.9.1 state that the *System Operator* may direct a *WESM Member* to conduct *load shedding* in response to the following

a) An overall shortage of energy at a node or in a region specified in the market network model; or

b) Other network conditions, as determined by the System Operator's accordance with the procedures established under the Grid Code and Distribution Code.

1.1.2. *WESM Rules* Clause 3.9.2 state that the *Market Operator* shall provide an advice on *load shedding* based on the results of the Day-Ahead Projection and Real-Time Dispatch, particularly for nodes that indicate that nodal energy prices expected to be equal to, or exceed, Nodal VoLL at any customer nodes in the market network model

1.1.3. *WESM Rules* Clause 3.9.3 state that the *System Operator* shall consider the following criteria in initiating load shedding

a) Initiate load shedding at the nodes advised by the Market Operator, or at other nodes after taking account of the load shedding targets from the relevant dispatch optimization, and any other considerations which they consider relevant under the Grid Code and Distribution Code and any other applicable regulatory instrument.

b) Initiate load shedding in response to any other circumstances which it reasonably considers necessitates such action under the Grid Code and Distribution Code or any other applicable regulatory instrument.

1.1.4. Based on the Grid Code and Distribution Code, *load shedding* can either be in the form of an *automatic load dropping* (ALD), a *manual load dropping* (MLD), or both.

1.1.5. For clarity in the procedures to be followed by the *System Operator*, the terms *automatic load dropping* and *manual load dropping* shall be used. Also, the procedures were formulated separately as the two events have different courses of action to be undertaken by the *System Operator*

1.1.6. For the *System Operator*, *load shedding* is instigated when the demand for electricity exceeds the supply capacity of the system, to prevent voltage sags or voltage instability and to restore transmission voltages to allowable limits, and/or to prevent the overloading of line or equipment. It is resorted to when available options to address the supply-demand imbalance, severe under-voltage or impending voltage sag or voltage instability condition, and/or line/equipment overloading have been exhausted.

1.1.7. Pursuant to *WESM Rules* Clause 3.9.7, the *System Operator* and the *Market Operator* shall manage all aspects of dispatch and pricing during periods when *load shedding* is required in accordance with the detailed procedures to be developed by the *System Operator* and the *Market Operator*, in consultation with WESM Participants, and subject to approval by the *PEM Board.*

1.1.8. This *Market Manual* was made consistent with the Grid Code and Distribution Code

1.2. PURPOSE

This document is intended to establish the responsibilities of the *WESM Members* and provide work procedures to the *System Operator* in managing supply shortfall, severe under-voltage and/or line or equipment overloading. It also aims to provide a consistent and equitable approach that uses best endeavors to balance the need for continued power system security and reliability with the electricity needs of the customer. And finally, it seeks to ensure that no *WESM Member* is treated unreasonably in the application of load shedding.

1.3. SCOPE

This management procedure applies to all *WESM Members* and shall be implemented in the Luzon and Visayas power systems and later in the Mindanao power system once an electricity market is established there.

SECTION 2 DEFINITIONS, REFERENCES, AND INTERPRETATION

2.1. DEFINITIONS

Unless otherwise defined or the context implies otherwise, the italicized terms used in this Manual that are defined in the *WESM Rules* shall bear the same meaning as defined in the *WESM Rules*. In addition, the following words and phrases as used in this Manual shall have the following meaning -

2.1.1. ***Load shedding*** refers to the reduction or disconnection of load from the system as exercised by the *System Operator* in response to the following.

a) An overall shortage of energy at a node or in a region specified in the market network model
b) A severe under-voltage or voltage instability at one or more nodes
c) Other network conditions, as determined by the System Operator in accordance with the procedures established under the Grid Code and the Distribution Code.

2.1.2. ***Automatic Load Dropping (ALD)***refers to the process of automatically and deliberately removing pre-selected loads from a power system in response to an abnormal condition in order to maintain the integrity of the system

2.1.3. ***Manual Load Dropping (MLD)*** refers to the process of manually and deliberately removing pre-selected loads from a power system in response to an abnormal condition in order to maintain the integrity of the system.

2.1.4. ***Red Alert*** refers to an alert issued by the System Operator when the grid contingency reserve is zero, a generation deficiency exists, or there is critical loading or imminent overloading of transmission lines or equipment.

2.1.5. ***Normal state*** refers to the grid operating condition when the system frequency, voltage, and transmission line and equipment loading are within their normal operating limits, the operating margin is sufficient, and the grid configuration is such that any fault current can be interrupted and the faulted equipment isolated from the grid.

2.1.6. ***Cascading outage*** refers to the uncontrolled successive loss of system elements triggered by an incident at any location.

2.1.7. ***Contingency*** refers to the unexpected failure or outage of a system component, such as a generator, transmission line, power transformer, bus, circuit breaker, or other electrical element. A contingency may also include multiple components, which are related by situations leading to simultaneous component outages.

2.1.8. ***Demand Control*** refers to the reduction in demand for the control of frequency when the grid is in an emergency state. This includes automatic load dropping, manual load dropping, demand reduction upon instruction by the System Operator, demand disconnection initiated by users, customer demand management, and voluntary load curtailment.

2.1.9. ***Demand Control Imminent Warning*** refers to a warning from the System Operator, not preceded by any other warning, which is issued when demand reduction is expected within thirty (30) minutes.

2.1.10. ***Disturbance*** refers to an unplanned event that produces an abnormal system condition.

2.1.11. ***Frequency control*** refers to a strategy used by the System Operator to maintain the frequency of the grid within the limits prescribed by the Grid Code by the timely use of frequency regulating reserve, contingency reserve and demand control.

2.1.12. ***Island grid*** refers to a portion of a power system or several power systems that is electrically separated from the interconnection due to the disconnection of transmission system elements.

2.1.13. ***Multiple outage contingency*** refers to an event caused by the failure of two or more components of the grid including generating units, transmission lines, and transformers.

2.1.14. ***Operating margin*** refers to the available generating capacity in excess of the sum of the system demand plus losses within a specified period of time.

2.1.15. ***Pmin*** refers to the minimum stable loading of generating units in the WESM.

2.1.16. ***Reliability*** refers to the performance of the elements of the bulk electric system that results in electricity being delivered to customers within accepted standards and in the amount desired. Reliability may be measured by the frequency, duration, and magnitude of adverse effects on the electric supply.

2.1.17. ***Security*** refers to the ability of the electric system to withstand sudden disturbances such as electric short circuits or unanticipated loss of system elements.

2.1.18. ***Stability*** refers to the ability of the dynamic components of the power system to return to a normal or stable operating point after being subjected to some form of change or disturbance.

2.1.19. ***Voltage collapse*** refers to an event that occurs when an electric system does not have adequate reactive support to maintain voltage stability. Voltage collapse may result in outage of system elements and may include interruption in service to customers.

2.1.20. ***Voltage control*** refers to any action undertaken by the System Operator or user to maintain the voltage of the grid within the limits prescribed by the Grid Code such as, but not limited to, adjustment of generator reactive output, adjustment in transformer taps or switching of capacitors or reactors.

2.1.21. ***Voltage instability*** refers to a condition that results in grid voltages that are below the level where voltage control equipment can return them to the normal level.

2.1.22. ***Voltage sag*** refers to a short-duration voltage variation where the RMS value of the voltage decreases to between 10 percent and 90 percent of the nominal value.

2.2. REFERENCES

This *Market Manual* shall be read in association with the *WESM Rules*

2.3. INTERPRETATION

Any reference to a section or clause in any Chapter of this *Market Manual* shall refer to the particular section or clause of the same Chapter in which the reference is made, unless otherwise specified or the context provides otherwise.

SECTION 3 RESPONSIBILITIES

3.1. The *System Operator* shall be responsible for the following

3.1.1. Establish the demand requirement for *load shedding* in order to limit the consequences of a major loss of generation in the grid.

3.1.2. Recognize the operating state to be in an *emergency* condition when it determines the existence of a situation, which has an adverse material effect on electricity supply or which poses as a significant threat to system security.

3.1.3. Issue a *Red Alert* Warning as may be necessary

3.1.4. Intervene in the spot market if either (a) an *emergency*, (b) a *threat to system security*, or (c) a *force majeure event* manifests in the grid.

3.1.5. Prepare, implement, and monitor the compliance of *WESM Members* with their load shedding schedule.

3.1.6. Give directions and coordinate with the *Market Operator* and *WESM Members* the actions to be taken in order to restore normal operation of the power system.

3.1.7. Provide the necessary notifications in accordance with the *WESM Rules* under clause 6.5.1.2.

3.1.8. Establish a *load shedding* program based on agreed priorities and equitable load-sharing between the distribution utilities, directly connected customers and cooperatives as shown in Appendix A.

3.1.9. Annually review the *load shedding* program in coordination with the *Market Operator* and the *WESM Members* subject to the approval of the *PEM Board*.

3.2. The *Market Operator* shall be responsible for the following

3.2.1. Inform the *System Operator* of the likelihood of initiating *load shedding* under clause 3.9.2 of the *WESM Rules*.

3.2.2. Coordinate actions with the *System Operator* in the resumption of the spot market to normal operation.

3.2.3. Issue market advisory to *WESM Members*

3.3. The *WESM Members* shall be responsible for the following

3.3.1. Comply with the *emergency* directions given by the *System Operator*, unless it reasonably believes that an *emergency* direction poses a real and substantial risk of damage to its equipment, to the safety of its employees or the public, or if undue injury to the environment.

3.3.2. Provide information required by the *System Operator* in order to address the *emergency* condition.

3.3.3. Generating Entities shall see to it that its units remain in synchronism for operating conditions as specified under the Grid Code.

3.4. *Network Service Providers* shall have a load shedding program prepared in consultation with the *System Operator* with established priority and based on equitable load allocation.

SECTION 4 LOAD SHEDDING PROCEDURES

4.1. PRECONDITIONS / PRE-REQUIREMENTS

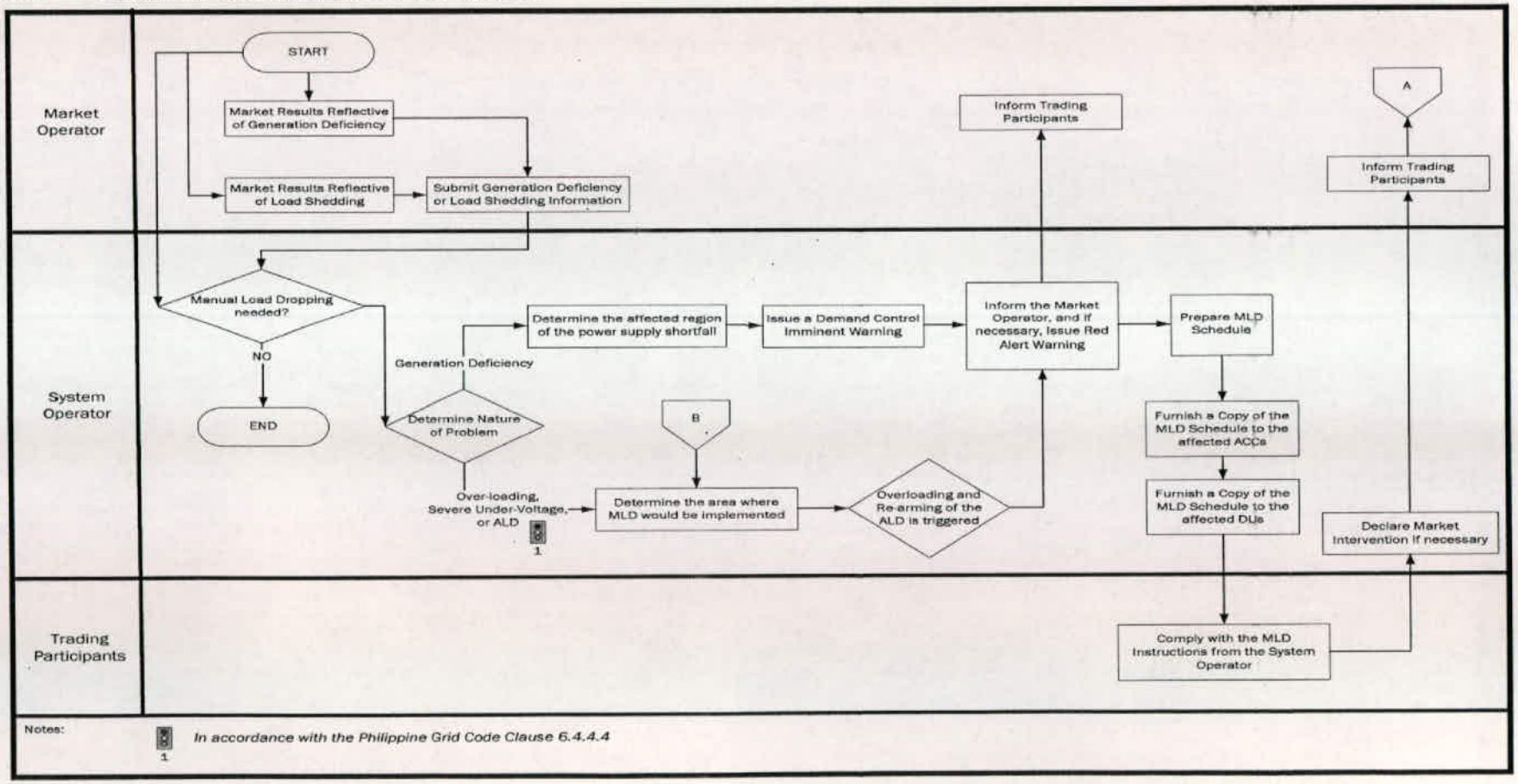
4.1.1. The nodal prices are reflective of the Nodal Volt price based on *market projections* or dispatch optimization performed prior to commencement of each trading interval.

4.1.2. Within a trading interval, a power supply shortfall in the electric system, a region, or a node unexpectedly happened.

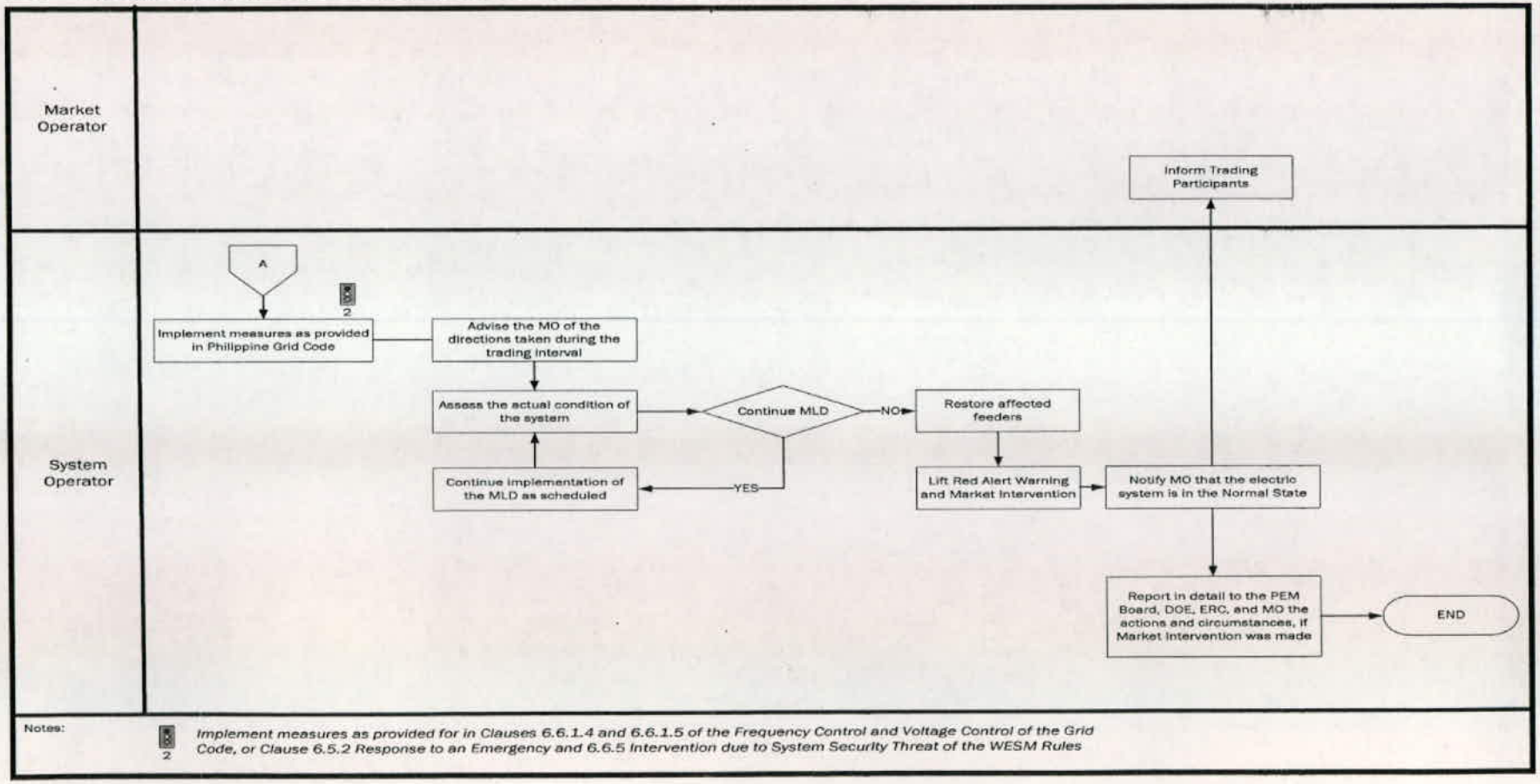
4.1.3. If either (a) an *emergency*, (b) a *threat to system security*, or (c) a *force majeure event* manifests in the grid.

4.1.4. The grid is under *Red Alert*.

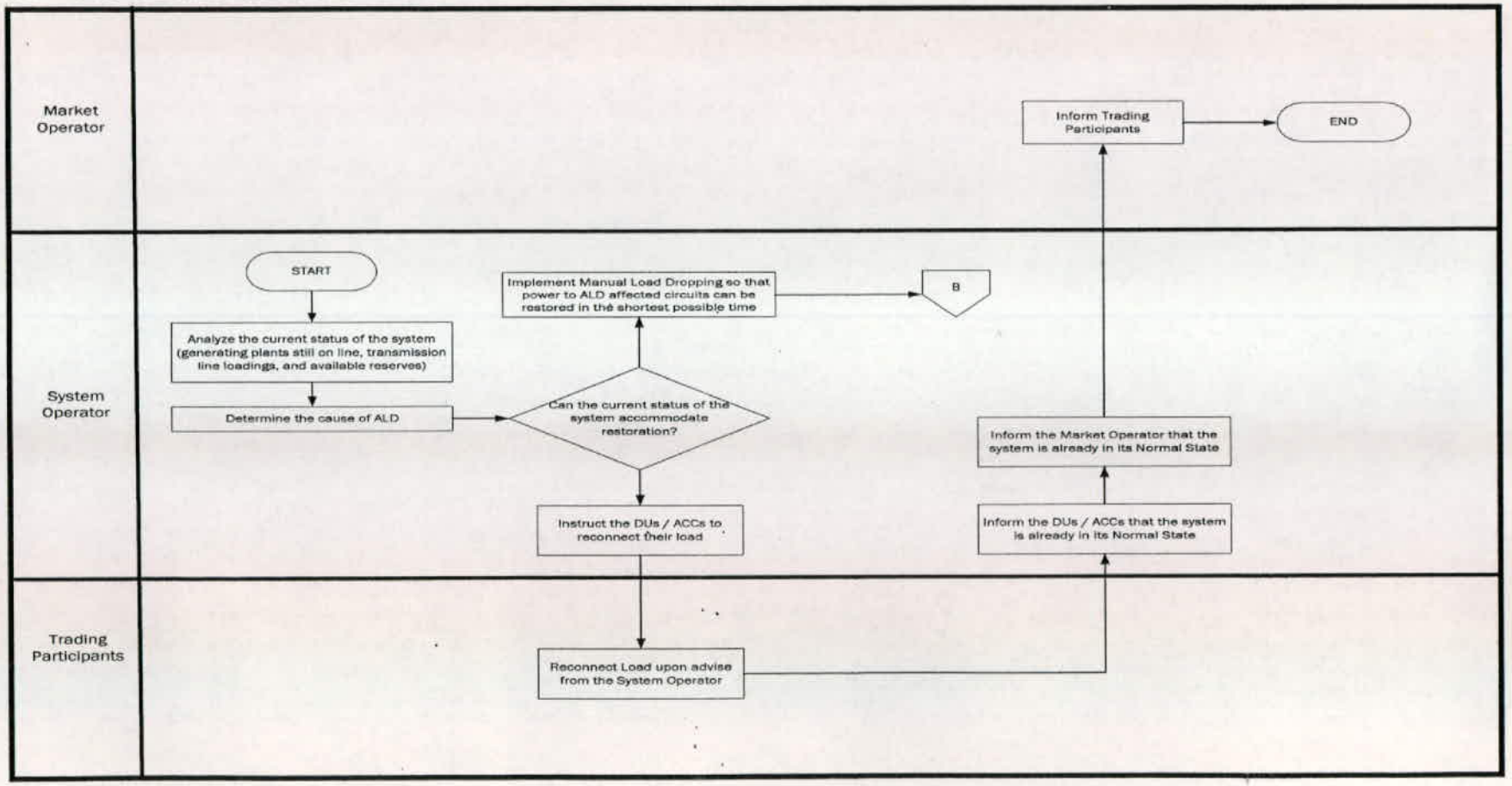
4.2. PROCEDURE FOR MANUAL LOAD SHEDDING



4.3. PROCEDURE FOR SYSTEM RESTORATION AFTER MANUAL LOAD DROPPING



4.4. PROCEDURE AFTER AN AUTOMATIC LOAD DROPPING



SECTION 5 AMENDMENT, PUBLICATION AND EFFECTIVITY

5.1. AMENDMENTS TO THIS MANUAL

Any amendment to, or revision to this Manual shall be approved by the PEM Board.

5.2. PUBLICATION AND EFFECTIVITY

Upon approval of the PEM Board, this Manual shall take effect fifteen (15) days from its publication, or such later date as the PEM Board determines, in accordance with the WESM Manual of Procedures for Changes to the WESM Rules (WESM-RCM)

SECTION 6 APPENDIX

Appendix A. Load Shedding Allocation Program

A. Luzon Grid

The Manual Load Shedding, if needed, shall be implemented on the following customers with the given order ofpriority below:

8:00AM – 5:00PM	5:01PM – 7:59AM the following day
Residential	VLC (voluntary load curtailment)
Commercial	Residential
Industrial	Commercial
	Industrial

The Load Shedding requirement (kWh) shall be distributed among Distribution Utilities in direct proportion to their respective actual demand on an hourly basis.

B. Visayas and Mindanao Grids

The Manual Load Shedding, if needed, shall be implemented on the following customers with the given order of priority below:

1. Residential
2. Commercial
3. Industrial

The Load Shedding requirement (kWh) shall be distributed among Distribution Utilities in direct proportion to their respective actual demand on an hourly basis.

RCC Deliberations on Proposed Amendments to the Manual for Management Procedure for Load Shedding

Title	Section	Provision	Proposed Amendment	Rationale	RCC Proposed Amendment (08 January 2014)
Section Renumbering		Original Section Numbers (Table of Contents) Section 1- Introduction Section 2- Definition of Terms Section 3-Objective Section 4- Scope Section 5- Responsibilities 5.1- System Operator 5.2 Market Operator 5.3 WESM Participants Section 6- Pre/Conditions/Pre-Requirements Section 7- ALD Procedure Section 8: MLD Procedure Attachment A: Load Shedding Allocation Program	New Section Numbers: (Table of Contents) Section 1- Introduction 1.1 Background 1.2 Purpose 1.3 Scope Section 2- Definition, References and Interpretation 2.1 Definitions 2.2 References 2.3 Interpretation Section 3- Responsibilities Section 4- Load Shedding Procedure 4.1 Pre/Conditions/Pre-Requirements to Load Shedding 4.2 MLD Procedure 4.3 ALD Procedure Section 5- Review, Revision and Amendments Section 6- Publication and Effectivity	The Manual has been restructured to adopt the procedure framework recommended by the PEMC Harmonization TWG.	
New Section	**SECTION 3 RESPONSIBILITIES**	**Introduction** Load shedding, as defined in the WESM Rules, is reducing or disconnecting load from the system. This action is conducted by the System Operator in response to: a. An overall shortage of energy at a node or in a region specified in the market network model, or b. Other network conditions, as determined by the System Operator in accordance with the procedures established under the Grid Code and	Introduction 1.1 Background ~~Load shedding, as defined in the WESM Rules, is reducing or disconnecting load from the system. This action is conducted by the System Operator~~ 1.1.1 ***WESM Rules*** **Clause 3.9.1 state that the *System Operator* may direct a *WESM Member* to conduct *load shedding*** in response to **the following:** a) An overall shortage of energy at a node or in a region specified in the market network model; or	The purpose of these revisions is to reflect/cite the relevant clauses of the WESM Rules in managing and implementing load shedding.	**1.1. BACKGROUND** 1.1.1. ***WESM Rules*** **Clause 3.9.1 states that the *System Operator* may direct a *WESM Member* to conduct *load shedding*** in response to **the following:** a) An overall shortage of energy ~~at a node or~~ **at a node or** in a region specified in the market network model; or **b) An overall shortage of energy at a node specified in**

RCC Deliberations on Proposed Amendments to the Manual for Management Procedure for Load Shedding

Title	Section	Provision	Proposed Amendment	Rationale	RCC Proposed Amendment (08 January 2014)
		the Distribution Code. Load shedding is also implemented by the System Operator upon advice from the Market Operator in the event that: a. day ahead projections performed using the market dispatch optimization model, or b. dispatch optimization performed prior to commencement of each trading interval, indicate that nodal energy prices are expected to be equal to, or exceed nodal value of lost load (VoLL) at any customer nodes in the market network model.	b) Other network conditions, as determined by the System Operator's accordance with the procedures established under the Philippine Philippine Grid Code and Philippine Philippine Distribution Code. **1.1.2 WESM Rules 3.9.2 state that the Market Operator shall provide an load shedding** ~~is also implemented by the System Operator upon advice from the Market Operator in the event that:~~ **based on the results of** Day-Ahead projections ~~performed using the market dispatch optimization model, or dispatch optimization performed prior to commencement of each trading interval,~~ **and Real-Time Dispatch, particularly for nodes that** indicate that nodal energy prices expected to be equal to, or exceed, Nodal VoLL at any customer nodes in the market network model. 1.1.3 **WESM Rules Clause 3.9.3 state that the System Operator shall consider the following criteria in initiating load shedding** **a) Initiate load shedding at the nodes advised by the Market Operator, or at other nodes after taking account of the load shedding targets from the relevant dispatch optimization, and any other considerations which they consider relevant under the Philippine Grid Code and Philippine Distribution Code and any other applicable regulatory instrument.** **b) Initiate load shedding in response**		**the market network model; or** c) ~~**b)**~~ Other network conditions, as determined by the System Operator's accordance with the procedures established under the Grid Code and Distribution Code. **1.1.2 WESM Rules 3.9.2 states that the Market Operator shall inform the System Operator on the likelihood of load shedding** ~~is also implemented by the System Operator upon advice from the Market Operator in the event that:~~ **based on the results of** Day-Ahead Projections ~~performed using the market dispatch optimization model, or dispatch optimization performed prior to commencement of each trading interval,~~ **and Real-Time Dispatch, particularly for nodes that** indicate that nodal energy prices **are** expected to be equal to, or exceed, Nodal VoLL at any customer nodes in the market network model. 1.1.3 **WESM Rules Clause 3.9.3 states that the System Operator shall consider the following criteria in initiating load shedding** **a) Initiate load shedding at the nodes based on information provided by the Market Operator, or at other nodes after taking account of the load shedding targets from the relevant dispatch optimization, and any other considerations which they consider relevant under the Philippine Grid**

RCC Deliberations on Proposed Amendments to the Manual for Management Procedure for Load Shedding

Title	Section	Provision	Proposed Amendment	Rationale	RCC Proposed Amendment (08 January 2014)
			to any other circumstances which it reasonably considers necessitates such action under the Philippine Grid Code and Philippine Distribution Code or any other applicable regulatory instrument.		Code and Philippine Distribution Code and any other applicable regulatory instrument. b) Initiate load shedding in response to any other circumstances which it reasonably considers necessitates such action under the Philippine Grid Code and Philippine Distribution Code or any other applicable regulatory instrument.

RCC Deliberations on Proposed Amendments to the Manual for Management Procedure for Load Shedding

Title	Section	Provision	Proposed Amendment	Rationale	RCC Proposed Amendment (08 January 2014)
Responsibilities	3	**System Operator** **(b)** Declare an emergency when it determines the existence of a situation which has an adverse material effect on electricity supply or which poses as a significant threat to system security.	3.1 System Operator 3.1.2 ~~Declare an emergency~~ **Recognize the operating state to be in an *emergency* condition** when it determines the existence of a situation which has an adverse material effect on electricity supply or which poses as a significant threat to system security.	Reworded for clarity.	
Responsibilities	3		**New Provision** Responsibilities of Market Operator a) xx b) xx c) **Issue market advisory to *WESM Members***	This responsibility is added to ensure that all WESM members are properly informed when load shedding occurs.	
MLD Procedure	4	Implement measures as provided for in Clauses 7.6.1.4 Frequency Control and Voltage Control of the Grid Code, or Clause 6.5.2 Response to an Emergency and 6.6.5 Intervention due to System Security Threat of the WESM Rules	Implement measures as provided for in Clauses ~~7~~ **6** .6.1.4 **and 6.6.1.5 of the** Frequency Control and Voltage Control of the Philippine Grid Code, or Clause 6.5.2 Response to an Emergency and 6.6.5 Intervention due to System Security Threat of the WESM Rules	Cited the correct provision of the Philippine Grid Code.	
Review, Revision and Amendment	New Section 5		**Amendments to this *Market Manual* shall be done in accordance with Chapter 8 of the WESM Rules and the provisions of the *Rules Change Manual.***	Added as reference the WESM Rules Change Manual to document the process in amending and proposing changes to this Manual.	
Publication and Effectivity	New Section 6		**This Manual shall take effect fifteen (15) days from its publication on the website, or as provided by the PEM Board, whichever comes earlier.**	Added in accordance with the provisions of the Rules Change Manual.	

convenience, please underline and put in bold letters the proposed changes to the WESM Manual.

Proposed Amendments to the WESM Rules on Load Shedding

Section	Original Provision	RCC-Approved Proposed Amendments	Rationale
3.9.1 Direction to Conduct Load Shedding	The *System operator* may direct a *Trading Participant* to conduct *load shedding* in response to: xxx	The *System operator* may direct a ~~*Trading Participant*~~ *WESM member* to conduct *load shedding* in response to: xxx	Consistency with the proposed changes to the Manual on the sections on load shedding
3.9.4 Advising of Load Shedding	xxx (b)*Trading Participants* who are likely to be directly affected by such *load shedding*.	xxx (*b*)~~*Trading Participants*~~ *WESM members* who are likely to be directly affected by such *load shedding*.	

Wholesale Electricity Spot Market

PUBLIC

WESM Manual

Management Procedure for Load Shedding Issue 2

Abstract	This document covers method and procedures in managing load shedding.

Document Identity: WESM-MPLS-002
Issue: 002
Reason for Issue: Audit Findings
Approval Date:
Publication Date:
Effective Date:

Document Change History

Issue No.	Proponent	Date of Effectivity	Reason for Amendment

Document Approval

Issue No.	RCC Approval	RCC Resolution No.	PEM Board Approval	PEM Board Resolution No.
0				
2				

Reference Documents

Document ID	Document Title
	WESM Rules
	Philippine Grid Code
	Philippine Distribution Code
WESM-DP	Dispatch Protocol Manual

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SECTION 1 INTRODUCTION

1.1. BACKGROUND

1.1.1. *WESM Rules* Clause 3.9.1 states that the *System Operator* may direct a *WESM Member* to conduct *load shedding* in response to the following

a) An overall shortage of energy in a region specified in the market network model; or
b) An overall shortage of energy at a node specified in the market network model; or
c) Other network conditions, as determined by the System Operator's accordance with the procedures established under the Grid Code and Distribution Code.

1.1.2. *WESM Rules* Clause 3.9.2 states that the *Market Operator* shall inform the System Operator on the likelihood of *load shedding* based on the results of the Day-Ahead Projections and Real-Time Dispatch, particularly for nodes that indicate that nodal energy prices are expected to be equal to, or exceed, Nodal VoLL at any customer nodes in the market network model

1.1.3. *WESM Rules* Clause 3.9.3 states that the *System Operator* shall consider the following criteria in initiating load shedding

a) Initiate load shedding at the nodes based on information provided by the Market Operator, or at other nodes after taking account of the load shedding targets from the relevant dispatch optimization, and any other considerations which they consider relevant under the Grid Code and Distribution Code and any other applicable regulatory instrument.
b) Initiate load shedding in response to any other circumstances which it reasonably considers necessitates such action under the Grid Code and Distribution Code or any other applicable regulatory instrument.

1.1.4. Based on the Grid Code and Distribution Code, *load shedding* can either be in the form of an *automatic load dropping* (ALD), a *manual load dropping* (MLD), or both.

1.1.5. For clarity in the procedures to be followed by the *System Operator*, the terms *automatic load dropping* and *manual load dropping* shall be used. Also, the procedures were formulated separately as the two events have different courses of action to be undertaken by the *System Operator*

1.1.6. For the *System Operator*, *load shedding* is instigated when the demand for electricity exceeds the supply capacity of the system, to prevent voltage sags or voltage instability and to restore transmission voltages to allowable limits, and/or to prevent the overloading of line or equipment. It is resorted to when available options to

address the supply-demand imbalance, severe under-voltage or impending voltage sag or voltage instability condition, and/or line/equipment overloading have been exhausted.

1.1.7. Pursuant to *WESM Rules* Clause 3.9.7, the *System Operator* and the *Market Operator* shall manage all aspects of dispatch and pricing during periods when *load shedding* is required in accordance with the detailed procedures to be developed by the *System Operator* and the *Market Operator*, in consultation with WESM Participants, and subject to approval by the *PEM Board*.

1.1.8. This *Market Manual* was made consistent with the Grid Code and Distribution Code

1.2. PURPOSE

This document is intended to establish the responsibilities of the *WESM Members* and provide work procedures to the *System Operator* in managing supply shortfall, severe under-voltage and/or line or equipment overloading. It also aims to provide a consistent and equitable approach that uses best endeavors to balance the need for continued power system security and reliability with the electricity needs of the customer. And finally, it seeks to ensure that no *WESM Member* is treated unreasonably in the application of load shedding.

1.3. SCOPE

This management procedure applies to all *WESM Members* and shall be implemented in the Luzon and Visayas power systems and later in the Mindanao power system once an electricity market is established there.

SECTION 2 DEFINITIONS, REFERENCES, AND INTERPRETATION

2.1. DEFINITIONS

Unless otherwise defined or the context implies otherwise, the italicized terms used in this Manual that are defined in the *WESM Rules* shall bear the same meaning as defined in the *WESM Rules*. In addition, the following words and phrases as used in this Manual shall have the following meaning -

2.1.1. ***Load shedding*** refers to the reduction or disconnection of load from the system as exercised by the *System Operator* in response to the following.

a) An overall shortage of energy at a node or in a region specified in the market network model
b) A severe under-voltage or voltage instability at one or more nodes
c) Other network conditions, as determined by the System Operator in accordance with the procedures established under the Grid Code and the Distribution Code.

2.1.2. ***Automatic Load Dropping (ALD)***refers to the process of automatically and deliberately removing pre-selected loads from a power system in response to an abnormal condition in order to maintain the integrity of the system

2.1.3. ***Manual Load Dropping (MLD)*** refers to the process of manually and deliberately removing pre-selected loads from a power system in response to an abnormal condition in order to maintain the integrity of the system.

2.1.4. ***Red Alert*** refers to an alert issued by the System Operator when the grid contingency reserve is zero, a generation deficiency exists, or there is critical loading or imminent overloading of transmission lines or equipment.

2.1.5. ***Normal state*** refers to the grid operating condition when the system frequency, voltage, and transmission line and equipment loading are within their normal operating limits, the operating margin is sufficient, and the grid configuration is such that any fault current can be interrupted and the faulted equipment isolated from the grid.

2.1.6. ***Cascading outage*** refers to the uncontrolled successive loss of system elements triggered by an incident at any location.

2.1.7. ***Contingency*** refers to the unexpected failure or outage of a system component, such as a generator, transmission line, power transformer, bus, circuit breaker, or

other electrical element. A contingency may also include multiple components, which are related by situations leading to simultaneous component outages.

2.1.8. ***Demand Control*** refers to the reduction in demand for the control of frequency when the grid is in an emergency state. This includes automatic load dropping, manual load dropping, demand reduction upon instruction by the System Operator, demand disconnection initiated by users, customer demand management, and voluntary load curtailment.

2.1.9. ***Demand Control Imminent Warning*** refers to a warning from the System Operator, not preceded by any other warning, which is issued when demand reduction is expected within thirty (30) minutes.

2.1.10. ***Disturbance*** refers to an unplanned event that produces an abnormal system condition.

2.1.11. ***Frequency control*** refers to a strategy used by the System Operator to maintain the frequency of the grid within the limits prescribed by the Grid Code by the timely use of frequency regulating reserve, contingency reserve and demand control.

2.1.12. ***Island grid*** refers to a portion of a power system or several power systems that is electrically separated from the interconnection due to the disconnection of transmission system elements.

2.1.13. ***Multiple outage contingency*** refers to an event caused by the failure of two or more components of the grid including generating units, transmission lines, and transformers.

2.1.14. ***Operating margin*** refers to the available generating capacity in excess of the sum of the system demand plus losses within a specified period of time.

2.1.15. ***Pmin*** refers to the minimum stable loading of generating units in the WESM.

2.1.16. ***Reliability*** refers to the performance of the elements of the bulk electric system that results in electricity being delivered to customers within accepted standards and in the amount desired. Reliability may be measured by the frequency, duration, and magnitude of adverse effects on the electric supply.

2.1.17. ***Security*** refers to the ability of the electric system to withstand sudden disturbances such as electric short circuits or unanticipated loss of system elements.

2.1.18. ***Stability*** refers to the ability of the dynamic components of the power system to return to a normal or stable operating point after being subjected to some form of change or disturbance.

2.1.19. ***Voltage collapse*** refers to an event that occurs when an electric system does not have adequate reactive support to maintain voltage stability. Voltage collapse may result in outage of system elements and may include interruption in service to customers.

2.1.20. ***Voltage control*** refers to any action undertaken by the System Operator or user to maintain the voltage of the grid within the limits prescribed by the Grid Code such as, but not limited to, adjustment of generator reactive output, adjustment in transformer taps or switching of capacitors or reactors.

2.1.21. ***Voltage instability*** refers to a condition that results in grid voltages that are below the level where voltage control equipment can return them to the normal level.

2.1.22. ***Voltage sag*** refers to a short-duration voltage variation where the RMS value of the voltage decreases to between 10 percent and 90 percent of the nominal value.

2.2. REFERENCES

This *Market Manual* shall be read in association with the *WESM Rules*

2.3. INTERPRETATION

Any reference to a section or clause in any Chapter of this *Market Manual* shall refer to the particular section or clause of the same Chapter in which the reference is made, unless otherwise specified or the context provides otherwise.

SECTION 3 RESPONSIBILITIES

3.1. The *System Operator* shall be responsible for the following

3.1.1. Establish the demand requirement for *load shedding* in order to limit the consequences of a major loss of generation in the grid.

3.1.2. Recognize the operating state to be in an *emergency* condition when it determines the existence of a situation, which has an adverse material effect on electricity supply or which poses as a significant threat to system security.

3.1.3. Issue a *Red Alert* Warning as may be necessary

3.1.4. Intervene in the spot market if either (a) an *emergency*, (b) a *threat to system security*, or (c) a *force majeure event* manifests in the grid.

3.1.5. Prepare, implement, and monitor the compliance of *WESM Members* with their load shedding schedule.

3.1.6. Give directions and coordinate with the *Market Operator* and *WESM Members* the actions to be taken in order to restore normal operation of the power system.

3.1.7. Provide the necessary notifications in accordance with the *WESM Rules* under clause 6.5.1.2.

3.1.8. Establish a *load shedding* program based on agreed priorities and equitable load-sharing between the distribution utilities, directly connected customers and cooperatives as shown in Appendix A.

3.1.9. Annually review the *load shedding* program in coordination with the *Market Operator* and the *WESM Members* subject to the approval of the *PEM Board*.

3.2. The *Market Operator* shall be responsible for the following

3.2.1. Inform the *System Operator* of the likelihood of initiating *load shedding* under clause 3.9.2 of the *WESM Rules*.

3.2.2. Coordinate actions with the *System Operator* in the resumption of the spot market to normal operation.

3.2.3. Issue market advisory to *WESM Members*

3.3. The *WESM Members* shall be responsible for the following

3.3.1. Comply with the *emergency* directions given by the *System Operator*, unless it reasonably believes that an *emergency* direction poses a real and substantial risk of damage to its equipment, to the safety of its employees or the public, or if undue injury to the environment.

3.3.2. Provide information required by the *System Operator* in order to address the *emergency* condition.

3.3.3. Generating Entities shall see to it that its units remain in synchronism for operating conditions as specified under the Grid Code.

3.4. *Network Service Providers* shall have a load shedding program prepared in consultation with the *System Operator* with established priority and based on equitable load allocation.

SECTION 4 LOAD SHEDDING PROCEDURES

4.1. PRECONDITIONS / PRE-REQUIREMENTS

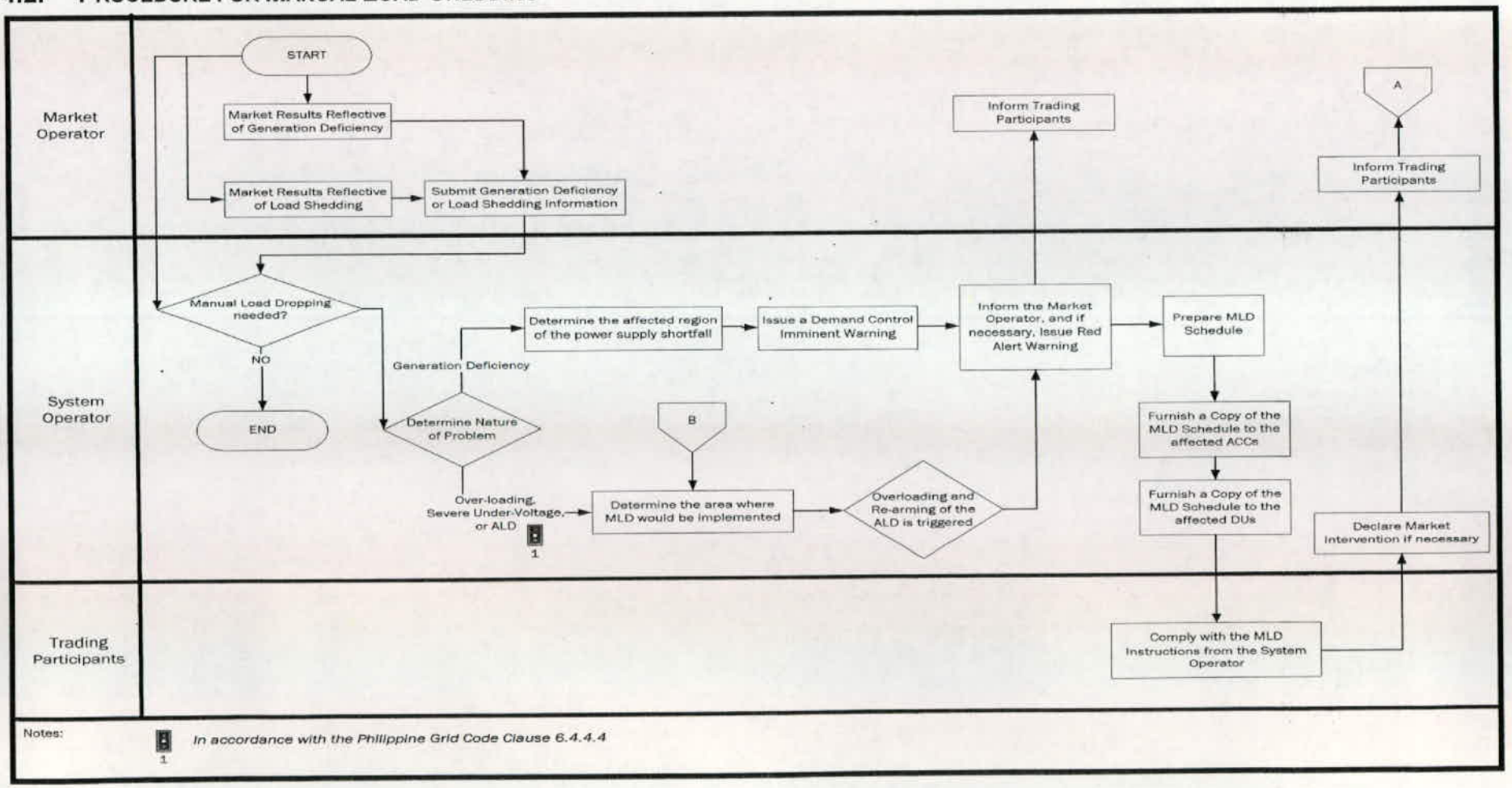
4.1.1. The nodal prices are reflective of the Nodal Volt price based on *market projections* or dispatch optimization performed prior to commencement of each trading interval.

4.1.2. Within a trading interval, a power supply shortfall in the electric system, a region, or a node unexpectedly happened.

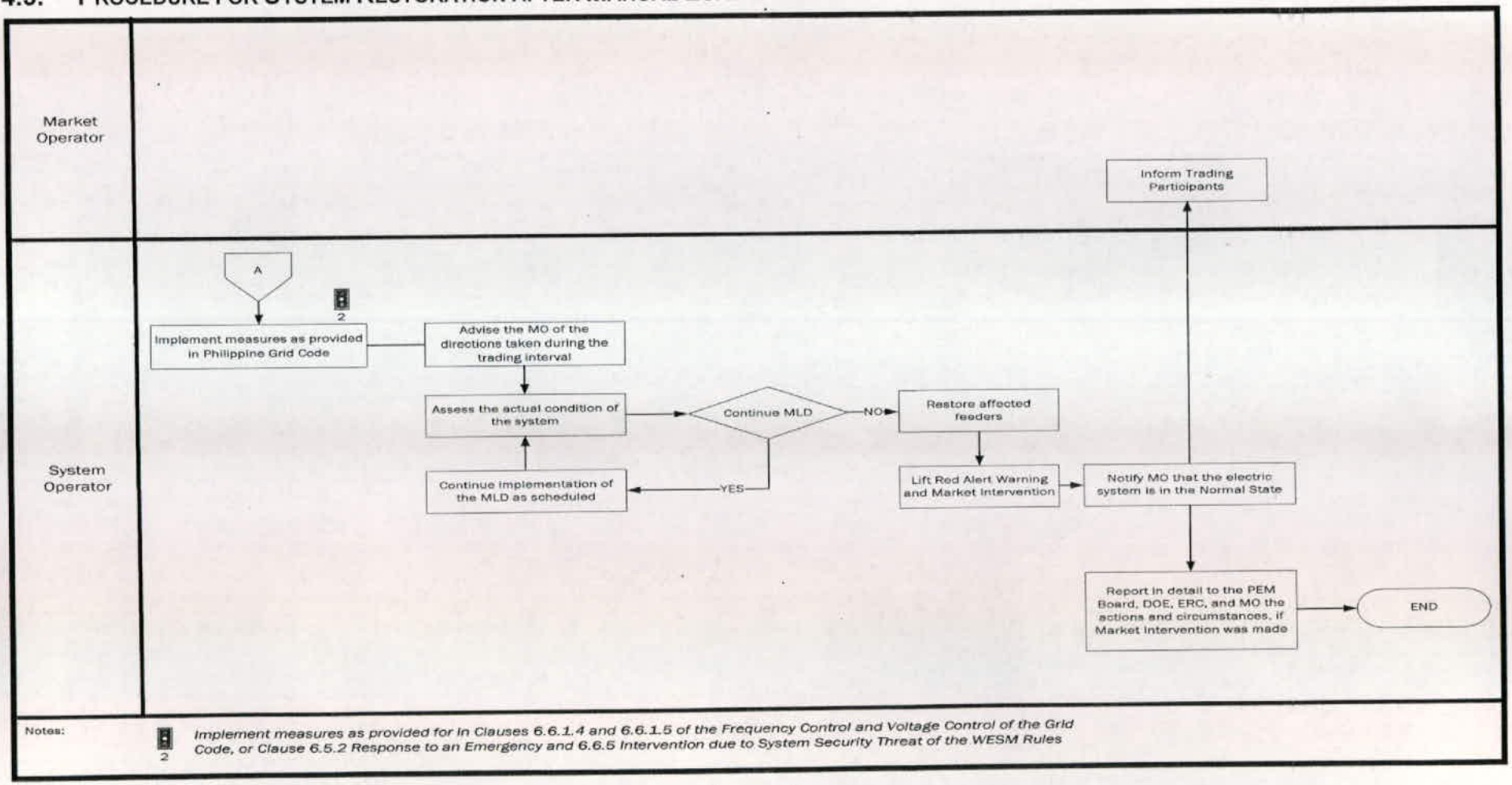
4.1.3. If either (a) an *emergency*, (b) a *threat to system security*, or (c) a *force majeure event* manifests in the grid.

4.1.4. The grid is under *Red Alert*.

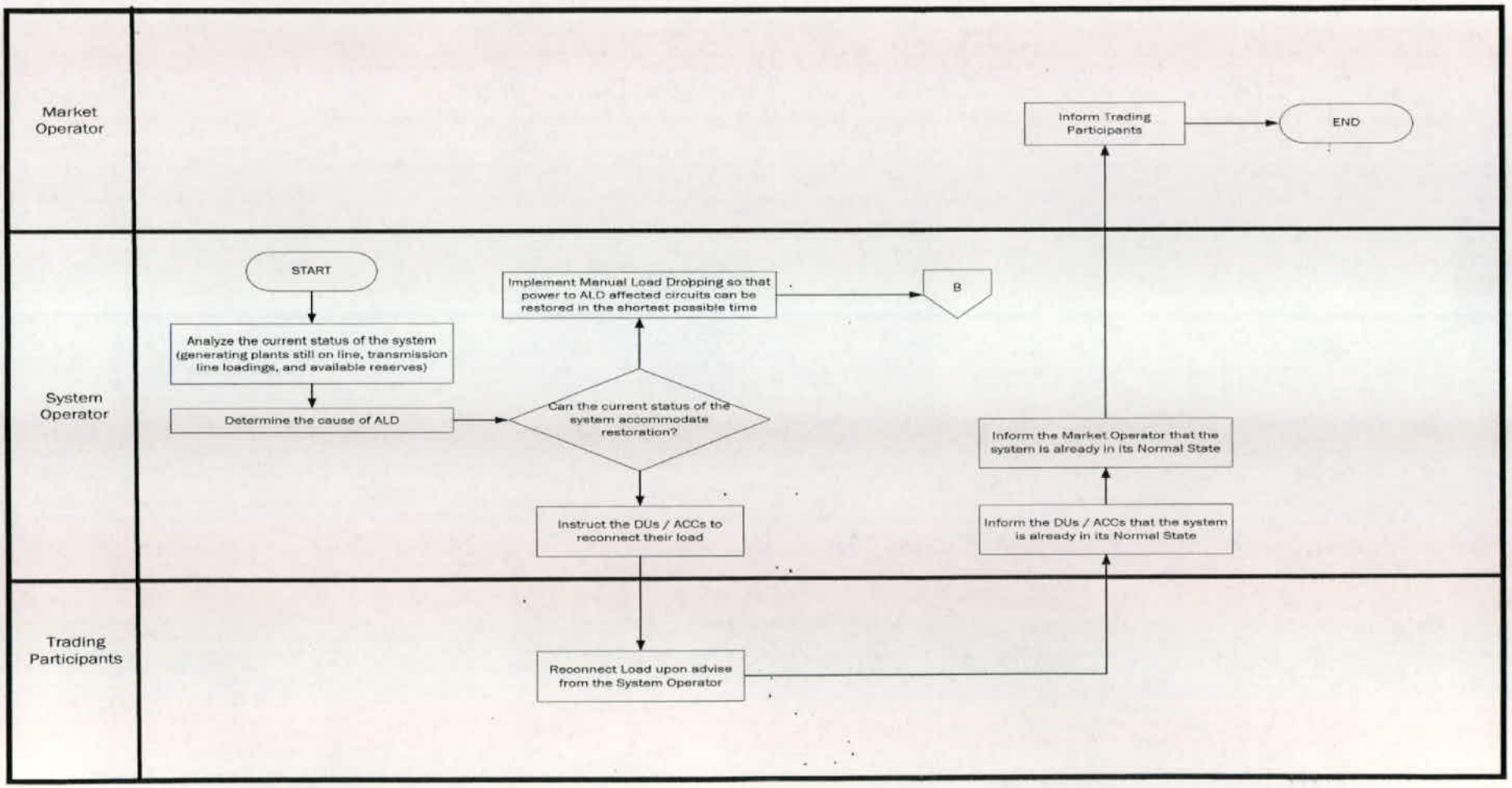
4.2. PROCEDURE FOR MANUAL LOAD SHEDDING



4.3. PROCEDURE FOR SYSTEM RESTORATION AFTER MANUAL LOAD DROPPING



4.4. PROCEDURE AFTER AN AUTOMATIC LOAD DROPPING



SECTION 5 AMENDMENT, PUBLICATION AND EFFECTIVITY

5.1. AMENDMENTS TO THIS MANUAL

Any amendment to, or revision to this Manual shall be approved by the PEM Board.

5.2. PUBLICATION AND EFFECTIVITY

Upon approval of the PEM Board, this Manual shall take effect fifteen (15) days from its publication, or such later date as the PEM Board determines, in accordance with the WESM Manual of Procedures for Changes to the WESM Rules (WESM-RCM)

SECTION 6 APPENDIX

Appendix A. Load Shedding Allocation Program

A. Luzon Grid

The Manual Load Shedding, if needed, shall be implemented on the following customers with the given order ofpriority below:

8:00AM – 5:00PM	5:01PM – 7:59AM the following day
Residential	VLC (voluntary load curtailment)
Commercial	Residential
Industrial	Commercial
	Industrial

The Load Shedding requirement (kWh) shall be distributed among Distribution Utilities in direct proportion to their respective actual demand on an hourly basis.

B. Visayas and Mindanao Grids

The Manual Load Shedding, if needed, shall be implemented on the following customers with the given order of priority below:

1. Residential
2. Commercial
3. Industrial

The Load Shedding requirement (kWh) shall be distributed among Distribution Utilities in direct proportion to their respective actual demand on an hourly basis.