



PUBLIC

WESM Manual

MANAGEMENT PROCEDURE ON EXCESS GENERATION

Issue 1.0

Abstract

This document covers the mechanism and policies to be employed to manage expected periods with excess generation.

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Related Document

Document ID	Document Title
	WESM Rules
	PGC
	MMS Design Specifications
WESM-MRU-000	Dispatch Criteria on Must Run Units
WESM-SSRG-000	System Security and Reliability Guidelines
WESM-EP-000	Emergency Procedures

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Table of Contents

Section	Description	Page
1	Introduction	5
1.1	About this Manual	5
1.2	Purpose	5
1.3	Scope	5
1.4	Intended Audience	5
1.5	Conventions	5
1.6	Background	6
2	Definition of Terms	8
3	Responsibilities	9
4	Criteria and Pre-Conditions for impending and existing Excess Generation	9
5	Responsibilities Pertaining to the Mitigation and Arrest of Excess Generation in the Power System.	9
6	Management Procedures	11
7	Flowchart	13
8	Market and Intervention Reports	15
9	Provision for Must Run Dispatch Auction	15



1.0 Introduction

1.1 About this Manual

This document describes the methodology and processes of managing excess generation in the WESM. This document takes into account the requirements of the Philippine Wholesale Electricity Spot Market Rules (the “WESM Rules”). Where there is discrepancy between the requirements in this document and the WESM Rules, the WESM Rules will prevail. Standards and policies appended to, or referenced in, these procedures will provide a supporting framework.

1.2 Purpose

- 1.2.1 To provide the mechanism for mitigating excess generation condition in the power system.
- 1.2.2 To provide mechanism for selecting generating plants to be shut down if excess generation condition cannot be mitigated.

1.3 Scope

These procedures will be implemented for imminent excess generation condition in the Luzon, Visayas and Mindanao power system in association with the System Security, Supply Adequacy and Emergency Procedures of the *System Operator*.

1.4 Intended Audience

This document is intended for use by the *Market Operator* (the “MO”), the *System Operator* (the “SO”), and the *Trading Participants*.

1.5 Conventions

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

- Terms and acronyms used in this *market manual* including all Parts thereto that are italicized have the meanings ascribed thereto in *WESM Rules*, the Philippine Grid Code or in the Definition of Terms in Section 2.0 of this document.
- Double quotation marks are used to indicate titles of publications, legislation, forms and other documents.
- Any procedure-specific convention(s) will be identified within the specific document itself.



1.6 Background

The WESM Rules clauses 3.9.8 and 10.4.16 require that, *prior to the spot market commencement date*, MO and SO, in consultation with *WESM Participants*, and subject to approval by the *PEM Board*, will each develop and *publish* the procedures which they plan to adopt with respect to the management of all aspects of *dispatch* and pricing should it be necessary to shut down *generating systems* in the event the *dispatch optimization*, or any *market projection*, indicate *excess generation* at any *node*.

Excess generation is a situation where system or regional demand has reached a critical low level that selected generating plants may be forced to shut down by SO to avoid exceeding the allowable limit in system frequency deviation which can result to inadvertent power flow, system stability issues and transmission constraints. Excess generation is clearly a threat to the security and reliability of the power system.

Excess generation can be encountered in the power system in real-time considering two scenarios:

1. There is instantaneous or sudden loss of significant amount of load demand in the power system.
2. The power system reaches off-peak condition whereby demand is so low that it is still below the minimum generating level of the generators synchronized in the power system.

The former scenario requires the immediate implementation of the *System Operator Emergency Procedure*¹ for over-frequency. The latter scenario can be anticipated through the indication of a downtrend demand and generation level in the power system. A mechanism therefore can be employed to mitigate possible excess generation incident to the power system and minimize (or avoid entirely) possible intervention of SO in the dispatch scheduling process in the WESM. However, if intervention cannot be avoided, then SO may ultimately trip a generating unit to maintain control and preserve the security of the power system. In such case, the mechanism for selecting which generating plant or unit to shutdown should be transparent to maintain the level playing field for all the *Trading Participants*.

The MO prepares market projections, in particular, the Day-Ahead Projections, which incorporates the latest system requirements and demand forecasts, bids and offers in the market, system condition

¹ Please see WESM-EP-000 for complete information on the emergency procedures.



and generation level. This is prepared every four (4) hours.² Utilizing the information inputted in the DAP, the possibility of excess generation condition can be identified by both *SO* and *MO*. Furthermore, should excess generation be encountered in a DAP interval, the nodal prices would reflect constraint violation penalty prices³ corresponding to the constraint violation coefficient for excess generation. The resulting DAP information is published after each DAP run and this is available to all *Trading Participants*. The DAP processes, therefore, can provide information for *SO* to enable it to assess projected system security, for *MO* to review demand forecast and security constraints provided by the the *SO*, and for the *Trading Participants* to enable them to adjust their offer in the WESM, all in order to mitigate possible incidence of excess generation in the power system.

Excess generation is normally encountered during off-peak conditions in the power system. Off-Peak conditions are normally between 0000 hours (12 midnight) and 0800 hours (8 AM) of the day for Luzon. However, excess generation maybe encountered also during peak conditions in the power system if a considerable amount of demand is tripped due to adverse weather condition or abnormal sub-transmission system condition.

Therefore, to minimize distortion in market prices and schedules, excess generation should be mitigated from the moment it is indicated in the day-ahead market projections. Effective mitigation process requires close coordination between *MO*, *SO* and the *Trading Participants*.

Related to the process for mitigation of excess generation is the system security and reliability requirement for must-run units. Reliability must-run units are the units that need to be dispatched if the system demand is to be met even if the demand is very low. They are over-riding security constraints provided by *SO* and applied in the *Market Dispatch Optimization Model*. They are to be provided prior to any market projections run⁴.

The excess generation condition signaled in the DAP and advised by *MO* provides appropriate lead-time for all *Trading Participants* to modify their bids/offers in the spot market. On the other hand, given the must-run units and the low demand in the power system, all the generators synchronized in the power system may still opt to run. That is, the generating plants may see the need to generate in which case the necessity comes from their self-commitment and not from

² Please see WESM-TT-000 for DAP process timeline.

³ Please see WESM-CVC-000 for complete details on constraint violation coefficients.

⁴ Please see WESM-MRU-000 for the criteria and procedure for reliability must-run units.



the necessity to supply the demand in the system and thus maintain sufficient offers in the market during off-peak intervals. Given this condition, the SO would have to shutdown non-MRU generators which are not necessary for local or regional protection (system security) while considering plant limitations for downtime and re-synchronization to the power system for the succeeding intervals wherein demand is increasing (supply adequacy).

To provide a transparent and level playing field for all generators, should it become necessary to shut down a generator during imminent and existing excess generation condition, the MO will provide a generator merit order to the SO based on the offered price of their first block offer used in the last DAP run prior to the interval where possible and indicated excess generation condition is indicated.

2.0 Definition of Terms

- 2.1 Constraint Violation Coefficients – coefficients set by the Market Operator in accordance with clause 3.6.2 of the WESM Rules. The Market Operator is to ensure that, if constraints will be violated, such violation will occur in appropriate order.
- 2.2 Excess Generation – Generation which may be scheduled to occur in excess of load requirements, even though market energy prices have fallen to the market price floor and which are dealt with in accordance with clause 3.9.8 of the WESM Rules.
- 2.3 Must Run Units – Generating units which are designated to run during excess generation consistent with the criteria developed by MO and the SO. This is required by the power system for reliability reasons regardless if there is excess generation or not.
- 2.4 Market Advisories – These are Market Operator notices or alerts to *Trading Participants* and the *System Operator* relating to the WESM operations and on emergency situations.
- 2.5 Over Riding Constraints – constraints imposed in the *Market Dispatch Optimization Model* by the *Market Operator*, at the recommendation of the *System Operator*, with the intention of over-riding the effect of a *Trading Participant's* offers or demand bids in accordance with WESM Rules clause 3.5.13.
- 2.6 System Advisories – These are *System Operator* notices or alerts to the *Trading Participants* and the *Market Operator* on system condition and emergencies.



The definition of terms used in this document will conform with the definition of terms in the WESM Rules, the Philippine Grid Code and the other WESM Manuals.

3.0 Responsibilities

- 3.1 The MO will be responsible for the development, maintenance, publication, revision of this document in consultation with the *Trading Participants* and SO.
- 3.2 The SO will be responsible for the validation of this document and coordinate with MO for subsequent revisions and issuances.
- 3.3 The *Trading Participants* will provide the necessary information and references for subsequent revisions and validation of this document.
- 3.4 The *PEM Board* will be responsible for the approval of this document and subsequent revisions and issuances.

4.0 Criteria and Pre-Conditions for impending and existing Excess Generation

- 4.1 Demand bids, energy and reserve offers have been submitted by the *Trading Participants* and received by the *Market Operator* in accordance with the WESM timetable.
- 4.2 Cancelled bids and offers for the Real-Time Dispatch are being observed by the *Trading Participants* unless they are otherwise provided by SO with re-dispatch instructions.
- 4.3 The results of the Week-Ahead and the Day-Ahead Projections manifest the occurrence of an *excess generation*. The *System Operator* and the *Trading Participants* are notified of the excess generation.
- 4.4 The *Dispatch Schedule* for the real-time dispatch has resulted to a solution with significant *Constraint Violation Coefficient* on *excess generation*.
- 4.5 The system or regional generation level is approaching the regulating reserve requirement band of the minimum generating limit (Pmin) of the synchronized generators.

5.0 Responsibilities Pertaining to the Mitigation and Arrest of Excess Generation in the Power System.

- 5.1 The System Operator will:



- 5.1.1 Determine the level of threat to system security based on the *System Security and Reliability Guidelines* approved by the *PEM Board*.
 - 5.1.2 Coordinate with MO and provide necessary information which will be utilized in the calculation of the *dispatch schedule* to mitigate or arrest possible *excess generation* condition indicated in the market projections.
 - 5.1.3 Elect reliability *must-run units* based on the Dispatch Criteria on Must Run Units approved by the *PEM Board*.
 - 5.1.4 Issue *excess generation* alert to the *Trading Participants* and MO of the imminent threat to system security and reliability during real-time dispatch.
 - 5.1.5 Implement the *Emergency Procedures* and provide instructions to generating systems not elected as must-run to shut down, as maybe necessary, based on the *System Security and Reliability Guidelines* and offer merit order provided by MO.
- 5.2 The Market Operator will:
- 5.2.1 Prepare the Market Projections based on the WESM Timetable incorporating over-riding constraints, transmission limits and outage schedules provided by SO.
 - 5.2.2 Prepare the real-time schedule and prices in accordance with the WESM Timetable incorporating over-riding constraints, transmission limits and outage schedules provided by SO.
 - 5.2.3 Coordinate and inform SO and the *Trading Participants* of any indication of excess generation in the market projections results.
 - 5.2.4 Prepare offer based merit order and submit to SO as basis for shutting down generators during off-peak condition.
 - 5.2.5 Issue Pricing Error Notice to the *Trading Participants* via market advisory should the *Ex-Ante* Real-Time Dispatch indicate excess generation in the pricing and scheduling results.
- 5.3 The Trading Participants will:
- 5.3.1 Review generation unit availability, maintenance schedule, energy and ramping limits in anticipation of the off-peak condition in the power system.



- 5.3.2 Make prudent offers for intervals with expected low demand.
- 5.3.3 Coordinate and implement re-dispatch instructions and generator tripping as instructed by SO.

6.0 Management Procedures

6.1 Occurrence of Excess Generation condition in the Day-Ahead Projection

- 6.1.1 The MO will verify if there is any indication of *excess generation* in the Day Ahead Projections (from the 12:00 noon run and in the succeeding DAP run) and will advise the *Trading Participants* through the system messages and market reports published in the WESM website.
- 6.1.2 Prior to the 4:00 PM DAP run, the SO will assess the impact of the projected excess generation condition and nominate *Must Run Units* (the “MRU”) and provide the information to the MO as over-riding constraints in the MDOM. The details Over-Riding Constraint will be recorded as provided in *WESM Rules* clause 3.5.13.4.
- 6.1.3 The objectives of nominating MRU’s in the dispatch scheduling process are as follows:
 - 6.1.3.1 Assure that system security is not compromised in the *trading interval with excess generation*
 - 6.1.3.2 Assure adequacy of supply in the succeeding *trading intervals*.
- 6.1.4 Prior to the 4:00 PM DAP run, the *Trading Participants* will consider the projected off-peak system condition and assess their market offers for the periods where imminent and *excess generation* conditions are indicated.
- 6.1.5 The *Trading participants* may exercise prudence on their bids and offers with regard to market integrity and power system security for intervals with indicated excess generation periods by:
 - 6.1.5.1 Customers – Assessing their electricity consumption, and, if possible, increase their electricity consumption in view of the surplus in electricity supply.
 - 6.1.5.2 Generators – Assessing the capacity and mode of operation of their generating units in view of the stiff competition for a very limited demand for electricity.
- 6.1.6 The MO will confirm and inform the *Trading Participants* and SO, if *excess generation* is indicated in the 4:00 PM DAP run.



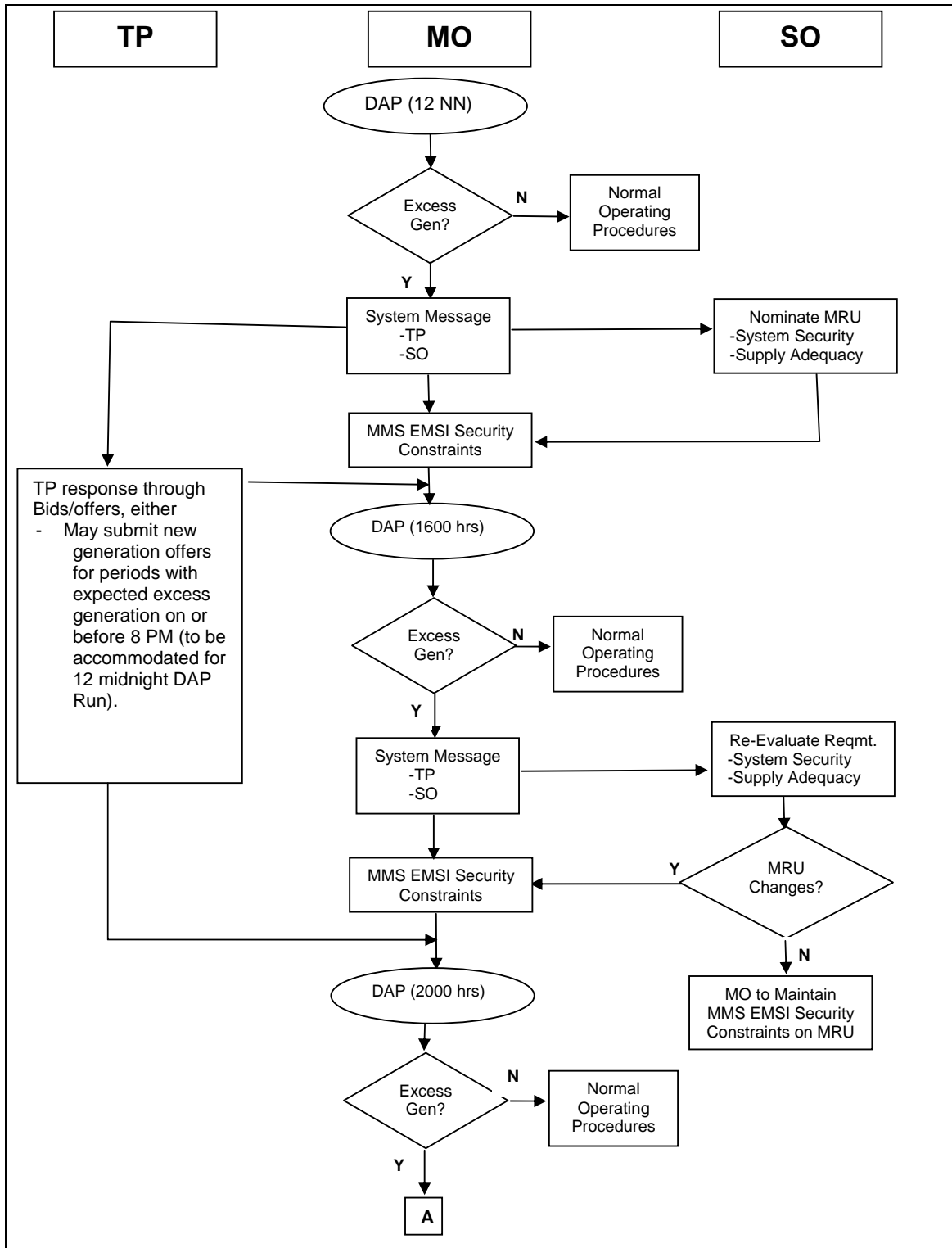
- 6.1.7 Prior to the 8:00 PM DAP run, the *Trading Participants* will make final adjustment to their market bids/offers for intervals indicated with imminent or *excess generation* condition so that these offers maybe accepted for the 12:00 midnight DAP run.
- 6.1.8 Prior to the 8:00 PM DAP run, the SO may adjust any nomination in the MRU based on their latest and projected system security and supply adequacy assessment of the power system.
- 6.1.9 The MO will verify in the 20:00 hour (8:00 PM) DAP run if there are still indications of excess generation and continuously coordinate with the SO. The SO may also coordinate with generating plants on the following:
 - 6.1.9.1 Minimum stable loading and emergency minimum energy limits.
 - 6.1.9.2 Possibility of additional unit maintenance for the periods where there is possible occurrence of excess generation.
- 6.1.10 The MO will again verify if there are indications of excess generation in the 12:00 midnight run.
- 6.1.11 The MO will prepare an offer-based merit order based on the offers for the 12:00 midnight DAP run and transmit the information to the SO.
- 6.1.12 The SO will finalize a scheduling strategy considering the merit order provided by the MO and taking into account the security of the power system and the supply adequacy for the next peak period.
- 6.1.13 Based on the scheduling strategy, the SO may ultimately remote- trip a generating plant to mitigate and prevent any over-frequency in the power system.
- 6.1.14 If the real-time dispatch indicates the application of the excess generation penalty price, then the MO will issue a *pricing error notice* to the *trading participants* as soon as possible.

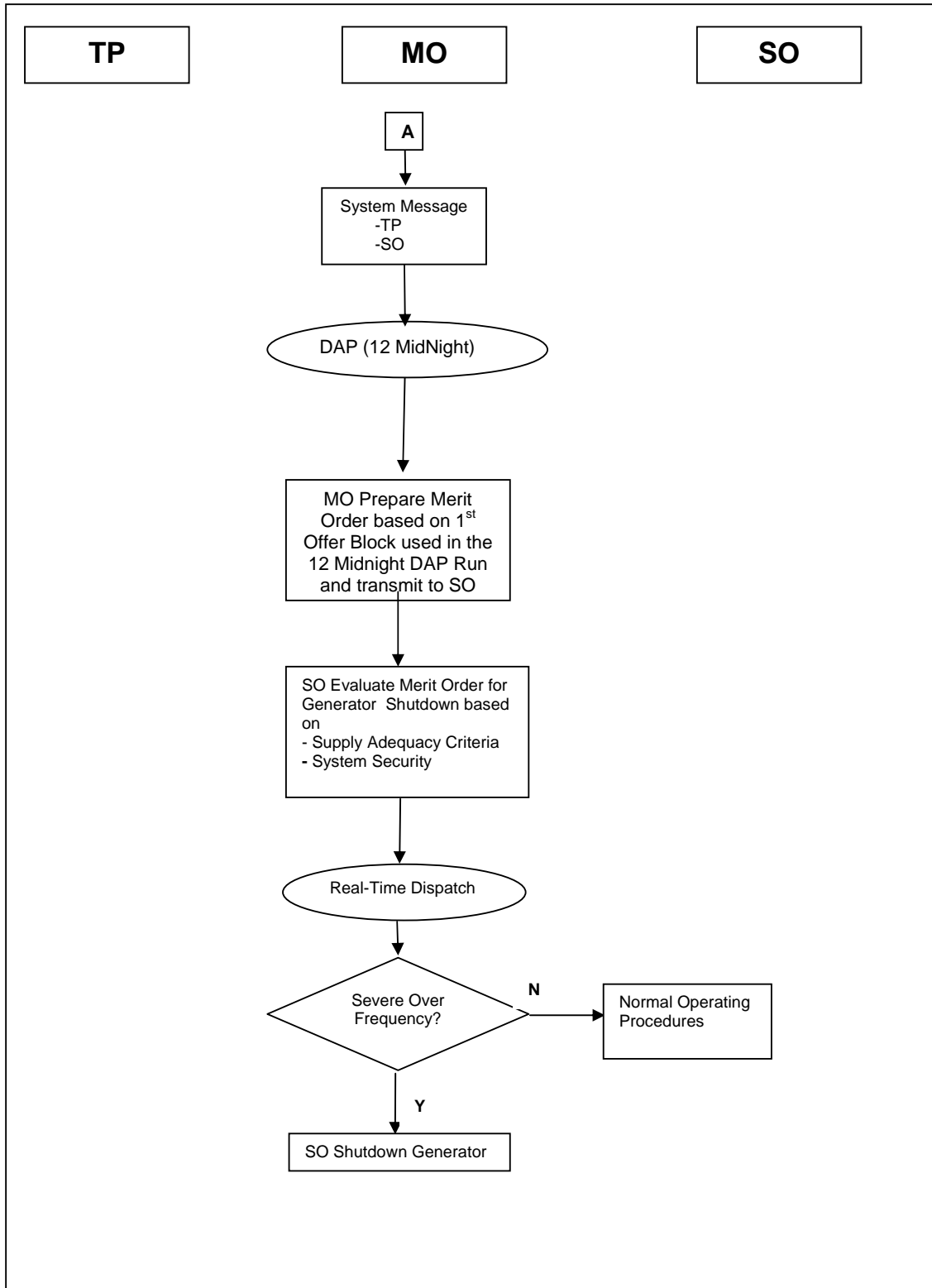
6.2 Real-Time Dispatch (with Excess Generation Intervals)

- 6.2.1 If excess generation is encountered in the real-time dispatch, then the SO will immediately implement its *Emergency Procedures*.



7.0 Flow Chart







8.0 Market and Intervention Reports

- 8.1 The SO will be responsible for preparing intervention reports as regards to the technical implication of the imminent excess generation event and/or excess generation incident.
- 8.2 The MO will be responsible for preparing a market report on the impact of the imminent *excess generation* event or the excess generation incident on the market.
- 8.3 The market and Intervention reports pertaining to *excess generation* will be prepared and submitted to the *PEM Board* within one week from the occurrence of the incident.

9.0 Provision for Non-Reliability Must Run Dispatch Auction

The WESM Rules at present has no provision for any auctioning process to be applied for managing *excess generation*. In this regard, the following will be taken into consideration:

- 9.1 MO and SO will coordinate with the Market Surveillance Committee in assessing the following:
 - 9.1.1 Occurrence of trading intervals with excess generation.
 - 9.1.2 Impact of occurrence of excess generation to *trading participants* and the application of the above procedures to mitigate excess generation condition.
 - 9.1.3 Nomination of generating plants as reliability *must-run units*.
 - 9.1.4 Applicability of dispatch auction for generating plants not declared as reliability must run for periods where there is imminent threat of excess generation.
- 9.2 The assessment will make recommendations as to the feasibility and viability of incorporating *must-run* dispatch auction in the WESM.