



Operation Code OC-10: Procedures for Monitoring and Testing to ensure compliance by Users to the Malaysian Grid Code

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1. OC-10 specifies the procedures to be followed by the GSO, the Single Buyer and Users in coordinating and carrying out tests and monitoring to ensure compliance by Users covering:-
 - All parts of the Connection Code;
 - Generating Unit Scheduling & Dispatch parameters;
 - Generating Unit Availability Declaration;
 - Supplementary Services (including response to frequency, reactive capability, fast start capability and Black Start capability)

Introduction & Objectives – cont'd



2. GSO and Single Buyer are responsible to facilitate and coordinate the required testing and monitoring.
3. Users are responsible for carrying out tests and or monitoring in accordance with the relevant Agreement and or specifications issued by the GSO and the Single Buyer.
4. Users and Single Buyer may propose to the GSO, any tests in this OC-10 or in relevant Agreement to be carried out.
5. GSO shall consider and may approve and facilitate the tests subject to safety, security and integrity of the Grid System

Scope



This OC-10 applies to

1. the GSO
2. the Single Buyer; and
3. the following Users:
 - Generators
 - Network Operators
 - Grid Owner
 - Distributors; and
 - Directly Connected Customers

OC10.4 Procedure for Monitoring



1. OC10.4 specifies procedures to be followed if monitoring of User or Generator response and performance by the GSO indicates non-compliance with Connection Code or failure to provide Supplementary Services or meet SDC1 parameters or as in relevant Agreement.
2. GSO shall notify the relevant Generator or User and Single Buyer with the failure details & circumstances
3. Generator or User to clarify to GSO & Single Buyer
 - Cause of failure
 - Actions to be taken & Timeframe to meet compliance requirements
 - Parameters to apply for Dispatch Unit (Generator)
4. Within 14days of GSO notification of failure, if agreement between relevant parties is not achieved on
 - Actions to be taken by User; and/or
 - Parameters to apply for Generators Dispatch Units;then the Single Buyer or Generator may request a test.

10.5 Procedure for Testing



1. This OC10.5 specifies tests, test procedures, test reporting requirements & required notification to be given by GSO & Single Buyer (SB) to User
2. Test Procedures to be specified by GSO and Single Buyer :-
 - Reactive Power, Black Start, Dispatch Accuracy - (GSO)
 - Frequency response, Availability Tests – (GSO & SB)
 - Other Compliance Tests and Monitoring e.g.
 - PSS Settings and Controller Testing – (GSO & SB)
 - AGC and other control devices – (GSO & SB)
3. Test details and procedures to be agreed by the GSO, the SB and relevant Generator
4. For tests required under relevant Agreements, GSO & SB to make notification to Generator in accordance to procedures in the Agreement.

Procedure for Testing – Reactive Power, Frequency Response & BlackStart



Reactive Power Tests	<ul style="list-style-type: none"> • At least Once every 5 years or as required by GSO or SB • Within $\pm 2.5\%$ of registered capability • Procedure to be specified by GSO
Frequency Response Tests	<ul style="list-style-type: none"> • Testing to be carried out as part of Routine monitoring • Response to be within $\pm 2.5\%$ of the level in the Connection Code or as per relevant Agreement • Procedure to be specified by GSO and SB
Black Start Tests	<ul style="list-style-type: none"> • At least once every 3 years • Blackstart Station Test and/or Blackstart Generating Unit Test
Fast start Capability	<ul style="list-style-type: none"> • Identified Generating Units to be Synchronised and Loaded-up to full Load within 5 minutes or as in relevant Agreement. • Startup initiated by Freq relays setting range between 49-50Hz

• Such Generating Units contribute to the Operating Reserve
GSO to notify Generator



Reactive Power Capability Curve

CAPABILITY CURVE

CUSTOMER : N E B

R.S. : IBENGGANU

SPEC.

$E_t = 1.00$ (P.U.)

$X_d = 0.84$ (P.U.)

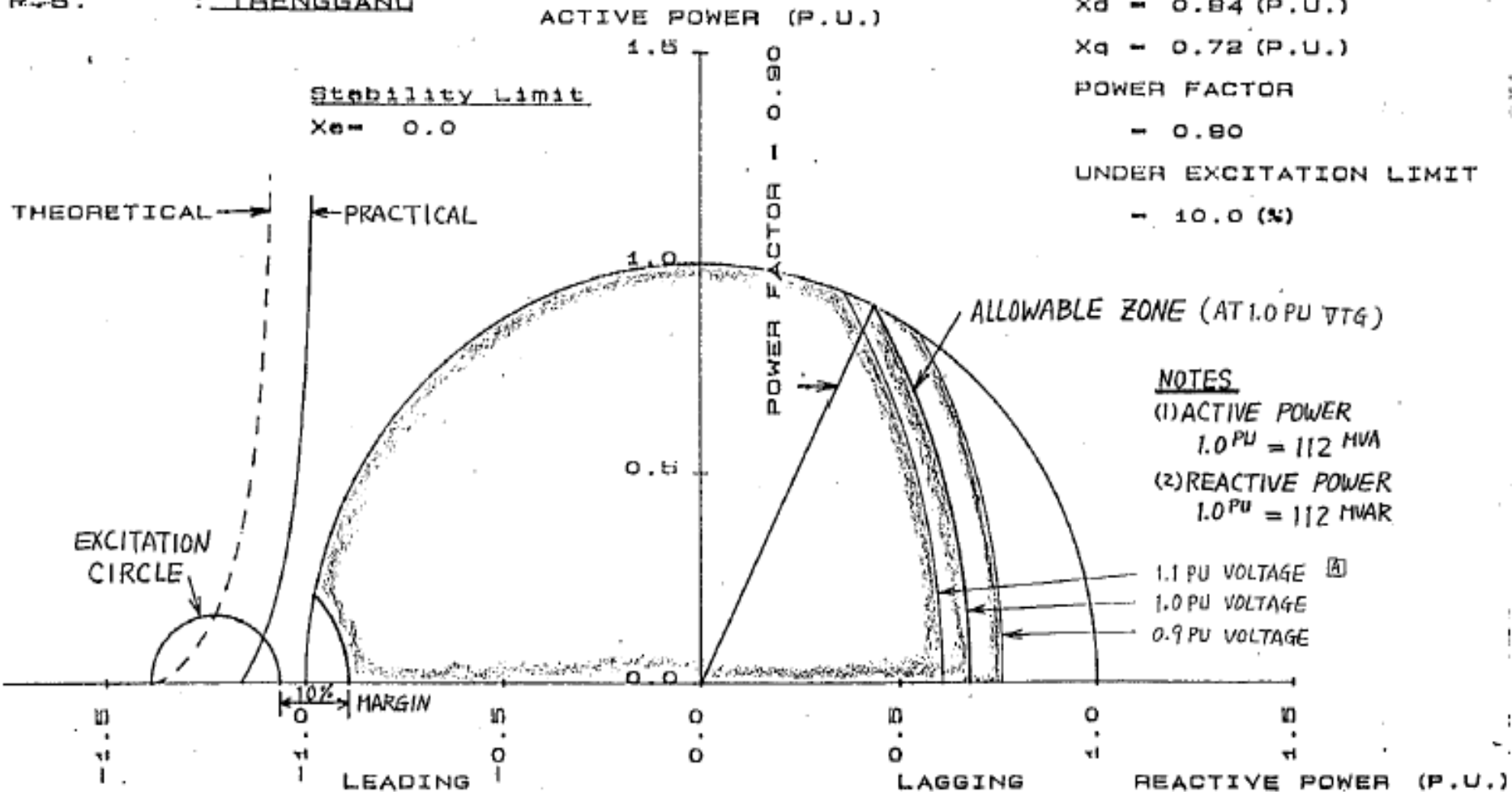
$X_q = 0.72$ (P.U.)

POWER FACTOR

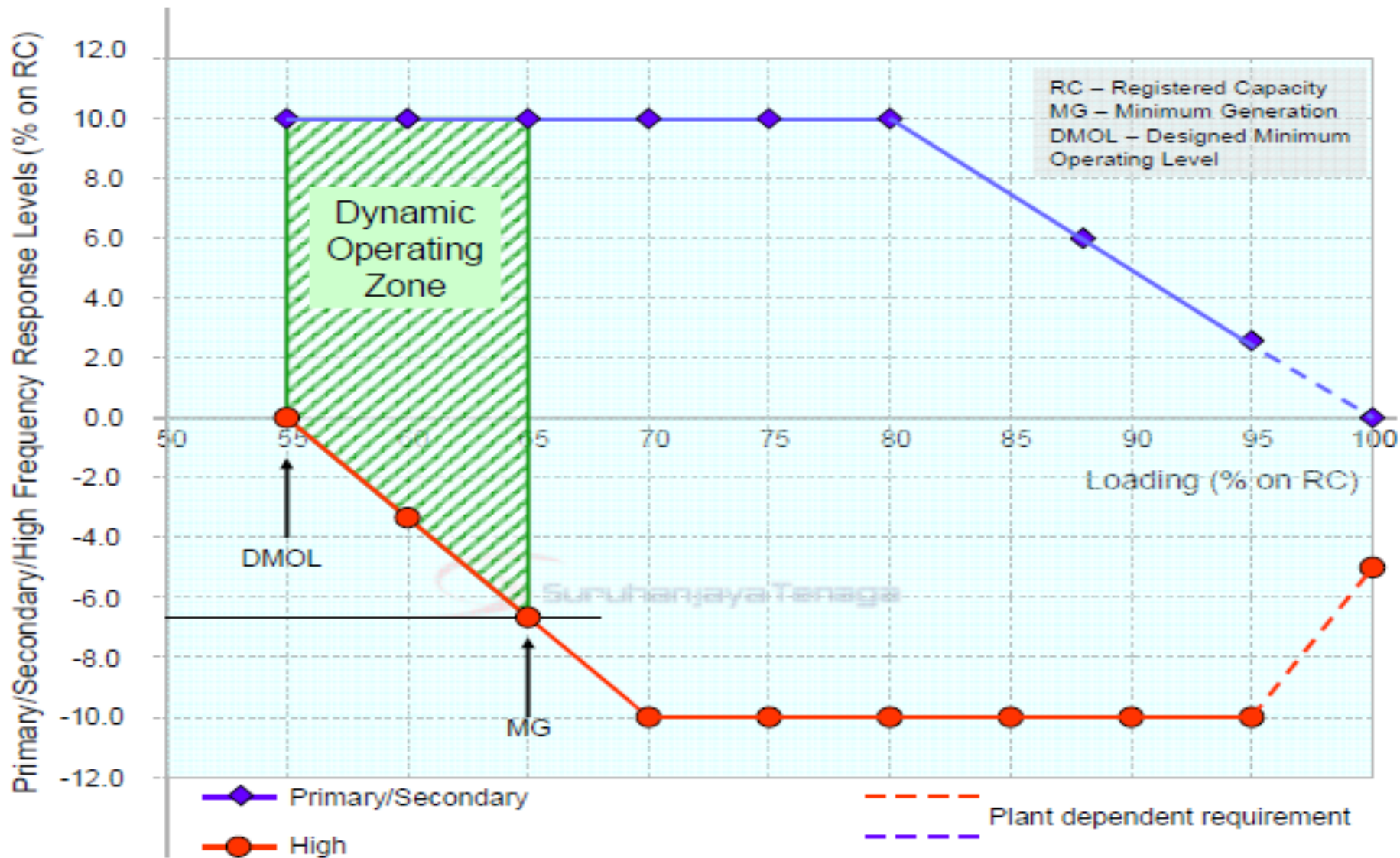
- 0.80

UNDER EXCITATION LIMIT

- 10.0 (%)



Minimum Frequency Response Requirement Profile for a 0.5 Hz Change from Target Frequency



Procedure for Testing – Dispatch Accuracy & Availability Tests



Dispatch Accuracy Tests

- Procedure to be specified by GSO
- Maximum once (1) per month unless on justifiable grounds.
- SDC parameters within $\pm 1\%$ of declared
- Synchronization within ± 5 minutes of the declared time.
- Synchronizing generation within $\pm 1\%$ of registered capacity

Availability Tests

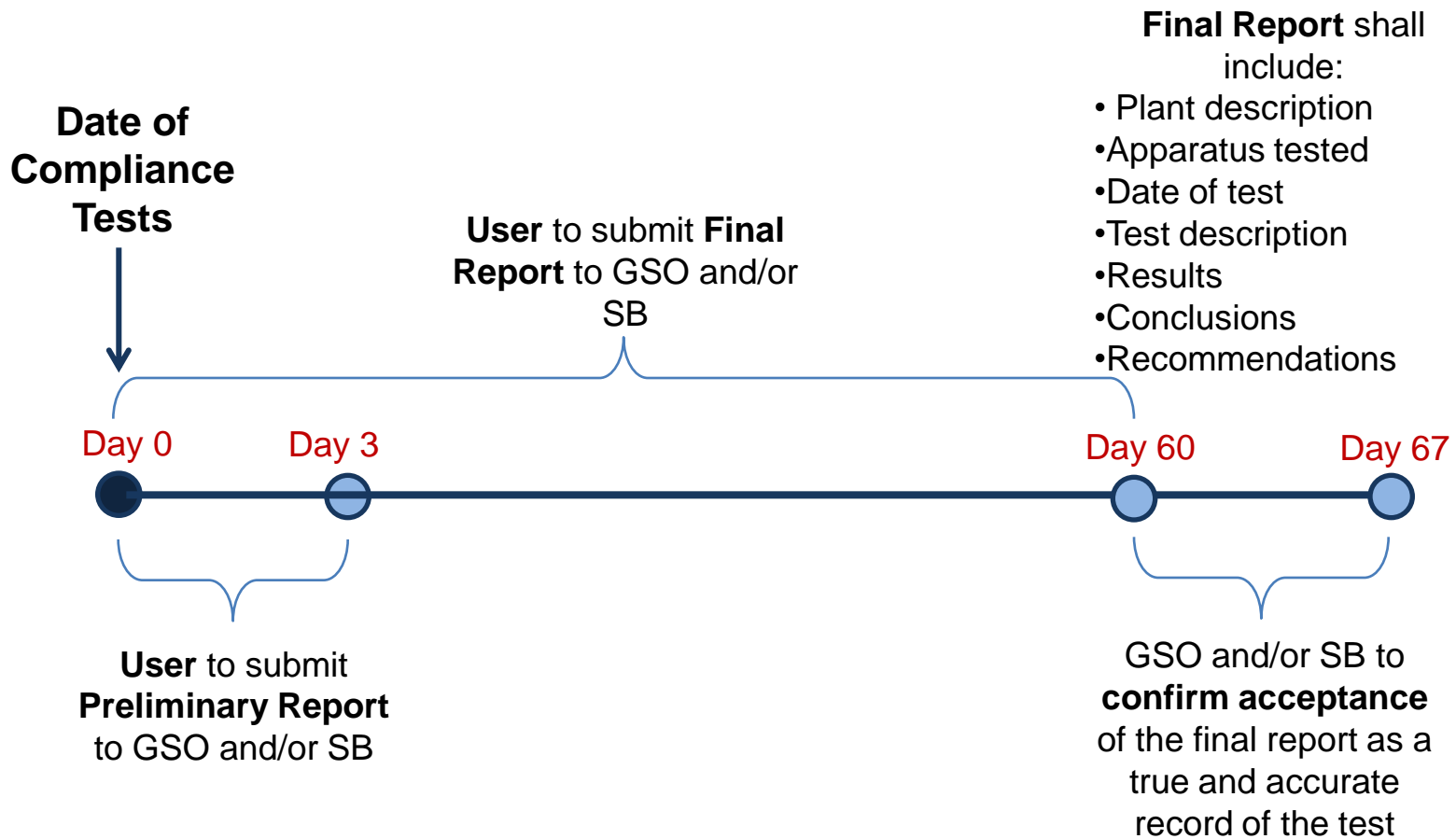
- GSO shall facilitate test* as required by SB following Agreement
- GSO may at any time instruct User to conduct test*.
- *Applicable to both Dispatch Accuracy and Availability Tests



Other Compliance Tests and Monitoring

- Procedure may be specified in relevant Agreement by SB and GSO
- Users including the Grid Owner shall install appropriate plant performance monitoring equipment as specified by the GSO, and provide the output data to the GSO

Test Reporting Requirements

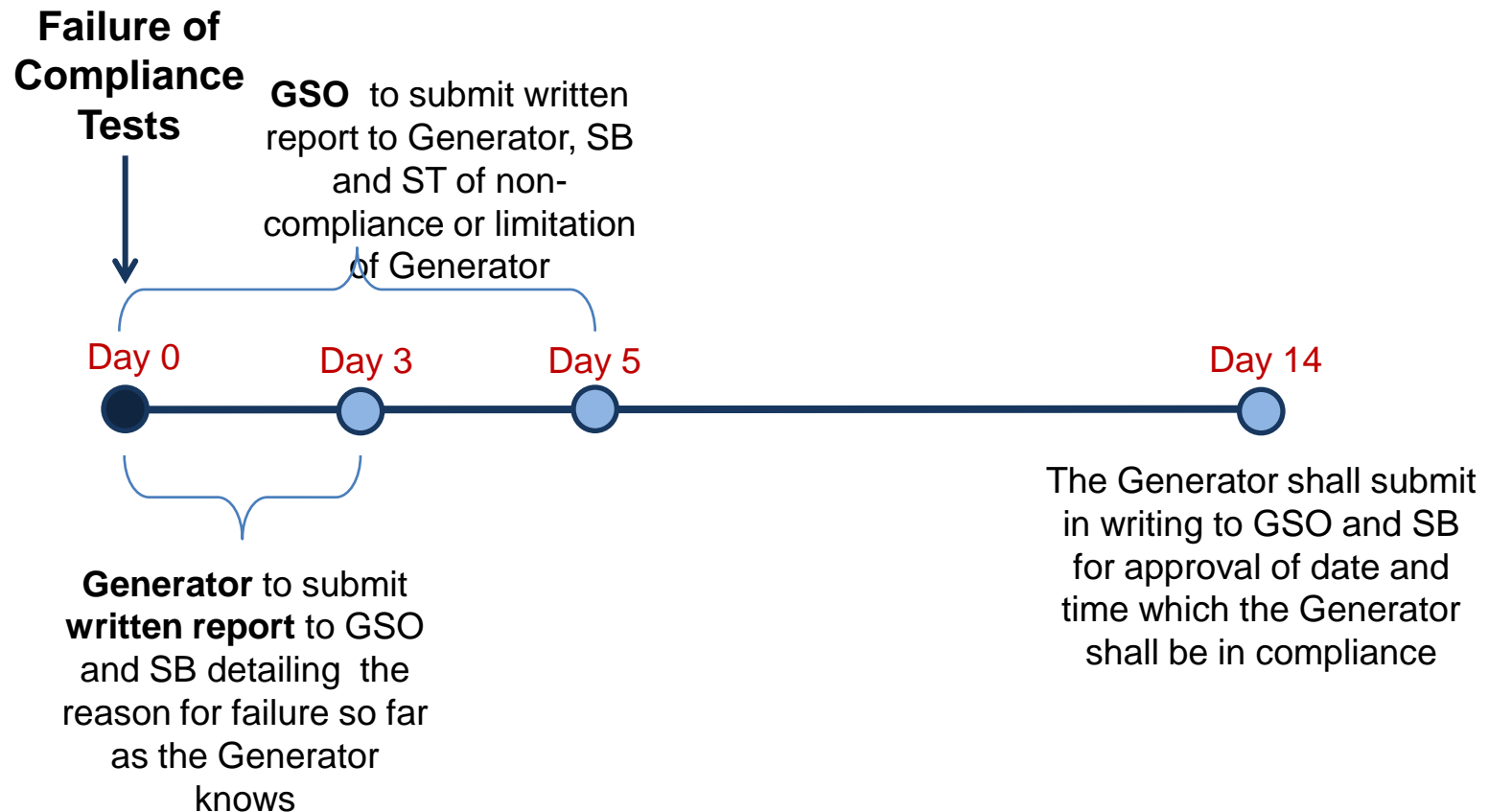


* Day refers to Business Days

OC10.6 - Failure of Compliance Test



Failure of Compliance Tests



* Day refers to Business Days

Managing Test Failure and Disputes

1. For unresolved dispute upon Test failure, Users may request GSO for Retest with 2 biz-days notice.
2. Within 14 biz-days of acceptance of test failure or retest the Generator shall write to GSO and Single Buyer proposing the date/ time by which the CDGU would be ready to pass the test and prove compliance to the relevant MGC requirement .
3. For disputes upon Failure of Retest, affected parties to use dispute resolution procedure in Agreement.
4. If no provisions in Agreement, the dispute resolution procedure in MGC-General Conditions shall apply; whereby any affected party may refer the case to the Suruhanjaya Tenaga for determination. Suruhanjaya Tenaga may decide to determine the dispute or may choose to refer the dispute for arbitration.



THANK YOU



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