WEM PROCEDURE: GENERATOR MONITORING PLANS

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1. INTRODUCTION

1.1. Purpose and scope

1.1.1. This WEM Procedure: Generator Monitoring Plans (Procedure) is made in accordance with AEMO's functions under clause 2.1A.2(h) of the Wholesale Electricity Market Rules (WEM Rules).

1.1.2. The *Electricity Industry Act 2004*, the WEM Regulations and the WEM Rules prevail over this Procedure to the extent of any inconsistency.

1.1.3. In this Procedure, where obligations are conferred on a Rule Participant, that Rule Participant must comply with the relevant obligations in accordance with clause 2.9.7A or 2.9.8 of the WEM Rules, as applicable.

1.1.4. The purpose of this Procedure is to document:

(a) the requirements in a Template Generator Monitoring Plan;

(b) the process by which a Market Participant must submit a proposed Generator Monitoring Plan for a Transmission Connected Generating System;

(c) the process by which a Market Participant must submit proposed updates and amendments to a Generator Monitoring Plan previously approved by AEMO;

(d) the process the process by which AEMO must assess and approve:

(i) a Generator Monitoring Plan proposed by a Market Participant; and

(ii) updates and amendments to a proposed Generator Monitoring Plan approved by AEMO in paragraph 1.1.4(d)(i);

(e) the tests that a Facility must conduct in order to demonstrate compliance with its Registered Generator Performance Standards and Generator Monitoring Plan; and

(f) the process by which a Market Participant must report any alleged non-compliance or suspected non-compliance with:

(i) applicable Registered Generator Performance Standards;

(ii) an applicable approved Generator Monitoring Plan; or

(iii) an approved Rectification Plan.

1.1.5. Appendix A of this Procedure outlines the head of power clauses that this Procedure is made under, as well as other obligations in the WEM Rules covered by this Procedure.

1.2. Definitions

1.2.1. Terms defined in the *Electricity Industry Act 2004*, the WEM Regulations and the WEM Rules have the same meanings in this Procedure unless the context requires otherwise.

1.2.2. The following definitions apply in this Procedure unless the context requires otherwise.

Table 1 Definitions

Term	Meaning
Monitoring Results or Monitoring Data	Data obtained as a result of continuous in-service monitoring under paragraph 3.2.2(a) of this Procedure.
Test Results or Test Data	Data obtained as a result of periodical online and/or offline testing under paragraph 3.2.2(b) of this Procedure.
Disturbance Data	Data obtained as a result of analysis of performance during and following a power system disturbance under paragraph 3.2.2(c) of this Procedure.
Generating System	Transmission Connected Generating System, which has the meaning given in clause A12.1 of the WEM Rules.

1.3. Interpretation

1.3.1. The following principles of interpretation apply in this Procedure unless the context requires otherwise.

(a) Clauses 1.3 to 1.5 of the WEM Rules apply in this Procedure.

(b) References to time are references to Australian Western Standard Time.

(c) Terms that are capitalised, but not defined in this Procedure, have the meaning given in the WEM Rules.

(d) A reference to the WEM Rules or WEM Procedures includes any associated forms required or contemplated by the WEM Rules or WEM Procedures.

(e) Words expressed in the singular include the plural and vice versa.

(f) A reference to a paragraph refers to a paragraph of this Procedure.

(g) A reference to a clause refers to a clause or section of the WEM Rules.

(h) References to WEM Rules in this Procedure in bold and square brackets [Clause XXX] are included for convenience only, and do not form part of this Procedure.

(i) Text located in boxes and headed as Explanatory Note X in this Procedure is included by way of explanation only and does not form part of this Procedure.

1.4. Related documents

1.4.1. The documents in Table 2 are associated with this Procedure.

Table 2 Related documents

Title	Location
WEM Rules	Economic Regulation Authority (ERA) website
Technical Rules	ERA website
WEM Procedure: Generator Model Submission and Maintenance (maintained by Western Power)	WEM Website
WEM Procedure: Transitional Procedure for Generator Performance Standards (maintained by Western Power)	WEM Website

2. TEMPLATE GENERATOR MONITORING PLAN

2.1. Introduction

2.1.1. A Market Participant that is responsible for a Transmission Connected Generating System must develop a Generator Monitoring Plan in accordance with the requirements of the Template Generator Monitoring Plan described in paragraph 2 of this Procedure, and in the format[1] specified by AEMO, other than in respect of variations described in clause 3A.6.4(b) of WEM Rules.

2.1.2. This paragraph 2 of this Procedure specifies:

(a) how a Market Participant responsible for a Transmission Connected Generating System must monitor performance against the applicable Registered Generator Performance Standards including any testing and verification requirements [Clause 3A.6.2(a)i];

(b) record keeping obligations relating to monitoring compliance with Registered Generator Performance Standards [Clause 3A.6.2(a)ii];

(c) information and data provision obligations a Market Participant responsible for a Transmission Connected Generating System must comply with when requested by AEMO, the Network Operator or the Economic Regulation Authority, including the form by which that information and data must be provided [Clause 3A.6.2(a)iii].

2.1.3. In support of paragraph 2.1.2(a) of this Procedure, AEMO specifies:

(a) the requirements in developing a Generator Monitoring Plan by a Market Participant, to enable monitoring of technical performance of a Transmission Connected Generating System against the applicable Registered Generator Performance Standards:

(i) the general principles that must be considered and incorporated by a Market Participant in developing a Generator Monitoring Plan (refer to paragraph 2.2 of this Procedure);

(ii) the information and data that must be incorporated by a Market Participant in developing a Generator Monitoring Plan (refer to paragraph 2.3 of this Procedure); and

(iii) the requirement to submit the evidence of compliance with the applicable Registered Generator Performance Standards by a Market Participant to AEMO (refer to paragraph 2.4 of this Procedure); and

(b) the compliance testing and monitoring requirements in paragraph 3 of this Procedure, which include the testing and monitoring regime, the compliance verification mechanism and the frequency of testing.

2.1.4. In support of paragraph 2.1.2(b) and 2.1.2(c) of this Procedure, AEMO specifies:

(a) in relation to monitoring compliance with the applicable Registered Generator Performance Standards, the information and data that a Market Participant must keep, and the period for which it must be kept (refer to paragraphs 2.5.1 and 2.5.2 of this Procedure); and

(b) the form for which the information and data must be provided when requested by AEMO, the Network Operator or the Economic Regulation Authority (refer to paragraph 2.5.3 of this Procedure).

[1] AEMO publishes Generator Monitoring Plan Form on WEM Website (hyperlink TBA).

2.2. General Principles

2.2.1. A Market Participant must consider and incorporate the following compliance principles when developing a Generator Monitoring Plan:

(a) the testing and monitoring regime (including relevant measuring and recording devices[2]), verification mechanism and frequency of testing and monitoring, must be such that all relevant compliance with an applicable Registered Generator Performance Standard can be conclusively established;

(b) Where the compliance of the relevant part of an applicable Registered Generator Performance Standard cannot be demonstrated through generator performance testing and monitoring, alternative methods to demonstrate compliance must be specified;

(c) outlining and addressing any risks created by the Generator Monitoring Plan, while maintaining the ability to conclusively establish the relevant compliance status of an applicable Registered Generator Performance Standard;

(d) consideration of efficiency and practicality of implementing the Generator Monitoring Plan, which includes but is not limited to implementation costs and availability of skills and labour, while maintaining the ability to conclusively establish the relevant compliance status of an applicable Registered Generator Performance Standard; and

(e) regular reviews and updates incorporating learnings from past implementation of the Generator Monitoring Plan, and continuous changes and improvement relevant to any parts of the Generator Monitoring Plan (e.g. testing and monitoring regime and verification mechanisms).

2.2.2. To support the principles specified in paragraph 2.2.1 of this Procedure, a Market Participant must, as a minimum, provide the specified information and data in paragraph 2.3 of this Procedure.

2.3. Information and Data requirements

2.3.1. A proposed Generator Monitoring Plan, submitted by a Market Participant to AEMO for approval in accordance with paragraph 4 of this Procedure, must contain as a minimum, for each Technical Requirement described in Appendix 12 of the WEM Rules:

(a) the applicable Registered Generator Performance Standard for that Technical Requirement;

(b) a compliance testing and monitoring methodology, in accordance with the specific requirements described in paragraph 3.2 of this Procedure;

(c) a mechanism to verify compliance, in accordance with the specific requirements described in paragraph 3.3 of this Procedure;

(d) a description of the frequency of testing or proposed monitoring period, in accordance with the specific requirements described in paragraph 3.4 of this Procedure;

(e) details of any non-compliance and suspected non-compliance that has occurred, any rectification action taken, the status of compliance at the time of submission of the proposed Generator Monitoring Plan, and if applicable, the test results following a request

[2] Recording device and measuring device have the same meaning and are used interchangeably in this Procedure. The term 'equipment' is not used in this context in this Procedure as it has specific meaning in the Technical Rules.

by AEMO to undertake a test in accordance with clause 3A.9.4 of the WEM Rules (refer to paragraph 7.1.7 of this Procedure);

(f) a process for future audits or reviews of the Generator Monitoring Plan, including the proposed process and frequency of the review;

(g) any relevant information requested by AEMO and/or any notification provided by AEMO in accordance with clause 3A.9.2, 3A.10.3 and 3A.10.4 of the WEM Rules;

(h) the commencement date of an approved Generator Monitoring Plan; and

(i) a proposed timeframe for when evidence of compliance to the Generator Monitoring Plan will be provided to AEMO (as described in paragraph 2.4 of this Procedure).

2.3.2. A proposed Generator Monitoring Plan, submitted by a Market Participant to AEMO for approval in accordance with paragraph 4 of this Procedure, may include additional information at the discretion of the Market Participant. This information may include details of the relevant implementation team for the Generator Monitoring Plan, including roles and responsibilities of this team.

2.4. Evidence of Compliance with the Generator Monitoring Plan

2.4.1. Market Participants must implement an approved Generator Monitoring Plan in accordance with the proposed frequency of testing outlined in the approved Generator Monitoring Plan and, notwithstanding the self-reporting regime specified in clause 3A.10 of the WEM Rules, must complete and provide evidence of compliance, or specify where there is a lack thereof, to AEMO no later than the date and time specified in the approved Generator Monitoring Plan under paragraph 2.3.1(i) of this Procedure.

2.4.2. Evidence of compliance provided under paragraph 2.4.1 of this Procedure must include information and/or data to demonstrate that the required tests and/or monitoring specified in the Generator Monitoring Plan have been successfully conducted and recorded.

2.4.3. Evidence of compliance provided under paragraph 2.4.1 of this Procedure must clearly specify the period during which the testing and monitoring occurred, and when the reporting of the evidence of compliance is applicable.

2.4.4. Evidence submitted to AEMO, in order to demonstrate compliance described in paragraphs 7.1.1 to and 7.1.3 of this Procedure, must be sufficient to enable AEMO, in its discretion, to clearly identify that it has been achieved.

E[A] Examples

Examples of evidence of compliance in paragraph 2.4.4 of this Procedure that do not establish a compliance status conclusively are:

(a) statements such as 'The active power ramp rate was observed to have operated satisfactorily' made without providing relevant active power measurements and results to substantiate the statement; and

(b) Test Data failing to record and demonstrate that the post-step response has settled to a new level and, Settling Time has been calculated based on such Test Data; and

(c) charts that have not been appropriately annotated and fail to provide clarify in relation to the Test Results.

2.5. Retention of records

2.5.1. Market Participants must retain information and data related to Registered Generator Performance Standards and Generator Monitoring Plans for all Transmission Connected Generating Systems they are responsible for, which include but are not limited to:

(a) all information and data described in the Registered Generator Performance Standards;

(b) all inputs used in developing the Generator Monitoring Plans, including the information and data described in paragraph 2.3 of this Procedure;

(c) all information and data described in the Generator Monitoring Plans, including the evidence of compliance described in paragraph 2.4.2 of this Procedure, such as:

(i) records of tests conducted and the results of those tests, which include not are not limited to:

(A) date/time of the test;

(B) a description of the test;

(C) results of the test; and

(D) any observed implications for compliance from the test;

(ii) Monitoring Data, either from continuous recording or as a result of a disturbance or a test; and

(iii) records of relevant general or technical inspections conducted by a Market Participant; and

(d) all correspondences with AEMO, the Network Operator and the Economic Regulator Authority in relation to Registered Generator Performance Standards and the Generator Monitoring Plans.

2.5.2. Market Participants must retain all information and data referred to in paragraph 2.5.1 of this Procedure in accordance with clause 10.1.2 of the WEM Rules.

2.5.3. Market Participants must retain the data and information referred to in paragraph 2.5.1 of this Procedure in electronic form such that it can be provided to AEMO, the Network Operator and Economic Regulator Authority on request (refer to clause 3A.6.2 (a) (iii) of the WEM Rules) within 5 business days. Where the data is stored in respect of continuous recording or as a result of a disturbance or a test, that data must be stored in a format that is non-proprietary and able to be accessed by AEMO, the Network Operator or the Economic Regulator Authority via typical office applications (e.g. CSV or Excel format).

3. COMPLIANCE TESTING AND MONITORING REQUIREMENTS

3.1. Overview

3.1.1. Compliance testing and monitoring requirements specified this paragraph 3 of this Procedure include the following aspects:

(a) testing and monitoring regime;

(b) verification mechanism; and

(c) frequency of testing.

3.1.2. This paragraph 3 of this Procedure specifies the testing and verification requirements (described in 3A.9.1 of the WEM Rules, and where the testing and verification requirements are relevant under clause 3A.6 of the WEM Rules) that are necessary to verify compliance:

(a) with an applicable Registered Generator Performance Standard;

(b) with an applicable Generator Monitoring Plan; and

(c) with applicable Registered Generator Performance Standards before an Interim Approval to Generate Notification and an Approval to Generate Notification are issued.

3.1.3. Compliance with an applicable Registered Generator Performance Standard is verified by means of the testing and monitoring regime, verification mechanism and frequency of testing described in an approved Generator Monitoring Plan. This includes demonstrating initial compliance in order to obtain an Interim Approval to Generate or Approval to Generate Notification, demonstrating continued compliance following generator maintenance or upgrades (including following Relevant Generator Modification), and demonstrating ongoing compliance.

3.1.4. Compliance with an applicable Generator Monitoring Plan is described in paragraph 7 of this Procedure.

3.2. Testing and monitoring regime

3.2.1. A testing and monitoring regime must be prepared for each Technical Requirement specified in Appendix 12 of the WEM Rules and in accordance with the mandatory tests outlined in Appendix B of this Procedure.

3.2.2. The testing and monitoring regime may consist of different forms of tests, including, but not limited to:

(a) continuous in-service monitoring;

(b) periodical online and/or offline testing; and

(c) analysis of performance during and following a power system disturbance[3].

[3] A power system disturbance refers to the power system deviating from normal operating conditions to the extent that could threaten the stability or change the operation of the Transmission Connected Generating System as a result of one or more Contingency Events.

3.2.3. The testing and monitoring regime must consider and incorporate:

(a) all relevant parts of an applicable Registered Generator Performance Standard that must be verified;

(b) information about how continuous monitoring must be performed, including location, quantities to measure, the measuring device used and analysis on the measuring results;

(c) detailed steps of how an online and/or offline test must be performed;

(d) a requirement that, where tests are required under Appendix 12 of the WEM Rules, these tests must be undertaken in addition to any alternative test methodology that has been considered;

(e) a verification mechanism that is in accordance with the specific requirements in paragraph 3.3 of this Procedure;

(f) a clear objective and expectation of the outcome of a test or monitoring;

(g) the quantities to be measured for a test, including the duration for which the quantities are measured before, during and after a test, that establish the outcome of the test;

(h) information about the locations where the test or monitoring measurements are made, including those measurements necessary to assist with post-test or post-monitoring analysis;

(i) information about the appropriateness of the form of the Test Results and Monitoring Results (including those listed in Attachment 11 of the Technical Rules) to enable a compliance status to be established conclusively;

(j) information about the appropriateness and degree of accuracy of the units of measurement of the testing and monitoring, including those used in the recording devices and analysis of test results, such that they describe a measured quantity accurately and support a compliance status being established conclusively;

(k) information about other reasonable approximation that supports a conclusive assessment of the compliance status of the Transmission Connected Generating System with an applicable Registered Generator Performance Standard, where a quantity cannot be directly measured in the test environment;

(l) information about the variation in technical performance of the Transmission Connected Generating System under power system operating conditions and/or ambient conditions, resulting in the requirement to repeat the tests multiple times under different conditions or via continuous monitoring, to conclusively establish the compliance status of an applicable Registered Generator Performance Standard under variable conditions;

(m) information about the technical performance of the Transmission Connected Generating System in the most onerous power system operating condition and/or ambient conditions that are applicable to the Transmission Connected Generating System;

(n) all relevant test information that must be recorded to assist with post-test or post-monitoring analysis, including the time and date, relevant power system condition during the period, operating arrangement and configuration within the Transmission Connected Generating System, and ambient conditions at the start of, end of and during a test (or a monitoring);

(o) information about the suitability of the test and monitoring regime for validating modelled technical performance, where any parts of the modelled technical performance have been identified as requiring validation;

(p) information about the appropriateness of the measuring device including the accuracy, resolution and reliability of the measurements. At a minimum, it must be demonstrated that the device meets the relevant requirements described in Attachment 11 of the Technical Rules, must not result in inaccurate or inconclusive results, and:

  (i) the make and model of each of the measuring device must be specified; and

  (ii) the calibration or relevant test certificates must be provided for each of the devices;

(q) confirmation that measurements are synchronised to within the timeframe specified in the Technical Rules, where multiple quantities are measured using multiple recording devices during a test;

(r) confirmation of the requirement to verify each type of Generating Unit and/or each type of control and protection system, or justification for the lack of such requirement, where a Transmission Connected Generating System consists of Generating Units of different makes or Generating Units having different control and Protection Systems installed, the requirement to verify each type of Generating Units and/or for each type of control and Protection Systems;

(s) information about any potential risks, which include, but are not limited to, those related to:

  (i) Power System Safety and Power System Reliability;

  (ii) health and safety of personnel on-site;

  (iii) health and safety of the public; and

  (iv) damage to equipment;

(t) information about any mitigation opportunities for each of the potential risks identified in paragraph 3.2.3(s) of this Procedure.

3.2.4. Any information provided under paragraph 3.2.3 of this Procedure must be specific and detailed, for example, where a proposed test is referenced from another document (such as Australian Standards or other international standards), the test may be quoted but details of the compliance test and monitoring test must be specified in relation to the characteristics of the Transmission Connected Generating System.

3.2.5. Market Participants may propose any suitable testing and monitoring methods, and any numbers of tests and monitoring regimes, as necessary to verify compliance against any part of the applicable Registered Generator Performance Standards. However, these tests must demonstrate incorporation of all relevant principles and requirements described in paragraphs 2.2 and 2.3 of this Procedure, and the mandatory tests described in Appendix B of this Procedure.

3.3. Compliance verification mechanism

3.3.1. The verification mechanism in paragraph 3.3 of this Procedure describes generally how a Technical Requirement must be verified, including considering the test and monitoring regime (including the available Test Results and Monitoring Results), and providing evidence necessary to substantiate a claim of compliance.

3.3.2. A Market Participant must verify a Technical Requirement by incorporating the following into the verification mechanism:

(a) where a requirement for performance is quantified in a Technical Requirement (such as speed of response and accuracy level), the verification mechanism must be such that the required performance can be quantified;

(b) where a Technical Requirement requires provision of certain information and requires updates to that information, the verification mechanism must include confirmation that the information has been provided and this information is valid at the time the evidence of compliance is submitted to AEMO;

(c) where a Technical Requirement specifies how a test is to be performed, including the location at which the technical performance must be established is specified, the verification mechanism must ensure the tests are conducted in the required manner and include measurements that demonstrate the test has been conducted in required location;

(d) where a Technical Requirement is in relation to installation and/or availability of a control system or equipment, the verification mechanism must include confirmation that the relevant system or equipment has been installed and all required functionality is available on a continuous basis;

(e) where a Technical Requirement is in relation to the connection status of a Transmission Connected Generating System (such as a requirement to remain in Continuous Uninterrupted Operation, or not to disconnect following a disturbance), the verification mechanism must include, as applicable:

(i) if the Transmission Connected Generating System or equipment within the Transmission Connected Generating System was disconnected, evidence to support the notion that the disconnection was intentional and in compliance with an approved protection scheme;

(ii) evidence that a Transmission Connected Generating System remains connected during a disturbance; and/or

(iii) confirmation of relevant in-service protection settings;

(f) where a requirement is in relation to an obligation of AEMO and/or a Network Operator, consideration that must be made during a negotiation process of a Generator Performance Standard, and the requirement cannot be verified by means of testing and monitoring, a verification mechanism is not required by the Market Participants;

(g) where a requirement is in relation to conformance to a WEM Procedure, the Technical Rules, Australian Standards or any internal standards of the Market Participant, the verification mechanism must consider how the requirement is described in the relevant document; and

(h) in any case, consideration must be given to ensuring that the verification mechanism supports a compliance status being established conclusively.

3.4. Frequency of testing

3.4.1. A Generator Monitoring Plan must include the proposed frequency of testing for each of the tests and monitoring arrangements.

3.4.2. In setting the frequency of testing and monitoring, the Market Participant must consider and address the following factors:

(a) the technology adopted by the Transmission Connected Generating System in relation to a Technical Requirement;

(b) past learnings/experience with the specific Transmission Connected Generating System, or the relevant parts of the Transmission Connected Generating System;

(c) industry experience with the particular generation technology;

(d) manufacturer's advice, for example with respect to the particular model of equipment within a Transmission Connected Generating System or control system version; and

(e) an assessment of the frequency of testing required to provide reasonable assurance of compliance.

3.4.3. A Generator Monitoring Plan must also propose how the frequency of testing should be reviewed and updated, including the philosophy and basis on which the frequency of testing will be reviewed.

4. SUBMISSION PROCESS

4.1.1. A Market Participant must submit a proposed Generator Monitoring Plan to AEMO no later than six months after the applicable Registered Generator Performance Standards are implemented.

4.1.2. Where a Facility with Registered Generator Performance Standards commences operation for the first time, or following a Relevant Generator Modification, the Market Participant responsible for the Facility must submit the relevant Generator Monitoring Plan to AEMO prior to the issue of an Approval to Generate Notification by a Network Operator, and must allow for time required by AEMO to assess the Generator Monitoring Plan in accordance with paragraph 5 of this Procedure and allowing for any additional time that may be required following notification of the outcome of such assessment.

4.1.3. A Market Participant must submit a revised proposed Generator Monitoring Plan, containing updates and amendments to an approved Generator Monitoring Plan, to AEMO in accordance with the following conditions and timeframes:

(a) within 6 months of a new Registered Generator Performance Standard taking effect, where a new Registered Generator Performance Standard[4] supersedes an existing Registered Generator Performance Standard, including in accordance with clause 3A.14.1(b) of the WEM Rules where there has been a Relevant Generator Modification;

(b) within 6 months of amendments to the Template Generator Monitoring Plan as specified in paragraph 2 of this Procedure taking effect, as required by clause 3A.6.9 of the WEM Rules;

(c) within 5 business days of implementing the approved Generator Monitoring Plan, where any parts of the approved Generator Monitoring Plan have not been implemented by a Market Participant because the relevant parts described in the approved Generator Monitoring Plan have been found to be infeasible during its execution; or

(d) as soon as practicable after it forms the view that any parts of the approved Generator Monitoring Plan are no longer valid, due to reasons other than those specified in paragraphs 4.1.3(a), 4.1.3 (b) or 4.1.3 (c) of this Procedure.

4.1.4. In relation to paragraph 4.1.3(d) of this Procedure, a Market Participant must notify AEMO as soon as practically possible after it forms the view that any parts of the approved Generator Monitoring Plan are no longer valid and, must:

(a) provide details as to which parts of the approved Generator Monitoring Plan have been deemed invalid; and

(b) submit an updated proposed Generator Monitoring Plan no later than 20 Business Days after notifying AEMO that the information is invalid.

[4] A Registered Generator Performance Standard may be superseded due to a range of reasons, which include, but are not limited to, updates to relevant requirements in WEM Rules, changes to this Procedure, or re-negotiation of a Registered Generator Performance Standard due to changes in technical performance.

4.1.5. Where a previously submitted proposed Generator Monitoring Plan or an approved Generator Monitoring Plan has been amended and re-submitted to AEMO by a Market Participant, the Market Participant must include:

(a) reasons for the updates and amendments; and

(b) references within the document where the approved Generator Monitoring Plan has been updated.

4.1.6. A Generator Monitoring Plan submitted by a Market Participant, including a Generator Monitoring Plan containing amendments and updates requested by AEMO in accordance with clause 3A.6.8(b) of the WEM Rules, is not an approved Generator Monitoring Plan until it has been approved by AEMO in accordance with paragraph 5 of this Procedure, and AEMO has issued a notice to the Market Participant that the Generator Monitoring Plan has been approved.

5. ASSESSMENT AND APPROVAL PROCESS

5.1.1. The scope of AEMO's assessment of a proposed Generator Monitoring Plan is limited to:

(a) the content of the Generator Monitoring Plan required by paragraph 2 of this Procedure; and

(b) the applicable Registered Generator Performance Standards, including applicable equipment settings and control modes approved by the Network Operator,

and is conducted for the purpose of confirming suitability for monitoring ongoing compliance with a Facility's Registered Generator Performance Standards.

5.1.2. Where a Market Participant has submitted a proposed Generator Monitoring Plan that includes evidence of compliance with the applicable Registered Generator Performance Standards, AEMO's approval of the proposed Generator Monitoring Plan extends to the Generator Monitoring Plan itself, but does not include AEMO's approval or acceptance of the compliance, or lack thereof, with any other part of the Registered Generator Performance Standards for that Facility.

5.1.3. AEMO's approval of a proposed Generator Monitoring Plan does not preclude any other necessary processes, arrangements and approvals (e.g. approval for Outages) being undertaken to execute the testing and monitoring regime in accordance with the approved Generator Monitoring Plan.

5.1.4. AEMO's approval of a proposed Generator Monitoring Plan does not include AEMO's acceptance of any obligations or responsibilities related to the implementation of the approved Generator Monitoring Plan, and does not include acceptance of any potential risks identified within the Generator Monitoring Plan.

5.1.5. Where a Generator Monitoring Plan has been submitted without an active set of Registered Generator Performance Standards or Approval to Generate Notification being issued, it may be assessed by AEMO but it must not be approved by AEMO until the Registered Generator Performance Standards become active or, in the case of a Transmission Connected Generating System commencing operation for the first time, where an Approval to Generate Notification has been issued.

5.1.6. In assessing whether to approve or reject a proposed Generator Monitoring Plan, AEMO must consider:

(a) the requirements described in clauses 1.41.12, 3A.6.5 and 3A.6.6 of the WEM Rules, where applicable; and

(b) whether the Generator Monitoring Plan demonstrates consideration of all principles and requirements described in paragraphs 2.1 to 2.4 of this Procedure.

5.1.7. AEMO must use its best endeavours to notify a Market Participant of the outcome of the assessment described in paragraph 5.1.6 within 30 Business Days of submission.

5.1.8. Where a modification has been made to a proposed Generator Monitoring Plan following a rejection notification by AEMO, made in accordance with clause 3A.6.8 of the WEM Rules, AEMO must assess the proposed Generator Monitoring Plan in accordance with the requirements and timeframe specified in paragraph 5.1.6 and paragraph 5.1.7 of this Procedure respectively.

5.1.9. There must only be one approved Generator Monitoring Plan for a Transmission Connected Generating System in effect at any time. The applicable approved Generator Monitoring Plan remains effective until such time that:

(a) it has been superseded by another approved Generator Monitoring Plan; or

(b) the Transmission Connected Generating System is de-registered.

5.1.10. Where a proposed Generator Monitoring Plan is an update to an approved Generator Monitoring Plan, AEMO must assess the applicable proposed Generator Monitoring Plan in accordance with the processes specified in this paragraph 5 of this Procedure.

6. GENERATOR MONITORING PLANS FOR EXISTING TRANSMISSION CONNECTED GENERATING SYSTEMS

6.1. Overview

6.1.1. For a Market Participant responsible for an Existing Transmission Connected Generating System, clause 1.41 of the WEM Rules describes all relevant requirements and obligations that must be fulfilled by Market Participants and AEMO in relation to a Generator Monitoring Plan. Paragraph 6 and of this Procedure describes additional requirements for Generator Monitoring Plans under this Procedure, as permitted by clause 1.41.6 of the WEM Rules.

6.2. Requests for extension

6.2.1. Where a request for an extension of the time period for the submission of a proposed Generator Monitoring Plan is made in accordance with clauses 1.41.3 and 1.41.4 of the WEM Rules by a Market Participant, the information that must be provided by a Market Participant to AEMO, in order for AEMO to consider if a Market Participant is making reasonable progress towards having a Generator Monitoring Plan, includes but is not limited to:

(a) reasons for the request for extending the date by which a proposed Generator Monitoring Plan must be submitted;

(b) the time by which the Market Participant expects the proposed Generator Monitoring Plan to be submitted; and

(c) the actions the Market Participants must take to complete and submit the proposed Generator Monitoring Plan.

6.2.2. In determining whether a request for extending the submission deadline for a proposed Generator Monitoring Plan for an Existing Transmission Connected Generating System is to be approved or rejected, AEMO must consider, where relevant:

(a) whether the Existing Transmission Connected Generating System is still progressing with reaching an Agreed Generator Performance Standard;

(b) the risks that the relevant Existing Transmission Connected Generating System pose to Power System Security and Power System Reliability, considering the size, location, technology, expected frequency and duration of operation of the Generating System;

(c) complexity in developing the Generator Monitoring Plan, in particular, the testing and monitoring regime, considering factors such as the age and technology of the relevant Existing Transmission Connected Generating System; and

(d) whether a Market Participant has a large number of Existing Transmission Connected Generating Systems for which it needs to develop Generator Modelling Plans.

6.3. Approval process

6.3.1. For a proposed Generator Monitoring Plan, submitted in accordance with clause 1.41.2 of the WEM Rules, the assessment and approval for the proposed Generator Monitoring Plan and the effect of an approved Generator Monitoring Plan is specified in paragraph 5 of this Procedure.

6.3.2. For a proposed Generator Monitoring Plan, submitted in accordance with clause 1.41.2 of the WEM Rules, where there is no Existing Monitoring Plan, AEMO must consider all requirements of the Template Generator Monitoring Plan (described in paragraph 2 of this Procedure), in assessing and approving the proposed Generator Monitoring Plan.

6.3.3. For a proposed Generator Monitoring Plan, submitted in accordance with clause 1.41.2 of the WEM Rules, where there is an Existing Monitoring Plan, AEMO must consider the requirement specified in clause 1.41.9 of WEM Rules, that it must approve the method of monitoring as it relates to a Technical Requirement as set out in the Existing Monitoring Plan, in conjunction with all other requirements specified for the Template Generator Monitoring Plan (described in paragraph 2 of this Procedure), in assessing and approving the proposed Generator Monitoring Plan.

7. NON-COMPLIANCE

7.1.1. For the purposes of this Procedure, a non-compliance refers to, for a Transmission Connected Generating System, a failure to comply with the requirements of:

(a) an applicable Registered Generator Performance Standard as required under paragraph 7.1.2 of this Procedure; or

(b) an applicable Generator Monitoring Plan, as described in paragraph 7.1.3 of this Procedure,

prior to considering the self-reporting regime, Rectification Plans and effect of a Rectification Plan described in clauses 3A.10, 3A.11 and 3A.12 of the WEM Rules.

7.1.2. Non-Compliance with an applicable Registered Generator Performance Standard for a Transmission Connected Generating System include, but are not limited to:

(a) when any part of an applicable Registered Generator Performance Standard has been established as non-compliant, including when clause 3A.10.2 of the WEM Rules applies; and

(b) where a non-compliance is suspected and cannot be conclusively established otherwise.

7.1.3. Compliance with a Generator Monitoring Plan requires that all tests and data recording requirements to support self-monitoring, specified in the approved Generator Monitoring Plan, have been, and are able to be, conducted in accordance with the requirements of the approved Generator Monitoring Plan and that any required evidence is able to be produced.

7.1.4. Market Participants must notify AEMO of any non-compliance described in paragraphs 7.1.1 to 7.1.3 of this Procedure, including alleged non-compliance and suspected non-compliance, in accordance with relevant processes described in clauses 3A.10, 3A.11 and 3A.12 of the WEM Rules.

7.1.5. In addition to all timeframe requirements specified in clauses 3A.10, 3A.11 and 3A.12 of the WEM Rules, within 5 Business Days of returning to a compliant state, a relevant Market Participant must notify AEMO that the non-compliance has been resolved and compliance has been re-established.

7.1.6. Where a Market Participant is requested by AEMO to undertake a test to determine whether it is compliant in accordance with clause 3A.9.4 of the WEM Rules:

(a) AEMO may propose any tests described in Appendix B and Appendix C of this Procedure, Attachment 11 of the Technical Rules, or any other tests proposed by AEMO that are consistent with the principles and requirements set out in paragraph 2 in this Procedure; and

(b) AEMO must specify the timeframe by which a test proposed in paragraph 7.1.6(a) of this Procedure must be undertaken, and the timeframe for which evidence of compliance must be submitted;

A Market Participant must undertake a test proposed by AEMO in accordance with paragraphs 7.1.6(a) and 7.1.6(b) of this Procedure. However, a Market Participant may propose alternative tests and/or timeframes and, after undertaking an assessment consistent with the process described in paragraph 5 of this Procedure, AEMO may approve the alternative test if it is satisfied that the alternative tests and/or timeframes support the relevant compliance status being established conclusively, and there are no unacceptable risks to Power System Security and/or Power System Reliability.

7.1.7. Where a Market Participant is required by AEMO to undertake a test, in accordance with clause 3A.9.4 of the WEM Rules to determine whether it is compliant, AEMO may require that the test results and outcomes be included in the applicable approved Generator Monitoring Plan and submitted to AEMO.

7.1.8. Where a Market Participant has submitted a proposed Rectification Plan for consideration by AEMO, in accordance with clause 3A.11.1 of the WEM Rules, and AEMO has proposed an alternative Rectification Plan in accordance with clause 3A.11.3(d) of the WEM Rules, a Market Participant must re-submit the proposed Rectification Plan reflecting the alternative Rectification Plan as soon as practicable if the Market Participant accepts the proposed Rectification Plan.

APPENDIX A. RELEVANT CLAUSES OF THE WEM RULES

Table 3 details:

(a) the head of power clauses in the WEM Rules under which the Procedure has been developed; and

(b) each clause in the WEM Rules requiring an obligation, process or requirement be documented in a WEM Procedure, where the obligation, process or requirement has been documented in this Procedure.

Table 3 Relevant clauses of the WEM Rules

Clause
1.41.6
3A.6.2
3A.9.1

APPENDIX B. MANDATORY TESTS

Table 4 details the mandatory tests that must be undertaken by Market Participant in order to establish compliance during connection of a new Transmission Connected Generating System or following a Relevant Generator Modification (where AEMO determines tests are relevant to the Relevant Generator Modification). The tests must be included in a Generator Monitoring Plan, but they must not form the entirety of a Generator Monitoring Plan. For ongoing compliance verification, Market Participant must adopt a verification mechanism that incorporates other testing and monitoring methods, as described in Appendix D of this Procedure.

Table 4 Mandatory tests

Technical Requirement	Test Descriptions[5]	Suggested frequency of testing[6]
Active Power capability	• Test the Generating Unit or Generating System at the Rated Maximum Active Power output level at a range of ambient temperature, including the maximum ambient temperature described in clause A12.2.3.3 of WEM Rules, and under a range of operating conditions; and • the operating conditions, ambient temperature on-site on the day of testing and location where temperature is measured must be recorded.	Every 3 years and/or after every Relevant Generator Modification.
Reactive Power Capability	• Test the Generating System at Rated Maximum Active Power output level at the Connection Point or another agreed location as described in test C9 in Attachment 11 of the Technical Rules; • repeat the tests at other Active Power levels, which typically include Rated Minimum Active Power output level, and 25%, and 50% and 75% of Rated Maximum Active Power output level. The selected Active Power levels must be sufficient to reasonably establish the Reactive Power Capability in both supply and absorb regions on the Reactive Power Capability curve; and • the operating conditions, ambient temperature on-site on the day of testing and location where temperature is measured must be recorded.	Every 3 years and/or after every Relevant Generator Modification.
Voltage and Reactive Power Control	• Perform voltage step response and voltage control tests in accordance with tests C1 to C4, C6 to C8, S5 to S7 described in Attachment 11 of the Technical Rules; • perform Reactive Power step response tests, including tests S1 and S2 described in Attachment 11 of the Technical Rules; and • perform both lagging and leading Power Factor step response tests, in 0.25 step from unity to 0.95 or another Power Factor specified by AEMO.	Every 3 years and/or after every Relevant Generator Modification.
Active Power control	• Perform Active Power step response test, as described in test S10 in Attachment 11 of the Technical Rules, and the	Every 3 years and/or after every Relevant

[5] Where a test described in Attachment 11 of the Technical Rules is not suitable for the technology of a Generating System a or Generating Unit, and/or verifying the compliance with an applicable Registered Generator Performance Standard, AEMO may request the test with modification suitable for the technology and/or establishing compliance with the Registered Generator Performance Standards.

[6] Suggested frequency of testing refers to suggested frequency of periodical testing for ongoing verification of compliance against a Registered Generator Performance Standard.

Technical Requirement	Test Descriptions[5]	Suggested frequency of testing[6]
	step tests must be performed for different pre-step Active Power levels. The steps must be repeated with other additional step sizes if deemed warranted; and • perform tests to demonstrate that for a loss of communications, Remote Monitoring Equipment or Remote Control Equipment, Active Power level is sustained.	Generator Modification.
Inertia and frequency control	• Perform speed or frequency step tests, for frequency step sizes both within the dead band and outside the dead band; • frequency step tests can be performed by means of Active Power step tests such that the Active Power steps are equivalent to the desired frequency step sizes, as described in test S10 in Attachment 11 of the Technical Rules; and • frequency step tests must be performed for different pre-step Active Power levels and different sizes of frequency change. The measured Active Power response for a frequency change must be compared to expected (as-calculated) Active Power changes in order to ascertain accuracy of the response.	Every 3 years and/or after every Relevant Generator Modification.
Disturbance ride through for a frequency disturbance	• Where possible, perform speed or frequency setpoint tests such that the speed for frequency setpoints is set to just below the over-frequency disconnection settings and just above the under-frequency disconnection settings (similar to the described methods in test S11 in Attachment 11 of the Technical Rules), and is sustained for a period longer than defined in the disconnection settings. The tests must be performed for all disconnection settings, unless proven not feasible; and • any other equivalent tests appropriate to the technology of a Transmission Connected Generating System.	Every 3 years and/or after every Relevant Generator Modification.
Disturbance ride through for a voltage disturbance	• Where possible, perform voltage setpoint tests with the voltage setpoints at just below the disconnection settings and just above the disconnection settings, and sustain for a period longer than defined in the disconnection settings. The tests must be performed for all disconnection settings, unless proven not feasible; and • any other equivalent tests as appropriate to the technology of a Generating System.	Every 3 years and/or after every Relevant Generator Modification.
Disturbance ride through for multiple disturbances	• Any tests as appropriate to the technology of a Generating System.	Every 3 years and/or after every Relevant Generator Modification.
Disturbance ride through for partial load rejection	• Perform load rejection tests as described in test C5 in Attachment 11 of the Technical Rules.	Every 3 years and/or after every Relevant Generator Modification.
Disturbance ride through for quality of supply	• Not applicable, unless appropriate to the technology of a Generating System.	If applicable, every 3 years and/or after every Relevant

Technical Requirement	Test Descriptions[5]	Suggested frequency of testing[6]
		Generator Modification.
Quality of electricity generated	• Direct measurements and continuous monitoring of harmonics, flicker and negative sequence voltage under a selected range of power system conditions, including possible permutations of operating arrangements within the Generating System, using power quality measuring device; and • the tests must be such that harmonics, flicker and negative sequence voltage contribution by the Generating System can be reasonably derived from the measurements, including repeat tests, as required, such that contribution by the Generating System can be reasonably established.	Immediately after every Relevant Generator Modification.
Generation Protection Systems	• Test the relevant sub-systems by means of secondary injection into protection system relays.	Every 5 years or longer, depending on the self-diagnostic mechanism available, and/or after every Relevant Generator Modification.
Remote monitoring requirements	• Test availability and continual functionality of relevant sub-systems of Remote Monitoring Equipment routinely.	Annually and/or after every Relevant Generator Modification.
Remote control requirements	• Test availability and continual functionality of relevant sub-systems of Remote Control Equipment.	Annually and/or after every Relevant Generator Modification.
Communications equipment requirements	• Routinely test the availability of communication links, including any redundancies; • Routinely test relevant sub-systems, including power backup or Uninterruptible Power Supply (UPS) system; and • Test routine and emergency control telephone calls, as described in clause A12.16.3.2 in WEM Rules.	Annually and/or after every Relevant Generator Modification.
Generation system model	• Verify various aspects of the technical performances as demonstrated by a generation system model against all mandatory tests specified in Appendix B.	Immediately after every Relevant Generator Modification and/or whenever modelled technical performances requiring verification have been identified.

APPENDIX C. SUGGESTED TESTS AND MONITORING

Table 5 details the suggested tests and monitoring that may be undertaken by the Market Participants, in addition to the mandatory tests specified in Appendix B, in order to establish ongoing verification of their compliance with a Registered Generator Performance Standard.

Table 5 Suggested tests and monitoring

Technical Requirement	Suggested test and monitoring descriptions	Suggested frequency of testing/monitoring period
Active Power capability	• Monitor and assess the Active Power level using Monitoring Data at the required location under all operating conditions, with operating conditions, ambient temperature on-site and location where temperature is measured continuously recorded.	Continuous monitoring with assessment performed half-yearly.
Reactive Power Capability	• Monitor and assess the Reactive Power Capability using SCADA data at the required location under all operating conditions, with operating conditions, ambient temperature on-site and location where temperature is measured continuously recorded.	Continuous monitoring with assessment performed half-yearly.
Voltage and Reactive Power Control	• Monitor and assess in-service performance of voltage, Reactive Power or Power Factor using high speed recorders during every event involving a significant variation to voltage, Reactive Power and/or Power Factor.	Continuous monitoring with assessment undertaken whenever relevant disturbance takes place.
Active Power control	• Monitor and assess in-service Active Power response to target Active Power levels continuously.	Continuous monitoring with assessment performed half-yearly.
Inertia and frequency control	• Monitor and assess in-service performance using high speed recorders for every event involving a significant variation to system frequency.	Continuous monitoring with assessment undertaken whenever relevant disturbance takes place.
Disturbance ride through for a frequency disturbance	• Monitor and assess performance of a Generating System, using high speed recorders for every event involving a significant variation in system frequency, including events that result in both the Generating System or any generating unit(s) within a Generating System disconnecting and where the Generating System remains connected. Time of the event, frequency, as recorded by the Generating System, and the response of the Generating System, during fault and post-fault, must be recorded; and/or • investigate every disconnection of a Generating System, or any generating unit(s) within a Generating System that occurs during a significant frequency disturbance, which includes where the relevant Protection Systems activate (which may be based on protection relay activity logs).	Continuous monitoring with assessment undertaken whenever relevant disturbance takes place.

Technical Requirement	Suggested test and monitoring descriptions	Suggested frequency of testing/monitoring period
Disturbance ride through for a voltage disturbance	• Monitor and assess performance of a Generating System, using high speed recorders for every event involving significant variation in voltage, as recorded by the Generating System, including events that result in both the Generating System or any generating unit(s) within a Generating System disconnecting and where the Generating System remains connected. Time of the event, voltage as recorded by the Generating System, and the response of the Generating System, during fault and post-fault, must be recorded; and/or • investigate every disconnection of a Generating System or any generating unit(s) within a Generating System that occurs during a significant voltage disturbance, which includes where the relevant protection systems activate (which may be based on protection relay activity logs).	Ongoing monitoring with assessment undertaken whenever relevant disturbance takes place.
Disturbance ride through for multiple disturbances	• Monitor and assess performance of a Generating System, using high speed recorders for every event involving significant variation in voltage, as recorded by the Generating System, including events that result in both the Generating System or any generating unit(s) within a Generating System disconnecting and where the Generating System remains connected. Time of the event, voltage as recorded by the Generating System and the response of the Generating System, during fault and post-fault, must be recorded; and/or • investigate every disconnection of a Generating System or any generating unit(s) within a Generating System that occurs.	Ongoing monitoring with assessment undertaken whenever relevant disturbance takes place.
Disturbance ride through for partial load rejection	• Monitor and assess performance of a Generating System, using high speed recorders for every event involving sudden and significant reduction in Active Power, including events that result in both the Generating System disconnecting and where the Generating System remains connected. Time of the event, frequency as recorded by the Generating System and the response of the Generating System, during fault and post-fault, must be recorded; and/or • investigate every disconnection of a Generating System or any generating unit(s) within a Generating System that occurs during significant frequency disturbances, which includes where the relevant Protection Systems activate (which may be based on protection relay activity logs).	Ongoing monitoring with assessment undertaken whenever relevant disturbance takes place.
Disturbance ride through for quality of supply	• Investigate every disconnection of a Generating System or any generating unit(s) within a Generating System, including verifying the applied settings of the Protection Systems; and/or	Ongoing monitoring with assessment undertaken whenever relevant disturbance takes place.

Technical Requirement	Suggested test and monitoring descriptions	Suggested frequency of testing/monitoring period
	• monitor and measure harmonics, flicker and negative sequence voltage continuously under a selected range of power system conditions, including a range of operating arrangements within the Generating System, using a power quality measuring device.	
Quality of electricity generated	• Refer to relevant tests in Appendix B.	Continuous, or periodically with each monitoring period sufficiently long to capture a range of power system conditions.
Generation Protection Systems	• Investigate every disconnection of a Generating System, or any generating unit(s) within a Generating System; and/or • investigate every protection failure, especially where a protection has not operated the way it is designed to; and/or • routinely verify the applied settings of the Protection Systems; and/or • test the relevant sub-systems by means of secondary injection into Protection System relays.	Every 5 years or longer depending on the self-diagnostic mechanism[7] available, and/or after every Relevant Generator Modification.
Remote monitoring requirements	• Continuously monitor the availability and continual functionality of Remote Monitoring Equipment by means of an automated monitoring and logging system; and/or • continuously monitor the availability and continual functionality of all specified signals, as required by clause A12.14.3.3 of the WEM Rules.	Continuous monitoring with assessment performed half-yearly.
Remote control requirements	• Continuously monitor the availability and functionality of Remote Control Equipment by means of an automated monitoring and logging system or any other means, as appropriate.	Continuous monitoring with assessment performed half-yearly.
Communications equipment requirements	• Continuously monitor the availability and functionality of communications equipment by means of an automated monitoring and logging system.	Continuous monitoring with assessment performed half-yearly.
Generation system model	• Verify various aspects of the technical performance of a generation system model against disturbances. This must include modelled technical performances that have been identified as requiring verification.	Whenever modelled technical performances have been identified requiring verification or when disturbances deemed appropriate for verification of a modelled technical performance are available.

[7] The self-diagnostic mechanism must be specified and outlined in the Generator Monitoring Plan to support the proposed frequency of testing for generation Protection Systems.

APPENDIX D. COMPLIANCE VERIFICATION MECHANISMS

Table 6 to Table 21 detail the verification mechanisms for ongoing verification of Registered Generator Performance Standards considered reasonable and appropriate by AEMO. They serve as a guide to assist development of a relevant testing and monitoring regime in a proposed Generator Monitoring Plan.

D.1 Active Power Capability

Table 6 Suggested compliance verification for clause A12.2 of the WEM Rules

Criteria description	Appendix 12 clauses	Verification of compliance
Requirements apply at Connection Point unless otherwise specified	A12.2.2.1, A12.2.3.1	• Demonstration that all tests and monitoring undertaken to verify the requirements under A12.2 of the WEM Rules have been performed at the required location.
Temperature Dependency Data	A12.2.2.1, A12.2.3.2	• Active Power capability vs ambient temperature from Test Data and Monitoring Data is consistent with the provided Temperature Dependency Data.
Maximum ambient temperature assessment	A12.2.2.1, A12.2.3.3	• Active Power capability vs maximum ambient temperature specified by the Network Operator, from Test Data and Monitoring Data, is consistent with the provided Temperature Dependency Data.
Rated Maximum Active Power	A12.2.2.1, A12.2.3.4	• Test Data and Monitoring Data demonstrate that rated Active Power output is capable of sustaining for at least 5 minutes under different operating conditions.
Temporary Active Power reduction	A12.2.2.1, A12.2.3.5	• Specifying and outlining the agreement to allow for temporary reduction in Active Power.

D.2 Reactive Power Capability

Table 7 Suggested compliance verification for clause A12.3 of the WEM Rules

Criteria description	Appendix 12 clauses	Verification of compliance
Requirements apply at Connection Point unless otherwise specified	A12.3.1.1	• Demonstration that all tests and monitoring undertaken to verify the requirements under A12.3 of the WEM Rules have been performed at the required location.
Generator Capability Chart	A12.3.1.2	• The required Reactive Power achieved at all selected Active Power levels are consistent with those in provided Generator Capability Chart, considering the range of ambient temperatures recorded during the tests.
Reactive Power Capability -No limitations	A12.3.1.3	• Demonstration that Reactive Power level required by the Generator Capability Chart is achieved at all selected Active Power levels with all relevant limitation and Protection Systems in service.

Criteria description	Appendix 12 clauses	Verification of compliance
Maximum ambient temperature assessment	A12.3.1.4	• Monitoring Data shows that the required Reactive Power achieved at all selected Active Power levels are consistent with those in the provided Generator Capability Chart, which is specified for the maximum ambient temperature.
Full Dispatch of Active Power and Reactive Power Capability at Connection Point	A12.3.1.5	• Test Data and/or Monitoring Data show required Reactive Power achieved at Rated Maximum Active Power output, consistent with the provided Generator Capability Chart.
Reactive Power -supply & absorption	A12.3.2.1, A12.3.3.1	• Test Data and/or Monitoring Data show required Reactive Power successfully achieved at all selected Active Power levels in both supply and absorb regions, consistent with the provided Generator Capability Chart.
Reactive Power - continuous delivery within specified voltage range	A12.3.2.2, A12.3.3.2	• Monitoring Data shows Reactive Power can be delivered continuously for voltages at the Connection Point within the allowable steady state voltage range specified in the Technical Rules, or between 0.9 per unit and 1.1 unit, whichever is applicable.
Agreement to reduce Active Power if temperature > 25 degrees	A12.3.3.3	• Where Active Power level is reduced, ambient temperature must be above 25 degrees in the location where the Generating System is situated.

D.3 Voltage and Reactive Power Control

Table 8 Suggested compliance verification for clause A12.4 of the WEM Rules

Criteria description	Appendix 12 clauses	Verification of compliance
Power system oscillations Adequately Damped	A12.4.2.2(a), A12.4.3.2(a)	• Test Data and/or Disturbance Data show all post-step and post-disturbance responses are Adequately Damped, thereby confirm that the Equipment capabilities and Control Systems are sufficient to ensure power system oscillations are Adequately Damped.
No degradation of damping performance of power system	A12.4.2.2(b), A12.4.3.2(b)	• Test Data and/or Disturbance Data show all post-step and post-disturbance responses of the power system are Adequately Damped, thereby confirm that the Generating System does not degrade the damping of any critical mode of oscillation of the power system.
Operation of the Generator System does not cause instability of power system	A12.4.2.2(c)	• Monitoring Data and/or Disturbance Data show continual stable responses.
Equipment for testing & establishing characteristics	A12.4.2.3, A12.4.3.2(c)	• Test Data and/or Disturbance Data show all required quantities can be monitored and recorded.

Criteria description	Appendix 12 clauses	Verification of compliance
Ability to operate in all control modes	A12.4.2.4(a), A12.4.3.3	• Test Data shows all requirements are met in all the relevant control modes, thereby demonstrates that the Generating System has Control Systems that able to operate in all control modes.
Ability to switch between control modes	A12.4.2.4(b)	• Test Data shows all requirements are met in all the relevant control modes, thereby demonstrates that the Generating System has Control Systems that able to switch between control modes.
Voltage Control System - control accuracy of voltage	A12.4.2.5(a), A12.4.3.4(a)	• All step Test Data shows the voltage is controlled to within 0.5% of the setpoint, where the setpoint may be adjusted to incorporate any voltage droop or reactive current compensation agreed with AEMO and the Network Operator.
Voltage Control System - support network voltage during fault	A12.4.2.5(b)	• Disturbance Data confirm Reactive Power vs voltage response during fault is correct, thereby demonstrates that the Generating System has a voltage control system that regulates voltage in a manner that helps to support network voltages during fault.
Voltage Control System - continuous controllability	A12.4.2.5(c), A12.4.3.4(b)	• Test Data show the voltage can be continuously controlled within the specified range without tap-changing of a relevant transformer if applicable, subject to the Generator Performance Standards for Reactive Power Capability with the voltage control location agreed with AEMO and the Network Operator. Record of transformer tap positions are provided for confirmation; or • Test Data show the voltage can be continuously controlled within the specified range, subject to Reactive Power Capability with the voltage control location agreed with AEMO and the Network Operator. Record of transformer tap positions are provided for confirmation.
Voltage Control System - limiting devices	A12.4.2.5(d)	• Confirmation that the relevant limiting devices exist and are in service; and • all requirements under Appendix 12.4 of the WEM Rules can be met with the tests performed with all relevant limiters in service, unless required otherwise by the mandatory tests in Appendix B.
Power system stabiliser (where installed)	A12.4.2.6	• Provision of block diagrams of the Generating Unit's power system stabiliser, and the block diagram demonstrates that the power system stabiliser meets the specified requirements.

Criteria description	Appendix 12 clauses	Verification of compliance
Reactive Power Control System - control accuracy	A12.4.2.7(a), A12.4.3.5(a)	• Reactive Power or Power Factor step Test Data shows the Reactive Power is controlled to the level of the accuracy levels specified.
Reactive Power Control System - setpoint	A12.4.2.7(b), A12.4.3.5(b)	• Test Data shows the Reactive Power can be continuously controlled within specified Reactive Power Capability range without tap-changing of a relevant transformer. Record of transformer positions during a relevant test must be provided as part of evidence of compliance for confirmation.
Approved structure and parameter settings	A12.4.2.8	• Confirmation that approved structure and parameter settings of all components of the Control System that have been approved by the Network Operator and AEMO and are still applicable and valid.
Control System Adequately Damped	A12.4.2.9	• Test Data shows all post-step and post-disturbance responses are Adequately Damped.
Excitation Control System – capable of operation at 105% voltage	A12.4.2.10(a)	• Step Test Data shows that the voltage at the stator of the Generating Unit can be sustained at 105% of nominal voltage continuously at Rated Maximum Active Power output.
Excitation Control System - Excitation ceiling voltage	A12.4.2.10(b), A12.4.3.6(a)	• Step Test Data shows the excitation ceiling voltage can be achieved at the specified levels.
Excitation Control System – power system stabiliser	A12.4.2.10(c)	• Provision of block diagrams of the Generating Unit's power system stabiliser.
Minimum equivalent gain	A12.4.2.10(d), A12.4.2.14	• Test Data shows the minimum gain of 200 is achieved in the control system.
Power system stabiliser requirements	A12.4.2.12	• Provision of block diagrams of the Generating Unit's power system stabiliser, and the block diagram demonstrates that the power system stabiliser meets the specified requirements.
Power oscillation damping capability	A12.4.2.13	• Test Data and/or Disturbance Data show all post-step and post-disturbance responses are Adequately Damped; and • confirmation that the Generating Unit's power system stabiliser is responsive and adjustable over frequency range from 0.1 Hz and 2.5 Hz; and • provision of block diagrams of the Generating Unit's power system stabiliser demonstrating it has power system frequency and Active Power output of the Generating Unit as inputs.
Rise Time	A12.4.2.11, A12.4.2.15	• Test Data shows Rise Time of all required step response tests are measured according to the WEM Procedure: Generator Model Submission and Maintenance and must be within the criteria specified in Appendix 12 of the WEM Rules.

Criteria description	Appendix 12 clauses	Verification of compliance
Settling Time	A12.4.2.11, A12.4.2.15, A12.4.3.6(b), A12.4.3.7	• Test Data shows Settling Time of all required step response tests are measured according WEM Procedure: Generator Model Submission and Maintenance and must be within the criteria specified in Appendix 12 of the WEM Rules.
Settling Time (saturation)	A12.4.2.11, A12.4.2.15	• Test Data shows Settling Time of all required step response tests resulting in controlled output limits being reached are measured according to WEM Procedure: Generator Model Submission and Maintenance and must be within the criteria specified in Appendix 12 of the WEM Rules.
Agreed controlled parameters to meet performance characteristics	A12.4.2.16	• Confirmation that the controlled parameters agreed with the Network Operator and AEMO and are still applicable and valid.
Reactive power control system - limiting devices	A12.4.3.5(c)	• As demonstrated in disturbance ride through for a voltage disturbance
Highest level a Generating System can reasonably achieve	A12.4.4.1	• N/A.

D.4 Active Power Control

Table 9 Suggested compliance verification for clause A12.5 of the WEM Rules

Criteria description	Appendix 12 clauses	Verification of compliance
Compliance with Dispatch Systems Requirements	A12.5.1.1	• All relevant requirements in Dispatch Systems Requirements are listed and evidence of compliance is provided.
Arrangement for Access to limit Active Power output	A12.5.1.2	• Confirmation of the Arrangement for Access to limit Active Power output and that the arrangement is still applicable and valid.
Control systems Adequately Damped	A12.5.1.3	• Test Data and/or Monitoring Data show that post-step Active Power is Adequately Damped, at different pre-step or pre-disturbance Active Power levels.
Provision of disconnection settings	A12.5.1.4	• Provision of all applicable disconnection settings.
Maintaining Active Power output during loss of communications, or failure of Remote Monitoring Equipment or Remote Control Equipment	A12.5.1.5	• Test Data and/or Monitoring Data showing sustained Active Power level despite loss of communications, or failure of Remote Monitoring Equipment or Remote Control Equipment. • Monitoring Data showing Active Power change is not due to loss of communications, or failure of Remote Monitoring Equipment or Remote Control Equipment.

Criteria description	Appendix 12 clauses	Verification of compliance
Capability of Control System	A12.5.2.1, A12.5.3.1	• Monitoring Data show Active Power change, in accordance with the requirements of Appendix 12 of the WEM Rules, appropriately and continually in response to its Dispatch Instructions, for different sizes of Active Power changes and to different Active Power levels.
Rate of change of output	A12.5.2.2, A12.5.3.2	• Test Data and/or Monitoring Data show rate of change of Active Power is continuously within the requirements specified in Appendix 12 of the WEM Rules for different sizes of Active Power change.

D.5 Inertia and Frequency Control

Table 10 Suggested compliance verification for clause A12.6 of the WEM Rules

Criteria description	Appendix 12 clauses	Verification of compliance
Control Systems Adequately Damped	A12.6.1.1	• Test Data and/or Disturbance Data show post-step or post-fault Active Power is Adequately Damped at different pre-step or pre-disturbance Active Power levels, and for different rates of frequency change.
Maximum ramp rate expression	A12.6.1.2	• Demonstration of how ramp rate, expressed as the change in Active Power, as shown in Test Data, Monitoring Data and/or Disturbance Data, is calculated.
Provision of disconnection settings	A12.6.1.3	• Provision of all applicable disconnection settings.
Equipment for testing & establishing characteristics	A12.6.1.4	• Test Data and/or Disturbance Data show all required quantities can be monitored and recorded and appropriate permanently installed equipment is used.
Ramp rate after frequency response	A12.6.1.5	• Test Data and/or Disturbance Data show Active Power response recovery post 10 sec, at different pre-step or pre-disturbance Active Power levels, and for different sizes of frequency change, to confirm that the Generating System can meet the relevant the requirements of clause A12.5 of the WEM Rules when returning to regular Active Power output.
Availability of automatic variable Active Power MW control (speed & MW control) characteristic	A12.6.2.1(a), A12.6.3.1(a),	• Test Data and/or Disturbance Data show Active Power respond correctly to each frequency change, thereby confirming the Generating System has an automatic variable Active Power control characteristic.

Criteria description	Appendix 12 clauses	Verification of compliance
Capability for continuous operation in frequency response mode unless otherwise instructed	A12.6.2.1(b), A12.6.3.1(b),	• Applicable control system settings are provided to confirm Generating System is in frequency control or frequency response mode; • Test Data and/or Monitoring Data confirm Generating System Active Power correctly responds to observed frequency in Normal Operating Frequency Band, thereby demonstrating that the Generating System is capable of operating in a mode in which it will automatically alter its Active Power output to arrest and correct to changes in power system frequency; and • Test Data and/or Disturbance Data confirm Generating System Active Power correctly responds to observed frequency that is outside the Normal Operating Frequency Band during a fault, thereby demonstrating that the Generating System is capable of operating in a mode in which it will automatically alter its Active Power output to arrest and correct to changes in power system frequency.
Frequency dead band	A12.6.2.1(c), A12.6.3.1(c)	• As-applied protection settings confirm required frequency dead band on each Generating Unit or Generating System; • Frequency step Test Data confirm the non-response when the frequency change is within the dead band; • Frequency step Test Data confirm the Active Power response is correct, given the frequency step change and the frequency dead band; • Monitoring Data confirm Generating System Active Power correctly responds to observed frequency in Normal Operating Frequency Band; • Disturbance Data confirm Generating System Active Power correctly responds to observed frequency during a fault for which the frequency is outside the Normal Operating Frequency Band.
Droop response (frequency reduction)	A12.6.2.1(d)(i), A12.6.3.2(a)	• Applicable Control System settings confirm the required frequency-Active Power response. • Test Data and/or Disturbance Data show required response for Active Power vs frequency, at different pre-step or pre-disturbance Active Power levels, and for different sizes of frequency change.

Criteria description	Appendix 12 clauses	Verification of compliance
Droop response (frequency increase)	A12.6.2.1(d)(ii), A12.6.3.2(b)	• Applicable Control System settings confirm the required frequency-Active Power response. • Test Data and/or Disturbance Data show required response for Active Power vs frequency, at different pre-step or pre-disturbance Active Power levels, and for different sizes of frequency change.
Sustaining Active Power output	A12.6.2.1(d)(iii), A12.6.3.2(d)	• Test Data and/or Disturbance Data show the Generating System can sustain Active Power changes of at least the amounts specified for frequency increase and frequency decrease respectively, and for not less than 10 seconds, at different pre-step or pre-disturbance Active Power levels.
Rate of response	A12.6.2.1(d)(iv), A12.6.2.1(d)(v), A12.6.3.2(e), A12.6.3.2(f)	• Test Data and/or Disturbance Data show Active Power reaches the required response level within the specified time requirement for different rates of frequency change.
Response capability above 85% of output	A12.6.3.2(c)	• Confirmation that response capability included as part of the relevant Generator performance Standard in still applicable and valid.
Required Active Power level & ramp rate must not be outside the rated values	A12.6.4.1	• Monitoring Data show Active Power and ramp rate are within the required limits.
Additional source of Inertia or frequency control, and Control System must be coordinated with the remainder of Generating System to meet Technical Requirements	A12.6.4.2	• N/A.

D.6 Disturbance Ride Through for a Frequency Disturbance

Table 11 Suggested compliance verification for clause A12.7 of the WEM Rules

Criteria description	Appendix 12 clauses	Verification of compliance
Requirements apply at the Connection Point unless specified otherwise	A12.7.1.1	• Demonstration that all tests and monitoring undertaken to verify the requirements under A12.7 of the WEM Rules have been performed at the required location.
Provision of disconnection settings	A12.7.1.2	• Provision of all applicable disconnection settings.
Capability of remaining in Continuous Uninterrupted Operation for specified frequency and time ranges	A12.7.2.1, A12.7.3.1	• Evidence from investigation of every disconnection of the Generating System is provided to confirm that disconnection of Generating System is not due to over frequency and/or overspeed protection

Criteria description	Appendix 12 clauses	Verification of compliance
Capability of remaining in Continuous Uninterrupted Operation for specified RoCoF over prescribed time periods	A12.7.2.2, A12.7.3.2	• Evidence from investigation of every disconnection of the Generating System is provided to confirm that disconnection of Generating System is not due to RoCoF or equivalent protection.
The Network Operator and AEMO agree that frequency would be unlikely to fall below specified band in the Frequency Operating Standard.	A12.7.4.1	• Not applicable.

D.7 Disturbance Ride Through for a Voltage Disturbance

Table 12 Suggested compliance verification for clause A12.8 of the WEM Rules

Criteria description	Appendix 12 clauses	Verification of compliance
Common requirement for this Technical Requirement (Common): requirement applies at the Connection Point, unless specified otherwise	A12.8.1.1	• Demonstration that all tests and monitoring undertaken to verify the requirements under A12.8 of the WEM Rules have been performed at the required location.
Common: remaining in Continuous Uninterrupted Operation while the Connection Point voltage remains within 90%< nominal voltage < 110%	A12.8.1.2	• Evidence from investigation of every disconnection of the Generating System is provided to confirm that disconnection of the Generating System while the Connection Point voltage was still within the specified voltage ranges, was not due to voltage protection, thereby demonstrates that the Generating System can remain in Continuous Uninterrupted Operation while the voltage vary within the specified ranges.
Common: Provision of disconnection settings	A12.8.1.3	• Provision of all applicable disconnection settings.
Remaining in Continuous Uninterrupted Operation for variance in voltage within specified voltage ranges	A12.8.2.1, A12.8.3.1	• Evidence from investigation of every disconnection of the Generating System is provided to confirm that disconnection of the Generating System while variance in voltage was still within the specified voltage ranges, was not due to voltage protection, thereby demonstrates that the Generating System can remain in Continuous Uninterrupted Operation while the voltage vary within the specified ranges.

Criteria description	Appendix 12 clauses	Verification of compliance
Relaxation of 0% voltage level duration where agreed by the Network Operator and AEMO	A12.8.3.2	• Evidence from investigation of every disconnection of the Generating System is provided to confirm that, where agreed by the Network Operator and AEMO, the Generating System did not disconnect while the voltage was at 0% for a duration less than that prescribed in Registered Generator Performance Standards.
Provision of operational arrangements	A12.8.3.3	• Confirmation that the operational arrangements necessary to ensure the Generating System and each of its operating Generating Units will meet its Generator Performance Standard are still applicable and valid.

D.8 Disturbance Ride Through for Multiple Disturbances

Table 13 Suggested compliance verification for clause A12.9 of the WEM Rules

Criteria description	Appendix 12 clauses	Verification of compliance
Provision of disconnection settings	A12.9.1.2	• Provision of all applicable disconnection settings.
Operational arrangements to ensure Generating System will meet agreed performance levels under abnormal conditions	A12.9.1.3	• Confirmation that any operational arrangements have been included in the Generator Performance Standard and are still applicable and valid.
Fault following operation of auto-reclose Protection Scheme	A12.9.1.4	• Where there are multiple disturbances, confirmation that a fault that is re-established following an automatic reclose Protection Scheme has been considered as a separate disturbance.
Reactive current contribution	A12.9.1.5, A12.9.1.6	• Provision of Manufacturer's datasheet to confirm that the reactive current contribution at the required location, is equal or exceed the required Maximum Continuous Current of the Generating System or Generating Unit, whichever is applicable; or • Generation System Model confirms that the reactive current contribution at the required location is equal or exceed the required Maximum Continuous Current of the Generating System or Generating Unit, whichever is applicable, provided the observed performance of the Generation System matches the predicted performance of the Generation System, using the Generation System Model.

Criteria description	Appendix 12 clauses	Verification of compliance
Capability to remain in Continuous Uninterrupted Operation for specified disturbances	A12.9.2.2, A12.9.3.2	• Provision of applicable Control System and/or Protection scheme settings to confirm the Generating System can remain in Continuous Uninterrupted Operation for any of the specified disturbances, provided it is not an event that would disconnect the Generating unit by design. • For each occurrence of multiple disturbances, provision of Disturbance Data showing the Generating System remained in Continuous Uninterrupted Operation for any of the specified disturbances, provided it is not an event that would disconnect the Generating unit by design.
Ability to remain Continuous Uninterrupted Operation for a series of disturbances within a specified period	A12.9.2.3, A12.9.3.3	• Provision of applicable Control System and/or Protection scheme settings to confirm that the Generating System can remain in Continuous Uninterrupted Operation for a series of up to 15 disturbances within any 5 minute period. • For each occurrence of multiple disturbances, Disturbance Data shows the Generating System can remain in Continuous Uninterrupted Operation for a series of up to 15 disturbances within any 5 minute period.
Supply and absorption of reactive during fault	A12.9.2.4(a), A12.9.2.5(a), A12.9.2.6, A12.9.3.4(a), A12.9.3.5(a), A12.9.3.6	• For each occurrence of multiple disturbances, Disturbance Data shows reactive current level pre-disturbance during a fault and post-disturbance, and that the reactive current response during a fault meets the specified level.
Supply and absorption of Reactive Power sufficient to ensure voltage level after fault is within range	A12.9.2.4(b)	• For each occurrence of multiple disturbances, Disturbance Data shows voltage level at Connection Point or another agreed location returns to the range for Continuous Uninterrupted Operation following clearance of the fault.
Active Power levels after fault clearance within the specified time	A12.9.2.4(c), A12.9.2.5(b), A12.9.3.4(a), A12.9.3.4(b), A12.9.3.5(b)	• For each occurrence of multiple disturbances, Disturbance Data shows the Active Power level pre-disturbance and post-disturbance, and provides confirmation that the Active Power level at the Connection Point or another agreed location returns to specified level within the required time, following fault clearance.

Criteria description	Appendix 12 clauses	Verification of compliance
Reactive current Rise Time and Settling Time within the specified range and Adequately Damped	A12.9.2.7, A12.9.3.7, A12.9.3.8	• For each occurrence of multiple disturbances, Disturbance Data shows reactive current response has a Rise Time and Settling Time during a fault that are within the specified range and the response following fault clearance is Adequately Damped. • Confirmation that the Rise Time and Settling Time have been provided as part of Generator Performance Standard, and the Rise Time and Settling Time are still valid.
Generating System has sufficient current to maintain Rated Maximum Apparent Power for specified over-voltage range at Connection Point	A12.9.2.8(a)	• Provision of Active Power versus Reactive Power Generator Capability Chart at specified over-voltage range, to demonstrate that there is sufficient current to maintain Rated Maximum Apparent power at the specified over-voltage range.
Maximum Continuous Current for specified under-voltage range at Connection Point	A12.9.2.8(b)	• Provision of Active Power versus Reactive Power Generator Capability Chart at specified under-voltage range, to demonstrate that Maximum Continuous Current is available at the specified under-voltage range.
Connection of Generating System at proposed performance level would not cause other connections to trip when they otherwise would not have tripped	A12.9.4.1	• Not applicable.[8]

[8] For each disconnection of a Generating System or a Load, investigation by a Network Operator or AEMO concludes that it is not caused by the relevant Generating System.

D.9 Disturbance Ride Through for Partial Load Rejection

Table 14 Suggested compliance verification for clause A12.10 of the WEM Rules

Criteria description	Appendix 12 clauses	Verification of compliance
Capability of Continuous Uninterruptable Operation, provided reduction within specified range	A12.10.2.1, A12.10.3.1	• Evidence from investigation of every disconnection of a Generating System is provided to confirm that the disconnection is not caused by overspeed protection or other relevant protection, which has operated as a result of a load rejection event, provided the reduction in Active Power requirement is within the specified range. • Details of applicable protection system settings (such as over speed protection, reverse power protection) are provided to confirm the intended ride-through capability in the event of sudden Active Power reduction requirement. • Test Data demonstrates that the Generating System and each of its operating Units remain connected following a sudden reduction in Active Power requirement, provided the reduction is within the specified range.

D.10 Disturbance Ride Through for Quality of Supply

Table 15 Suggested compliance verification for clause A12.11 of the WEM Rules

Criteria description	Appendix 12 clauses	Verification of compliance
Does not disconnect if conditions at the Connection Point are within specified levels	A12.11.2.1, A12.11.3.1	• Evidence from investigation of every disconnection of a Generating System is provided to confirm that the disconnection is not caused by power-quality protection (voltage fluctuation, harmonic voltage distortion and voltage unbalance) conditions at the Connection Point, while all power quality quantities are within specified values.

D.11 Quality of Electricity Generated

Table 16 Suggested compliance verification for clause A12.12 of the WEM Rules

Criteria description	Appendix 12 clauses	Verification of compliance
Voltage imbalance not greater than the limits determined by the Network Operator	A12.12.1.1	• Demonstration that the derived voltage imbalance produced by the Generating System at the Connection Point, must not be greater than the limits determined by the Network Operator.

Criteria description	Appendix 12 clauses	Verification of compliance
Voltage fluctuation within specified limits	A12.12.2.1(a), A12.12.3.1(a)	• Demonstration that the derived voltage fluctuation produced by the Generating System at the Connection Point, must not be greater than the specified limits.
Harmonic voltage within limits	A12.12.2.1(b), A12.12.3.1(b)	• Demonstration that the derived harmonic voltage distortion produced by the Generating System at the Connection Point, must not be greater than the specified limits. • Where the specified limits are in the form of harmonic current distortion, demonstration that the derived harmonic current distortion produced by the Generation System at the Connection Point, must not be greater than the specified limits.
Does not prevent Network Operator from meeting SWIS Operating Standards and contractual obligations	A12.12.4.1	• Not applicable.

D.12 Generation Protection Systems

Table 17 Suggested compliance verification for clause A12.13 of the WEM Rules

Criteria description	Appendix 12 clauses	Verification of compliance
Protection requirements for Generating Systems and the Transmission System, as per the Technical Rules	A12.13.2.1, A12.13.3.1	• Details of applicable protection settings have been provided to confirm faults will be cleared within the specified time. • Disturbance Data providing confirmation of faults cleared within specified time.
Redundancy and fault clearance of Protection Schemes as per Technical Rules	A12.13.2.1, A12.13.3.2	• Confirmation of availability and continual functionality of the redundant Protection schemes. • Provision of applicable protection settings of the redundant Protection schemes to confirm faults will be cleared within the prescribed times.
Anti-islanding protection in accordance with documented performance requirements	A12.13.2.1, A12.13.3.3	• Confirmation of availability and continual functionality of the anti-islanding protection. • Using Disturbance Data, provision of confirmation of correct anti-islanding protection operation preventing the Generating System from supplying an isolated portion of the SWIS when it is not secure to do so. • Verify the applied settings in accordance with the relevant documented guidelines.

Criteria description	Appendix 12 clauses	Verification of compliance
Protection Schemes, with appropriate settings, as necessary to facilitate disconnection under abnormal conditions	A12.13.2.1, A12.13.3.4	• Confirmation of availability and continual functionality of the relevant Protection Schemes necessary to disconnect the Generating System under abnormal conditions. • Using Disturbance Data, provision of confirmation demonstrating correct operation of relevant Protection schemes to disconnect Generating System under abnormal conditions. • Confirmation of the applicable settings as specified in Appendix 12 of the WEM Rules.
Provision of all Protection Scheme settings	A12.13.2.1, A12.13.3.5	• Provision of the applicable Protection Scheme settings to the Network Operator and AEMO.

D.13 Remote Monitoring Requirements

Table 18 Suggested compliance verification for clause A12.14 of the WEM Rules

Criteria description	Appendix 12 clauses	Verification of compliance
Installation of Remote Monitoring Equipment	A12.14.2.1, A12.14.3.1	• Confirmation of the availability and continual functionality of the Remote Monitoring Equipment.
Conformance to Communication Standard	A12.14.2.1, A12.14.3.2	• All relevant requirements in Communication Standard are listed and evidence of conformance of the Remote Monitoring Equipment with the Communication Standard and other specified requirements is provided.
Remote Monitoring Equipment provides for specified signals and other information required by the Network Operator or AEMO	A12.14.2.1, A12.14.3.3	• Confirmation of the availability and continual functionality of the specified signals and such other information required by the Network operator AEMO in relation to the Remote Monitoring Equipment.
Availability of Remote Monitoring Equipment	A12.14.2.1, A12.14.3.4	• Confirmation of the availability and continual functionality of Remote Monitoring Equipment at all times, subject to Outages as agreed with AEMO.

D.14 Remote Control Requirements

Table 19 Suggested compliance verification for clause A12.15 of the WEM Rules

Criteria description	Appendix 12 clauses	Suggested compliance verification
Installation of Remote Control Equipment	A12.15.2.1, A12.5.3.1	• Confirmation of the availability and continual functionality of the Remote Control Equipment, where required to be installed by the Network Operator or AEMO.

Criteria description	Appendix 12 clauses	Suggested compliance verification
Conformance to Communication Standard	A12.15.2.1, A12.5.3.2	• All relevant requirements in Communication Standard are listed and evidence of conformance of the Remote Control Equipment with the Communication Standard and other specified requirements is provided.
Availability of Remote Control Equipment	A12.15.2.1, A12.5.3.3	• Confirmation of the availability and continual functionality of the Remote Control Equipment at all times, subject to Outages as agreed with AEMO.

D.15 Communications Equipment Requirements

Table 20 Suggested compliance verification for clause A12.16 of the WEM Rules

Criteria description	Appendix 12 clauses	Suggested compliance verification
Provision and maintenance of communication paths from specified equipment to communications interface at the relevant Power Station and in a location acceptable to the Network Operator	A12.16.2.1, A12.16.3.1	• Confirmation of the availability and continual functionality of the communication links between the Remote Monitoring Equipment and Remote Communications Equipment installed at a Generating Unit to a communications interface at the relevant Power Station and in a location acceptable to the Network Operator, including any redundancies.
Provision and maintenance of speech communication channel for routine and emergency control telephone calls	A12.16.2.1, A12.16.3.2	• Confirmation of the availability and continual functionality of a speech communication channel by means of which routine and emergency control telephone calls may be established between the operator of the Generation System and AEMO or the Network Operator (as applicable).
Conformance of the speech communication channel with the Communication Standard	A12.16.2.1, A12.16.3.3	• All relevant requirements in Communication Standard are listed and evidence of conformance with all requirements is provided.
Public switched telephone network requirements	A12.16.2.1, A12.16.3.4	• Confirmation of sole-purpose connection for operational communications.
Availability of communication path	A12.16.2.1, A12.16.3.5	• Confirmation of the availability and continual functionality of the communication paths to any applicable Remote Monitoring Equipment or Remote Communication Equipment, including any redundancies and subject to Outages as agreed by AEMO.
Primary Speech Communication Channel	A12.16.2.1, A12.16.3.6	• Description and confirmation that the Primary Speech Communication Channel, including speed and clarity of speech transmission, is in good working order.

D.16 Generation System Model

Table 21 Suggested compliance verification for clause A12.17 of the WEM Rules

Criteria description	Appendix 12 clauses	Suggested compliance verification
Provision of modelling data	A12.17.2.1, A12.17.3.1	• Confirmation of validity of all provided modelling data.
Ability to predict output from modelling data	A12.17.2.1, A12.17.3.2	• Overlays of simulated and real-life performances and demonstration that modelling data is sufficient to enable the Network Operator or AEMO to predict the output of the Generation System under all power system conditions, to within the required range, in accordance with WEM Procedure: Generator Model Submission and Maintenance.
Accuracy of modelling data compared with observed performance	A12.17.2.1, A12.17.3.3	• Overlays of simulated and real-life performances and demonstration that observed performance of the Generation System matches the predicted performance of the Generation System, using the Generation System Model, as assessed by the Network Operator or AEMO, to within the required range, in accordance with WEM Procedure: Generator Model Submission and Maintenance.
Provision of updates to the Generation System Model in order to meet the Technical Requirement	A12.17.2.1, A12.17.3.4	• Confirmation of provision of updates to the Generation System Model in order to meet the requirements of the Technical Requirement in this paragraph D.16 of this Procedure in accordance with the timeframes specified in the WEM Procedure made under clause 3A.4.2 of the WEM Rules.

NOTE: AEMO provides the following draft Generator Monitoring Plan Form as an attachment to the draft WEM Procedure: Generator Monitoring Plans, for the purpose of industry consultation from 11 December 2020 to 8 January 2021 only. AEMO will publish the formal Generator Monitoring Plan Form separately on the WEM Website.

Important notice

PURPOSE

AEMO publishes Generator Monitoring Plan form to assist Market Participants in developing a proposed Generator Monitoring Plan. Market Participants must submit Generator Monitoring Plans that are consistent with the format presented in this Generator Monitoring Plan form, in accordance with WEM Procedure: Generator Monitoring Plans, to AEMO.

DISCLAIMER

This document or the information in it may be subsequently updated or amended. This document does not constitute legal or business advice, and should not be relied on as a substitute for obtaining detailed advice about the Wholesale Electricity Market Rules or any other applicable laws, procedures or policies. AEMO has made every effort to ensure the quality of the information in this document but cannot guarantee its accuracy or completeness.

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USER GUIDE

1. The blue texts in this form are explanatory notes to assist Market Participants in providing required information and they are to be deleted prior to submission a proposed Generator Monitoring Plan, by a Market Participant to AEMO.
2. The *italicised* texts are examples. They are to be deleted prior to submission a proposed Generator Monitoring Plan, by a Market Participant to AEMO.

[COVER PAGE]

FACILITY X: GENERATOR MONITORING PLAN

Item	Description	Comment {to be deleted prior to submission]
Market Participant	[Enter according to WEM registration]	Compulsory, for the purpose of verification.
Facility	[Enter according to WEM registration]	Compulsory, for the purpose of verification.
Registered Generator Performance Standard reference	[Enter according to issue of Registered Generator Performance Standards]	Compulsory, for the purpose of verification.
Contact Name	[Name/Position]	Compulsory, for AEMO to contact relevant personnel of a Market Participant.
Address/Phone/Fax	[Address/Phone/Fax]	Compulsory, for AEMO to contact relevant personnel of a Market Participant.
Author	[Name/Position]	Optional, may be entered for Market Participant's record keeping.
Reviewed By	[Name/Position]	Optional, may be entered for Market Participant's record keeping.
Approved By	[Name/Position]	Optional, may be entered for Market Participant's record keeping.

VERSION RELEASE HISTORY

Version	Effective Date	Summary of Changes	Comment {to be deleted prior to submission]
1.0	dd [Month] 20yy	[Enter relevant changes] *First submission to AEMO*	Compulsory, for the purpose of AEMO's assessment.

REVIEW STATUS

Review Date	Date	Comment {to be deleted prior to submission]
Next review date	dd [Month] 20yy	Compulsory, for the purpose of AEMO's assessment.
Historical review #1	1/1/2015	Compulsory, for the purpose of AEMO's assessment.

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FIGURES

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1. INTRODUCTION

1.1. Facility X

[Include any introduction/summary of the Facility or the Generating System to assist AEMO in understanding this Generator Monitoring Plan.]

1.1.1. Facility X – Generating Unit A

[Brief introduction/summary of a Generating Unit of the applicable Generating System]

Table 1 Example of a brief introduction/summary for a gas/steam turbine Generating System

Item	Description
Excitation system make and model	*ABC model v22*
Turbine make and model	
Governor make and model	
Rated MVA	
Rated MW	
Rated Power Factor	
Nominal voltage (kV)	
Rated stator current (kA)	
Rated field current (A)	
Rated Hz	
Rated filed voltage (VDC)	
Ceiling factor	
Include others as appropriate	

Table 2 Example of a brief introduction/summary for an asynchronous Generating System

Item	Description
Wind Turbine Generator/Inverter make and model	*EPIC Sun model v3.5*
Number of Wind Turbine Generators/Inverters	*100*
Power Plant Controller make and model	*EPIC Sun PPC*
Rated MVA	*100 x 2.5 MVA*
Rated MW	*100 x 2.5 MVA*
Rated Power Factor	*0.9*
Nominal voltage (kV)	*0.69*
Rated current	*XX*
Include others as appropriate	

1.1.2. Facility X – Generating Unit B

[Brief introduction/summary of other types of Generating Units of the applicable Generating System, if applicable.]

1.1.3. Facility X – Other equipment

[Brief introduction/summary of other equipment within the Generating System that are part of the applicable Registered Generating Performance Standard, e.g. harmonic filters, static and dynamic reactive power device, special protection schemes.]

1.2. Roles and responsibilities/Site test coordination

[Roles and responsibilities may be included for internal releases and record keeping, especially in the case that a Generator Monitoring Plan is prepared by an external consulting engineer.]

All personnel involved in preparing, maintaining, executing and approving this Generator Monitoring Plan are summarised in Table 3.

In addition, The Generator Monitoring Plan, including any outcome of the testing and verification, must be distributed internally according to the following distribution list for review and comments, prior to submission to AEMO:

a. *Facility X Compliance Team;*
b. *Facility X Operations Team; and*
c. *Facility X Asset Maintenance Team.*

Table 3 Example of roles and responsibilities for execution of Compliance Monitoring Plan

Role	*Contact*	*Responsibility*
Facility X Operations Manager		
Facility X Coordinator		
Facility X Lead Engineer		
Consulting Engineer (Generator Monitoring Plan)		
Consulting Engineer (Testing and Verification)		
Network Operator		
AEMO		

1.3. Non-compliance

[Include details of any non-compliance and suspected non-compliance, rectification and status of compliance at the time of submission of this Generator Monitoring Plan, and if applicable, the test results following a request by AEMO to undertake a test in accordance with clause 3A.9.4 of the WEM Rules.]

There has been no non-compliance identified and/or self-reported by Facility X to date.

There has been no non-compliance reported or advised by AEMO and/or established by ERA at the time of submission of this Generator Monitoring Plan.

1.4. Requests for information

[Include any relevant information requests by AEMO in accordance with clause 3A.9.2 of the WEM Rules, and/or any relevant notification provided by AEMO in accordance with clauses 3A.10.3 and

3A.10.4 of the WEM Rules. Detail where and how the Information has been provided in this Generator Monitoring Plan or other communications, including the form, format and manner.]

AEMO has not requested any information under clause 3A.9.2 of the WEM Rules or provide any notification under clauses 3A.10.3 and 3A.10.4 of the WEM Rules.

1.5. Commencement Date

[Include proposed commencement date for this Generator Monitoring Plan.]

This Generator Monitoring plan approved by AEMO, takes effect from 1st August 2021, until another approved Generator Monitoring Plan supersedes it.

1.6. Proposed timeframe for evidence of compliance

[Include proposed timeframe for submission of the first complete set of evidence of compliance, as well as the subsequent sets of evidence of compliance. Evidence of compliance is described in WEM Procedure: Generator Monitoring Plans].

The first complete set of evidence of compliance is scheduled to be submitted by Facility X to AEMO prior to 1st February 2022, i.e. within 6 months after the commencement date specified in Section 1.5.

The subsequent evidence of compliance will be submitted according the proposed frequency of testing specified in each section from Section 2 to Section 17.

1.7. Non-compliance reporting

[Include any internal processes for a Facility to report any identified non-compliance for that Facility. Note that the process to self-report any non-compliance to AEMO is specified in WEM Rules and WEM Procedure: Generator Monitoring Plans.]

Where non-compliance has been identified at any time for any of the Technical Requirements described in Appendix 12 of the WEM Rules, , compliance team must notify Operations Manager according to internal non-compliance notification process, refer to Internal Instructions xxx.

1.8. Review of Generator Monitoring Plan

[Include audit or review process for Generator Monitoring Plan]

The Generator Monitoring Plan must be independently audited by an external party engaged by Facility X, every 5 years for compliance with:

- *Chapter 3A of WEM Rules;*
- *Appendix 12 of WEM Rules, and*
- *WEM Procedure: Generator Monitoring Plans.*

1.9. Glossary

[Include any terms and abbreviations necessary to assist AEMO in understanding of this Generator Monitoring Plan.]

Table 4 Terms and abbreviations used in this Generator Monitoring Plan

Term	*Definition*
Evidence of compliance	*It has the meaning described in WEM Procedure: Generator Monitoring Plans.*
Monitoring Results or Monitoring Data	*It has the meaning described in WEM Procedure: Generator Monitoring Plans.*

Term	*Definition*
Test Results or Test Data	*It has the meaning described in WEM Procedure: Generator Monitoring Plans.*
Disturbance Data	*It has the meaning described in WEM Procedure: Generator Monitoring Plans.*

2. ACTIVE POWER CAPABILITY

2.1. Testing and monitoring

[Include details of testing and monitoring, considering the principles and information required by WEM Procedure: Generator Monitoring Plans in order for AEMO to understand, assess and approve this Generator Monitoring Plan.]

2.1.1. Method 1:

The test should be undertaken during summer from December to March, and during the hottest time of the day so that Rated Maximum Active Power output level can be verified at the required maximum ambient temperature of 45 degrees, as specified by the Network Operator.

The record of ambient temperature is available locally outside the protection relay room of Facility X.

Approval for testing from the Network Operator and AEMO must be obtained prior to the test being undertaken.

The following steps provide a high-level view of how the test is to be undertaken:

1. *Record the ambient temperature at the time of test;*
2. *Ensure generator MW output, gas pressure and generator speed are being recorded for diagnosis purposes;*
3. *Adjust the MW level to Rated Minimum Active Power output level and sustain for at least 5 minutes;*
4. *Stop and save recording, review the test results to confirm if the test needs to be repeated;*
5. *Repeat the test by adjusting MW level to 25%, 50%, 75% of Rated Maximum Active Power output level, and to Rated Maximum Active Power output;*

Detailed steps are described in the attached document 'Test Plan Facility X'. Test Plan Facility X complete with timestamps where the tests have been performed and signatures by those who have performed and witnessed, will be submitted as part of evidence of compliance

2.1.2. Method 2:

Test equipment described in Section 2.2 is used to monitor the Active Power level continuously at 30 minute interval at the Connection Point located at substation ABC 132 kV. The ambient temperature and relevant operating condition quantities listed as follows are recorded continuously as part of monitoring and logging system of the governor Control System.

The Monitoring Data is scheduled to be assessed annually after 31st March. The results will be compiled and circulated for comment internally according to distribution list described in Section xxx. All results will be compiled and submitted as evidence of compliance to AEMO at the proposed timeframe for evidence of compliance as described in Section 1.6.

There are no power backup or UPS system installed for the monitoring equipment. In the event of the equipment being out of service and gaps are found in the Monitoring Data, Facility X will request network SCADA data from Network Operator to complete the Monitoring Data.

2.2. Recording or measuring device

[Include details of relevant recording or measuring device, including demonstration of their compliance with requirements in Attachment 11 of Technical Rules, their appropriateness of the

measuring device (accuracy, resolution and reliability) for this specific test (refer to WEM Procedure: Generator Monitoring Plans for requirements for recording or measuring device).]

2.2.1. *Method 1:*

The test equipment for Active Power on-site online tests will be as supplied by Consulting Engineer (testing and verification) at the time of site testing. Consulting Engineer must as part of their contract provide specifications and calibration test certificates at least 5 days prior to the site-test proposed in Section 2.1.1 to Facility X, to support demonstration of compliance of the test equipment with relevant requirements in Attachment 11 of the Technical Rules. These specifications and calibration test certificates will be supplied upon submission of evidence of compliance.

2.2.2. *Method 2:*

The test equipment for continuous monitoring in method 2 is LEGEND model A459, which is compliant with requirements in Attachment 11 of the Technical Rules, as demonstrated in Table xxx. LEGEND model A459 specifications and calibration test certificates are attached.

Table 5 Compliance with requirements in Attachment 11 of the Technical Rules

Description	*Technical Requirement*	*LEGEND A459 Specification*
Calibration		
Analogue to digital to conversion at full screen		
Sample rate		
Departure from linearity		
DC offset error		
Bandwidth – Voltage		
Bandwidth – Current		

2.3. Compliance verification

[Proposed verification mechanisms are suggestions described in Appendix D of the WEM Procedure: Generator Monitoring Plans. Market Participants may propose any other suitable ongoing verification mechanisms. Market Participants are to include details of the applicable Registered Generator Performance Standards and evidence of compliance.]

Table 6 Ongoing compliance verification of Active Power capability and evidence of compliance

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Requirements apply at Connection Point unless otherwise specified	A12.2.2.1, A12.2.3.1		• Demonstration that all tests and monitoring undertaken to verify the requirements under A12.2 of the WEM Rules have been performed at the required location.	
Temperature Dependency Data	A12.2.2.1, A12.2.3.2		• Active Power capability vs ambient temperature from Test Data and Monitoring Data is consistent with the provided Temperature Dependency Data.	
Maximum ambient temperature assessment	A12.2.2.1, A12.2.3.3		• Active Power capability vs maximum ambient temperature specified by the Network Operator, from Test Data and Monitoring Data, is consistent with the provided Temperature Dependency Data.	
Rated Maximum Active Power	A12.2.2.1, A12.2.3.4		• Test Data and Monitoring Data demonstrate that rated Active Power output is capable of sustaining for at least 5 minutes under different operating conditions.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Temporary Active Power reduction	A12.2.2.1, A12.2.3.5		• Specifying and outlining the agreement to allow for temporary reduction in Active Power.	

2.4. Frequency of testing

[Include frequency of testing for each method.]

2.4.1. *Method 1*

The online test described in Section 2.1.1 is to be taken every 3 years but may be taken more frequently or more than once within the 3 years, if the required temperature is reached.

If there is sufficient evidence from the ongoing monitoring described in Section 2.1.2 (method 2) to conclusively establish that the Technical Requirement has been met, this test may not be necessary.

2.4.2. *Method 2*

Continuously.

2.5. Risks and mitigation

[Include all risks identified and mitigation for each risk identified.]

Table 7 Risks and Mitigation

Risk	*Mitigation*

3. REACTIVE POWER CAPABILITY

3.1. Testing and monitoring

[Include details of testing and monitoring, considering the principles and information required by WEM Procedure: Generator Monitoring Plans in order for AEMO to understand, assess and approve this Generator Monitoring Plan.]

xxx

3.2. Recording or measuring device

[Include details of relevant recording or measuring device, including demonstration of their compliance with requirements in Attachment 11 of Technical Rules, their appropriateness of the measuring device (accuracy, resolution and reliability) for this specific test (refer to WEM Procedure: Generator Monitoring Plans for requirements for recording or measuring device).]

xxx

Table 8 Compliance with requirements in Attachment 11 of the Technical Rules

Description	*Technical Requirement*	*LEGEND A459 Specification*
Calibration		
Analogue to digital to conversion at full screen		
Sample rate		
Departure from linearity		
DC offset error		
Bandwidth – Voltage		
Bandwidth – Current		

3.3. Compliance verification

[Proposed verification mechanisms are suggestions described in Appendix D of the WEM Procedure: Generator Monitoring Plans. Market Participants may propose any other suitable ongoing verification mechanisms. Market Participants are to include details of the applicable Registered Generator Performance Standards and evidence of compliance.]

Table 9 Ongoing compliance verification of Reactive Power capability and evidence of compliance

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Requirements apply at Connection Point unless otherwise specified	A12.3.1.1		• Demonstration that all tests and monitoring undertaken to verify the requirements under A12.3 of the WEM Rules have been performed at the required location.	
Generator Capability Chart	A12.3.1.2		• The required Reactive Power achieved at all selected Active Power levels are consistent with those in provided Generator Capability Chart, considering the range of ambient temperatures recorded during the tests.	
Reactive Power Capability -No limitations	A12.3.1.3		• Demonstration that Reactive Power level required by the Generator Capability Chart is achieved at all selected Active Power levels with all relevant limitation and protection systems in service.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Maximum ambient temperature assessment	A12.3.1.4		• Monitoring Data shows that the required Reactive Power achieved at all selected Active Power levels are consistent with those in the provided Generator Capability Chart, which is specified for the maximum ambient temperature.	
Full Dispatch of Active Power and Reactive Power Capability at Connection Point	A12.3.1.5		• Test Data and/or Monitoring Data show required Reactive Power achieved at Rated Maximum Active Power output, consistent with the provided Generator Capability Chart.	
Reactive Power - supply & absorption	A12.3.2.1, A12.3.3.1		• Test Data and/or Monitoring Data show required Reactive Power successfully achieved at all selected Active Power levels in both supply and absorb regions, consistent with the provided Generator Capability Chart.	
Reactive Power - continuous delivery within specified voltage range	A12.3.2.2, A12.3.3.2		• Monitoring Data shows Reactive Power can be delivered continuously for voltages at the Connection Point within the allowable steady state voltage range specified in the Technical Rules, or between 0.9 per unit and 1.1 unit, whichever is applicable.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Agreement to reduce Active Power if temperature > 25 degrees	A12.3.3.3		• Where Active Power level is reduced, ambient temperature must be above 25 degrees in the location where the Generating System is situated.	

3.4. Frequency of testing

[Include frequency of testing for each test and monitoring period for each monitoring.]

xxx

3.5. Risks and mitigation

[Include all risks identified and mitigation for each risk identified.]

Table 10 Risks and Mitigation

Risk	*Mitigation*

4. VOLTAGE AND REACTIVE POWER CONTROL

4.1. Testing and monitoring

[Include details of testing and monitoring, considering the principles and information required by WEM Procedure: Generator Monitoring Plans in order for AEMO to understand, assess and approve this Generator Monitoring Plan.]

xxx

4.2. Recording or measuring device

[Include details of relevant recording or measuring device, including demonstration of their compliance with requirements in Attachment 11 of Technical Rules, their appropriateness of the measuring device (accuracy, resolution and reliability) for this specific test (refer to WEM Procedure: Generator Monitoring Plans for requirements for recording or measuring device).]

xxx

Table 11 Compliance with requirements in Attachment 11 of the Technical Rules

Description	*Technical Requirement*	*LEGEND A459 Specification*
Calibration		
Analogue to digital to conversion at full screen		
Sample rate		
Departure from linearity		
DC offset error		
Bandwidth – Voltage		
Bandwidth – Current		

4.3. Compliance verification

[Proposed verification mechanisms are suggestions described in Appendix D of the WEM Procedure: Generator Monitoring Plans. Market Participants may propose any other suitable ongoing verification mechanisms. Market Participants are to include details of the applicable Registered Generator Performance Standards and evidence of compliance.]

Table 12 Ongoing compliance verification of voltage and Reactive Power control and evidence of compliance

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Power system oscillations Adequately Damped	A12.4.2.2(a), A12.4.3.2(a)		• Test Data and/or Disturbance Data show all post-step and post-disturbance responses are Adequately Damped, thereby confirm that the Equipment capabilities and Control Systems are sufficient to ensure power system oscillations are Adequately Damped.	
No degradation of damping performance of power system	A12.4.2.2(b), A12.4.3.2(b)		• Test Data and/or Disturbance Data show all post-step and post-disturbance responses of the power system are Adequately Damped, thereby confirm that the Generating System does not degrade the damping of any critical mode of oscillation of the power system.	
Operation of the Generator System does not cause instability of power system	A12.4.2.2(c)		• Monitoring Data and/or Disturbance Data show continual stable responses	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Equipment for testing & establishing characteristics	A12.4.2.3, A12.4.3.2(c)		• Test Data and/or Disturbance Data show all required quantities can be monitored and recorded.	
Ability to operate in all control modes	A12.4.2.4(a), A12.4.3.3		• Test Data shows all requirements are met in all the relevant control modes, thereby demonstrates that the Generating System has Control Systems that able to operate in all control modes.	
Ability to switch between control modes	A12.4.2.4(b)		• Test Data shows all requirements are met in all the relevant control modes, thereby demonstrates that the Generating System has Control Systems that able to switch between control modes.	
Voltage Control System - control accuracy of voltage	A12.4.2.5(a), A12.4.3.4(a)		• All step Test Data shows the voltage is controlled to within 0.5% of the setpoint, where the setpoint may be adjusted to incorporate any voltage droop or reactive current compensation agreed with AEMO and the Network Operator.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Voltage Control System - support network voltage during fault	A12.4.2.5(b)		• Disturbance Data confirm Reactive Power vs voltage response during fault is correct, thereby demonstrates that the Generating System has a voltage control system that regulates voltage in a manner that helps to support network voltages during fault.	
Voltage Control System - continuous controllability	A12.4.2.5(c), A12.4.3.4(b)		• Test Data show the voltage can be continuously controlled within the specified range without tap-changing of a relevant transformer if applicable, subject to the Generator Performance Standards for Reactive Power Capability with the voltage control location agreed with AEMO and the Network Operator. Record of transformer tap positions are provided for confirmation; or • Test Data show the voltage can be continuously controlled within the specified range, subject to Reactive Power Capability with the voltage control location agreed with AEMO and the Network Operator. Record of transformer tap positions are provided for confirmation.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Voltage Control System - limiting devices	A12.4.2.5(d)		• Confirmation that the relevant limiting devices exist and are in service; and • all requirements under Appendix 12.4 of the WEM Rules can be met with the tests performed with all relevant limiters in service, unless required otherwise by the mandatory tests in Appendix B.	
Power system stabiliser (where installed)	A12.4.2.6		• Provision of block diagrams of the Generating Unit's power system stabiliser, and the block diagram demonstrates that the power system stabiliser meets the specified requirements.	
Reactive Power Control System - control accuracy	A12.4.2.7(a), A12.4.3.5(a)		• Reactive Power or Power Factor step Test Data shows the Reactive Power is controlled to the level of the accuracy levels specified.	
Reactive Power Control System - setpoint	A12.4.2.7(b), A12.4.3.5(b)		• Test Data shows the Reactive Power can be continuously controlled within specified Reactive Power Capability range without tap-changing of a relevant transformer. Record of transformer positions during a relevant test must be provided as part of evidence of compliance for confirmation.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Approved structure and parameter settings	A12.4.2.8		• Confirmation that approved structure and parameter settings of all components of the Control System that have been approved by the Network Operator and AEMO and are still applicable and valid.	
Control System Adequately Damped	A12.4.2.9		• Test Data shows all post-step and post-disturbance responses are Adequately Damped.	
Excitation Control System – capable of operation at 105% voltage	A12.4.2.10(a)		• Step Test Data shows that the voltage at the stator of the Generating Unit can be sustained at 105% of nominal voltage continuously at Rated Maximum Active Power output.	
Excitation Control System - Excitation ceiling voltage	A12.4.2.10(b), A12.4.3.6(a)		• Step Test Data shows the excitation ceiling voltage can be achieved at the specified levels.	
Excitation Control System – power system stabiliser	A12.4.2.10(c)		• Provision of block diagrams of the Generating Unit's power system stabiliser.	
Minimum equivalent gain	A12.4.2.10(d), A12.4.2.14		• Test Data shows the minimum gain of 200 is achieved in the control system.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Power system stabiliser requirements	A12.4.2.12		• Provision of block diagrams of the Generating Unit's power system stabiliser, and the block diagram demonstrates that the power system stabiliser meets the specified requirements.	
Power oscillation damping capability	A12.4.2.13		• Test Data and/or Disturbance Data show all post-step and post-disturbance responses are Adequately Damped; and • confirmation that the Generating Unit's power system stabiliser is responsive and adjustable over frequency range from 0.1 Hz and 2.5 Hz; and • provision of block diagrams of the Generating Unit's power system stabiliser demonstrating it has power system frequency and Active Power output of the Generating Unit as inputs.	
Rise Time	A12.4.2.11, A12.4.2.15		• Test Data shows Rise Time of all required step response tests are measured according to the WEM Procedure: Generator Model Submission and Maintenance and must be within the criteria specified in Appendix 12 of the WEM Rules.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Settling Time	A12.4.2.11, A12.4.2.15, A12.4.3.6(b), A12.4.3.7		• Test Data shows Settling Time of all required step response tests are measured according WEM Procedure: Generator Model Submission and Maintenance and must be within the criteria specified in Appendix 12 of the WEM Rules.	
Settling Time (saturation)	A12.4.2.11, A12.4.2.15		• Test Data shows Settling Time of all required step response tests resulting in controlled output limits being reached are measured according to WEM Procedure: Generator Model Submission and Maintenance and must be within the criteria specified in Appendix 12 of the WEM Rules.	
Agreed controlled parameters to meet performance characteristics	A12.4.2.16		• Confirmation that the controlled parameters agreed with the Network Operator and AEMO and are still applicable and valid.	
Reactive power control system - limiting devices	A12.4.3.5(c)		• As demonstrated in disturbance ride through for a voltage disturbance	
Highest level a Generating System can reasonably achieve	A12.4.4.1		• N/A.	

4.4. Frequency of testing

[Include frequency of testing for each method.]

xxx

4.5. Risks and mitigation

[Include all risks identified and mitigation for each risk identified.]

Table 13 Risks and Mitigation

Risk	*Mitigation*

5. ACTIVE POWER CONTROL

5.1. Testing and monitoring

[[Include details of testing and monitoring, considering the principles and information required by WEM Procedure: Generator Monitoring Plans in order for AEMO to understand, assess and approve this Generator Monitoring Plan.]

xxx

5.2. Recording or measuring device

[Include details of relevant recording or measuring device, including demonstration of their compliance with requirements in Attachment 11 of Technical Rules, their appropriateness of the measuring device (accuracy, resolution and reliability) for this specific test (refer to WEM Procedure: Generator Monitoring Plans for requirements for recording or measuring device).]

xxx

Table 14 Compliance with requirements in Attachment 11 of the Technical Rules

Description	*Technical Requirement*	*LEGEND A459 Specification*
Calibration		
Analogue to digital to conversion at full screen		
Sample rate		
Departure from linearity		
DC offset error		
Bandwidth – Voltage		
Bandwidth – Current		

5.3. Compliance verification

[Proposed verification mechanisms are suggestions described in Appendix D of the WEM Procedure: Generator Monitoring Plans. Market Participants may propose any other suitable ongoing verification mechanisms. Market Participants are to include details of the applicable Registered Generator Performance Standards and evidence of compliance.]

Table 15 Ongoing compliance verification of Active Power control and evidence of compliance

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Suggested verification	Evidence of compliance
Compliance with Dispatch Systems Requirements	A12.5.1.1		• All relevant requirements in Dispatch Systems Requirements are listed and evidence of compliance is provided.	
Arrangement for Access to limit Active Power output	A12.5.1.2		• Confirmation of the Arrangement for Access to limit Active Power output and that the arrangement is still applicable and valid.	
Control systems Adequately Damped	A12.5.1.3		• Test Data and/or Monitoring Data show that post-step Active Power is Adequately Damped, at different pre-step or pre-disturbance Active Power levels.	
Provision of disconnection settings	A12.5.1.4		• Provision of all applicable disconnection settings.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Suggested verification	Evidence of compliance
Maintaining Active Power output during loss of communications, or failure of Remote Monitoring Equipment or Remote Control Equipment	A12.5.1.5		• Test Data and/or Monitoring Data showing sustained Active Power level despite loss of communications, or failure of Remote Monitoring Equipment or Remote Control Equipment. • Monitoring Data showing Active Power change is not due to loss of communications, or failure of Remote Monitoring Equipment or Remote Control Equipment.	
Capability of Control System	A12.5.2.1, A12.5.3.1		• Monitoring Data show Active Power change, in accordance with the requirements of Appendix 12 of the WEM Rules, appropriately and continually in response to its Dispatch Instructions, for different sizes of Active Power changes and to different Active Power levels.	
Rate of change of output	A12.5.2.2, A12.5.3.2		• Test Data and/or Monitoring Data show rate of change of Active Power is continuously within the requirements specified in Appendix 12 of the WEM Rules for different sizes of Active Power change.	

5.4. Frequency of testing

[Include frequency of testing for each method.]

xxx

5.5. Risks and mitigation

[Include all risks identified and mitigation for each risk identified.]

Table 16 Risks and Mitigation

Risk	*Mitigation*

6. INERTIA AND FREQUENCY CONTROL

6.1. Testing and monitoring

[Include details of testing and monitoring, considering the principles and information required by WEM Procedure: Generator Monitoring Plans in order for AEMO to understand, assess and approve this Generator Monitoring Plan.]

xxx

6.2. Recording or measuring device

[Include details of relevant recording or measuring device, including demonstration of their compliance with requirements in Attachment 11 of Technical Rules, their appropriateness of the measuring device (accuracy, resolution and reliability) for this specific test (refer to WEM Procedure: Generator Monitoring Plans for requirements for recording or measuring device).]

xxx

Table 17 Compliance with requirements in Attachment 11 of the Technical Rules

Description	*Technical Requirement*	*LEGEND A459 Specification*
Calibration		
Analogue to digital to conversion at full screen		
Sample rate		
Departure from linearity		
DC offset error		
Bandwidth – Voltage		
Bandwidth – Current		

6.3. Compliance verification

[Proposed verification mechanisms are suggestions described in Appendix D of the WEM Procedure: Generator Monitoring Plans. Market Participants may propose any other suitable ongoing verification mechanisms. Market Participants are to include details of the applicable Registered Generator Performance Standards and evidence of compliance.]

Table 18 Ongoing compliance verification of inertia and frequency control and evidence of compliance

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Suggested verification	Evidence of compliance
Control Systems Adequately Damped	A12.6.1.1		• Test Data and/or Disturbance Data show post-step or post-fault Active Power is Adequately Damped at different pre-step or pre-disturbance Active Power levels, and for different rates of frequency change.	
Maximum ramp rate expression	A12.6.1.2		• Demonstration of how ramp rate, expressed as the change in Active Power, as shown in Test Data, Monitoring Data and/or Disturbance Data, is calculated.	
Provision of disconnection settings	A12.6.1.3		• Provision of all applicable disconnection settings.	
Equipment for testing & establishing characteristics	A12.6.1.4		• Test Data and/or Disturbance Data show all required quantities can be monitored and recorded and appropriate permanently installed equipment is used.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Suggested verification	Evidence of compliance
Ramp rate after frequency response	A12.6.1.5		• Test Data and/or Disturbance Data show Active Power response recovery post 10 sec, at different pre-step or pre-disturbance Active Power levels, and for different sizes of frequency change, to confirm that the Generating System can meet the relevant the requirements of clause A12.5 of the WEM Rules when returning to regular Active Power output.	
Availability of automatic variable Active Power MW control (speed & MW control) characteristic	A12.6.2.1(a), A12.6.3.1(a),		• Test Data and/or Disturbance Data show Active Power respond correctly to each frequency change, thereby confirming the Generating System has an automatic variable Active Power control characteristic.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Suggested verification	Evidence of compliance
Capability for continuous operation in frequency response mode unless otherwise instructed	A12.6.2.1(b), A12.6.3.1(b),		• Applicable control system settings are provided to confirm Generating System is in frequency control or frequency response mode; • Test Data and/or Monitoring Data confirm Generating System Active Power correctly responds to observed frequency in Normal Operating Frequency Band, thereby demonstrating that the Generating System is capable of operating in a mode in which it will automatically alter its Active Power output to arrest and correct to changes in power system frequency; and • Test Data and/or Disturbance Data confirm Generating System Active Power correctly responds to observed frequency that is outside the Normal Operating Frequency Band during a fault, thereby demonstrating that the Generating System is capable of operating in a mode in which it will automatically alter its Active Power output to arrest and correct to changes in power system frequency.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Suggested verification	Evidence of compliance
Frequency dead band	A12.6.2.1(c), A12.6.3.1(c)		• As-applied protection settings confirm required frequency dead band on each Generating Unit or Generating System; • Frequency step Test Data confirm the non-response when the frequency change is within the dead band; • Frequency step Test Data confirm the Active Power response is correct, given the frequency step change and the frequency dead band; • Monitoring Data confirm Generating System Active Power correctly responds to observed frequency in Normal Operating Frequency Band; • Disturbance Data confirm Generating System Active Power correctly responds to observed frequency during a fault for which the frequency is outside the Normal Operating Frequency Band.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Suggested verification	Evidence of compliance
Droop response (frequency reduction)	A12.6.2.1(d)(i), A12.6.3.2(a)		• Applicable Control System settings confirm the required frequency-Active Power response. • Test Data and/or Disturbance Data show required response for Active Power vs frequency, at different pre-step or pre-disturbance Active Power levels, and for different sizes of frequency change.	
Droop response (frequency increase)	A12.6.2.1(d)(ii), A12.6.3.2(b)		• Applicable Control System settings confirm the required frequency-Active Power response. • Test Data and/or Disturbance Data show required response for Active Power vs frequency, at different pre-step or pre-disturbance Active Power levels, and for different sizes of frequency change.	
Sustaining Active Power output	A12.6.2.1(d)(iii), A12.6.3.2(d)		• Test Data and/or Disturbance Data show the Generating System can sustain Active Power changes of at least the amounts specified for frequency increase and frequency decrease respectively, and for not less than 10 seconds, at different pre-step or pre-disturbance Active Power levels.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Suggested verification	Evidence of compliance
Rate of response	A12.6.2.1(d)(iv), A12.6.2.1(d)(v), A12.6.3.2(e), A12.6.3.2(f)		• Test Data and/or Disturbance Data show Active Power reaches the required response level within the specified time requirement for different rates of frequency change.	
Response capability above 85% of output	A12.6.3.2(c)		• Confirmation that response capability included as part of the relevant Generator performance Standard in still applicable and valid.	
Required Active Power level & ramp rate must not be outside the rated values	A12.6.4.1		• Monitoring Data show Active Power and ramp rate are within the required limits.	
Additional source of Inertia or frequency control, and Control System must be coordinated with the remainder of Generating System to meet Technical Requirements	A12.6.4.2		• N/A.	

6.4. Frequency of testing

[Include frequency of testing for each method.]

xxx

6.5. Risks and mitigation

[Include all risks identified and mitigation for each risk identified.]

Table 19 Risks and Mitigation

Risk	*Mitigation*

7. DISTURBANCE RIDE THROUGH FOR A FREQUENCY DISTURBANCE

7.1. Testing and monitoring

[Include details of testing and monitoring, considering the principles and information required by WEM Procedure: Generator Monitoring Plans in order for AEMO to understand, assess and approve this Generator Monitoring Plan.]

xxx

7.2. Recording or measuring device

[Include details of relevant recording or measuring device, including demonstration of their compliance with requirements in Attachment 11 of Technical Rules, their appropriateness of the measuring device (accuracy, resolution and reliability) for this specific test (refer to WEM Procedure: Generator Monitoring Plans for requirements for recording or measuring device).]

xxx

Table 20 Compliance with requirements in Attachment 11 of the Technical Rules

Description	*Technical Requirement*	*LEGEND A459 Specification*
Calibration		
Analogue to digital to conversion at full screen		
Sample rate		
Departure from linearity		
DC offset error		
Bandwidth – Voltage		
Bandwidth – Current		

7.3. Compliance verification

[Proposed verification mechanisms are suggestions described in Appendix D of the WEM Procedure: Generator Monitoring Plans. Market Participants may propose any other suitable ongoing verification mechanisms. Market Participants are to include details of the applicable Registered Generator Performance Standards and evidence of compliance.]

Table 21 Ongoing compliance verification of disturbance ride through for a frequency disturbance and evidence of compliance

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Requirements apply at the Connection Point unless specified otherwise	A12.7.1.1		• Demonstration that all tests and monitoring undertaken to verify the requirements under A12.7 of the WEM Rules have been performed at the required location.	
Provision of disconnection settings	A12.7.1.2		• Provision of all applicable disconnection settings.	
Capability of remaining in Continuous Uninterrupted Operation for specified frequency and time ranges	A12.7.2.1, A12.7.3.1		• Evidence from investigation of every disconnection of the Generating System is provided to confirm that disconnection of Generating System is not due to over frequency and/or overspeed protection	
Capability of remaining in Continuous Uninterrupted Operation for specified RoCoF over prescribed time periods	A12.7.2.2, A12.7.3.2		• Evidence from investigation of every disconnection of the Generating System is provided to confirm that disconnection of Generating System is not due to RoCoF or equivalent protection.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
The Network Operator and AEMO agree that frequency would be unlikely to fall below specified band in the Frequency Operating Standard.	A12.7.4.1.		• Not applicable.	

7.4. Frequency of testing

[Include frequency of testing for each method.]

xxx

7.5. Risks and mitigation

[Include all risks identified and mitigation for each risk identified.]

Table 22 Risks and Mitigation

Risk	*Mitigation*

8. DISTURBANCE RIDE THROUGH FOR A VOLTAGE DISTURBANCE

8.1. Testing and monitoring

[Include details of testing and monitoring, considering the principles and information required by WEM Procedure: Generator Monitoring Plans in order for AEMO to understand, assess and approve this Generator Monitoring Plan.]

xxx

8.2. Recording or measuring device

[Include details of relevant recording or measuring device, including demonstration of their compliance with requirements in Attachment 11 of Technical Rules, their appropriateness of the measuring device (accuracy, resolution and reliability) for this specific test (refer to WEM Procedure: Generator Monitoring Plans for requirements for recording or measuring device).]

xxx

Table 23 Compliance with requirements in Attachment 11 of the Technical Rules

Description	*Technical Requirement*	*LEGEND A459 Specification*
Calibration		
Analogue to digital to conversion at full screen		
Sample rate		
Departure from linearity		
DC offset error		
Bandwidth – Voltage		
Bandwidth – Current		

8.3. Compliance verification

[Proposed verification mechanisms are suggestions described in Appendix D of the WEM Procedure: Generator Monitoring Plans. Market Participants may propose any other suitable ongoing verification mechanisms. Market Participants are to include details of the applicable Registered Generator Performance Standards and evidence of compliance.]

Table 24 Ongoing compliance verification of disturbance ride through for a voltage disturbance and evidence of compliance

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Common requirement for this Technical Requirement (Common): requirement applies at the Connection Point, unless specified otherwise	A12.8.1.1		• Demonstration that all tests and monitoring undertaken to verify the requirements under A12.8 of the WEM Rules have been performed at the required location.	
Common: remaining in Continuous Uninterrupted Operation while the Connection Point voltage remains within 90%< nominal voltage < 110%	A12.8.1.2		• Evidence from investigation of every disconnection of the Generating System is provided to confirm that disconnection of the Generating System while the Connection Point voltage was still within the specified voltage ranges, was not due to voltage protection, thereby demonstrates that the Generating System can remain in Continuous Uninterrupted Operation while the voltage vary within the specified ranges.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Common: Provision of disconnection settings	A12.8.1.3		• Provision of all applicable disconnection settings.	
Remaining in Continuous Uninterrupted Operation for variance in voltage within specified voltage ranges	A12.8.2.1, A12.8.3.1		• Evidence from investigation of every disconnection of the Generating System is provided to confirm that disconnection of the Generating System while variance in voltage was still within the specified voltage ranges, was not due to voltage protection, thereby demonstrates that the Generating System can remain in Continuous Uninterrupted Operation while the voltage vary within the specified ranges.	
Relaxation of 0% voltage level duration where agreed by the Network Operator and AEMO	A12.8.3.2		• Evidence from investigation of every disconnection of the Generating System is provided to confirm that, where agreed by the Network Operator and AEMO, the Generating System did not disconnect while the voltage was at 0% for a duration less than that prescribed in Registered Generator Performance Standards.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Provision of operational arrangements	A12.8.3.3		• Confirmation that the operational arrangements necessary to ensure the Generating System and each of its operating Generating Units will meet its Generator Performance Standard are still applicable and valid.	

8.4. Frequency of testing

[Include frequency of testing for each method.]

xxx

8.5. Risks and mitigation

[Include all risks identified and mitigation for each risk identified.]

Table 25 Risks and Mitigation

Risk	*Mitigation*

9. DISTURBANCE RIDE THROUGH FOR MULTIPLE DISTURBANCES

9.1. Testing and monitoring

[Include details of testing and monitoring, considering the principles and information required by WEM Procedure: Generator Monitoring Plans in order for AEMO to understand, assess and approve this Generator Monitoring Plan.]

xxx

9.2. Recording or measuring device

[Include details of relevant recording or measuring device, including demonstration of their compliance with requirements in Attachment 11 of Technical Rules, their appropriateness of the measuring device (accuracy, resolution and reliability) for this specific test (refer to WEM Procedure: Generator Monitoring Plans for requirements for recording or measuring device).]

xxx

Table 26 Compliance with requirements in Attachment 11 of the Technical Rules

Description	*Technical Requirement*	*LEGEND A459 Specification*
Calibration		
Analogue to digital to conversion at full screen		
Sample rate		
Departure from linearity		
DC offset error		
Bandwidth – Voltage		
Bandwidth – Current		

9.3. Compliance verification

[Proposed verification mechanisms are suggestions described in Appendix D of the WEM Procedure: Generator Monitoring Plans. Market Participants may propose any other suitable ongoing verification mechanisms. Market Participants are to include details of the applicable Registered Generator Performance Standards and evidence of compliance.]

Table 27 Ongoing compliance verification of disturbance ride through for multiple disturbances and evidence of compliance

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Provision of disconnection settings	A12.9.1.2		• Provision of all applicable disconnection settings.	
Operational arrangements to ensure Generating System will meet agreed performance levels under abnormal conditions	A12.9.1.3		• Confirmation that any operational arrangements have been included in the Generator Performance Standard and are still applicable and valid.	
Fault following operation of auto-reclose Protection Scheme	A12.9.1.4		• Where there are multiple disturbances, confirmation that a fault that is re-established following an automatic reclose Protection Scheme has been considered as a separate disturbance.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Reactive current contribution	A12.9.1.5, A12.9.1.6		• Provision of Manufacturer's datasheet to confirm that the reactive current contribution at the required location, is equal or exceed the required Maximum Continuous Current of the Generating System or Generating Unit, whichever is applicable; or • Generation System Model confirms that the reactive current contribution at the required location is equal or exceed the required Maximum Continuous Current of the Generating System or Generating Unit, whichever is applicable, provided the observed performance of the Generation System matches the predicted performance of the Generation System, using the Generation System Model.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Capability to remain in Continuous Uninterrupted Operation for specified disturbances	A12.9.2.2, A12.9.3.2		• Provision of applicable Control System and/or Protection scheme settings to confirm the Generating System can remain in Continuous Uninterrupted Operation for any of the specified disturbances, provided it is not an event that would disconnect the Generating unit by design. • For each occurrence of multiple disturbances, provision of Disturbance Data showing the Generating System remained in Continuous Uninterrupted Operation for any of the specified disturbances, provided it is not an event that would disconnect the Generating unit by design.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Ability to remain Continuous Uninterrupted Operation for a series of disturbances within a specified period	A12.9.2.3, A12.9.3.3		• Provision of applicable Control System and/or Protection scheme settings to confirm that the Generating System can remain in Continuous Uninterrupted Operation for a series of up to 15 disturbances within any 5 minute period. • For each occurrence of multiple disturbances, Disturbance Data shows the Generating System can remain in Continuous Uninterrupted Operation for a series of up to 15 disturbances within any 5 minute period.	
Supply and absorption of reactive during fault	A12.9.2.4(a), A12.9.2.5(a), A12.9.2.6, A12.9.3.4(a), A12.9.3.5(a), A12.9.3.6		• For each occurrence of multiple disturbances, Disturbance Data shows reactive current level pre-disturbance during a fault and post-disturbance, and that the reactive current response during a fault meets the specified level.	
Supply and absorption of Reactive Power sufficient to ensure voltage level after fault is within range	A12.9.2.4(b)		• For each occurrence of multiple disturbances, Disturbance Data shows voltage level at Connection Point or another agreed location returns to the range for Continuous Uninterrupted Operation following clearance of the fault.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Active Power levels after fault clearance within the specified time	A12.9.2.4(c), A12.9.2.5(b), A12.9.3.4(a), A12.9.3.4(b), A12.9.3.5(b)		• For each occurrence of multiple disturbances, Disturbance Data shows the Active Power level pre-disturbance and post-disturbance, and provides confirmation that the Active Power level at the Connection Point or another agreed location returns to specified level within the required time, following fault clearance.	
Reactive current Rise Time and Settling Time within the specified range and Adequately Damped	A12.9.2.7, A12.9.3.7, A12.9.3.8		• For each occurrence of multiple disturbances, Disturbance Data shows reactive current response has a Rise Time and Settling Time during a fault that are within the specified range and the response following fault clearance is Adequately Damped. • Confirmation that the Rise Time and Settling Time have been provided as part of Generator Performance Standard, and the Rise Time and Settling Time are still valid.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Generating System has sufficient current to maintain Rated Maximum Apparent Power for specified over-voltage range at Connection Point	A12.9.2.8(a)		• Provision of Active Power versus Reactive Power Generator Capability Chart at specified over-voltage range, to demonstrate that there is sufficient current to maintain Rated Maximum Apparent power at the specified over-voltage range.	
Maximum Continuous Current for specified under-voltage range at Connection Point	A12.9.2.8(b)		• Provision of Active Power versus Reactive Power Generator Capability Chart at specified under-voltage range, to demonstrate that Maximum Continuous Current is available at the specified under-voltage range.	
Connection of Generating System at proposed performance level would not cause other connections to trip when they otherwise would not have tripped	A12.9.4.1		• Not applicable.[1]	

[1] For each disconnection of a Generating System or a Load, investigation by a Network Operator or AEMO concludes that it is not caused by the relevant Generating System.

9.4. Frequency of testing

[Include frequency of testing for each method.]

xxx

9.5. Risks and mitigation

[Include all risks identified and mitigation for each risk identified.]

Table 28 Risks and Mitigation

Risk	*Mitigation*

10. DISTURBANCE RIDE THROUGH FOR PARTIAL LOAD REJECTION

10.1. Testing and monitoring

[Include details of testing and monitoring, considering the principles and information required by WEM Procedure: Generator Monitoring Plans in order for AEMO to understand, assess and approve this Generator Monitoring Plan.]

xxx

10.2. Recording or measuring device

[Include details of relevant recording or measuring device, including demonstration of their compliance with requirements in Attachment 11 of Technical Rules, their appropriateness of the measuring device (accuracy, resolution and reliability) for this specific test (refer to WEM Procedure: Generator Monitoring Plans for requirements for recording or measuring device).]

xxx

Table 29 Compliance with requirements in Attachment 11 of the Technical Rules

Description	*Technical Requirement*	*LEGEND A459 Specification*
Calibration		
Analogue to digital to conversion at full screen		
Sample rate		
Departure from linearity		
DC offset error		
Bandwidth – Voltage		
Bandwidth – Current		

10.3. Compliance verification

[Proposed verification mechanisms are suggestions described in Appendix D of the WEM Procedure: Generator Monitoring Plans. Market Participants may propose any other suitable ongoing verification mechanisms. Market Participants are to include details of the applicable Registered Generator Performance Standards and evidence of compliance.]

Table 30 Ongoing compliance verification of disturbance ride through for partial load rejection and evidence of compliance

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Capability of Continuous Uninterruptable Operation, provided reduction within specified range	A12.10.2.1, A12.10.3.1		• Evidence from investigation of every disconnection of a Generating System is provided to confirm that the disconnection is not caused by overspeed protection or other relevant protection, which has operated as a result of a load rejection event, provided the reduction in Active Power requirement is within the specified range. • Details of applicable protection system settings (such as over speed protection, reverse power protection) are provided to confirm the intended ride-through capability in the event of sudden Active Power reduction requirement. • Test Data demonstrates that the Generating System and each of its operating Units remain connected following a sudden reduction in Active	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
			Power requirement, provided the reduction is within the specified range.	

10.4. Frequency of testing

[Include frequency of testing for each method.]

xxx

10.5. Risks and mitigation

[Include all risks identified and mitigation for each risk identified.]

Table 31 Risks and Mitigation

Risk	*Mitigation*

11. DISTURBANCE RIDE THROUGH FOR QUALITY OF SUPPLY

11.1. Testing and monitoring

[Include details of testing and monitoring, considering the principles and information required by WEM Procedure: Generator Monitoring Plans in order for AEMO to understand, assess and approve this Generator Monitoring Plan.]

xxx

11.2. Recording or measuring device

[Include details of relevant recording or measuring device, including demonstration of their compliance with requirements in Attachment 11 of Technical Rules, their appropriateness of the measuring device (accuracy, resolution and reliability) for this specific test (refer to WEM Procedure: Generator Monitoring Plans for requirements for recording or measuring device).]

xxx

Table 32 Compliance with requirements in Attachment 11 of the Technical Rules

Description	*Technical Requirement*	*LEGEND A459 Specification*
Calibration		
Analogue to digital to conversion at full screen		
Sample rate		
Departure from linearity		
DC offset error		
Bandwidth – Voltage		
Bandwidth – Current		

11.3. Compliance verification

[Proposed verification mechanisms are suggestions described in Appendix D of the WEM Procedure: Generator Monitoring Plans. Market Participants may propose any other suitable ongoing verification mechanisms. Market Participants are to include details of the applicable Registered Generator Performance Standards and evidence of compliance.]

Table 33 Ongoing compliance verification of disturbance ride through for Quality of Supply and evidence of compliance

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Does not disconnect if Quality of Supply is within specified levels	A12.11.2.1., A12.11.3.1.		• Evidence from investigation of every disconnection of a Generating System is provided to confirm that the disconnection is not caused by power-quality protection (voltage fluctuation, harmonic voltage distortion and voltage unbalance) conditions at the Connection Point, while all power quality quantities are within specified values.	

11.4. Frequency of testing

[Include frequency of testing for each method.]

xxx

11.5. Risks and mitigation

[Include all risks identified and mitigation for each risk identified.]

Table 34 Risks and Mitigation

Risk	*Mitigation*

12. QUALITY OF ELECTRICITY GENERATED

12.1. Testing and monitoring

[Include details of testing and monitoring, considering the principles and information required by WEM Procedure: Generator Monitoring Plans in order for AEMO to understand, assess and approve this Generator Monitoring Plan.]

xxx

12.2. Recording or measuring device

[Include details of relevant recording or measuring device, including demonstration of their compliance with requirements in Attachment 11 of Technical Rules, their appropriateness of the measuring device (accuracy, resolution and reliability) for this specific test (refer to WEM Procedure: Generator Monitoring Plans for requirements for recording or measuring device).]

xxx

Table 35 Compliance with requirements in Attachment 11 of the Technical Rules

Description	*Technical Requirement*	*LEGEND A459 Specification*
Calibration		
Analogue to digital to conversion at full screen		
Sample rate		
Departure from linearity		
DC offset error		
Bandwidth – Voltage		
Bandwidth – Current		

12.3. Compliance verification

[Proposed verification mechanisms are suggestions described in Appendix D of the WEM Procedure: Generator Monitoring Plans. Market Participants may propose any other suitable ongoing verification mechanisms. Market Participants are to include details of the applicable Registered Generator Performance Standards and evidence of compliance.]

Table 36 Ongoing compliance verification of Quality of Electricity generated and evidence of compliance

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Voltage imbalance not greater than the limits determined by the Network Operator	A12.12.1.1		• Demonstration that the derived voltage imbalance produced by the Generating System at the Connection Point, must not be greater than the limits determined by the Network Operator.	
Voltage fluctuation within specified limits	A12.12.2.1(a), A12.12.3.1(a)		• Demonstration that the derived voltage fluctuation produced by the Generating System at the Connection Point, must not be greater than the specified limits.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Harmonic voltage within limits	A12.12.2.1(b), A12.12.3.1(b)		• Demonstration that the derived harmonic voltage distortion produced by the Generating System at the Connection Point, must not be greater than the specified limits. • Where the specified limits are in the form of harmonic current distortion, demonstration that the derived harmonic current distortion produced by the Generation System at the Connection Point, must not be greater than the specified limits.	
Does not prevent Network Operator from meeting SWIS Operating Standards and contractual obligations	A12.12.4.1		• Not applicable.	

12.4. Frequency of testing

[Include frequency of testing for each method.]

xxx

12.5. Risks and mitigation

[Include all risks identified and mitigation for each risk identified.]

Table 37 Risks and Mitigation

Risk	*Mitigation*

13. GENERATION PROTECTION SYSTEMS

13.1. Testing and monitoring

[Include details of testing and monitoring, considering the principles and information required by WEM Procedure: Generator Monitoring Plans in order for AEMO to understand, assess and approve this Generator Monitoring Plan.]

xxx

13.2. Recording or measuring device

[Include details of relevant recording or measuring device, including demonstration of their compliance with requirements in Attachment 11 of Technical Rules, their appropriateness of the measuring device (accuracy, resolution and reliability) for this specific test (refer to WEM Procedure: Generator Monitoring Plans for requirements for recording or measuring device).]

xxx

Table 38 Compliance with requirements in Attachment 11 of the Technical Rules

Description	*Technical Requirement*	*LEGEND A459 Specification*
Calibration		
Analogue to digital to conversion at full screen		
Sample rate		
Departure from linearity		
DC offset error		
Bandwidth – Voltage		
Bandwidth – Current		

13.3. Compliance verification

[Proposed verification mechanisms are suggestions described in Appendix D of the WEM Procedure: Generator Monitoring Plans. Market Participants may propose any other suitable ongoing verification mechanisms. Market Participants are to include details of the applicable Registered Generator Performance Standards and evidence of compliance.]

Table 39 Ongoing compliance verification of generation Protection systems and evidence of compliance

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Protection requirements for Generating Systems and the Transmission System, as per the Technical Rules	A12.13.2.1, A12.13.3.1		• Details of applicable protection settings have been provided to confirm faults will be cleared within the specified time. • Disturbance Data providing confirmation of faults cleared within specified time.	
Redundancy and fault clearance of Protection Schemes as per Technical Rules	A12.13.2.1, A12.13.3.2		• Confirmation of availability and continual functionality of the redundant Protection schemes. • Provision of applicable protection settings of the redundant Protection schemes to confirm faults will be cleared within the prescribed times.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Anti-islanding protection in accordance with documented performance requirements	A12.13.2.1, A12.13.3.3		• Confirmation of availability and continual functionality of the anti-islanding protection. • Using Disturbance Data, provision of confirmation of correct anti-islanding protection operation preventing the Generating System from supplying an isolated portion of the SWIS when it is not secure to do so. • Verify the applied settings in accordance with the relevant documented guidelines.	
Protection Schemes, with appropriate settings, as necessary to facilitate disconnection under abnormal conditions	A12.13.2.1, A12.13.3.4		• Confirmation of availability and continual functionality of the relevant Protection Schemes necessary to disconnect the Generating System under abnormal conditions. • Using Disturbance Data, provision of confirmation demonstrating correct operation of relevant Protection schemes to disconnect Generating System under abnormal conditions. • Confirmation of the applicable settings as specified in Appendix 12 of the WEM Rules.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Provision of all Protection Scheme settings	A12.13.2.1, A12.13.3.5		• Provision of the applicable Protection Scheme settings to the Network Operator and AEMO.	

13.4. Frequency of testing

[Include frequency of testing for each method.]

xxx

13.5. Risks and mitigation

[Include all risks identified and mitigation for each risk identified.]

Table 40 Risks and Mitigation

Risk	*Mitigation*

14. REMOTE MONITORING REQUIREMENTS

14.1. Testing and monitoring

[Include details of testing and monitoring, considering the principles and information required by WEM Procedure: Generator Monitoring Plans in order for AEMO to understand, assess and approve this Generator Monitoring Plan.]

xxx

14.2. Recording or measuring device

[Include details of relevant recording or measuring device, including demonstration of their compliance with requirements in Attachment 11 of Technical Rules, their appropriateness of the measuring device (accuracy, resolution and reliability) for this specific test (refer to WEM Procedure: Generator Monitoring Plans for requirements for recording or measuring device).]

xxx

Table 41 Compliance with requirements in Attachment 11 of the Technical Rules

Description	*Technical Requirement*	*LEGEND A459 Specification*
Calibration		
Analogue to digital to conversion at full screen		
Sample rate		
Departure from linearity		
DC offset error		
Bandwidth – Voltage		
Bandwidth – Current		

14.3. Compliance verification

[Proposed verification mechanisms are suggestions described in Appendix D of the WEM Procedure: Generator Monitoring Plans. Market Participants may propose any other suitable ongoing verification mechanisms. Market Participants are to include details of the applicable Registered Generator Performance Standards and evidence of compliance.]

Table 42 Ongoing compliance verification of Remote Monitoring requirements and evidence of compliance

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Installation of Remote Monitoring Equipment	A12.14.2.1, A12.14.3.1		• Confirmation of the availability and continual functionality of the Remote Monitoring Equipment.	
Conformance to Communication Standard	A12.14.2.1, A12.14.3.2		• All relevant requirements in Communication Standard are listed and evidence of conformance of the Remote Monitoring Equipment with the Communication Standard and other specified requirements is provided.	
Remote Monitoring Equipment provides for specified signals and other information required by the Network Operator or AEMO	A12.14.2.1, A12.14.3.3		• Confirmation of the availability and continual functionality of the specified signals and such other information required by the Network operator AEMO in relation to the Remote Monitoring Equipment.	
Availability of Remote Monitoring Equipment	A12.14.2.1, A12.14.3.4		• Confirmation of the availability and continual functionality of Remote Monitoring Equipment at all times, subject to Outages as agreed with AEMO.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Remote Monitoring Equipment provides for specified signals and other information required by the Network Operator or AEMO	A12.14.2.1, A12.14.3.1		• Confirmation of the availability and continual functionality of the Remote Monitoring Equipment.	
Availability of Remote Monitoring Equipment			•	

14.4. Frequency of testing

[Include frequency of testing for each method.]

xxx

14.5. Risks and mitigation

[Include all risks identified and mitigation for each risk identified.]

Table 43 Risks and Mitigation

Risk	*Mitigation*

15. REMOTE CONTROL REQUIREMENTS

15.1. Testing and monitoring

[Include details of testing and monitoring, considering the principles and information required by WEM Procedure: Generator Monitoring Plans in order for AEMO to understand, assess and approve this Generator Monitoring Plan.]

xxx

15.2. Recording or measuring device

[Include details of relevant recording or measuring device, including demonstration of their compliance with requirements in Attachment 11 of Technical Rules, their appropriateness of the measuring device (accuracy, resolution and reliability) for this specific test (refer to WEM Procedure: Generator Monitoring Plans for requirements for recording or measuring device).]

xxx

Table 44 Compliance with requirements in Attachment 11 of the Technical Rules

Description	*Technical Requirement*	*LEGEND A459 Specification*
Calibration		
Analogue to digital to conversion at full screen		
Sample rate		
Departure from linearity		
DC offset error		
Bandwidth – Voltage		
Bandwidth – Current		

15.3. Compliance verification

[Proposed verification mechanisms are suggestions described in Appendix D of the WEM Procedure: Generator Monitoring Plans. Market Participants may propose any other suitable ongoing verification mechanisms. Market Participants are to include details of the applicable Registered Generator Performance Standards and evidence of compliance.]

Table 45 Ongoing compliance verification of Remote Control requirements and evidence of compliance

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Installation of Remote Control Equipment	A12.15.2.1, A12.5.3.1		• Confirmation of the availability and continual functionality of the Remote Control Equipment, where required to be installed by the Network Operator or AEMO.	
Conformance to Communication Standard	A12.15.2.1, A12.5.3.2		• All relevant requirements in Communication Standard are listed and evidence of conformance of the Remote Control Equipment with the Communication Standard and other specified requirements is provided.	
Availability of Remote Control Equipment	A12.15.2.1, A12.5.3.3		• Confirmation of the availability and continual functionality of the Remote Control Equipment at all times, subject to Outages as agreed with AEMO.	

15.4. Frequency of testing

[Include frequency of testing for each method.]

xxx

15.5. Risks and mitigation

[Include all risks identified and mitigation for each risk identified.]

Table 46 Risks and Mitigation

Risk	*Mitigation*

16. COMMUNICATION EQUIPMENT REQUIREMENTS

16.1. Testing and monitoring

[Include details of testing and monitoring, considering the principles and information required by WEM Procedure: Generator Monitoring Plans in order for AEMO to understand, assess and approve this Generator Monitoring Plan.]

xxx

16.2. Recording or measuring device

[Include details of relevant recording or measuring device, including demonstration of their compliance with requirements in Attachment 11 of Technical Rules, their appropriateness of the measuring device (accuracy, resolution and reliability) for this specific test (refer to WEM Procedure: Generator Monitoring Plans for requirements for recording or measuring device).]

xxx

Table 47 Compliance with requirements in Attachment 11 of the Technical Rules

Description	*Technical Requirement*	*LEGEND A459 Specification*
Calibration		
Analogue to digital to conversion at full screen		
Sample rate		
Departure from linearity		
DC offset error		
Bandwidth – Voltage		
Bandwidth – Current		

16.3. Compliance verification

[Proposed verification mechanisms are suggestions described in Appendix D of the WEM Procedure: Generator Monitoring Plans. Market Participants may propose any other suitable ongoing verification mechanisms. Market Participants are to include details of the applicable Registered Generator Performance Standards and evidence of compliance.]

Table 48 Ongoing compliance verification of Communications Equipment requirements and evidence of compliance

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Provision and maintenance of communication paths from specified equipment to communications interface at the relevant Power Station and in a location acceptable to the Network Operator	A12.16.2.1, A12.16.3.1		• Confirmation of the availability and continual functionality of the communication links between the Remote Monitoring Equipment and Remote Communications Equipment installed at a Generating Unit to a communications interface at the relevant Power Station and in a location acceptable to the Network Operator, including any redundancies.	
Provision and maintenance of speech communication channel for routine and emergency control telephone calls	A12.16.2.1, A12.16.3.2		• Confirmation of the availability and continual functionality of a speech communication channel by means of which routine and emergency control telephone calls may be established between the operator of the Generation System and AEMO or the Network Operator (as applicable).	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Conformance of the speech communication channel with the Communication Standard	A12.16.2.1, A12.16.3.3		• All relevant requirements in Communication Standard are listed and evidence of conformance with all requirements is provided.	
Public switched telephone network requirements	A12.16.2.1, A12.16.3.4		• Confirmation of sole-purpose connection for operational communications.	
Availability of communication path	A12.16.2.1, A12.16.3.5		• Confirmation of the availability and continual functionality of the communication paths to any applicable Remote Monitoring Equipment or Remote Communication Equipment, including any redundancies and subject to Outages as agreed by AEMO.	
Primary Speech Communication Channel	A12.16.2.1, A12.16.3.6		• Description and confirmation that the Primary Speech Communication Channel, including speed and clarity of speech transmission, is in good working order.	

16.4. Frequency of testing

[Include frequency of testing for each method.]

xxx

16.5. Risks and mitigation

[Include all risks identified and mitigation for each risk identified.]

Table 49 Risks and Mitigation

Risk	*Mitigation*

17. GENERATION SYSTEM MODEL

17.1. Testing and monitoring

[Include details of testing and monitoring, considering the principles and information required by WEM Procedure: Generator Monitoring Plans in order for AEMO to understand, assess and approve this Generator Monitoring Plan.]

xxx

17.2. Recording or measuring device

[Include details of relevant recording or measuring device, including demonstration of their compliance with requirements in Attachment 11 of Technical Rules, their appropriateness of the measuring device (accuracy, resolution and reliability) for this specific test (refer to WEM Procedure: Generator Monitoring Plans for requirements for recording or measuring device).]

xxx

Table 50 Compliance with requirements in Attachment 11 of the Technical Rules

Description	*Technical Requirement*	*LEGEND A459 Specification*
Calibration		
Analogue to digital to conversion at full screen		
Sample rate		
Departure from linearity		
DC offset error		
Bandwidth – Voltage		
Bandwidth – Current		

17.3. Compliance verification

[Proposed verification mechanisms are suggestions described in Appendix D of the WEM Procedure: Generator Monitoring Plans. Market Participants may propose any other suitable ongoing verification mechanisms. Market Participants are to include details of the applicable Registered Generator Performance Standards and evidence of compliance.]

Table 51 Ongoing compliance verification of Generation System Model and evidence of compliance

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Provision of modelling data	A12.17.2.1, A12.17.3.1		• Confirmation of validity of all provided modelling data.	
Ability to predict output from modelling data	A12.17.2.1, A12.17.3.2		• Overlays of simulated and real-life performances and demonstration that modelling data is sufficient to enable the Network Operator or AEMO to predict the output of the Generation System under all power system conditions, to within the required range, in accordance with WEM Procedure: Generator Model Submission and Maintenance.	

Criteria description	Appendix 12 clauses	Registered Generator Performance Standard	Proposed verification	Evidence of compliance
Accuracy of modelling data compared with observed performance	A12.17.2.1, A12.17.3.3		• Overlays of simulated and real-life performances and demonstration that observed performance of the Generation System matches the predicted performance of the Generation System, using the Generation System Model, as assessed by the Network Operator or AEMO, to within the required range, in accordance with WEM Procedure: Generator Model Submission and Maintenance.	
Provision of updates to the Generation System Model in order to meet the Technical Requirement	A12.17.2.1, A12.17.3.4		• Confirmation of provision of updates to the Generation System Model in order to meet the requirements of the relevant Technical Requirement in accordance with the timeframes specified in the WEM Procedure made under clause 3A.4.2 of the WEM Rules.	

17.4. Frequency of testing

[Include frequency of testing for each method.]

xxx

17.5. Risks and mitigation

[Include all risks identified and mitigation for each risk identified.]

Table 52 Risks and Mitigation

Risk	*Mitigation*