

Category	GPS	NER Clause	Description	CMP Monitoring
B	3.1	S5.2.5.1	Reactive power Capability	<ol style="list-style-type: none"> <li>1. Capability will be monitored using SCADA under normal wind farm operation.</li> <li>2. Capability will be tested either: <ol style="list-style-type: none"> <li>a. Immediately after commissioning new plant; or</li> <li>b. After major work on or major changes are made to the <ol style="list-style-type: none"> <li>i. Relevant generator power control parameters; or</li> <li>ii. Wind farm voltage control system ; or</li> <li>iii. Wind farm connection assets.</li> </ol> </li> </ol> </li> <li>3. No routine testing is specified.</li> </ol>
B	3.2	S5.2.5.2	Quality of Electricity Generated	<ol style="list-style-type: none"> <li>1. Capability will be monitored through use of Power Quality Monitors: <ol style="list-style-type: none"> <li>a. Immediately after commissioning new plant; or</li> <li>b. When major changes are made to the generating system's <ol style="list-style-type: none"> <li>i. Generating units; or</li> <li>ii. Connection assets</li> </ol> </li> </ol> </li> </ol>
A	3.3	S5.2.5.3	Generating unit response to frequency disturbances	<ol style="list-style-type: none"> <li>1. Performance will be monitored using the following systems under normal machine operation: <ol style="list-style-type: none"> <li>a. Digital protection relays;</li> <li>b. Other data-logging equipment as required.</li> </ol> </li> <li>2. Performance will be assessed against the <i>performance standard</i> requirements following a unit trip as a result of a large system frequency disturbance.</li> <li>3. Functional testing / validation of electrical protection and turbine protection covered by proposed practice listed in S.5.2.5.8</li> </ol>
A	3.3	S5.2.5.4	Generating unit response to voltage disturbances	<ol style="list-style-type: none"> <li>1. Performance will be monitored using the following systems under normal machine operation: <ol style="list-style-type: none"> <li>a. Digital protection relays;</li> <li>b. Other data-logging equipment as required.</li> </ol> </li> <li>2. Performance will be assessed against the <i>performance standard</i> requirements following a unit trip as a result of power system voltage disturbance</li> <li>3. Functional testing of electrical protection covered by proposed practice listed in S.5.2.5.8</li> </ol>
A	3.4	S5.2.5.7	Partial Load Rejection	This standard is not applicable to this generator assets.
A	3.5	S5.2.5.8	Protection of generating unit from power system disturbances	<ol style="list-style-type: none"> <li>1. Performance is confirmed by the generating system remaining synchronised during power system disturbance conditions where required under a provision of the Rules;</li> <li>2. Performance is monitored, in-service, where data is available.</li> <li>3. Protection system relays, between the generating unit terminals but within the generating system shall be tested by secondary injection <ol style="list-style-type: none"> <li>a. At each major overhaul; and/or</li> <li>b. 5 Yearly by routine functional testing of unit electrical protection systems and</li> <li>c. Verification of database registered protection settings to occur annually.</li> </ol> </li> <li>4. Performance will be assessed against the performance standard requirements following a unit trip as a result of a relevant system event in which the unit should have remained synchronised.</li> <li>5. Changes to turbine control parameters will be controlled such that the performance of the generating system and generating units is not compromised in relation to the GPS.</li> </ol>

Category	GPS	NER Clause	Description	CMP Monitoring
A	3.6	S5.2.5.9	Protection Systems that impacts on power system security	<ol style="list-style-type: none"> <li>Performance is confirmed by assessing operation of protection systems against the requirements of the standard when a generating unit trips as a result of fault occurring between the generating unit stator and the connection point.</li> <li>Performance is monitored, in-service, where data is available. If appropriate data is not currently available, additional on-line data logging facilities to be considered.</li> <li>Relevant protection system relays shall be tested by secondary injection <ol style="list-style-type: none"> <li>At each major overhaul; and/or</li> <li>5 Yearly by routine functional testing of unit electrical protection systems and</li> <li>Verification of database registered protection settings to occur annually.</li> <li>Verification of database registered protection settings to occur in conjunction with injection testing.</li> </ol> </li> <li>C/B Fail protection tests shall be carried out bi-annually. Performance will be assessed against the <i>performance standard</i> requirements following a unit trip as a result of a relevant system event in which the unit should have remained synchronised.</li> <li>Changes to turbine control parameters will be controlled such that the performance of the generating system and generating units is not compromised in relation to the GPS</li> </ol>
A	3.7	S5.2.5.10	Asynchronous operation of synchronous generating units	This standard is not applicable to this generator asset.
A	3.8	S5.2.5.11	Frequency Control	This standard is not applicable to this wind generator asset.
B	3.9	S5.2.5.12	Stability	<ol style="list-style-type: none"> <li>Changes to turbine control parameters will be controlled such that the performance of the generating system and generating units is not compromised in relation to the GPS.</li> </ol>
A	3.10	S5.2.5.13	Excitation control system	<ol style="list-style-type: none"> <li>Performance will be monitored using the following systems: <ol style="list-style-type: none"> <li>Digital protection relays;</li> <li>Other data-logging equipment as required.</li> </ol> </li> <li>Changes to turbine control parameters will be controlled such that the performance of the generating system and generating units is not compromised in relation to the GPS.</li> </ol>
A	3.11	S5.2.6.1	Remote Monitoring	<ol style="list-style-type: none"> <li>SCADA monitored values and farm panel metering will be routinely checked every five years.</li> <li>The following equipment will be calibration checked at each major outage or once every five years: <ol style="list-style-type: none"> <li>Transducers; and</li> <li>Wind Farm panel metering.</li> </ol> </li> </ol>
B	3.12	S5.2.8	Auxiliary Transformers	<ol style="list-style-type: none"> <li>Performance will be monitored as part of condition monitoring and maintenance routines.</li> </ol> Unit auxiliary supplies on wind farms are taken from within connection point when units are on-line. Very small wind farm station service auxiliary load requirements are considered negligible under NEM CMP requirements.
B	3.13	S5.2.9	Fault Level	<ol style="list-style-type: none"> <li>Performance will be monitored using the following systems: <ol style="list-style-type: none"> <li>Digital protection relays;</li> <li>Other data-logging equipment as required.</li> </ol> </li> <li>Following a fault, where recorded data is available, comparison to be made of measured fault currents and computer simulations</li> <li>Performance will be recalculated if significant modifications or upgrades to generating plant and equipment are made.</li> </ol>

#### Categorisations of Elements

There are two distinct categorisations of the *performance standards*. These categorisations are defined as follows:

##### 1 Category "A" Elements

Category A includes elements for which

- The generator can be held individually responsible on an ongoing basis; and
- There is the propensity for performance changes over time due to issues that may include:
  - Genuine poor performance of equipment relative to design expectations;
  - Degradation of components due to natural aging that impact on dynamic performance characteristics (especially true of analogue circuitry);

(3) General wear and tear associated with mechanical and hydraulic systems

(4) There is a foreseeable risk that performance changes could occur as a result of human intervention, intended or otherwise.

2 Category "B" Elements

Category B includes elements that:

- i) Relate to performance characteristics which have a low probability of changing over time without some type of significant modification or initiating event;
- ii) Relate to *fixed design characteristics* already adequately addressed as part of the formal NER connection agreement process; and
- iii) Are of lesser importance given the nature of its plant and the risks associated with non-compliance.

The CMP defines differing approaches for the two categories:

1 Category "A" elements will generally:

- i) Be tested on a time based condition
- ii) Monitored constantly
- iii) Have control regimes around setting changes

2 Category "B" elements will generally:

- i) Be tested at commissioning or Factory Acceptance
- ii) Have subsequent checks in terms of overall performance through on-line monitoring rather than specific control or testing of parameters.