

Reliability Panel AEMC

## **DRAFT REPORT**

# Template for Generator Compliance Programs

08 May 2009

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## **About the AEMC**

The Council of Australian Governments, through its Ministerial Council on Energy, established the Australian Energy Market Commission (AEMC) in July 2005 to be the Rule maker for national energy markets. The AEMC is currently responsible for Rules and policy advice covering the National Electricity Market. It is a statutory authority. Our key responsibilities are to consider Rule change proposals, conduct energy market reviews and provide policy advice to the Ministerial Council as requested, or on AEMC initiative.

## **About the AEMC Reliability Panel**

The Panel is a specialist body within the AEMC and comprises industry and consumer representatives. It is responsible for monitoring, reviewing and reporting on the safety, security and reliability of the national electricity system and advising the AEMC in respect of such matters. The Panel's responsibilities are specified in section 38 of the National Electricity Law (NEL).

## **Disclaimer**

The views and recommendations set out in this document are those of the Reliability Panel and are not necessarily those of the Australian Energy Market Commission.

## **Reliability Panel Members**

### **Chairman**

Ian C Woodward, Commissioner, Australian Energy Market Commission

### **Other AEMC Reliability Panel Members**

Gavin Dufty, Manager Policy and Research, St Vincent de Paul Society, Victoria

Hugh Gleeson, Chief Executive Officer, United Energy

Mark Grenning, Chief Advisor Energy, Rio Tinto

Gordon Jardine, Chief Executive, Powerlink

Tim O'Grady, Group Manager Wholesale Markets Development, Origin Energy

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## Abbreviations

AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
NEL	National Electricity Law
NEM	National Electricity Market
NEMMCO	National Electricity Market Management Company
NGF	National Generators Forum
NSP	Network Service Provider
Panel	Reliability Panel
Rules	National Electricity Rules
Template	Template for generator compliance programs

## Summary

Compliance with technical standards is crucial to ensuring power system security in the National Electricity Market (NEM). Ensuring high levels of compliance with effective standards is fundamental to the safe and reliable operation of the power system within the power system's technical envelope. If this were not the case, the risk of a major power system incident would materially increase.<sup>a</sup>

The October 2008 Rule change (Performance Standard Compliance of Generators)<sup>b</sup> included requirements for the Reliability Panel (Panel) to develop a template for generator compliance programs (template) based on a public consultation process. The template seeks to define "good electricity industry practice" for the purposes of the National Electricity Rules (Rules), and hence provides certainty for generators as to what is required of their compliance programs. Generators must develop and maintain compliance programs in line with the template. The template must be regularly reviewed by the Panel in order to provide a continual improvement focus.

As part of the public consultation process under clause 8.8.3 of the Rules, network service providers (NSPs) will be involved in the development of the template. The Rules also provide an ongoing role for the Panel including an obligation to review the template every three years or as the AEMC directs.

This Draft Report represents the second stage in the Panel's review to develop the template.

The Panel is publishing the draft template in section 4 of the Draft Report for consultation in accordance with clause 8.8.3 of the Rules. The Panel is seeking submissions on this template.

This draft template incorporates the initial comments received on the Panel's Issues Paper. The Issues Paper was published on 22 January 2009 and initial comments were sought on issues that should be addressed in the review. Comments were received from:

- AER
- Grid Australia
- NEMMCO
- NGF
- PacificHydro

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<sup>a</sup> Final Report of the AEMC Review of Enforcement of and Compliance with Technical Standards (dated 1 September 2006), p.4.

<sup>b</sup> National Electricity Amendment (Performance Standard Compliance of Generators) Rule 2008 No. 10.

The Panel will also hold a meeting open to all Registered Participants on its draft template. This meeting will be held at the office of the AEMC on 12 June 2009 from 10.00 am to 12.00 pm.

The final report from this review will be forwarded to the AEMC, setting out the Panel's determination of the template in accordance with clause 8.8.3(j) of the Rules. The Panel will submit the Final Report setting out its determination of the template to the AEMC on 23 July 2009 for publication.

Interested stakeholders are invited to provide comments on the draft template outlined in this Draft Report. Submissions should be received by 5 pm on 19 June 2009. Submissions must cite the project reference code: "REL0032".

Send submissions electronically to [submissions@aemc.gov.au](mailto:submissions@aemc.gov.au)

Or mail to:  
Australian energy Market Commission  
PO Box A2449  
SYDNEY SOUTH NSW 1235

Or by Fax: (02) 8296 7899.

All enquiries on this project should be addressed to Charles Hoang on (02) 8296 7800.

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# 1 Introduction

## 1.1 Context and Background

In its 2006 review of enforcement of and compliance with technical standards, the Australian Energy Market Commission (AEMC) considered that the process of establishing compliance programs for Generators was flawed.<sup>1</sup> It considered that the National Electricity Rules (Rules) were silent on how a compliance agreement should be established if a Generator could not agree with the relevant NSP and NEMMCO on the requirements for a compliance program.<sup>2</sup> The Rules also provided little guidance on the factors that should be taken into account when agreeing to a compliance program.<sup>3</sup> It considered that there were flaws in the negotiate-agree model for compliance programs under the Rules for Generators.<sup>4</sup> The AEMC made a number of recommendations including the development of guidelines in its 2006 review.<sup>5</sup> It considered the guidelines would allow greater clarity on the form that a compliance program might take and clarity on what would be required to demonstrate compliance.<sup>6</sup> The concept of guidelines was later replaced with the terminology of a “template” for generator compliance programs.<sup>7</sup>

In its Rule change proposal<sup>8</sup> in February 2008, the National Generators Forum (NGF) proposed (and modified in some cases) the implementation of some of the recommendations from the AEMC’s 2006 review. It considered that the template for generator compliance programs (template) would effectively define “good industry practice” for the purposes of the Rules, allow for improvement in compliance plans based on market experience, allow the AER to audit compliance with the Rules in advance of incidents, and require Generators to develop and maintain compliance programs in a manner that was consistent with the template.<sup>9</sup>

On 23 October 2008, the AEMC published a notice under sections 102 and 103 of the National Electricity Law (NEL) of the making of the National Electricity Amendment

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<sup>1</sup> Final Report of the AEMC Review of Enforcement of and Compliance with Technical Standards (dated 1 September 2006), p.43.

<sup>2</sup> Final Report of the AEMC Review of Enforcement of and Compliance with Technical Standards (dated 1 September 2006), p.43.

<sup>3</sup> Final Report of the AEMC Review of Enforcement of and Compliance with Technical Standards (dated 1 September 2006), p.43.

<sup>4</sup> Final Report of the AEMC Review of Enforcement of and Compliance with Technical Standards (dated 1 September 2006), p.44.

<sup>5</sup> Final Report of the AEMC Review of Enforcement of and Compliance with Technical Standards (dated 1 September 2006), Pp.8-11.

<sup>6</sup> Final Report of the AEMC Review of Enforcement of and Compliance with Technical Standards (dated 1 September 2006), p.46.

<sup>7</sup> AEMC 2008, Performance Standard Compliance of Generators, Rule Determination (23 October 2008, Sydney), p.v.

<sup>8</sup> NGF Rule change proposal, 14 February 2008.

<sup>9</sup> NGF Rule change proposal, 14 February 2008, p.2.

(Performance Standard Compliance of Generators) Rule 2008 No. 10 and associated Rule determination. The Rule commenced operation on 23 October 2008.

The AEMC considered that the Rule change would promote efficient operation and use of electricity services and reliability, safety and security of the National Electricity Market (NEM) through a range of measures including the establishment of a framework where the processes and accountabilities for maintaining generator compliance are clearly defined.<sup>10</sup>

An outcome from that Rule change is that, as part of the framework of compliance programs, the Reliability Panel (Panel) will develop the template in consultation with interested parties and using a public consultation process.<sup>11</sup> The Panel is also required to review this template within a defined time period in accordance with clause 8.8.3 of the Rules every three years or as the AEMC directs.<sup>12</sup> Following such a review in accordance with clause 8.8.3(ba), the Panel may amend the template in accordance with its report to the AEMC submitted under clause 8.8.3(j).

For the framework of compliance programs to function effectively, the AEMC anticipated that:<sup>13</sup>

- Registered Participants (Generators) will institute and maintain generator compliance programs based on the template;
- the AER will regularly conduct spot audits of selected Generators' compliance programs as part of its compliance monitoring activities; and
- Generators will engage with their own external auditors to independently audit their compliance programs to determine whether they are required to amend their compliance programs and amend if required.

At the second round of consultation of the Rule change process, the Panel indicated that it supported the AEMC's conclusions.<sup>14</sup> It also foreshadowed that the Panel would need approximately nine months to develop the initial template after the final Rule was approved.<sup>15</sup>

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<sup>10</sup> AEMC 2008, Performance Standard Compliance of Generators, Rule Determination (23 October 2008, Sydney), p.vi.

<sup>11</sup> AEMC 2008, Performance Standard Compliance of Generators, Rule Determination (23 October 2008, Sydney), p.v.

<sup>12</sup> AEMC 2008, Performance Standard Compliance of Generators, Rule Determination (23 October 2008, Sydney), p.v.

<sup>13</sup> AEMC 2008, Performance Standard Compliance of Generators, Rule Determination (23 October 2008, Sydney), p.v.

<sup>14</sup> Panel submission on the draft Rule determination on Performance Standard Compliance of Generators, 15 August 2008, p.1.

<sup>15</sup> Panel submission on the draft Rule determination on Performance Standard Compliance of Generators, 15 August 2008, p.1.

## **1.2 The Panel's powers in making the template for generator compliance programs**

Clause 8.8.1(a)(2b) of the Rules provides that the functions of the Panel are to determine and publish the template and clause 8.8.3(a)(6) of the Rules requires the Panel to determine the template as soon as possible in accordance with the review process of clause 8.8.3 of the Rules.

The AEMC requested the Panel to undertake the review to develop the template in accordance with section 38 of the NEL, clause 8.8.3(c) of the Rules and the national electricity objective.

To this end, in November 2008, the AEMC approved the Terms of Reference for the Panel's review to develop the template. For ease of reference, a copy of the Terms of Reference is provided in Appendix A of this Draft Report.

Clause 8.8.3(i) also requires that the Panel must take into consideration the policy statements, directions or guidelines published by the AEMC from time to time. Besides the Terms of Reference and final Rule determination<sup>16</sup>, no policy statements, directions or guidelines have been provided to the Panel from the AEMC for this review.

## **1.3 The national electricity objective**

The AEMC has provided the Panel with its Terms of Reference for the review in which the Panel also needs to take into account the national electricity objective when undertaking the review process. Under section 7 of the NEL:

The objective of this Law is to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to—

- (a) price, quality, safety, reliability and security of supply of electricity; and
- (b) the reliability, safety and security of the national electricity system.

Having considered the issues raised in the submissions to the Issues Paper,<sup>17</sup> engaging with relevant stakeholders in developing the template,<sup>18</sup> and its own analysis,<sup>19</sup> the Panel is satisfied that the review will achieve the national electricity objective (NEO) and satisfies the requirements under the NEL. The Panel considers the review will satisfy the NEO as it will promote efficient operation and use of electricity services and reliability, safety and security of the NEM by:

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<sup>16</sup> AEMC 2008, Performance Standard Compliance of Generators, Rule Determination (23 October 2008, Sydney), p.vi.

<sup>17</sup> See section 2 of this Draft Report.

<sup>18</sup> See section 2 of this Draft Report.

<sup>19</sup> See section 2 of this Draft Report.

- establishing a template supported by industry that will assist Generators to develop their own compliance programs as required under the Rules;
- providing clarity to industry as to what constitutes good electricity industry practice with respect to technical standards compliance;
- clarifying the compliance program framework to avoid duplicating other processes within the framework such as the scope of the template and supporting ongoing compliance;
- recommending compliance principles that could be used as a guide for the Panel in its future reviews of the template;
- allowing for flexibility in the template by:
  - taking into account different technologies, types of plant, age of plant and size of plant in the design of the template;
  - recognising historical versions of performance standards that individual registered performance standard<sup>20</sup> for a plant may be based on; and
  - specifying various testing methods, frequency of testing relative to these methods, and bases for compliance assessment that these methods have to achieve for the particular performance standards.

#### **1.4 Transition requirements for generator compliance programs**

According to the transitional provisions under Rule 11.23:

- Registered Participants, which implemented compliance programs immediately after the commencement of the Rule change, are not required to comply with the obligation set out in rule 4.15(b)<sup>21</sup> until three months after the day on which the Panel publishes its initial template under clause 8.8.3 of the Rules or until a date that the Panel determines;
- Registered Participants, which implemented compliance programs immediately prior to the commencement of the Rule change (i.e. under the Old Clause

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<sup>20</sup> “Performance standard” is defined in the Rules to be “A standard of performance that:  
 (a) is established as a result of it being taken to be an applicable performance standard in accordance with clause 5.3.4A(i); or  
 (b) is included in the register of performance standards established and maintained by NEMMCO under rule 4.14(n),  
 as the case may be.”

<sup>21</sup> Rule 4.15(b) requires that a Registered Participant who engages in the activity of planning, owning, controlling or operating a plant to which a performance standard applies must institute and maintain a compliance program which complies with rule 4.15(c). The compliance program must be instituted, as soon as reasonably practicable, but no later than: (1) 6 months after the day that NEMMCO gives notice to the Registered Participant of registration of the performance standard under rule 4.14(n); or (2) 6 months after the day on which the plant commences operation.

5.7.3(b)<sup>22</sup>), must maintain compliance with those programs until three months after the day on which the Panel publishes its initial template under clause 8.8.3 of the Rules or until a date that the Panel determines; and

- Registered Participants, which have not implemented compliance programs under the Old Clause 5.7.3(b), must implement and maintain compliance programs under the Old Clause 5.7.3(b) until three months after the day on which the Panel publishes its initial template under clause 8.8.3 of the Rules or until a date that the Panel determines.

## 1.5 Related provisions in the Rules

There are a number of clauses in the Rules which provide for the negotiation of technical standards for connecting generators.<sup>23</sup> Once technical standards for new Generators are set through this process, they are included in the connection agreement and there are provisions for commissioning testing to establish that Generators comply with those requirements.<sup>24</sup>

Whether negotiated under the current arrangements or not, there are provisions to register the required performance standards for all Generators operating in the market.<sup>25</sup> These processes, taken together, establish a set of technical standards to which a Generator must adhere.

In developing any compliance program, it can be reasonably expected that these performance standards have been fulfilled and that the Generator's initial compliance with its registered performance standards have been established. It also needs to be recognised that the performance standards for individual Generators vary significantly both on the standards negotiated and the arrangements under which the technical standards might have been determined.

Under Rule 4.15(ca), the template for generator compliance programs must:

- (1) cover all performance standards; and
- (2) define suitable testing and monitoring regimes for each performance standard so that a Registered Participant can select a regime that complies with the obligations set out in rules 4.15(a), 4.15(b) and 4.15(c) for their particular plant.

Rule 4.15(a) requires that a Registered Participant must:

- (1) ensure that its plant meets or exceeds the performance standard applicable to its plant; and

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<sup>22</sup> Old Clause 5.7.3(b) means the clause 5.7.3(b) in the version of the Rules that was in force immediately prior to the commencement of the National Electricity Amendment (Performance Standards Compliance of Generators) Rule 2008.

<sup>23</sup> See rule 4.14 and clause 5.3.4A of the Rules.

<sup>24</sup> See rule 5.8 of the Rules.

<sup>25</sup> See rule 4.14 and clause 5.3.4A of the Rules.

- (2) ensure that its plant is not likely to cause a material adverse effect on power system security through its failure to comply with a performance standard; and
- (3) immediately ensure that its plant ceases to be likely to cause a material adverse effect on power system security through its failure to comply with a performance standard, if:
  - (i) the Registered Participant reasonably believes that by failing to comply with a performance standard, its plant is likely to cause a material adverse effect on power system security; or
  - (ii) NEMMCO advises the Registered Participant that by failing to comply with a performance standard, the Registered Participant's plant is likely to cause a material adverse effect on power system security.

Rule 4.15(b) requires that a Registered Participant who engages in the activity of planning, owning, controlling or operating a plant to which a performance standard applies must institute and maintain a compliance program which complies with Rule 4.15(c). The compliance program must be instituted, as soon as reasonably practicable, but no later than:

- (1) 6 months after the day that NEMMCO gives notice to the Registered Participant of registration of the performance standard under Rule 4.14(n); or
- (2) 6 months after the day on which the plant commences operation.

Rule 4.15(c) requires that a compliance program instituted and maintained under Rule 4.15(b) must:

- (1) be consistent with the template for generator compliance programs; and
- (2) include procedures to monitor the performance of the plant in a manner that is consistent with good electricity industry practice; and
- (3) be modified to be consistent with any amendments made under clause 8.8.3(ba) to the template for generator compliance programs, by no later than 6 months after amendments to the template for generator compliance programs are published or by a date determined by the Reliability Panel; and
- (4) provide reasonable assurance of ongoing compliance with each applicable performance standard.

## **1.6 Consultation process**

This review is likely to have important implications for NEM stakeholders, including Generators, NSPs and NEMMCO. Consistent with its philosophy of engaging with those parties, the Panel plans to involve stakeholders by seeking initial comments, submissions and holding meetings during this review and on each of its draft decisions.

The Terms of Reference from the AEMC require the Panel to deliver its Final Report by the end of July 2009.

The following anticipated revised key dates outline the consultation process leading up to the delivery of the Panel's Final Report to the AEMC on its template.

<b>Date</b>	<b>Milestone</b>
22 January 2009	Publish Issues Paper (completed)
6 March 2009	Close of submissions on Issues Paper (completed)
8 May 2009	Publish Draft Report
12 June 2009	Public Meeting
19 June 2009	Close of submissions on Draft Report
23 July 2009	Submit Final Report to AEMC
31 July 2009	Publish Final Report

## **1.7 Submissions on the Draft Report**

The Panel invites submissions from interested parties in response to the Draft Report by 5pm (Australian Eastern Standard Time) on 19 June 2009. Submissions may be sent electronically or by mail in accordance with the following requirements.

All enquiries on this project should be addressed to Charles Hoang on (02) 8296 7800.

### **1.7.1 Lodging a submission electronically**

Submissions must be sent by email to [submissions@aemc.gov.au](mailto:submissions@aemc.gov.au). The email must cite the project reference code: "REL0032". The submission must be on letterhead (if submitted on behalf of an organisation), signed and dated. The submission must be in PDF format, and must also be forwarded to the Panel via ordinary mail.

Upon receipt of the electronic version of the submission, the Panel will issue a confirmation email. If this confirmation email is not received within 3 business days, it is the submitter's responsibility to ensure successful delivery of the submission has occurred.

### **1.7.2 Lodging a submission by mail**

The submission must be on letterhead (if an organisation), signed and dated by the respondent. The submission should be sent by mail to:

The Reliability Panel  
Australian Energy Market Commission  
PO Box A2449  
Sydney South NSW 1235

or by Fax: (02) 8296 7899.

The envelope must be clearly marked with the project reference code: "REL0032".

Except in circumstances where the submission has been submitted electronically, upon receipt of the hardcopy submission the Panel will issue a confirmation letter. If this confirmation letter is not received within 3 business days, it is the submitter's responsibility to ensure successful delivery of the submission has occurred.



## **2 Development of the draft template for generator compliance programs**

### **2.1 Introduction**

As part of the procedure followed by the Panel in undertaking the review in accordance with clause 8.8.3(j) of the Rules, the Panel has been assisted in the development of the draft template by a Working Group. The Working Group is chaired by a member of the Reliability Panel and has representation from the NGF, the Clean Energy Council, Transmission Network Service Providers, VENCORP, the AER and NEMMCO. Members of the Working Group have contributed their extensive experience to the development task.

The development of this draft template has also been informed by comments to an Issues Paper. A total of five submissions were received from:

- the AER;
- NEMMCO;
- Grid Australia;
- the NGF; and
- Pacific Hydro.

### **2.2 Issues Paper**

On 22 January 2009, the Panel published an Issues Paper on its review to develop the template. The Issues Paper represented the first stage of the consultation process being undertaken by the Panel. The Panel welcomed submissions from stakeholders on the issues identified in the Issues Paper and, in particular, sought stakeholder views on:<sup>26</sup>

- are there benefits in adopting a set of compliance principles and what are these benefits in terms of meeting the Rules requirements for the template?
  - if so, are the examples of compliance principles in Appendix A of the Issues Paper appropriate?
- are there benefits in adopting compliance program categories and, if so, what are these benefits in terms of meeting the requirements in the Rules for the template?
- is it necessary to draft guidelines for template and, if so, are the example guidelines in Appendix B of the Issues Paper appropriate?

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<sup>26</sup> AEMC Reliability Panel 2009, Template for Generator Compliance Programs, Issues Paper (22 January 2009, Sydney), p.vii.

- what should be covered in the scope of the template, how should it be structured and what should it contain?
- how prescriptive should the template be for each performance standard e.g. should test methodologies be included?
  - how should the variation in individual performance standards and versions of the Rules be handled?
  - whether the examples for developing the template in appendices A, B, C and D are appropriate to be incorporated into the Panel’s template or what modifications should be considered?
- how can it be ensured that the template meets “good electricity industry practice” that would provide certainty for Generators as to what is required of their compliance programs? Stakeholders are invited to submit examples of existing compliance programs they consider would be appropriate in determining a best practice solution in formulating a template.
- having regard to the current processes for implementing the template already set in the Rules, what other implementation and transition issues may need to be addressed and how would these be put into effect?

Submissions on the Issues Paper closed on 6 March 2009.

### **2.3 Common issues raised in submissions on the Issues Paper**

Submissions on the Issues Paper demonstrated a broad range of ideas on what could be included in the scope of the template. Some of the common issues that can be identified from submissions include:

- how will the compliance program framework work in practice and what will be the future roles and responsibilities be of:
  - the Reliability Panel;
  - a Generator; and
  - the AER.
- should there be compliance principles?
- what is good electricity industry practice?
- how should differences in technology, types of plant, age of plant and size of plant be provided for?
- should compliance categories be covered?
- which performance standards will be covered?

- are there any additional transition requirements for the template?
- will there be different methods for demonstrating compliance?
- how will ongoing continuous compliance addressed?
- what should be considered in future reviews?

The following review comments on each of these areas and, where appropriate, provides the Panel's view in response.

## **2.4 How will the compliance program framework work in practice?**

In developing the template, the Panel has been mindful that this template will only be an element of the broader compliance framework. A range of bodies have a role in this compliance framework and these roles need to be considered in developing the template. A key party in this framework is the Generator themselves. The template has been developed by the Panel on the basis that it is to be used by the Generator in developing their own compliance programs within the Generator's own compliance management framework.

This approach is broadly consistent with that proposed by NEMMCO. NEMMCO proposed in its submission for "a multi faceted approach or combination of approaches" to clarify the roles of the Panel, Generators and the AER within a compliance program framework.<sup>27</sup> Below explains this approach in further detail.

### **2.4.1 The Panel**

NEMMCO submitted that at the first level of the compliance program framework, the Panel should develop the compliance principles. These principles would be used by Generators in establishing, implementing and maintaining their own compliance programs.<sup>28</sup>

NEMMCO submitted that at the next level, the Panel should incorporate these principles into the template. The template would specify minimum requirements for testing and monitoring techniques for each performance standard that would result in good electricity industry practice.<sup>29</sup>

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<sup>27</sup> NEMMCO submission on the Issues Paper, 6 March 2009, Pp.5-7.

<sup>28</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.6.

<sup>29</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.6.

## 2.4.2 The Generator

At the first level, the Generator would be responsible for developing and maintaining a quality management policy. NEMMCO considered that this quality management policy would entail:<sup>30</sup>

- “the processes needed for the establishment, implementation and maintenance of the Generator Compliance Program,
- the sequence and interaction of these processes,
- the determination of criteria and methods needed to ensure that both the operation and control of these processes are effective,
- the availability of resources and information necessary to support the operation and monitoring of these processes,
- that these processes are monitored, measured and analysed, and
- actions necessary to achieve planned results and continual improvement of these processes are implemented.”

At the second level, NEMMCO suggested that the Generator would develop their compliance program that includes:<sup>31</sup>

- the systems and processes in place to ensure the Generator’s ability to consistently meet regulatory requirements;
- how the processes are managed in terms of issues such as records and document control, handling of non-conformances and management review;
- varying needs, particular technologies, the products provided, the processes employed; and
- an assessment plan that stipulates the specified monitoring and test procedures including required frequency of testing.

At the last level, NEMMCO suggested that the Generator would develop a set of compliance monitoring procedures for each test specified in the Generator’s compliance program. The procedures would cover:<sup>32</sup>

- “input and output requirements (for example specifications, resources and records to be kept),
- activities within the processes,
- verification and validation of processes and products,

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<sup>30</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.6.

<sup>31</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.6.

<sup>32</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.6.

- analysis of the process including dependability,
- identification, assessment and mitigation of risk,
- corrective and preventive actions,
- opportunities and actions for process improvement, and
- control of changes to processes and products.”

This approach is consistent with Grid Australia’s submission<sup>33</sup> that compliance programs should adopt a quality management approach to asset management by generation companies.

### 2.4.3 The AER

NEMMCO considered that the proposed framework of compliance programs would allow the AER to monitor the process and audit the quality management system.<sup>34</sup>

The AER elaborated in its submission on how it intended to monitor and enforce compliance in relation to the framework for compliance programs. In short, its compliance strategy would include:<sup>35</sup>

- “responding to a notification of a breach or possible breach of a performance standard; and
- spot audits of selected generators’ compliance programs.”

## 2.5 Should there be compliance principles?

The NGF provided an example of compliance principles which it considered important as a starting point in developing the template.<sup>36</sup>

Overall, most of the submissions supported some aspects of the NGF proposed compliance principles. However, there was some contention with the use of the term “principles” and various views on how any principles would be intended to apply. Grid Australia regarded the Rules as the principles.<sup>37</sup> NEMMCO considered that the principles “will be based on internationally recognised quality management system principles such as can be found in the ISO9000, 9001 and 9004 set of standards”.<sup>38</sup>

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<sup>33</sup> Grid Australia submission on the Issues Paper, 6 March 2009, p.2.

<sup>34</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.6.

<sup>35</sup> AER submission on the Issues Paper, 4 March 2009, p.1.

<sup>36</sup> The example of compliance principles proposed by the NGF can be found in Appendix A of the Issues Paper.

<sup>37</sup> Grid Australia submission on the Issues Paper, 6 March 2009, p.1.

<sup>38</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.6.

PacificHydro suggested that specific industry principles should not be contrary to, or overwrite, any of the principles contained in AS 3806-2000.<sup>39</sup>

The Panel observes that most of the “compliance principles” proposed by the NGF were covered when addressing the common compliance issues. The Panel agrees with the compliance principles proposed by the NGF with some modifications as the Panel considers that there is value in documenting the principles on which it has developed the template within the broader context. Further details on the compliance principles that were applied in developing this template are discussed in section 3. The Panel also considers it appropriate that those principles closely reflect the provisions in the Rules and the NEL.

## 2.6 What is good electricity industry practice?

According to Rule 4.15(c)(2), a compliance program instituted and maintained by a Generator must include procedures to monitor the performance of the plant in a manner that is consistent with good electricity industry practice.

The Rules define good electricity industry practice to be:<sup>40</sup>

The exercise of that degree of skill, diligence, prudence and foresight that reasonably would be expected from a significant proportion of operators of *facilities* forming part of the *power system* for the *generation, transmission or supply* of electricity under conditions comparable to those applicable to the relevant *facility* consistent with *applicable regulatory instruments, reliability, safety and environmental protection*. The determination of comparable conditions is to take into account factors such as the relative size, duty, age and technological status of the relevant *facility* and the *applicable regulatory instruments*.

In its submission, the NGF proposed a compliance principle where “Generators use of compliance program, based on the template, represents good electricity industry practice”.<sup>41</sup> It also submitted that its proposed principles for developing the template make the definition of “good electricity industry practice” more specific,<sup>42</sup> and that ongoing development of the template would ensure that “good electricity industry practice” would be better defined and maintained.<sup>43</sup> The NGF contended that “provided a generator’s compliance program was compliant with the Template, the generator could be confident its program was consistent with good electricity industry practice”.<sup>44</sup> Further, the NGF is of the view that as “these programs are already in place, widely used across the industry, and have been agreed between

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<sup>39</sup> PacificHydro submission on the Issues Paper, 9 March 2009, p.2.

<sup>40</sup> See Chapter 10 of the Rules.

<sup>41</sup> NGF submission on the Issues Paper, 6 March 2009, p.3.

<sup>42</sup> NGF submission on the Issues Paper, 6 March 2009, p.1.

<sup>43</sup> NGF submission on the Issues Paper, 6 March 2009, p.3.

<sup>44</sup> NGF submission on the Issues Paper, 6 March 2009, p.6.

generators, NSPs and NEMMCO, they are by definition good electrical industry practice”.<sup>45</sup>

Grid Australia indicated that “the templates provided by the Reliability Panel may assist by providing examples of current good practice but should serve as a guideline rather than override or create inconsistency with existing Rules obligations”.<sup>46</sup> It also stated that “performance compliance programs should be required to reflect a genuine commitment to the adoption of a quality management approach to asset management by generation companies. Inherent in this approach is a commitment, by generation companies, to refining compliance assurance processes over time to ensure continuous application of good electrical industry practice”.<sup>47</sup>

NEMMCO submitted that the template include a requirement that the “template must summarise good electricity industry practice and be based on good electricity industry practice”.<sup>48</sup> It also states that this “template will indicate which tests and monitoring techniques constitute good electricity industry practice for each performance standard area for different technologies”.<sup>49</sup> To ensure the template meets good electricity industry practice, it suggests that a “workgroup of industry experts should agree on tests and monitoring with regards to each performance standard area to be included in the template as an example and on those tests and monitoring that could reasonably be set as a minimum requirement”.<sup>50</sup>

PacificHydro proposed that “specific industry principles should build on the general principles contained in AS 3806 to enhance the Standard and create what should become accepted as good compliance practice in the electricity industry”.<sup>51</sup> However, it considered that a compliance program which is consistent with the template does not fully represent good electricity industry practice, but could become “good electricity industry compliance practice”.<sup>52</sup> It suggested that contributing to good electricity industry practice would also include “Many facets of a generator’s operations ... such as electrical procedures, training, and qualifications of staff, OH&S, operations and maintenance practises as well as compliance monitoring and reporting”.<sup>53</sup>

The AER stated that when it seeks information on how the generator’s compliance program meets the requirements under the Rules, part of the requirement is for the compliance program to include procedures to monitor the performance of the plant that is consistent with good electricity industry practice.<sup>54</sup> It noted that at the time of

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<sup>45</sup> NGF submission on the Issues Paper, 6 March 2009, p.6.

<sup>46</sup> Grid Australia submission on the Issues Paper, 6 March 2009, p.2.

<sup>47</sup> Grid Australia submission on the Issues Paper, 6 March 2009, p.2.

<sup>48</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.4.

<sup>49</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.6.

<sup>50</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.9.

<sup>51</sup> PacificHydro submission on the Issues Paper, 9 March 2009, p.2.

<sup>52</sup> PacificHydro submission on the Issues Paper, 9 March 2009, p.3.

<sup>53</sup> PacificHydro submission on the Issues Paper, 9 March 2009, p.3.

<sup>54</sup> AER submission on the Issues Paper, 6 March 2009, p.2.

its audit, the “compliance program was required to be in accordance with good electricity industry practice” and the “audit was therefore attempting to come to a view on how good electricity industry practice should be interpreted”.<sup>55</sup> It indicated that an “outcome from the audit was an assessment of what constitutes a good compliance program”.<sup>56</sup>

The Panel considers that the template should support good electricity industry practice in the management of their plant’s performance and adherence to standards. However the template cannot of itself fully define nor guarantee good electricity industry practice. Generators are required to develop their compliance programs in a manner consistent with, but not a carbon copy of, the template. The development of a Generator’s plant specific compliance program based on the template is discussed further in section 3.

## **2.7 How should differences in technology, types of plant, age of plant and size of plant be provided for?**

The NGF considered that performance standards should be designed so that these are able to “be adequately applied to a range of technologies, sizes of plant and deal with the fact that some plants were connected a long time ago”.<sup>57</sup> In relation to the template, the NGF contended that the template must be able to cater for all plant types, all plant sizes, all performance standards and power plants at the commissioning stage.<sup>58</sup>

NEMMCO argued for a similar requirement where the template “must allow for the difference in technology, age and size of the different power plants”.<sup>59</sup>

PacificHydro suggested that the “template must be broad enough to cover the various technologies; allow for different types of connection points; and avoid being overly prescriptive, as this in itself could design in compliance failure for generators”.<sup>60</sup>

The Panel considers that the consensus from submissions support the requirement for different technologies, types of plant, age of plant and size of plant to be taken into account in the design of the template. The template addresses this by providing a number of different test and monitoring methods for each performance standard requirement in the draft template. This is discussed further in section 4.

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<sup>55</sup> AER submission on the Issues Paper, 6 March 2009, p.3.

<sup>56</sup> AER submission on the Issues Paper, 6 March 2009, p.3.

<sup>57</sup> NGF submission on the Issues Paper, 6 March 2009, p.1.

<sup>58</sup> NGF submission on the Issues Paper, 6 March 2009, p.5.

<sup>59</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.4.

<sup>60</sup> PacificHydro submission on the Issues Paper, 9 March 2009, p.1.



## 2.8 Should compliance categories be covered?

The NGF proposed that relevant equipment in compliance programs be categorised as either:<sup>61</sup>

- equipment performance that does not vary over time; or
- equipment performance that varies with age.

Depending on which category the equipment falls under, the NGF considered that the compliance method would be different.<sup>62</sup>

NEMMCO suggested that it could be beneficial if Generators considered that it would be useful to categorise equipment as part of the compliance method. However, NEMMCO placed more importance on consistency in approach rather than form.<sup>63</sup>

Grid Australia did not support categories for all circumstances, but suggested that “it may be appropriate to provide these Categories as an example of an approach that could be adopted, provided it is adapted to fit the specific circumstances applying to the relevant generation equipment”.<sup>64</sup>

PacificHydro saw some benefit in the use of categories as it “may contribute to the template by associating each performance standard with a measure of ‘importance’ or ‘complexity’”.<sup>65</sup> On the other hand, it argued that categories “ought not to be fixed to particular standards as different technologies may have completely different levels of difficulties or complexities associated with a particular performance standard”.<sup>66</sup>

The Panel considers that defining terms relevant to the compliance principles would achieve a similar outcome to the application of categories. For example, the frequency of testing with respect to particular performance standards could be specified for plant that would be unlikely to drift over time.

## 2.9 Which performance standards will be covered?

Rule 4.15(ca)(1) requires that the template must cover all performance standards. While a range of specific performance standards were included in the sample templates which were attached to the Issues Paper, further analysis has revealed that not all standards were covered and that the clause numbering and layout has

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<sup>61</sup> NGF submission on the Issues Paper, 6 March 2009, p.4.

<sup>62</sup> NGF submission on the Issues Paper, 6 March 2009, p.4.

<sup>63</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.8.

<sup>64</sup> Grid Australia submission on the Issues Paper, 6 March 2009, p.2.

<sup>65</sup> PacificHydro submission on the Issues Paper, 9 March 2009, p.3.

<sup>66</sup> PacificHydro submission on the Issues Paper, 9 March 2009, p.3.

changed in respect to several standards from the Code to the latest version of the Rules.

PacificHydro noted that it may take a minimum period of at least three years for a Generator to negotiate and establish its access standards, through to completion and implementation of a compliance program.<sup>67</sup> It suggested that the template be able to be implemented at any time once the template is issued.<sup>68</sup> It recommended that “the template be kept relatively simple in its structure and grow over time with the NER versions and Rule numbers”.<sup>69</sup> It contended that as a “generator’s compliance plan will be based on its registered performance standard which remain relatively static for the life of the plant ... the template needs to remain current for all performance standard clause numbers and versions”.<sup>70</sup>

The Panel considers that as the template is based on agreed compliance programs, the transition from existing agreed compliance programs to new compliance programs in response to the initial template should be achievable within the three month timeframe under rule 11.23.

The Panel also considers that given the individual registered performance standard for a plant may be based on a different version of the Rules, it would be reasonable to recognise these historical versions. The Panel has taken into account the different versions of the performance standards by specifying the different clause numbering and versions of the Rules where applicable in the draft template. The Panel considers that the draft template in section 4 satisfies the matters set out in Rule 4.15(ca)(1) being that it must cover all performance standards.

## **2.10 Are there any additional transition requirements for the template for generator compliance programs?**

The NGF suggested that given “the existing transitional Rules and the fact that all generators should have agreed compliance programs now, the NGF is of the view that further transitional requirements are likely to be minimal”.<sup>71</sup> However, it considered that “transition will only be a consideration where existing plans should be modified. It may be necessary to recognising historical versions of compliance programs for any instances where the Template imposed significant additional costs on particular generators compared to their existing programs”.<sup>72</sup>

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<sup>67</sup> PacificHydro submission on the Issues Paper, 6 March 2009, p.6.

<sup>68</sup> PacificHydro submission on the Issues Paper, 6 March 2009, p.6.

<sup>69</sup> PacificHydro submission on the Issues Paper, 6 March 2009, p.6.

<sup>70</sup> PacificHydro submission on the Issues Paper, 9 March 2009, p.6.

<sup>71</sup> NGF submission on the Issues Paper, 6 March 2009, p.7.

<sup>72</sup> NGF submission on the Issues Paper, 6 March 2009, p.7.

NEMMCO considered that its proposed compliance program framework would provide for an easy transition “as current processes can be incorporated in such a system”.<sup>73</sup> However, it saw two areas that require agreement:<sup>74</sup>

- the process of implementing the quality management system and a timeframe for compliance; and
- the treatment of compliance programs currently with NEMMCO or the TNSPs.

## **2.11 Will there be different methods for demonstrating compliance?**

Rule 4.15(ca)(2) requires that the template must define suitable testing and monitoring regimes for each performance standard so that a Registered Participant can select a regime that complies with the obligations set out in rules 4.15(a), 4.15(b) and 4.15(c) for their particular plant.

NEMMCO raised a number of questions related to demonstrating compliance for each performance standard:<sup>75</sup>

- “What action is to be performed? (what tests/monitoring need to be done to prove satisfactory operation?)
- Why is this necessary? (what requirement from performance standard is being proved?)
- How will it be proved? (what constitutes a satisfactory outcome of the tests and how will unsatisfactory outcome be handled?)
- How often should the test/monitoring be done? (this could also vary between different ages and technologies)
- When will this be done? (what is the starting date of the cycle)
- Who needs to perform which test? (there should be no uncertainty with regard to which are the suitable tests/monitoring to be done for each type and age of technology)”

NEMMCO proposed that a “list of tests should be prescribed for the different technologies and age of plant, but the template does not need to go down to methodology level”.<sup>76</sup> It considered that such level of detail on the methodology would be maintained by each Generator.<sup>77</sup>

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<sup>73</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.9.

<sup>74</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.9.

<sup>75</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.4.

<sup>76</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.9.

<sup>77</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.9.

In its audit of four Generators, the AER found that there were different compliance mechanisms or methods or a combination of these mechanisms that were applied for each performance standard.<sup>78</sup> These methods included: benchmarking, testing, calculation, modelling and continuous monitoring.<sup>79</sup> It concluded in its audit that the template should be based on “a multifaceted approach, where different compliance mechanisms are applied to different aspects of the technical requirements (in most cases, multiple mechanisms are appropriate) ... The goal of the compliance program should be to demonstrate that there is ongoing compliance with the relevant performance and technical standards”.<sup>80</sup>

The NGF proposed that as “a minimum, the Template must contain the following information:”<sup>81</sup>

- Number of different testing methodologies at a high level to cover all types of plants
- Room for variations of testing methods
- Frequency of tests
- A clear definition of acceptance criteria”.

It suggested that “Compliance Principles must be set in order to determine the depth of testing and frequency of testing taking into account the materiality of each performance standard for individual plant.”<sup>82</sup>

PacificHydro suggested that the following should be included in the template: <sup>83</sup>

- “Monitoring – whether at the connection point, at the unit terminals, or both, may reference a meter or SCADA or other forms of data collection.
- Testing – Initially at commissioning, and then following any major plant changes or when performance drift has been identified through monitoring. This should be applied to Category A Performance Standards. Other items, such as protection relays, would have periodic trip check tests as part of ongoing maintenance.
- References to internal test procedures where required – this should be done in lieu of requiring the template to include details on tests – as tests must be site specific.
- Comments on any routine maintenance contribution towards the standard, tests or logs maintained at the end of maintenance.”

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<sup>78</sup> AER submission on the Issues Paper, 4 March 2009, p.3.

<sup>79</sup> AER submission on the Issues Paper, 4 March 2009, p.3.

<sup>80</sup> AER submission on the Issues Paper, 4 March 2009, Pp.3-4.

<sup>81</sup> NGF submission on the Issues Paper, 6 March 2009, p.6.

<sup>82</sup> NGF submission on the Issues Paper, 6 March 2009, p.6.

<sup>83</sup> PacificHydro submission on the Issues Paper, 9 March 2009, p.4.

However, PacificHydro argued that the template should not be prescriptive on test methodologies as numerous technologies require different tests or methods.<sup>84</sup> Otherwise, if the template is too prescriptive, it considered that the template:<sup>85</sup>

- “will lead to numerous management issues”;
- “may restrict a generator from performing an optimal test for its specific technology”;
- “may quickly become out of date”;
- “test methods for assessing or measuring new technologies may not be well understood, or easily ‘templated’”; and
- “could inadvertently create unnecessary barriers to the entry of new technologies by increasing the time and costs associated with the development and delivery of its compliance plan”.

The Panel considers that its draft template specifies various testing methods, frequency of testing relative to these methods, and the basis for compliance assessment that these methods have to achieve for the particular performance standards. Furthermore, it considers that the various testing methods will allow a Generator to choose which method would be appropriate for its generating system. It considers that the draft template in section 4 satisfies the matters set out in Rule 4.15(ca)(2) being that it must define suitable testing and monitoring regimes for each performance standard.

## **2.12 How will ongoing continuous compliance addressed?**

According to Rule 4.15(c)(4), a compliance program instituted and maintained by a Generator must provide reasonable assurance of ongoing compliance with each applicable performance standard.

The AER stated that when it seeks information on how the Generator’s compliance program meets the requirements under the Rules, part of the requirement is for the compliance program to provide reasonable assurance of ongoing compliance with each applicable performance standard.<sup>86</sup> Furthermore, the AER suggested that following its multifaceted approach, where different compliance methods would be applied to different aspects of the performance standards, would prove compliance and demonstrate “a high probability of ongoing compliance with the applicable performance requirement”.<sup>87</sup>

The Panel considers that a form of multifaceted approach has been incorporated into the draft template. However, it considers that a more complete multifaceted

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<sup>84</sup> PacificHydro submission on the Issues Paper, 9 March 2009, p.4.

<sup>85</sup> PacificHydro submission on the Issues Paper, 9 March 2009, p.4.

<sup>86</sup> AER submission on the Issues Paper, 6 March 2009, p.2.

<sup>87</sup> AER submission on the Issues Paper, 6 March 2009, Pp.3-4.

approach would be achieved through the compliance programs framework<sup>88</sup> which includes the template as part of the process.

### 2.13 What should be considered in future reviews?

According to clause 8.8.3(ba) of the Rules:

At least every 3 years from the date the *template for generator compliance programs* is determined pursuant to clause 8.8.3(a) and at such other times as the AEMC may request, the *Reliability Panel* must conduct a review of the *template for generator compliance programs* in accordance with this clause 8.8.3. Following such a review, the *Reliability Panel* may amend the *template for generator compliance programs* in accordance with its report to the AEMC submitted under clause 8.8.3(j).

The NGF considered that future reviews of the template and compliance programs be “based on experience, including market incidents, to allow appropriate refinement over time”.<sup>89</sup>

PacificHydro argued that in relation to future reviews of the template:<sup>90</sup>

- it “should not impede a generator from meeting their fundamental obligation to have a compliance plan in place within the specified time after commissioning”;
- the three year review cycle of the template would “likely cause transitional problems for new projects unless the template is designed to be used by any generator at any point in time”;
- it “should be possible to implement and use the template without delay due to a review”;
- reviews should not result in dramatic restructure of the template as:
  - the obligation to align with the template is resident in the Rules;
  - there would be additional costs for generators to deliver their compliance program; and
  - it would likely cause uncertainty around compliance delivery because some tests are done on a three or four year period;
- justification of costs should be provided, particularly if additional equipment or expert advice is required; and
- generators should not be required to repeat recently conducted tests if there are untimely changes made to the template.

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<sup>88</sup> See sections 2.4 and 3.4 of this Draft Report.

<sup>89</sup> NGF submission on the Issues Paper, 6 March 2009, p.1.

<sup>90</sup> PacificHydro submission on the Issues Paper, 6 March 2009, Pp.5-6.

The Panel will review the template at least every three years or at such other times as the AEMC directs in accordance to the Rules. The Panel envisages that should there be an urgent requirement to review this within the three year period, then commencement of such a review would be at the direction of the AEMC.

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### **3 Principles for the development of the template for generator compliance programs and guidelines for its application to compliance programs**

#### **3.1 Introduction**

This section first outlines the principles the Panel has adopted in developing the template. In addition to providing background to the process of developing this template, the documenting of these principles should be a guide to future revision and development of the template.

The section also provides guidance to assist Generators develop their own compliance programs. Compliance programs must be consistent with the template and include procedures to monitor the performance of plant in a manner that is consistent with good electricity industry practice. The Panel considers that good practice requires Generators to refine the template within an appropriate compliance management setting to their specific plant characteristics.

#### **3.2 Compliance principles**

The Panel used the following compliance principles in developing its template. These are recommended to be used as a guide in future reviews of the template.

- Principle 1: Where plant system performance may be variable with time, as for example with plant protection, control and alarm (PCA) systems, *Generators* are accountable for managing the functionality and integrity of systems and settings in accordance with the performance standards compliance program.
- Principle 2: The corollary of the Principle #1 is that where plant parameters are not subject to variability with time, the compliance regime should be restricted to confirmation that the plant continues to perform as intended with repeat testing when there are reasonable grounds to believe that the plant performance may have changed.
- Principle 3: The materiality of the issue must be considered when contemplating a compliance testing regime.
- Principle 4: A *Generator's* active use and implementation of a compliance program that is consistent with the approved template and the *Generator's* compliance management framework will provide a reasonable assurance of compliance with the *Generator's* registered performance standards.
- Principle 5: The template must therefore support the development of compliance programs which represent "good electricity industry practice". The template should specify the objectives and outcomes to be achieved by the testing or monitoring, and an appropriate test interval. The

*Generator* should exercise diligence and good electrical industry practice to determine the detailed methods and procedures to be employed for its plant.

Principle 6: The compliance testing regime must be efficient, and reflect an equitable balance between risk management and the risk created by the test regime itself.

Principle 7: Where compliance to a performance standard cannot be directly tested, the compliance program should include a range of other compliance testing methods to provide reasonable assurance that the performance standard continues to be met.

Principle 8: A *Generator* can only be reasonably held accountable for the compliance of its plant to its registered performance standards. In some instances *Generators* rely on NEMMCO and/or the TNSP to determine power system related equipment settings. In these cases, a *Generator* must maintain its systems and the required settings in those systems and is not liable for a compliance breach that results from using, or meeting, the required settings.

Principle 9: Compliance programs should be reviewed and updated periodically.

### **3.3 The nature of the template and its application**

A clear objective of the template is to provide clarity to all parties as to what constitutes good electricity industry practice with respect to technical standards compliance. The work of the Panel in developing the template and most submissions, however, highlight the difficulty of establishing a single template for the diverse range of plant in the NEM. The submission by Pacific Hydro reinforces this point stating that:<sup>91</sup>

“The requirement to develop and mandate a template creates a significant challenge. Such a template must be broad enough to cover the various technologies; allow for different types of connection points; and avoid being overly prescriptive, as this in itself could design in compliance failure for generators.”

Considering the principles under which the compliance template is to be developed and in the light of:

- the variety of technology of generating plant in the NEM;
- the different ages and sizes of that plant;
- the plant specific attributes of the generating plant and its potential impacts on the network; and

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<sup>91</sup> PacificHydro submission on the Issues Paper, 9 March 2009, p.1.

- the differing technical standards (or registered performance standards) to which they must comply,

the Panel recognises that the compliance template cannot be a prescriptive list of compliance choices. Such an approach would not be either efficient or representative of good electricity industry practice.

The approach taken is to support a flexible application of the template with appropriate controls. The Panel has therefore designed the template on the basis that it forms part of a Generator’s overall compliance management process. This is consistent with the NGF submission which envisioned a role for the template within a “quality assurance framework”.<sup>92</sup>

It is also broadly consistent with the proposals by Pacific Hydro. Pacific Hydro suggested that the Australian Standard for Compliance Programs (AS 3806-2006) should be used as a starting point and it should be assumed that companies are using the AS 3806 already in their compliance systems.<sup>93</sup> PacificHydro argued that the specific technical principles should not be contrary to, or overwrite, any of the principles contained in AS 3806.<sup>94</sup>

The following section outlines the nature of such a framework and the following chapter provides the draft template.

### **3.4 The framework for the development of a compliance program**

The Panel recognises that the Rules requires Generators to implement compliance programs that are consistent with the template but not a carbon copy of the template. The template is not an exhaustive document and is intended to assist Generators to design its own compliance programs. It is recognised that as each Generator may have its own particular requirements for their plant, the Generator is responsible for developing its own compliance program. The development of the compliance program and its ongoing application must, however, be within an appropriate framework.

In its submission<sup>95</sup>, NEMMCO proposed that the framework for compliance programs be further clarified in the form of a “multi-faceted approach”.

The figure below summarises NEMMCO’s proposed approach and the following extract from their submission<sup>96</sup> describes the proposal in more detail.

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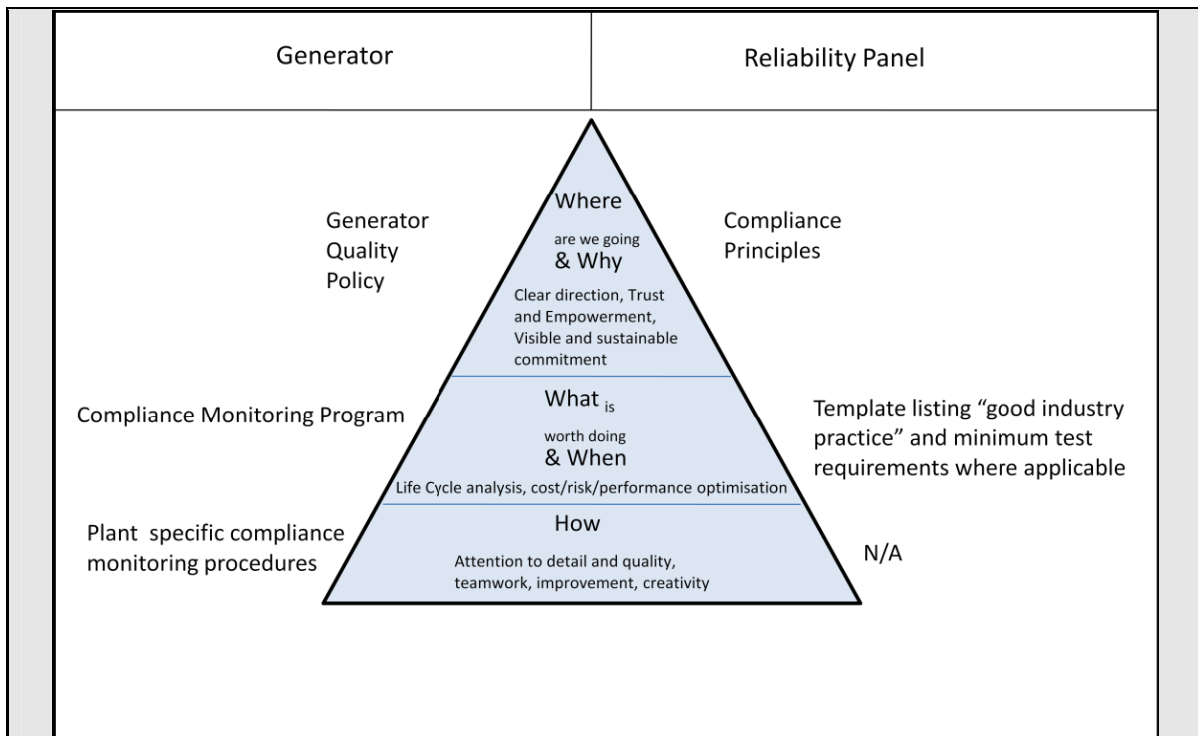
<sup>92</sup> NGF submission on the Issues Paper, 6 March 2009, p.1.

<sup>93</sup> PacificHydro submission on the Issues Paper, 9 March 2009, Pp.1-2.

<sup>94</sup> PacificHydro submission on the Issues Paper, 9 March 2009, Pp.1-2.

<sup>95</sup> NEMMCO submission on the Issues Paper, 6 March 2009, p.5.

<sup>96</sup> NEMMCO submission on the Issues Paper, 6 March 2009, Pp.5-6.



“The figure indicates a tiered approach. Documentation to be put in place by the Reliability Panel is indicated on the right hand side of the triangle, while the documentation the generators will need to have in place in response to this is indicated to the left.

The compliance principles that the Panel now asks the generators to follow will be based on internationally recognised quality management system principles such as can be found in the ISO9000, 9001 and 9004 set of standards. This set of compliance principles will need to be followed in the establishment, implementation and maintenance of the Generator Compliance Program. The concept of the suitability of testing and monitoring regimes for each performance standard as per Rule 4.15(ca) is therefore taken to a higher level. Generators will have to show that their processes are well managed and that there are sufficient supporting systems in place with regards to resourcing for, execution and review of all the processes supporting the achievement of performance standard targets.

At the next level the Reliability Panel will be responsible for putting a more detailed template in place. This template will indicate which tests and monitoring techniques constitute good electricity industry practice for each performance standard area for different technologies.

At the top tier on the generator side there is a quality management policy that will have to show:

- the processes needed for the establishment, implementation and maintenance of the Generator Compliance Program
- the sequence and interaction of these processes,
- the determination of criteria and methods needed to ensure that both the operation

and control of these processes are effective,

- the availability of resources and information necessary to support the operation and monitoring of these processes,
- that these processes are monitored, measured and analysed, and
- actions necessary to achieve planned results and continual improvement of these processes are implemented.

The resulting Generator Performance Standard Compliance Plan will then consist of a document detailing the systems and processes in place to ensure the generators ability to consistently meet regulatory requirements. The compliance program should stipulate how the processes are managed in terms of issues such as records and document control, handling of non-conformances and management review. The design and implementation of a generator's specific compliance program will be influenced by varying needs, particular technologies, the products provided, the processes employed and be manageable irrespective of the size and structure of the organisation. The plan should also include an assessment plan that stipulates the specified monitoring and test procedures including required frequency of testing. At the bottom of the tier on the generator side there should be a set of compliance monitoring procedures for each test the compliance program prescribes. These will include step by step instructions including the following:

- input and output requirements (for example specifications, resources and records to be kept),
- activities within the processes,
- verification and validation of processes and products,
- analysis of the process including dependability,
- identification, assessment and mitigation of risk,
- corrective and preventive actions,
- opportunities and actions for process improvement, and
- control of changes to processes and products.”

The Panel has decided not to mandate a particular management approach or standard, knowing that different organisations have their own approaches or are certified to various standards. However, in the context of developing the template, the Panel considers that NEMMCO's general proposal in clarifying the compliance program framework will assist it in determining the scope of the template and avoid duplicating other processes within the framework.

### **3.5 The need for documentation within the overall compliance arrangements**

While the Panel does not intend to mandate a particular management approach, any appropriate management would have a number of characteristics. One of those would be to record and document decisions. In addition to being necessary for proper management control, documentation will be necessary within the broader NEM compliance arrangements.

The overall compliance arrangements in the Rules and the NEL relies on participation of Generators, NEMMCO and the AER. For the framework of compliance programs to function effectively, in addition to the Panel's role in developing and reviewing the template, it was anticipated by the AEMC in its final Rule determination that:<sup>97</sup>

- Registered Participants (Generators) will institute and maintain generator compliance programs based on the template;
- the AER will regularly conduct spot audits of selected Generators' compliance programs as part of its compliance monitoring activities; and
- Generators will engage with external auditors to independently audit their compliance programs to determine whether they are required to amend their compliance programs and amend if required.

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<sup>97</sup> AEMC 2008, Performance Standard Compliance of Generators, Rule Determination (23 October 2008, Sydney), p.v.

## **4 The draft template for generator compliance programs**

### **4.1 Introduction**

The draft template is provided at the end of this Chapter 4. The following material provides explanatory notes to the template and defines important terms used in its drafting.

### **4.2 Pre-existing compliance**

The template is designed on the assumption that any analysis undertaken at the time of connection and subsequent commissioning tests conducted by the Generator have established the plant's compliance with its performance standards. This is also assumed for older plant that were connected in older versions of the Rules or Code. As a result, the testing and monitoring is, in some cases, based on the need to maintain compliance.

### **4.3 Power system security**

The NEMMCO power system security responsibilities are provided under clause 4.3.1 of the Rules. The Generator needs to take care that its compliance testing regime does not jeopardise power system security. Otherwise, under clause 4.8.1 of the Rules, the Generator must promptly advise NEMMCO or a relevant System Operator at the time that the Generator becomes aware, of any circumstance which could be expected to adversely affect the secure operation of the power system or any equipment owned or under the control of the Generator or a NSP. Nothing in the template seeks to override these responsibilities and all testing should be devised and undertaken recognising the need to maintain power system security.

### **4.4 Performance standards**

The Panel has sought to take into account all the relevant versions of the performance standards that may apply to a particular Generator. However, Generators should be aware in its development of compliance programs that the particular requirements under the particular performance standard may have changed over time, as well as changes in the version of the Rules, clause numbering and title in some places.

### **4.5 Compliance methods**

The template lists a number of different compliance methods for the applicable performance standards. These different methods can be selected by the Generator to suit its plant to demonstrate compliance. The method or methods on which a particular plant's compliance program is based should be selected within the broader compliance management framework of the Generator and should include consideration of all relevant factors including:

- the technology of the plant including whether it's performance is likely to drift or degrade over a particular timeframe;
- experience with the particular generation technology including manufacturer's advice;
- the connection point arrangement ; and
- an assessment of the risk and costs of different testing methods including consideration of the relative size of the plant.

#### **4.6 Frequency of tests**

In the template, there is a column titled "Frequency". This column indicates the suggested cycle of recurrent tests for a particular method. The actual frequency of testing on which a particular plant's compliance program is based should be determined within the broader compliance management framework of the Generator and should include consideration of all relevant factors including:

- the technology of the plant specific to that performance standard;
- experience with the particular generation technology;
- manufacturer's advice with respect to the particular model; and
- an assessment of the frequency required to provide reasonable assurance of compliance.

The frequency may also be managed within the broader framework to integrate NEM compliance testing with safety and other compliance programs and the overall asset management program for the plant. The actual frequency of testing may be described in terms of the:

- elapsed time;
- plant operating hours;
- MWhrs generated; or
- number of plant starts

between testing.

#### **4.7 Basis for compliance assessment**

In the template, there is a column titled "Basis for compliance assessment". The specific measure for the acceptance or otherwise of test results should be developed by the Generator when applying this compliance template to develop there compliance program. This column indicates the type of measure required as the benchmark for a particular method.



## 4.8 Defined terms

In the design of the template, it was decided that terms<sup>98</sup> would need to be defined in the template that could be applied for particular performance standards and technology:

**plant change** means when a replacement of components or equipment or refurbishment or change of system that the relevant Generator considers may affect its performance standard. An appropriate process needs to be established under the generators compliance management framework to ensure all changes to plant are noted and appropriately reviewed as to whether they constitute a plant change event.

**relevant sub-system** means any subcomponents which contribute to a generating system achieving its capability to meet the particular performance standard e.g. excitation systems, connection equipment including associated reactive plant, auxiliary power supplies, protection relays, circuit breakers etc. An appropriate process needs to be established under the generators compliance management framework to identify what sub-systems are relevant to achieving and maintaining the plant's performance with respect to each performance standard.

Appropriate testing for relevant sub-systems needs to be devised taking into account:

- the technology of the particular sub-system including whether it's performance is likely to drift or degrade over a particular timeframe;
- experience with the particular generation technology;
- manufacturer's advice with respect to the particular model; and
- an assessment of the frequency required to provide reasonable assurance of compliance.

**type testing** means testing, on a regular basis, a reasonable sample of plant within a larger population of plant of the identical model.

**monitoring** means active routine monitoring of the system to ensure ongoing compliance and not just mere logging. All monitoring should include quantitative analysis to confirm plant performance against:

- past performance;
- known performance characteristics; or
- plant performance models.

This definition should not be confused with "monitoring equipment" as defined in the Rules.

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<sup>98</sup> As the defined terms are only intended to be used in the template, it should not be used in the Rules.

#### 4.9 Draft template for generator compliance programs

Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
<b>Reactive Power Capability</b> (as required under S5.2.5.1 in versions 1-26 of the Rules)	Method 1:  At rated power output, adjust the reactive power capability to specified levels	Every 3 years and after <u>plant change</u>	Directly Measurable. Applies to synchronous and conventional plant.	Achieve reactive power requirements of the performance standard
	Method 2:  Exercise the over and under excitation limits at as close to rated power output as practical	Every 3 years and after <u>plant change</u>	Directly Measurable. Applies to synchronous and conventional plant.	Achieve reactive power requirements of the performance standard
	Method 3:  Step testing of AVR limiters	Every 3 years and after <u>plant change</u>	Applies to conventional plant	Achieve reactive power requirements of the performance standard
	Method 4:  (a) Capability will be tested	Following <u>plant change</u>	Applies to wind farms plant	Achieve performance standard

Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
	(b) Capability will be monitored using SCADA under normal wind farm operation	Annual review of a selection of events		Consistency with plant characteristics
	Method 5: Routine testing of <u>relevant sub-systems</u>	As appropriate to the technology of the <u>relevant sub-system</u>	Applicable to a wide range of generating plant and systems	Consistency with plant characteristics
<b>Power Factor when not generating</b> (clause and version of Rules: N/A)	Method 1: Direct measurement and calculation of power factor when not generating	Every 3 years and following <u>plant change</u>	Only applies where there is a circuit breaker, allowing auxiliary supply to be drawn through the main connection point	Actual capability directly demonstrated
<b>Quality of Electricity Generated</b> (as required under S5.2.5.2 in versions 1-26 of the Rules)	Method 1: (a) Direct measurements using power quality meters to derive: i. voltage fluctuation levels ii. voltage balance	Following <u>plant change</u>		Data analysis can demonstrate compliance is met. Consistency with plant characteristics.

Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
	<p>iii. harmonics, flicker and negative phase sequence voltage prior to synchronization</p> <p>(b) Routine testing of any <u>relevant sub-systems</u></p>	<p>As appropriate to the technology of the <u>relevant sub-system</u></p>	<p>Important when power quality at the connection point is dependent on ancillary plant of power electronic control systems</p>	
	<p>Method 2:</p> <p>(a) Capability will be monitored through use of Power Quality Monitors</p> <p>(b) Testing of any <u>relevant sub-systems</u></p>	<p>Routine monitoring</p> <p>Specific review annually and following <u>plant change</u></p> <p>As appropriate to the technology of the <u>relevant sub-system</u></p>	<p>Important when power quality at the connection point is dependent on ancillary plant of power electronic control systems</p>	<p>Not raising alarms.</p> <p>Consistency with plant characteristics (no deterioration).</p> <p>Consistency with plant characteristics</p>
<b>Response to</b>	Method 1:			



Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
	<p>Method 2:</p> <p>(a) Investigating system performance using high speed data recorders</p> <p>(b) Routine testing of <u>relevant sub-systems</u> including:</p> <ul style="list-style-type: none"> <li>i. testing of control system response to disturbances by the injection of simulated frequency / speed control signals</li> <li>ii. Routine tests of electrical/mechanical over speed devices</li> </ul>	<p>On major events and minimum annual review</p> <p>As appropriate to the technology of the <u>relevant sub-system</u></p>	<p>Appropriate to use where high speed monitors are available and models have been used in establishing compliance</p>	<p>Consistency of operation with plant models used to establish initial compliance; OR consistency with past performance</p>
	<p>Method 3:</p> <p>(a) Verify the modelled performance of turbines</p>	<p>Following <u>plant change</u></p>	<p>Only applicable to small asynchronous generators</p>	<p>Operation over the frequency range specified</p>

Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
	<p>(say 1-2%)</p> <p>(b) Verify the performance at the connection point by testing response to an introduced disturbance</p> <p>(c) Continuous monitoring (high speed) of performance at the connection point</p>	<p><u>Type testing</u> and verification every 10 years</p>	<p>with digital controls that are aggregated</p> <p>Each unit is not material and performance slippage is unlikely</p> <p>Appropriate to use where high speed monitors are available and models have been used in establishing compliance</p>	<p>and agreed in the Generator Performance Standard</p>
	<p>Method 4:</p> <p>(a) Performance of <u>relevant sub-systems</u> will be monitored using the following systems under normal machine operation: digital protection relays; other data-logging equipment as required</p> <p>(b) Routine testing and validation of <u>relevant</u></p>	<p>On major events and minimum annual review</p> <p>As appropriate to the technology of the</p>		<p>Achieve performance standard</p>

Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
	<u>sub-system</u> performance including: <ul style="list-style-type: none"> <li>i. electrical protection; and</li> <li>ii. turbine protection</li> </ul>	<u>relevant sub-system</u>		
<b>Response to Voltage Disturbances</b> (as required under S5.2.5.4 in versions 13-26 of the Rules)	Method 1: <ul style="list-style-type: none"> <li>(a) Investigating unit trips that occur during significant voltage disturbances</li> <li>(b) Routine testing of <u>relevant sub-systems</u> including:               <ul style="list-style-type: none"> <li>i. AVR systems</li> <li>ii. Auxiliary power systems</li> <li>iii. Protection relays</li> </ul> </li> </ul>	Event by event analysis  As appropriate to the technology of the <u>relevant sub-system</u>		Consistency with plant characteristics
	Method 2: <ul style="list-style-type: none"> <li>(a) Continuous high speed monitoring</li> </ul>	On major events and minimum annual	Appropriate to use where high speed monitors are available and models	Consistency of operation with plant models used to establish initial compliance;



Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
	<p>(b) Routine testing of <u>relevant sub-systems</u> including:</p> <ul style="list-style-type: none"> <li>i. AVR systems</li> <li>ii. Auxiliary power systems</li> <li>iii. Protection relays</li> </ul>	<p>review</p> <p>As appropriate to the technology of the <u>relevant sub-system</u></p>	<p>have been used in establishing compliance</p> <p>Where possible, testing of auxiliary power systems should include simulated disturbance testing</p>	<p>OR consistency with past performance</p>
	<p>Method 3:</p> <ul style="list-style-type: none"> <li>(a) With the generator out of service, test the ability of nominated 415 V drives to sustain a specified voltage interruption</li> <li>(b) In-service monitoring and investigation of any occurrence of a unit trip which may have been associated with a system voltage disturbance</li> </ul>	<p>every 4 years</p> <p>Analysis of all events</p>	<p>Applies only to 415 V drives</p> <p>This type of monitoring will be acceptable only if high speed monitoring is not available</p>	<p>Successful ride through of system voltage disturbances, as per the agreed performance standard</p>

Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
<p><b>Generating Unit response to disturbances following contingency events</b></p> <p>(as required under S5.2.5.5 in versions 13-26 of the Rules)</p>	<p>Method 1:</p> <p>(a) Direct testing by instigating a network trip.</p> <p>(b) Continuous monitoring using high speed recorders</p> <p>(c) Routine monitoring and testing of <u>relevant sub-systems</u></p>	<p>Following <u>plant changes</u></p> <p>On major events and minimum annual review</p> <p>As appropriate to the technology of the <u>relevant sub-system</u></p>	<p>Preferred method where possible and where risks can be managed</p> <p>Appropriate to use where high speed monitors are available and models have been used in establishing compliance</p>	<p>Actual results will confirm compliance with standard.</p> <p>Consistency of operation with plant models used to establish initial compliance; OR consistency with past performance.</p>
	<p>Method 2:</p> <p>(a) Investigate unit trips during major system events</p>	<p>On every event</p>		<p>Achieve performances standards</p>

Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
	(b) Routine monitoring and testing of <u>relevant sub-systems</u> including suitable testing to confirm circuit breaker operating times	As appropriate to the technology of the <u>relevant sub-system</u>		
<b>Quality of Electricity Generated and Continuous Uninterrupted Operation</b> (as required under S5.2.5.6 in versions 13-26 of the Rules)	Method 1: (a) Investigating unit trips to ensure the cause of the trip is not voltage unbalanced conditions  (b) Routine monitoring and testing of any <u>relevant sub-systems</u>	Following each event  As appropriate to the technology of the <u>relevant sub-system</u>		
	Method 2:  Monitoring in-service performance using high speed data recorders	Review performance annually	Appropriate to use where high speed monitors are available and models have been used in	Consistency of operation with plant models used to establish initial compliance; OR consistency with past

Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
			establishing compliance	performance
<b>Partial Load Rejection</b> (as required under S5.2.5.4 in versions 1-12 of the Rules, and S5.2.5.7 in versions 13-26 of the Rules)	Method 1: (a) Measure response of the generator to system over-frequency and analyse the unit performance  (b) Investigation of unit trips	On every event	Directly measurable	Achieve performance standards
	Method 2: (a) Routine testing of <u>relevant sub-systems including:</u> i. Analytical simulation of generator, auxiliary systems and critical protections ii. Secondary injection testing of critical protection systems (b) Assess any unit trip for relationship to load	As appropriate to the technology of the <u>relevant sub-system</u>  On every event	Type Test permissible where multiple units are	Simulation demonstrates ride through of load rejection event specified in Performance Standard  Operation over the conditions specified and

Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
	rejection event		involved	agreed in the Generator Performance Standard
	Method 3: (a) Response to partial load rejection to be assessed by in service performance (b) Test for correct operation of turbine overspeed trips	Every 4 years	Overspeed protection checked off-line after major overhauls	That plant remained in service when required to do so  That turbine trip operates to within acceptable tolerance of nominal trip setting for overspeed protection
<b>Protection from Power System Disturbances</b> (as required under S5.2.5.8 in versions 1-26 of the Rules)	Method 1: (a) Continuous monitoring using high speed recorders  (b) Routine testing of <u>relevant sub-systems</u> including applicable protection relays  (c) Investigate unit electrical	As appropriate to the technology of the <u>relevant sub-system</u>  On every event	Appropriate to use where high speed monitors are available and models have been used in establishing compliance	Consistency of operation with plant models used to establish initial compliance; OR consistency with past performance  That protection system operated in accordance with design and the Performance Standard

Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
	protection trips			
	<p>Method 2:</p> <p>(a) Routine testing of <u>relevant sub-systems</u> including:</p> <ul style="list-style-type: none"> <li>i. Injection of simulated signals (secondary injection) to demonstrate correct operation of the protection</li> <li>ii. Repair or recalibrate protection relays as required</li> </ul> <p>(b) Investigate unit trips</p>	<p>As appropriate to the technology of the <u>relevant sub-system</u></p> <p>On every event</p>		<p>Plant performance complies with the clearance times in the Generator Performance Standard</p>
	<p>Method 3:</p> <p>(a) Performance is monitored, in-service, where data is available</p>	<p>At each major overhaul; and/or every 5 years by routine functional testing of unit electrical protection</p>	<p>Applicable for wind farms.</p> <p>Changes to turbine control parameters will be controlled such that the</p>	<p>Performance is confirmed by the generating system remaining synchronised during power system disturbance conditions where required under a</p>

Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
	(b) Routine testing of <u>relevant sub-systems</u> including protection system relays, between the generating unit terminals but within the generating system shall be tested by secondary injection	systems and verification of database registered protection settings to occur annually  As appropriate to the technology of the <u>relevant sub-system</u>	performance of the generating system and generating units is not compromised in relation to the generator performance standard.	provision of the Rules  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
<b>Protection systems that Impacts on Power System Security</b> (as required under S5.2.5.9 in versions 1-26 of the Rules)	Method 1:  (a) Routine testing of protection systems including:  i. CB opening times;  ii. Protection relay injection testing.	As appropriate to the technology of the protection system	Directly Measurable	Achieve performance standard





Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
	<p>(a) 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</p> <p>(b) Relevant testing of any <u>relevant sub-systems</u> including protection system relays shall be tested by secondary injection</p> <p>(c) Verification of database registered protection settings to occur in conjunction with injection testing</p>	<p>At each major overhaul; and/or every 5 years by routine functional testing of unit electrical protection systems and verification of database registered protection settings to occur annually</p> <p>As appropriate to the technology of the <u>relevant sub-system</u></p>	<p>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</p>	<p>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</p> <p>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</p>

Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
<p><b>Asynchronous operation of synchronous generating units / Protection to Trip Plant for unstable operation</b></p> <p>(as required under S5.2.5.10 in versions 1-26 of the Rules)</p>	<p>Method 1:</p> <p>(a) Routine testing of <u>relevant sub-systems</u> including protection system testing by secondary injection</p> <p>(b) Assessment of protection system performance in the event of protection system operation or of asynchronous operation</p>	<p>As appropriate to the technology of the <u>relevant sub-system</u></p> <p>On every event</p>		<p>That all protection relays operate satisfactorily and to within design tolerance of setting value</p> <p>That protection system is operated in accordance with design and the Performance Standard</p>
<p><b>Frequency Control</b></p> <p>(as required under S5.2.5.11 in versions 1-26 of the Rules)</p>	<p>Method 1:</p> <p>Monitor in-service performance using high speed frequency data</p>		<p>Appropriate to use where high speed monitors are available and models have been used in establishing compliance</p>	<p>Achieve performance standard</p>
	<p>Method 2:</p>			

Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
	Assessment of governor system performance during events involving significant variation to system frequency	On every event	Assessment takes into account inertial response, overall governor droop setting etc	That governor system response is within the tolerance specified by the Performance Standards
	Method 3: (a) Analytical simulation of turbine and governor systems (b) Assess generator response to disturbances using high speed recording data	Type Test permissible where multiple units are involved  Ongoing		Achieve performance standard or confirm modelled performance to actual
	Method 4: (a) Step response test of the governor to test damping and droop characteristics (b) Routine Calibration Tests	Every 4 years  Every 4 years		Plant performance complies with the Generator Performance Standard
<b>Stability / Impact on Network Capability</b> (as required under	Method 1: (a) Monitor in-service performance for relevant	Following <u>plant changes</u>	Generator can only be held responsible for	Consistency of operation with plant models used to

Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
S5.2.5.12 in versions 1-26 of the Rules)	<p>performance characteristics not otherwise tested</p> <p>(b) Routine monitoring and testing of <u>relevant sub-systems</u> including suitable testing to confirm power system stabilizer performance (if relevant)</p>	As appropriate to the technology of the <u>relevant sub-system</u>	ensuring the performance of their generating system as it contributes to meeting this standard	establish initial compliance; OR consistency with past performance
<p><b>Excitation control system / Voltage and Reactive Power Control</b></p> <p>(as required under S5.2.5.13 in versions 1-26 of the Rules)</p>	<p>Method 1:</p> <p>(a) Monitoring in-service performance</p> <p>(b) Standard AVR testing - Step response</p>	Every 4 years		
	<p>Method 2:</p> <p>(a) AVR step response tests</p>	Every 4 years		

Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
	<ul style="list-style-type: none"> <li>(b) AVR step response test of OEL and UEL operation</li> <li>(c) AVR and PSS transfer function measurements over required frequency range</li> </ul>			
	<p>Method 3:</p> <ul style="list-style-type: none"> <li>(a) Transfer function measurements and step response tests with the unit unsynchronised and at full load</li> <li>(b) Assess the stability of limiter operation</li> <li>(c) Monitoring in-service performance</li> </ul>	Every 4 years		
	<p>Method 4:</p> <p>Performance of <u>relevant sub-systems</u> will be monitored using the following systems: digital protection relays;</p>	As appropriate to the technology of the <u>relevant sub-system</u>	<p>Applicable for Wind Farms.</p> <p>Changes to turbine</p>	

Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
	other data-logging equipment as required		control parameters will be controlled such that the performance of the generating system and generating units is not compromised in relation to the GPS.	
<b>Active Power Control</b> (as required under S5.2.5.14 in versions 13-26 of the Rules)	One off installation	Assess when changes are made		
<b>Remote Monitoring</b> (as required under S5.2.6.1 in versions 1-26 of the Rules)	Method 1: (a) Calibration of Transducers  (b) Verification of the accuracy of transmitted data	Following <u>plant change</u> and every 5 years		Confirmation at each end of the communications system by both parties
	Method 2: (a) SCADA monitored values and farm panel metering will be routinely checked	Every 5 years	Applicable for Wind Farms	



Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
	sub-systems including capacitor banks and circuit breakers	technology of the <u>relevant sub-system</u>		
	<p>Method 2:</p> <p>Performance will be monitored as part of condition monitoring and maintenance routines</p>		<p>This standard only applies to generating systems that takes auxiliary supplies from a separate supply.</p> <p>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.</p>	
<p><b>Fault Level / Current</b></p> <p>(as required under S5.2.9 in versions 1-12)</p>	<p>Method 1:</p> <p>(a) Monitoring in-service performance during</p>	Review following any event		Calculation confirms current fault current contribution



Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
of the Rules, and S5.2.8 in versions 13-26 of the Rules)	faults near the connection point  (b) Review and recalculation of fault levels  (c) Routine testing of any <u>relevant sub-systems</u>	Following <u>plant change</u>  As appropriate to the technology of the <u>relevant sub-system</u>		
	Method 2:  (a) Modelling and simulation of plant characteristics to make sure the plant is capable of meeting agreed standards  (b) Monitoring of generator contribution on fault event	Following <u>plant change</u>  Review following any event		Calculation confirms current fault current contribution
	Method 3:  (a) Performance of <u>relevant sub-systems</u> will be monitored using the	As appropriate to the technology of the <u>relevant sub-system</u>		Achieve performance standard

Performance Standard/Rules Clause	Suitable testing and monitoring methodology	Frequency	Notes	Basis for compliance assessment
	<p>following systems: digital protection relays; other data-logging equipment as required</p> <p>(b) Where recorded data is available, comparison to be made of measured fault currents and computer simulations</p> <p>(c) Review and recalculation of fault levels</p>	<p>Following a fault</p> <p>Following <u>plant change</u></p>		<p>Consistency of operation with plant models used to establish initial compliance; OR consistency with past performance</p>

## **A Panel's Terms of Reference for the Review**

[Reproduced below]

### **Reliability Panel Review to Develop the Template for Generator Compliance Programs AEMC Terms of Reference (21 November 2008)**

#### **Introduction**

On 23 October 2008, the Commission published a notice under sections 102 and 103 of the National Electricity Law (NEL) of the making of the National Electricity Amendment (Performance Standard Compliance of Generators) Rule 2008 and associated Rule determination. The Rule commenced operation on 23 October 2008.

An outcome from that Rule change is that, as part of the framework of compliance programs, the Reliability Panel (Panel) will develop the template for generator compliance programs based on a public consultation process and review this template within a defined time period in accordance with clause 8.8.3 of the National Electricity Rules (Rules) every three years or as the Commission directs. Following such a review in accordance with clause 8.8.3(ba), the Panel may amend the template for generator compliance programs in accordance with its report to the AEMC submitted under clause 8.8.3(j).

At the second round of consultation of the Rule change process, the Panel indicated that it supported the Commission's conclusions. It also foreshadowed that the period of time for the Panel to develop the initial template for generator compliance programs would be approximately nine months after the date that the final Rule was approved.

In accordance with clause 8.8.3(c) of the Rules, the AEMC advises the Panel of these terms of reference for its review to develop the template for generator compliance programs.

#### **Purpose of the Review**

As required by clause 8.8.1(a)(2b) of the Rules, the Panel is to determine and publish the template for generator compliance programs.

As required by clause 8.8.3(a)(6) of the Rules, the Panel is to conduct the review to develop the template for generator compliance programs in accordance with clause 8.8.3 of the Rules.

The AEMC requests the Panel, in accordance with section 38 of the NEL, clause 8.8.3 of the Rules and the national electricity objective in the NEL, to undertake a review. The Panel must undertake the review to develop the template for generator compliance programs.

## **Process**

This review is likely to have important implications for National Electricity Market stakeholders, including generators, network service providers and NEMMCO. Consistent with its philosophy of engaging with those parties and as required by clause 8.8.3, the AEMC requests the Panel to involve stakeholders by seeking submissions on the template for generator for compliance programs.

## **Timing**

Recognising the extensive work program within the Panel, the Panel should aim to complete its review by July 2009.