

Electricity Commission

Consultation Paper

Routine Testing of Assets

March 2007

Table of contents

Purpose	3
Submissions	3
Abbreviations used in this paper	4
Executive summary	4
Background	4
Development of the Test Plan	5
Agreeing the Test Plan under the current rules	5
Proposed rule amendments	6
Paper structure	7
Test Plan overview	7
Proposed amendments to technical code A	9
Type Testing	9
Process for amending Rules	10
Statement of proposal and assessment	10
Consideration against section 172X objectives	10
Attachments	10
Appendix 1: Statement of proposal	12
The proposal	12
Statement of the reasons for the proposal	12
Identifying the reasonably practicable options	13
Assessment of the reasonably practicable options	13
Assessment of the proposal	14
Assessment of option 1- the status quo	15
Assessment of option 2 - remove asset owner testing requirements from the rules	16
Extent the objective is promoted or achieved	17
Summary of the assessment	17
Other means to achieve the objective	17
Appendix 2: Benefits and outcomes of proposed tests	19
Appendix 3: Estimated annual cost of proposed tests	26
Appendix 4: Proposed rule amendments	27
Appendix 5: Consideration of the proposed rules against objectives and outcomes	34
Appendix 6: Suggested form of submission	36

Purpose

1. The Electricity Commission (Commission) is considering changes to the Electricity Governance Rules 2003 (Rules) by amending rule 8.2 of technical code A of schedule C3 of part C of the Rules to require asset owners to carry out periodic testing of their plant in accordance with a new appendix B to be added to technical code A . The purpose of this paper is to consult with the persons that the Commission thinks are representative of the interests of persons likely to be substantially affected by these proposed changes.
2. This paper is a statement of proposal in accordance with section 172F of the Electricity Act 1992 (Act), for the purposes of consultation under section 172E(2)(b)(ii). As such, it is required to set out a detailed statement of the proposal, a statement of the reasons for it, provide an assessment of the proposal and any reasonably practicable options identified by the Commission, and any other information that the Commission considers relevant.

Submissions

3. The Commission's preference is to receive submissions in electronic format (Microsoft Word and/or pdf). Submissions in electronic version should be emailed with 'Routine Testing of Assets' in the subject header to info@electricitycommission.govt.nz.
4. If submitters do not wish to send their submission electronically, they should post one hard copy of their submission to the address below.
Jenny Walton
Electricity Commission
Level 7, ASB Bank Tower
2 Hunter Street
P O Box 10041
WELLINGTON
Tel: (04) 460 8860
Fax: (04) 460 8879
5. The Commission will acknowledge receipt of all submissions electronically. Please contact Jenny Walton if you do not receive electronic acknowledgement of your submission within two business days.
6. Where possible, submissions should be provided in the format shown in Appendix 6. Your submission is likely to be made available to the general public on the Commission's website. Submitters should indicate any documents attached, in support of the submission, in a covering letter and clearly indicate any information that is provided to the Commission on a confidential basis. All information provided to the Commission is subject to the Official Information Act 1982.

Abbreviations used in this paper

Abbreviation	Description
ACS	Asset capability statement
Act	Electricity Act 1992
AOPO	Asset owner performance obligation
AUFLS	Automatic under frequency load shedding
AVR	Automatic voltage regulator
Commission	Electricity Commission
CQAG	Common Quality Advisory Group
GXP	Grid exit point
MED	Ministry of Economic Development
Minister	Minister of Energy
PPO	Principal performance obligations
Rules	Electricity Governance Rules 2003
Regulations	Electricity Governance Regulations 2003
SVC	Static var compensator
Test Plan	Agreed routine test plan

Executive summary

Background

7. The asset owner performance obligations (AOPOs) and the technical codes place specific requirements on asset owners for the performance of grid connected assets. These obligations support the system operator in planning to comply and complying with the principal performance obligations (PPOs).
8. Rule 8.2 of technical code A of schedule C3 of part C of the Rules requires the system operator and the Commission to agree a routine test plan (Test Plan). The system operator proposed that the Test Plan be implemented as a schedule of routine tests to be performed by asset owners at regular intervals.
9. The objective of the Test Plan is to assist asset owners to meet their AOPO obligations by:
 - a. verifying the accuracy of data supplied in asset capability statements (ACSs¹).
 - b. verifying to the satisfaction of the system operator that assets are capable of being operated within the limits stated in ACSs.
10. ACS data provided by asset owners is an essential input to the dynamic models, market models, and planning studies used by the system operator to plan to comply and to comply with the PPOs. Current ACS data is not fully complete and may not be up to date and accurate. The Test Plan gives

¹ The ACS is a statement of capability and operational limitations that asset owners must provide to the system operator for each asset, as required under rule 2.5 of technical code A of schedule C3 of part C of the Rules.

confidence to both the system operator and asset owners that assets meet the performance requirements of the Rules.

11. The requirement under the Rules for asset owners to provide asset capability data to the system operator and to carry out periodic testing of their assets is broadly consistent with current practices under electricity governance jurisdictions in Britain and Australia. The British Grid Code includes a separate operating code (OC5) which details asset testing and monitoring requirements. Similarly, the Australian National Electricity Code requires parties connected to the national grid to comply with inspection and testing clauses in the Code, or alternatively, to comply with the terms of a connection agreement which is consistent with the Code.

Development of the Test Plan

12. The system operator produced the first draft of the Test Plan on 21 May 2004 and called for submissions from participants. The first draft was based on early work completed under the former Combined Industry Rulebook framework and provided for various tests and test frequencies depending on the type of asset. The system operator made substantial changes to the draft after receipt of submissions and reissued a further draft for consultation on 25 August 2004. A final draft of the Test Plan was produced following the second round of consultation and submitted to the Commission on 22 October 2004 in accordance with rule 8.2.
13. Following receipt of the Test Plan, the Commission:
 - a. sought the views of the Common Quality Advisory Group (CQAG) on the acceptability of the Test Plan; and
 - b. engaged an independent consultant to review the reasonableness of the tests prescribed in the Test Plan, the frequency of the tests and the cost of asset owner compliance with the Test Plan.
14. Based on advice from the CQAG and the consultant's review, the Commission recommended that the testing of protection and control equipment be added to the Test Plan and a number of minor amendments be made. The system operator accepted the Commission's recommendations and produced a further draft of the Test Plan.

Agreeing the Test Plan under the current rules

15. Rule 8.2 of technical code A of schedule C3 of part C requires asset owners to carry out testing of their assets in accordance with the Test Plan once the Commission and the system operator have agreed the Test Plan. Rule 8.2 relies on the Test Plan being referred to in the Rules rather than by being included in the Rules by a rule amendment. In this respect, the Test Plan differs from the other documents in part C produced by the system operator, such as the Policy Statement and the Procurement Plan which are required to be included by rule amendment in accordance with the Act and specific rules in part C.

16. However, the Act does not specifically authorise the Minister of Energy (Minister) to make rules which incorporate other material into the Rules by reference alone. In view of this, the Commission sought advice from a public law QC, Richard Clarke, and the Ministry of Economic Development (MED) as to the legal status of the Test Plan, if introduced through rule 8.2.
17. Richard Clarke confirmed the Commission's concerns that obligations incorporated into the Rules by reference could be legally challenged.
18. The MED supported this advice stating that:

"Incorporation by reference allows material that does not form part of the body of the law to be enforced as law. The power to make delegated legislation requires specific statutory authorisation. Parliament decides which regulation or rule-making powers it passes on to the Governor-General and to the Minister. It would be ultra-vires the regulation-making power for the Governor-General or the Minister to further sub-delegate that power without specific statutory authority to do so. The Electricity Act 1992 does not contain specific statutory authorisation to make rules allowing incorporation of other material... The way around this is to amend Rule 8.2 so that it enables the routine test plan to be approved by the Minister as a schedule to the rules".

19. The Commission considers that the accuracy of ACS data and the ability of assets to perform in accordance with the ACS data significantly affects the system operator's ability to manage frequency and voltage excursions on the grid. The Test Plan is required to both verify the accuracy of ACS data and the performance capability of assets. Given the importance of the Test Plan, the Commission recommends amendments to rule 8.2 to ensure that all asset owners have a legal obligation to comply with the Test Plan, as intended.

Proposed rule amendments

20. The proposed rule amendments are to:
 - a. amend rule 8.2 of technical code A of schedule C3 of part C to require asset owners to carry out testing of their assets in accordance with a new appendix B² to technical code A; and
 - b. add those relevant parts of the Test Plan already developed under rule 8.2, which set out mandatory testing requirements, to the Rules in a new appendix B to technical code A.
21. The Test Plan, as developed by the system operator, includes ACS parameter specifications, testing guidelines and other reference material not suitable for inclusion in the Rulebook. However, as this information is useful to asset owners, the Commission proposes that the system operator publishes and maintains a separate explanatory guide containing detailed generic test procedures and ACS parameter specifications.

² Technical code A currently has no appendices, although a new appendix A is planned to be recommended shortly for the new duplicate protection rules.

22. The Commission proposes that the system operator sets out an overview of the explanatory guide in the next draft system operator policy statement including:
 - a. an overview of the content of the explanatory guide;
 - b. where the guide will be published;
 - c. the review period for the guide; and
 - d. the consultation the system operator will undertake in carrying out a review³.

Paper structure

23. Following this executive summary, the paper discusses background information relating to this proposal.
24. The amendments proposed to the Rules are set out in appendix 4.
25. The statement of proposal for the proposed amendments is set out in appendix 1.
26. Consideration of the proposal to change the Rules against the relevant objectives and outcomes is set out in appendix 5.
27. A suggested format for submissions is set out in appendix 6 to this paper.

Test Plan overview

28. The system operator's policy statement identifies the AOPOs that the system operator believes have a significant impact on its ability to meet its PPOs. The Test Plan includes tests considered necessary by the system operator for asset owners to be able to ensure their assets comply with these AOPOs and with the technical codes in part C of the Rules.
29. The Test Plan sets out the type of test, the output required from each test and the frequency of the testing required throughout the service life of the following categories of assets:
 - a. protection systems;
 - b. generators (voltage and frequency);
 - c. grid (voltage support);
 - d. HVDC (frequency capability); and
 - e. Automatic under frequency load shedding (AUFLS) systems.
30. The Test Plan does not include testing requirements to determine capability of assets during commissioning or following significant modification involving a

³ No further consultation is intended in preparing the first guide in light of the consultation that has already been completed.

control, protection or rating change to an asset. The testing requirements during commissioning and following modification of assets are separately set out in rule 2.6 of technical code A of part C.

31. The Test Plan does not include testing requirements for the services provided by ancillary services agents because there are no AOPOs or technical codes in part C of the Rules relating to ancillary services. The procurement plan in schedule C5 of part C separately includes the technical specifications for ancillary services and requirements for baseline and on-demand tests.
32. The Test Plan supports both the system operator and asset owners in meeting their obligations under the Rules by assisting:
 - a. the system operator to accurately model and dispatch the system so as to comply with its PPOs, particularly in regard to avoidance of cascade failure; and
 - b. asset owners to meet their AOPOs by requiring regular testing of assets to ensure the accuracy of asset capability statements provided to the system operator.
33. The system operator, with input from asset owners, developed the Test Plan tests, timeframes and required outputs taking into account the following factors:
 - a. the relative importance of the various asset data to the system operator in meeting its PPOs;
 - b. the practicality of performing the required tests;
 - c. the impact that performing the tests will have on the system operator's ability to meet the PPO's during such testing;
 - d. the impact that performing the tests will have on the assets;
 - e. international standards and best practices, customised for New Zealand power system conditions as required.
34. The system operator, in determining the frequency of tests, recognised that the electrical parameters of different classes of assets change at different rates over time. For example, the parameters of passive assets such as transmission lines, transformers, and reactors are relatively stable over time, whereas those of capacitor banks, rotating machines, analogue control systems and analogue protection systems are likely to change more quickly.
35. The system operator also considered the influence that assets have on the dynamic control and stability of the power system. Assets with control functions such as AUFLS, automatic voltage regulators (AVRs), governors, static var compensators (SVCs) and HVDC directly influence the control and stability of the power system. Accordingly, the system operator has placed a high emphasis in the Test Plan on the testing requirements and frequency of testing for these assets.

Proposed amendments to technical code A

36. The proposed amendments to technical code A of schedule C3 of part C of the Rules are to:
- a. amend rule 8.2 of technical code A to delete the requirement for the Commission and the system operator to agree a Test Plan;
 - b. amend rule 8.2 to require asset owners to test their assets in accordance with periodic testing requirements prescribed in a new appendix (appendix B) to technical code A; and
 - c. add a new appendix (appendix B) to technical code A specifying the periodic testing requirements for grid and grid connected assets.
37. The proposed rule amendments include specific arrangements for transitional compliance with the Test Plan over a two year period. The Commission is of the view that the proposed transitional arrangements combined with the existing dispensation and equivalence provisions set out in schedule C1 of part C of the Rules would allow asset owners to manage any transitional issues during the period of time required to achieve full compliance with the testing requirements.
38. Submitters are invited to comment on their ability to achieve full compliance with the proposed rule amendments over a two year transitional period.
39. The proposed amendments to technical code A are set out in full in appendix 4 to this paper.

Type Testing

40. A type test is a test carried out on a sample asset which is representative of a group of identical assets and is considered to be valid for all assets in the group. Assets considered to be identical are normally manufactured to the same specification, have the same operational and maintenance history, and are configured and controlled in the same way.
41. The Commission and the system operator consider type testing of assets to be a valid form of testing in the context of the Test Plan. However, the Commission has not included specific provisions for type testing in the proposed rule amendments. Any standard set out in the Rules to define whether assets are of the same type, and have remained of the same type over time, is likely to be open to disparate interpretation because it would need to contemplate a wide range circumstances.
42. The Commission proposes that asset owners use the existing equivalence rules in section III of part C to gain approval of type tests and that the system operator includes reference to type testing in its explanatory guide to the Test Plan.

Process for amending Rules

43. The Minister may make a rule for all or any of the purposes for which an electricity governance regulation may be made.⁴ A rule is made by publishing a notice in the Gazette.⁵
44. Sections 172X and 172Z of the Act apply.⁶ The Commission must, in formulating recommendations, give effect to its principal objectives and specific outcomes and its Government Policy Statement on electricity governance (GPS) objectives and outcomes.⁷
45. Under section 172E(2), before making a recommendation, the Commission must:
 - a. undertake an assessment under section 172F;
 - b. consult with persons that the Commission thinks are representative of the interests of persons likely to be substantially affected by the proposed rules;
 - c. give those persons the opportunity to make submissions; and
 - d. consider those submissions.

Statement of proposal and assessment

46. The Commission has prepared a statement of proposal, including an assessment, as required under section 172F of the Act. The statement of proposal is set out in appendix 1 of this paper.

Consideration against section 172X objectives

47. As discussed above, under section 172X, in formulating recommendations for rules the Commission must give effect to its principal objectives and specific outcomes and its GPS objectives and outcomes.
48. As set out in appendix 4, the proposed rule amendments give effect to the section 172X objectives and outcomes.

Attachments

49. The following items are attached:

Appendix 1 - Statement of proposal

Appendix 2 - Benefits and outcomes of the proposed tests

Appendix 3 - Estimated annual costs of the proposed tests

Appendix 4 - Detailed rule amendment proposal

⁴ Section 172H of the Electricity Act 1992.

⁵ Section 172I.

⁶ Section 172E(2)(a).

⁷ Section 172X.

Appendix 5 - Consideration of the proposed rule changes against the relevant objectives and outcomes

Appendix 6 - Suggested format for submissions

Appendix 1: Statement of proposal

50. Sections 172E and 172F of the Electricity Act 1992 (Act) set out the requirements on the Electricity Commission (Commission) regarding consultation on, and assessment of, a proposed rule change before recommending that an amendment to the Electricity Governance Rules 2003 (Rules) be made to the Minister of Energy (Minister).
51. As the proposal constitutes a rule amendment the process set out in the Act must be followed.
52. This paper is a statement of proposal under section 172F(2) of the Act, for the purposes of consultation under section 172E(2)(b)(ii). As such, it is required to set out a detailed statement of the proposal, a statement of the reasons for it, provide an assessment of the proposal and reasonably practicable options identified by the Commission, and any other information that the Commission considers relevant.

The proposal

53. The asset owner performance obligations (AOPOs) and the technical codes place specific requirements on asset owners for the performance of grid connected assets. These obligations support the system operator in planning to comply and complying with the principle performance obligations (PPOs).
54. Rule 8.2 of technical code A of schedule C3 of part C of the Rules requires the system operator and the Commission to agree a routine test plan (Test Plan). The objective of the Test Plan is to assist asset owners in meeting their AOPO obligations.
55. The proposal is to amend the Rules as set out in full in appendix 4 to this paper. The proposal includes:
 - a. amendment of rule 8.2 to delete the requirement for the Commission and the system operator to agree a Test Plan.
 - b. amendment of rule 8.2 to require asset owners to test their assets in accordance with periodic testing requirements prescribed in a new appendix (appendix B) to technical code A.
 - c. addition of a new appendix (appendix B) to technical code A specifying the periodic testing requirements for grid and grid connected assets.

Statement of the reasons for the proposal

56. Existing rule 8.2 requires asset owners to carry out testing of their assets in accordance with a Test Plan once it has been agreed by the Commission and the system operator. Rule 8.2 requires asset owners to comply with the Test Plan, despite it not being incorporated into the Rules by rule amendment. In this respect, the Test Plan differs from the other documents in part C produced by the system operator, such as the system operator Policy Statement and the Procurement Plan which are required to be included in the Rules by rule amendment in accordance with the Act and specific rules in

part C.

57. The Act does not specifically authorise the Minister to make rules under the Electricity Governance Regulations 2003 allowing incorporation of other material. Legal advice received by the Commission is that rule 8.2, as drafted, does not allow compliance with the Test Plan by asset owners to be legally enforced.
58. The Commission considers that Test Plan obligations on asset owners can significantly affect the system operator's ability to meet its PPOs under the Rules as outlined in paragraphs 66, 67 and 68 of this paper. The Commission agrees with the intent of rule 8.2 that the Test Plan be an enforceable set of provisions.
59. Accordingly, the Commission proposes that rule 8.2 be amended to allow the mandatory testing requirements of the Test Plan to be included in the Rules.
60. The objective of the proposal is to make certain asset owners' compliance with the Test Plan can be enforced so as to ensure that the system operator can comply with the PPOs.

Identifying the reasonably practicable options

61. Section 172F(1) of the Act requires the Commission to seek to identify all reasonably practicable options for achieving the objective of the rule. In preparing the proposal, the Commission has considered the following options:
 - a. the proposal, to set out, in the Rules, the mandatory testing requirements developed in the Test Plan which are considered necessary by the system operator for asset owners to be able to ensure their assets comply with the AOPOs and the technical codes in part C of the Rules;
 - b. option 1, to retain the status quo; and
 - c. option 2, to remove asset owner testing requirements from the Rules and rely on other Rules provisions such as the asset capability requirements in technical code A.

Assessment of the reasonably practicable options

62. Section 172F(1) of the Act requires the Commission to assess:
 - a. the costs and benefits of each reasonably practicable option, including the proposal;
 - b. the extent to which the objective would be promoted or achieved by each option; and
 - c. any other matters that the Commission considers relevant.

The assessment is set out below.

Assessment of the proposal

63. The Commission considers that the Test Plan obligations on asset owners can significantly affect the system operator's ability to meet its PPOs under the Rules. For this reason, the Commission is of the view that it is appropriate for these obligations to be made mandatory under the Rules.
64. The proposal is to make the testing obligations set out in existing rule 8.2 of technical code A of schedule C3 of part C legally enforceable, as originally intended. The proposal addresses an anomaly in rule 8.2 which requires asset owners to carry out testing of their assets in accordance with an agreed Test Plan, but does not give the Commission the ability to enforce asset owner compliance with the agreed Test Plan.
65. The schedule of tests outlined in proposed appendix B would include tests associated with:
 - a. frequency control and frequency response of assets;
 - b. voltage control of assets;
 - c. trip settings of automatic under frequency loading shedding systems (AUFLS); and
 - d. the operation of protection systems.
66. The proposed tests associated with frequency, voltage and AUFLS would ensure that asset capability information supplied to the system operator by asset owners, as required under rules 2.2 and 2.5 of technical code A, is verified through testing at regular intervals. Although rule 2.5 places an obligation on asset owners to supply asset capability information to the system operator that is up to date at all times, it does not provide a means for the system operator to verify asset owner compliance with this rule.
67. The proposed tests associated with the operation of protection systems would ensure that asset owners' compliance with the protection requirements of rule 4.4 of technical code A is verified at regular intervals.
68. The Commission recognises that testing of protection assets will not, in itself, provide useful asset capability information to the system operator. However, the system operator's ability to meet the PPOs is as reliant on the correct operation of protection systems as it is on the availability of accurate asset capability information.
69. It is particularly important that assets owners verify the settings and co-ordination of their protection systems on an ongoing basis as power system conditions change with time.
70. The benefits and outcomes of each individual test proposed to be included in a new appendix B to technical code A are outlined in detail in appendix 2 to this paper.
71. The proposed tests associated with the frequency control and frequency response of assets would ensure that the asset capability information used by the system operator to model reserve requirements is verified and up to date. As the accuracy of data improves over time, the system operator expects the

accuracy of the quantities of reserves calculated by the reserve management tool to improve and some resultant market benefits to be achieved.

72. The proposed tests associated with voltage control of assets would ensure that the asset capability information used by the system operator to model voltage stability constraints is verified and up to date. The system operator currently applies 23 voltage constraints in SPD that limit power flows on certain assets during plant outages. The system operator expects the accuracy of the calculated constraints limits to improve over time as test data becomes available.
73. The average annual cost⁸ to asset owners of the proposed Test Plan is estimated to be \$2.8 million in total. 80% of this annual cost is associated with the testing of protection relays as the number of these assets is much greater than the number of all other assets requiring testing combined.
74. A breakdown of the estimated annual cost is provided in appendix 3 to this paper. The estimate is based on costing data supplied by Areva test technicians.

75. Submitters are invited to supply details of the cost their own recent comparable tests if they consider the Commission's estimate to be inaccurate.

76. The Commission expects the marginal cost to asset owners resulting from the proposed Test Plan to be significantly lower than the total estimated annual cost of \$2.8 million. Cost increases for asset owners would only apply where the interval or specification of any current voluntary testing carried out by asset owners is to a lower standard than the proposed Test Plan requirements.

77. Submitters are invited to comment on the extent to which the Test Plan would increase their existing asset testing costs.

Assessment of option 1- the status quo

78. Under option 1 rule 8.2 of technical code A of schedule C3 of part C would remain in its current form. The Test Plan, as already developed in accordance with this rule, would be agreed by the Commission and the system operator. The Test Plan would not form part of the Rules, but under a provision in rule 8.2, asset owners would be asked to carry out testing of their assets in accordance with the agreed Test Plan.
79. The benefits and costs of option 1 are similar to the proposal, assuming the same Test Plan as the one included in the proposal was implemented and that asset owners complied with the Test Plan. Option 1 would not include the costs for making the rule amendments required under the proposal.
80. The objective of the rule amendment proposal could be met through option 1 if asset owners chose to voluntarily comply with the Test Plan.
81. Existing rule 8.2 states that "**Asset owners** will carry out testing of their **assets** in accordance with the agreed plan." The intent of the rule is that asset

⁸ The average annual cost is calculated as $\sum \left\{ \frac{(\text{test cost} \times \text{number of assets})}{\text{test period}} \right\}$

owner compliance with the Test Plan is mandatory, although the Act does not provide for the Test Plan to be made mandatory in this manner, as intended by the existing wording of rule 8.2.

82. The Commission considers the Test Plan obligations on asset owners can significantly affect the system operator's ability to meet its PPOs as outlined in paragraphs 66 67 and 68 of this paper, and accordingly, that compliance with the Test Plan should be mandatory, as intended by the existing wording of rule 8.2.
83. For this reason, the Commission is of the view that option 1, the status quo, is not an acceptable option.

Assessment of option 2 - remove asset owner testing requirements from the Rules

84. Under option 2 rule 8.2 would be deleted from the Rules and no explicit requirements would be placed on asset owners to carry out periodic testing of their assets. Reliance would be placed on other existing rules to ensure that asset owners provide up to date asset capability information to the system operator and that their assets are capable of being operated within the limits stated in the asset capability information provided by the asset owner. Those other rules would be:
 - a. rule 4.4 of section III of part C and rule 2.5 of technical code A require asset owners to provide the system operator with an asset capability statement for each asset forming part of the grid which is complete and up to date at all times;
 - b. rule 2.1.2 of technical code A requires asset owners to ensure that their assets are capable of being operated within the limits stated in the asset capability statement provided by the asset owner;
 - c. rule 4.4 of technical code A requires asset owners to provide protection systems for their assets. Asset owners must also ensure that its protection systems support the system operator in complying with the PPOs and must be designed and maintained to achieve a number of performance requirements in a reliable manner; and
 - d. rules 4.4 of section III of part C and rules 2.1.2, 2.5 and 4.4 of technical code A collectively place wide ranging obligations on asset owners to support the system operator in complying with the PPOs and to provide all necessary information required by the system operator. It could be argued that the Test Plan is an unnecessary requirement and that appropriate obligations are already placed on asset owners under other rules.
85. The benefits of option 2 are that asset owners are likely to incur lower testing costs than they would under either the proposal or option 1. Asset owners would be able to select what they considered to be the most appropriate testing programme for their assets and could vary the timing of testing to suit their business requirements.
86. However, the existing rules that oblige asset owners to ensure their assets comply with the data supplied in their asset capability statements and with the

AOPOs do not set any measurable standards of compliance for asset owners. Under option 2 asset owners could elect to carry out no testing of their assets after initial commissioning, should they consider their asset capability information not to change over time.

87. The Commission considers that the obligations on asset owners to support the system operator in complying with the PPOs significantly impact on system security and that there are considerable risks associated with inaccurate system modelling and uncertain asset performance capability in having no minimum asset testing requirements or measurable standards of compliance in the Rules. In order for the rules in technical code A that place obligations on asset owners to support the system operator in complying with the PPOs to be effective, the testing requirements currently set out in rule 8.2 need to be made mandatory.
88. Accordingly, the Commission is of the view that option 2, to remove asset owner testing requirements from the Rules, is not an acceptable option.

Extent the objective is promoted or achieved

89. The objective of the proposal is to make certain asset owners' compliance with the Test Plan can be enforced so as to ensure that the system operator can comply with the PPOs.
90. The objective is consistent with the intended outcomes of rule 8.2, but the current wording of the rule does not allow the outcomes to be legally enforced.
91. Options 1 and 2 would achieve the objective of ensuring the system operator can comply with the PPOs if all asset owners voluntarily complied with the Test Plan (option 1) or voluntarily adopted a reasonable alternative programme of testing (option 2). However, only the proposal would make certain asset owners' compliance with a programme of testing acceptable to the system operator.
92. The Commission's initial view is that the proposal meets the objectives of the rule amendment proposal to the greatest extent.

Summary of the assessment

93. The assessment of the benefits and costs of the proposal and reasonably practicable options supports the proposal.
94. The Commission considers that the proposal meets the objective of the rule amendments to the greatest extent.
95. Accordingly, the assessment of the benefits and costs, and the extent to which the objective would be promoted and achieved by each option, supports the proposal.

Other means to achieve the objective

96. The Commission must ensure that the objective of the rule is unlikely to be satisfactorily achieved by any reasonably practicable means other than the making of the rule (for example, by education, information, or voluntary compliance).

97. The Commission considers that the current Rules do not meet the objective stated above and, therefore, require amendment. The proposed amendments have been designed to ensure that asset owners meet, and continue to meet, their AOPOs and support the system operator in complying with the PPOs.
98. The Commission does not consider that alternatives, such as voluntary arrangements or education, would meet the objective set out above. Accordingly, the Commission considers that the objective of the proposed rule change is unlikely to be satisfactorily achieved by any reasonably practicable means other than by amending the Rules.

Appendix 2: Benefits and outcomes of proposed tests

Aspect of plant to be tested	Asset owner	Benefits of the test	Required outcomes	Applicable AOPO	Applicable PPO	Frequency of Tests
Generating unit frequency response.	Generators, other than owners of excluded generating stations not subject to a directive issued by the Board under rule 10 of section III of part C.	<p>The tests enable the system operator to :</p> <ul style="list-style-type: none"> a. model generating station contribution to frequency support by remaining synchronised and sustaining pre-event output, when subjected to disturbances on the system; and b. dispatch the appropriate assets and ancillary services necessary to maintain frequency stability. 	A set of under and over frequency trip settings and time delays.	<p>Rules 2.1, 2.3.1 and 2.3.2 of section III of part C.</p> <p>Rules 2.1, 2.3.1 and 2.3.2 of section III of part C.</p>	<p>Rules 2.1.1 and 2.2 of section II of part C.</p> <p>Rules 2.1, 2.3.1 and 2.3.2 of section III of part C.</p>	Under and over frequency relay trip settings (frequencies and time delays) every 4 years.
Generating unit governor and frequency control.	Generators, other than owners of excluded generating stations not subject to a directive issued by the Board under rule 10 of section III of part C.	<p>The tests allow asset owners to demonstrate the steady state and dynamic behaviour of turbines and speed governors through a mathematic model representation.</p> <p>An accurate model allows the system operator to model interactions with the system and other generating stations when subjected to disturbances, and thereby to manage the frequency of the system within defined</p>	<p>A complete verification of the model parameters and response of the governor system is required including:</p> <ul style="list-style-type: none"> a. a block diagram showing mathematical representation of the governor installed or frequency control system on the generating unit; b. a block diagram showing mathematical 	Rules 2.1, 2.3.1 and 2.3.2 of section III of part C.	Rules 2.1.1 and 2.2 of section II of part C.	<ul style="list-style-type: none"> a. Mechanical or analogue Governor control type every 5 years. b. Digital controllers and electro hydraulic interface Governor control type every 10 years.

Aspect of plant to be tested	Asset owner	Benefits of the test	Required outcomes	Applicable AOPO	Applicable PPO	Frequency of Tests
		stability limits.	<p>representation of the turbine dynamics including non-linearity and applicable fuel source; and</p> <p>c. parameter list showing gains, time constants and other settings applicable to block diagram.</p>			
Generating unit transformer voltage control.	Generators with a point of connection to the grid.	The tests allow asset owners to assess the ability of transformers to maintain point of supply voltage and reactive power capability within applicable limits.	<p>Verification of the control system operation of on-load tap changers including:</p> <p>a. voltage set points;</p> <p>b. operating dead bands; and</p> <p>c. response times.</p>	Rule 3.1.2, 3.2 of section III of part C.	Rule 2.1.1 of section II of part C.	Control system operation of on-load tap changers every 4 years.
Generating unit voltage response and control.	Generators with a point of connection to the grid.	<p>The tests allow asset owners to demonstrate the steady state and dynamic behaviour of their equipment through a mathematical model.</p> <p>An accurate model allows the system operator to model interactions with the system and other generating stations, when subjected to disturbances on the system, and thereby control the voltage stability of the system.</p>	<p>Verification of the model parameters and response of the excitation system or voltage control system is required including:</p> <p>a. a block diagram showing the mathematical representation of the automatic voltage regulator and exciter; and</p> <p>b. a parameter list showing gains, time constants and other settings applicable</p>	Rule 3.2 of section III of part C; rule 5.2 of technical code A	Rule 2.1.1 of section II of part C.	<p>a. Digital systems every 10 years.</p> <p>b. Analogue systems every 5 years.</p>

Aspect of plant to be tested	Asset owner	Benefits of the test	Required outcomes	Applicable AOPO	Applicable PPO	Frequency of Tests
			to the block diagrams.			
AUFLS profiles and trip settings (North Island GXP's only).	Distributors.	The tests provide the system operator with accurate profiling data and verification of trip settings required to maintain security of the power system during under frequency events and to minimise reserve costs.	Verification of the AUFLS profiling data and trip settings.	Rules 2.3.4 and 3.3.2 of section III of part C.	Rule 2.1.1 of section II of part C.	<ul style="list-style-type: none"> a. Profiling data every year. b. Under frequency trip settings and time delays every 4 years.
AUFLS profiles and trip settings (South Island GXP's only).	Grid owner.	The tests provide the system operator with accurate profiling data and verification of trip settings required to maintain security of the power system during under frequency events and to minimise reserve costs.	Verification of the AUFLS profiling data and trip settings.	Rule 3.3.1 of section III of part C.	Rules 2.1.1 of section II of part C.	<ul style="list-style-type: none"> a. Profiling Data every year. b. Under frequency trip settings and time delays every 4 years.

Aspect of plant to be tested	Asset owner	Benefits of the test	Required outcomes	Applicable AOPO	Applicable PPO	Frequency of Tests
Transformer voltage range.	Grid owner.	The test allows the grid owner to assess the ability of its transformers to maintain point of supply voltage and reactive power capability within acceptable limits. Some data is used for system modelling or input into applications used by the system operator for compliance assessment or other specific studies.	Verification of the control system operation of on-load tap changers including: <ul style="list-style-type: none"> a. voltage set points; b. operating dead bands; and c. response times. 	Rule 3.1 of section III of Part C.	Rule 2.1.1 of section II of part C.	Control system operation of on-load tap changers every 4 years.
Static var compensator transient response, control and protection.	Grid owner.	The tests provide the system operator with an accurate mathematical model that describes the steady state and dynamic behaviour of the static var compensator. The results of the test allow the system operator to: <ul style="list-style-type: none"> a. model interaction with the system when subjected to disturbances in the system and hence control the voltage stability of the system; b. confirm the expected response to faults; c. verify the integrity of the SVC control and protection systems. 	<ul style="list-style-type: none"> a. A block diagram showing the mathematical model of the static var compensator. b. A parameter list showing the gains, time constants, limiters and other settings applicable to the block diagram. c. A detailed functional description of all the components of the static var compensator and how they interact in all modes of control. d. Test results from step response tests and fault recovery a.c. disturbance response to verify tuning and stability of the static 	<p>Rules 4.1 and 4.4 of section III of part C.</p> <p>Rules 4.1 and 4.4 of section III of part C.</p> <p>Rules 4.1 and 4.4 of section III of</p>	Rule 2.1.1 of section II of part C.	<ul style="list-style-type: none"> a. Steady state & transient response performance; a.c. disturbance performance every 10 years. b. Control systems and protection every 4 years.

Aspect of plant to be tested	Asset owner	Benefits of the test	Required outcomes	Applicable AOPO	Applicable PPO	Frequency of Tests
			var compensator.	part C		
Grid capacitor reactive power control systems	Grid owner.	The tests are required to: <ul style="list-style-type: none"> a. verify the parameters of capacitors for modelling purposes; and b. check the operating thresholds and time delays of the capacitor switching operation of controlled capacitors, reactors and reactive power controllers. 	Verification of: <ul style="list-style-type: none"> a. capacitance, and b. control system operation. 	Rules 4.1 and 4.4 of section III of part C.	Rule 2.1.1 of section II of part C.	<ul style="list-style-type: none"> a. Capacitance measurement every 8 years. b. Control systems every 4 years.
Grid synchronous compensator.	Grid owner.	The tests provide the system operator with an accurate mathematical model that describes the equipment's steady state and dynamic behaviour. The results of the tests allow the system operator to model the compensator in steady state and dynamically.	<ul style="list-style-type: none"> a. A block diagram showing the mathematical model of the automatic voltage regulator and exciter. b. A detailed functional description of all of the control modes of the excitation system. c. A parameter list showing the gains, time constants, limiters and other settings applicable to the block diagram. 	Rules 4.1 and 4.4 of section III of part C.	Rule 2.1.1 of section II of part C.	<ul style="list-style-type: none"> a. Digital systems every 10 years. b. Analogue systems every 5 years.
HVDC link frequency control and protection.	HVDC owner.	The tests provide the system operator with verification of: <ul style="list-style-type: none"> a. the control system model that reflects the behaviour of the link in all possible operating 	<ul style="list-style-type: none"> a. A block diagram showing the mathematical model of the HVDC link. b. A parameter list showing the gains, time constants, 	Rules 2.3.3, 4.1 and 4.4 of section III of part C.	Rule 2.1.1 of section II of part C.	<ul style="list-style-type: none"> a. HVDC link modulation every 10 years. b. Control system and protection

Aspect of plant to be tested	Asset owner	Benefits of the test	Required outcomes	Applicable AOPO	Applicable PPO	Frequency of Tests
		<p>conditions;</p> <p>b. the control functionality of main modulations; and</p> <p>c. the integrity of primary plant control and protection systems.</p>	<p>limiters and other settings applicable to the block diagram.</p> <p>c. Detailed functional description of all the components of the HVDC link and how they interact in all modes of control.</p> <p>d. Results from offline or online testing (wherever possible) of the HVDC link for all the main modulation functions it performs.</p>			verification every 4 years.
Protection systems.	Generators with a point of connection to the grid.	Tests are required to allow asset owners to verify that their assets are compliant with the Rules.	Verification that the protection system operates correctly with applied settings.	Rule 5.5 of technical code A of schedule C3 of part C.	Rules 2.1.1, 2.2.3 and 2.2.4 of section II of part C.	<p>a. Digital self monitoring relays every 8 years.</p> <p>b. Digital non self monitoring relays every 4 years.</p> <p>c. Analogue relays once every 2 years.</p> <p>d. Measuring and trip circuits every 4 years.</p>

Aspect of plant to be tested	Asset owner	Benefits of the test	Required outcomes	Applicable AOPO	Applicable PPO	Frequency of Tests
Protection Systems.	Asset Owners and Grid Owners whose assets are connected to or form part of the grid.	The test is required to verify that the protection system will disconnect faulted assets.	Verification that the protection system operates correctly with applied settings.	Rule 4.4.1.1 of technical code A of schedule C3 of part C.	Rules 2.1.1, 2.2.3 and 2.2.4 of section II of part C.	<ul style="list-style-type: none"> a. Digital self monitoring relays every 8 years. b. Digital non self monitoring relays every 4 years. c. Analogue relays every 2 years. d. Measuring and trip circuits every 4 years.
Protection systems	All asset owners.	<p>The test is required to verify that:</p> <ul style="list-style-type: none"> a. protection settings are correctly identified and applied; b. protection is co-ordinated with other asset owners; and c. protection remains co-ordinated, with other asset owners, after any change or modification at the grid interface. 	Verification that asset owners have the capability of meeting the requirements of the AOPO's and technical codes in relation to protection.	Rules 4.1 and 4.4 of technical code A of schedule C3 of part C.	Rules 2.1.1, 2.2.3, 2.2.4 of section II of part C.	Verification every 4 years.

Appendix 3: Estimated annual cost of proposed tests to asset owners

Description	Test period (years)	Rate	Unit	Estimated number of assets	Cost per annum
Generating unit frequency response	4	\$1,450	per relay	100	\$36,250
Generating unit governor and frequency control*	7	\$10,500	per system	100	\$150,000
Generating unit transformer voltage control	4	\$1,650	per transformer	100	\$41,250
Generating unit voltage response and control	4	\$6,800	per system	100	\$170,000
Distributor automatic under frequency load shedding	4	\$880	per relay	275	\$60,500
Grid owner automatic under frequency load shedding	4	\$880	per relay	60	\$13,200
Grid owner transformer voltage range	4	\$1,020	per transformer	220	\$56,100
Static var compensator	4	\$3,520	per system	1	\$880
Grid owner capacitor	6	\$3,590	per unit	30	\$17,950
Synchronous compensator*	7.5	\$3,300	per unit	15	\$6,600
HVDC modulation function	10	\$4,950	per end	2	\$990
HVDC link frequency control and protection	4	\$9,900	per end	2	\$4,950
				Subtotal	\$558,670
Protection relays*	4	\$1,500	per relay	6000	\$2,250,000
				Total	\$2,808,670
* average testing frequency used					

Appendix 4: Proposed rule amendments

This appendix presents the amendments proposed to the Rules.

- i. Replace rule 8.2 of technical code A of schedule C3 of part C of the Rules as follows:

8.2 Asset owners to conduct testing

~~The **system operator** will consult with the relevant **asset owners** regarding a routine test plan. Following consultation, the **system operator** will agree a routine test plan, including timeframes for **assets**, with the **Board**. **Asset owners** will carry out testing of their **assets** in accordance with the agreed plan. In addition to the testing requirements for commissioning set out in rule 2.6, **asset owners** must carry out periodic testing of their **assets** and **automatic under-frequency load shedding** systems in accordance with the requirements set out in appendix B.~~

- ii. Add the following appendix to the end of technical code A of schedule C3 of part C of the Rules:

Appendix B⁹: Routine testing of assets

1. Periodic tests to be carried out

This appendix sets out periodic tests required for the purposes of rule 8.2 of technical code A. **Asset owners** may be required to carry out other tests to ensure their **assets** and **automatic under-frequency load shedding** systems are safe and reliable.

2. Generating unit frequency response

Each **generator**, other than owners of **excluded generating stations** not subject to a relevant directive issued by the **Board** under rule 10 of section III of part C, must:

- 2.1 test the trip frequencies and trip time delays of each of its **generating units**' over-frequency and under-frequency relays at least once every 4 years;
- 2.2 based on the test carried out in accordance with rule 2.1, provide a verified set of under-frequency trip settings and time delays to the **system operator** in an updated **asset capability statement** within 3 months of the completion date of each such test; and
- 2.3 based on the test carried out in accordance with rule 2.1 provide a verified set of over-frequency trip settings and time

⁹ Note that the Commission is currently working on another rule change proposal, which, if accepted, would insert a new Appendix A. This proposed appendix has therefore been named "Appendix B" on the assumption that the other appendix will be inserted first. If the other appendix is not inserted, this appendix would become 'Appendix A'.

delays to the **system operator** in an updated **asset capability statement** within 3 months of the completion date of each such test..

3. Generating unit governor and frequency control

Each **generator**, other than owners of **excluded generating stations** not subject to a relevant directive issued by the **Board** under rule 10 of section III, must:

3.1 test the governor system response of each of its **generating units**' mechanical or analogue speed governors at least once every 5 years;

3.2 test the governor system response of each of its **generating units**' digital or electro-hydraulic speed governors at least once every 10 years;

3.3 based on the tests carried out in accordance with rules 3.1 and 3.2, provide a verified set of modelling parameters and governor system response data to the **system operator** in an updated **asset capability statement** within 3 months of the completion date of each such test including:

3.3.1 a block diagram showing the mathematical representation of the governor;

3.3.2 a block diagram showing the mathematical representation of the turbine dynamics including non-linearity and the applicable fuel source; and

3.3.3 a parameter list showing gains, time constants and other settings applicable to the block diagrams.

4. Generating unit transformer voltage control

Each **generator** with a **point of connection** to the **grid** must:

4.1 test the operation of the **control system** on each of its **generating units**' transformer on-load tap changers at least once every 4 years; and

4.2 based on the test carried out in accordance with rule 4.1, provide a verified set of control parameters to the **system operator** in an updated **asset capability statement** within 3 months of the completion date of each test performed in accordance with rule 4.1, including voltage set points, operating dead bands and response times.

5. Generating unit voltage response and control

Each **generator** with a **point of connection** to the **grid** must:

- 5.1 test the modelling parameters and voltage response of each of its **generating units**' analogue excitation systems at least once every 5 years;
- 5.2 test the modelling parameters and voltage response of each of its **generating units**' digital excitation systems at least once every 10 years;
- 5.3 based on the tests carried out in accordance with rules 5.1 and 5.2, provide a verified set of modelling parameters and voltage response data to the **system operator** in an updated **asset capability statement** within 3 months of the completion date of each such test including:
 - 5.3.1 a block diagram showing the mathematical representation of the automatic voltage regulator;
 - 5.3.2 a block diagram showing the mathematical representation of the exciter; and
 - 5.3.3 a parameter list showing gains, time constants and other settings applicable to the block diagrams.

6. Distributor automatic under-frequency load shedding systems profiles and trip settings

Each North Island **distributor** must:

- 6.1 provide profiling data as described in rule 6.5 of **technical code B** to the **system operator** in an updated **asset capability statement** at least once every year;
- 6.2 test the operation of its **automatic under-frequency load shedding** systems at least once every 4 years; and
- 6.3 based on the test carried out in accordance with rule 6.2, provide a verified set of trip settings and time delays to the **system operator** in an updated **asset capability statement** within 3 months of the completion date of each such test.

7. Grid owner automatic under-frequency load shedding systems profiles and trip settings

Each South Island **grid owner** must:

- 7.1 provide profiling data as described in rule 6.5 of **technical code B** to the **system operator** in an updated **asset capability statement** at least once every year;
- 7.2 test the operation of its **automatic under-frequency load shedding** systems at least once every 4 years; and
- 7.3 based on the test carried out in accordance with rule 7.2, provide a verified set of trip settings and time delays to the

system operator in an updated asset capability statement within 3 months of the completion date of each such test.

8. Grid owner transformer voltage range

Each grid owner must:

- 8.1 test the operation of the control system on each of its transformers' on-load tap changers at least once every 4 years, and;
- 8.2 based on the test carried out in accordance with rule 8.1, provide a verified set of control parameters to the system operator in an updated asset capability statement within 3 months of the completion date of each such test, including voltage set points, operating dead bands and response times.

9. Grid owner static var compensator transient response and control

Each grid owner must:

- 9.1 test the transient response, steady state response and a.c. disturbance response of each of its static var compensators at least once every 10 years;
- 9.2 test the operation of the control system on each of its static var compensators at least once every 4 years;
- 9.3 based on the test carried out in accordance with rule 9.1, provide a verified set of modelling parameters, transient response parameters, steady state response parameters, and a.c. disturbance response parameters to the system operator in an updated asset capability statement within 3 months of the completion date of each such test including:
 - 9.3.1 a block diagram showing the mathematical representation of the static var compensator;
 - 9.3.2 a parameter list showing gains, time constants, limiters and other settings applicable to the block diagrams;
 - 9.3.3 a detailed functional description of all of the components of the static var compensator and how they interact in each mode of control;
 - 9.3.4 step response test results; and
 - 9.3.5 a.c. fault recovery disturbance test results; and
- 9.4 based on the test carried out in accordance with rule 9.2, provide a set of control system test results to the system operator in an updated asset capability statement within 3 months of the completion date of each such test.

10. Grid owner capacitors and reactive power control systems

Each grid owner must:

- 10.1 test the capacitance of each of its capacitors at least once every 8 years;
- 10.2 test the operation of the **control system** on each of its reactive power control assets at least once every 4 years;
- 10.3 based on the test carried out in accordance with rule 10.1, provide a set of test results to the **system operator** in an updated **asset capability statement** within 3 months of the completion date of each such test; and
- 10.4 based on the test carried out in accordance with rule 10.2, provide a verified set of **control system** test results to the **system operator** in an updated **asset capability statement** within 3 months of the completion date of each such test, including voltage set points, operating dead bands and time delays.

11. Grid owner synchronous compensators

Each grid owner must:

- 11.1 test each of its synchronous compensator analogue and electromechanical excitation systems at least once every 5 years;
- 11.2 test each of its synchronous compensator digital excitation systems at least once every 10 years;
- 11.3 based on the tests carried out in accordance with rules 11.1 and 11.2, provide a verified set of modelling parameters to the **system operator** in an updated **asset capability statement** within 3 months of the completion date of each such test including:
 - 11.3.1 a block diagram showing the mathematical representation of the automatic voltage regulator;
 - 11.3.2 a block diagram showing the mathematical representation of the exciter;
 - 11.3.3 a detailed functional description of the excitation system in all modes of control; and
 - 11.3.4 a parameter list showing gains, time constants, limiters and other settings applicable to the block diagrams.

12. HVDC link frequency control and protection

The HVDC owner must:

- 12.1 test the operation of the **control system** on its **HVDC link** at least once every 4 years;
- 12.2 test the operation of the protection system on its **HVDC link** at least once every 4 years;
- 12.3 test the modulation functions on its **HVDC link** at least once every 10 years;
- 12.4 based on the test carried out in accordance with rule 12.1, provide a set of control system test results and verified modelling parameters to the **system operator** in an updated **asset capability statement** within 3 months of the completion date of each such test including:
 - 12.4.1 a block diagram showing the mathematical representation of the **HVDC link**;
 - 12.4.2 a parameter list showing gains, time constants, limiters and other settings applicable to the block diagram; and
 - 12.4.3 a detailed functional description of all of the components of the **HVDC link** and how they interact in each mode of control;
- 12.5 based on the test carried out in accordance with rule 12.2, provide a set of protection system test results to the **system operator** in an updated **asset capability statement** within 3 months of the completion date of each such test; and
- 12.6 based on the test carried out in accordance with rule 12.3, provide a set of modulation function test results to the **system operator** in an updated **asset capability statement** within 3 months of the completion date of each such test.

13. Asset owner a.c. protection systems

Each asset owner must:

- 13.1 test the operation of the self monitoring digital protection systems on its a.c. **assets** at least once every 8 years;
- 13.2 test the operation of the non-self monitoring digital protection systems on its a.c. **assets** at least once every 4 years;
- 13.3 test the operation of the analogue protection systems on its a.c. **assets** at least once every 2 years;

- 13.4 test the operation of the protection system measuring circuits on its a.c. **assets** at least once every 4 years;
- 13.5 test the operation of protection system trip circuits, including circuit breaker trips, on its a.c. **assets** at least once every 4 years;
- 13.6 confirm at least once every 4 years that its protection settings are identified, co-ordinated, applied correctly and meet the requirements of the **AOPOs** and the **technical codes**;
- 13.7 based on the tests carried out in accordance with rules 13.1, 13.2, 13.3, 13.4 or 13.5, provide a set of protection system test results to the **system operator** in an updated **asset capability statement** within 3 months of the completion date of each such test; and.
- 13.8 based on the confirmation carried out in accordance with rule 13.6, provide a set of results to the **system operator** in an updated **asset capability statement** within 3 months of the completion date of each such confirmation.

14. Transitional provisions

- 14.1 Unless a shorter test interval is specified in this appendix, each **asset owner** must complete the first of each test required in this appendix no later than two years after the date upon which this appendix came into force.
- 14.2 A test of a type that is required to be carried out in accordance with this appendix, but that an **asset owner** carried out prior to the date upon which this appendix came into force, is deemed to be the first test of that type required in this appendix provided that:
- 14.2.1 the **asset owner** has submitted the relevant written test results to the **system operator**;
- 14.2.2 the **system operator** has advised the asset owner that the specification of the test is acceptable;
- 14.2.3 the interval between the actual date of the test and the date upon which this appendix came into force is less than the maximum test interval specified for the corresponding test in this appendix.
- 14.3 If a test has been deemed to be the first test in accordance with rule 14.2, the date by which the next such test must be carried out must be calculated using the actual date upon which the first test was carried out, not the date upon which it was deemed to have been carried out.

Appendix 5: Consideration of the proposed rules against objectives and outcomes

Objectives and Outcomes under section 172N of the Act	Response
The Commission's principal objectives are as follows:	
<ul style="list-style-type: none"> • To ensure that electricity is produced and delivered to all classes of consumers in an efficient, fair, reliable, and environmentally sustainable manner; and • To promote and facilitate the efficient use of electricity. 	The proposed rule amendment is consistent with the efficient, fair and reliable delivery of electricity.
The Commission's specific outcomes are as follows:	
a. energy and other resources are used efficiently;	The proposed rule amendment does not contribute directly to this outcome.
b. risks (including price risks) relating to security of supply are properly and efficiently managed;	The proposed rule amendment improves the security of supply by assisting asset owners to meet the AOPOs and in supporting the system operator in complying with the PPOs.
c. barriers to competition in the electricity industry are minimised for the long-term benefit of end-users;	The proposed rule amendment does not contribute directly to this outcome.
d. incentives for investment in generation, transmission, lines, energy efficiency, and demand-side management are maintained or enhanced and do not discriminate between public and private investment;	The proposed rule amendment does not contribute directly to this outcome.
e. the full costs of producing and transporting each additional unit of electricity are signalled;	The proposed rule amendment places obligations on parties best able to meet them in a cost effective manner.
f. delivered electricity costs and prices are subject to sustained downward pressure; and	<p>The proposed rule amendment will improve the accuracy of system modelling and thereby:</p> <ul style="list-style-type: none"> • contribute to the efficient management of voltage constraints

Objectives and Outcomes under section 172N of the Act	Response
	<p>through improved the accuracy of system modelling; and</p> <ul style="list-style-type: none"> • reduce the cost of frequency keeping by improving the response to frequency fluctuations.
<p>g. the electricity sector contributes to achieving the Government's climate change objectives by minimising hydro spill, efficiently managing transmission and distribution losses and constraints, promoting demand-side management and energy efficiency, and removing barriers to investment in new generation technologies, renewables, and distributed generation.</p>	<p>The proposed rule amendment does not contribute directly to this outcome</p>

Appendix 6: Suggested form of submission

Rule or paragraph reference	Comment	Recommendation