Ancillary services procurement plan

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Introduction

1. This **procurement plan** sets out the processes the **system operator** must use reasonable endeavours to follow when it procures **ancillary services** during the term of this **procurement plan**.

2. Terms used in this **procurement plan** which are defined terms under the **Code** have the same meaning as contained in Part 1 of the **Code**. Some other terms are defined in Appendix D of this **procurement plan**.

3. Unless the context requires otherwise, references in this **procurement plan** to:

   3.1 paragraphs are to paragraphs of this **procurement plan**;

   3.2 Appendices are to Appendices of this **procurement plan**; and

   3.3 "the term of this **procurement plan**" are to the period of time from the commencement of this **procurement plan** until the **Authority** adopts a new **procurement plan**.

4. A paragraph number in this **procurement plan** preceded by a letter indicates that the paragraph is in the Appendix corresponding to that letter.

5. The content and structure of this **procurement plan** is consistent with the content and structure set out in clause 8.43 of the **Code**.

Ancillary services to purchase

6. The **system operator** may purchase the following **ancillary services** from **ancillary service agents**:

   6.1 **frequency keeping**;

   6.2 **instantaneous reserve**;

   6.3 **over frequency reserve**;

   6.4 **voltage support**; ~~and~~

   6.5 **black start**; and

   ~~6.5~~6.6 **emergency reserve**.

7. The purpose of **frequency keeping** is to balance any generation and **demand** inequalities with the objective of maintaining the **grid** frequency within the **normal band** under normal operating conditions. Factors that contribute to inequalities under normal operating conditions include unanticipated load changes, differences in **generator** ramping, and the inherent inaccuracies between the modelled and actual system conditions.

8. The purpose of **instantaneous reserve** is to manage frequency recovery after an **under-frequency event**, with the objective of arresting the frequency fall, and recovering the frequency after an **under-frequency event**.

9. The purpose of **over frequency reserve** is to manage frequency recovery after an event that might otherwise cause the **grid** frequency to exceed 52 Hz in the North Island or 55 Hz in the South Island. For such an event, the **system operator's** objective is to arrest the rise in frequency and recover it to the **normal band**.

10. The purpose of **voltage support** is to provide additional **reactive power** resources of the static or dynamic type, depending on the location and **network** loading conditions, to contribute to **network** voltage control when dispatched.

11. The purpose of **black start** is to maintain equipment that can initialise the **supply** for the progressive relivening of the **grid** following a partial or total blackout.

12. The purpose of **emergency reserve** is to minimise the electrical disconnection of **demand** in a **grid emergency**.

~~12.~~13. Implementation of this **procurement plan** is subject to the **ancillary services** being made available to the **system operator** on:

   ~~12.1~~13.1 the terms contained in this **procurement plan**; or

   ~~12.2~~13.2 terms that, in the **system operator's** reasonable opinion, do not differ materially from those contained in this **procurement plan**.

Principles applied in making net purchase quantity assessments (clause 8.43(a) of the Code)

The requirements for complying with the principal performance obligations (PPOs) (clause 8.43(a)(i) of the Code)

~~13.~~14. The **system operator** must procure the following **ancillary services** to assist it to achieve the following objectives:

Ancillary service	Objectives
Frequency keeping	Compliance with clause 7.2A(2), 7.2B of the **Code** Compliance with the **policy statement**
Instantaneous reserve	Compliance with clause 7.2A, 7.2B of the **Code** Prevent the frequency from going outside defined limits for specified contingencies Compliance with the **policy statement**
Over frequency reserve	Compliance with clause 7.2A(1), 7.2A(2), 7.2B of the **Code** Compliance with the **policy statement**
Voltage support	Compliance with clause 7.2A(1) of the **Code** Compliance with the **policy statement**
Black start	Compliance with clause 8.5 of the **Code** Compliance with the **policy statement**

15. The **system operator** may procure the following **ancillary services** to assist it to achieve the following objectives:

Ancillary service	Objectives
Emergency reserves	To avoid involuntary reductions in, or **electrical disconnection** of, **demand** in a **grid emergency** Compliance with the **policy statement**

The requirements for achieving the dispatch objective (clause 8.43(a)(ii) of the Code)

~~14.~~16. The **system operator** must use reasonable endeavours to **dispatch** assets in a manner consistent with the **dispatch objective**. This includes the dispatch of **ancillary services**.

~~15.~~17. It is recognised in the **Code** that the meeting of the **dispatch objective** is subject to the availability and capability of **generation** and **ancillary services**. Accordingly, the **system**

operator must **dispatch ancillary services** according to the **dispatch objective** provided there is sufficient availability of **ancillary services**.

~~16.~~18. The **policy statement** sets out the policies used by the **system operator** in scheduling and dispatching **ancillary services** to assist it in planning to comply and complying with its **dispatch objective**.

Asset owner contribution (clause 8.43(a)(iii) of the Code)

~~17.~~19. The **system operator** must assess the net purchase quantity of **ancillary services** required to achieve compliance with the **PPOs**, taking into account its assessment of the contribution that **asset owners** provide in achieving the **PPOs** through compliance with the **asset owner performance obligations** and **technical codes**.

~~18.~~20. The **system operator's** assessment of the contribution provided by **asset owners** must rely on the following:

~~18.1~~20.1 that **asset owners** will at all times comply with the **asset owner performance obligations** including any **dispensation** or **equivalence arrangement** in respect of these obligations that has been granted by the **system operator** pursuant to the **Code**;

~~18.2~~20.2 that information contained in the **asset capability statements** provided by **asset owners** is correct;

~~18.3~~20.3 the contribution provided by **asset owners** in meeting the relevant **asset owner performance obligations** will be provided at no additional procurement cost when dispatched for energy; and

~~18.4~~20.4 the existence of any contracts of the type and nature set out in clause 8.6 of the **Code**.

Impact of dispensations and alternative ancillary service arrangements held by asset owners (clause 8.43(a)(iv) of the Code)

Dispensations

~~19.~~21. The **system operator** must take into account all known **dispensations** from compliance with an **asset owner performance obligation** or **technical code** when determining the net quantity of procurement required for each **ancillary service**.

~~20.~~22. **Allocable cost** excludes the readily identifiable and quantifiable costs resulting from granting **dispensations**. A **dispensation** may affect the net quantity of procurement for an **ancillary service**, and the additional procurement cost must be borne by the **asset owner** with the **dispensation**.

Alternative ancillary service arrangements

~~21.~~23. At the time of the preparation of this **procurement plan**, no **alternative ancillary service arrangements** were in place.

~~22.~~24. The **system operator** has no information indicating that any **alternative ancillary service arrangements** will be in operation over the period of this **procurement plan** which may decrease the quantity of **ancillary services** needing to be purchased by the **system operator**.

Impact of local quality agreements and existing long term contracts held by asset owners

Local quality agreements

~~23.~~25. In assessing the net quantities of procurement, the **system operator** must take account of any existing contracts for higher levels of **common quality** that the **system operator** has entered into under clause 8.6 of the **Code**. These are referred to as local quality agreements.

Existing long term contracts

~~24.~~26. In assessing the net quantities of procurement, the **system operator** must take account of any **existing long term contracts**.

~~25.~~27. The **system operator** may continue to procure **ancillary services** under **existing long term contracts** during the term of this **procurement plan**.

Cost effectiveness

~~26.~~28. The **system operator** must consider the following in achieving the appropriate balance between cost and quality for each **ancillary service** purchased:

~~26.1~~28.1 the technical specification of the plant being offered, including any measuring equipment required;

~~26.2~~28.2 the minimum acceptable service standard;

~~26.3~~28.3 the number of suppliers offering the service and reasons for any limitations;

~~26.4~~28.4 the actual cost of providing the service over the **ancillary service** procurement contract term;

~~26.5~~28.5 the liability for providing the service and the potential cost of failure; ~~and~~

28.6 the desirability of maintaining capability and competition in the provision of **ancillary services**; and

~~26.6~~28.7 for **emergency reserve**, the results of assessments under paragraph 49 and the **value of expected unserved energy** for **emergency reserve**.

Methodologies for net purchase quantity assessments (clause 8.43(b) of the Code)

Assessment methodology for frequency keeping

~~27.~~29. Subject to paragraphs 30 and 31, all parties that can offer **frequency keeping** compliant with the **system operator's** technical requirements and the **Code** and who are prepared to enter into an **ancillary service** procurement contract with the **system operator**, on terms acceptable to the **system operator,** to provide **frequency keeping** on a **half-hour clearing market procurement** basis must be contracted by the **system operator** for provision of **frequency keeping**. Each such **ancillary service** procurement contract is a contract to provide **frequency keeping** for the purposes of clause 13.82(5)(a) of the **Code**.

~~28.~~30. The **system operator** may procure **back-up SFK** from one or more parties, but is not required to enter into an **ancillary service** procurement contract for **back-up SFK** with every potential provider of **back-up SFK**.

~~29.~~31. Parties who wish to provide **frequency keeping** are subject to a pre-contract technical review, as part of which the party may be required to complete one or more tests at the party's cost. The **system operator** must be satisfied with the outcome of the technical review before entering into an **ancillary service** procurement contract with that party for **frequency keeping**. Without limitation, the scope of the technical review may include a review of:

~~29.1~~31.1 the control accuracy of the party's proposed **FK sites**;

~~29.2~~31.2 the **response rates** of the party's proposed **FK sites**;

~~29.3~~31.3 the capabilities of the monitoring equipment for the party's proposed **FK sites**; and

~~29.4~~31.4 for **multiple provider frequency keeping**, the ability of the party's **proposed FK sites** to receive and respond to **regulating instructions**.

~~30.~~32. The **system operator** must assess the net purchase quantity of **frequency keeping** in accordance with the processes set out in paragraphs 14 to 28.

~~31.~~33. The **system operator** must use reasonable endeavours to have an **ancillary service** procurement contract with at least one provider of **frequency keeping** in each **island**.

Assessment methodology for instantaneous reserve

~~32.~~34. Subject to paragraph 35, all parties that can offer **instantaneous reserve** compliant with the **system operator's** technical requirements and the **Code** and who are prepared to enter into an **ancillary service** procurement contract with the **system operator**, on terms acceptable to the **system operator**, to provide **instantaneous reserve** on a **half-hour clearing market procurement** basis must be contracted by the **system operator** for provision of **instantaneous reserve** on that basis. Each such **ancillary service** procurement contract is a contract to provide **reserve offers** for the purposes of clause 13.37 of the **Code** and a contract to provide **instantaneous reserve** for the purposes of clause 13.82(5)(a) of the **Code**.

~~33.~~35. Parties who wish to provide **instantaneous reserve** are subject to a pre-contract technical review, as part of which the party may be required to complete one or more tests at the party's cost. The **system operator** must be satisfied with the outcome of the technical review before entering into an **ancillary service** procurement contract with that party for **instantaneous reserve**. Without limitation, the scope of the technical review may include a review of:

~~33.1~~35.1 for **generation reserve**, the model and the model validation report submitted as part of the **asset capability statement** for the relevant site; and

~~33.2~~35.2 relevant test methodology prior to testing and test results post testing.

~~34.~~36. The **system operator** must assess the net purchase quantity of **instantaneous reserve** in accordance with the processes set out in paragraphs 14 to 28 and Schedule 13.3 of the **Code**.

Assessment methodology for over frequency reserve

~~35.~~37. Subject to paragraph 38, the **system operator** may procure **over frequency reserve** from parties that can offer **over frequency reserve** compliant with the **system operator's** technical requirements and the **Code** and who are prepared to enter into an **ancillary service** procurement contract with the **system operator**, on terms acceptable to the **system operator**, to provide **over frequency reserve** on a **firm quantity procurement** basis. Each such **ancillary service** procurement contract is a contract to provide **over frequency reserve** for the purposes of clause 13.82(5)(a) of the **Code**.

~~36.~~38. Parties who wish to provide **over frequency reserve** are subject to a pre-contract technical review, as part of which the party may be required to complete one or more tests at the party's cost. The **system operator** must be satisfied with the outcome of the technical review before entering into an **ancillary service** procurement contract with that party for **over frequency reserve**. Without limitation, the scope of the technical review may include a review of:

~~36.1~~38.1 relevant test methodology prior to testing and test results post testing;

~~36.2~~38.2 **circuit breaker** operating time;

~~36.3~~38.3 relay injection testing;

~~36.4~~38.4 ramp rate if applicable;

~~36.5~~38.5 control equipment operating time if applicable;

~~36.6~~38.6 remote enable/disable control; and

~~36.7~~38.7 remote/manual arming and disarming function.

~~37.~~39. The **system operator** must assess the net purchase quantity of **over frequency reserve** in accordance with the processes set out in paragraphs 14 to 28.

Assessment methodology for voltage support

~~38.~~40. Subject to paragraph 41, the **system operator** may procure **voltage support** from parties that can offer **voltage support** compliant with the **system operator's** technical requirements and the **Code** and who are prepared to enter into an **ancillary service** procurement contract with the **system operator**, on terms acceptable to the **system operator**, to provide **voltage support** on a **firm quantity procurement** basis. Each such **ancillary service** procurement contract is a contract to provide **voltage support** for the purposes of clause 13.82(5)(a) of the **Code**.

~~39.~~41. Parties who wish to provide **voltage support** are subject to a pre-contract technical review, as part of which the party may be required to complete one or more tests at the party's cost. The **system operator** must be satisfied with the outcome of the technical review before entering into an **ancillary service** procurement contract with that party for **voltage support**. Without limitation, the scope of the technical review may include a review of relevant test methodology prior to testing and test results post testing.

~~40.~~42. The **system operator** must assess the net purchase quantity of **voltage support** in each **zone** in accordance with the processes set out in paragraphs 14 to 28.

Assessment methodology for black start

~~41.~~43. Subject to paragraph 44, the **system operator** may procure **black start** from parties that can offer **black start** compliant with the **system operator's** technical requirements and the **Code** and who are prepared to enter into an **ancillary service** procurement contract with the **system operator,** on terms acceptable to the **system operator,** to provide **black start** on a **firm quantity procurement** basis.

~~42.~~44. Parties who wish to provide **black start** are subject to a pre-contract technical review, as part of which the party may be required to complete one or more tests at the party's cost. The **system operator** must be satisfied with the outcome of the technical review before entering into an **ancillary service** procurement contract with that party for **black start**. Without limitation, the scope of the technical review may include a review of:

~~42.1~~44.1 the auxiliary/battery bank or diesel generator being offered;

~~42.2~~44.2 the capability of the generator to be livened without **grid** power;

~~42.3~~44.3 the ability to synchronise the available unit(s);

~~42.4~~44.4 the ability to energise the grid circuits; and

~~42.5~~44.5 relevant test methodology prior to testing and test results post testing.

~~43.~~45. The **system operator** must assess the net purchase quantity of **black start** in accordance with the processes set out in paragraphs 14 to 28.

~~44.~~46. The **system operator** must use reasonable endeavours to have **ancillary service** procurement contracts for **black start** at two sites in each **island**.

Assessment methodology for emergency reserve

47. Subject to paragraphs 48 and 49, the **system operator** may procure **emergency reserve** from parties that can offer **emergency reserve** compliant with the **system operator's** technical requirements and the **Code** and who are prepared to enter into an **ancillary service** procurement contract with the **system operator,** on terms acceptable to the **system operator,** to provide **emergency reserve** on a **firm quantity procurement** basis.

48. Parties who wish to provide **emergency reserve** are subject to a pre-contract technical review, as part of which the party may be required to complete one or more tests at the party's cost. The **system operator** must be satisfied with the outcome of the technical review before entering into an **ancillary service** procurement contract with that party for **emergency reserve**. Without limitation, the scope of the review may include:

48.1 **self-certification**;

48.2 confirmation of the eligibility of the party's equipment to provide **emergency reserve** within the definition of **emergency reserve** in Part 1 of the **Code**; and

48.3 a review the party's ability to receive, acknowledge and respond to **pre-activation notifications** and **activation notifications**.

49. The **system operator** must assess the net purchase quantity of **emergency reserve** in accordance with the **emergency reserve forecasting methodology** and the processes set out in paragraphs 14 to 28. The **system operator** must **publish** the **emergency reserve forecasting methodology**.

50. Following each assessment under paragraph 49**,** the **system operator** must **publish**:

50.1 the period covered by the assessment;

50.2 the results of the assessment, including the **call periods** and quantities of **emergency reserve** to be procured (if any); and

50.3 the methodology to be used to determine when **pre-activation notifications** and **activation notifications** will be sent (if any **emergency reserve** is to be procured).

Procurement processes (clause 8.43(c) of the Code)

Ancillary service procurement contracts

~~45.~~51. Subject to paragraph 52, the **system operator** may enter into an **ancillary service** procurement contract with an **ancillary service agent** at any time during the period of this **procurement plan** using any means of entering into the contract it considers appropriate.

Tendering

~~46.~~52. Subject to paragraphs 53 and 54, the **system operator** must seek tenders from potential providers of each **ancillary service** at least once every 2 years taking into account the period since the **system operator** last sought tenders from potential providers of the **ancillary service** under any previous **procurement plan**.

~~47.~~53. The **system operator** need not comply with paragraph 52 for an **ancillary service** that is or would be procured on a **firm quantity procurement** basis if the **system operator** considers none or no more of the **ancillary service** is required in the relevant **region**.

~~48.~~54. The **system operator** need not comply with paragraph 52 for an **ancillary service** if the **system operator** considers there is only one potential provider of the **ancillary service** in the relevant **region**.

~~49.~~55. The terms and conditions of each tender process referred to in paragraph 52 must require the **system operator** to treat information received from tenderers during the tender process as confidential, subject only to the provisions that permit the disclosure of confidential information under the **system operator's** standard form **ancillary service** procurement contract.

Contracting

~~50.~~56. The **system operator** must negotiate in good faith **ancillary service** procurement contracts using the **system operator's** standard form **ancillary service** procurement contracts as starting points.

~~51.~~57. The term of an **ancillary service** procurement contract may differ from that of this **procurement plan**. Without limitation, the **system operator** may enter into a **new long term contract** for any **ancillary service**.

Bases of procurement

~~52.~~58. Subject to paragraph 59, **ancillary services** must be procured through a half-hour clearing market process whereby, for each **ancillary service** and **trading period**, **ancillary service agents** submit offers to the **system operator** to provide **the ancillary service**. The market for the **ancillary service** is priced and settled for each **trading period** based on the offers dispatched by the **system operator**. This type of procurement is referred to as **"half-hour clearing market procurement"**.

~~53.~~59. **Ancillary services** must be procured on a fixed quantity and fixed price basis where the **system operator** assesses there is a requirement for a fixed quantity or a high availability, irrespective of **dispatch**, of the **ancillary service**. This type of procurement is referred to as **"firm quantity procurement"**.

~~54.~~60. **Ancillary services** procured on a firm quantity procurement basis must be paid for by way of an **availability fee**, an **event fee** or both. **Ancillary services** procured on a **half-hour**

clearing market procurement basis must be paid for by way of an offer price and may also be paid for by way of an **availability fee**.

~~55.~~61. The basis of procurement for each **ancillary service** is set out in Appendix A.

Islanded situations

~~56.~~62. Despite anything to the contrary in this **procurement plan**, when part of the **grid** is **islanded** the **system operator** may procure **ancillary services** for that part of the **grid** using procurement processes other than those set out in paragraphs 52 to 61 and Appendix A. For the avoidance of doubt, an **ancillary service** procured under this paragraph is not an **alternative ancillary service arrangement**.

Administrative costs (clause 8.43(d) of the Code)

~~57.~~63. Identifiable **administrative costs** are those significant costs incurred by the **system operator** as a direct consequence of implementing this **procurement plan** and that are specifically attributable to an **ancillary service** and that have been agreed to by the **Authority** and the **system operator**. The **system operator** is entitled to recover these costs as an **allocable cost** in accordance with the **ancillary service** cost recovery methodology set out in clauses 8.55 to 8.70 of the **Code**.

~~58.~~64. Any **administrative costs** must be charged at the following standard rates:

Grade	Position	Rate $/hr (excl GST)
1	Analyst/Engineer	138
2	Senior Analyst/Engineer/Consultant	170
3	Senior Advisor	222

Technical requirements and key contracting terms (clause 8.43(e) of the Code)

~~59.~~65. The key technical requirements for each **ancillary service** are set out in Appendix B.

~~60.~~66. The key contracting terms for the procurement of **ancillary services** are set out in Appendix C.

~~61.~~67. When entering into **ancillary service** procurement contracts with **ancillary service agents** for the provision of **ancillary services**, subject to paragraph 69, the **system operator** must use reasonable endeavours to ensure that the **ancillary service** procurement contracts include the key technical requirements and the key contracting terms.

~~62.~~68. The **ancillary service** procurement contracts negotiated between the **system operator** and the **ancillary service agents** must not be materially inconsistent with the key contracting terms.

~~63.~~69. Despite anything to the contrary in this **procurement plan**, when part of the **grid** is **islanded** the **system operator** may procure **ancillary services** for that part of the **grid** under **ancillary service** procurement contracts that do not include the key technical requirements or key contracting terms set out in Appendices B or C. For the avoidance of doubt, an **ancillary service** procured under this paragraph is not an **alternative ancillary service arrangement**.

Arrangements for unanticipated procurement of ancillary services (clause 8.43(f) of the Code)

~~64.~~70. During a **grid emergency**, the **system operator** relies on **ancillary service agents** complying with their obligations set out in **technical code** B of schedule 8.3 of the **Code**.

~~65.~~71. Any departures from this **procurement plan** must be in accordance with clause 8.47 of the **Code**.

~~66.~~72. Where the **system operator** identifies a need to change any aspect of this **procurement plan**, the **system operator** may propose a change pursuant to clause 7.13(1) of the **Code**.

System operator reporting to the Authority (clause 8.43(g) of the Code)

~~67.~~73. The **system operator** must report to the **Authority** in relation to the procurement of **ancillary services** as follows:

~~67.1~~73.1 ~~settlement volumes,~~volumes (including quantities of **emergency reserve pre-activated** and **activated**), prices, costs, and **administrative costs** where appropriate, on a monthly basis;

~~67.2~~73.2 any issues arising with respect to cost allocation, liability and disputes, on a monthly basis; and

~~67.3~~73.3 other general procurement issues to be contained within the **system operator** monthly report provided in accordance with clause 3.13 and clause 3.14 of the **Code**.

Appendix A – Bases for procuring ancillary services (paragraph 61)

Frequency keeping

A1. The **system operator** must:

A1.1 procure **frequency keeping** on a **half-hour clearing market procurement** basis; and

A1.2 procure **frequency keeping** as **single provider frequency keeping** or **multiple provider frequency keeping**.

A2. The **system operator** may:

A2.1 procure **back-up SFK** at the same time it procures **multiple provider frequency keeping**; and

A2.2 pay an **availability fee** for **back-up SFK** but must not otherwise pay an **availability fee** for **frequency keeping**.

A3. For each **island** independently, the **system operator** may set an **MFK transition trading period** or **SFK transition trading period**.

A4. The **system operator** must communicate the setting of an **MFK transition trading period** or **SFK transition trading period** by:

A4.1 notifying all **ancillary service agents** with an **ancillary service** procurement contract for **frequency keeping** in the relevant **island**; and

A4.2 publishing the notification on the **system operator's** website.

A5. The **system operator** need not communicate an **SFK transition trading period** in accordance with paragraph A4 in advance of the **SFK transition trading period** if the transition to **single provider frequency keeping** is urgent.

A6. Subject to paragraph A7, the **system operator** must dispatch offer(s) to provide **frequency keeping** for each **island** for each **trading period** to provide an aggregate **MW band** sufficient to meet the **system operator's net purchase quantity assessment** for that **trading period** at least cost based on the **offer prices** and estimated **constraint costs**. For the avoidance of doubt, the aggregate **MW band** may be zero.

A7. The **system operator** may depart from paragraph A6 by excluding a **frequency keeping** offer from its determination of the least cost **frequency keeping** solution if the **system operator** reasonably considers it necessary to do so to comply with the **PPOs**. The **system operator** must notify the affected **ancillary service agent** as soon as reasonably practicable if it does this.

A8. **Frequency keeping** for an **island** may be provided by one or more providers of **frequency keeping** in the other **island**, via the **HVDC link**.

Instantaneous reserve

A9. The **system operator** must:

A9.1 procure **instantaneous reserve** on a **half-hour clearing market procurement** basis; and

A9.2 procure **instantaneous reserve** as **fast instantaneous reserve** and **sustained instantaneous reserve**.

A10. The **system operator** must dispatch **reserve offers** in accordance with Subpart 2 of Part 13 of the **Code**.

A11. **Reserve offers** dispatched by the **system operator** must be priced and settled in accordance with Subpart 4 of Part 13 of the **Code**.

A12. **Instantaneous reserve** for an **island** may be provided by one or more providers of **instantaneous reserve** situated in the other **island**, via the **HVDC link**.

Over frequency reserve, voltage support and black start

A13. The **system operator** has determined that it is uneconomic to procure **over frequency reserve**, **voltage support** and **black start** on a **half-hour clearing market procurement** basis.

A14. The **system operator** must procure **over frequency reserve**, **voltage support** and **black start** on a **firm quantity procurement** basis.

A15. For the purpose of determining when an **event fee** is payable for **over frequency reserve**, **voltage support** and **black start**:

A15.1 an **over frequency reserve** event occurs for a dispatched **OFR site** when the **OFR equipment** initiates its **over frequency reserve** response;

A15.2 a **voltage support** event occurs for voltage support **equipment** when the **voltage support equipment** is dispatched; and

A15.3 a **black start** event begins when the **system operator** requests **black start** and ends when **core grid** restoration is complete. There may be multiple attempts at restoration before the event ends.

Emergency reserve

A16. The **system operator** has determined that it is uneconomic to procure **emergency reserve** on a **half-hour clearing market procurement** basis.

A17. If the **system operator** procures **emergency reserve**, the **system operator** must procure **emergency reserve** on a **firm quantity procurement** basis.

A18. Any **pre-activation event fee** must be per **pre-activation event**. Any **activation event fee** must be per **activation event** and may also be per **trading period** of the **activation event**.

A19. If the **ancillary service agent** does not provide at least the contracted amount of **emergency reserve** when **activated**, any **activation event fee** payable for the **activation event** will be reduced proportionately.

A20. A **pre-activation event** occurs when a **pre-activation notification** is sent by the **system operator** to the **ancillary service agent**. A **pre-activation notification** must specify the **trading periods** to which it applies. All contiguous **trading periods** specified in a **pre-activation notification** constitute a single **pre-activation event.**

A21. An **activation event** occurs and begins at the start of the **trading period** immediately following the **trading period** in which the **system operator** sends an **activation notification** to the **ancillary service agent** and ends at the end of the **trading period** in which the **system operator** sends a **restoration notification** to the **ancillary service agent**.

A22. To avoid doubt, for a **billing period**:

A22.1 the **emergency response pre-event cost** is the total **availability fees** (if any) for **emergency reserve** procured for the **billing period**; and

A22.2 the **emergency reserve event cost** is the total **event fees** (if any) for all **emergency reserve events** during the **billing period**.

Appendix B – Key technical requirements for ancillary services (paragraph 65)

B1. For the avoidance of doubt, a key technical requirement that is expressed as an **ancillary service agent** right or obligation does not confer or impose that right or obligation on an **ancillary service agent** unless and until that right or obligation is included in an **ancillary service** procurement contract between the **system operator** and the **ancillary service agent**.

Frequency keeping

Performance requirements and technical specifications for frequency keeping

B2. The **ancillary service agent** must provide one or more **frequency keeping units** and trained operators or **control equipment** at an **FK site** that, collectively, are capable of meeting the relevant performance requirements set out in paragraphs B3 to B8 below

Single provider frequency keeping performance requirements

B3. Subject to paragraph B7, when providing **single provider frequency keeping** the **ancillary service agent** must:

B3.1 when there is a **grid frequency error**, ensure the relevant **FK site** responds to eliminate the **grid frequency error** and commences the response as fast as practicable but in all cases within 10 seconds of the **grid frequency error** occurring;

B3.2 ensure the relevant **FK site** provides an average **response rate** of at least 10 **MW** per minute when the **grid** frequency is outside the **normal band** over each of the **ancillary service agent's single provider frequency keeping periods**;

B3.3 at all times act to maintain the frequency of the **grid** within the **normal band**, and use reasonable endeavours to continuously maintain the frequency of the **grid** as close as possible to 50 Hz; and

B3.4 use reasonable endeavours to continuously maintain **frequency time error** as close as possible to zero.

B4. Subject to paragraph B7, the **ancillary service agent** must ensure the **grid frequency error** over any of the **ancillary service agent's single provider frequency keeping periods** does not exceed the maximum allowable **grid frequency error** specified in the **ancillary service agent's ancillary service** procurement contract. Such **grid frequency error** must be determined by reference to the **system operator measured frequency** but excluding any frequency measurements that are outside the **normal band**.

B5. If providing **back-up SFK**, the **ancillary service agent** must ensure the **FK site** is available continuously to provide **back-up SFK**, except:

B5.1 where there is an **allowed outage**; or

B5.2 during any **trading period** when the **FK site** is not dispatched to generate electricity.

Multiple provider frequency keeping performance requirements

B6. Subject to paragraph B7, when providing **multiple provider frequency keeping** the **ancillary service agent** must:

B6.1 comply with **regulating instructions** issued to it; and

B6.2 ensure that the relevant **FK site** provides a **response rate** of at least 0.4 **MW** per minute per **MW** in the dispatched **MW band**.

General frequency keeping performance requirements

B7. In meeting the performance requirements in paragraphs B3, B4 and B6, the **ancillary service agent's FK site** is not required to operate outside the limits of the **MW band** contained in the relevant **dispatch instruction** issued in accordance with Part 13 of the **Code** or above the relevant **control max** or below the relevant **control min.**

B8. The **ancillary service agent** must ensure that **frequency keeping equipment** is maintained, and each operator of the **control equipment** is trained, in accordance with good industry practice to enable the provision of **frequency keeping** in accordance with the relevant performance requirements above.

Back-up SFK outages

B9. An outage of an **FK site** will not be taken into account in assessing the **ancillary service agent's** compliance with paragraph B5 (and will be an **allowed outage**) if the **ancillary service agent** removes the **FK site** from service:

B9.1 for maintenance of the **FK site**;

B9.2 to eliminate or mitigate a risk of injury to any person or damage to the **FK site**; or

B9.3 for a test of the **FK site**;

provided that:

B9.4 the **outage** is no longer than the shorter of:

B9.4.1 one month; and

B9.4.2 a period of time equivalent to a reduction in the relevant **availability fee** of the amount specified in the **ancillary service** procurement contract for the **FK site**; and

B9.5 the **ancillary service agent** otherwise complies with its obligations under the **ancillary service** procurement contract in respect of the **outage**.

B10. The **ancillary service agent** must use reasonable endeavours to minimise the duration and frequency of any outage that affects the **ancillary service agent's** ability to provide **back-up SFK**.

B11. Where an outage that may compromise the **ancillary service agent's** ability to provide **back-up SFK** is planned or anticipated by the **ancillary service agent,** the **ancillary service agent** must:

B11.1 provide the **system operator** with as much advance warning as reasonably practicable of the **outage**, its expected start date and its expected duration;

B11.2 consult with the **system operator** on the timing of the **outage** with the intention that the timing of the **outage** must ensure that the **system operator** can, at all times, comply with its **principal performance obligations**;

B11.3 notify the **system operator** as soon as reasonably practicable of any amended programme for the **outage**; and

B11.4 keep the **system operator's** POCP (Planned Outage Coordination Process) system updated to ensure that POCP at all times accurately reflects the details of the **outage**.

B12. In the event of any unexpected **outage** that may compromise the **ancillary service agent's** ability to provide **back-up SFK**, the **ancillary service agent** must:

B12.1 inform the **system operator** as soon as reasonably practicable following the start of such unexpected **outage** of the cause and expected duration of the **outage**; and

B12.2 use reasonable endeavours to continue to provide **back-up SFK**.

Monitoring requirements for frequency keeping

B13. The **ancillary service agent** must comply, and provide monitoring equipment that complies, with the relevant monitoring requirements as set out below.

Single provider frequency keeping monitoring requirements

B14. The **ancillary service agent** must provide monitoring equipment that accurately measures and records in a time-tagged manner the following:

B14.1 **FK output** at each of its **FK sites** that provides **single provider frequency keeping**; and

B14.2 frequency of the **grid** in Hz.

B15. When an **FK site is** providing **single provider frequency keeping** the relevant monitoring equipment must measure and record:

B15.1 **FK output** at an agreed location in the **grid** at least once every 1 second, each measurement accurate to within plus or minus 2% of the measured value; and

B15.2 frequency at least once every 1 second (or such longer period as the **system operator** may determine), each measurement accurate to within 0.01 Hz.

Multiple provider frequency keeping monitoring requirements

B16. The **ancillary service agent** must provide monitoring equipment that accurately measures and records in a time-tagged manner the following:

B16.1 FK output at each of its **FK sites** that provides **multiple provider frequency keeping**; and

B16.2 the **regulating instructions** received for each of its **FK sites** that provides **multiple provider frequency keeping**.

B17. When an **FK Site** is providing **multiple provider frequency keeping** the relevant monitoring equipment must measure and record:

B17.1 **FK output** at an agreed location in the **grid** at least once every 1 second, each measurement accurate to within plus or minus 2% of the total expected **FK output** range of the **FK site**; and

B17.2 the **regulating instructions** received for the **FK site**.

General frequency keeping monitoring requirements

B18. The **ancillary service agent** must ensure that the **frequency keeping** data recorded by the monitoring equipment at each **FK site** for each calendar month is held by the **ancillary service agent** for at least 30 **business days** following the end of that calendar month and is

provided to the **system operator** within 5 **business days** of a written request from the **system operator**.

B19. If an **FK site** is a **block dispatch group**, **station dispatch group** or group of load sources then, for the purposes of paragraphs B13 to B18, the **FK site** is to be treated as the specific **frequency keeping unit(s)** within the **FK site** that are allocated to **frequency keeping** for the relevant period.

B20. The **ancillary service agent** must ensure the monitoring equipment is maintained, and each operator of the monitoring equipment is trained, in accordance with good industry practice.

Offer requirements for frequency keeping

B21. The **ancillary service agent** may submit an **offer** to provide **frequency keeping** no later than 2 **trading periods** immediately preceding the **trading period** to which the offer relates. Each offer submitted is valid until revised or cancelled in accordance with paragraph B25 or B26.

B22. Each offer to provide **frequency keeping** must be submitted to the **system operator** through **WITS** or, if necessary, using the back-up procedures specified by the **WITS manager** under clause 13.52 of the **Code**.

B23. There will be separate **ancillary service** procurement contract schedules for back-up SFK and multiple provider frequency keeping. The **ancillary service agent** must have:

B23.1 a valid and enforceable **ancillary service** procurement contract for **back-up SFK** from an **FK site** in order to **offer single provider frequency keeping** from that **FK site**; and

B23.2 a valid and enforceable **ancillary service** procurement contract for **multiple provider frequency keeping** from an **FK site** in order to **offer multiple provider frequency keeping** from that **FK site**.

B24. Each offer to provide **frequency keeping** must include the following information:

B24.1 a unique code for the **FK site** for which the **offer** is made;

B24.2 a unique code for the **ancillary service agent** submitting the **offe**r;

B24.3 the **trading day** for which the **offer** is made;

B24.4 the **trading periods** for which the **offer** is made;

B24.5 the **control min** and **control max** for the **FK site** for which the **offer** is made; and

B24.6 up to five separate **MW bands** and prices.

B25. The **ancillary service agent** may revise or cancel an **offer** to provide **frequency keeping** by submitting a revised **offer** before the **FK gate closure** for the offer.

B26. The **ancillary service agent** may revise or cancel an **offer** to provide **frequency keeping** after the **FK gate closure** for the **offer** only in circumstances where a **bona fide physical reason** necessitates the revision or cancellation or where the **system operator** has issued a **formal notice**.

B27. Each revision or cancellation of an **offer** to provide **frequency keeping** must be submitted or notified to the **system operator** through **WITS** or, if necessary, using the back-up procedures specified by the **WITS manager** under clause 13.52 of the **Code.**

B28. If the **ancillary service agent** revises or cancels an **offer** to provide **frequency keeping** after the **FK gate closure** for the offer, the **ancillary service agent** must report the revision or cancellation to the **system operator** in writing together with an explanation of the reasons for the revision or cancellation.

B29. The **system operator** must, as soon as reasonably practicable, confirm to the **ancillary service agent** the receipt of any new or revised **offer** to provide **frequency keeping**, or the cancellation of such an **offer**, through **WITS** or, if necessary, using the back-up procedures specified by the **WITS manager** under clause 13.52 of the Code.

B30. If at any time the **system operator** is not satisfied (acting reasonably) that the **ancillary service agent** can meet the relevant performance requirements then:

B30.1 if so notified by the **system operator** (which notice must outline the areas of concern that the **system operator** has), the **ancillary service agent** must not submit any **offers** to provide **frequency keeping** until and unless it has provided evidence that demonstrates to the **system operator's** reasonable satisfaction that it can meet the performance requirements; and

B30.2 **offers** to provide **frequency keeping** submitted by the **ancillary service agent** are deemed not to be submitted pursuant to a valid and enforceable contract with the **system operator** and must not be accepted by the **system operator**.

B31. **Frequency keeping** offers for an **FK site** must be subject to a minimum and may be subject to a maximum **MW band**. The minimum and maximum **MW bands** must be based on the results of the **technical review** referred to in paragraph 31. The **system operator** must publish the minimum **MW band** on its website.

B32. The **ancillary service agent** must not submit **frequency keeping** offers unless:

B32.1 it has conducted and passed an **end-to-end test or baseline test** of the relevant **frequency keeping equipment** at the relevant **FK site(s)** and test results have been assessed and approved by the **system operator**; or

B32.2 it has demonstrated fully compliant operational performance of that **frequency keeping equipment** in accordance with paragraph B38.2.

B33. Paragraph B30 applies to any **frequency keeping offers** submitted in breach of paragraph B32.

Dispatch requirements for frequency keeping

B34. The **system operator** must use all reasonable endeavours to issue **dispatch instructions** for **frequency keeping** at least five minutes in advance of the start or end of the relevant **trading period**, as the case may be.

B35. If an **ancillary service agent** finds it cannot maintain the frequency within the required targets the **ancillary service agent** must advise the **system operator** as soon as is practicable. If so notified, the **system operator** must review its **dispatch instructions** for **frequency keeping** and make any further **dispatch instructions** it considers reasonably necessary or desirable to maintain the frequency within the required targets.

B36. The **ancillary service agent** must ensure that prior to the start of a **trading period** for which it has received a **dispatch instruction** to provide **frequency keeping**, the relevant **FK site** is connected and able to provide **frequency keeping** from the start of that **trading period.**

B37. If an **FK site** is a **block dispatch group**, **station dispatch group** or group of load sources then the **ancillary service agent** must ensure that during a **trading period** for which it has received a **dispatch instruction** to provide **single provider frequency keeping,** the **single provider frequency keeping** performance requirements in paragraphs B3 and B4 are met at the relevant **FK site(s)**.

Testing requirements for frequency keeping

B38. The **ancillary service agent** must either:

B38.1 conduct and pass an **end to end test** of each **FK site** at least once every six months; or

B38.2 have demonstrated fully compliant operational performance of the **FK site** by providing **frequency keeping** from the **FK site** during the previous six months, to the reasonable satisfaction of the **system operator**.

B39. The **ancillary service agent** must conduct and pass an **end-to-end test** of the **frequency keeping equipment** for an **FK site** following any change to the **frequency keeping equipment** for the **FK site** that may impact its **frequency keeping** performance.

B40. A **baseline test** or **on-demand test** of an **FK site** and/or trained operators used for providing **frequency keeping** (other than monitoring equipment) must verify whether or not the **frequency keeping equipment** meets the relevant performance requirements in paragraphs B3 to B8 or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**.

B41. A test of monitoring equipment must verify whether or not the monitoring equipment meets the relevant performance requirements in paragraphs B14 to B20**.**

B42. Within 15 **business days** of completing a **test** the **ancillary service agent** must provide the **system operator** with the corresponding test data and verification of meeting the relevant performance requirements.

Instantaneous reserve

Performance requirements and technical specifications for instantaneous reserve

B43. To be able to provide **instantaneous reserve** the **ancillary service agent** must have **IR equipment** that can provide **fast instantaneous reserve** and/or **sustained instantaneous reserve** in accordance with the requirements specified in this **procurement plan**.

B44. The **ancillary service agent** must ensure that at all times the **IR equipment** that is the subject of a **reserve offer**:

B44.1 is maintained, and each operator of the **IR equipment** is trained, in accordance with good industry practice to enable the provision of **instantaneous reserve** in accordance with the relevant performance requirements below;

B44.2 is able to respond, when dispatched, within the timeframe applicable to either **fast instantaneous reserve** or **sustained instantaneous reserve**, as the case may be; ~~and~~

B44.3 is available and has the capacity to provide the quantity of **instantaneous reserve** specified in the **reserve offer**~~.~~; and

B44.4 is not the subject of any **ancillary service** procurement contract for **emergency reserve**.

B45. The **ancillary service agent** must, when dispatched to provide **instantaneous reserve** in accordance with Part 13 of the **Code**:

B45.1 provide additional **supply** into the **grid** equal to or exceeding the **dispatched quantity** of **instantaneous reserve** automatically when there is an **under-frequency event**; and/or

B45.2 reduce **demand** from the **grid** equal to or exceeding the **dispatched quantity** of **instantaneous reserve** automatically when the frequency of the **grid** falls to or below the **trip frequency**.

B46. The **ancillary service agent** must:

B46.1 unless otherwise specified in this **procurement plan,** provide;

B46.1.1 **fast instantaneous reserve** within 6 seconds of a **contingent event** or **extended contingent event**, and

B46.1.2 **sustained instantaneous reserve** within 60 seconds of a **contingent event** or **extended contingent event**; and

B46.2 in the case of **IR equipment** providing **interruptible load** other than **battery energy storage systems**:

B46.2.1 for **fast instantaneous reserve,** the drop in load (in **MW**) must occur within 1 second of the **grid** system frequency falling to or below 49.2 Hz, or the **trip frequency** specified in the **ancillary service agent's ancillary service** procurement contract, and must be sustained for a period of at least 60 seconds; or

B46.2.2 for **sustained instantaneous reserve**, the average drop in load (in **MW**) must occur over the first 60 seconds after the **grid** system frequency falls to or below 49.2 Hz, or the **trip frequency** specified in the **ancillary service agent's ancillary service** procurement contract, and must be sustained for a period of at least 30 minutes or until instructed by the **system operator**, whichever is lesser. The **ancillary service agent** must use reasonable endeavours to maintain the **sustained instantaneous reserve** response after the 30 minute period for as long as the **grid** system frequency remains below the **normal band**; and

B46.3 in the case of **IR equipment** providing **generation reserve** other than **battery energy storage systems**:

B46.3.1 meet, where relevant, the requirements for frequency response and control set out in clause 5(1) of **technical code** A of schedule 8.3 of the **Code** and has been approved by the **system operator**;

B46.3.2 provide stable performance with adequate damping;

B46.3.3 respond with a **droop** set within the range 1.5 - 7 percent or with a controlled response as agreed with the **system operator**; and

B46.3.4 not adversely affect the operation of the **grid** because of any non-linear characteristics or the rate of change in output;

B46.4 in the case of a **battery energy storage system** or **aggregated battery energy storage system** of no more than 5 **MW** capacity providing **instantaneous reserve,** meet the performance requirements for**:**

B46.4.1 **IR equipment** providing **interruptible load** in paragraph B46.2; or

B46.4.2 a **battery energy storage system** or **aggregated battery energy storage system** larger than 5 **MW** capacity providing **instantaneous reserve** in paragraph B46.5;

B46.5 in the case of a **battery energy storage system** or **aggregated battery energy storage system** larger than 5 **MW** capacity providing **instantaneous reserve**:

B46.5.1 provide stable performance and not adversely affect operation of **grid**;

B46.5.2 provide a controlled dynamic response appropriate for both the inherent control characteristics of the **battery energy storage system or aggregated battery energy storage system** and its location on the **grid**. The control action must be agreed with the **system operator** with regard to measurement delays, digital sample rates, speed of response (**MW**/sec), sensitivity of response (**MW**/Hz) and grid sensitivity (**MW**/Hz);

B46.5.3 if a **droop** control is used, respond with an appropriate **droop** across the

full range of the **battery energy storage system** or **aggregated battery energy storage system's** capability, provided that:

46.5.3.1. **droop** need not be specified on rated capacity, however, if it is specified on rated capacity, **droop** should not be lower than 2%;and

46.5.3.2. any **droop** control must meet the controlled dynamic response agreed with the **system operator**;

B46.6 in the case of a **battery energy storage system** larger than 5 **MW** capacity providing **instantaneous reserve**:

B46.6.1 the maximum response delivered by a **droop** controller can be maintained when the **grid frequency** starts to recover to within the **normal band**, using a sample-and-hold or 'latch' control action. This enables the **battery energy storage system** to maximise the available **instantaneous reserve** response without use of a low **droop** setting. The response must return to a proportional response to frequency before the **grid frequency** exceeds the upper limit of the **normal band**. Reduction of **battery energy storage system's** output to achieve this must be fast (in the order of 5 **MW**/sec) but must not continue if the frequency falls below the lower limit of the **normal band**; and

B46.6.2 provide a controlled ramp rate for all output changes that are not related to a frequency deviations. This ramp rate must be in the order of 10 to 25 MW/min unless otherwise agreed with the **system operato**r; and

B46.7 in the case of **IR equipment** providing **generation reserve**:

B46.7.1 in the North Island, ensure the **IR equipment** remains connected:

46.7.1.1. at all times when the frequency is above 47.5 Hz;

46.7.1.2. for at least 120 seconds when the frequency is at 47.5 Hz;

46.7.1.3. for at least 20 seconds when the frequency is at 47.3 Hz;

46.7.1.4. for at least 5 seconds when the frequency is at 47.1 Hz;

46.7.1.5. for at least 0.1 seconds when the frequency is at 47.0 Hz;

46.7.1.6. at any frequencies between those specified above, for times derived by linear interpolation; and

B46.7.2 in the South Island, ensure the **IR equipment** remains connected:

46.7.2.1. at all times while frequency is at or above 47 Hz; and

46.7.2.2. for 30 seconds if the frequency falls below 47 Hz but not below 45 Hz.

Assessment of performance requirements for interruptible load other than that provided by battery energy storage systems

B47. In assessing the delivery of **interruptible load** quantities, the **system operator** must apply the following methodology:

B47.1 **Fast instantaneous reserve** must be calculated as the total reduction in load that occurs within one second of either the **grid** system frequency falling to or below 49.2 Hz or the **trip time**, and which is sustained for a period of at least 60 seconds. The total reduction in load is to be calculated from the **pre-event load**.

B47.2 **Sustained instantaneous reserve** must be calculated as the average reduction in load that occurs over the first 60 seconds after either the **grid** system frequency falls to or below 49.2 Hz or the **trip time**. The average reduction in load is to be calculated from the **pre-event load**. **Sustained instantaneous reserve** load is not to be restored until advised by the **system operator**.

B47.3 The **fast instantaneous reserve** and **sustained instantaneous reserve** delivered quantities must be determined from the aggregate load response:

B47.3.1 recorded at the **ancillary service agent's IR equipmen**t; or

B47.3.2 recorded at the **contracted GXPs** (if any), if no data is recorded at the **IR equipment** and the **system operator** reasonably considers it is not appropriate to assess delivered quantities from data recorded at the **IR equipment**.

B47.4 If the assessment of **interruptible load** performance during an **under-frequency event** demonstrates a greater response than the contracted value for the **IR equipment**, then the contracted value for the relevant equipment may be increased to the level attained during the **under-frequency event**.

B47.5 In assessing **interruptible load** performance during an **under-frequency event**, the **system operator** must allow for **interruptible load** response to be up to 1 **MW** below the **dispatched MW** quantity at the time.

B47.6 To account for possible timing errors in the data provided by the **ancillary service agent** and a possible reduction in **pre-event load** due to the influence of falling frequency, the **pre-event load** must be taken at a previous steady state frequency. That is, at a time prior to the **UFE time** when frequency is close to 50 Hz for at least 60 seconds, as assessed by the **system operator**.

Assessment of performance requirements for generation reserve not from battery energy storage systems

B48. In assessing the delivery of **fast instantaneous reserve** quantities from **generation reserve** not from **battery energy storage systems**, the **system operator** must apply the following methodology:

B48.1 **IR equipment** that is the subject of a **reserve offer** for **fast instantaneous reserve** is deemed to comply with the performance requirement in paragraph B46.3 if and only if the **IR equipment's** actual response meets or exceeds its **asset capability statement** modelled response.

B48.2 The **IR equipment's asset capability statement** modelled response is the response that could reasonably be expected if all the information in the **IR equipment's** current **asset capability statement** is correct, taking into account:

B48.2.1 the frequency profile of the **under-frequency event**;

B48.2.2 the **IR equipment's** real power output immediately before the start of the **under-frequency event** (**"pre-event real power output"**);

B48.2.3 the number of **generating units** on **partly loaded spinning reserve** mode;

B48.2.4 the number of hydro **generating units** on **tail water depressed reserve** mode; and

B48.2.5 the amount of **fast instantaneous reserve dispatched**.

B48.3 The **IR equipment's** actual response must be calculated as the additional **real power output** of the **IR equipment** compared to the **pre-event real power output** of the **IR equipment**.

B48.4 In calculating the actual response, the **system operator** must use reasonable endeavours to exclude inertial response.

B48.5 In determining the **pre-event real power output** of the **IR equipment**, the **system operator** must apply the following methodology when calculating the delivered quantities:

B48.5.1 to account for possible timing errors contained in the data provided by the **ancillary service agent,** the **pre-event real power output** must be taken at a previous steady state frequency. That is, at a time prior to the **UFE time** when frequency is close to 50 Hz for at least 60 seconds, as assessed by the **system operator**;

B48.5.2 **generating unit** data must be used if measured and provided by the **ancillary service agent**.

B48.6 On request, the **system operator** must provide each **ancillary service agent** with details of the **system operator's** assessment under paragraph B48.5 of the **ancillary service agent's** delivery of **fast instantaneous reserve** quantities.

Assessment of performance requirements for instantaneous reserve from battery energy storage systems

B49. Unless the **battery energy storage system** is being assessed as **IR equipment** providing **interruptible load** under paragraph B47, in assessing the delivery of **fast instantaneous reserve** quantities from **battery energy storage systems,** the **system operator** must apply the following methodology:

B49.1 **IR equipment** that is the subject of a **reserve offer** for **fast instantaneous reserve** is deemed to comply with the performance requirements in paragraphs B46.4 and B46.5 if and only if the **IR equipment**'s actual response meets or exceeds its **asset capability statement** modelled response.

B49.2 The **IR equipment's asset capability statement** modelled response is the response that could reasonably be expected if all the information in the **IR equipment's** current **asset capability statement** is correct, taking into account:

B49.2.1 the frequency profile of the **under-frequency event**;

B49.2.2 the **IR equipment's** operating state and real power output or load immediately before the start of the **under-frequency event** (**"pre-event real power"**); and

B49.2.3 the amount of **fast instantaneous reserve** dispatched.

B49.3 The **IR equipment's** actual response must be calculated as the change in the real power of the **IR equipment** from its **pre-event real power**.

B49.4 On request, the **system operator** must provide each **ancillary service agent** with details of the **system operator's** assessment under paragraph B49.3 of the **ancillary service agent's** delivery of **fast instantaneous reserve** quantities.

Monitoring requirements for instantaneous reserve

B50. The **ancillary service agent** must provide monitoring equipment that accurately measures and records the **instantaneous reserve** response (in **MW**) from the **ancillary service agent's IR equipment**:

B50.1 in the case of monitoring equipment for **interruptible load**:

B50.1.1 for **fast instantaneous reserve,** at no greater than 0.1 second intervals commencing not less than 15 seconds prior to, and continuing until 60

seconds after the **trip time**;

B50.1.2 for **sustained instantaneous reserve,** at no greater than 0.1 second intervals commencing not less than 15 seconds prior to, and continuing until 60 seconds after, the **trip time**, and then at no greater than 1 second intervals until the **instantaneous reserve** response ends;

B50.2 in the case of monitoring equipment for **generation reserve**:

B50.2.1 for **fast instantaneous reserve**, at no greater than 0.1 second intervals commencing not less than 2 minutes prior to, and continuing until 60 seconds after, the **UFE time**; and

B50.2.2 for **sustained instantaneous reserve**, at no greater than 0.1 second intervals commencing not less than 2 minutes prior to, and continuing until 60 seconds after, the **UFE time**, and then at no greater than 1 second intervals until 15 minutes after the **UFE time**; and

B50.3 In the case of all monitoring equipment:

B50.3.1 including measurement of the locally measured frequency at ±0.01 Hz resolution and the relay activation signal;

B50.3.2 in a time-tagged manner such that all recorded data is either:

50.3.2.1. GPS clock time-tagged; or

50.3.2.2. if GPS clock time-tagging capability is not available, then aligned with the time-tagged frequency measurement from the same device; and

B50.3.3 where possible, net of any **demand** or **supply** response from other sources at the same point of connection to the **grid**.

B51. The **ancillary service agent** must ensure that the data recorded by the monitoring equipment under paragraph B50 is held by the **ancillary service agent** for at least 60 **business days** and is provided to the **system operator** within 5 **business days** of a written request from the **system operator**.

B52. **Interruptible load** data provided to the **system operator** under paragraph B51, must be aligned using the **trip time** and be provided in the format specified on the **system operator's** website, unless otherwise agreed with the **system operator**.

B53. The **ancillary service agent** may provide an independently verified error range for data it provides to the **system operator** under paragraph B51, which the **system operator** must have regard to in any assessment of the **ancillary service agent's** compliance with performance requirements using the data.

B54. For hydro **generating stations**, the data referred to in paragraph B50 may be measured, recorded and provided by **generating station** unless the **generating station** is providing both **tail water depressed reserve** and **partly loaded spinning reserve**, in which case the data must be measured, recorded and provided by **generating unit**. For other **generating stations** providing **partly loaded spinning reserve**, the data referred to in paragraph B50 must be measured, recorded and provided by **generating unit**.

B55. The **ancillary service agent** must ensure the monitoring equipment is maintained in accordance with good industry practice.

Offer requirements for instantaneous reserve

B56. If the **system operator** reasonably believes that the maximum quantities of **fast instantaneous reserve** and **sustained instantaneous reserve** that can be provided by the **ancillary service agent** are higher or lower than the maximum quantities specified in the **ancillary service** procurement contract, the **system operator** may, by written notice to the

ancillary service agent, increase or decrease the maximum quantities of **fast instantaneous reserve** and **sustained instantaneous reserve** specified in the **ancillary service** procurement contract. The **system operator** must use reasonable endeavours to contact the **ancillary service agent** and discuss the matter prior to providing such notice, but any failure to do so does not invalidate the notice.

B57. If at any time the **system operator** is not satisfied (acting reasonably) that the **ancillary service agent** can meet the relevant performance requirements, then:

B57.1 if notified by the **system operator** (which notice must outline the areas of concern that the **system operator** has), the **ancillary service agent** must not submit any **reserve offers** until and unless it has provided evidence that demonstrates to the **system operator's** reasonable satisfaction that it can meet the performance requirements;

B57.2 **reserve offers** submitted by the **ancillary service agent** (or any **reserve offers** relating to specific **IR equipment**) are deemed not to be submitted pursuant to a valid and enforceable contract with the **system operator** and must not be accepted by the **system operator**; and

B57.3 if such **reserve offers** are in the **price-responsive schedule** or the **non-response schedule** (as the case may be), the **system operator** may require the removal of such **reserve offers** from the relevant **price-responsive schedule** or **non-response schedule** (as the case may be).

B58. The **ancillary services agent** must ensure that its **reserve offers** for **interruptible load** not provided by **battery energy storage systems** do not include any load that may reasonably be required to be shed to satisfy any obligation (of the **ancillary service agent** or a third party) to provide:

B58.1 **automatic under-frequency load shedding** (AUFLS); or

B58.2 load shedding under any other agreement with Transpower, in its capacity as **system operator** or a **grid owner**, or a third party.

B59. For the avoidance of doubt, the **ancillary service agent** may not **offer** any **IR equipment** that:

B59.1 has been armed for AUFLS or which is armed for any other load shedding agreement; or

B59.2 may be dynamically/remotely armed to meet the AUFLS obligations by the **network** owner.

B60. Under clause 8.54B of Part 8 of the **Code**, the **ancillary services agent** is to provide information about **interruptible load** with the **connected asset owner** or **grid owner** as the case may be within 10 business days of entering into the **ancillary services** procurement contract**.**

B61. The **ancillary service agent** must not submit reserve offers:

B61.1 in respect of **IR equipment** or **points of connection** to the **grid** that are not covered by the **ancillary service** procurement contract;

B61.2 for **interruptible load** unless:

B61.2.1 it has conducted and passed an **end-to-end test** of the relevant **IR equipment** and the test results have been assessed and approved by the **system operator**; or

B61.2.2 it has demonstrated fully compliant operational performance of that **IR equipment** in accordance with paragraph B46.1;

B61.3 for **generation reserve**, unless it has conducted and passed a **baseline test** of each item of **IR equipment** and the test results have been assessed and approved

by the **system operator**.

B62. Paragraphs B57.2 and B57.3 apply to any **reserve offers** submitted in breach of paragraph B58.

Testing requirements for instantaneous reserve

B63. The **ancillary service agent** must either:

B63.1 conduct and pass an **end-to-end test** of **IR equipment** and monitoring equipment it uses for providing **interruptible load**:

B63.1.1 in the case of a response that is recorded at the **ancillary service agent's IR equipment**, at least once every 24 months;

B63.1.2 in the case of a response that is recorded at **contracted GXPs** and not at the **IR equipment,** at least once every 12 months; and

B63.1.3 immediately following any change to the **IR equipment** or monitoring equipment that may impact the **ancillary service agent's instantaneous reserve** performance; or

B63.2 have demonstrated fully compliant operational performance of the **IR equipment** and monitoring equipment it uses for providing **interruptible load** by responding to an **under-frequency event** during the period referred to in paragraph B63.1.1 or B63.1.2 (as applicable).

B64. The scope of the **end-to-end test** referred to in paragraph B63.1 must be agreed between the **ancillary service agent** and the **system operator** and may not require the full contracted amount of **interruptible load** to be shed, provided the functionality of the **IR equipmen**t is demonstrated to the **system operator's** reasonable satisfaction.

B65. For **generation reserve** and **instantaneous reserve** offered by **battery energy storage systems**, the **ancillary service agent** must conduct and pass a **baseline test** of each item of the **IR equipment** used to provide **instantaneous reserve**:

B65.1 at least once every four years for analogue equipment and non-self-monitoring digital equipment; and

B65.2 at least once every ten years for self-monitoring digital equipment; and

B65.3 immediately following any change to **IR equipment** that may impact the **IR equipment's instantaneous reserve** performance.

B66. A **baseline test** for **generation reserve** and **instantaneous reserve** from **battery energy storage systems**:

B66.1 must be used to validate the **asset capability statement** modelled response of the assets which are the subject of a **reserve offer** for **fast instantaneous reserve**;

B66.2 may be combined with testing required under clause 2 of **Technical Code** A of Schedule 8.3 of the **Code**; and

B66.3 must use settings (including speed governor settings for **generation reserve**) agreed between the **system operator** and the **ancillary service agent** before the test, which the **ancillary service agent** must not change without **system operator** approval.

B67. An **end-to-end test, baseline test,** or **on-demand test** of **IR equipmen**t must verify whether the equipment meets the relevant performance requirements in paragraphs B43 to B46 or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**.

B68. A test of monitoring equipment undertaken per clauses B63.1 above, must verify whether the monitoring equipment meets the performance requirements in paragraph B50.

B69. Within 15 **business days** of completion of a test the **ancillary service agent** must provide the **system operator** with the corresponding test or performance data and verification of meeting the relevant performance requirements.

B70. Test or performance data provided to the **system operator** under paragraphs B63 and B65 must include an indication of any time delays that occur in the measurement systems used by the control systems of the **IR equipment**.

Over frequency reserve

Performance requirements and technical specifications for over frequency reserve

B71. The **ancillary service agent** must ensure that the **OFR equipment** is maintained, and each operator of the **OFR equipment** is trained, in accordance with good industry practice to enable the provision of **over frequency reserve** in accordance with the relevant performance requirements below.

B72. In the case of an **OFR site** that provides **over frequency reserve** by tripping, the **ancillary service agent** must ensure that:

B72.1 when the **relay equipment** is armed, the **relay equipment** and **circuit breaker equipment** automatically disconnects the **OFR site** to which they are fitted within 0.5 seconds of the frequency of the **grid** rising to or above the frequency specified in the **ancillary service** procurement contract for that **OFR site**. This maximum time to disconnect covers both the action of the **relay equipment** and **circuit breaker equipment**; and

B72.2 if the **system operator** has remote arming and/or disarming control of the **relay equipment**, immediately arms or disarms (as appropriate) when it receives a remote arming or disarming signal from the **system operator's** co-ordination centre.

B73. In the case of an **OFR site** that is a **battery energy storage system** or provides **over frequency reserve** by fast ramping**,** the **ancillary service agent** must ensure that:

B73.1 when the **control equipment** is enabled, the **control equipment** automatically reduces the real power output of the **OFR site** within 0.5 seconds of the frequency of the **grid** rising above the frequency specified in the **ancillary service** procurement contract; and

B73.2 the rate of reduction of the real power output is at or above the ramp rate specified in the **ancillary service** procurement contract for the **OFR site.**

B74. The **ancillary service agent** must ensure that all **OFR equipment** is available continuously to provide **over frequency reserve** except:

B74.1 where there is an **allowed outage**; or

B74.2 during any **trading period** when the relevant **OFR site** is not generating electricity.

Over frequency reserve outages

B75. An **outage** of **OFR equipment** will not be taken into account in assessing the **ancillary service agent's** compliance with the performance requirements in paragraph B74 (and will b e an **allowed outage**) if the **ancillary service agent** removes the **OFR equipment** from service:

B75.1 for maintenance of the **OFR equipment**;

B75.2 to eliminate or mitigate a risk of injury to any person or damage to the **OFR equipment**; or

B75.3 for a test of the **OFR equipment;**

provided that:

B75.4 the **outage** is no longer than the shorter of:

B75.4.1 one month; and

B75.4.2 a period of time equivalent to a reduction in the relevant **availability fee** of the amount specified in the **ancillary service** procurement contract for the **OFR site**; and

B75.5 the **ancillary service agent** otherwise complies with its obligations under the **ancillary service** procurement contract in respect of the **outage.**

B76. The **ancillary service agent** must use reasonable endeavours to minimise the duration and frequency of any **outage** that affects the **ancillary service agent's** ability to provide **over frequency reserve**.

B77. Where an **outage** that may compromise the **ancillary service agent's** ability to provide **over frequency reserve** is planned or anticipated by the **ancillary service agent** the **ancillary service agent** must:

B77.1 provide the **system operator** with as much advance warning as reasonably practicable of the **outage**, its expected start date and its expected duration;

B77.2 consult with the **system operator** on the timing of the outage with the intention that the timing of the **outage** must ensure that the **system operator** can, at all times, comply with its **principal performance obligations**;

B77.3 notify the **system operator** as soon as reasonably practicable of any amended programme for the **outage**; and

B77.4 keep the **system operator's** POCP (Planned Outage Coordination Process) system updated to ensure that POCP at all times accurately reflects the details of the **outages**.

B78. In the event of any unexpected **outage** that may compromise the **ancillary service agent's** ability to provide **over frequency reserve**, the **ancillary service agent** must:

B78.1 inform the **system operator** as soon as reasonably practicable following the start of such unexpected **outage** of the cause and expected duration of the outage; and

B78.2 use reasonable endeavours to continue to provide **over frequency reserve**.

Monitoring requirements for over frequency reserve

B79. The **ancillary service agent** must provide monitoring equipment for each **OFR site** that:

B79.1 is available continuously (except during an **allowed outage**);

B79.2 continuously measures and transmits to the designated interface point information as to whether or not the **control equipment** is armed (except during an **allowed outage**); and

B79.3 is maintained, and ensure each operator of the monitoring equipment is trained, in accordance with good industry practice.

Testing requirements for over frequency reserve

B80. In the case of an **OFR site** that provides **over frequency reserve** by tripping, the **ancillary service agent** must conduct and pass a **baseline test** of all items of **OFR equipment** at the **OFR site**:

B80.1 at least once every 4 years, unless:

B80.1.1 the **ancillary service agent** has demonstrated fully compliant operational performance of the **OFR equipment** by providing **over frequency reserve** in the previous 4 years; and

B80.1.2 the **ancillary service agent** has provided the **system operator** with the corresponding operational data for verification of fully compliant operational performance of the **OFR equipment**; and

B80.2 immediately following any change to **OFR equipment** that may impact the **FK site's over frequency reserve** performance.

B81. For tests under paragraph B80, the operation time of the **circuit breaker equipment** may be tested separately to the relay operating time, hold delay, and trip coil supervision.

B82. In the case of an **OFR site** that provides **over frequency reserve** by tripping, the **ancillary service agent** must:

B82.1 carry out a review of each trip circuit and relay configuration; and

B82.2 conduct and pass a **baseline test** of monitoring equipment, including arming/disarming indications and remote enabling/disabling control unless the **ancillary service agent** has demonstrated fully compliant operational performance of the monitoring equipment by providing **over frequency reserve** in the previous 2 years.

B83. In the case of an **OFR site** that is a **battery energy storage system** or provides **over frequency reserve** by fast ramping**,** the **ancillary service agent** must conduct and pass an **end-to-end test** of the **OFR site**:

B83.1 at least once every 1 year, unless:

B83.1.1 the **ancillary service agent** has demonstrated fully compliant operational performance of the **OFR site** by providing **over frequency reserve** in the previous 1 year; and

B83.1.2 the **ancillary service agent** has provided the **system operator** with the corresponding operational data for verification of fully compliant operational performance of the **OFR site;** and

B83.2 immediately following any change to the **OFR equipment** that may impact the **OFR equipment's over frequency reserve** performance.

B84. A **baseline test, end-to-end test** or **on-demand test** of **OFR equipment** or an **OFR site** must verify whether or not the **OFR equipment** or **OFR site** meets the performance requirements in paragraphs B72 and B73 (as appropriate).

B85. A test of monitoring equipment must verify whether or not the monitoring equipment meets the performance requirements in paragraph B79.2.

B86. Within 15 **business days** of completion of a test, the **ancillary service agent** must provide the **system operator** with the corresponding test data and verification of meeting the relevant performance requirements using the **system operator's** prescribed test form.

Voltage support

Performance requirements and technical specifications for voltage support

B87. In order to provide **voltage support**, the **ancillary service agent** must provide either:

B87.1 continuously variable **reactive power** resources that have:

B87.1.1 the capability of providing the contracted **reactive power** quantities whilst the **grid** is operated to the voltage range, as specified in the **technical codes**; and

B87.1.2 both automatic and 24-hour manual voltage control facilities; or

B87.2 static **reactive power** resources that have:

B87.2.1 provision for manual control available on a 24-hour basis; and

B87.2.2 automatic operation to parameters and for conditions specified by the **system operator**.

B88. All **voltage support equipment** provided by an **ancillary service agent** must have data and analogue indications of the **reactive power** and status of the **voltage support equipment**, provided in accordance with the requirements of the **technical codes**.

B89. To be able to provide voltage support, the **ancillary service agent** must provide **voltage support equipment** that:

B89.1 is available continuously to provide **voltage support** at the maximum **reactive power** and network busbar(s) specified in the **ancillary service** procurement contract, except where there is an **allowed outage**;

B89.2 is able to respond, when dispatched, in accordance with the response times specified in the **ancillary service** procurement contract; and

B89.3 is maintained in accordance with good industry practice to enable the provision of **voltage support** in accordance with the performance requirements above.

Monitoring requirements for voltage support

B90. The **ancillary service agent** must provide monitoring equipment that:

B90.1 is available at all times (except during an **allowed outage**);

B90.2 continuously measures and transmits to the designated interface point the **reactive power** provided by the **voltage support equipment** (except during an **allowed outage**); and

B90.3 is maintained in accordance with good industry practice.

Testing requirements for voltage support

B91. There are no **baseline tests** for **voltage support**.

B92. An **on-demand test** of **voltage support equipment** must verify whether or not the **voltage support equipment** meets the performance requirements in paragraphs B87 to B89, or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**.

B93. A test of monitoring equipment must verify whether or not the monitoring equipment meets the performance requirements in paragraph B90.2.

B94. Upon completion of an **on-demand test** the **ancillary service agent** must provide the **system operator** with the corresponding test data and verification of meeting the relevant performance requirements within 15 **business days**.

Black start

Performance requirements and technical specifications for black start

B95. The **ancillary service agent** must ensure that the **black start equipment** and **black start generating units** are maintained, and each operator of the **black start equipment** and **black start generating units** are trained, in accordance with good industry practice to enable the provision of **black start** in accordance with the performance requirements below.

B96. The **ancillary service agent** must ensure that, when requested to provide **black start**, it provides **black start** by:

B96.1 starting a **black start generating unit** and raising it to synchronous speed, without any power being obtained from the **grid** or any **local network**;

B96.2 operating the **black start generating unit** at zero load at synchronous speed for 15 minutes (or such shorter period as instructed by the **system operator**);

B96.3 having the **black start generating unit** switched on to de-energised **network** busbar(s);

B96.4 starting any remaining **black start generating units** and synchronising to the **network** busbar(s);

B96.5 progressively energising the **grid** from those **network** busbar(s) by providing generation output that supports the initial charging of transmission circuits and **assets**;

B96.6 ensuring the **black start generating units** provide the **reactive power capability** specified in clause 8.23 of the **Code**;

B96.7 subject to paragraph B96.6, controlling the **grid** voltage as instructed by the **system operator**; and

B96.8 providing an emergency frequency regulating reserve service by maintaining the **grid** frequency to between 49.25 Hz and 50.75 Hz, to the extent practicable.

B97. The **ancillary service agent** must ensure that:

B97.1 sufficient **black start equipment** and **black start generating units** are available continuously to provide **black start**, except where there is an **allowed outage**;

B97.2 the **black start equipment** is able to start without power being obtained from the **grid** or any **local network**;

B97.3 the **black start generating units** are able to achieve the response times to synchronous speed specified in the **ancillary service** procurement contract; and

B97.4 the **black start generating units** otherwise have the capabilities specified in the **ancillary service** procurement contract.

B98. When requested by the **system operator**, the **ancillary service agent** must use reasonable endeavours to provide additional services to re-energise the **grid** or prevent **grid** de-energisation over and above the **black start** service described in paragraph B97. The **system operator** must pay the **ancillary service agent** for the reasonable costs incurred by the **ancillary service agent** in providing these additional services.

Black start outages

B99. An outage of the **black start equipment** or **black start generating units** will not be taken into account in assessing the **ancillary service agent's** compliance with the performance requirement in paragraph B97.1 (and will be an **allowed outage**) if the **ancillary service agent** removes the **black start equipment** or **black start generating units** from service:

B99.1 for maintenance of the **black start equipment** or **black start generating units**;

B99.2 to eliminate or mitigate a risk of injury to any person or damage to the **black start equipment** or **black start generating units**;

B99.3 for a test of the **black start equipment** or **black start generating units**,

provided that the **ancillary service agent** complies with its obligations under the **ancillary service** procurement contract in respect of the outage.

B100. The **ancillary service agent** must use reasonable endeavours to minimise the duration and frequency of any outage that affects the **ancillary service agent's** ability to provide **black start**.

B101. Where an outage that may compromise the **ancillary service agent's** ability to provide **black start** is planned or anticipated by the **ancillary service agent** the **ancillary service agent** must:

B101.1 consult with the **system operator** on the timing of the outage with the intention that the timing of the outage must ensure that the **system operator** can, at all times, comply with its **principal performance obligations**;

B101.2 unless the **system operator** agrees otherwise in writing, **provide** notice to the **system operator** of the outage, its expected start date, its expected duration and the programme of works no later than:

B101.2.1 12 weeks before the start of the outage for outages planned to be 12 hours or greater in duration; or

B101.2.2 2 weeks before the start of the outage for outages planned to be less than 12 hours in duration; and

B101.3 if the expected start date, expected duration or programme of works for a planned outage changes, provide the **system operator** with as much advance warning as reasonably practicable of the revised expected start date, expected duration or programme of works.

B102. For each planned outage for which the **ancillary service agent** fails to meet the notice requirements in paragraph B101.2 the **ancillary service agent** is liable to the **system operator** for an amount equal to the **availability fee** charged by the **ancillary service agent** for one month.

B103. In the event of any unexpected **outage** that compromises the **ancillary service agent's** ability to provide **black start**, the **ancillary service agent** must:

B103.1 immediately report the unexpected **outage** to the **system operator**, including reporting to the **system operator** the expected time to rectify the unexpected **outage**;

B103.2 determine and rectify the cause of the unexpected **outage** as soon as practicable;

B103.3 use reasonable endeavours to continue to provide **black start**; and

B103.4 notify the **system operator** upon completion of the outage.

Testing requirements for black start

B104. The **ancillary service agent** must conduct and pass a **baseline test** of each item of **black start equipment**:

B104.1 at least once every 6 weeks, unless:

B104.1.1 the item of **black start equipment** has been generating at any time during that period; and

B104.1.2 the **ancillary service agent** has notified the **system operator** via email of the results of the test within 5 business days of the test; and

B104.2 immediately following any change to the item of **black start equipment** that may impact its **black start** performance.

B105. A **baseline test** or **on-demand test** of **black start equipment** must verify whether or not the **black start equipment** meets the performance requirements in paragraph B97.2.

B106. Without limiting any other rights the **system operator** may have to request tests of **black start**, the **system operator** may require the **ancillary service agent** to conduct a **baseline test** of **black start** no more than once per rolling 12-month period.

B107. A **baseline test** or **on-demand test** of **black start** must verify whether or not the **black start** meets the performance requirements in paragraphs B96 and B97, or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**. A **baseline test** or **on-demand test** of **black start** will include a full station shutdown unless the **system operator** determines otherwise in consultation with the **ancillary service agent**.

~~B108. Not used~~

~~B109.~~B108. The **ancillary service agent** must ensure that during a **baseline test** or **on-demand test** of **black start**, the monitoring equipment accurately measures and records the following for the **black start generating unit**:

~~B109.1~~B108.1 **active power**;

~~B109.2~~B108.2 **active power** setpoint;

~~B109.3~~B108.3 **reactive power**;

~~B109.4~~B108.4 generator speed;

~~B109.5~~B108.5 voltage setpoint;

~~B109.6~~B108.6 generator terminal voltage; and

~~B109.7~~B108.7 gate position.

~~B110.~~B109. The data referred to in paragraph B108 must:

~~B110.1~~B109.1 be measured and recorded (in a time tagged manner) over intervals no greater than 0.02 seconds for all variables, except for **active power** setpoint, generator speed, voltage setpoint and gate position which may be measured and recorded (in a time tagged manner) over intervals no greater than 0.1 seconds;

~~B110.2~~B109.2 commence not less than 6 seconds prior to the test and end not less than 60 seconds after the response has stabilised to a steady state; and

~~B110.3~~B109.3 be held by the **ancillary service agent** for a period of not less than 2 years.

~~B111.~~B110. Within 15 **business days** of completion of a test**,** the **ancillary service agent** must provide the **system operator** with the corresponding test data in a form reasonably acceptable to the **system operator**. The **system operator** is to verify whether the testing meets the relevant performance requirements.

Emergency reserve

Performance requirements and technical specifications for emergency reserve

B111. All **trading periods** in a **call period** are **emergency reserve pre-event trading periods**.

B112. The **ancillary service agent** must ensure that the **emergency reserve equipment** is maintained, and each operator of the **emergency reserve equipment** is trained, in accordance with **good electricity industry practice**, to enable the provision of **emergency reserve** in accordance with the performance requirements below.

B113. The **ancillary service agent** must provide **emergency reserve** using **emergency reserve equipment** that is eligible to provide **emergency reserve** within the definition of **emergency reserve** in Part 1 of the **Code**.

B114. The **ancillary service agent** must:

B114.1 acknowledge each **pre-activation notification**, **activation notification** and **restoration notification** within the timeframe specified in the **ancillary service** procurement contract. Each acknowledgement of a **pre-activation notification** must include confirmation of the **emergency reserve response** (in **MW**) the **ancillary service agent** is currently capable of providing;

B114.2 subject to paragraph B115 when the **ancillary service agent** receives an **activation notification** within the period specified in a preceding **pre-activation notification** that was sent within the timeframe specified in paragraph B116:

B114.2.1 provide an **emergency reserve response** of at least the contracted quantity and within any rate of change specified in the **ancillary service** procurement contract, starting at or before the beginning of the **trading period** after the **activation notification** is sent; and

B114.2.2 maintain the **emergency reserve response** until restoration is instructed by the **system operator** by sending the **ancillary service agent** a **restoration notification**;

B114.3 subject to paragraph B115, when the **ancillary service agent** receives an **activation notification** in circumstances other than those specified in paragraph B114.2, use reasonable endeavours to meet the performance requirements in paragraphs B114.2.1 and B114.2.2; and

B114.4 upon receiving a **restoration notification**, end the **emergency reserve response** within any rate of change specified in the **ancillary service** procurement contract.

B115. The **ancillary service agent** is not required to provide an **emergency reserve response:**

B115.1 for any **trading period** outside the **call period**; or

B115.2 for longer than the relevant maximum response time specified in the **ancillary service** procurement contract (if any).

B116. The minimum period between the **system operator** sending a **pre-activation notification** to the **ancillary service agent** and the start of an **activation event** during the period specified in the **pre-activation notification**:

B116.1 is as specified in the **ancillary service** procurement contract;

B116.2 must be the same for all **ancillary service agents**; and

B116.3 may be different at different times of the **call period**.

B117. The **ancillary service agent** may be required to use software tools specified in the **ancillary service** procurement contract to:

B117.1 receive and acknowledge **pre-activation notifications**, **activation notifications** and **restoration notifications**; and

B117.2 update **emergency reserve** response capability.

B118. If the **ancillary service agent** is unable to provide an **emergency reserve response** of at least the contracted quantity during the **call period** for any reason, including if the **emergency reserve equipment** becomes ineligible to provide **emergency reserve** or there is an outage of the **emergency reserve equipment**:

B118.1 the **ancillary service agent** must immediately notify the **system operator** of its reduced **emergency reserve response** capability (in **MW**) and the reason for the reduced capability;

B118.2 the **ancillary service agent** must provide such further information about its reduced capability as the **system operator** may reasonably request;

B118.3 the **ancillary service agent** must continue to acknowledge **pre-activation notifications**, **activation notifications** and **restoration notifications** in accordance with paragraph B114.1; and

B118.4 unless the reduced capability is due to a **bona fide physical reason**, the **ancillary service agent** will be deemed to have failed to comply with the performance requirements and to have committed a material breach of the **ancillary service** procurement contract, even if there are no **emergency reserve events** during the relevant period.

B119. If the **ancillary service agent** fails to acknowledge a **pre-activation notification, activation notification** or **restoration notification** in accordance with paragraph B114.1:

B119.1 if the failure relates to a **pre-activation notification** or **activation notification**, no **event fee** is payable for the relevant **emergency reserve event**; and

B119.2 the **ancillary service agent** must, as soon as reasonably practicable:

B119.2.1 investigate the reason for the failure;

B119.2.2 take action to prevent similar failures in future; and

B119.2.3 inform the **system operator** of the reason for the failure and the actions taken to prevent similar failures in future.

B120. The **system operator** may, on notice to the **ancillary service agent**, reduce the contracted quantity of **emergency reserve** and reduce proportionately the **availability fee** and **event fee** if:

B120.1 the **ancillary service agent** notifies the **system operator** under paragraph B118;

B120.2 the **ancillary service agent** fails to provide an **emergency reserve response** of at least the contracted amount during an **activation event**;

B120.3 a test or **self-certification** shows that the **ancillary service agent** has, or may have, an **emergency reserve response** capability lower than the contracted amount; or

B120.4 the **system operator** otherwise becomes aware that the **ancillary service agent** has an **emergency reserve response** capability lower than the contracted amount.

B121. Any reduction made under paragraph B120 applies from the start of the **billing period** in which the **system operator** gives notice and for the remainder of the term of the **ancillary service** procurement contract, unless the **system operator** notifies the **ancillary service agent** otherwise.

Emergency reserve outages

~~B122. There are no **allowed outages** for **emergency reserve equipment**.~~

B122. The **ancillary service agent** must use reasonable endeavours to minimise the duration and frequency of any outage that affects the **ancillary service agent's** ability to provide the contracted quantity of **emergency reserve**.

B123. In the event of any outage that may compromise the **ancillary service agent's** ability to provide the contracted quantity of **emergency reserve**, the **ancillary service agent** must:

B123.1 comply with paragraph B118;

B123.2 determine and rectify the cause of the outage as soon as practicable, and notify the **system operator** when the outage is rectified; and

B123.3 use reasonable endeavours to continue to provide the contracted quantity of **emergency reserve**.

B124. If the **ancillary service agent** fails to comply with paragraph B123, the **ancillary service agent** will be deemed to have failed to comply with the performance requirements and to have committed a material breach of the **ancillary service** procurement contract, even if there are no **emergency reserve events** during the relevant period.

Monitoring requirements for emergency reserve

B125. The **ancillary service agent** must provide monitoring equipment that:

B125.1 is available continuously during the **call period**;

B125.2 is installed at an appropriate location to enable accurate recording of:

B125.2.1 **demand** or supply (as appropriate) from the emergency reserve equipment; and

B125.2.2 emergency **reserve response**;

B125.3 records and stores data at time intervals of no greater than 1 minute, unless otherwise agreed in writing by the **system operator**;

B125.4 records and stores data that is GPS, Precision Time Protocol (PTP) or Network Time Protocol (NTP) time-tagged, unless otherwise agreed by the **system operator**;

B125.5 records and stores data for the following time periods:

B125.5.1 the duration of each **emergency reserve event**;

B125.5.2 the 30 minutes prior to the start of each **activation event**; and

B125.5.3 such other time periods as may be needed to calculate the **baseline profile**; and

B125.6 is maintained and operated in accordance with **good electricity industry practice**.

B126. The **ancillary service agent** must retain data recorded and stored by the monitoring equipment for at least 30 **business days**.

B127. The **ancillary service agent** must carry out a self-assessment of its performance after each **activation event** and record the results of the self-assessment in writing. The record of a self-assessment must contain, at a minimum:

B127.1 the **baseline profile** and the data and method used to calculate it;

B127.2 the data recorded during the **activation event**;

B127.3 a calculation of the **emergency reserve response** based on the **baseline profile** and the data recorded during the **activation event**; and

B127.4 such other information as may reasonably be required for the **system operator** to verify the **ancillary service agent's emergency reserve response**.

B128. The method for calculating the **baseline profile** must:

B128.1 be suitable for the relevant type of **emergency reserve equipment**; and

~~B128.2 use past consumption or generation data (as applicable) as an input, and may also use other data, such as weather data; and~~

B128.2 be agreed between the **system operator** and **ancillary service agent** during pre-contract technical review.

B129. The **ancillary service agent** must provide to the **system operator** the following information within 10 **business days** of the **system operator's** written request:

B129.1 the **ancillary service agent's** record of any of its self-assessments under paragraph B127; and

B129.2 any of the information specified in paragraphs B127.1 to B127.4 for any **activation event**.

B130. Within 15 **business days** of the **system operator's** written request, the **ancillary service agent** must provide to the **system operator** any data recorded and stored by the **ancillary service agent's** monitoring equipment under paragraph B125, even if there are no **emergency reserve events** during the relevant period. The data must be provided in a format, or using a template, specified by the **system operator**.

B131. If any information requested by the **system operator** under paragraph B129 or B130 is not provided within the required timeframe, the **ancillary service agent** will be deemed to have failed to comply with the performance requirements for every **emergency reserve event** during the relevant period and to have committed a material breach of the **ancillary service** procurement contract.

Testing and self-certification requirements for emergency reserve

B132. There are no **baseline tests** for **emergency reserve**.

B133. The **ancillary service agent** must provide **self-certification** to the **system operator** at the times specified in the **ancillary service** procurement contract.

B134. The **ancillary service agent's** obligations to carry out **on-demand tests** and provide **self-certification** to the **system operator** are deemed to be performance requirements.

B135. An **on-demand test** of **emergency reserve equipment** must verify whether the **emergency reserve equipment** is capable of meeting the performance requirements in paragraphs B114 and B117.

B136. An **on-demand test** of monitoring equipment must verify whether the monitoring equipment is capable of meeting the performance requirements in paragraph B125.

B137. A **self-certification** must verify whether:

B137.1 the **emergency reserve equipment** is eligible to provide **emergency reserve** within the definition of **emergency reserve** in Part 1 of the **Code**;

B137.2 the **emergency reserve equipment** is capable of meeting the performance requirements in paragraphs B114 and B117; and

B137.3 monitoring equipment is capable of meeting the performance requirements in paragraph B125.

B138. If the **ancillary service agent** fails an **on-demand test** of **emergency reserve equipment** or monitoring equipment, the **ancillary service agent** will be deemed not to have complied with the performance requirements from the start of the **billing period** in which the **on-demand test** was carried out until the **on-demand test** is passed.

B139. If the **ancillary service agent** provides a **self-certification** to the **system operator** that shows the **ancillary service agent** may not be capable of meeting a performance requirement, the **ancillary service agent** will be deemed to have failed to comply with the performance requirements from the start of the **billing period** in which the **self-certification** was provided, until such time as the **ancillary services agent** completes and provides to the **system operator** a ~~test~~ **self-certification** and test results showing that the **ancillary service agent** is capable of meeting the performance requirement ~~is passed~~.

B140. If the **ancillary service agent** fails to provide a **self-certification** to the **system operator** when required under the **ancillary service** procurement contract, the **ancillary service agent** will be deemed to have failed to comply with the performance requirements from the start of the **billing period** in which the **self-certification** was due until the **ancillary service agent** provides a **self-certification** to the **system operator**.

B141. If there are any changes to the **emergency reserve equipment** or monitoring equipment that may impact the **ancillary service agent's emergency reserve** performance:

B141.1 the **ancillary service agent** must notify the **system operator** as soon as reasonably practicable, and in advance of the changes if they are planned or anticipated; and

B141.2 if required, the **ancillary service agent** must conduct an **on-demand test** of the **emergency reserve equipment** or monitoring equipment after the changes.

B142. Despite paragraph C27, the **system operator** is not required to pay any of the **ancillary service agent's** costs for any:

B142.1 testing or re-testing of **emergency reserve equipment** or monitoring equipment under paragraph B138 or B139; or

B142.2 **on-demand test** of **emergency reserve equipment** or monitoring equipment under paragraph B141.2.

Appendix C – Key contracting terms for ancillary service procurement contracts (paragraph 66)

C1. For the avoidance of doubt, a key contracting term that is expressed as an **ancillary service agent** right or obligation does not confer or impose that right or obligation on an **ancillary service agent** unless and until that right or obligation is included in an **ancillary service** procurement contract between the **system operator** and the **ancillary service agent**.

Disputes

C2. In the event of a dispute between the parties in relation to the **ancillary service** procurement contract (not being a dispute under the **regulations** or **Code**) that the parties cannot resolve by negotiation, the parties can agree to refer the dispute for resolution by:

C2.1 mediation; or

C2.2 independent expert determination; or

C2.3 Rulings Panel determination under Part 3 of the **enforcement regulations**; or

C2.4 arbitration in accordance with the provisions of the Arbitration Act 1996.

C3. In the event that the parties do not agree to refer an unresolved dispute to one of the above forms of dispute resolution, or having been referred to such dispute resolution the dispute is not resolved within 100 **business days** (or such longer period as the parties may agree), either party may refer the dispute to an arbitrator for resolution. The arbitrator must be agreed between the parties or, failing agreement, must be an arbitrator appointed by the President for the time being of the New Zealand Law Society. Such arbitration shall be conducted under and in accordance with the provisions of the Arbitration Act 1996.

Obligations under the regulations and Code

C4. Nothing in the **ancillary service** procurement contract limits any obligation of the **ancillary service agent** or the **system operator** to comply with the **regulations** or **Code** or limit any liabilities arising due to the breach of the **regulations** or **Code** by an **ancillary service agent** or the **system operator**.

C5. Any performance requirement in the **ancillary service** procurement contract that refers to a specific clause of the **Code** is subject to any **dispensation** granted to the **ancillary service agent**, provided the **ancillary service agent** has notified the **system operator** of the **dispensation**.

Rights to terminate

C6. A party has the right to terminate the **ancillary service** procurement contract (or an **ancillary service** schedule to the **ancillary service** procurement contract) immediately on notice to the other party where a change to the **regulations** or **Code** that occurs during the term of the **ancillary service** procurement contract:

C6.1 results in the **ancillary service** procurement contract being materially inconsistent with the **regulations** or **Code**; or

C6.2 imposes material additional obligations or material costs on the terminating party in respect of matters covered by the **ancillary service** procurement contract.

Whether any such change is material is to be decided by independent dispute resolution where the parties cannot agree.

C7. A party has the right to terminate the **ancillary service** procurement contract immediately on notice to the other party if:

C7.1 the other party goes into liquidation, compromises with its creditors, enters statutory management or receivership, becomes insolvent, or is subject to any analogous event; or

C7.2 the other party sells its business without the consent of the terminating party, such consent not to be unreasonably withheld; or

C7.3 it becomes illegal for the terminating party to perform the **ancillary service** procurement contract.

C8. The **system operator** has the right to terminate an **ancillary service** schedule to the **ancillary service** procurement contract immediately on notice to the **ancillary service agent** if:

C8.1 the **ancillary service agent** commits a material breach of the **ancillary service** procurement contract in relation to that **ancillary service**; and

C8.2 such breach, if remediable, is not remedied to the **system operator's** reasonable satisfaction within 10 **business days** of the **system operator's** notice, or such longer period as the **system operator** may determine.

C9. A failure by the **ancillary service agent** to meet a performance requirement for the **ancillary service** is not a material breach unless:

C9.1 the **ancillary service agent** has previously failed to meet the same performance requirement under its existing **ancillary service** procurement contract; or

C9.2 the effect of the failure is that the **ancillary service** was not provided at all when it should have been.

Payment and invoicing

C10. The payment and invoicing terms of the **ancillary service** procurement contract must recognise and be consistent with the obligations of the parties under the **Code** in respect of payment and invoicing.

C11. The **system operator** may delegate its invoicing obligations under the **ancillary service** procurement contract to the **clearing manager**. Invoices for **ancillary services** are paid by the **clearing manager** on the **system operator's** behalf.

Limitation of liability

C12. Where a party breaches an obligation under the **ancillary service** procurement contract that is also an obligation contained within the **regulations** or **Code**, the liability (if any) of that party is determined under and in accordance with the **regulations** and **Code** (including the limitations of liability contained in the **regulations** and **Code**) and that party has no liability under the **ancillary service** procurement contract.

C13. The **system operator's** liability to the **ancillary service agent** under the **ancillary service** procurement contract is limited to situations where the **system operator** has breached the provisions of the **ancillary service** procurement contract. For the avoidance of doubt, the **ancillary service agent** has no claim against the **system operator** for failing to follow the **procurement plan** in any respect.

C14. The **system operator** is only liable to the **ancillary service agent** for direct loss suffered by the **ancillary service agent** and caused by the **system operator's** breach of the **ancillary service** procurement contract. The **system operator** is not liable for loss of use, revenue or profit, any third party damages, and third party settlement or any costs associated with such items, even where such losses may be direct losses.

C15. The **ancillary service agent's** liability to the **system operator** under the **ancillary service** procurement contract is limited to situations where the **ancillary service agent** has breached the provisions of the **ancillary service** procurement contract.

C16. The **ancillary service agent** is only liable to the **system operator** for direct loss suffered by the **system operator** and caused by the **ancillary service agent's** breach of the **ancillary service** procurement contract. The **ancillary service agent** is not liable for loss of use, revenue or profit, any third party damages, and third party settlement or any costs associated with such items, even where such losses may be direct losses.

C17. The maximum liability of each party to the other party under the **ancillary service** procurement contract is as follows:

C17.1 $100,000 in any 1 year period in respect of all defaults of obligations contained in the general contracting terms of the **ancillary service** procurement contract (and not contained in an **ancillary service** schedule to the **ancillary service** procurement contract) irrespective of the number of defaults; and

C17.2 in respect of defaults of obligations contained in an **ancillary service** schedule to the **ancillary service** procurement contract:

C17.2.1 the combined maximum liability for any single event or related series of events is the lesser of 5% of the total amount of the expected annual fees payable for that particular **ancillary service** (such total to be set by the **system operator** prior to the execution of the **ancillary service** procurement contract) or $100,000; and

C17.2.2 the combined maximum liability in any 1 year period is the lesser of 20% of the total amount of the expected annual fees payable for that particular **ancillary service** (to be set by the **system operator** prior to the execution of the contract) or $300,000, irrespective of the number of events.

C18. The **system operator** has no liability to the **ancillary service agent** in respect of:

C18.1 the **system operator's** selection or dispatch of any other **ancillary service agent** to provide **multiple provider frequency keeping**; or

C18.2 any other **ancillary service agent's** failure to comply with a **dispatch instruction** for **multiple provider frequency keeping**, **regulating instructions** or any performance or monitoring requirement for **multiple provider frequency keeping**.

C19. Nothing in paragraphs C12 to C18 limits the **system operator's** ability to withhold payment for an **ancillary service** under paragraph C23.1.

Force majeure

C20. The parties may be able to rely on force majeure in certain circumstances to provide relief from any liability under the **ancillary service** procurement contract for a breach of the provisions contained in the **ancillary service** procurement contract. The following situations must be included in the definition of force majeure within the **ancillary service** procurement contract:

C20.1 any event or circumstance occasioned by, or in consequence of, any act of God (being an event or circumstance (i) due to natural causes, directly or indirectly and exclusively without human intervention, and (ii) which could not by any amount of ability have been foreseen or, if foreseen, could not by any amount of human care and skill have been resisted), strikes, lockouts, other industrial disturbances, acts of public enemy, wars, blockades, insurrections, riots, epidemics, aircraft, or civil disturbances; or

C20.2 the binding order of any Court, government or a local authority (except where the

ancillary service agent seeks to invoke this paragraph and the local authority which made the binding order is the owner of, or is otherwise associated with or related to, the **ancillary service agent**); or

C20.3 any other event or circumstance beyond the control of the party invoking this paragraph and being such that, by the exercise of reasonable care acting in accordance with good industry practice, such party could not have prevented such failure.

C21. Any force majeure provision contained in the **ancillary service** procurement contract must not apply to any liability of the **ancillary service agent** that arises due to a breach of the **regulations** or **Code** whether or not such obligation arises in the provision of **ancillary services**.

Claims for failure to perform

C22. The **system operator** may notify the **ancillary service agent** of a claim that the **ancillary service agent** has failed, or is unable, to meet a performance requirement in the **ancillary service** procurement contract or comply with a **dispatch instruction** for the **ancillary service**.

C23. If the claim is accepted (voluntarily by the **ancillary service agent** or after dispute resolution):

C23.1 the **system operator** is not liable to pay the **ancillary service agent** for providing the **ancillary service** for the relevant period; and

C23.2 the **ancillary service agent** must take remedial steps to ensure that it is able to meet the performance requirement and/or comply with **dispatch instructions**.

Tests

C24. The **ancillary service agent** must pay its costs of any **baseline test**.

C25. For each **ancillary service** the **system operator** may request:

C25.1 an "**on-demand test**"; and/or

C25.2 a statement of the capability and operational limitations of the equipment used to provide or monitor the **ancillary service**,

which, if requested, the **ancillary service agent** must carry out or provide within a timeframe agreed between the **system operator** and the **ancillary service agent**. Unless the **system operator** and the **ancillary service agent** agree otherwise, if an **on-demand test** has been requested but not carried out and passed within 30 **business days** of the **system operator's** request, the **ancillary service agent** is deemed to be incapable of providing or monitoring the **ancillary service** from the end of that period until the **on-demand test** is carried out and passed.

C26. The **ancillary service agent** must provide the **system operator** with written information in such detail as the **system operator** reasonably requires about the timing of tests and the results of tests.

C27. The **system operator** must pay the **ancillary service agent**'s reasonable costs of an **on-demand test** unless:

C27.1 the equipment fails the **on-demand test**; or

C27.2 the **system operator** requested the **on-demand test** within 20 **business days** of the **ancillary service agent** notifying the **system operator** that the **ancillary service agent** had completed remedial action on the equipment in response to a claim by the **system operator** under paragraph C22, and the sole purpose of the

on-demand test is to determine the sufficiency of that remedial action.

C28. If equipment used to provide or monitor an **ancillary service** fails a **baseline test** or **on-demand test** the **ancillary service agent**:

C28.1 is deemed to be incapable of providing or monitoring the **ancillary service** until the test is passed; and

C28.2 must re-test the equipment until the test is passed, and the **ancillary service agent** must pay the costs of any such re-test unless:

C28.2.1 the equipment is used to provide or monitor **frequency keeping** and/or **instantaneous reserve** and no other **ancillary service**; or

C28.2.2 otherwise agreed with the **system operator.**

C29. In carrying out and reporting on a test, the **ancillary service agent** must comply with any relevant test guidelines published on the **system operator's** website, including by using and submitting to the **system operator** any standard forms in those guidelines.

Inspections

C30. The **system operator** may inspect any equipment used by the **ancillary service agent** to provide or monitor an **ancillary service**. The **system operator** must not interfere unreasonably with the **ancillary service agent's** business in carrying out such an inspection.

C31. The **system operator** must give the **ancillary service agent** at least five **business days'** notice of any such inspection, unless the **system operator** reasonably believes that the equipment is being used in a manner inconsistent with providing the **ancillary service** in accordance with the **ancillary service** procurement contract, in which case the **system operator** may give less or no notice.

Sub-contracting and assignment

C32. The **ancillary service agent** may not sub-contract any of its obligations under the **ancillary service** procurement contract to any person without the **system operator's** prior consent. If the **ancillary service agent** does sub-contract any of its obligations under the **ancillary service** procurement contract, it remains primarily responsible for the performance of those obligations, including for any breach of the **regulations** or **Code** arising from the performance or non-performance of those obligations.

C33. The **system operator** may assign its interest in the **ancillary service** procurement contract to any person who takes over the role of **system operator**. Otherwise, neither party may assign its interest in the **ancillary service** procurement contract to any person without the consent of the other party.

New long term contracts

C34. The following provisions must be included in any new long term contract for **back-up SFK**, over frequency reserve, voltage support or black start:

C34.1 If, in the **system operator's** reasonable opinion, the number or duration of maintenance outages of equipment used to provide or monitor the **ancillary service** is such that the **ancillary service agent's** ability to provide or monitor the **ancillary service** in accordance with the **new long term contract** has been substantially detrimentally affected, the **system operator** may, by giving one month's prior written notice to the **ancillary service agent**, terminate the **new long term contract**.

C34.2 Any **availability fee** or **event fee** payable under the **new long term contract** is to be subject to adjustment no more frequently than once per year in accordance with an objective formula to be agreed between the **system operator** and **ancillary service agent**.

Appendix D – Glossary of terms

In this **procurement plan**, unless the context otherwise requires:

"**activation event**" means an **emergency reserve event** involving **activation**;

"activation event fee" means an **event fee** that applies to an **activation event**;

"activation notification" means an instruction by the **system operator** to an **ancillary service agent** providing **emergency reserve** to **activate emergency reserve**, and includes any amendment to that instruction. For the avoidance of doubt, an **activation notification** is not a **dispatch instruction**;

"aggregated battery energy storage system" means an aggregation of multiple **battery energy storage systems,** aggregated by an **ancillary service agent**, located at the same **GXP** or at multiple **GXPs**;

"allowed outage" means an outage of equipment used to provide the relevant **ancillary service** that is permitted under an **ancillary service** procurement contract;

"availability fee" means a fixed fee for the availability of an **ancillary service**, irrespective of dispatch or provision, expressed as dollars per period of availability;

"**back-up SFK**" means **single provider frequency keeping** that is procured against the risk of technical failure of **multiple provider frequency keeping**;

"**baseline profile**" means the consumption or generation (or combined) profile that would have been expected to occur had an **activation event** not occurred;

"baseline test" means a test of an **ancillary service** or the equipment used to provide an **ancillary service** that is specified in Appendix B as a test the **ancillary service agent** is required to carry out;

"**battery energy storage system**" means an **energy storage system** with an electro-chemical storage component;

"black start equipment" means diesel generators or auxiliary hydro plant capable of livening a **black start generating unit** isolated from the **grid**;

"black start generating unit" means the generating unit that is livened during a **black start** event;

"**call period**" means a period during which **emergency reserve** must be available;

"circuit breaker equipment" means a circuit breaker and auxiliary equipment that supports operation of the circuit breaker;

"Code" means the Electricity Industry Participation Code 2010, in which this **procurement plan** is incorporated by reference under clause 8.42(1);

"**constraint costs**" means **constrained off amounts** and **constrained on amounts** attributable to **frequency keeping**;

"contingent event" means a contingent event as defined in the **policy statement**;

"**contracted GXPs**" means the **GXPs** at which an **ancillary service agent** may provide **interruptible load**, as set out in an **ancillary service** procurement contract for **instantaneous reserve**;

"**control equipment**" means:

a) for **frequency keeping**, equipment in respect of a **frequency keeping unit** that automatically responds to changes in frequency for the purposes of providing **frequency keeping**; or

b) for **over frequency reserve**, equipment that is capable of tripping or controlling the output of an **OFR site** and may include **relay equipment**, **circuit breaker equipment** or a control system capable of automatically reducing the real power output of the **OFR site**;

"control max" means the maximum quantity of power (in **MWs**) an **FK site** can operate at and still provide **frequency keeping** to the relevant performance requirements. The **control max** offered for an **FK site** must be greater than or equal to **control min** plus twice the range of the offered **MW band** for the **FK site**;

"control min" means the minimum quantity of power (in **MWs**) an **FK site** must operate at to provide **frequency keeping** to the relevant performance requirements;

"droop" refers to a proportional droop or **control system** that adjusts a generator's power output proportionally to deviations in frequency or adjusts a setpoint for output based on a frequency measurement;

"**emergency reserve equipment**" means equipment, which may be an aggregation of equipment located in the same island, used to provide **emergency reserve**, ~~whether~~ including load sources or **generating units**, but excluding monitoring equipment;

"**emergency reserve forecasting methodology**" means a document setting out the methodologies the **system operator** will apply to determine whether **emergency reserve** should be procured, in what quantities and for what **call periods**;

"**emergency reserve response**" means a reduction in **demand** or increase in **supply** from **emergency reserve equipment,** relative to a **baseline profile**, during an **activation event**;

"end-to-end test" means a specific type of test to verify that the integrated components of a system for providing an **ancillary service**, including the monitoring components (except for **black start** monitoring components), function correctly as a complete system and are able to provide the relevant **ancillary service** in accordance with all performance requirements for the **ancillary service** in the **ancillary service** procurement contract;

"enforcement regulations" means the Electricity Industry (Enforcement) Regulations 2010;

"event fee" means a fixed price for the dispatch or provision of an **ancillary service**, expressed as dollars per event~~;~~, and in the case of **emergency reserve** means a **pre-activation event fee** or an **activation event fee**;

"existing long term contract" means an **ancillary service** procurement contract entered into between the **system operator** and an **ancillary service agent** before the commencement of this **procurement plan**, the term of which **ancillary service** procurement contract overlaps with the term of this **procurement plan**;

"**extended contingent event"** means an extended contingent event as defined in the **policy statement;**

"firm quantity procurement" is defined in paragraph 59;

"FK gate closure" means, for a **frequency keeping** offer, the time referred to in clause 13.46 of the **Code** after which the offer could not be revised if the offer were a **reserve offer**;

"FK output" means the generation from or load at an **FK site**, as the case may be;

"**FK site**" means a **frequency keeping unit** or group of **frequency keeping units**. An **FK site** may be a **generating unit**, **generating station**, **block dispatch group**, **station dispatch group**, load source or group of load sources;

"frequency keeping equipment" means all equipment used to provide **frequency keeping** including **control equipment** and the **FK site** but excluding monitoring equipment;

"**frequency time error**" means a deviation from **New Zealand standard time** caused by variations in system frequency;

"grid frequency error" means the **grid** frequency deviation in Hz from 50.00 Hz;

"half-hour clearing market procurement" is defined in paragraph 58;

"islanded", in relation to part of the **grid**, means that that part of the **grid** is disconnected from the rest of the **grid** owing to planned or unplanned outages;

"IR equipment" means all equipment used to provide **instantaneous reserve**, which may include **generating units**, load sources or **battery energy storage systems**, but excluding monitoring equipment;

"**MFK transition trading period**" is a trading period on which **frequency keeping** for an island will transition from **single provider frequency keeping** to **multiple provider frequency keeping**;

"multiple provider frequency keeping" means, for a **trading period** and **island**, **frequency keeping** that is **dispatched** on the basis that during the **trading period** there may be more than one provider of **frequency keeping** in the **island**;

"MW band" means a range in **MW** over which an **FK site** may vary its **FK output**;

"new long term contract" means an **ancillary service** procurement contract entered into between the **system operator** and an **ancillary service agent** during the term of this **procurement plan**, the term of which **ancillary service** procurement contract exceeds 1 year;

"offer price" means a price offered by an **ancillary service agent** for the dispatch of an **ancillary service** for a **trading period**, expressed as dollars per unit of quantity of the **ancillary service**;

"OFR equipment" means all equipment used to provide **over frequency reserve** including **relay equipment, circuit breakers**, monitoring equipment, control equipment and/or arming/disarming equipment and indication;

"**OFR site**" means one or more **generating units or battery energy storage systems** to which **control equipment** is fitted in order to provide **over frequency reserve**;

"on-demand test" means a test of an **ancillary service** or the equipment used to provide an **ancillary service** that is not a **baseline test** and that the **ancillary service agent** is only required to carry out if requested by the **system operator** under the **ancillary service** procurement contract**;**

"pre-activation event" means an **emergency reserve event** involving **pre-activation**;

"pre-activation event fee" means an **event fee** that applies to a **pre-activation event**;

"pre-activation notification" means an instruction by the **system operator** to an **ancillary service agent** providing **emergency reserve** to **pre-activate emergency reserve**, and includes any amendment to that instruction. For the avoidance of doubt, a **pre-activation notification** is not a **dispatch instruction**;

"pre-event real power" is defined in paragraph B49.2.2;

"pre-event real power output" is defined in paragraph B48.2.2;

"pre-event load" means the average load over a period of 60 seconds with a reasonable adjustment for any load change detected on the relevant **network**;

"region" means New Zealand, an **island** or a smaller geographical region within an **island**, and includes a **zone**;

"**regulating instruction**" means an instruction by the **system operator** to an **ancillary service agent** providing **multiple provider frequency keeping** from an **FK site** to increase or decrease FK output from the **FK site** within the dispatched **MW band** for the **FK site**. For the avoidance of doubt, a regulating instruction is not a dispatch instruction;

"regulations" means the **enforcement regulations** and any other regulations made under the **Act**;

"relay equipment" means equipment fitted to a **generating unit** that automatically disconnects the **generating unit** when the frequency of the **grid** reaches the **required frequency** for that **generating unit**;

"response rate" means the rate of change in **FK output** from an **FK site** in **MW** per minute;

"**restoration notification**" means a notification by the **system operator** to an **ancillary service agent** providing **emergency reserve** that the **emergency reserve response** for an **activation event** can be ended;

"**self-certification**" means certification by an **ancillary service agent** providing, or a person intending to provide, **emergency reserve** as to the **ancillary service agent's** or other person's ability to comply with the performance requirements for **emergency reserve** that is:

a) in writing and signed by a director (or equivalent office holder) of the **ancillary service agent** or other person; and

b) in a form **published** by the **system operator**;

"**SFK transition trading period**" is a **trading period** on which **frequency keeping** for an island will transition from **multiple provider frequency keeping** to **single provider frequency keeping**;

"single provider frequency keeping" means, for a **trading period** and **island**, **frequency keeping** that is dispatched on the basis that during the **trading period** there must be only one provider of **frequency keeping** in the **island**;

"**single provider frequency keeping period**" means, in relation to an **ancillary service agent** and island, all the **trading periods** within any continuous period of 30 days for which the **ancillary service agent** was dispatched to provide **single provider frequency keeping** in the island;

"system operator measured frequency" means the frequency of the **grid** as determined by **system operator** frequency logging;

"trip frequency" means the trip frequency for **interruptible load** and specified in the relevant **ancillary service** procurement contract;

"trip time" means, for **interruptible load**, the time at which the **ancillary service agent's** locally measured frequency of the **grid** falls to or below the **trip frequency**;

"UFE time" means the time at which an **under-frequency event** occurs, as determined by reference to the **system operator measured frequency**; and

"**voltage support equipment**" means all equipment used to provide **voltage support** including assets capable of providing reactive power but excluding monitoring equipment.