TRANSPOWER

GL-EA-974 Companion Guide for Commissioning Plan Development

System Operator

Transpower New Zealand Limited

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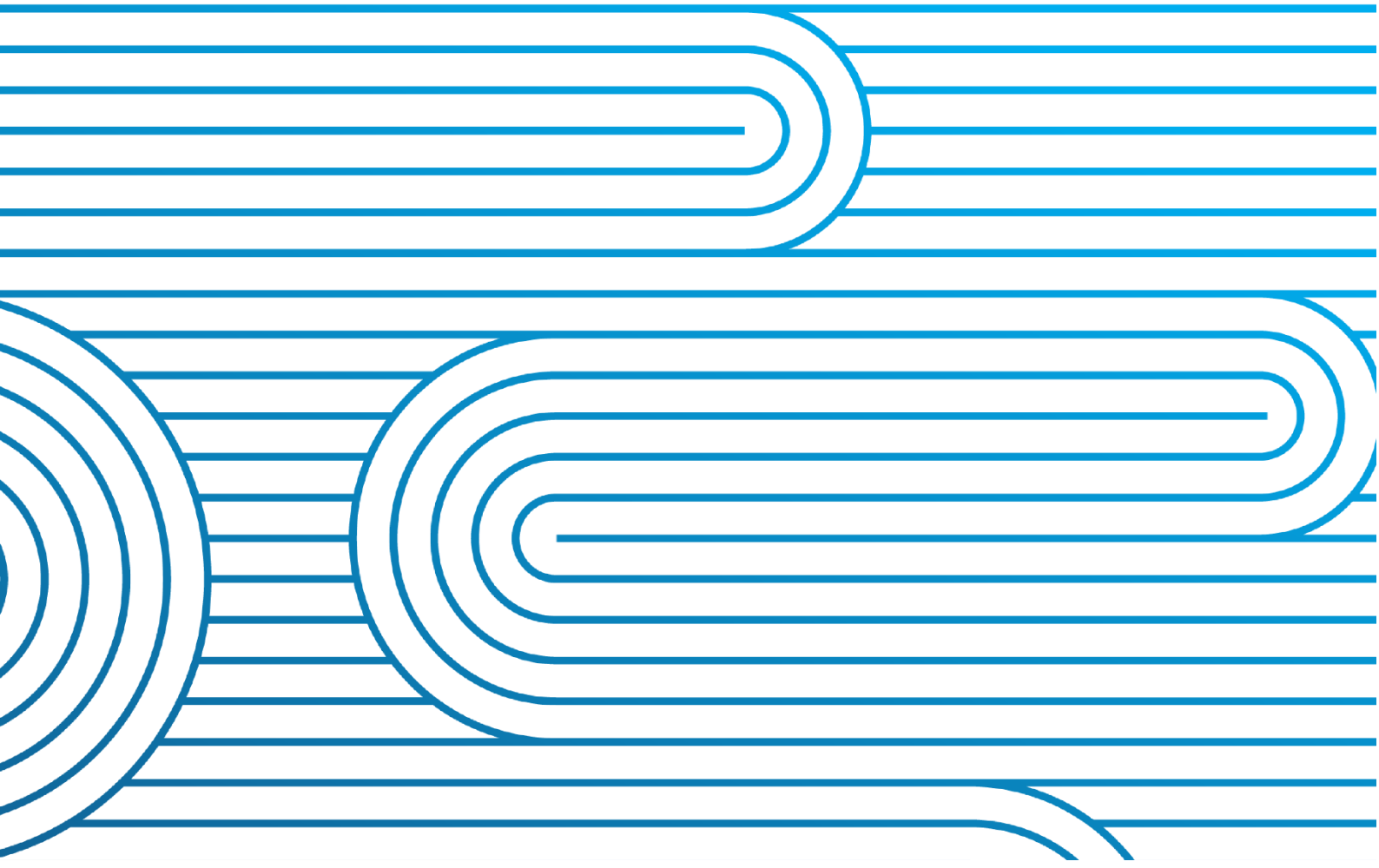

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	Name & Position	Date
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IMPORTANT

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Executive Summary

This **guide** assists with the process of providing the appropriate information to the System Operator to allow for the commissioning and testing of assets. An overview of this process is shown in Figure 1 below.

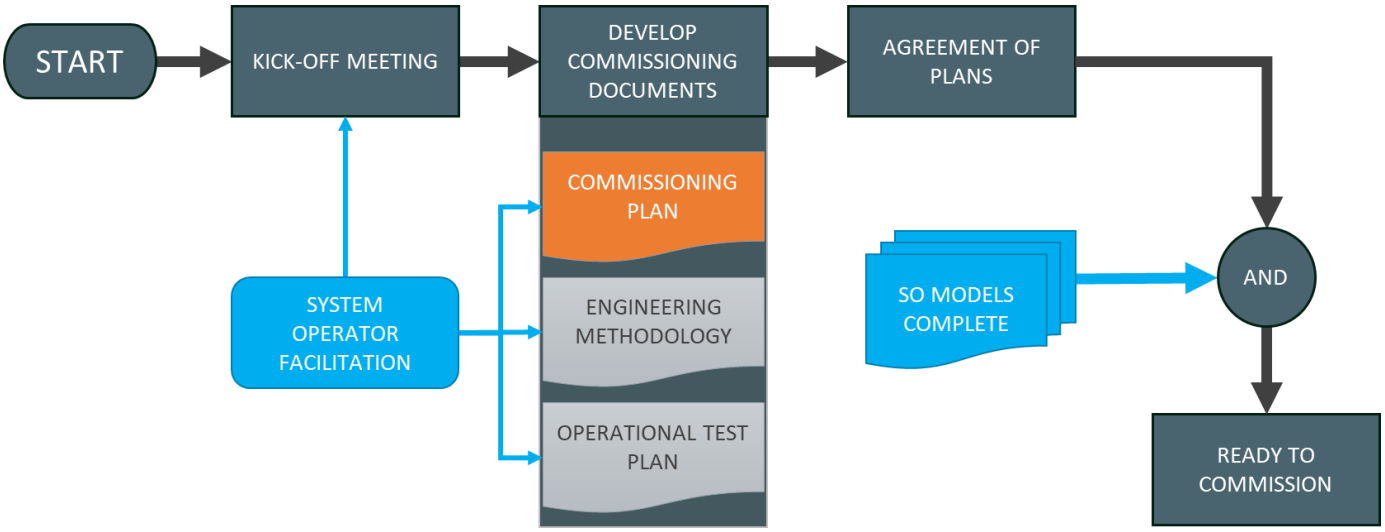

Figure 1 Process Overview

The commissioning plan is the first of the documents to be developed and is intended to set the framework for the coordination of activities between the Asset Owner and the System Operator.

1 Definitions and interpretations

1.1 Definitions

In this **guide**, unless the context otherwise requires:

ACS	Asset Capability Statement
AOPO's	Asset Owner Performance Obligations
AS	Ancillary Service
ASPP	Ancillary Service Procurement Plan
AVR	Automatic Voltage Regulator
Code	Electricity Industry Participation Code 2010
FIR	Fast Instantaneous Reserve
Generating unit	All equipment functioning as a single entity to produce electricity which includes, for example, the collective output of a wind farm or a solar farm
Guide	This Companion guide for commissioning plan development
ICCP	Inter Control Centre Protocol
MCO	Maximum Continuous Output
MFK	Multiple Frequency Keeping
NCC	National Co-ordination Centre
OEL	Over-excitation limiter
PLSR	Partially Loaded Spinning Reserve
SFK	Single Frequency Keeping
SIR	Sustained Instantaneous Reserve
TWD	Tail-water depressed
UEL	Under-excitation limiter

1.2 Interpretations

Terms used in this **guide** which are defined in Part 1 of the **Code** and which are not defined in this **guide**, have the same meaning as given in the **Code**. In the event of any inconsistency or conflict between the provisions of this **guide** and the rest of the **Code**, the rest of the **Code** shall prevail.

2 Introduction

2.1 Purpose

To:

- guide Asset Owners on how to use the *DT-EA-338 – EIPC Commissioning Plan Template* to provide the necessary information to the System Operator when commissioning new assets or after significant changes to existing assets,
- explain the requirements for each section, and
- help determine which sections of the *Commissioning Plan Template* are applicable to the current commissioning situation.

2.2 Content

This **guide** explains the various sections in the Commissioning Plan Template and gives an indication on the sort of the information that is expected to be entered by the Asset Owner. It does not seek to alter any obligations on Asset Owners or the System Operator in any way from those detailed in the Code or its amendments.

It should be read in conjunction with:

- **DT-EA-338 – EIPC Commissioning Plan Template** for the actual commissioning plan development; and
- **Parts 8 and 13 of the Code** for the most up-to-date background information and performance requirements.

This **guide** does not relieve Asset Owners of the need to read, understand and comply with Asset Owner obligations set out in the Code. While the EIPC Commissioning Plan template is designed to fulfil the requirements of the Code and meet the expectations of the System Operator, the Asset Owner is responsible for the accuracy and completeness of all information it contains.

2.3 Intended use of the Commissioning Plan Template

The *Commissioning Plan Template* is intended to be used by the Asset Owner to fulfil, in part, the requirements of the Code, specifically the following clauses of Schedule 8.3, Technical Code A:

2 General Requirements

(6) Each asset owner must provide a commissioning plan or test plan in accordance with subclauses (7) or (8) (as the case may be) in the following situations:

(a) when changes are made to assets that alter any of the following at the grid interface:

(i) the single-line diagram:

(ii) a protection system, other than a change to a protection system setting:

(iii) a control system, including a change to a control system setting:

(iv) any rating of assets:

(b) when assets are to be connected to, or are to form part of, the grid:

(c) if it is necessary for an asset owner to perform a system test or other test to ascertain or confirm asset capabilities, and if the commissioning or testing or connection of those assets may affect the system operator's ability to plan to comply, or to comply with, its principal performance obligations. If an asset owner is unsure whether the commissioning or connection of an asset may impact on the system operator's ability to plan to comply, and to comply, with the principal performance obligations it must contact the system operator for advice.

(7) The commissioning plan prepared by an asset owner and agreed by the system operator must—

(a) include a timetable containing the sequence of events necessary to connect the assets to the grid and conduct any proposed system test; and

(b) contain the protection and control settings to be applied before the assets are made live (where live has the meaning given to it in the Electricity (Safety) Regulations 2010); and

(c) contain the procedures for commissioning the plant with minimum risk to personnel and plant and to the ability of the system operator to plan to comply and to comply with its principal performance obligations.

...

(9) Once assessed by the system operator acting reasonably, the asset owner must follow the commissioning plan or test plan at all times, unless otherwise agreed with the system operator (such agreement must not be unreasonably withheld if compliance with the commissioning plan or testing plan is not practicable and non-compliance does not impact on the system operator's ability to comply with its principal performance obligations or on other asset owners).

Note that the excerpt above was correct at the time of writing, the Asset Owner should review the actual Code clauses rather than relying on this copy.

In some cases the demonstration of Code compliance, and the associated commissioning plan, would form part of a larger plan to complete the commissioning of new or upgraded assets. To avoid providing information to the System Operator that is unnecessary to assess the Asset Owners obligations to the Code it is expected that the Commissioning Plan Template will be limited to addressing only those items directly related to Code compliance.

2.4 General Style Conventions

The template contains placeholders, sample text, and suggested text. Before submitting the first draft of the commissioning plan to the System Operator, the Asset Owner should satisfy themselves that placeholders have been filled in, sample text has been replaced, and the suggested text has been reviewed and either agreed or altered as applicable.

To assist with this all placeholders, sample text, and suggested text have been formatted in italics, once the plan is ready for submission there should be no italicised text in the document.

Placeholders are italicised and highlighted grey – *placeholder text*. Placeholders require the Asset Owner to complete the information that is specific for the commissioning to be undertaken, and specific to the organisation involved.

Sample text is italicised and highlighted yellow – sample text. Sample text is a real world example of the **type of information** that could be included but is not intended to remain in the document.

Suggested text is italicised only – *suggested text.* Suggested text is intended to be reviewed by the Asset Owner and modified as necessary. In most cases the text details the activities the Asset Owner will undertake as part of the commissioning process and should require only minor modification. It shold be noted that suggested text is still evaluated as being written by the Asset Owner even if it is used verbatim in the final commissioning plan.

To update the 'Asset Owner Name' and the 'Name of Unit' throughout the document enter the 'Asset Owner Name' and the 'Name of Unit' on the fields on the front cover of the document then press Ctrl A then F9 or do a print preview, this will update the relevant fields in the document with the new text.

3 Determining the Relevance of Sections

The *Commissioning Plan Template* contains all of the sections necessary to complete commissioning for a new asset.

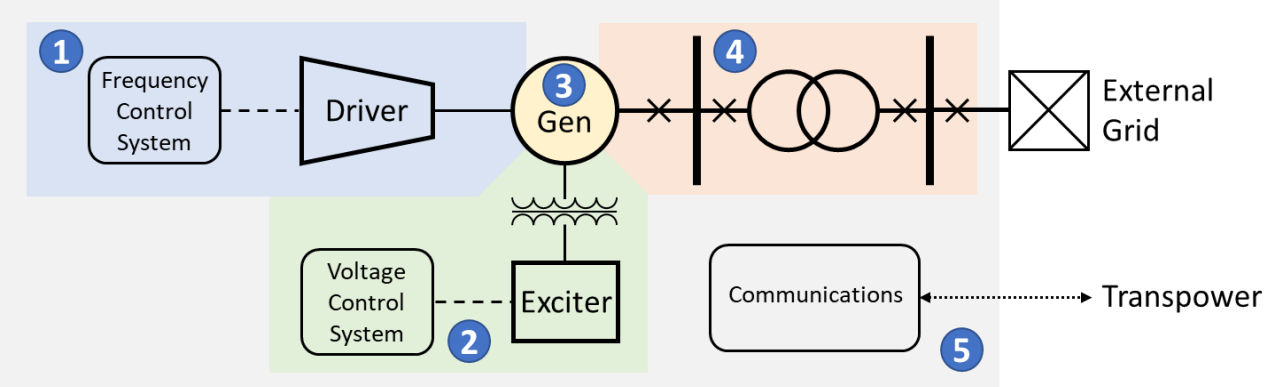

Figure 2 Generic Generation System

Figure 2 above shows a generic generation system. Commissioning plans can address additions or changes to:

- 1 – Frequency Control System
  - includes governer, frequency controller, driving unit, instantaneous reserves
- 2 – Voltage Control System
  - includes exciter, AVR, PSS, excitation limiters, voltage controller
- 3 – Generator
  - includes elements of frequency and voltage control systems
- 4 – Physical Connection
  - includes protection system, connection arrangements, unit transformer
- 5 – Information
  - includes data used for dispatch, SCADA and market systems

The table below identifies which sections are expected to have further information based on the scope of the commissioning. The other sections should be updated to reflect that there are no changes and therefore no information is required. While it may seem redundant to state that there is no change, this method provides positive confirmation rather than assumed confirmation. It is another check step to ensure that the scope of testing accurately covers the relevant changes.

Area	Description	Sections Affected
1	Frequency Control System	7.4, 8.1, 8.4, 10
2	Voltage Control System	8.2, 8.4
3	Generator	7.5, 8.4
4	Physical Connection	7.1
5	Information	7.2, 7.3, 8.3, 8.4, 9

4 Section Descriptions

Heading numbers have not been used to cross-reference this guideline to the template document. The Asset Owner may wish to add sections to the document, or even delete sections in some cases. If that happens the numbering would be misaligned. For this reason the references below correspond to the section headings in the template document.

4.1 Scope of Commissioning

4.1.1 Introduction

The introduction should contain a general statement in regards to the equipment being commissioned. In the case of new assets it may provide information linking the commissioning to a wider project. In the case of existing assets it may highlight the particular equipment that is being upgraded.

4.1.2 Agreement

Once the commissioning plan has been reviewed and accepted by the Asset Owner and the System Operator the final version should be signed and scanned (or converted to a PDF document) for final storage.

4.1.3 Commissioning Objectives

In general, the objective of commissioning from a System Operator perspective falls into three categories:

- safe connection of the asset to the external grid after project works are carried out
- ensuring that commissioning is carried out in compliance with the relevant C requirements, including agreement with the System Operator on scope of testing, submission of Test Plans, and communication expectations from both the Asset Owner and System Operator
- completing sufficient testing to demonstrate the asset is compliant with the Code

If there are any components or assets that are being decommissioned these should be highlighted here.

4.1.4 Commissioning Scope and Sequence

The commissioning should detail those systems that are being tested. This should be grouped into the sections noted in Figure 2 above.

The sequence of tests and test details should be provided in the Engineering Methodology document, which may or may not be available at the same time. It is sufficient to reference the Engineering Methodology document rather than entering the detail of tests in the Commissioning Plan. It is helpful to provide a brief overview of the type of tests and order.

4.1.5 Commissioning Period

The statements in this section are aligned with Code requirements and apart from entering the expiry date of the commissioning period it is expected that this will remain largely unchanged.

It should be noted that all dates in this document are expected to be preliminary and the System Operator will treat them as indicative only.

4.1.6 Version Control

Version control should be used to facilitate tracking of changes to the Commissioning Plan by the Asset Owner. It is expected that each new version sent to the System Operator will have the version updated to avoid confusion.

4.2 Pre-requisites for Commissioning

The sections which are relevant to the scope of the project will have been determined using the table in Section 3. Sections which are not impacted by the changes or additions should state that there are no changes.

4.2.1 Engineering Methodology

At least 8 weeks prior to the start of the Commissioning Period, the Engineering Methodology, including a full description of the proposed tests containing information listed below, needs to be made available for review by the System Operator:

- the proposed test methodology, including sequence and expected results;
- the signals to be monitored;
- the data format that test results will be supplied in (either XLS, ASCII, CSV or COMTRADE files);
    - the Asset Owner must ensure that the data sampling rate is sufficient to demonstrate the fastest equipment characteristics of interest.
- details of any potential impacts to equipment capability or compliance with the Code expected during testing; and,
- confirmation that sufficient information to prove equipment capability and allow model validation, if applicable, will be contained in the Test Report.

Further details of testing requirements can be found in *GL-EA-010 Companion Guide for Testing of Assets*.

4.2.2 Protection Coordination

For new assets or where protection equipment has been changed (not including protection setting changes) –

If connecting directly to Transpower assets the Asset Owner must ensure that the protection system is coordinated with the Grid Owner

If connecting to Distribution assets the asset owner must ensure the protection system is coordinated with both the Distributor and the Grid Owner

In either case the protection systems must have been tested prior to electrical connection of the asset.

The pre-requisites in this case would be:

- a finalised Protection Coordination Report
- a finalised Grid Owner Generator Interface Review
- a finalised Test Report for all new protection equipment elements and any new elements in existing protection equipment.

4.2.3 Ability to Meet Dispatch Instructions

If the unit is subject to dispatch, the ability to follow those dispatch instructions for real power, reactive power, and voltage control must be in place before the asset is connected to the grid.

To meet dispatch instructions requires an electronic dispatch facility to be configured and tested using test dispatch instructions, and have the appropriate personnel and/or facilities in place to receive, acknowledge, and comply with dispatch instructions given by the System Operator.

If the traders responsible for dispatch of the asset are unfamiliar with the dispatching protocols then it is expected that discussions with the System Operator Operations Managers will take place prior to commissioning to establish how the dispatch process will be managed during the commissioning period.

If configuration and testing of the dispatch facility is required this section should detail the timeline for these activities, particularly noting the expected date of testing and expected completion date.

4.2.4 Transpower SCADA Visibility

The preferred method of providing visibility of asset operating parameters to the System Operator is via ICCP (Inter Control Center Protocol) although there are other legacy methods in use that are no longer supported.

Prior to commissioning the Asset Owner must ensure that all data being sent to the System Operator is correct. It is important that any changes to signals at the asset level are correctly reflected through to the System Operator.

For initial configuration of ICCP see Transpower's ICCP Standard

To add or remove data from an exisitng ICCP configuration (or dataset) the Asset Owner should contact Customer.Solutions@transpower.co.nz

4.2.5 System Operator Reserves Management Tool Updated

Where there has been a change to amount of reserves that are expected to be offered for the unit, or if reserves are going to be offered for the first time, the System Operator's Reserves Management Tool (RMT) needs to be updated to reflect the future state.

Application to update RMT needs to be made at least 12 weeks prior to the completion of the Commissioning Period.

To offer reserves for the first time or make changes to existing reserves offers this should be noted in the commissioning plan and advised to the Market Insights Team within the System Operator at market.operations@transpower.co.nz

4.2.6 System Operator Market Modelling Completed

Each generating unit is modelled in the market system based on the supplied asset capability curve and statement of maximum continuous output. These parameters need to be configured in the market system prior to commissioning the assets.

If there are changes to the existing capability curve or this is a new unit then this should be noted in the Commissioning Plan. Of particular note here is when the capability curve will be provided to the System Operator. Once available, the capability curve and relevant parameters should be entered in the Asset Capability Database.

4.3 Assessment of Compliance

The asset owner must carry out sufficient testing to demonstrate Code and Ancillary Service (if any) performance of the assets being commissioned. Where tests do not demonstrate obligations or performance in full, use of a validated mathematical model and power system software may be acceptable with prior approval of the System Operator.

Test results and reports from all tests intended to demonstrate asset performance must be provided to the System Operator for a final assessment that the asset or configuration of assets meet the Asset Owner Performance Obligations and Technical Codes.

Any final assessment of compliance will be based upon the information provided by the Asset Owner which will include test results. This section of the Commissioning Plan has included those clauses which are typically relevant to asset commissioning. The Asset Owner is responsible for ensuring that they have reviewed the Code and understand their obligations.

For each area the commissioning plan should note how the obligations are to be demonstrated. The options are: factory testing; site testing; modelled response; parameter validation; or not required. The Asset Owner should enter the method being used to demonstrate a particular obligation in the appropriate column in each of the tables. Demonstration can be a combination of options. An example would be supporting under-frequency events, unit testing using the standard under-frequency curve from GL-EA-010 Companion Guide for Testing of Assets validates the mathematical model, and the model is used to determine performance in other situations.

4.3.1 Frequency Support Obligations

This section covers the ability of the asset to:

- connect to the power system in a stable manner in regards to generator frequency,
- correctly respond to fluctuations in system frequency, and
- remain connected for system frequency excursions

4.3.2 Voltage Support Obligations

This section covers the ability of the asset to:

- connect to the power system in a stable manner in regards to terminal voltage,
- provide adequate voltage support (reactive power),
- operate correctly across the normal range of system voltages, and
- remain connected for system voltage excursions

4.3.3 Operational Communications

This section covers:

- the ability to receive instructions and formal notices from the System Operator
- the communication paths for transmitting information (voice and data) to the System Operator
- the configuration and accuracy of indications and measurements

4.3.4 Validation of Asset Capability Statement

An Asset Capability Statement (ACS) must be provided before the completion of the planning, at, or before, the completion of construction , and at, or before, the completion of commissioning. The

4.3.5 Dispatch Requirements

This section covers the requirement for a generator to be dispatched by the Market System. This means having access to the Wholesale Information Trading System (WITS) and understanding the requirements for making offers.

If the unit has not been subject to dispatch before then the Asset Owner should contact the Market Insights Team within the System Operator at market.operations@transpower.co.nz

4.3.6 Ancillary Services

If planning to provide ancillary services then testing needs to be carried out to demonstrate the asset capability. The requirements for each of these tests is outlined in the GL-EA-010 Companion Guide for Testing of Assets

4.4 Post Commissioning

The commissioning process is not complete, from a Code perspective, once the testing is finished. There are a number of activities that need to take place and these activities should be outlined in this section. The Asset Owner is responsible to ensure that they meet their Code obligations and may choose to add other components to the list.

The expected time-frame to meet the requirements is shown in the template. The Asset Owner should review these dates along with their project planning to ensure that an accurate representation of timing is given.

Final assessment of compliance cannot be secured until all test results are received and if a model is necessary, the model is validated against the provided test results. Ancillary services cannot be offered until the relevant test results have been fully assessed.

The table reference time T, this is the completion of commissioning activities. To minimise the risk to the power system, test demonstrating the correct control system response should be completed first and therefore will occur before the end of commissioning. Any changes to the ACS should be reflected in the database as soon as

commissioning is complete. It is expected that test results will be provided to the System Operator, in their raw format, as soon as possible after commissioning is finished. Validating a software model against the test results is expected to take some time but should be completed in a timely manner.

4.5 Project Communications

While there may be more than the Asset Owner involved in completing the commissioning activities, the Asset Owner is always responsible for fulfilling the Code obligations. It is important that both the System Operator and Asset Owner ensure that all communication flows between these two entities. Some aspects of commissioning may involve Transpower as Grid Owner, in which case communication needs to occur directly with the Grid Owner and not with the System Operator as intermediary.

4.5.1 Communication Paths

This section contains a general commitment to communicating between parties at the lowest level and only escalating to more senior people in the event of difficulties. If escalation is required it is expected that either the Asset Owner or the System Operator would inform the other party.

The Asset Owner is responsible for all performance obligations, as well as all communication and information supplied to the System Operator, even when other parties may be contracted by the Asset Owner to provide that information. These include equipment manufacturers, project managers, or construction companies, to name a few. A diagram showing the communication path can be included for clarity. An example is given in the template.

4.5.2 Key Personnel

This section lists the key contacts for the project and all aspects of commissioning. Use the "Other" list for third parties outside the Asset Owner and System Operator.

4.5.3 Escalation Path

The escalation path is provided to ensure that issues are resolved at the lowest level within the respective organisations. It is expected that these escalation levels will be used infrequently and that the other party will be made aware when escalation occurs. It is also expected that escalation levels are not skipped if issues are unresolved at the current level.

4.6 Operational Considerations

4.6.1 Offer and Dispatch

This is a statement of the obligation to ensure that any generation during the commissioning period will be subject to the normal offer and dispatch processes. While it is possible that an Asset Owner may be granted relief from following dispatch for some tests, under normal situations the intention is that the unit will attempt to follow dispatch if at all possible. In some cases this may be achieved through the coordination of other local assets as long as they are part of a block dispatch already.

4.6.2 Risk to the Power System

Assets connecting to the power system for the first time are relying on unproven control systems and are therefore at risk of operating incorrectly. Incorrect operation is categorised as either primary risk or secondary risk. Primary risk is caused by the unit itself, in other words, the response of the unit has issues when the system is stable. Secondary risk is caused by a system disturbance, this is where an event in another part of the power system or on an adjacent unit causes the unit being commissioned to respond incorrectly.

In order to minimise the impact to the system as a result of incorrect operation and to minimise the cost of any mitigation measures, testing should be prioritised to allow for testing at the lowest possible unit output. This means

any testing for operation and stability that can be completed offline is completed before the unit is connected to the grid. Basic functions for online operation and stability are completed as early as possible and at the lowest load that accurately demonstrates the response. More advanced functions, typically in relation to system disturbances, are completed last.

Until a control system is proven it will be normally be treated as a "secondary contingent event" risk and that for any contingent event on the power system the unit will trip. This can result in additional reserve cover being needed while the unit being commissioned is synchronised.

As early in the commissioning as possible unproven control systems should be tested and results shared with the System Operator. Pending acceptance of the results this allows a reduced need for reserves cover as the risk of the unit under test can be considered to be "secondary extended contingent event" status, where the unit is expected to perform to its capability for any contingent event yet still recognising a commissioning risk where it could trip for a major power system event.

Asset owners are best able to assess the commissioning risks for their assets in the first instance.

4.6.3 Initial Assessment of Control Response

In order to minimise any potential risk of the asset detrimentally impacting the power system, testing of control response should be given priority. This consists of triggering small step changes for the frequency and/or voltage control systems as appropriate and noting the direction of the unit's response is correct and that the unit output has a visibly stable response. It is recognised that some safety and protection system may need to validated with the asset connected to the power system and that these tests should be completed first.

As part of minimising the potential risk the System Operator needs to assess the control response of the unit before further testing is allowed. Asset Owners are requested to provided five business days notice of the provision of test results for assessment to allow for a timely assessment. Given this notice and a full set of results the System Operator will endeavour to complete the assessment of the results **within two business days**.

The unit under test is not allowed to be reconnected to the power system until this assessment has taken place and the testing programme should allow for this break.

4.6.4 Other Plant Risks

The Asset Owner should assess whether there are site systems or issues that could impact the operation of the unit being commissioned. The items to be noted here are issues that could affect the Asset Owner Performance Obligations which typically relate to frequency control, voltage control or unit stability. These could be systems affecting fuel supply, lubrication, hydraulics, pneumatics, or site services, to name a few. Only the Asset Owner is able to identify these potential issues and their impact. The Asset Owner should note these things in the commissioning plan as these may affect the risk status of the asset, even after demonstrating Code requirements have been met, and provide an opportunity for the System Operator to understand the risk and the impacts that they could have.

4.6.5 System Tests

The major tests for frequency control and voltage control systems are outlined in the table provided and in the expected order of completion. The Asset Owner or the System Operator can change the expected order as required but should be following the philosophy outlined above. There may also be other systems that affect the operation or stability of the system and these should be noted and tested as early as possible.

The table in this section of the template describes the systems to be tested, whether or not the unit needs to be online to complete the test and the area of concern; safety and trip systems, control system response (relating to power system risk), or system response.

4.6.6 Changes in Risk Status

This section contains a general commitment by the Asset Owner to inform the System Operator of any changes during commissioning which may alter the risk assessment of the asset.

4.7 Code Requirements

4.7.1 Special Provisions

This section details relief from the Code that is required during commissioning. At this point in the process it is not expected that a final assessment of the Code requirements has been undertaken. Each test during the commissioning period will also be covered by an Operational Test Plan which includes the specific relief that is required for that test, if any.

Asset Owner Performance Obligations are generally found in Part 8 Subpart 2 (clauses 8.16 – 8.38) and requirements for Ancillary Services are in Subpart 3 (clauses 8.39 – 8.54) along with the relevant technical codes of Part 8. The typical clauses of relevance for different systems are shown in the table below. It should be noted that these are provided as a quick reference and the Asset Owner is responsible for ensuring that the appropriate relief is granted at the time of testing to avoid breaching the Code requirements.

System	Clauses that may apply
Frequency Control Systems	8.17, 8.19
Voltage Control Systems	8.23, 8.24, 8.25, 8.25A
Operational Communications	Schedule 8.3, Tech Code C
Dispatch Instructions	13.81 (2) (a) (ii)

4.7.2 Dispensations and/or Equivalence Arrangements

This section details dispensations or equivalence arrangements that will be required to be granted before the asset is connected to the power system for the first time. It should be noted that the dispensation process takes up to 16 weeks and that if the unit is operated with a shortfall against the Code it may be reportable as a breach of the Code. The process for granting an Equivalence Arrangement is generally shorter but the Asset Owner should discuss these well ahead of expected testing.

4.8 Commissioning Period Documents

The Asset Owner must submit documentation to the System Operator that provides advance notice of the load profiles, commissioning requirements and specific testing requirements. This documentation is in the form of the Week Ahead Schedule, Day Ahead Schedule, and Operational Test Plans.

4.8.1 Week ahead schedule

This document gives all parties to the commissioning plan advance notice of the load profile and commissioning requirements over the next calendar week and is particularly useful to the System Operator when additional reserves are required to mitigate secondary risks. This schedule is to be provided weekly in advance (once a week).

The Week Ahead Schedule contains an estimate of the MW and MVAr loading required for the following 7 days and notice of any testing scheduled for the same period. These details are provided on a best endeavours basis and are subject to change should commissioning activities require it. Any changes must be communicated in the "Day Ahead Schedule".

4.8.2 Day ahead schedule

This document gives all parties to the commissioning plan accurate notice of the generation profile and commissioning requirements over the next 24-hour period. This schedule is provided daily in advance.

The Day Ahead Schedule contains details of generation profile for the unit being commissioned, both MW and MVAr. This schedule may be changed outside of the one-hour gate closure period.

4.8.3 Operational Test Plans

Asset Owners who wish to perform system tests or tests to ascertain asset capability must submit a test plan to the System Operator which has the effect of requesting agreement to such test or tests. The template form, FM-EA-010 or FM-EA-502, available from the System Operator website, must be used.

Where the Asset Owner is unsure whether a proposed test may impact system security, they must contact the System Operator for advice.

A test plan may include advice of a temporary change in asset performance and/or capability which must only be applicable whilst the test is being carried out. In addition to the test plan form, the Asset Owner may submit additional information to assist the System Operator to assess the impact of the proposed test.

5 Related Documentation

5.1 Format of test data

See GL-EA-010 Companion Guide for Testing of Assets for full details.

5.2 Modelling Requirements

See GL-EA-716 Power Plant Dynamic Model Validation and Submission Prerequisites for full details

5.3 Companion Guide for Commissioning Generation

A checklist of activities related to commissioning generation:

GL-EA-404 Companion Guide for Commissioning and Decommissioning

5.4 Companion Guide for Testing of Generating Assets

Guidance for testing generation assets:

GL-EA-010 Companion Guide for Testing of Assets

5.5 Companion Guide for Modelling

Guidance for compiling, validating, and delivering mathematical models and test results to the System Operator:

GL-EA-716 Power Plant Dynamic Model Validation and Submission Prerequisites

5.6 Operational Test Plans

Guidance on the Operational Test Plan process:

https://www.transpower.co.nz/system-operator/resources-asset-owners/asset-testing

Operational Test Plans must be submitted using the System Operator approved form found below:

https://www.transpower.co.nz/sites/default/files/bulk-upload/documents/FM-EA-010_Test_Plan.docx

5.7 Source for Documentation

Most of the above documentation can be found on the Generation Connection & Dispatch page of the System Operator's website.

https://www.transpower.co.nz/system-operator/resources-asset-owners/generation-connection-dispatch

1 Document Information

1.1 Copyright Information

1.2 Revision History

SharePoint Revision	Date	Change	Section
1.0	9/2/	New Document	

1.3 Metadata

Document ID Information

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DMS Structure

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Process:		
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	01-01 Assess Asset Capability	[Business Model L4]
Document Complexity Rating	3W	

Document Control

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