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1 INTRODUCTION

1.1 BACKGROUND

As part of the terms and conditions for connection, and in the interests of other Users connected to the Distribution Network, this document specifies the technical requirements which must be complied with by Users connecting and operating their equipment on premises connected to Westpower's Distribution Network. This document, the Distribution Code, sets out these terms and conditions. It covers three broad areas:

- technical requirements for connection
- requirements for operational contact
- requirements for long-term planning

It is also a statement of assurance to the Users of the network how they can expect the network to be operated and managed. In addition to complying with the Distribution Code, Users of the Distribution Network will be required to comply with the Electricity (Safety) Regulations 2010 and any amendments thereof, and Codes of Practices promulgated under these Regulations. This document is primarily a technical document and is to be read in conjunction with:

- Westpower's Electricity Pricing Schedule
- Westpower's Connection Agreements as appropriate
- Westpower's Use of System Agreement with electricity retailers

1.2 SCOPE

The Distribution Code comprises a Network Connection Code, a Network Operating Code, Contingency Planning, System Tests and Embedded Generation.

Copies of the Distribution Code can be obtained from the Reception Desk at 146 Tainui Street, Greymouth, the website www.westpower.co.nz or writing to the Asset Manager, PO Box 388, Greymouth.

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2 NETWORK CONNECTION CODE

2.1 INTRODUCTION

The Network Connection Code defines the conditions and standards applicable to all User Systems connected or proposed to be connected to the Westpower Distribution Network.

2.2 NETWORK CONNECTION BACKGROUND INFORMATION

2.2.1 Connection Arrangements

The design of connections between the Distribution Network and the User's System shall be in accordance with this code and Westpower's Network Standards, and may include such modification as approved in writing by Westpower.

When an application for connection is made on a Request for Supply form, www.westpower.co.nz/pdfs/form_request_for_supply.pdf

Westpower will determine available capacity from the Distribution Network, and will notify the User of the voltage to which the User will be connected in accordance with its normal practice for the type of load to be supplied. Westpower may on occasion specify a different connection voltage in order to avoid potential disturbance caused by the User's Apparatus to other users of the Distribution Network, or for other technical reasons, or may agree alternative methods for minimising the effects of disturbing loads.

If sufficient capacity is not available or network extensions are required it will be necessary for the User to enter into a Network Extension Agreement in accordance with Westpower's Investment Policy.

It will be necessary for Westpower to be reasonably satisfied in writing that the User's System will comply with all appropriate requirements of the Distribution Code before issuing a Network Connection Agreement to the User.

Westpower's approval of the connection of a Customer's Installation is conditional on:

- a) the agent or contractor nominated to carry out the Connection Services having been previously accredited by Westpower.

(At present ElectroNet Services Ltd are the only contractors accredited to live network connections)

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- b) the installation complying with Westpower's connection requirements
- c) the installation having a valid Certificate of Compliance
- d) full compliance with this Distribution Code
- e) the User completing a System Connection Form with an electricity Retailer approved to use Westpower's Distribution Network

Westpower is required to give at least 15 business days written notice to the Territorial Authority and other affected utility operators where an electrical reticulation is to be constructed along, over or under any legal road. Furthermore, resource consents are required for certain works in the Buller District Council area and these can take several weeks to obtain.

2.2.2 Information Required by Westpower

The following information should be provided to Westpower when a connection is requested on the Request for Supply form. Should a preliminary examination of this data indicate that more detailed information is required, this shall be provided to Westpower upon request. For supplies at Low Voltage it is normally possible to assess whether a proposed connection is acceptable, and to determine the necessary supply arrangements, from analysis of the following limited data:

- a) the maximum current requirements (A) and number of phases (refer 2.2.4). Note: this is not the fuse size which will be determined by Westpower.
- b) the type and electrical loading of equipment to be connected, for example, the number and size of motors, including maximum starting currents and electrical heating arrangements
- c) the date when the connection is required
- d) the proposed Network Connection address

For supplies other than at Low Voltage the following additional information may be required at Westpower's discretion.

- a) All types of Demand:
 - (i) the maximum Active Power requirement
 - (ii) the maximum and minimum Reactive Power requirements

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- (iii) the type of load and control arrangements, eg controlled rectifier or larger motor drives with maximum starting currents
 - (iv) the maximum load on each phase at the time of maximum Demand
 - (v) the maximum harmonic currents to be imposed on the Distribution Network
- b) Fluctuating Loads:
- Details of the cyclic variation, and where applicable the duty cycle, of Active Power (and Reactive Power, if appropriate), in particular.
- (i) the rates of change of Active Power and Reactive Power, both increasing and decreasing
 - (ii) the shortest repetitive time interval between fluctuations in Active Power and Reactive Power
 - (iii) the magnitude of the largest step changes in Active Power and Reactive Power, both increasing and decreasing
- In some cases, more detailed information such as an indication of the pattern of build up of load and a proposed commissioning programme may be required.
- c) Capacitors and Inductors:
- Details will be required of capacitor banks and reactors connected at High Voltage which could affect the Distribution Network. Sufficient detail is required for the following:
- (i) to verify that controlling equipment of the Distribution Network is suitably rated
 - (ii) to show that the performance of the Distribution Network will not be impaired.

2.2.3 Network Connection Points

The Network Connection Point (NCP) is the point of connection of the Customer's installation with Westpower's Distribution Network. At the NCP, there is a fuse in each phase conductor, the rating of which determines the maximum capacity available to the Customer Installation from the network.

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The location of the Network Connection Point will be determined by Westpower and will be where practicable be as close as possible to the boundary of the Customers' premises and in general not on private land. However in cases where two or more Customer Installations share the same premises, or where High Voltage network lines cross on to private land, the Network Connection Point for the Customer's installation may be on private property.

Where a customer's service line or a network extension crosses through or over any neighbouring property on separate title, it is the customer's responsibility to obtain an easement for that section of works. This requirement also applies to distribution lines where the easement must be provided by the customers in the name of Westpower Limited. An agreement to grant such easements is required before supply is connected.

For all new installations, Network Connection Point fuses will only be mounted within Westpower's service pillar boxes or on network poles.

Network connection fuses may not be removed, replaced, repaired or in any other way interfered with other than by Westpower's accredited personnel.

Note: the NCP is not necessarily located at the Point of Supply as defined in the Act.

2.2.4 Standard Supply Capacities and Supply Details

Standard supply capacities are as follows:

Category 1 - Domestic

Single Phase up to 15 kVA

Category 1 - Non Domestic

Single or Three Phase up to 15 kVA

Street Lighting

Category 2

Three Phase 15 kVA to 200 kVA

Category 2 - Time of Use Metering

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Three Phase 100 kVA to 200 kVA

Category 3

Three Phase over 200 kVA

Where the supply is two or three phases, the load must be balanced as equally as possible across the phases. Any cost associated with the correction of phase balancing is to the Customer's account.

Where a Network Connection Point is not available at the boundary of the premises, Westpower reserves the right to determine the availability of capacity for all new or capacity upgrade requests.

2.2.5 Temporary Supplies

Where metered builders supply boxes are connected to Westpower's network they must meet the requirements of the Electricity (Safety) Regulations 2010. Responsibility for the operation and safety of the temporary supply is with the User.

Connections to the Distribution Network and livening services will be provided by Westpower free of charge. Any upgrade in capacity for the final installation will be treated as a new connection by Westpower, providing no new Request for Supply is required and the final installation is in line with the original request.

2.2.6 Specification of Equipment, Lines and Cables

Westpower reserves the right to determine the suitability of standards proposed for equipment connected to the Distribution Network. Design and construction must comply with the current Westpower Network Standards which are separately documented and publicly available.

2.3 NETWORK CONNECTION DESIGN CONSIDERATIONS

2.3.1 Security

The connection between the Distribution Network and any User System shall be designed to be consistent with the Westpower's Asset Management Plan and Risk Management Plan, any relevant statutory Laws, Regulations and Electrical Codes of Practice and with this Distribution Code. Where any User System does not comply,



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Westpower may disconnect the non complying User System from the Distribution Network.

2.3.2 Frequency and Voltage

Any User Systems connected to the Distribution Network shall be designed to enable the Normal Operating Frequency and voltages to be supplied to Users and to comply with statutory Regulations and Electrical Codes of Practice.

Nominal supply is 50 Hertz at 230 volts \pm 6% (216.2 volts – 243.8 volts).

2.3.3 System Disturbances and Waveform Distortion

Distortion of the System Voltage Waveform caused by certain types of equipment may result in annoyance to other Users of the Distribution Network or damage to connected Apparatus. In order to limit these effects the following shall apply to User's loads connected to the Distribution Network:

- a) voltage fluctuations shall comply with the limits set out in statutory Regulations, the Electrical Codes of Practice and related NZ standards
- b) the harmonic content of any load shall comply with the limits of the New Zealand Electrical Code of Practice for Harmonic Levels (ECP36:1993) and any subsequent amendments
- c) motor starting shall comply with the Committee Report on Motor Starting Current for AC Motors published by the Electricity Engineers Association of NZ

Under special circumstances Westpower may consider other limits or levels.

Under fault and circuit switching conditions the rated frequency or voltage may fall or rise transiently.

2.3.4 Short Circuit Ratings

The short circuit rating of User's equipment at the Network Connection Point should not be less than the design fault level of the Distribution Network.

The Distribution Network's 11kV system is designed for a maximum short circuit level of 250MVA (13kA). Customer Installations which take supply at 11kV shall be designed for a 250MVA prospective short circuit level, unless Westpower at their discretion specify otherwise.

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Information on the maximum prospective short circuit current at any proposed point of supply is available on request to Westpower.

2.3.5 Earthing

The arrangements for connecting the System with earth shall be designed to comply with the requirements of the Regulations, Electrical Codes of Practice and NZ Standards as may be applicable.

Design practice for multiple earth Systems shall comply with Good Industry Practice. The specification of associated equipment shall meet the voltages and fault levels which will be imposed on the equipment as a result of the method of earthing.

Users shall take precautions to limit the occurrence and effects of circulating currents in respect of the neutral points connected with earth where there is more than one source of energy. Refer to Westpower's Distribution Earthing Code.

2.3.6 Voltage Regulation and Control

Any extension or connection to the Distribution Network shall be designed in such a way that it does not adversely affect the voltage control employed by Westpower.

2.3.7 Protection

The Distribution Network and the User System connected to the Distribution Network shall incorporate protective devices in accordance with any relevant Regulations, Electrical Codes of Practice and NZ Standards.

In order to ensure satisfactory operation of the Distribution Network, Westpower reserves the right to determine the Protection Systems, operating times, discrimination and sensitivity at the Ownership Boundary.

The User's arrangements for protection, including types of equipment and Protection settings, must be compatible with Westpower's Network Standards. In particular:

- a) the maximum clearance times must be within the limits established by Westpower in accordance with Protection rating and equipment short circuit rating

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- b) the User should be aware that auto-reclosing or sequential switching features may be in use on the Distribution Network. Westpower will, on request, provide details of auto-reclosing or sequential switching features in order that the User may take this into account in the design of the User's System, including Protection arrangements
- c) the User should be aware that the Protection arrangements on the Distribution Network may cause disconnection of one phase only of a three phase supply for certain types of faults

2.3.8 Substations on Customers Premises

In some cases the supply required by a prospective Customer or an increase in supply required by an existing Customer may not, in the opinion of Westpower's Asset Manager, reasonably be available from the local works. In these cases the Customer shall provide and maintain at their cost (if any) an acceptable building for a substation, lines, cables or other equipment on the Customers premises.

In these cases, Easements in Gross to Westpower's minimum requirements covering the 'electrical works' will be required. These may also be required on adjacent properties (whether owned by the Customer or others) depending on the access route to the property requiring new or upgraded supply. It is the Customer's responsibility to gain the easements required.

A fenced pad-type substation may be installed where access to the substation area is not open to the public. Where access is open to the public, a padmount transformer or fully enclosed substation will be required.

Unimpeded vehicle access to the substation for the repair or removal of the transformer and other Westpower property must be maintained at all times.

Where 11kV cables and mains cables are to be covered by concrete structures (other than concrete to protect the cables) they must be installed in ducts unless acceptable alternative access is available.

2.3.9 Equipment at Ownership Boundary

All equipment at the Ownership Boundary shall meet the design principles contained in this Code. Connection to the Distribution Network shall incorporate a means of disconnection of the User's installation by Westpower.

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2.4 CUSTOMER INSTALLATION TECHNICAL REQUIREMENTS

2.4.1 Ripple Control

Westpower operates a 425 Hz ripple control System on its Distribution Network. All electrical installations must at all time present high impedance to this frequency.

Where Users install capacitors on their installations, these capacitors must be designed to avoid affecting any signals which Westpower uses for its System management purpose. Westpower reserves the right to require the User to provide any necessary corrective measures if the Users capacitors interfere with Westpower's signals. Advice for installation of capacitors is available from Westpower.

2.4.2 Superimposed Signals

Use of the Distribution Network is restricted to the conveyance of electricity. Use of the Distribution Network for mains borne signaling or communication purposes including power line carrier of any frequency requires the separate agreement of Westpower.

2.4.3 Power Factor

The Power Factor of any installation greater than 15kVA capacity shall not be less than 0.95 lagging. All new connections or increased capacity installations must comply with this requirement before the Network Connection Application will be approved.

The Power Factor of Customer Installations may be corrected by using correction of individual appliances or by bulk correction at the Customer's switchboard.

Approved ripple signal blocking equipment must be fitted to bulk correction installations, with blocking chokes installed on all phases. Blocking chokes will also be required at other installations where in the opinion of Westpower, the installation causes an unacceptable lowering of ripple injection signal voltage or absorption of ripple signal current. In all instances, ripple blocking will be installed at the User's cost.

Westpower reserves the right to charge existing connected Users a network penalty in addition to the normal electricity charges after 6 months notice has been given by Westpower to correct the Power Factor of the installation.

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2.4.4 Mains

The recommended residential service main is copper neutral screen with a minimum cross sectional area of 16mm² or aluminium equivalent. All service mains shall be appropriate for the load group required and shall comply with NZS3000:1997.

Mains cables shall be installed in accordance with the applicable regulatory, industry and local authority standards.

It is preferred the service main cables do not share the same trench as Westpower's distribution cables.

2.4.5 Water Heaters

All water heating installations must comply with the requirements of NZS 4602 and 4603:1986 or equivalent, and must be installed to the requirements of the relevant building codes.

The following recommended minimum standards apply to water heater cylinders connected to Westpower's Controlled Tariffs:

Water Saver	Cylinder Capacity	Element Rating
Single Bedroom Residence	135 Litres	1000W
Multi Bedroom Residence	180 Litres	2000W
Night Only		
Minimum Cylinder Size	270 Litres	3000W

2.4.6 Motor Starting

Except where alternative arrangements are agreed in writing between Westpower and the User, all motor starting is to comply with the Electrical Engineers Association Report on Motor Starting Currents for AC Motors.

Reduced current starters are required for all motors greater than those in the Table below unless otherwise authorised by the Asset Manager.

Size Limitations of Motors that may be started Direct on Line

	Rural	Urban Residential	Urban Non Residential
Single Phase	0.75kW (1hp)	1.5kW (2hp)	2.2kW (3hp)

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Three Phase	4.0kW (5.3hp)	4.0kW (5.3hp)	7.5kW (10hp)
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Rural, Urban and Residential zonings are as zoned in the Local Authority District Plan.

All other motors shall have the Relative Voltage Change at the point of common coupling and at the 11kV supply substation not exceeding the amounts in the table below.

Schedule of Relative Voltage Change		
Frequency of Starting	PCC	At 11kV Bus
In excess of 10 Starts per hour	1.0%	0.5%
In excess of 3 starts per day	3.0%	1.0%
Not more than 3 starts per day including not more than 1 start Between 5pm & 11pm on any day	6.0%	1.5%
Emergency equipment Started infrequently	12.0%	2.0%

2.4.7 Welders

Welders rated at 5kVA or under are classed as portable appliances and may be operated at 230V. Welders rated over 5kVA shall be supplied from two phases, shall comply with BS 638 and shall be corrected to 0.8 pf.

Operation of welders shall comply with the Australian Standards on Disturbances in Supply Networks AS 2279.

3 NETWORK OPERATING CODE

3.1 INTRODUCTION

The Network Operating Code deals with various operational matters affecting Users, including the provision of forecasts of likely Demand, the planning of System Outages and generating plant Outages, the reporting of operational changes and Events, safety matters, and procedures for dealing with contingencies.

Information exchanged for planning purposes is confidential to the parties holding the information. In many cases this will comprise sensitive commercial information and must be treated accordingly.



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3.2 PLANNING INFORMATION

The Distribution Code details the planning information to be exchanged between Westpower and Users, or, where appropriate, between Westpower and a Retailer on behalf of Users.

3.2.1 Information supplied by Westpower

Westpower will provide all System parameters reasonably required for planning by the User. All reasonable costs incurred in obtaining this information shall be to the account of the User.

3.2.2 Requirements for Electricity Retailers and Other Users

Users of the Distribution Network must provide sufficient planning data and information and safety management requirements as requested by Westpower from time to time, to enable Westpower to comply with technical and legislative requirements.

A User must give adequate notice of any significant changes to its System or operating regime to enable Westpower to prepare its development plan, budget for, and implement any necessary System modifications.

3.3 OPERATIONAL LIAISON

Westpower has requirements for the exchange of information in relation to operations on the Distribution Network, or the System of any User connected to the Distribution Network. It does not seek to deal with any actions arising from the exchange of information, but merely with that exchange.

3.3.1 Planned Outages and Events

Requirement to Notify

In the case of a Planned Outage or Event on the System of a User which has an operational effect on the Distribution Network, the User will notify Westpower in accordance with this Code.

Timing of Notification

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Notification of a Planned Outage or Event shall be given as soon as possible after the occurrence of the Planned Outage or Event, or the time that an Event is known of or anticipated by the notifying party. A notification of a Planned Outage will be given as far in advance as possible, and in any case shall be given in sufficient time to reasonably allow the recipient to consider and assess the implications and risks arising.

3.3.2 Significant Incidents

Reporting Procedure

Where an Event on the System of a User has had a significant effect on the Distribution Network, the Event shall be reported in writing to Westpower. Such an Event will be termed a significant incident.

For the purposes of this section of the Distribution Code, the term "Event" is deemed to include those emergency operations which a User may initiate in response to particular abnormal circumstances which may arise on the System.

3.4 SAFETY CO-ORDINATION

Westpower specifies the safety management system criteria to be applied to meet statutory requirements such as the "Safety Manual - Electricity Industry July 2004, Parts 1 and 2" and the "Safety Manual - Electricity Industry January 2009, Part 3" (as amended or its successor code), other legislative requirements and other relevant Codes, imposed on owners and operators of the Distribution Network.

Similar criteria and standards of safety management systems are required to be provided by other Users of the Distribution Network when carrying out work or tests at the operational interface with the Distribution Network.

3.4.1 Objective

The objective is to establish requirements with a view to ensuring safety of persons working on the Distribution Network and at or across operational and Ownership Boundaries.

3.4.2 Procedure

An approved Health & Safety Handbook specifying the principles and procedures, and where appropriate, the documentation to be applied, so as to ensure the health

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and safety of all who are liable to be working or testing on the Distribution Network, or on Apparatus connected to it, will be established by Westpower and Users.

3.5 SYSTEM LOAD CONTROL

Westpower is concerned with the provisions for Demand control under emergency conditions to be made by Westpower or the User with Systems connected to the Distribution Network. Procedures are established to enable Westpower either in its own right or following a request from Transpower, to achieve a reduction in Demand in order to avoid a breakdown or overload of any part of the Total System or the Distribution Network. The following methods of reducing Demand are dealt with:

- a) voltage reduction;
- b) User Demand management;
- c) User disconnection;
- d) automatic low frequency disconnection;
- e) emergency manual User disconnection.

3.5.1 Procedures

This Distribution Code applies to Westpower and Users, including Embedded Generators. Implementation of Demand control by Westpower may affect Customers of Retailers, and where applicable, contractual arrangements between Retailers and their Customers should reflect this. Demand control may take the forms outlined below.

Operational System Load Reduction

Westpower will arrange procedures to reduce load within the Distribution Network in a controlled manner by reducing voltage and/or disconnecting Customers or portions of Customer loads.

Automatic Disconnection of Demand through Low-Frequency Detectors

Westpower shall not be responsible for any low frequency disconnection operations initiated by Transpower, even if such arrangements were made in consultation with Westpower.

Emergency Manual Disconnection of Demand

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Where required by regulation or if requested by Transpower, or for its own purposes, Westpower may arrange to have available an emergency manual disconnection procedure. The procedure will be designed to be called upon to operate irrespective of System frequency. Contractual arrangements between Retailers and their Customers should reflect the possibility of emergency disconnection of load.

3.5.2 Normal Load Management

The safe and secure operation of the Distribution Network is dependent on the current Load Control regime. In the short to medium term, this regime is necessary to maintain the level of charges specified by Westpower in agreement with Retailers.

The charges specified in agreements with Retailers are effectively discounted from the uncontrolled levels and any significant reduction of the Load Control service is likely to result in a reduction of this effective discount.

Current Control Regime

Westpower offers a Load Control Service for the following appliances in Domestic premises.

- storage-type water heaters

- permanently wired storage space heaters

- electric kilns

- spa and swimming pools

- storage heaters

The above appliances may be disconnected as controlled supplies at any time of the year, but this will normally be during the months of May, June, July, August and September. This period is chosen both to minimise the charges payable to Transpower and to match the design capacity of the Network. Accordingly this period may vary from time to time.

If the above appliances are not controlled then the Customer's Installation will be assessed at a higher effective control period Demand than would otherwise be the case and this is reflected in Westpower's tariffs.

Additionally the Load Control Service may be operated to meet the requirements of the Electricity Retailers for tariff switching and in the event of a material reduction of available electricity, the Load Control Service may be operated for the Retailers.

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4 CONTINGENCY PLANNING

4.1 INTRODUCTION

This section of the Distribution Code covers requirements for assisting the re-start or operating of the Total System in abnormal situations which require co-ordination between Transpower, Westpower and Users, with a common approach to give uniformity of priorities. It also specifies requirements to be met during periods of declared Civil Emergencies.

4.2 SYSTEM RECOVERY PROCEDURES

The Total System may experience complete or partial shutdown in situations where a major fault has a cascading effect through this System, or where there has been a significant loss of generation. In such situations, System recovery must be co-ordinated in such a way that ensures it is carried out in a minimum of time. Westpower is required to follow the procedures laid down in the relevant Transpower connection codes and to liaise with Transpower when taking any action which may have an impact on the Transpower transmission System.

Where generation has been lost completely:

the start-up of Embedded Generators subject to Central Dispatch and which have been identified as having Black Start Capability shall be the responsibility of Transpower.

the start-up of Embedded Generators not subject to Central Dispatch and which have Black Start Capability shall be co-ordinated by Westpower, with due notification being given to Transpower.

Where there is sufficient generating capacity available by configuring Westpower's Distribution Network appropriately, Westpower shall establish stable "islands of supply" around particular Generators.

The strategy to be applied in the above circumstances shall be documented by Westpower.

4.3 CIVIL EMERGENCIES

Westpower has an obligation to carry out certain Civil Emergency duties related to its Distribution Network. Under such emergencies the actions of Westpower and all parties connected either directly or indirectly to the Distribution Network will be governed by the procedures laid down in the relevant portions of the Civil Defence Act 1983.

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5 SYSTEM TESTS

5.1 INTRODUCTION

This section specifies Westpower's requirement to test and/or monitor its Distribution Network to ensure that Users are not operating outside the technical parameters required by any part of this Distribution Code.

5.2 COSTS OF TESTS

At the discretion of Westpower, a charge may be levied on Users for the carrying out of System Tests requested by the Customer and on such terms as may be agreed with the Customer.

5.3 PROCEDURES

The testing and monitoring relates to two aspects of the Distribution Network, namely Quality of Supply and Network Connection Point parameters. System test procedures shall be carried out in accordance with Westpower's standard procedures unless agreed otherwise by Westpower.

5.3.1 Quality of Supply

Westpower from time-to-time will test and/or monitor the Quality of Supply at various points on its Distribution Network. Specific testing and/or monitoring may be initiated by request of the User

Where the results of such tests show that the User is operating outside the technical parameters specified in any part of the Distribution Code, or of any other statutory regulation or Electrical Code of Practice, the User will be informed accordingly.

Where the User requests, a re-test can be carried out and witnessed by a User representative.

A User shown to be operating outside limits specified in this document will immediately, or within such time as may be agreed with Westpower, remedy the situation or disconnect from its System any Apparatus causing the problem. Continued failure to remedy the situation may result in the User being disconnected from the Distribution Network until they can warrant this Code will be complied with.

5.3.2 Network Connection Point Parameters

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Westpower will from time-to-time monitor the effect of the User on the Distribution Network. The monitoring will normally be related to the amount of Power and Reactive Power transferred across the Network Connection Point. Where the User is exporting to or importing from the Distribution Network Active Power and Reactive Power in excess of the parameters in the Use of Systems Agreement, Westpower will inform the User of, and where appropriate demonstrate the results of such monitoring.

Where the User requires increased Active Power and Reactive Power in excess of the physical capacity of the Network Connection Point, the User will restrict power transfers to the limits specified in the Use of Systems Agreement until a modified Use of Systems Agreement has been applied for from Westpower and physically established.

6 REQUIREMENTS FOR EMBEDDED GENERATION

6.1 INTRODUCTION

This section is applicable to all existing or prospective Generators, including Users with Own Generation having plant operating in parallel with the Distribution Network. It is recognised that some existing Generators may not comply at present with all the requirements of this section, and in such cases Westpower will advise the Generator which requirements these are. The Generators shall take reasonable steps to comply with these requirements within a time frame acceptable to Westpower.

Generators must be aware their installations are governed by the Electricity Governance (Connection of Distributed Generation) Regulations 2007 when connecting to Distribution Networks

The Guidelines and Application Forms are contained in Westpower's Distributed Generation Information Pack that can be obtained from the Reception Desk at 146 Tainui Street, Greymouth, the website www.westpower.co.nz or writing to the General Manager, Assets and Engineering Services, PO Box 388, Greymouth.

All prospective Generators must complete the Network Connection Application Form and Westpower will determine in its sole discretion whether or not connection is acceptable.

6.2 GENERATION CONNECTION ARRANGEMENTS

The design of connections between the Distribution Network and a Generator shall be subject to the approval of Westpower who at its sole discretion will determine the standards deemed acceptable.

DISTRIBUTION CODE

When an Application for Connection and Operation is made, and Westpower in its sole discretion determines transfer capacity, Westpower will agree with the Generator the voltage to which the Generator will be connected. Westpower may on occasion specify a different connection voltage for technical reasons, or may have additional requirements as a consequence of the voltage at connection.

Before entering into a Network Connection Contract it will be necessary for Westpower to be reasonably satisfied in writing that the Generator will comply with all appropriate requirements of the Distribution Code.

6.3 GENERAL REQUIREMENTS

Embedded Generators connected at Low Voltage with a station output not in excess of 10 kW shall, as a minimum requirement, comply with the requirements of such statutory Regulations and Electrical Codes of Practice as may be applicable. Their presence shall not restrict switching on the System.

Embedded Generators connected at High Voltage or of a larger capacity shall, in addition to the minimum requirements, comply with the general principles of the Transpower Connection Codes and the particular requirements of Westpower.

6.4 INFORMATION TO BE PROVIDED

Embedded Generators will fall within three basic classes for which minimum information as outlined below shall be provided to Westpower by the Generator. The classes are:

- a) Generators with embedded generating plant connected at Low Voltage with a station capacity less than 10 kW having a 30 business day approval process
- b) Generators with embedded generating plant connected at High Voltage with a station capacity greater than 10 kW and up to 5 MW having a 60 business day approval process
- c) Generators with embedded generating plant with a station capacity in excess of 5 MW having an approval process of 80 business days

Westpower will, subject to the User agreeing to meet the reasonable costs, use the information provided to model the Distribution Network and to decide what method of connection will need to be employed and the voltage level at which the connection should be made.

6.5 INFORMATION REQUIRED

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6.5.1 Information Required from all Embedded Generators

It will be necessary for each Generator to provide information to Westpower on the generating plant and the proposed interface arrangements between the generating plant and the Distribution Network. The following information shall be required by Westpower before entering into an agreement to connect generating plant onto the Distribution Network:

- a) Generating Plant Data
 - (i) terminal volts (kV)
 - (ii) rated kVA
 - (iii) rated kW
 - (iv) maximum Active Power sent out (kW max) Reactive Power requirements (kVAr), if any
 - (v) type of generating plant - synchronous, asynchronous, etc
 - (vi) type of prime mover
 - (vii) anticipated operating regime of generation, eg continuous, intermittent, peak lopping
 - (viii) fault level contribution (for large machines, this may be covered by the details listed in 5.4.2)
 - (ix) method of voltage control
 - (x) Generator transformer details, as applicable
 - (xi) requirements for Top-Up supplies and/or standby supplies

- b) Interface Arrangements
 - (i) the means of synchronisation between the Distribution Network and the User's System
 - (ii) details of arrangements for connecting with earth that part of the Generator's System directly connected to the Distribution Network

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- (iii) the means of connection and disconnection which are to be employed
- (iv) precautions to be taken to ensure the continuance of safe conditions should any earthed neutral point of the Generator's System operated at HV become disconnected from earth

6.5.2 Additional Information Required from Large Embedded Generators

Additional information required from Embedded Generators connected at high voltage and of capacity greater than 10 kW is contained in the Distributed Generation Information Pack.

6.5.3 Additional Information for Transpower Requirements

Generators are required to supply such information as requested by Transpower. It will be the responsibility of the Generator to provide the information required to Westpower. Westpower will pass on the information to Transpower.

7 DEFINITIONS

In this Distribution Code, the following terms shall have the following meanings unless the context otherwise requires:

Act	The Electricity Act 1992 and amendments thereto.
Active Power	The product of voltage and in-phase component of alternating current (measured in kilo-watts (kW) or megawatts (MW)).
Apparatus	All electrical machines, fittings, and appliances.
Apparent Power	The product of voltage and alternating current (measured in kilo-volt-amperes (kVA) or mega-volt-amperes (MVA)).
Authorisation	The formal sanction, preferably given in writing, to undertake specified tasks that have a specific meaning in safety management systems.
Back-up Protection	The protection system which will open a fault-current interrupting device in the absence of the correct operation of the primary protection system.

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Black Start	The procedure necessary for a generator to recover from a total or local system shutdown.
Black Start Capabilities	The ability of a power station to commence generating without the need for a power supply external to the power station.
Central Dispatch	The dispatch of generating units by Transpower.
Certificate of Compliance	A certificate issued in accordance with Regulation 39, Electricity (Safety) Regulations 2010.
Civil Emergency	A state of national, regional or local civil defence emergency as declared by the appropriate civil defence controller.
Connection Agreement	The agreement between the Customer and the Distributor for the provision of Line Function Services.
Control Centre	A location for the control and operation of all or part of the Distribution Network, the Transpower transmission system, or the system of a User.
Control Person	A person who has been nominated by Westpower, Transpower or a User to be responsible for controlling and coordinating system operations, including all health and safety requirements in hazard identification and emergencies that will apply to people in the place of work and people in the vicinity of the place of work.
Conveyancing Agreement	Means an agreement between the Retailer and the Distributor for the provision of Conveyancing Services.
Customer	Means a purchaser of Line Function Services either directly from Westpower or indirectly through a Retailer.
Customer Installation	Means any Fittings owned or used by a Customer (except Distributor's Equipment) that form all or part of a system for conveying electricity from the Customer's Network Connection Point to where the electricity may be consumed.
Demand	The electricity demand expressed in kVA/MVA, kW/MW or kVAr/MVAr of apparent power, active power and reactive power respectively.
Distribution Network	Means the Distributor's system including all Fittings comprising that system to convey electricity from the Network's Point or Points of Supply and which terminates at the Customer's Network Connection Point.
Distributor	A person or organisation who supplies Line Function Services.
Electrical Code of Practice	An Electrical Code of Practice issued pursuant to the Electricity (Safety) Regulations 2010.



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Embedded Generator	A person or organisation who generates electricity and whose generating units are directly connected to a Distribution Network.
Embedded Network Operator	Means an entity that operates a public or private network for supply to itself or other parties.
Event	An unscheduled or unplanned (although it may be anticipated) occurrence on or relating to a system, including, without limiting that general description, faults, incidents and breakdowns and adverse weather conditions being experienced.
Generator	Any other person or Organisation that generates and supplies electricity.
Good Industry Practice	Means the exercise of that degree of skill, diligence, prudence and foresight which would reasonably and ordinarily be expected from a skilled and experienced operator engaged in the same type of undertaking under the same or similar circumstances and includes adherence to the principles laid out in any code of practice generally adopted by the electrical industry.
High Voltage	Any line voltage exceeding 1000 volts ac or 1500 volts dc.
kVA	Kilo-volt-ampere (1000 volt-amperes)
kW	Kilo-watt (1000 watts).
Line Function Services	The provision, operation and maintenance of electric lines, substations, related equipment and all other services necessary for the conveyance of electricity from Generators to Customers' Network Connection Points including the procuring of contracts with Transpower for the connection of the Distributor's Network, the provision of a Load Control Service and the allocation of Losses.
Load Control Service	The function of reducing or interrupting a part or all of a Customer's supply of electricity on the basis agreed between the Retailer and Distributor at the date of this agreement or such other basis as may be agreed between the Distributor and the Retailer with the principal purpose of optimising TPNZ charges and minimising existing and future network capacity requirements.
Low Voltage	Any line voltage exceeding 32 volts ac or 115 volts dc, but not exceeding 1000 volts ac or 1500 volts dc.
MVA	Mega-volt-ampere (1,000,000 volt-ampere)
MVA_r	Mega-var (1,000,000 vars).
MW	Mega-watt (1,000,000 watts).



DISTRIBUTION CODE

Network Connection Agreement	The agreement issued by Westpower confirming its approval for the User to connect to the Distribution Network.
Network Connection Point	The point of connection at which a supply of electricity may flow between the Distribution Network and the Customer's Installation as defined by the Distributor.
Network Point of Supply	The point or points of connection between the Distribution Network and Transpower's network or any Generator or any other distribution network through which the Distribution Network receives a supply of electricity.
Network Standards	The Westpower Network Extension Design Standards, Network Extension Construction Standards, Network Extension Arrangement Drawings and Network Extension Component Drawings.
New Capacity Agreement	The agreement between the Distributor and the Retailer or the Customer (as appropriate) to supply new capacity or upgraded capacity or other requirements of the Distribution Network to meet the needs of the Retailer or the Customer.
Normal Operating Frequency	The number of alternating current cycles per second, expressed in hertz, at which the system normally operates, ie 50 Hertz.
Operational Boundary	The boundary between the equipment operated by Westpower or a User and the equipment operated by another, as specified in the relevant site responsibility schedules.
Operational Diagram	A schematic representation of the HV apparatus and the connection to all external circuits at a connection point, incorporating its numbering, nomenclature and labeling.
Outage	Removal of equipment from service, generally to permit maintenance or other work to be undertaken.
Ownership Boundary	The boundary between the equipment owned by Westpower and the equipment owned by the User.
Planned Outage	A pre-planned outage of generating plant, or of part of the Transpower transmission system, or of part of a Distribution Network.
Point of Connection	The point of interconnection of a User and includes all Network Connection Points.
Power Factor	The ratio of active power to apparent power.
Power Station	An installation comprising one or more generating units, even where sited separately, which are owned and/or controlled by the same Generator and may reasonably be considered as being managed as one power station.



DISTRIBUTION CODE

Protection	The provisions for detecting abnormal conditions in a system and initiating fault clearance, or actuating signals or indications.
Quality of Supply	A satisfactory supply of electricity pursuant to this Code and the Electricity (Safety) Regulations 2010.
Reactive Power	The product of voltage and current and the sine of the phase angle between them, which is normally measured in Kilo-vars (kVAR) or Mega-vars (MVAR).
Regulations	Regulations made pursuant to the Electricity Act 1992.
Request for Supply	The application form required by Westpower to connect to the Distribution Network.
Retailer	Means an Electricity Supply Business which uses the Distribution Network for the purpose of conveying electricity it is selling to Customers whether with or without Line Function Services it is selling.
Superimposed	Those electrical signals carried on a Distribution Network for the purpose Signals of information transfer or load management.
System	A Distribution Network running at various voltages.
System Connection Form	The form obtained from the electricity Retailer to be completed by the User to obtain a supply of electricity.
System Control	The administrative and other arrangements established to maintain as far as possible the proper safety and security of a system.
System Tests	Those tests which involve simulating conditions or the controlled application of irregular, unusual or extreme conditions on the total system or any part of it, but not including routine testing, commissioning or recommissioning tests.
Top-Up	The supply of electricity to a User on a continuing or regular basis to make good any shortfall between the User's total supply requirements and that met from other sources.
Total System	The Transpower transmission system and the Distribution Networks and any other transmission or Distribution Networks throughout New Zealand.
TPNZ	Transpower New Zealand Ltd, its successors and permitted assigns.
TPNZ Network	The electricity transmission network owned and operated by TPNZ.
Use of System Agreement	An agreement between the Retailer and the Distributor for the provision of Line Function Services.



DISTRIBUTION CODE

User	Any person or organisation using the Distribution Network, but excluding Transpower. It includes all customers with Connection Agreements, embedded generators, Retailers, and Embedded Network Operators.
User System	Any system owned by a User including Customer Installations, generating units, Distribution Networks, equipment connecting generating units or Distribution Networks.
User With Own Generation	A User with one or more generating units connected to the customer's system providing all or part of the customer's electricity requirements and which may use the Distribution Network for the transport of any surplus of electricity being exported.



DISTRIBUTION CODE

8 WESTPOWER STANDARD - DOCUMENT CHANGE REQUEST

Memo To: General Manager, Assets & Engineering Services,
Westpower Asset Management Group,
P O Box 375,
Greymouth.

Change Details:
(Attach separate sheets
as necessary).

**Paragraphs
Affected:**

Priority: **Urgent** (Within 1 week) **Routine** (Within 12 months) **Low** (Next Review)

Submitted By (Print Name)	Date
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Document Change Request - Acknowledgement

Dear

Thank you for your suggestion regarding changes to the above mentioned document.

Your request has been noted and added to our works program. Should we require any additional information regarding your notification then we will be in contact with you.

Thank you for your contribution to improving the quality of Westpower’s documentation.
Regards,

.....
General Manager, Assets & Engineering Services **Date**