STATUTORY INSTRUMENTS
2003 No. 24

THE ELECTRICITY (PRIMARY GRID CODE) REGULATIONS, 2003

ARRANGEMENT OF REGULATIONS

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IN EXERCISE of the powers conferred upon the Electricity Regulatory Authority by section 121 of the Electricity Act, 1999 these Regulations are made this 11th day of April, 2003.

1. Citation

These Regulations may be cited as the Electricity (Primary Grid Code) Regulations, 2003.

2. Interpretation

In these Regulations, unless the context otherwise requires-

"Act" means the Electricity Act, 1999;

"active" means the time integral for the product of voltage and the in-phase component of current flow;

"apparent power" means the square root of the sum of the squares of the active power and reactive power;

"business day" means a day, other than a Saturday, Sunday, or public holiday;

"complaint" means a written or verbal expression of dissatisfaction about an action, proposed action, or failure to act by a licensee or retail seller, its employees or contractors;

"confidential information" means any information specified under clause 1.5 of the Schedule;

"connect" means the making and maintaining of contact between the electrical systems of two persons such as may allow the supply of electricity between those systems;

“consumer” means any person supplied or entitled to be supplied with electrical energy for personal, industrial or commercial use but does not include a person supplied with electrical energy for delivery to another person;

“control area” means the area in which a licensee has installed equipment and is able to exercise physical supervision and control over the equipment;

“date of receipt” means in relation to the receipt by a consumer of a notice given by a licensee or retail seller-

(a) in the case where the licensee or retail seller hands the notice, or sends a facsimile of the notice to the consumer, the date the licensee or retail seller hands such notice or sends it;

(b) in the case where the licensee or retail seller leaves the notice at the consumer’s supply address, the date the licensee or retail seller leaves it;

(c) in the case where the licensee or retail seller gives the notice by post, a date 7 business days after the date the licensee or retail seller posts the notice;

“demand” refers to the active power or apparent power consumed by a consumer in respect of an electrical installation integrated over a fifteen or thirty minute period;

“distribute” in relation to electricity, means to distribute electricity to a consumer’s point of supply using a distribution system;

“distribution area” means the area in which a licensee is licensed to distribute electricity;

“distribution licence” means a licence to distribute electricity;

“distribution system” in relation to a licensee, means a system of electric lines and associated equipment at nominal voltage levels of 33 kV or below which that licensee is licensed to use to distribute electricity under its distribution licence;

“licensee” means the holder of a licence under the Act;

“electrical installation” means any electrical equipment at a consumer’s supply address that is connected to, but not part of a distribution system;

“embedded generating unit” means a generating unit which is connected to a distribution system;

“embedded generator” means a generator whose embedded generating units are connected to a distribution system;

“emergency” means an emergency due to the actual or imminent occurrence of an event which in any way endangers or threatens to endanger the safety or health of any person or which destroys or damages, or threatens to destroy or damage any property;

“energy” includes active or reactive electrical energy;

“ERA” means the Electricity Regulatory Authority established under the Act;

“excitation control system” in relation to an embedded generating unit means the automatic control system that provides the field excitation for the embedded generating unit including excitation limiting devices and any power system stabiliser;

“franchise consumer” refers to a consumer other than a non-franchise consumer and an embedded generator;

“generating unit” means an electricity generator and related equipment essential to its operation, which together function as a single unit;

“generation licence” means a licence to generate electricity issued under the Act;

“generator” means a holder of a generation licence or a person who has been exempted from the requirement to obtain a generation licence;

“governor system” means the automatic control system which regulates energy input (for example, steam, gas and water) into the turbine of a generating unit;

“IEC” means the International Electrotechnical Commission, Switzerland;

“IEEE” means the Institute of Electrical and Electronic Engineers, New York;

“impulse voltage” means a wave of voltage which, without appreciable oscillations, rises rapidly to a maximum value and falls, usually less rapidly to zero with small, if any, loops of opposite polarity;

“interruption” refers to temporary interruption of supply to a consumer but does not include disconnection for non-payment of bills or non-compliance with this Code;

“load” means a customer’s demand for electricity at a supply point;

“point of common coupling” means the nearest point in a licensee’s distribution system where connection is made between-

(a) the licensee’s distribution system and another licensee’s distribution system; or

(b) two or more consumers’ electrical installation;

“point of connection” in relation to an embedded generating unit, means the point at which the embedded generating unit is connected to the licensee’s distribution system;

“point of supply”

(a) in relation to a low voltage electric line, means-

(i) in the case of an underground line (unless sub-paragraph (iii) applies) the point at which that line crosses the boundary of the land;

(ii) in the case of an overhead, line (unless sub-paragraph (iii) applies), the first point of connection of that line on the land being either-

(A) if the line is carried onto the land by one or more poles, the first pole on the land carrying that line;

(B) if the line is connected directly to premises on that land, that connection to the premises;

(C) if it is not possible to determine the point of supply in accordance with sub-sub-paragraph (A), the point at which the line crosses the boundary of the land; and

(iii) in the case of a line connected to a licensee's assets, the point at which the line is connected to a licensee's assets; and

(b) in relation to a high voltage electric line, means the point agreed between the relevant licensee and the consumer supplied by that electric line;

"power factor" means the ratio of the active power to the apparent power;

"public lighting" means lighting provided by a licensee to a municipality or other local authority for the purpose of lighting public places;

"quality of supply" means the measure of the ability of the distribution system to provide supply that meets the voltage quality requirements of these Regulations;

"reactive energy" means the time integral of the product of voltage and the out of phase component of current flow;

"reactive power" means the rate at which reactive energy is supplied;

"redundant load" means a load connected to the distribution system that is planned to be permanently disconnected;

“reliability of supply” means the measure of the ability of the distribution system to provide supply to consumers;

“retail sales” means sales of electricity to consumers;

“retail seller” means a person who holds a licence for retail sales of electricity, or exempted from the requirement to obtain such a licence pursuant to the Act;

“rural area” means an area supplied with electricity by an electric line which-

(a) forms part of a distribution system; and

(b) is a single feeder, the length of which measured from the relevant zone substation is at least 15kms;

“sale licence” means a licence to sell electricity pursuant to the Act;

“supply” means supply to consumers, generation, transmission, distribution and sale including importation and exportation of electrical energy;

“supply address” means the address where the consumer is being supplied with electricity;

“System Operator” means a person designated to operate the power system as described in section 56 of the Act;

“total harmonic distortion” means the ratio of the root-mean-square of the harmonic content to the root-mean-square of the fundamental quantity, expressed as a percent of the fundamental;

“Tribunal” means the Electricity Disputes Tribunal established by the Act;

“voltage” (except in the case of Impulse Voltage, means the Root Mean Square (RMS) of the phase to phase voltage.

3. Establishment of Grid Code.

The Grid Code required to be established by the Authority under section 121 of the Electricity Act, 1999 shall be as specified in the Schedule to these Regulations.

SCHEDULE.

SCHEDULE

GRID CODE

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THE UGANDA GRID CODE

INTRODUCTION

1.1 Application.

1.1.1 This Code provides the guidelines and procedures for the licensees of the electric power system to operate the Uganda power system.

1.1.2 It is recognised that prior to the introduction of this Code generation licensees have concluded Power Purchase Agreements (PPA) that may be at variance with provisions of this Code. Nothing contained in this Code is intended to modify the parties' rights and obligations under the PPA. In the event of any conflict, the PPA shall take precedence only to the extent that it does not affect the security and safety provisions specified in this Code.

1.2 Scope.

1.2.1 This Code shall be complied with by all generation licensees ("generator"), the Grid System Operator ("System Operator"), the distribution licensees ("distributor") and consumers connected to the High Voltage Transmission Grid (HVTG) ("big consumer") in the course of their respective businesses.

1.2.2 This Code shall be administered by the Uganda Grid Code Committee (the "Committee") who shall be empowered by the Electricity Regulatory Authority ("ERA") under section 14 of the Act, while ERA is empowered to make final decisions on amendments of this Code in consultation with the Committee.

1.3 General requirements.

1.3.1 This Code contains rules and procedures for the efficient management of the electric supply industry in Uganda, taking into account a wide range of operational conditions that are likely to be encountered under normal and exceptional circumstances. This Code does not predict and address all possible operational situations, so that in such unforeseen circumstances, the System Operator shall be required in

the course of the discharge of his or her responsibilities to act decisively to meet any of the following requirements-

(a) the avoidance of breakdown, separation or collapse (total or partial) of the Grid System;

(b) the preservation or restoration of the integrity of the Grid System;

(c) the requirements of safety under all circumstances, including the prevention of personal injury;

(d) the prevention of damage to plant or apparatus and;

(e) the non-compliance by generators, distributors or big consumers with this Code.

1.3.2 In the absence of an applicable provision of this Code or any of these general requirements, the application of current good utility practice shall be conducted.

1.3.3 Generators, distributors of big consumers shall provide such reasonable co-operation and assistance to the Systems Operator as the System Operator may request in pursuance of all of the above general requirements including compliance with instructions issued by the Systems Operator.

1.4 Responsibilities.

1.4.1 All generators, distributors or big consumers shall provide such information to the System Operator as is necessary to facilitate compliance with this Code.

1.4.2 The responsibilities of the System Operator are to-

(a) supervise the operation of the Grid System;

(b) co-ordinate the planning of the Grid System with the generators, distributors and big consumers;

(c) perform the monitoring and reporting function required for the effective operation of this Code;

(d) submit periodic reports to the licensees, the Grid Code Committee and ERA;

(e) provide service to coordinate interconnections to the Grid; and

(f) provide data to ERA to support the development and expansion plans for the Grid System.

1.5 Confidentiality.

1.5.1 The System Operator, in the pursuance of its obligations, shall receive information from the generators, distributors and big consumers relating to their respective businesses.

1.5.2 Some of the information received by the System Operator may be considered proprietary by the generators, distributors, or big consumers. The System Operator shall keep information that is labeled confidential and not release it to any person without the approval of the generator, distributor or big consumer. ERA may further determine that certain information while not labeled as such be considered to be confidential. If the System Operator breaches this confidentiality, it shall be subject to penalties as may be determined by ERA.

2.0 GENERAL CONDITIONS.

General conditions apply to all provisions of this Code. Their objective is to ensure, to the extent possible, that all sections of this Code work towards the effective and efficient operation of the Grid System and to ensure safety.

2.1 Unforeseen circumstances.

2.1.1 If circumstances arise which the provisions of this Code have not foreseen, the System Operator shall, to the extent reasonably practicable under the circumstances, consult promptly all affected

generators distributors and big consumers in an effort to reach agreement as to what action if any, should be taken.

2.1.2 If agreement between the System Operator and generators, distributors or big consumer cannot be reached in the time available, the System Operator shall determine what actions, if any, should be taken and shall notify the generators, distributors, big consumers and ERA immediately thereafter.

2.1.3 Wherever the System Operator makes a determination, he or she shall do so having regard, in any event, to what is reasonable in all circumstances towards maintaining the reliability and safety of the system.

2.1.4 Each generator, distributor and big consumer shall comply with all instructions of the System Operator following such a determination; provided the instructions are consistent with the then current technical parameters of the particular generator, distributor and big consumer as registered under this Code. The System Operator shall promptly refer all such unforeseen circumstances and any such determination to ERA.

2.1.5 If such instructions by the System Operator are outside the then current technical parameters of a particular generator or distributor, the matter shall be determined in any emergency by ERA. The matter shall then be brought before the Grid Code Committee for consideration of a revision of the Grid Code.

2.2 The Grid Code Committee.

2.2.1 ERA shall establish and maintain the Grid Code Committee (the "Committee") under the Act.

2.2.2 The functions of the Committee are-

(a) to regularly review this Code;

(b) to review all suggestions for amendments to this Code that are submitted by licensees or big consumers;

(c) to submit recommendations to ERA as to amendments to this Code that the Committee believes are necessary or desirable, and provide reasons for the recommendations;

(d) issue guidance on the interpretation, implementation and performance of this Code when required to do so by ERA;

(e) consider changes that may be necessary or desirable to this Code arising out of any unforeseen circumstances.

2.2.3 ERA may request the Committee for guidance on the interpretation, implementation and performance of this Code on it owns initiative or upon request by a licensee or big consumer.

2.2.4 The Committee shall consist of-

(a) a Chairperson who shall be a senior staff member of ERA appointed by the Chairperson of ERA;

(b) one person representing the System Operator;

(c) one person representing generators;

(d) one person representing distributors;

(e) one person representing Special Interest Groups as shall be determined by the Authority.

(f) one person representing the Uganda Institution of Professional Engineers.

2.2.5 The Committee shall have a Secretary who shall be a senior member of staff of ERA appointed by the Chairperson of ERA.

2.2.6 If the generators, distributors or Special Interest Group fail to agree on appointment of representatives to participate on the Committee, the Chairperson of ERA shall appoint those representatives from among the stakeholders of each group represented.

2.3 Meetings.

2.3.1 The Committee shall establish and adopt its own rules and procedures relating to the conduct of its business to be approved by ERA.

2.3.2 The Committee shall meet for a minimum of four times every year.

2.3.3 The Chairperson of the Committee may call any additional meetings that are considered necessary.

2.3.4 The Chairperson shall call an extraordinary meeting at the request of three or more members.

2.3.5 The notice of a meeting, along with the agenda and location of such meeting, shall be sent one month before the scheduled meeting date.

2.3.6 ERA shall serve as the Secretariat of the Committee and be responsible for co-ordination, notices and arrangements of the meetings.

2.4 Communication between the System Operator and Generators, Distributions and big consumers.

2.4.1 All operational instructions given by the System Operator and communications unless otherwise specified in this Code (other than relating to the submission of data and notices) between the System Operator and a generator shall take place between the System Operator and the generator's power station.

2.4.2 Unless otherwise specified in this Code, all instructions given by the System Operator, and communications (other than relating to the submission of data and notices) between the System Operator and generators, distributors and big consumers shall be given by telephone or voice recording, electronic message or by facsimile and shall be confirmed within 24 hours. Confirmation may be by telephone, electronic message or in writing.

2.4.3 The recording (by whatever means) of instructions or communication given or made by telephone shall be accepted by the System Operator and generators, distributors and big consumers as evidence of those instructions or communication.

2.4.4 All messages sent by telephone or radio shall be repeated by the receiving party to ensure that the receiving party has clearly understood such instructions. Names of the originator and recipient of such instruction or communication shall be logged at relevant ends. Copies or recordings of all communications given by the System Operator by whatever means shall be retained by the System Operator for 12 months.

2.4.5 Technical data and notices to be submitted to the System Operator under this Code (other than that data which is subject to a specific requirements of this Code as to the manner of its delivery) shall be delivered in writing either by hand or sent by registered post, or in case of insufficient time, by facsimile transfer, and followed by the original by way of registered post or by hand.

2.5 Uganda Standards and Codes of Practice.

All installations, equipment, plant or apparatus shall comply with Uganda National Bureau of Standards and Codes of Practice or in their absence, the IEE or British and IEC Standards. In the absence of each Standard or Code of Practice, the responsible agency shall be consulted, along with ERA, to get permission for the utilisation of good professional practice.

2.6 Procedures to settle disputes.

2.6.1 Any dispute between any generator, distributor, big consumer or the System Operator in relation to any provision of this Code may be referred to ERA.

2.6.2 ERA shall decide on the dispute and make an order accordingly. The practice and procedure to be followed in the determination of a dispute shall be such as ERA may consider appropriate.

2.6.3 Any directly affected person who feels aggrieved by the decision of ERA under paragraph 2.6.2 may appeal against ERA's decision to the Tribunal established under Part XIII of the Act.

3.0 SYSTEM OPERATIONS CODE.

3.1 Introduction.

System Operations Code provides guidelines, criteria and procedures to promote co-ordinated operation of the Grid System in Uganda.

3.1.1 Objective.

The objective of the System Operations Code is to ensure that adequate and reliable electric power supply is available to the consumers of the Uganda electric power system under normal, and to as large an extent as possible, under emergency operating conditions. The reliability criteria for normal as well as emergency conditions are described in the System Operations Code.

3.1.2 Scope.

The System Operations Code is applicable to all generators, distributors, big consumers and the System Operator in the Grid System of Uganda.

3.1.3 Implementation.

ERA is responsible for the ratification, interpretation, application and revision to the System Operations Code in consultation with the Grid Operations Code Committee.

3.2 Operational Planning.

3.2.1 Introduction.

The operational plans include scheduling the operation of the generators to ensure reliable operating margins, scheduling operating configurations of the transmission system, developing procedures for maintaining system integrity during emergencies and planning maintainance outages with the generating plants, big consumers, transmission and distribution facilities.

3.2.2 General Operational Planning Criteria.

The operational plans for the Grid System are based on the operations criteria to maintain the reliability and continuity of supply.

3.2.2.1 Capacity Regulation.

The Grid System shall operate sufficient generation capacity to meet its obligation to continuously balance its generation to meet the system load.

3.2.2.2 Voltage Control.

The Grid System shall operate capacitive, inductive, reactive generation scheduling, transmission lines scheduling and load shedding at proper levels to maintain system voltages within established high and low limits (+or-6% at low voltage). Reactive generation scheduling, transmission and switching and load shedding if necessary, shall be implemented to maintain these levels. Each generator shall maintain adequate MVAR reserve resources to support its voltage under credible contingency conditions.

3.2.2.3 Time and Frequency Regulation-

(a) frequency shall be scheduled at 50Hz (+or-0.5) and controlled to that value except for those periods in which frequency deviations are scheduled to correct for time error;

(b) operating limits for frequency deviation and time error shall be established with Grid System reliability as first priority;

(c) each generator shall participate in time error correction procedures;

(d) The Grid System Operator shall co-ordinate the time error correction procedures.

3.2.2.4 Inadvertent Interchange Management.

Each generator shall, through daily schedule verification and the use of reliable metering equipment, accurately account for inadvertent interchange. Recognising generation and load patterns, each generator shall be active in preventing inadvertent interchange accumulation.

3.3 Operating Reserves Criteria.

3.3.1 Introduction.

The Grid System shall operate its capacity resources to provide for a level of operating reserves, sufficient to account for such factors as errors in fore-casting, generation and transmission equipment unavailability, number and size of generating units, system equipment, forced outages, maintenance schedules, regulating requirements and system load diversity.

3.3.2 Operating Reserves.

Operating reserves consist of spinning reserves and non-spinning reserves.

3.3.2.1 Spinning reserves constitute the additional output from generating plant that must be realisable in real time in order to arrest a drop of system frequency due to a loss of generation or a loss of external inter-connector or mismatch between generation and demand.

3.3.2.2 Non-spinning reserves constitute the output available from standby generating units that can be synchronised and loaded up within 5 minutes for a hydro and 30 minutes for a thermal plant to respond to abnormal demand increase or further generating units breakdown.

3.3.3 Allocation of Operating Reserves.

3.3.3.1 The System Operator shall allocate sufficient spinning reserves to be distributed among the various generating units in the Grid System as a contingency against loss of generation, error in demand forecast, sudden increase in demand or reduction in generation capacity. The operating reserves shall be large enough to cover the loss of the largest generating unit in the system.

3.3.3.2 Non-spinning reserves may be allocated to any generator or generating unit as long as that generating unit has not been allocated as part of the spinning reserves and can be synchronised and put on line within 30 minutes.

3.4 System Voltage and Reactive Power Criteria.

3.4.1 Reactive Power Reserve Guidelines.

(1) Where it is practicable and economic, each generator, distributor and big consumer of the Grid System shall meet its local reactive requirements. Generators shall in addition carry sufficient reserve reactive capacity to protect the system voltage levels under any contingency condition. Distributors shall ensure sufficient reactive equipment to maintain power factor within required limits (not less than 0.9).

(2) The reserves shall be planned and set to be applied effectively within the appropriate time interval when contingencies occur.

(3) With automatic voltage regulating equipment in service at power stations set to appropriate voltage levels, the system is to some extent self-regulating.

3.4.2 System Voltage Criteria.
Each generator and the System Operator shall co-ordinate the use of voltage control equipment to maintain transmission voltages as specified in the Connection Agreement prepared by the System Operator and generators in co-operation and approved by ERA, and reactive flows to maintain system security and stability.

3.4.3 Co-ordination by the System Operator.
On the basis of the expected power flows, the System Operator shall determine the required voltage profile of the system and allocate the MVAR generation and reactive reserve capacity required in each section of the system and generating unit to ensure the maintenance of satisfactory voltage levels in the event of loss of circuits. The System Operator shall arrange the reactive output of generating units to meet the reactive requirements as economically as possible.

3.4.4 Responsibility of the Generators.
Generators shall operate their plant to maintain the specified voltage levels and provide reactive capacitive and inductive VARS as instructed by the System Operator.

Generators shall inform the System Operator of any difficulties in meeting the agreed voltage levels or in providing the reactive requirements. They shall in addition ensure that automatic voltage regulators and VAR limiters are continuously in service and inform the System Operator whenever a generating unit is operating without its automatic voltage regulator or VAR limiter.

3.4.5 Emergency Operations Criteria.

To maintain stable conditions throughout the system under emergency conditions, the following emergency operations criteria shall be followed by the system Operator, generators and distributors accordingly-

1. Sudden Voltage Fall-

(a) in the event of a sudden fall in system voltage and a corresponding sudden rise in reactive power generation, each generating unit shall maintain the additional MVAR output that the units have picked up and shall not reduce field current or adjust transformer taps until instructed by the System Operator, except when adjustment is necessary to keep units within their capability limits;

(b) when requested by the System Operator, generating units shall increase MVAR output to the capability of the units. Capability output of units shall be determined by rotor, stator, transformer oil and temperature limits set by the manufacturers or the maximum name plate rating output of the exciter;

(c) normal running shall be resumed on instruction from the System Operator; and

(d) The System Operator may ask distributors and big consumers to lock transformer tap positions or shed load when necessary in order to maintain stable voltage.

2. Sudden Voltage Rise.
In the event of a sudden rise in system voltage and a corresponding fall in reactive generation, generating units shall not take action to recover the MVAR generation lost on the units. Field current shall not be increased or transformer taps adjusted until instructed by the System Operator, except when adjustment is necessary to keep units within their stability limits.

3.5 Operations Plans.

3.5.1 Introduction.
The generators and the System Operator are responsible for maintaining a set of current plans which are designed to evaluate options and set procedures for reliable operation through a reasonable future time period. In addition, each generator, working with the System Operator, is responsible for using available personnel and system equipment to implement these plans to assure that Grid System reliability is maintained.

3.5.2 Objectives.
The objectives of the Operations Plans are-

(a) to inform all generators, distributors or big consumers whose Systems are connected to the Grid System, of the procedures and responsibilities which are required to execute the operations plans; and

(b) to enable the System Operator to co-ordinate operations and outages of centrally dispatched generating units taking into account transmission system outages, so as to provide the maximum reliability of electric power delivery at the lowest cost.

3.5.3 Basic Operating Requirements.
The following provisions present the basic operating requirements pertaining to operations plans for the Grid System-

1. Normal Operations.
   Each generator, working with the System Operator, shall plan its future operations so that normal interconnection operation proceeds in an orderly consistent manner and each distributor shall provide its best estimate of demand to the System Operator so that the System Operator can develop the total demand forecast.

2. Planning for Emergency Conditions.
   A set of plans shall be developed, maintained and implemented by each generator and the System Operator, to cope with operating emergencies. These plans shall be conducted with other generators and the System Operator as appropriate.

3. Long-term Deficiencies.
   Each generator and the System Operator shall maintain comprehensive, co-ordinated procedures to deal with long-term capacity or energy deficiencies.

4. Load Shedding.
   Each distributor or big consumer co-ordinated by the System Operator, shall establish a program of manual and automatic load-shedding which is designed to arrest frequency or voltage decays that could result in an uncontrolled failure of the Grid System. The program shall be co-ordinated throughout the Grid System to prevent unbalanced load-shedding which may cause high transmission loading and extreme voltage deviations.

5. System Restoration.
   Each generator, co-ordinated by the System Operator shall develop and periodically update a logical plan to re-establish the system in a stable and orderly manner in the event of a partial or total collapse of the system. This plan shall be co-ordinated with other control areas in the Grid System to ensure a consistent Grid System restoration plan. A reliable and adequate source of start-up power for generating units shall be provided. Where sources are remote from the generating unit, instructions shall be issued to expedite availability.

Generation restoration steps shall be verified by actual testing whenever possible. System restoration procedures shall be verified by actual testing or by simulation.

6. Communications for the Grid System.
The System Operator is responsible for maintaining continuously available communication with all generators and distributors.

(a) Facilities.
Each generator and distributor, and the System Operator, shall provide adequate and reliable telecommunication facilities, including telephone, internally and with other systems and control areas (where appropriate) to ensure the exchange of information necessary to maintain reliability. When possible these facilities shall be redundant and diversely routed.

(b) System Operator Communication Procedures.
Procedures for operator-to operator communication shall be established by each generator or distributor working with the System Operator so that communication between operating personnel is consistent, efficient, and effective during normal and emergency conditions.

(c) Loss of Communication.
Operating instructions and procedures shall be established by each control area to enable operation to continue during the loss of communication facilities.

3.5.4 Annual Operations Plan.

3.5.4.1 Basic Guidelines.
The annual operations plan shall contain sufficient information in a suitable form to assess the following-

(a) the adequacy and capability of generating units to meet forecast demand and energy for the next year to 5 years ahead;

(b) verification that generation and transmission outages are planned to maximise resource utilisation, optimise placement of generation outages to produce a minimum running cost;

(c) ensure that the operational problems likely to be encountered are highlighted and alternative solutions considered and evaluated; and

(d) verification that the actions taken and emergency procedures issued to deal with possible abnormal system conditions are adequate and satisfactory.

3.5.4.2 Procedural Requirements.

The formal operations planning procedures to implement these major steps require-

(a) the dates by which relevant programs shall be issued;

(b) determination of the responsibility for the System Operator and the generators and distributors to produce and provide data;

(c) definition of the work necessary for the System Operator and the generators and distributors to contribute towards the annual operations plan; and

(d) the lines of communication and interaction between the System Operator and the generators and distributors.

3.5.4.3 Co-ordination of Maintenance.

The annual operations plan shall show that the outage requirements of the System Operator, generators and distributors are co-ordinated so that the security of the overall system is assured. These annual operations plans are viewed and confirmed annually while the quarterly outage plans are reviewed and confirmed quarterly.

3.5.5 Weekly Operations Plans.

3.5.5.1 Each week by 15.00 hours on Thursday the System Operator shall issue a preliminary weekly operations plan which shall run from 00.00 hours on the following Monday to 00.00 hours on the subsequent Monday. The weekly operations plan shall include all generating units that are on standby duty as non-spinning reserve.

3.5.5.2 By 10.00 hours on Saturday, the System Operator shall prepare a weekly operations plan that takes into account the generating units unavailability.

3.5.5.3 Each week the System Operator shall determine the allocation of reserve margin to each generator, with due consideration to start-up prices, response characteristics of the generating units on the Grid System, system constraints, availability of generating units, hydro dam levels and the lake inflows rates in its weekly operations plan.

3.5.5.4 The weekly operations plan shall state the amount of operating reserve to be utilised by the System Operator in the scheduling and dispatching process.

3.5.5.5 The Weekly Plan may include the possibility of shared spinning reserves with neighbouring systems.

3.5.6 Implementation Procedure for Annual Operations Plan.
These procedures shall be prepared by the System Operator and published in a document for reference by relevant parties.

3.5.7 Data Requirements.
A list of response capability data required in connection with spinning reserve for each generating unit shall be submitted to the System Operator before the unit comes into commercial operation and shall be updated by the end of April each calendar year and shall be within the parameters set out in the Connection Agreement between the System Operator and the generator. The System Operator shall be informed promptly of any change in these parameters.

3.6 Transmission Operations Planning.

3.6.1 Introduction.

Reliable operation of the Grid System facilities requires co-ordination among all participants. A high level of reliability is achieved in the operation of a Grid System when-

(a) transmission equipment is operated within its normal rating, except for temporary conditions after a contingency has occurred;

(b) the capability of components of the Grid System for both normal and emergency conditions has been established by technical studies and operating experience;

(c) when line loading, equipment loading or voltage levels deviate from normal operating limits or is expected to exceed emergency limits following a contingency, and if reliability of the bulk power supply is threatened, the Grid System Operator shall take immediate steps to relieve the conditions. These steps include notifying other systems, adjusting generation, changing schedules between control areas, initiating load relief measures, and taking such other action as may be required; and

(d) system operation shall be co-ordinated among systems and control areas. This includes co-ordination of equipment outages, voltage levels, MW and MVAR flow monitoring and switching that affects two or more systems of transmission components.

3.6.2 Grid System Operations Planning Procedures.

In order to accomplish the needed level of co-ordination, the System Operator shall perform studies to determine the Grid System operating configurations, how the system is to be operated within emergency transfer limits, how protective relaying is to be co-ordinated and how maintenance outages are to be co-ordinated.

3.6.3 Grid System Co-ordinating Studies.

1. Studies shall be made on a co-ordinated basis-

   (a) to determine the facilities on each system which may affect the operation of the co-ordinated area;

   (b) to determine operating limitations for normal operation when all transmission components are in service; and

   (c) to determine operating limitations of transmission facilities under abnormal or emergency conditions.

2. In determining ratings of transmission facilities, consideration shall be given to thermal and stability limits, short and long time loading limits and voltage limits.

3. Periodic studies shall be made to determine the Emergency Transfer Capability of transmission lines interconnecting control areas. Studies shall be made annually or at such other time that changes are made to the bulk-system which may affect the Emergency Transfer Capability.

4. Studies shall be made to develop operating voltage or reactive schedules for both normal and outage conditions.

5. Neighbouring systems shall use uniform line identifications and ratings when referring to transmission facilities of a grid system network. This shall foster consistency when referring to facilities and reduce the likelihood of misunderstandings.

6. The scheduling of outages of transmission facilities which may affect neighbouring systems shall be co-ordinated.

7. Any forced outage which may have a bearing on the reliability of the Grid System shall be communicated to all systems which may be affected.

3.6.4 Emergency Transfer Capability.

Emergency Transfer Capability is defined as the total amount of power above the net contracted purchases and sales which can be scheduled with assurance of adequate system reliability for transfers over the transmission network for periods up to several days, based on the most limiting of the following constraints-

(a) all transmission loadings initially within long-term emergency ratings and voltages initially within acceptable limits;

(b) bulk power system capable of remaining stable after absorbing the initial power swings and upon the loss of any single transmission circuit, transformer, bus section, or generating unit; and

(c) all transmission loadings within their respective short-time emergency ratings and voltages within emergency limits after the initial power swings following the disturbance but before system adjustments are made (and in the event of a permanent outage of a facility, transfer schedules may need to be reviewed).

3.6.5 Protection Co-ordination.

The satisfactory operation of the Grid System, especially under abnormal conditions, is greatly influenced by the relay equipment and relay schemes in effect. Relaying of tie points between the Grid System is of primary concern to the respective systems, although internal system relaying often directly affects the adjacent systems.

Individual generators and distributors have an obligation to implement relay application, operation, and preventive maintenance criteria according to the specifications on relays in the Technical Code. The application of the relay systems of the generators and distributors shall be co-ordinated by the System Operator to enhance the system reliability and yet have the least adverse effect on the Grid System.

3.6.6. Maintenance Co-ordination.

3.6.6.1 Introduction.

The Grid System and interconnections continually grow in size and complexity so that increasingly greater emphasis shall be placed on co-ordination of scheduled outages of equipment and facilities by the System Operator that significantly affect performance and reliability of the Grid System. Effective co-ordination of maintenance among systems and areas is essential in achieving the high degree of reliability required in the operation of the Grid System. It is additionally essential that the length of maintenance outages be examined and minimised as required.

3.6.6.2 Maintenance Co-ordination Procedure.

To accomplish maintenance co-ordination, the following procedures shall be followed-

(a) scheduled outages of generating capacity shall be planned and updated and co-ordinated between the System Operator and all generators as required within co-ordinated areas. Generating capacity maintenance schedules and revisions shall be exchanged with adjacent areas as required;

(b) scheduled outages of transmission facilities which may affect Grid System operation shall be co-ordinated within and among adjacent co-ordinated areas;

(c) scheduled outages of system voltage regulating equipment, such as automatic voltage regulators on generators, supplementary excitation control, synchronous condensers, shunt and series capacitors and reactors shall be co-ordinated as required. Field excitation strength, adequate for stability shall be maintained at all times on generating units whose automatic voltage regulators are out of service.

(d) scheduled outages of telemetry and control equipment and associated communication channels shall be co-ordinated between the affected areas.

3.7 Emergency Operations.

3.7.1 Introduction.

During the operations of the Grid System, contingencies may occur that include equipment failure, system faults and interruption of service due to natural elements. To maintain continuity of supply to the maximum number of customers, procedures must be followed by the System Operator, generators and distributors to perform emergency operations. The emergency operations include-

(a) System Disturbance Monitoring;

(b) Demand Reduction Procedures;

(c) Load-Shedding, Sectionalising and Restoration Procedures; and

(d) Black-Start Procedures.

3.7.2 System Disturbance Monitoring.

1. In the event of system disturbance, the primary requirements is to return the Grid System to normal state as soon as possible. The following shall be checked immediately and abnormality of any of them shall indicate that a serious System problem has occurred-

    (a) system frequency;

    (b) external interconnected parties tie-line flow;

    (c) sequence of events to determine the cause and the condition of the remaining Grid System;

    (d) status of the connected generating units; and

    (e) system voltages, especially in strategic transmission substations.

2. The System Operator shall-

(a) determine what remains intact in the Grid System;

(b) reconfigure the Grid System to a safe and secure state;

(c) reconnect consumers in stages; and

(d) ensure load or generation balance.

3.7.3 Demand Reduction Procedures.

3.7.3.1 Introduction.

In the event of insufficient generation, transfer of load breakdown or operational problems in whole or part of the Grid System, in order to keep system frequency within the limits to prevent the loading of transmission lines or equipment beyond their thermal limits, reduction in demand may be required. The procedures to reduce demand, prepared by the System Operator and approved by ERA, include-

(a) issuance of various warnings;

(b) consumer demand reduction;

(c) emergency manual disconnection; and

(d) automatic under-frequency demand disconnection.

The procedures for effective and well co-ordinated demand reduction to avoid or relieve operational problems in the Grid System are described in this clause.

3.7.3.2 Warnings of the Possibility of Load Reduction.

1. Issue of warnings-

(a) warnings shall be issued by the System Operator by telephone or fax to generators, distributors, big consumers and directly connected consumers.

When the estimates of the demand and plant availability for the following week indicate a potentially critical situation, warnings shall be issued as soon as possible, bearing in mind that adequate notice must be given to consumers;

(b) during periods of protracted plant shortage exceeding several days for whatever cause, warnings shall be issued. This shall be based on the best information available at that time and shall indicate the amount of demand reduction anticipated. Confirmation or modification of the warning shall be issued as and when appropriate;

(c) it may be necessary for the System Operator to issue a warning of possible demand reduction to cover a local situation where the risk of serious over loading of the generating and transmission equipment in a particular section of network is foreseen.

2. Objective of warning-

(a) the objective of warnings is to obtain the necessary demand relief required with the least possible inconvenience to consumers and to ensure that response to requests for disconnection or reduction is both prompt and effective. Demand reduction shall be required without warning if unusual and unforeseeable circumstances create severe operational problems;

(b) the warnings are to enable distributors, big consumers and directly connected customers to assess their demand disconnection or reduction requirements.

3. Types of warnings.

A colour-coded warning system is applicable during situations of serious protracted supply shortages as follows-

(a) Yellow warning.
A yellow warning shall be issued by the System Operator to generators and distributors, when, for any reason there is cause to believe that the risk of serious system disturbances is abnormally high. During the period of a yellow warning, generators and distributors affected shall be alerted and maintained in the condition in which they are best able to withstand system disturbances, like generators with means of safeguarding the station auxillary supplies shall bring them into operation. Generator's control room and substation staff shall be standing by to receive and carry out switching instructions from the System Operator or to take any authorised independent action.

(b) Orange warning.
An orange warning shall be issued during periods of protracted plant shortage to provide guidance to distributors in the most efficient utilisation of their manpower resources in implementing disconnections or demand reductions as outlined in the Load Curtailment Plan. To this end, estimates of the amount of demand reductions required together with the time and duration. That the demand reductions are likely to be enforced shall be included in the warning.

(c) Red warning.
A red warning shall be issued to indicate that demand reduction or disconnection under controlled conditions is imminent. Distributors shall take such preparatory action as is necessary to ensure that at any time during the specified period disconnection or reduction of supply may be applied promptly and effectively.

4. Hours and days of risk.
All warnings shall state the hours and days risk and in the case of orange warnings and red warnings, the estimated amount of load reduction.

5. Modification or cancellation of warnings.
   If after the issue of a warning, it appears that system conditions have so changed that the risk of load reduction is reduced or removed entirely, the System Operator shall issue the appropriate modification or cancellation by telephone or any other appropriate means.

3.7.3.3 Conditions requiring controlled load reduction.

Temporary plant shortage or overloading of the Grid System constitutes grounds requiring controlled load reduction.

3.7.3.4 Action resulting from the above prescribed conditions-

1. Whenever possible an orange or red warning shall be given to distributors as early as possible.

2. Arrangements shall be made to import more power from the neighbouring systems.

3. Except when protracted plant shortage is expected, load reduction shall be implemented to prevent the system frequency from falling below 49.5Hz.

4. The System Operator shall instruct controlled demand reduction to directly connected consumers. The issuance of these instructions shall be governed by the procedures specified in paragraph 2.4.2.

5. The System Operator shall instruct demand disconnection which has been pre-arranged into groups. The amount of demand disconnection depends on the severity of the operational problem.

6. When the system is normalised, the System Operator shall initiate demand restoration.

3.7.3.5 Protracted Plant Shortage or Overloading of Main System-

1. The System Operator shall give warnings as early as possible to the distributors to enable them assess their demand reduction or disconnection plan.

2. On the day during which demand disconnection is required, the System Operator shall confirm by telephone or fax to distributors to initiate the demand disconnection stating the amount, time and duration when such disconnection is required.

3. Distributors may rotate the demand disconnection to consumers as long as the amount of the demand curtailment remains the same.

4. The System Operator shall be kept informed of the amount of the demand disconnected and the time of the disconnection.

5. Demand restoration shall only be carried out with the agreement of the System Operator. The System Operator shall be kept informed as the restoration is implemented.

3.7.3.6 Situations requiring Rapid Demand Disconnection.

In certain circumstances, load reduction at consumers' terminals may not be adequate for relieving dangerous system conditions. In such circumstances, the System Operator may instruct block load-shedding (like tripping of feeders or transformers at substations). Subsequent notification shall follow to the generators, and distributors by telephone or fax.

3.7.3.7 Automatic Under-frequency Disconnection.

Each distributor shall make available up to a percentage to be determined, of its peak demand for automatic under-frequency disconnection through the installation of under-frequency relays to limit the consequence of major loss of generation. The percentage shall be specified by ERA in consultation with the Committee.

1. Demand shall be split into discrete MW blocks. The number, size, location and associated under-frequency setting of these blocks shall be specified by the System Operator as and when required in consultation with relevant distributors.

2. Following the allotted load dis-connections, should the system condition still be critical, the System Operator may request distributors to implement additional demand disconnection and restore the equivalent amount that has been disconnected earlier. This is to prepare for subsequent fall of frequency due to other potential operational problems.

3. Load disconnected by under-frequency relays may only be restored on instruction from the System Operator.

4. When a restoration instruction is given by the System Operator, it shall be carried out systematically under the instructions of the System Operator.

5. The System Operator may include big consumers and consumers directly connected to the Grid System in the under-frequency Demand Disconnection Scheme.

6. A generator may disconnect from the system either manually or automatically should the generating station itself be subjected to frequency that may cause damage to its generating sets. Such a disconnection facility shall be agreed upon by the System Operator.

7. After automatic disconnection or manual reconnection, the System Operator shall be informed immediately, or as soon as it is practically possible, of such action.

8. The System Operator shall be supplied with details of the actual load disconnected.

3.7.3.8 Equitable Load Reduction.

1. The System Operator, in consultation with distributors, shall endeavour, as far as practicable, to spread demand reduction equitably.

2. In protracted plant shortage or overloading of the main-system, large imbalances of generation and demand may cause excessive power transfers across the Grid System. Should such transfers endanger the stability of the Grid System or cause a risk of damaging transmission equipment, demand reductions shall proceed notwithstanding the inequalities of disconnection that may arise from such adjustments.

3.7.3.9 Preparation of Demand Reduction Plans.

1. The System Operator together with the distributors shall prepare a manual containing load shedding guidelines. This manual shall be updated as and when required.

2. The System Operator together with distributors shall prepare a load curtailment plan for appropriate levels of demand disconnection or reduction. This plan shall be revised as and when required.

3.7.3.10 Schedule and Dispatch during Demand Reduction.

During demand reduction, scheduling and dispatch in accordance with the Merit Order may be suspended by the System Operator. This shall be done only if pieces of equipment of the security of the grid is being threatened by overloads or under-voltages or instability.

3.7.3.11 The System Operator shall import as much power as possible from externally interconnected parties before implementing demand reduction.

3.7.4 Load-Shedding, Sectionalising, and Restoration.

3.7.4.1 Introduction.

A major disturbance in the Grid System may result in certain areas becoming isolated and experiencing abnormally low frequency and voltage levels. Any operation at low frequency causes a slowing down of electrically driven equipment, and in the case of generating plant auxiliaries, may make it impossible to increase or even maintain station generation. To provide emergency relief, general guidelines shall be adopted and implemented by the various interconnected areas and regions in the application of under-frequency relays or other means for shedding load, sectionalising systems, and isolating generation in cases of major disturbances.

3.7.4.2 General Guidelines.

1. All spinning reserve and emergency generating capability shall be utilised to the extent practicable before resorting to load shedding.

2. The main objectives in the application of under-frequency relays are to shed load, to sectionalise a system, or to isolate generation to aid in the early restoration of service and to minimise the loss of generating capability as a result of a major disturbance.

3. It is preferable to shed load in an emergency for a short period of time to aid in maintaining or re-establishing the interconnection, rather than risk operating for an extended period of time with low frequency and voltage.

4. Sufficient load shall be shed, either by automatic or manual means, so that the remaining load in any isolated area does not exceed the available generating capability in that area, regardless of ownership. Automatic shedding of load whenever possible is preferred to manual shedding because of the speed with which loads can be shed. The percentage of load to be shed by automatic percentage of load to be shed by automatic procedures may vary between areas.

The amount and location of the load to be the amount and location of the load to be shed shall be determined on the basis of studies relating to the specific area.

3.7.4.3 Load Shedding Procedures.

The System Operator shall co-ordinate the system load-shedding program and procedures.

3.7.4.4 Restoration Procedures.

To expedite restoration in the event of an area shutdown of generating capability, the following steps are taken-

(a) each system shall set up necessary operating instructions and procedures to cover emergency conditions, including loss of communication;

(b) where an outside source of power is necessary for start-up, necessary switching procedures shall be determined and periodically reviewed with dispatchers and the operating personnel;

(c) as soon as system conditions, including frequency and voltage permit, any separated area shall be synchronised with adjoining areas;

(d) when generating and transmission capability is available and frequency has been restored to normal, restoration of shed load shall begin. After agreement with the System Operator, dispatchers of the involved systems shall carefully co-ordinate the restoration of load; and

(e) at attended substations, any load shed by automatic or manual means shall be restored only upon direct or pre-arranged order of the dispatcher.

3.7.4.5 The System Operator shall co-ordinate the rate that load is restored to prevent adding load faster than generating and transmission capability permits.

3.7.4.6 Black Start Procedures.

Black start of the system may be required when the system experiences a total collapse or a partial collapse. Generators shall, in consultation with the System Operator, develop contingency plans to restart their own systems after a total or partial collapse in their area. All contingency plans shall be reviewed and updated periodically to reflect changes in the system and to address any deficiency found.

3. 8 Operational Liaison.

3.8.1 Introduction.

In order to maintain co-ordination of operation in the Grid System, the System Operator, generators, and distributors shall maintain communication and exchange information regarding the status of their respective systems and demand during normal operations and emergency situations.

3.8.2 Operation Liaison Procedures.

3.8.2.1 Liaison terms.

In this clause-

(a) “operation” means planned action on a system;

(b) “event” means unplanned occurrence, a fault, breakdown, incident or adverse weather conditions;

(c) “operation effect” means an operation of a system that is caused by another operation or event that happened in another system.

3.8.2.2 Requirement to notify Operations.

1. Operation on the Grid System.

The System Operator shall inform a generator, distributor or big consumer of an operation it intends to carry out that may have an effect on their system or demand. The intended time of operation shall also be notified.

2. Operation on a generator's or distributor's system.
A generator or distributor shall inform the System Operator of an operation which may have an effect on the Grid System. The System Operator may pass such information to other relevant generators or distributors if in the opinion of the System Operator, such generators or distributors are likely to be affected by the reported operation.

3.8.2.3 Situations where notification by the System Operator, generators, distributors or big consumers may be required-

(a) planned outage of plant, apparatus or demand;

(b) operation of any circuit breaker, isolator or dis-connector;

(c) voltage control;

(d) operation caused by any other event.

3.8.2.4 Notification Guidelines.

1. Notification shall have sufficient details to enable a recipient to assess the risk arising from such an operation or event. The name of the information provider shall be given. A recipient has the right to clarify such information. An information conveyer can only pass information that it has received and no more.

2. A generator or distributor cannot pass information it received from the System Operator to persons other than another generator or distributor connected to the System or apparatus. To these persons, a generator or distributor can only state that there has been an incident in the Interconnected System and the general nature of the incident (but not the cause) and the estimated duration (if known). Such information shall, if the need arises, be made available to ERA.

3. Except during an emergency, notification if orally received shall be written down and repeated back to the sender to confirm its accuracy.

4. Notification for a proposed operation shall be given as far in advance as possible, or as soon as possible after an event has occurred, to enable the other party to assess the implication and risks. In the case of an event, reporting shall be done immediately, or as soon as it is practically possible.

3.8.2.5 Requirement to notify Events.

1. Events on the Grid System.
For Events on the Grid System which have or may have operational effect on the system of a generator, distributor or big consumer, the System Operator shall inform the relevant generator, distributor or big consumer.

2. Events on a generator's distributor's or big consumers' system.
For an event on the generator, distributor or big consumers' system which may have an operational effect on the Grid System, the generator, distributor or big consumer shall notify the System Operator. If an event has occurred or if an operation that was done in a generator, distributor or big consumers' system caused another event another party's system, the second party has the right under this Code to inquire about the first event or operation from the first party. The first party shall notify the inquirer in accordance with the Operation Code.

3.8.2.6 Situations where notification of Events by the System Operator is required-

(a) overloading of plant or apparatus that may be a hazard to personnel;

(b) activation of alarm or indication of abnormal operating conditions;

(c) adverse weather conditions;

(d) breakdown of or faults on, or temporary changes in capabilities of plant or apparatus;

(e) breakdown of, or faults on control, communication or metering equipment;

(f) increased risk of inadvertent protection operation; and

(g) sudden extensive changes of demand.

3.8.2.7 Notification of Events Guidelines.

1. Notification consists of-

   (a) a description of the event with sufficient details (but not the cause) for a recipient to consider and assess the implication and risk;

   (b) full names and title of the individual reporting.

2. A recipient may ask questions to clarify. The reporting officer shall, in so far as he or she is able, answer the query raised. In answering a question, the second party shall not pass anything further than what it has been told by the first party.

3. The System Operator shall make available fault reports of the relevant part of the Grid System to ERA or any generator or distributor upon request.

3.8.2.8 Significant Incident Report.

1. If a generator, distributor or big consumer determines that an event under this Code is of significance, he or she may ask for a report of the event in writing from the party concerned in accordance with the provisions of this Code on system, fault and incident reporting.

2. The significant incident report shall contain as a minimum-

   (a) operation of plant or apparatus either manually or automatically;

(b) voltage outside statutory limits;

(c) frequency outside statutory limits;

(d) system instability.

3.8.2.9 Procedures for Significant Incidents.

1. A yellow warning shall be issued by the System Operator to all generators, distributors and big consumers who may be affected when the System Operator knows there is a risk of widespread and serious disturbance to the whole, or a part of the Grid Network.

2. The yellow warning shall contain such information as the System Operator deems appropriate. The distributor, generator and big consumer shall be furnished with extra information upon request.

3. For the duration of a yellow warning, each generator and distributor in receipt of the yellow warning shall take the necessary steps to warn its operational staff and to maintain its plant or apparatus in the condition in which it is best able to withstand the anticipated disturbance.

4. Scheduling and dispatch in accordance with the Merit Order may be affected during a yellow warning period.

3.9 System Fault and Incident Reporting.

3.9.1 Introduction.

This clause provides procedures to be adopted for reporting faults, breakdowns, and significant incidents which may happen in the Grid System or a generator, distributor or big consumer's system which has operational effect on the other's system. It also describes the procedure for setting up joint investigation of a significant incident.

3.9.2 Procedures for System Fault and Incident Reporting.

3.9.2.1 Written report of events by generators, distributors or big consumer to the system operator.

If the System Operator determines that an event, which was reported earlier by a generator, distributor or big consumer to be significant, or an event in its system is of significance, the System Operator may request a generator distributor or big consumer to submit a detailed written report of the event. The System Operator may not pass the report to other persons, but may use the information compiled, in preparing the report to another generator or distributor on the Grid System which has been affected by the significant incident on the generator or distributor's System.

3.9.2.2 Written report of events by the System Operator to generators, distributors or big consumers.

1. If a generator, distributor or big consumer determines that an event which was reported earlier by the System Operator is of significance, the generator, distributor or big consumer may request the System Operator to submit a written report for details of the event. The generator, distributor or big consumer shall not pass the report to other persons, but shall use the information contained in that report to prepare another report to other affected generators, distributors or big consumers which are connected to the Grid System.

2. A report prepared under this clause may contain a confirmation of oral notification with more details relating to the significant incident (although it need not state the cause of the event) and shall have, as a minimum, the contents specified under sub-clause 3.8.2.8.

3.9.2.3 Timing.

A written report of a fault shall be sent within 24 hours after receiving an official request and shall be in the form of a preliminary report. A full report shall be submitted within one month.

3.9.3.4 Joint Investigation.

The author of the written report or the recipient may request joint investigation of the significant incident if so warranted.

3.9.3 Exchange of information.

3.9.3.1 A knowledge of conditions in adjacent systems is essential to good operation. Information shall be transmitted to all parties associated with the operation of the system, to provide them with the opportunity to correctly assess any situation, and give the appropriate operating instructions.

3.9.3.2 Meetings shall be held to discuss long-range plans to develop strategies for inter-area operation.

3.9.3.3 Interconnected system shall develop a reliable means of communications between system operators. System Operators shall notify their counterparts of changes in system status such as-

(a) system facilities operating near critical levels;

(b) abnormal voltage conditions or problems;

(c) changes or degradation of protective relays;

(d) changes in maintenance that may have an effect on interconnected operation;

(e) generation or transmission outages;

(f) new facilities;

(g) changes in communication media or routes; and

(h) severe weather.

3.9.3.4 To ensure that communication networks are working properly and that timely exchange of information is taking place, specific procedures shall be implemented, between control centres of generators, distributors and the System Operator. These procedures shall identify what information is to be exchanged within a schedule.

3.9.3.5 Procedures for the routine exchange of operating information between systems on a scheduled basis, prepared by all parties associated with the operation of the system shall be established in addition to those required for operating instructions. This shall maximise the effectiveness of the communication system, while providing essential information on the status of the system to be available to the operators, consequently enhancing the operators' ability to perform effectively during emergency situations.

3.10 Testing and Monitoring.

3.10.1 Introduction.

This clause specifies the procedures for tests (other than routine tests by generators, at their own expense required by prudent utility practices to monitor the parameters of the generating units. This Code requires performing the following tests (which are subject to system conditions prevailing on the day)-

1. Tests on generating units to check if they have the capability to comply with the Connection Agreement and to provide the ancillary services that they are either required, or have pledged to provide, and that they meet their generation scheduling and dispatch parameters.

2. Tests on generating units to ensure that the generating units are available in accordance with their Availability Declaration.

3.10.2 Objectives.

The objectives of these tests are-

1. To establish that generating units can operate within their generation scheduling and dispatch parameters (or equivalents) and that generators comply with the Connection Agreements.

2. To monitor the provision of ancillary services and the testing of reactive power and automatic Frequency Sensitive Operation.

3. To establish whether each generation unit is available as declared.

4. To establish, where applicable, whether generators can provide those ancillary services which they are either required or have agreed to provide.

3.10.3 Procedures.

1. The System Operator shall monitor the performance of-

   (a) generating units against parameters registered; and

   (b) compliance by generators with the Connection Agreements.

2. In the event that a generating unit, in the System Operator's opinion fails to meet in any material respect the parameters registered as generation scheduling and dispatch parameters or a generator fails persistently to comply with the Connection Agreement as it is required, or has agreed to provide, the System Operator shall notify the relevant generator, giving details of the failure and of the monitoring that the System Operator has performed.

3. The relevant generator shall, as soon as possible, provide the System Operator with an explanation of the reasons for the failure, and the details of the action that it proposes to take within a reasonable period to enable the generating unit meet the required parameters.

4. The System Operator and the generator shall discuss the action that the generator proposes to take and shall endeavour to reach agreement as to the modified parameters which are to apply to the generating units, and the effective dates for the application of the agreed parameters.

5. In the event that agreement cannot be reached within 10 days of notification of the failure by the System Operator to the generator, the generator shall be required to perform a test to verify the results of the System Operator's queries.

6. For the purpose of monitoring dispatch error, the System Operator shall use a method which incorporates a specified number of sampling points which are, so far as possible equally spaced, every 30 minutes. The type of sampling points and source shall be determined by the Grid Code Committee.

7. In the allocation of costs (including unanticipated costs) between the generator and the System Operator, the general principle is that the test proposer (System Operator) shall bear the costs if the results of the test proposed subsequently show that the test is not justified and, in the same manner, the generator shall bear the costs of test proposed by the System Operator if the results of the test proposed show that the test is justified.

3.10.4 Procedure for testing the ability to comply with the Connection Agreement and to provide ancillary services.

3.10.4.1 Reactive Power Tests.

1. The System Operator may at any time, based on reasonable grounds, (although it may not do so more than twice in any calendar year in respect of any particular generating unit, except the extent that it can on reasonable grounds justify the necessity for further tests or unless the further test is a re-test) issue an instruction requiring a generator to carry out a test, at a time not sooner than 48 hours from the time the instruction is issued, on any one or more of the generator's generating units, to demonstrate that the relevant generating unit meets the Reactive Power Capability registered.

2. The instruction referred to in paragraph 1 may only be issued if the relevant generator has declared the relevant generating unit as available in an Availability Declaration for the schedule day current at the time at which the instruction is issued, in which event the relevant generator shall then be obliged to declare that the generating unit as available in an Availability Declaration for the time and the duration that the test is instructed to be carried out, unless the generating unit would not then be

available by reason of forced outage or planned outage expected prior to this instruction.

3. The test shall be initiated by the issue of Dispatch Instructions in accordance with the parameters submitted.

4. The test shall be performed in conformity with the test procedures specified by the Grid Code Committee.

3.10.4.2 Automatic Frequency Sensitive Testing.

1. Testing of this parameter shall be carried out wherever technically applicable as part of the routine monitoring of generating units' compliance with Dispatch Instructions for Frequency Sensitive Operation. The System Operator shall notify a generator that it proposes to carry out such a test at least 48 hours prior to the time of the proposed test, and the System Operator shall only make such a notification if the relevant generator has declared the relevant generating unit as available in an Availability Declaration for the time and for the duration that the test is instructed to be carried out, unless that generating unit would not then be available for reason of forced outage or planned outage expected prior to this instruction.

2. The test shall be performed in conformity with the test procedures prescribed by the Grid Code Committee.

3.10.4.3 Fast Start Capability Testing.

1. The System Operator may at any time, based on reasonable grounds and whenever technically applicable, (although it may not do as more than twice in any calendar year in respect of any particular generator except to the extent or unless the further test is a re-test) issue an instruction requiring a generator at a time not sooner than 48 hours from the time that the instruction is issued, to synchronise and load up to its offered availability, any one or more of the generating units.

2. The instruction referred to in paragraph 1 may only be issued if the relevant generator has declared that generating unit as available in any Availability Declaration for the schedule day current at the time at which the instruction in respect of the time that the test is instructed to be carried out, unless that generating unit would not then be available by reason of forced outage or planned outage expected prior to this instruction.

3. The test shall be initiated by the issue of Dispatch Instruction.

4. The test shall be performed in conformance with the test procedures prescribed by the Grid Code Committee.

3.10.4.4 Black Start Testing.

1. The System Operator may require a generator with a black start system to carry out a “Black Start Test” on a generating unit in a black start station in order to demonstrate that a black start station has a black start capability.

2. Where the System Operator requires a generator with a black start station to carry out a black start unit test, the System Operator shall not require the black start test to be carried out on more than one generating unit at the black start station at the same time, and shall not, in the absence of exceptional circumstances, expect any of the other generating units at the black start station to be directly affected by the black start unit test.

3. The System Operator may require a generator with a black start station to carry out a black start unit test once in a calendar year at a date mutually agreed between the System Operator and the generator.

4. Where the System Operator wishes a generator with a black start station to carry out a black start test, it shall notify the relevant generator at least 7 days prior to the time of the black start test with details of the proposed black start test.

5. The test shall be performed in conformity with the test procedures prescribed by the Grid Code Committee.

3.10.4.5 Other Ancillary Services.

Instruction shall not be issued for tests of other ancillary services, but monitoring of performance in response to system derived inputs shall be carried out in accordance with the procedures specified in paragraph 3.10.4.

3.10.4.6 Procedure for Availability Testing.

1. The System Operator may at any time carry out a test on the availability of a generating unit by scheduling and dispatching that generating unit. Accordingly, the generating unit shall be scheduled and dispatched to its declared dependable availability even though it may not otherwise have been scheduled and dispatched on the basis of the relevant Merit Order or on system grounds in the absence of the requirement for this availability test. The generator whose generating unit is the subject of the dependable availability test shall comply with instructions properly given by the System Operator relating to the declared dependable availability test.

2. The Generating Unit shall pass the test if it can maintain its load to the declared dependable availability for 4 hours continuously under normal system condition.

3.10.4.7 Dispatch Accuracy Testing.

1. The System Operator may at any time based on reasonable grounds, (although it may not do so more than twice in any calendar year in respect of any particular generating unit, except to the extent that it can on reasonable grounds justify the necessity for further tests or unless the further test is a re-test) issue an instruction requiring a generator to carry out a test, at a time no sooner than 48 hours from the time the instruction was issued, on any one or more of the generator’s generating units, to demonstrate that the relevant generating unit meets the

relevant generator scheduling and dispatch parameters which have been monitored under clause 3.10.3.

2. The instruction referred to in paragraph 1 may only be issued if the relevant generator has submitted an Availability Declaration relating to the generating unit in respect of the schedule day current at the time at which the instruction is issued, in which event the relevant generator shall then be obliged to submit an Availability Declaration for the generating unit in respect of the time and the duration that the test is instructed to be carried out, unless that generating unit would not then be available by reason of forced outage or planned outage expected prior to this instruction.

3. The test shall be initiated by the issue of Dispatch Instructions.

4. The test shall be performed in conformity with the test procedures prescribed by the Grid Code Committee.

3.10.4.8 Failure of generating unit to pass test and disputes.

1. If the generating unit concerned fails to pass the test, the generator shall provide the System Operator with a written report specifying in reasonable detail the reasons for any failure of the test so far as they are known to the generator after due and careful inquiry. This shall be provided within 3 business days of the test. If a dispute arises relating to the failure, the System Operator, with agreement of the generator, may carry out a re-test with a 48 hour notice.

2. If the generating unit concerned, in the System Operator's view fails to pass the re-test and a dispute arises on that, either party may refer such dispute to ERA for a decision as provided for under clause 2.6.

3. If it is determined that the generating unit has failed the test or re-test, the generator shall within 14 days or such longer period as the System Operator may agree, following such failure, submit in writing to the System Operator for approval the date and time by which the generator shall have brought the

generating unit concerned to a condition where it complies with the relevant capability and would pass the test. The System Operator shall not unreasonably withhold or delay its approval of the generator's proposed date and time submitted. Should the System Operator not approve the generator's proposed date or time (or any revised proposal), the generator shall amend such proposal having regard to any comments the System Operator may have made, and re-submit it for approval.

4. If a generating unit fails the test, the generator shall amend the relevant registered parameters of the generating unit relating to the capacity for which it has been tested for the period until the generating unit can achieve the parameters previously registered, as demonstrated in a re-test.

5. Once the generator has indicated to the System Operator the date and time that the generating unit can achieve the parameters previously registered, the System Operator shall either accept this information or require the generator to demonstrate that the relevant capability of that generating unit concerned has been restored by means of a repetition of the test by a 48 hours' notice. The provisions of this sub-clause shall apply to such further test.

4.0 SCHEDULING AND DISPATCH CODE

4.1 Introduction.

4.1.1 Scheduling the operations of generating units is a major component of operations plans. Scheduling of the generating units depends upon the pattern of demand by the system, the order-of-merit operation of generating units, the availability of generating units, the flexibility of operation of generating units, constraints on the transmission system, security requirements, and system losses.

4.1.2 Generation Scheduling procedures include the following-

1. The submission of an Availability Declaration by each generator to the System Operator.

2. The submission to the System Operator of any revised generation scheduling and dispatch parameters for the following availability Declaration Period by each generator.

3. The submission of certain system data by each generator to the System Operator.

4. The issue to the System Operator of a Generation Schedule the day before the schedule day.

5. Where an externally interconnected party outside the country is connected to the Grid System for the purpose of system security enhancement and economic operation (e.g. sharing of spinning reserve), the generation scheduling and hence, power transaction shall be governed by Inter-Utility Joint Operation Agreements and any other Inter-Utility Agreements.

6. Generation scheduling requires generator data to enable the System Operator to prepare a Merit Order to be used in scheduling (Unit Commitment) and dispatch (Economic Dispatch) and the preparation and issue of a Generation Schedule. Based on this data, the System Operator is required to ensure that there is sufficient generation to meet system demand at all times in the most economic manner, together with an appropriate margin of reserve, while maintaining the integrity of the Grid System and security and quality of supply.

4.1.3 Procedure.

4.1.3.1 The computation of the generation schedule shall require the following information-

1. Availability declaration.

2. Generation scheduling and generation dispatch parameters.

3. Other relevant generation data.

4.1.3.2 By 10.00 hours each day, each generator shall submit to the System Operator in writing (or by such agreed electronic data transmission facilities) the above information which shall be applicable for generation for the next period (following day) from 00.00 hours to 24.00 hours.

4.1.3.3 The generation data to be submitted shall be as specified by the Grid Code Committee.

4.1.3.4 The generation schedule shall be submitted by the System Operator to the relevant generator by 14.30 hours.

4.1.4 Availability Declaration.

4.1.4.1 The Availability Declaration is to be expressed in a whole number of MW per generator unit, in respect of any time period (specifying the time at which each time period begins and ends). Such Availability Declaration shall replace any previous Availability Declaration Period.

4.1.4.2 A revised Availability Declaration for a generating unit which, since the time at which the availability declaration for that generation unit under this paragraph was prepared, has either-

(a) become available at a different wattage to that which such generating unit was proposed to be made available for generation in any such Availability Declaration whether higher or lower (including zero); or

(b) in the case of a generating unit declared to be not available for generation in an Availability Declaration, has become available for generation. A revised Availability Declaration submitted by a generator under this clause shall state, for any generating unit whose availability for any generation is revised, the time periods (specifying the time at which each time period begins and ends) in the relevant availability declaration and, if such generating unit is available at what wattage, expressed in a whole number of MW, for each such time period.

4.1.5 Generation Scheduling and Dispatch Parameters.

4.1.5.1 The generation Scheduling and Dispatch Parameters shall reflect the true operating characteristics of generating units. Any revision to the generation scheduling and dispatch parameters from those submitted under a previous declaration shall be submitted for application for the following period. If such parameters are not revised, the previously submitted generation scheduling and dispatch parameters shall apply for the next following Availability Declaration period.

4.1.5.2 A generation schedule shall be compiled daily by the System Operator as a statement of which units may be required for the next following schedule day-

1. In compiling the generation schedule, the System Operator shall take account of and give due weight to the following factors-

   (a) Grid System constraints from time to time, as determined by the System Operator and as advised by generators;

   (b) for generating units, their parameters registered as generation Scheduling and Dispatch Parameters (including indications of generating unit inflexibility);

   (c) the requirements, as determined by the System Operator and as advised by distributors, for voltage control and MVAR reserves;

   (d) the need to provide operating margins (by using the various categories of reserves as specified in clause 3.3.2), as determined by the System Operator;

   (e) the requirements as determined by the System Operator for maintaining Frequency Control.

2. The Generation Schedule shall be compiled by the System Operator to schedule such generating units taking into account the above factors and in accordance with Offered Availability-

(a) in accordance with the Merit Order Table and taking into account the start-up price element of the Generation Offer price;

(b) as shall in aggregate be sufficient to match at all times (to the extent possible having regard to the offered availability) the forecast system demand together with an appropriate margin of reserve, as identified in the Weekly Operational Policy; and

(c) as shall in aggregate be sufficient to maintain Frequency Control.

3. After the completion of the scheduling process, but before the issue of the Generation Schedule, the System Operator may deem it necessary to make the adjustments to the output of the scheduling process. Such adjustments may be made necessary by the following factors-

(a) changes of Offered Availability or Generation Scheduling of Dispatched Parameters of generating units, notified to the System Operator after the commencement of the scheduling process;

(b) changes to System Demand forecasts;

(c) changes to transmission constraints, emerging from the necessarily interactive process of scheduling and network security assessment, including either-

(i) changes to the numerical values prescribed to existing constraint groups; or

(ii) identification of new constraint groups;

(d) changes to generating unit requirements within constrained groups, following notification to the Grid System Operator of the changes in capability;

(e) changes of generating unit requirements within constrained groups, following re-appraisal of Demand forecast within that constraint group;

(f) changes to any conditions which in the opinion of the System Operator, would impose increased risk to the Grid System and would therefore require the System Operator to increase operational reserve levels. Such conditions include-

(i) unpredicted transmission equipment outages which places more than the equivalent of one large generating unit at risk to any fault;

(ii) un-predicted outage of generator's equipment which imposes increased risk to the station output;

(iii) volatile weather situation giving rise to low confidence in demand forecasts;

(iv) severe (unpredicted) weather conditions imposing high risk to the Grid System; and

(v) limitations or deficiencies of the System Operator scheduling process computational algorithms.

4. For the following situations, a written record of these adjustments shall be kept by the System Operator, for a period of at least 12 months-

(a) adverse weather is anticipated;

(b) a yellow warning has been issued;

(c) demand control has been instructed by the System Operator; or

(d) a total or partial collapse exists.

4.1.5.3 These factors may mean that a generating unit is chosen other than in accordance with the Merit Order. Any other deviations from the use of the Merit Order by dispatch shall be reported by the System Operator including those responsible for the deviation.
These reports shall be consolidated into a weekly report by the System Operator to the generators, distributors and ERA.

4.1.5.4 Content of Generation Schedule.
The information contained in the Generation Schedule shall indicate for a generating unit or Interconnection Power Transaction, the period for which it is scheduled during the following Schedule Day. It shall also include generating units or Interconnection Power Transactions running as a result of non-System reason (such as test purposes) and system requirements (such as Reactive Power Reserve) and generating units and Externally Interconnected Parties assigned to a specific reserve role.

4.1.6 Special Actions.

1. The Generation Schedule may be followed by a list of special actions (either pre or post-fault) that the System Operator may request a generator to take in respect of generating units, or an Externally Interconnected Party to take in respect of a Generation Power Transaction, in order to maintain the integrity of the Grid System. For consumers directly connected to the Grid System to which power station or consumers are also connected, these special actions shall generally involve Load Transfer between the Grid Supply Points or arrangements for Demand reduction by manual or automatic means.

2. For Externally Interconnected Parties these special actions shall generally involve an increase or decrease of net power flows across an External Interconnection by manual or automatic means.

3. These special actions shall be discussed and agreed upon with the generator, externally interconnected party, distributor or consumer concerned. If not agreed, generation may be restricted or demand may be at risk.

4.1.7 Other relevant Generation Data.

4.1.7.1 Other relevant generation data include-

(a) details of any special factors which in the opinion of the generator may have a material effect on the likely output of such generating units;

(b) details of any generating unit's commissioning or changes in the commissioning programs submitted earlier.

4.1.8 Distribution System Data.
By 10.00 hours each day, distributors shall submit to the System Operator in writing confirmation or notification of the following for the following Availability Declaration period-

(a) constraints on its distribution system which the System Operator may need to take into account;

(b) the requirements of voltage control and MVAR reserves which the System Operator may need to take into account for system security reasons. The form of the submission shall be that of a Generation output (both MW and MVAR) required in relation to that Distribution System following Availability Declaration Period.

4.1.9 Revision of generation schedule.

1. If a revision in the Availability Declaration, distribution scheduling and dispatch parameters or other relevant generation data is received by the System Operator prior to 15.00 hours on the day prior to the relevant schedule day, the System Operator shall, if there is sufficient time prior to the issue of the generation schedule, take into account the revised Availability Declaration, generation scheduling and dispatch parameters or other relevant generator data in preparing the generation schedule.

2. If a revision in Availability Declaration generation scheduling and dispatch parameters of other relevant generation data is received by the System Operator at or after 15.00 hours in each day but before the end of the next following schedule day, the System Operator shall, if it re-schedules the units available to generate, take into account the revised Availability Declaration, generation scheduling and dispatch parameters or other relevant generation data in that re-scheduling.

4.1.10 Issue of Generation Schedule.

4.1.10.1 The Generation Schedule shall be issued to generators and distributions or otherwise to the generator direct by 14.30 hours each day. If an event on the Grid System (for example loss of generation in a critical part of the Grid System) occurs which requires a substantial amendment in the data being used in preparing the generation schedule, the System Operator reserves the right to issue a revised generation schedule to the extent necessary as a result of such Events.

4.1.10.2 The System Operator may instruct units before the issue of the Generation Schedule Day to which the instruction relates, if the length of the Notice to Synchronise requires the instruction to be given at that time.

4.1.10.3 When the length of the time required for the Notice to Synchronise is within 30 minutes of Synchronisation causing the unit to be unable to meet the indicative Dispatch instructions, the generator shall immediately inform the System Operator.

4.1.10.4 The Generation Schedule received by each generator shall contain only information relating to its units.

4.2 Merit Order Operation.

4.2.1 To meet the continuously changing demand on the Grid System in the most economical manner, generating units shall, as far as practicable be put on load and loaded up in accordance with the least “variable operation and maintenance costs inclusive of cost of fuel (where applicable) and consumables” (hereinafter “operating costs”) of

producing electricity from each generating unit. Fixed costs are not taken into consideration. At any time the total generating plant with the least Operating Costs is used to meet the demand with a satisfactory margin.

4.2.2 For this purpose generating units are listed according to the lowest-to-highest operating costs for each generating unit and such a list is known as an “Order-of-Merit-Schedule”.

4.2.3 The order-of-merit schedule for a hydro System is divided into 2 sections-

1. Merit Order for scheduling generation on and off the system. The next unit that is not operating with the lowest operating cost is the next to go on the system and the last unit is the first to go off.

2. For a merit-order-for determining the generated output of generating units which are on load, the flexibility of the units shall determine how they operate on the system. The more flexible a unit is, the more likely it shall be used to follow the load changes that occur during the day. The less flexible units shall operate better at more constant loads. This merit order shall take into account the costs of operating the units at different loading of the turbine along with constraints in changing loads to determine the operational sequence of the generating units.

4.2.4 The order-of-merit shall be updated by the offered generator data for the next availability declaration period. The updating shall take into account not only changes to the cost of fully loaded units, but also the difference in the loading cost curves for each unit and for each plant.

4.2.5 Hydro Turbine Loading Charts.

1. The efficiency of a hydro turbine varies with the changes in head across it and loading charts are prepared for each unit to show the relationship between efficiency and output over the range of turbine heads which can occur due to fluctuation in storage and tailrace levels.

For convenience, these changes normally take the form of water consumption or output for various station gross heads. Significant tunnel or tailrace losses are taken into account when preparing the charts.

2. The rate of change of water consumption in hydro turbines gives the incremental rate curve. When several turbines are operating in a station, the minimum consumption of water is achieved by loading each set at the same incremental rate. Similarly, incremental rate curves of turbines at different stations, when calculated for equivalent heads, are used to allocate loading.

3. When additional generation is added to meet a load less than that of one machine, average rate curves are used in order to determine if it is more economical to run one or two machines. This method is used to determine Merit Order.

4.2.6 Economic Dispatch.

1. Each day is divided into a number of operating periods, depending upon the number of peaks, troughs and constant levels in the estimated demand curve.

2. For each operating period, unit commitment requirement on line is determined by computer simulations. This value is the sum of the estimated maximum demand for the period and the specified spinning reserve units.

3. Units which are required to run for security or inflexibility purposes are allocated first. This is followed by hydro units in accordance with the required Hydro Merit Order.

4. In cases where only partial loading of a set is required for security or inflexibility reasons, the assessment of whether or not to use the remainder of the set capacity is determined, by the hydro loading curves specified in section 4.2.5.

5. When scheduling over a trough, the duration of the period may be too short to shut down a less flexible unit and bring it on load again for the next period. In this case, this unit is considered as inflexible and allocated a minimum load equal to its minimum stable generation.

6. Scheduling shall also take into account the rates of loading and unloading of units and other station constraints such as the time intervals between synchronising or shutting down sets to each station.

4.3 System Operations.

4.3.1 Introduction.

Operation of the Grid System in a synchronised and co-ordinated manner shall ensure the adequacy, availability and reliability of electric power supply to the consumers. Co-ordination of the Grid System is required both under normal and emergency operating conditions.

4.3.2 Normal Operations.

Normal operation of the Grid System includes co-ordinating the following functions-

1. Frequency and Time Control.

2. Control scheduling and dispatch.

3. Voltage and reactive control.

4.3.2.1 Frequency and Time Control.

4.3.2.2. Introduction.

1. In order to maintain the continuity and quality of power supply, the system frequency shall be maintained within the specified limits. The control of the system frequency is co-ordinated by the System Operator who is also responsible for keeping the electric time.

2. All generating units in the Grid System that are capable of performing regulation functions such as load-following and free governor action are required to contribute towards the maintenance of system frequency.

4.3.2.2 Operational limits for Grid System Frequency and Time.

The allowable variation in System Frequency and Electric Time in the System Operations shall not, except in special circumstances, exceed-

1. Frequency: + or – 0.5 Hz.

2. Electric time error: + or – 1 minute.

4.3.2.2.1 Procedures for Co-ordinating System Frequency and Time Control-

1. Normal condition.
   All generating units shall be capable of operating by-

   (a) the automatic increase or decrease in generation output due to free governor action (Primary Response) in response to the initial System Frequency transient; and

   (b) a sustained response due to automatic generation control action from the System Operator (Secondary Response) or due to manual generator control action by the Station Operator under instruction by the Grid System Operator which is sufficient to contain and correct the System Frequency to within the statutory requirements of Frequency Control.

2. The System Operator may permit any of the generating units not to perform its frequency regulation duties. This is provided that the System Operator determines that there is sufficient frequency regulating capacity from the remaining generating units synchronised on the System.

2. A System Frequency induced change in the MW generation output of generating units which assists the recovery to target frequency shall not be overridden by the generator,

except where it is done for safety reasons (in relation to either personnel or plant) or to preserve the integrity of the generating units.

4. Free governing action of a generating unit shall not be inhibited at any time except when-

   (a) it may be detrimental to the operation of the generating unit and under such situation, the System Operator shall be immediately informed; or

   (b) when directed by the System Operator.

5. The System Operator shall review and co-ordinate governor droop settings of all generating units and under no circumstances shall the settings be altered without prior consent from the System Operator.

4.3.2.2.2 Action taken under sustained low frequency.

1. Immediate action in response to low system frequency shall be made as follows-

   (a) all synchronised generating units shall increase their MW generating output at a rate to be specified by the Grid Code Committee, per 0.1 Hz departure of frequency below the declared Target System Frequency, up to the maximum capability of the plant on line or to the limits of safe loading of transmission equipment. This is to take immediate effect when there is a sustained low System Frequency condition that is below 49.5 Hz and without further dispatch instructions from the System Operator. The System Operator shall be informed immediately by telephone of action taken;

   (b) All generating units that have been declared available shall be required to be synchronised and loaded in the event there is a sustained low system frequency condition

(i.e. not Transient) that is below 49.5 Hz, provided local security and safety conditions permit.

2. The action in paragraph 1 shall be performed without delay after failed attempts to contact the System Operator for dispatch instruction. Manual synchronisation shall be attempted if automatic synchronisation fails. Generators are to relay information to the System Operator after such operation.

4.3.2.2.3 Action taken Under Sustained High Frequency.

Immediate action in response to high system frequency shall be made as follows-

1. All synchronised generating units shall decrease their MW generating output at a rate to be specified by the Grid Code Committee, per 0.1Hz departure of frequency above the declared Target System Frequency up to the minimum load of the plant on line consistent with local security.

2. This is to take immediate effect when there is a sustained high system frequency condition that is above 50.5 Hz and without further dispatch instructions from the system Operator. The System Operator shall be immediately and directly informed of actions taken.

4.3.2.2.4 Under Frequency Load-Shedding.

1. The System Operator shall co-ordinate and implement at its Control Centre a Staged Automatic Relay Initiated Under Frequency Load Shedding Scheme designed to protect the integrity of the Grid System under server Generation-Demand imbalances.

2. The System Operator shall-

   (a) advise on the relevant low frequency setting, quantum and location of firm load-shed;

(b) revise the scheme as and when necessary to assess its sufficiency and effectiveness in protecting the system under the most severe plausible contingency;

(c) implement the necessary implementation action; and

(d) appropriately inform all parties involved.

4.3.2.2.5 Protection of Generating Units during Under-Frequency Related Emergencies.

1. All generating units shall have sufficient protection systems to prevent damage under abnormal System Frequency Operation.

2. Generating units shall at least be equipped with over-speed protection and under-frequency relay tripping facilities.

3. The System Operator shall advise on the appropriate settings to be employed, but the under-frequency tripping settings shall be lower than the System's last stage or step of Automatic Relay Initiated Under-frequency Load-shedding relay operation.

4.3.2.2.6 Time Keeping and Time Error Correction.

1. Time error correction shall be performed by making an appropriate offset to the Target System Frequency and notification of the change in Target System Frequency shall be made at least 15 minutes in advance.

2. The System Operator shall be responsible for-

(a) monitoring and recording Electric Time Error;

(b) initiating or terminating Time Error corrective action orders; and

(c) ensuring as far as practicable that the Electric Time Error does not exceed the predetermined limits.

4.3.2.2.7 Tie Line Frequency Bias Settings.

These settings shall be as specified by the Grid Code Committee.

4.4 Control Scheduling and Dispatch.

4.4.1 Introduction.

In order to operate the Grid System, the System Operator shall prepare generating units operations schedules and issue unit dispatch instructions.

4.4.2 Information used.

4.4.2.1 The Information which the System Operator shall use in issuing dispatch instructions are as follows-

1. The generation schedule used in dispatching the generating units shall be based on the schedule prepared and supplied under the generation scheduling procedures in this clause. This takes into account information regarding Availability Declaration, unit commitment, offer prices, and system security constraints, Grid demand forecast, generation trading contracts and other relevant operational data.

2. Commercial Ancillary Services.

4.4.2.2 Re-optimisation of Generation Schedule or subsequent schedules.

1. The System Operator shall re-optimise the schedules when in its judgement a need arises. As it may be the case that no notice shall be given prior to this re-optimisation, it is important that generators always keep the System Operator informed of changes of availability declarations and dispatch parameters immediately as they occur.

2. Indicative synchronising and de-synchronising times of generating units in the re-optimised schedule shall be made available to the generators who shall immediately acknowledge the times, together with their compliance of the synchronising instructions.

4.4.2.3 Generation Dispatch Instructions.

1. The System Operator shall issue Dispatch Instructions to all generators for the schedule day at any time during the period beginning immediately after the issue of the Generation Schedule for that schedule day.

2. Dispatch instructions shall recognise the Offered Availability Declared, Generation Scheduling and Dispatch Parameters and other relevant generation data supplied to the System Operator. A Dispatch Instruction may be subsequently cancelled or varied. Units declared available but not included in the generation schedule may be Issued Dispatch Instructions.

3. In addition to instructions relating to dispatch of active power, Dispatch Instructions may include-

   (a) details of the reserve to be carried on each generating unit including specification of the time scale in which that reserve may be transferable into increased generation output;

   (b) an instruction for generating units to provide Ancillary Services;

   (c) Target (at instructed MW level) voltage levels or the individual reactive power output from generating units. In the event of sudden change in system voltage, generating units shall not take any action to override automatic MVAR response unless instructed otherwise by the System Operator, or unless immediate action is necessary to comply with stability limits. Generators may take such action as is necessary to maintain the integrity of the generating units;

   (d) notice and change in notice to synchronise or de-synchronise generating units in a specific time-scale;

(e) an instruction for generating units to operate in Synchronous Compensation mode; and

(f) an instruction to carry out tests as specified in clause 3.10.

4. The form of instructions and terms to be used by the System Operator in issuing instructions together with their meanings are to be mutually agreed by all relevant parties.

4.4.2.4 Communication with Generators and Distributors.

System regulation shall be performed automatically using Automatic Generation Control (AGC) facilities by the System Operator or Dispatch Instruction shall be given by telephone or voice links (and shall include exchange of operator names) or by automatic logging devices and shall be formally acknowledged immediately by generators. In the event that while carrying out Dispatch Instructions, an un-foreseen problem arises caused by safety reasons, the System Operator shall be notified without delay by telephone.

4.4.2.5 Action required by generators.

1. Each generator shall comply with all Dispatch Instructions properly given by the System Operator. If an unforeseen problem arises which affects the safety of the plant or personnel, the generator shall disregard Dispatch Instructions and take necessary corrective actions after which the System Operator shall be notified immediately.

2. De-synchronising may take place without the System Operator's prior agreement if it is done purely on safety grounds. Synchronisation or de-synchronisation or de-synchronisation as a result of inter-trip schemes or low frequency relay operation shall be reported to the System Operator immediately.

3. Each generating unit shall be operated with AVRs and VAR limiters in-service unless released from this obligation by the System Operator.

4. To preserve the Grid System synchronously connected system integrity under emergency conditions, the System Operator may issue Dispatch Instructions to change generation output even when this is outside the parameters so registered or amended. This may, for example, be an instruction to trip a generating unit. A refusal may only be given on safety grounds (relating to person or plant).

4.4.2.6 Generators Response Time.

The response times for units operating under different modes, and the procedure by which the response time shall be changed, shall be agreed from time to time between the System Operator and generators.

4.4.2.7 Generating Unit Changes.

Generators shall without delay notify the System Operator by telephone of any changes or loss (temporary or otherwise) to the operational capability of any unit that is synchronised or units that had been instructed to synchronise within 3 hours.

4.4.2.8 Instructions to Distributors.

The System Operator shall issue instructions directly to distributors for Special Actions and Demand Control. These instructions may include-

(a) a demand reduction, disconnection or restoration of load and load transfer; and

(b) a demand inter-trip.

4.5 Voltage and Reactive Control.

4.5.1 Introduction.

The System Operator shall keep capacitive and inductive reactive resources in proper balance to maintain voltages within acceptable limits, minimise real power losses, and minimise interference to interconnected systems.

4.5.2 Voltage and Reactive Control Guidelines.

1. Each Generator shall provide for its own load reactive requirements, as well as its share of reactive requirements associated with interconnecting transmission lines and exported power.

2. The System Operator shall be kept informed of all generation and transmission reactive resources available for his or her use.

3. The System Operator shall be kept informed of reactive limits and allowable voltage deviations throughout the Grid System.

4. Sufficient data acquisition equipment with suitable visual or audible indicators shall be available to the System Operator and generators to monitor system voltage levels, Load Tap Change (LTC) settings, reactive flow and status of rotating and static transmission reactive resources.

5. The System Operator and distributors shall be aware of and be authorised to use corrective action, including load reduction necessary to prevent voltage collapse when reactive resources are insufficient.

6. Power flow and stability studies shall be conducted to determine additional reactive requirements resulting from reasonable generation and transmission contingencies.

7. Prearranged voltage levels, reactive control equipment settings, and changes in transmission line configuration shall be co-ordinated with neighbouring systems to prevent detrimental reactive flows.

8. Transfer or interchange limits shall reflect voltage or reactive restrictions in addition to thermal and stability limitations.

9. Reactive resources shall be planned so that the system Operator can maintain scheduled voltages for all normal and first contingency operations.

10. All reasonable efforts shall be made to keep major transmission lines in service during light load periods. Major transmission lines shall be removed from service for voltage control, only after all reactive control equipment is fully utilised and appropriate studies indicate that system reliability shall not be degraded below acceptable levels.

11. Voltage reduction to obtain load relief shall only be implemented on the sub-transmission and distribution system.

4.5.3 Online Operating Procedures.

1. Automatic voltage regulators and power system stabilisers shall be kept in service on generating units and synchronous condensers, to the maximum extent possible, in order to ensure stability and proper voltage response to abrupt changes in generation and transmission.

2. The System Operator and generators shall systematically monitor the system for deviations from pre-arranged levels and anticipated reactive flow, and take corrective action when necessary.

3. Corrective action shall not impose unacceptable voltage stress on internal generation or transmission equipment, reduce system reliability beyond acceptable limits or unduly impose voltage or reactive burdens on neighbouring systems. Corrective action may require load reduction in order to stay within the stated limits.

4. Neighbouring systems shall be notified when taking any action that would significantly affect the voltage or reactive flow in their system.

4.5.4 Operational Review.

1. Surveys shall be made periodically and during abnormal operations and analysed for compliance to voltage and reactive guidelines.

2. Periodic review shall be made with planning engineers to ensure that long range planning allows operational compliance with the voltage and reactive guidelines.

5.00 DISTRIBUTION AND RETAIL SALES CODE.

5.0 GENERAL PROVISIONS.

5.1 Effective date.

5.1.1 This Code is effective on a date to be determined by ERA.

5.2 Purpose.

5.2.1 The purpose of this Code is to regulate the following activities so that they are undertaken in a safe, efficient and reliable manner-

(a) distribution of electricity by a licensee to its consumers;

(b) connection of a consumer's electrical installation to the distribution system;

(c) connection of embedded generating units to the distribution system;

(d) connection of the distribution system to the transmission grid;

(e) retail sales of electricity to consumers.

5.3 Application.

5.3.1 Each licensee and retail seller of electricity shall comply with this Code under its respective licence.

5.3.2 An embedded operator holding a generation licence, shall comply with this Code under its licence.

5.3.3 A person exempted from holding a generation licence or a retail sales licence shall comply with this Code if a condition of the exemption requires that person to do so.

5.3.4 Each consumer shall comply with this Code in relation to distribution or retail sales of electricity to electrical installations of the consumers.

5.3.5 Each owner or other person responsible for a supply address shall comply with this Code.

5.3.6 An agreement for the distribution of electricity between an embedded generator or licensee or an agreement for the sale of electricity between an embedded generator and a retail seller shall include as a term of the agreement an obligation that the embedded generator must comply with this Code.

5.4 Deemed compliance.

5.4.1 Notwithstanding clause 5.3, a consumer is deemed to comply with this Code unless such consumer is expressly informed by the licensee of non-compliance or otherwise becomes aware of the non-compliance.

5.4.2 Where a breach of this Code by a licensee is found to be caused by a consumer not complying with this Code, the licensee is deemed to have complied with this Code unless the licensee does not act in accordance with Part 16 to seek the consumer's compliance.

5.5 Tenant's obligations.

5.5.1 Where a residential consumer has been notified of non-compliance in accordance with clause 16.2 and is unable to remedy the non-compliance as he or she is not the owner of the supply address, the consumer shall use his or her best endeavour to have the owner or other person responsible for the supply address fulfil the obligation.

5.5.2 Upon request, the consumer shall provide the licensee with evidence that he or she has notified the owner, or other person responsible of the non-compliance and of the requirement to comply with this Code.

5.6 Owner of a supply address' obligation.

5.6.1 Where a consumer's compliance with this Code is dependent on contribution by the owner or other person responsible for the supply address, the owner or that other responsible person is obliged to use his or her best endeavour to make it possible for the consumer's compliance.

5.7 Variation by written agreement.

5.7.1 A licensee or a consumer may seek a written agreement with the other party to expressly vary their respective rights and obligations under this Code.

5.7.2 If such agreement is sought, the consumer and the licensee shall negotiate in good faith.

5.7.3 An agreement entered into pursuant to this clause shall not reduce the rights or increase the obligations of a consumer without giving benefits of equal value, whether financial or otherwise.

5.7.4 The agreed variation in rights and obligations shall in no way inflict on safety regulations that apply to the installations.

5.8. Review.

5.8.1 ERA may review this Code on its own initiative or in response to a proposal by a licensee, consumer organisation or other interested party, with a view to identifying whether it would, if amended, better facilitate the achievement of the objectives specified in the Act.

5.8.2 Before conducting a review, unless ERA is satisfied on reasonable grounds that an amendment is urgently required, ERA shall ensure that-

(a) all licensees, retail sellers, consumer organisations and other interested parties are given reasonable time, not less than thirty days to make representations to ERA concerning the proposed amendments; and

(b) those representations are taken into account.

5.8.3 ERA shall notify all licensees, consumer organisations and other interested parties of any amendment ERA makes to this Code in accordance with this clause.

5.8.4 A licensee shall inform its consumers of any amendment to this Code which require any action to be taken by the consumers.

6.0 ASSET MANAGEMENT.

6.1 Good asset management.

6.1.1 A licensee shall use its best endeavour to-

(a) assess and record the characteristics, location condition and performance of its distribution system;

(b) keep its distribution installations well maintained to provide for a safe and reliable operation of the distribution system in compliance with safety regulations and other relevant regulations;

(c) develop and implement plans for the construction, maintenance, operation, refurbishment and repair of its distribution system to economically-

(i) meet reasonable consumer expectations of distribution services;

(ii) comply with the laws and other performance obligations which apply to the provision of distribution services; and

(iii) develop, test or stimulate and implement contingency plans to deal with events which have a low probability of occurring, but are realistic and would have a sustainable impact on consumers.

6.2 Review.

6.2.1 Clause 6.1.1 defines elements of good asset management which are designed to encourage innovation in the provision of distribution services and avoid a prescription of licensees' practices in detail. That notwithstanding, ERA may review a licensee's practices if there is a substantial decline in the quality or reliability of supply, or evidence of a significant risk that such a decline may occur in the future when compared to the licensee's historical performance and its performance targets.

6.3 Consumer's installation and equipment.

6.3.1 A consumer shall use its best endeavours to ensure that-

(a) the consumer's electrical installation and any equipment within it-

(i) complies with this Code;

(ii) is maintained in a safe condition; and

(b) protection equipment in the consumer's electrical installation is in compliance with safety regulations or requirements of the licensee within the framework of such standards.

6.3.2 A consumer shall use its best endeavours-

(a) to ensure that the distribution system and the reliability and quality of supply to other consumers are not adversely affected by the consumer's actions or equipment; and

(b) not to allow a supply of electricity to its electrical installation to be used other than at the consumer's premises nor supply electricity to any other person.

6.4 Licensee's equipment on consumer's premises.

6.4.1 A consumer shall-

(a) not interfere, or allow interference, with any licensee's equipment installed in or on the consumer's premises; and

(b) allow its licensee to provide and maintain on the consumer's premises any reasonable or agreed facility required to protect any equipment of the licensee.

6.4.2 If official identification is produced by the licensee's officers or agents on request, a consumer shall provide the licensee's officers or agents at all times with a safe, convenient and unhindered access to their equipment on the consumer's premises for any purposes associated with the supply, metering or billing of electricity or the inspection or testing of the consumer's electrical installation.

6.4.3 Where necessary the consumer shall provide safety equipment and appropriate safety instructions to officers or agents of the licensee to ensure safe access to the consumer's premises.

6.4.4 A licensee shall, in cases other than emergencies, use its best endeavour to access a consumer's premises at a time which is reasonably convenient to both parties.

7.0 CONNECTION OF SUPPLY.

7.1 Supply and metering equipment.

7.1.1 A licensee shall, in accordance with the licensee's specifications to be approved by ERA-

(a) provide, install and maintain, in a manner which is sensitive to the environment and the amenity of the area, equipment for the supply of electricity up to the point of supply; and

(b) provide, install and maintain standard metering and necessary ancillary equipment, at a suitable location to be provided by the consumer.

7.2 Existing connections.

7.2.1 Subject to clause 6.3 and a consumer meeting the requirements in clause 7.1.1, a licensee shall use its best endeavours to connect the consumer at a supply address previously supplied by the licensee as soon as it is practically possible.

7.2.2 The consumer shall-

(a) make application in writing and provide acceptable identification as required by the licensee;

(b) agree to pay the licensee's connection fee, the standing service fee and the electricity usage charges in accordance with the licensee's charge rates to be approved by ERA;

(c) provide contact details for billing purposes;

(d) if the request is made in respect of a rental property, provide contact details for the property owner or the owner's agent;

(e) if required by the licensee, satisfy the licensee that necessary safe, convenient and unhindered access to the supply address, the meter and the electrical installation is available;

(f) if required by the licensee, provide the licensee with estimated electrical load information for the consumer's proposed use of the supply address;

(g) if required in accordance with Part 14.0 of this Code, provide a security deposit, or enter into a payment arrangement; and

(h) not have an outstanding debt relating to a previous supply address (other than a debt the subject of a bona fide dispute, or for which repayment arrangements have been made).

7.2.3 The licensee shall connect the consumer's supply address only if the consumer's electrical facilities are in compliance with the applicable requirements for wiring.

7.2.4 Where augmentation of a licensee's network is required in order for the licensee to supply a consumer the licensee and the consumer's respective rights and obligations shall be determined in accordance with the licensee's applicable standards approved by ERA.

7.3 New connections.

7.3.1 A licensee shall use its best endeavour to make supply available at a new supply address on the date agreed with the consumer, or where no date is agreed upon with the consumer, as soon as practically possible, provided that-

(a) adequate supply is available at the required voltage at the boundary of a new supply address;

(b) the consumer's electrical installation and any equipment within it-

(i) complies with this Code or other applicable standards; and

(ii) is installed properly and is in a safe condition;

(c) the consumer satisfies the requirements in clause 7.3.2; and

(d) conditions pertaining to way-leaves have been satisfied.

7.3.2 A consumer shall-

(a) ensure that a Completion of Wiring Certificate from an electrician has been provided to the licensee;

(b) if required by the licensee, satisfy the licensee that necessary safe, convenient and unhindered access to the supply address, the meter and the electrical installation is available;

(c) if required by the licensee, provide the licensee with estimated electrical load information for the consumer's proposed use of the supply address;

(d) agree to pay the licensee's connection fee, the standing service fee, and electricity usage charges, in accordance with the licensee's charge rates as approved by ERA;

(e) provide contact details for billing purposes;

(f) if required in accordance with Part 14.0 of this Code, provide a security deposit, or enter into a payment arrangement; and

(g) not have an outstanding debt relating to a previous supply address (other than a debt the subject of a bona fide dispute, or for which repayment arrangements have been made).

7.4 Temporary connections.

7.4.1 Clause 7.3 applies to temporary connections. Costs related to supply, mounting, stripping and maintenance shall be provided before a temporary connection is established.

7.5 Use of supply.

7.5.1 A consumer shall not-

(a) allow electricity supplied by a licensee to the consumer's supply address to be used at another supply address;

(b) take at the consumer's supply address, electricity supplied to another supply address;

(c) supply electricity to any other person, except in accordance with a licence issued by ERA or an exemption granted under the Act;

(d) tamper with, or permit tampering with, the meter or associated equipment;

(e) bypass, or allow electricity supplied to the supply address to bypass the meter;

(f) allow electricity supplied under a residential tariff to be used for non-residential purposes; or

(g) allow electricity supplied under a specific purpose tariff to be used for another purpose.

7.6 Illegal use.

7.6.1 Where a consumer has obtained supply otherwise than as permitted by this Code, the licensee may-

(a) estimate the usage for which the consumer has not paid;

(b) take debt recovery action for the unpaid amount; or

(c) take action in accordance with Part 15.0 to disconnect supply to the consumer's premises.

7.6.2 Where a consumer's action in obtaining supply otherwise than as permitted by this Code results in damage to the licensee's equipment, the consumer may be liable for repair or replacement costs and the licensee may take action to recover such costs.

8.0 QUALITY OF SUPPLY.

8.1 Compliance.

8.1.1 A licensee shall use its best endeavours to provide electricity supply in accordance with this Part of this Code.

8.2 Supply frequency.

8.2.1 The System Operator is responsible for the frequency of each licensee's distribution system, having an obligation under this Code to use reasonable endeavours to maintain system frequency at 50 Hz, subject to the allowable variations specified under this Code.

8.2.2 A licensee has no obligation in respect of the frequency of its distribution system beyond complying with the System Operator's instructions made pursuant to this Code.

8.3 Supply voltage.

8.3.1 Subject to clause 3.2.1, a licensee shall maintain a nominal voltage level at the point of supply to the consumer's electrical installation in accordance with the following standard nominal voltages-

(a) 240 V, (plus or minus 6%)

(b) 415 V, (plus or minus 6%)

(c) 11 kV, (plus or minus 10%)

(d) 33 kV, (plus or minus 10%)

8.3.2 Variations from the relevant standard nominal voltage listed in clause 8.3.1 may occur in accordance with the permitted percentages as indicated.

8.3.3 A licensee shall use its best endeavours to minimise the frequency of voltage variations as allowed under clause 8.3.1 for periods of less than one minute.

8.4 Power signals.

8.4.1 A licensee may send, in accordance with the established standard, signals for the following-

(a) ripple control systems;

(b) medium-frequency power line carrier systems; or

(c) radio-frequency power-line carrier systems.

8.5 Power factor.

8.5.1 A consumer shall ensure that its demand for reactive power does not exceed the maximum level allowed by applying the power factor limits specified in the connection agreement to the consumer's maximum demand for apparent power or active power.

8.5.2 If the consumer's network tariff includes a charge for the maximum demand for apparent or active power, then for the purposes of this clause, the consumer's maximum demand for apparent or active power is to be taken to be the maximum demand for which it was most recently billed.

8.5.3 Notwithstanding clause 8.5.2, a consumer shall use its best endeavours to keep the power factor of its electrical installation within the relevant range set out in the connection agreement when the consumer's demand for active or apparent power is more than 50% of its maximum demand.

8.6 Harmonics.

8.6.1 A licensee shall ensure that the harmonic levels in the voltage at point of common coupling nearest to a consumer's point of supply comply with the levels specified within the appropriate standard.

8.6.2 Subject to clause 8.5.1, a licensee shall comply with the IEEE Standard 519-1992 "Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems".

8.6.3 A consumer shall keep harmonic currents below the limits specified and otherwise comply at its nearest point of common coupling with the IEEE Standard 519-1992.

8.7 Inductive interference.

8.7.1 A licensee shall ensure that inductive interference caused by its distribution system is within acceptable limits of good utility practice.

8.7.2 Any third party constructing facilities in the vicinity of an existing right-of-way of the licensee shall ensure that its facilities are not subject to excessive interference from the licensee, and shall itself be held responsible for any costs that might be incurred for rectifying such problems should they arise.

8.8 Negative sequence voltage.

8.8.1 Subject to clause 8.10 a licensee shall maintain the negative sequence voltage at the point of common coupling to a consumer's three phase electrical installation or a level less than 1%.

8.8.2 The negative sequence voltage may vary above 1% of an applicable voltage level, but not beyond 2% for a total of 5 minutes in every 30 minute period for consumers with a load exceeding IMW.

8.9 Load balance.

8.9.1 A consumer shall ensure that the current in each phase of a three phase electrical installation does not deviate from the average of the three phase currents-

(a) by more than 5% for a standard nominal voltage up to 1kV; and

(b) by more than 2% for a standard nominal voltage above 1kV.

8.9.2 Notwithstanding clause 8.10.1, deviations are permissible for periods of less than 2 minutes-

(a) up to 10% for a standard nominal voltage up to 1kV; and

(b) up to 4% for a standard nominal voltage above 1kV.

8.10 Voltage fluctuations.

8.10.1 A licensee shall maintain voltage fluctuations at the point of common coupling of a level which maintains the integrity of service to all affected consumers.

8.10.2 Subject to clause 8.10.1, a consumer shall ensure that its equipment does not cause voltage fluctuations at the point of common coupling that creates unacceptable deviations from nominal service voltage for adjacent consumers.

8.10.3 If two or more consumers' electrical installations are connected at the same point of common coupling, the maximum permissible contribution to voltage fluctuations allowable from each consumer shall be in proportion to their respective maximum demand, unless otherwise agreed.

8.11 Monitoring quality of supply.

8.11.1 Each licensee shall monitor quality of supply in accordance with good asset management principles specified under this Code.

8.12 Consumer's Right to Information.

8.12.1 Where a consumer requests, the licensee shall provide within 10 business days, an explanation for any change in the quality of its electricity supply outside the allowed limits specified under this Code.

9.0 RELIABILITY.

9.1 Requirements.

9.1.1 ERA may in each licensee's licence determine requirements for reliability of supply.

9.1.2 As a minimum, these targets may include-

(a) the total time consumers may experience loss of supply;

(b) the frequency with which supply to consumers may be interrupted, including momentary interruptions; and

(c) the duration of interruptions, excluding momentary interruptions, for consumers on average, and to a substantial majority of consumers.

9.1.3 Where groups of consumers are expected to receive substantially different levels of service, separate requirements may be set.

9.2 Minimum standard of reliability.

9.2.1 A licensee shall use its best endeavours to ensure that the duration of interruptions to the supply of electricity to consumers' electrical installations is held at a minimum, taking into account the relationship between costs and reliability of supply.

9.3 Right to interrupt supply.

9.3.1 Notwithstanding clause 9.2, a licensee may interrupt supply at any time for the following reasons-

(a) planned maintenance repair, or augmentation of the distribution system;

(b) unplanned maintenance or repair of the distribution system in circumstances where, in the opinion of the licensee, the consumer's electrical installation or the distribution system poses an immediate threat of injury or material damage to any person, property or to the distribution system;

(c) the need to shed energy because the total demand for electricity at the relevant time exceeds the total supply available;

(d) as required by the System Operator;

(e) the installation of a new supply to another consumer;

(f) in the case of an emergency; or

(g) to restore supply to a consumer.

9.4 Unplanned interruptions.

9.4.1 In the case of an unplanned interruption or an emergency, the licensee shall-

(a) within 30 minutes of being advised of the interruption or emergency, or as soon as is practicable, provide by way of a 24 hour telephone service, information on the nature of the interruption and an estimate of the time when supply shall be restored or when reliable information on restoration of supply shall be available;

(b) provide options for consumers who call the service to be directly connected to a telephone operator if required; and

(c) use its best endeavours to restore the consumer's supply as soon as possible, making allowance for reasonable priorities.

9.4.2 Wherever reasonable and practicable, a licensee shall provide prior information to consumers who may be interrupted by load shedding.

9.5 Planned interruptions.

9.5.1 In the case a planned interruption, a licensee shall provide affected consumers with at least two or more business days notice of the interruption. Such a notice may be advertised in a paper of wide circulation in the area where the interruption is planned. The notice shall-

(a) specify the expected date, time and interruption duration; and

(b) provide a 24 hour telephone number for inquiries.

9.5.2 The licensee shall use its best endeavours to restore the consumer's supply as quickly as possible.

10.0 SAFETY OF SUPPLY.

10.1 Licensee's obligations.

10.1.1 A licensee shall-

(a) ensure that its distribution system is safe and meets the requirements of any regulation made under the Act and applicable codes;

(b) at the request of a consumer, provide to the consumer advice-

(i) on the facilities required to protect the licensee's equipment; and

(ii) on the consumer's use of supply so that it does not interfere with the licensee's distribution system or with supply to any other electrical installation.

10.2 Consumer's obligations.

10.2.1 Subject to clause 10.2.2, a consumer shall-

(a) maintain the electrical installation at the consumer's supply address in a safe condition;

(b) provide and maintain at the consumer's supply address, a facility to protect the licensee's equipment which meets the licensee requirements prescribed by ERA;

(c) ensure that all the consumer's electrical installations and changes of such are made by certified electricians;

(d) provide safe, convenient and unhindered access to the supply address to enable work to be carried out;

(e) keep all vegetation at the supply address clear from all low voltage service lines at the supply address and all vegetation on the supply address clear of any private electric line on neighbouring property; and

(f) keep all structures and vehicles clear of all electric lines at or over the supply address.

10.2.2 A consumer shall not-

(a) allow a person, other than a person who is (to the best of the consumer's knowledge) an electrician in possession of a valid Installation Permit, to perform any wiring work on an electrical installation;

(b) use the electricity supply in a manner that the consumer ought reasonably to be aware may-

(i) interfere with the licensee's distribution system or with supply to any other electrical installation; or

(ii) cause damage or interference to any third party; or

(c) interfere, or knowingly allow interference, with the licensee's distribution system or any metering equipment at the supply address, except as may be permitted by law.

11.0 EMBEDDED GENERATION.

11.1 Agreement to connect.

11.1.1 A licensee shall ensure that its distribution system is able to receive a supply of electricity from an embedded generating unit connected to its distribution system, in accordance with an agreement with the embedded generator on the terms and conditions of dispatch, connection and disconnection.

11.1.2 If such an agreement is sought by an embedded generator, the licensee and embedded generator shall negotiate in good faith.

11.1.3 Notwithstanding 11.1.1, if two or more embedded generating units are connected in parallel, their obligations under clauses 11.5,11.6, 11.7 and 11.8 of this Code apply to the point of common coupling and the maximum permissible contribution of each embedded generating unit shall be in proportion to their capacity, unless otherwise agreed.

11.2 Supply frequency.

11.2.1 An embedded generator shall ensure that the embedded generating unit is capable of continuous uninterrupted operation at the system frequency of 50 Hz and permitted variations in accordance with clause 8.2.1.

11.3 Co-ordination and compliance of embedded generating units.

(a) An embedded generator shall ensure that-

(b) the embedded generating unit, and any equipment within it that is connected to a distribution system-

(i) complies with this Code;

(ii) is maintained in a safe condition; and

(c) protection equipment is at all times effectively co-ordinated with the electrical characteristics of the distribution system.

11.4 Minimum requirements for embedded generating units (synchronous type).

11.4.1 An embedded generating unit that exports more than 1MW to the licensee shall have-

(a) an excitation control system including a voltage regulator; and

(b) a governor system responsive to system frequency changes.

11.4.2 An embedded generator shall ensure that each of its embedded generating units that exports more than 1MW to the licensee complies with this Code's requirements with regard to-

(a) response to disturbances;

(b) safe shutdown without external electricity supply;

(c) restart following loss of external electricity supply; and

(d) frequency responsiveness and governor stability.

11.5 Negative sequence voltage.

11.5.1 An embedded generator shall ensure that an embedded generating unit's contribution to the negative sequence voltage at the point of connection between the embedded generating unit and the distribution system is less than 1%.

11.6 Harmonics.

11.6.1 An embedded generator shall ensure that an embedded generating unit's contribution to the harmonic distortion levels in the supply voltage at the point of connection between the embedded generating unit and the distribution system is within the limits specified.

11.4.2 An embedded generator shall comply with the recommended practices and requirements for harmonic control in electrical power systems and the current harmonic limits.

11.7 Inductive interference.

11.7.1 An embedded generator shall ensure that inductive interference caused by its embedded generating unit is within acceptable limits of good utility practice.

11.8 Fault levels.

11.8.1 An embedded generator shall design and operate its embedded generating unit so that it does not cause fault levels in the distribution system to exceed the levels specified by the licensee.

12.0 BILLS

12.1 Issuing.

12.1.1 A licensee shall issue a bill to a consumer at least every three months.

12.1.2 A licensee shall issue a bill to the consumer at the agreed address-

(a) where the consumer or his or her agent has made a written request to the licensee to do so; or

(b) where a person authorised to act on behalf of the consumer has made a written request.

12.2 Contents.

12.2.1 The licensee shall separately itemise the following charges on any bill issued-

(a) the standing service fee;

(b) an electricity usage charge;

(c) the capacity charge, where applicable; and

(d) any other charge in connection with the supply of electricity, such as a reconnection fee or a charge for service provided, either at the request of the consumer or due to the failure of a consumer to perform an obligation.

12.2.2 Where a licensee provides goods or services additional to those specified in clause 12.2.1, the licensee may bill those goods, or services separately. Where a licensee opts not to bill separately, the licensee shall-

(a) include the charges for such goods and services as separate items in its bills;

(b) apply payments received from a consumer as directed by the consumer; and

(c) where a consumer does not direct how the payment is to be allocated, apply the payment to the items referred to under clause 12.2.1 before applying any portion of it to the additional goods or services.

12.2.3 A licensee shall include the following particulars on each bill in a consumer's billing cycle-

(a) the dates of the previous and current meter readings or estimates;

(b) the previous and the current meter readings or estimates;

(c) consumption, or estimated consumption, in kWhs;

(d) the relevant tariff or tariffs;

(f) the meter number or numbers;

(g) the amount due;

(h) the pay by date;

(i) where and how the bill is to be paid;

(j) the telephone number for billing and payment inquiries;

(k) a 24 hour contact telephone number for faults and emergencies;

(l) the consumer's supply address and any relevant mailing address;

(m) the consumer's name and account number;

(n) the amount of arrears or credit;

(o) the amount of any other charge (as specified in clause 12.2.1) and details of the service provided.

12.2.4 Where a consumer requests and the data is available, a licensee shall provide to the consumer free of charge the consumer's historical billing data for the previous three years. Where the consumer requests for historical billing data beyond the previous three years, the licensee

may impose a charge for providing the data, determined by reference to its Approved Statement of Charges.

12.3 The basis of a bill.

12.3.1 A licensee shall-

(a) base a consumer's bill on a reading of the meter at the consumer's supply address; and

(b) read the meter at a consumer's supply address at least once in any 6 months; or

(c) for un-metered supply, base a consumer's bill on tariffs as approved by ERA.

12.3.2 Where a licensee is unable to base a bill on a reading of the meter at a consumer's supply address because-

(a) access is denied as a result of action by the consumer, a third party, weather conditions or an industrial dispute;

(b) access is denied for safety reasons;

(c) the meter or ancillary equipment has recorded usage incorrectly; or

(d) the meter has been tampered with,

the licensee may provide the consumer with an estimated bill based on the consumer's reading of the meter or the consumer's prior billing history or where the consumer does not have a prior billing history, either average usage of electricity at the relevant tariff or average usage at the supply address, whichever is the lower.

12.3.3 Where, because of circumstances referred to in clause 12.3.2, a licensee has provided a consumer with an estimated bill and the licensee is subsequently able to read the meter, the licensee shall adjust the estimated bill in accordance with the meter reading.

12.3.4 Where a consumer denies access to a licensee for the purposes of reading a meter as the consumer's supply address and subsequently requests the licensee to replace an estimated bill with a bill based on a reading of the meter, provided the consumer allows access to the meter, the licensee shall comply with the request and may impose a charge for doing so, determined by reference to its approved statement of charges.

12.4 Undercharging.

12.4.1 Subject to clause 12.3.2, where a licensee undercharges a consumer as a result of the licensee's error, the licensee may recover from the consumer the amount undercharged.

12.4.2 Where a licensee proposes to exercise its right under clause 12.4.1 to recover an amount undercharged as a result of its error, the licensee shall-

(a) limit the amount to be recovered to the amount undercharged in the 12 months prior to the consumer's last bill;

(b) list the amount to be recovered as a separate item in a special bill or in the next bill in the consumer's billing cycle together with an explanation of the amount;

(c) not charge the consumer interest on the amount; and

(d) if the consumer requests it, allow the consumer time to pay the amount undercharged in agreed instalments, up to a period equal to the period in which the undercharging occurred, to a maximum period of 12 months.

12.4.3 Where a licensee undercharges a consumer as a result of the consumer's fraud or use of electricity otherwise than in accordance with this Code, the licensee may take action in accordance with clause 7.6 of this Code.

12.5 Overcharging.

12.5.1 Where a consumer is overcharged as a result of an error by a licensee, the licensee shall rectify the anomaly at the next billing.

12.5.2 No interest shall accrue to a credit or refund referred to in clause 12.5.1.

12.6 Period outside usual billing cycle.

12.6.1 Where a consumer's bill covers a period other than the consumer's usual billing cycle, the licensee shall adjust the standing service fee and the kWh usage calculation for step tariffs on a pro-rata basis.

12.7 Change in Tariff.

12.7.1 Where a consumer's tariff is changed or a consumer's tariff rate changes during a billing period, the licensee shall calculate the consumer's bill on the basis of pro-rata application of each tariff to its respective period.

13.0 PAYMENTS.

13.1 Payment due date.

13.1.1 A consumer shall pay a bill by the pay-by date specified in the bill.

13.2 Payment methods.

13.2.1 A licensee shall offer the following payment methods and may, at its discretion, offer additional methods-

(a) a consumer may pay in person at a network of agencies or payment outlets providing an adequate level of consumer access; or

(b) by any other payment arrangement as agreed.

13.3 Payment difficulties.

13.3.1 Where a residential consumer indicates to a licensee that the consumer is experiencing difficulties in paying a bill or requires assistance, the licensee may offer an instalment plan option.

13.4 Review of a bill.

13.4.1 A licensee shall review a consumer's bill at the consumer's request.

13.4.2 Where a licensee is reviewing a bill, the consumer shall pay-

(a) that portion of the bill under review that the consumer and the licensee agree is not in dispute; or

(b) an amount equal to the average amount of the consumer's bills in the previous 12 months; and

(c) any future bills.

13.4.3 Where, after conducting a review of the bill or check reading and examination of a meter, a licensee is satisfied that it is-

(a) correct, the consumer may request the licensee to conduct a meter test. The consumer may require the text to be conducted by a third, competent neutral party to be present. If the meter is found to be accurate, the consumer shall pay the cost of the test and the amount of the bill;

(b) incorrect, the licensee shall make a correction in accordance with clause 12.4 or 12.5.

13.5 Shortened collection cycle.

13.5.1 Where a licensee issues a consumer who is on a monthly billing cycle with two disconnection warnings, the licensee may place the consumer on a shortened collection cycle.

13.6 Vacating a supply address.

13.6.1 A consumer shall give the licensee at least 3 business days notice of the date on which the consumer intends to vacate the consumer's address and a forwarding address to which a final bill may be sent.

13.6.2 Where a consumer gives notice in accordance with clause 13.6.1, the consumer shall remain responsible for paying for electricity supplied to the supply address and otherwise remain responsible for fulfilling the consumer's obligations under this Code at the supply address to the date notified under clause 13.6.1.

13.6.3 If a consumer does not give notice in accordance with clause 13.6.1, the consumer shall remain responsible for paying for the electricity supplied to the supply address and otherwise remain responsible for fulfilling the consumer's obligations under this Code at the supply address until 3 business days after the licensee has received notice to discontinue supply at the supply address, or until a new consumer commences to take supply at the supply address, whichever occurs first.

14.0 SECURITY DEPOSIT.

14.1 Security deposits.

14.1.1 Subject to clauses 14.2 and 14.3, a licensee may require a consumer to provide a security deposit before connection to supply.

14.1.2 The amount of a security deposit shall be not greater than-

(a) for a consumer who is on a quarterly billing cycle, 1.5 times the estimated quarterly bill; and

(b) for a consumer who is on a monthly billing cycle, 3 times the estimated monthly bill.

The amount for security deposit shall be calculated with reference to a schedule of type of consumer and type of business.

14.1.3 A licensee may increase any consumer's security deposit when the existing deposit becomes insufficient to secure the consumer's current electricity usage.

14.1.4 If agreed between the licensee and the consumer, a bank guarantee may be accepted as an alternative to the security deposit arrangement.

14.2 Interest on security deposit.

14.2.1 Where a licensee receives a security deposit from a consumer, the licensee shall pay to the consumer interest on the deposit at a rate and on terms and conditions approved by ERA.

14.3 Use of security deposits.

14.3.1 A licensee may use a consumer's security deposit and interest which has accrued to it to offset any amount owed by a consumer to the licensee-

(a) if the consumer refuses to take supply after work at installations to provide the consumer supply has been conducted;

(b) if the consumer fails to pay a bill resulting in disconnection of the supply address;

(c) if the consumer defaults on a final bill; or

(d) at the request of a consumer who is vacating the supply address or requesting disconnection of supply to the supply address.

14.3.2 Where a licensee uses a security deposit in accordance with clause 14.3.1, the licensee shall provide the consumer an account of its use of the security deposit and pay the balance (if any) of the security deposit to the consumer within the current billing cycle.

15.0 DISCONNECTION OF SUPPLY.

15.1 Debt-unpaid bills.

15.1.1 A licensee may disconnect supply to a consumer's supply address if a consumer has not paid or adhered to the consumer's obligation to make payments in accordance with an agreed payment plan.

15.2 Emergencies.

15.2.1 Notwithstanding any other clause in this Part, a licensee may disconnect or interrupt supply to a consumer's supply address in the case of an emergency.

15.2.2 Where a licensee exercises its disconnection right under clause 15.2.1, the licensee shall-

(a) provide, by way of its 24 hour emergency line, information on the nature of the emergency and an estimate of the time when supply shall be reconnected; and

(b) use its best endeavours to reconnect the consumer's supply address.

15.3 Health and safety.

15.3.1 Notwithstanding any other clause in this Part and subject to clause 15.2.1, a licensee may disconnect or interrupt supply to a consumer's supply address for reasons of health or safety.

15.3.2 Except in the case of an emergency or where there is a need to reduce the risk of fire or where relevant regulations require it, a licensee shall not disconnect a consumer's supply address for a health or safety reason unless the licensee has-

(a) given the consumer written notice of the problem;

(b) allowed the consumer 5 business days to rectify the problem (the 5 days shall be counted from the date of receipt of the notice); and

(c) at the expiration of 5 business days the consumer, by way of a written disconnection warning, another 5 business days' notice of its intention to disconnect the consumer (the days shall be counted from the date of receipt of the notice).

15.4 Planned maintenance.

15.4.1 Subject to clause 15.4.2 and 15.4.3 a licensee may disconnect or interrupt supply to a consumer's supply address for the purposes of carrying out the licensee's planned maintenance on, or augmentation to the licensee's system.

15.4.2 A licensee shall not exercise its right to disconnect under clause 15.4.1 unless the licensee has given the consumer not less than 2 business days' written notice of its intention to disconnect (the days shall be counted from the date of receipt of the notice).

15.4.3 A licensee shall use its best efforts to minimise interruptions to supply occasioned by the licensee's planned maintenance or augmentation and restore supply as soon as practicable.

15.5 Illegal use.

15.5.1 Notwithstanding any other clause in this Part, a licensee may disconnect supply to a consumer's supply address immediately where the consumer has obtained the supply of electricity at the supply address otherwise than in accordance with this Code.

15.6 Disconnection not permitted.

15.6.1 A licensee shall not disconnect supply to a consumer's supply address-

(a) where a consumer has made a complaint directly related to the reason for the prepared disconnection to ERA, the Tribunal or the Court or another external dispute resolution body and the complaint remains unresolved;

(b) where the consumer has failed to pay an amount on a bill which does not relate to the standing service fee, the electricity usage charge, capacity charge, or charges for other services rendered by the licensee;

(c) after 3p.m. on a weekday, or on a Friday, on a weekend, on a public holiday or on the day before a public holiday, except in the case of a planned interruption.

15.7 Consumer's right to request disconnection.

15.7.1 A licensee shall use its best endeavours to disconnect supply to a consumer's supply address and finalise the consumer's accounts in accordance with the consumer's request.

16.0 RECONNECTION AFTER DISCONNECTION.

16.1 Licensee and customer obligations.

16.1.1 Where a licensee exercises its right to disconnect supply to a consumer's supply address-

(a) under clause 15.1, for non-payment of a bill and the consumer pays or agrees to accept an offer (made in accordance with clause 13.3) of an instalment plan, or other payment option;

(b) under clause 15.2 because it is denied access to the meter and the customer provides access to the meter;

(c) under clause 15.3, for a health or safety reason and the consumer has rectifies the problem;

(d) under clause 15.5, for obtaining supply otherwise than in accordance with this Code and the consumer ceases to so obtain supply and pays or makes an arrangement to pay for the supply so obtained the licensee shall, subject to Part 7.0 of this Code, the consumer making a request for reconnection, and paying the licensee's reasonable fee, if any, as listed or its approved statement of charges, reconnect the consumer's supply.

16.2 Reconnection.

16.2.1 Where pursuant to clause 16.1 a licensee is under an obligation to reconnect a consumer and the consumer makes a request for reconnection,

the licensee shall make a reconnection as soon as possible, and not later than two business days from the request and receipt of the reconnection charge as listed in the licensee's approved statement of charges.

17.0 PUBLIC LIGHTING

17.1 Duty to repair.

17.1.1 This shall be handled in accordance with standing written agreements or contracts with the respective local authorities.

18.0 PROVISION OF INFORMATION.

18.1 Consumer's obligations.

18.1.1 A consumer shall inform the licensee as soon as possible if there is any proposed change-

(a) in responsibility for the payment of the licensee's bill;

(b) to the consumer's contact details;

(c) to the major electricity usage proposal of the consumer's supply;

(d) affecting access to metering equipment; or

(e) to wiring or plant or equipment which may affect the quality or safety of the supply of electricity to the consumer or to any other person.

18.2 Planning information.

18.2.1 A consumer shall, upon request from a licensee, generally or specifically provide details of loads connected or planned to be connected to the distribution system which are required for the purpose of the licensee's planning including-

(a) the location of load in the distribution system;

(b) existing loads;

(c) existing load profile;

(d) changes in load schedule;

(e) planned outages;

(f) forecast on development of loads;

(g) anticipated new loads; and

(h) anticipated redundant loads.

18.3. Licensee's obligation.

18.3.1 A licensee shall provide to a consumer information on-

(a) the type and frequency of bills the consumer shall receive;

(b) payment options available to the consumer;

(c) how to make a complaint to, or inquiry of the licensee;

(d) how to contact consumer organisations;

(e) the licensee's guaranteed service level;

(f) the licensee's 24 hour 7 days a week consumer contact line; and

(g) the licensee's quality of supply obligations and the expected reliability and quality of supply.

18.3.2 When requested by a consumer, the licensee shall-

(a) provide the consumer with reasonable information on-

(i) the licensee's tariffs, including any alternative tariffs which may be available to the consumer;

(ii) the licensee's requirements in relation to the consumer's proposed new electrical installation; or

(iii) changes to the consumer's existing electrical installation, including advice about supply extensions;

(b) provide this information free of charge within 10 business days of the consumer's request;

(c) upon request, provide this information in writing; or

(d) advise the consumer where he or she may obtain a copy of the relevant standards which are given force by the Act.

19.0 CONFIDENTIALITY.

19.1 A licensee to whom confidential information is provided-

(a) shall not disclose or give access to that confidential information to any person except as permitted or obliged under this Code or any other law;

(b) shall only use or reproduce the confidential information for the purpose for which it was provided under this Code or any other law, or a purpose consented to by the discloser;

(c) shall regard it as confidential information if it is-

(i) information about any person's private conditions except for place of birth, date of birth, citizenship, civil status, occupation, place of residence and work; and

(ii) information about technical arrangements and undertakings and conduct of business which for competitive reasons shall be of importance to keep secret.

19.1.1 Clause 19.1 does not prevent-

(a) the disclosure, use or reproduction of information if the current information is at that time generally and publicly available other than as a result of a breach of confidence by the licensee or a related business associate;

(b) the disclosure of information to-

(i) an employee or officer of the licensee or a related business associate; or

(ii) a legal or other professional adviser or other consultant of the licensee, which require the information for the purpose of tasks of advising the licensee or for the purpose of planning or augmenting the distribution system;

(c) the disclosure, use or reproduction of information with the consent of the person the information is relating to;

(d) the disclosure, use or reproduction of information to the extent required by law of-

(i) any Government or government body, authority or agency, including ERA, having jurisdiction over a licensee or its related business associate;

(ii) any stock exchange having jurisdiction over a licensee or its related business associate;

(e) the disclosure, use or reproduction of information if required in connection with legal proceedings, arbitration, expert determination or other dispute resolution mechanism, or for the purpose of advising a person in relation thereto;

(f) the disclosure, use or reproduction of information if required to protect the safety of personnel or property; or

(g) the disclosure, use or reproduction of information as an identifiable component of an aggregate sum.

19.1.2 The obligation of confidentiality under clause 19.1.1 applies to recipients of such information disclosed for reasons specified under clause 19.1.2.

19.1.3 In the case of disclosure of information under clause 19.1.2, prior to making such disclosure, the licensee shall inform the recipient of the information about the confidentiality and shall take appropriate precautions to ensure that the recipient keeps the information confidential and does not use the information for any other purposes other than those specified under clause 19.1.2.

20.0 NON-COMPLIANCE.

20.1 Licensee's obligation to remedy.

20.1.1 If a licensee breaches this Code such licensee shall remedy that breach as soon as possible.

20.1.2 If a licensee becomes aware of its failure to comply with any obligation of this Code which can reasonably be expected to have a material adverse impact on a consumer, such licensee shall-

(a) notify each consumer likely to be adversely affected by the non-compliance within 5 business days;

(b) undertake an investigation of the non-compliance as soon as practicable but in any event within 20 business days; and

(c) advise the consumer of the steps it is taking to comply.

20.1.3 If a licensee becomes aware of a breach of this Code by a consumer, which is not of a trivial nature, the licensee shall notify the consumer in writing of-

(a) details of the non-compliance and its implications, including any impact on the licensee and other consumers;

(b) actions that the consumer must take to remedy the non-compliance;

(c) a reasonable time period in which compliance shall be demonstrated;

(d) any consequences of non-compliance; and

(e) the licensee's procedure for handling complaints.

20.2 Consumer's obligation to remedy.

20.2.1 A consumer shall use its best endeavors to remedy any non-compliance with this Code within the time period specified in any notice of non-compliance sent by a licensee in accordance with clause 20.1.2.

20.3 Disconnection of supply for non-compliance.

20.3.1 Subject to clause 20.1.3. a licensee may disconnect supply to a consumer's supply address if-

(a) the consumer has not fulfilled an obligation to comply with this Code as notified under clause 20.1.3; and

(b) the licensee has given the consumer a 5 days' written notice of disconnection (such notice to be in addition to the notice referred to in clause 20.1.2) and the consumer fails to comply with the notice; or

(c) the consumer enters into an arrangement to comply but fails to comply with that arrangement.

20.3.2 A licensee shall not disconnect supply to a consumer's supply address under clause 20.3.1 if there is a dispute between the consumer and the licensee which has been notified by the consumer under Part 21, and is still being dealt with by the licensee under that Part, or is the subject of proceedings before ERA, the Tribunal, the Court, or any kind of arbitration.

21.0 COMPLAINTS AND DISPUTE RESOLUTION.

21.1 Complaints.

21.1.1 If a consumer, which means as end-user, or another licensee, has a complaint regarding the licensee's obligation under the Act, this Code or any other relevant law, code or standard or a licensee's acts or omissions, the consumer may contact its licensee to settle the complaint.

21.1.2 Where, after raising the complaint to the licensee the consumer is not satisfied with the licensee's response to the complaint, the consumer may refer the complaint to ERA.

21.1.3 ERA may delegate its competence relating to dispute resolution to local or centralised committees established pursuant to the Act or ERA may decide to conduct the dispute resolution itself depending on the gravity of the dispute.

21.2 Appeals.

21.2.1 Disputes resolved by committees as provided under clause 21.1.3 are appealable to ERA.

21.2.2 Disputes resolved by ERA are appealable to the Electricity Dispute Tribunal established under Part XIII of the Act.

21.2.3 ERA may determine that dispute resolution delegated to committees provided under clause 21.1.3 may not be appealed to ERA or the Electricity Dispute Tribunal if the disputed amount of money is limited and the dispute is of a non-principal nature.

21.2.4 ERA may issue guidelines on the enforcement of clause 21.2.3.

21.2.5 All disputes may, notwithstanding this Code, be referred to Court.

22.0 ADVICE ON THE USE OF ELECTRICITY.

22.1 Provision of advice.

22.2 A licensee shall provide to a consumer on request and free of charge-

(a) advice on how a consumer may reduce the consumer's electricity costs;

(b) advice on how, and at what estimated cost, a consumer may arrange for an energy audit of the consumer's supply address; and

(c) advice on the typical running costs of major domestic appliances.

23.0 ACCESS TO SUPPLY ADDRESS.

23.1 Consumer's obligations.

23.1.1 A consumer shall allow a licensee and its equipment safe, convenient and unhindered access to the consumer's supply address for the following purposes-

(a) to read the meter at the consumer's supply address;

(b) to connect or disconnect supply;

(c) to inspect or test the electrical installation at the consumer's supply address;

(d) to undertake repairs, testing, or maintenance of the licensee's distribution system; and

(e) to prune or clear vegetation from electric lines at the consumer's supply address.

23.2 Licensee's obligations.

23.2.1 Except in the case of an emergency, where the consumer is the person responsible for maintaining vegetation under the power-lines, a licensee intending to prune or clear vegetation from electric lines at a supply address, shall give the consumer at that supply address at least 5 business days notice of its intention.

23.2.2 A licensee's representative seeking access to a consumer's supply address shall carry, or wear in accordance with the licensee's requirements, official identification, and show that identification upon request by the consumer.

23.3 Hazards.

23.3.1 Where a consumer's supply address contains a hazard, the consumer shall provide the licensee seeking access to the supply address with protection against the hazard, including any necessary protective clothing.

24.0 METERING AND SETTLEMENT.

24.1 Meter requirements.

24.1.1 All electricity delivered or sold by a licensee or retail seller shall be charged for by meter measurements, unless a fixed monthly amount for electricity supply is determined. A licensee shall read the meters at least once every 6 months.

24.1.2 Each licensee shall provide, install, own and maintain all meters necessary for measurement of electricity delivered to its consumers. No licensee is allowed to put in and use any meter that is not reliable and does not conform with ERA's approved standards.

24.1.3 A licensee is responsible for all metered values from the metering points existing in its network.

24.1.4 A licensee is responsible for ensuring that energy consumption or energy flow at meeting points in its network is metered and read.

24.1.5 All meter points shall be read regularly.

24.2 Meter records.

24.2.2 Each licensee shall keep a record of all its meters, showing the consumer's address and date of the last test. All meter tests shall be properly referenced.

24.2.3 The record of each test made shall show the identifying number and constraints of the meter, the standard meter and other measuring devices used, the date and kind of test made, by whom made, the error or percentage of accuracy at each load tested, and sufficient data to permit verification of all calculations.

24.3 Meter tests on request by consumer.

24.3.1 Each licensee may, where a reasonable need has been made for testing at request of a consumer, arrange to test the accuracy of the meter serving that consumer. The licensee shall inform the consumer of the time and place of the test and permit the consumer or his or her authorised representative to be present if the consumer so desires. The consumer shall be properly informed of the results of any test on a meter that serves him or her.

24.3.2 A licensee may charge the consumer for coverage of the costs for tests on meters. The fee may be charged in advance.

24.3.3 If the meter is found to be more than nominally defective to the consumer's or the licensee's disadvantage, any fee charged for a meter test shall be refunded to the consumer.

24.3.4 "More than nominally defective" means a deviation of more than 2.0% from accurate registration.

25.0 AGREEMENTS.

25.1 Preparation and use of end-user agreements.

25.1.1 A licensee shall prepare and use model agreements in distribution and retail sale of electricity in their relation to their consumers within the framework of this Code. Such model agreements may vary between different types or classes of consumers, and is subject to approval by ERA.

25.1 Connection agreements.

25.1.1 Licensees shall negotiate and enter into agreements for the connection between the distribution system and embedded generation and the transmission grid. Such agreement shall be within the framework of this Code, and subject to approval by ERA.

……..
CHAIRPERSON
ELETRICITY REGULATORY AUTHORITY.