



THE ASSAM GAZETTE

অসাধাৰণ

EXTRAORDINARY

প্ৰাপ্ত কৰ্তৃত্বৰ দ্বাৰা প্ৰকাশিত

PUBLISHED BY AUTHORITY

নং 38 দিশপুৰ, শনিবাৰ, 5 ফেব্ৰুৱাৰী, 2005, 16 মাঘ, 1926 (শক)
No. 38 Dispur, Saturday, 5th February, 2005, 16th Magha, 1926 (S.E.)

GOVERNMENT OF ASSAM
ASSAM ELECTRICITY REGULATORY COMMISSION

NOTIFICATION

The 6th August, 2004

No. AERC. /2004/8. -- In exercise of powers under Sections 181 of the Electricity Act, 2003 read with Section 42(1) and all powers enabling it in that behalf, the Assam Electricity Regulatory Commission hereby frames the following regulations as appended:-

(1) Short title, commencement and interpretation:-

- (1) This Regulation may be called the Assam Electricity Regulatory Commission (Distribution Code) Regulations, 2004.
- (2) This Distribution Code regulations applies to all Distribution System participants, including
 - (a) Distribution Licensee;
 - (b) Open Access Customers connected to Distribution Systems;
 - (c) Other Distribution Licensee connected to Distribution Systems;
 - (d) Embedded Generators; and
 - (e) Large Consumers
- (3) This Regulation extends to the whole of the State of Assam
- (4) These Regulations shall come into force from the date of their notification in the Assam Gazette

Distribution Code for Assam

Chapter 1: GENERAL

1.1 Objectives

To ensure that various Chapters of the Distribution Code work together to develop and maintain an efficient coordinated and economical distribution system and the Distribution Licensee and all Distribution System participants comply with respective obligations as specified in the Act.

1.2 Requirement of Distribution Code

The Section 42 (1) of the Electricity Act 2003 provides that it shall be the duty of a Distribution Licensee to develop and maintain an efficient coordinated and economical distribution system in his area of supply and to supply electricity in accordance with the provisions contained in the Act and the Distribution Licensee Standards of Performance issued by the AERC.

This Distribution Code has been specified by the Commission so as to ensure that the Distribution Licensee comply with the requirement of section 42 (1) of the Act read with Section 86 sub-section 1 clause (h) and (i) of the Act.

1.3 Suspension of Provisions

Any provision of the Distribution Code may be suspended, in whole or in part, during a security period, emergency period or pursuant to any directions from the Commission.

1.4 Unforeseen Circumstances

The Distribution Code contains procedures to permit equitable management of day-to-day technical situations in the Distribution System, taking into account a wide range of operational conditions likely to be encountered under both normal and abnormal circumstances. It is nevertheless necessary to recognize that the Distribution Code cannot predict and address all possible operational conditions and fully exhaustive as to the requirements of Distribution System.

1.5 Overriding Effect Of Electricity Laws

Nothing contained in this code shall have effect, in so far as it is inconsistent with the requirement of the Electricity Act 2003, Indian Electricity Rules 1956, all other relevant legislations, the rules and regulations made there under; and the Indian Electricity Grid Code (IEGC), the State Grid Code specified by the Commission and directions of the Commission.

1.6 Mode of Data Submission

Submission of data under the Distribution Code shall be in an electronic format; or in writing; or any suitable format agreed upon by the parties.

1.7 Notices

Submission of service notice(s) under the Distribution Code shall be by hand delivery,

registered mail, E-mail followed by written communication, telex or facsimile transfer. Exception to these requirements may be made with the agreement of the parties.

1.8 Confidentiality

All data submitted to the Distribution Licensee according to the Distribution Code shall be treated by the Distribution Licensee as confidential and shall not be released without the written consent of the affected User. These include, but are not limited to demand forecast, metered data and generating unit characteristics.

Aggregate data however may be released for planning and evaluation of Distribution System reliability and security as may be specified by the Commission.

1.9 Settlement of Disputes

In the event of any dispute between any User/Consumer and the Distribution Licensee, or between the distribution licensees regarding interpretation of any provision of the Distribution Code, the matter shall be resolved according to the procedures set down in this Code. The Commission will be the final arbitrator whose decision shall be final and binding on both the parties.

1.10 Non-compliance

All Users are required to comply with the provisions of the Distribution Code. Where any person to whom these provisions apply finds himself unable to comply with any provision of the Distribution Code, they shall promptly refer the matter to the Distribution Licensee and/or the Commission, as the case may be, indicating the difficulty in complying with such provision. The Distribution Licensee/Commission looking into reasonableness of the cause allows relaxation for such period, as it may consider appropriate. Any continued non-compliance by a User, without reasonable grounds shall attract provisions of the Code for non-compliance, which may include restriction or disconnection from the Licensee's distribution system or such other action as provided in the Code.

Where non-compliance with the Distribution Code by any person or licensee has occurred or is likely to occur due to a direction issued by the Government of Assam (GOA) in accordance with section 108 of the Act, the Commission shall publish such directions by the GOA on the Commission's website and the capital city newspaper and note that non-compliance has been caused by the directions issued by the GOA.

Chapter 2: DEFINITIONS AND GLOSSARY

2.1 DEFINITIONS

In the Distribution Code Regulations the following words and expressions shall, unless the subject matter or context otherwise requires or is inconsistent therewith, bear the meaning given hereunder:

“Act” means the Electricity Act, 2003 (Central Act no. 36 of 2003).

“Active Power” means the product of voltage and the in-phase component of alternating current measured in units of watts and standard multiples thereof.

“AERC” or “Commission” means the Assam Electricity Regulatory Commission constituted under section 17 of the Electricity Regulatory Commissions Act, 1998 and which continues to be so under section 82 of the Electricity Act, 2003 (no.36 of 2003).

“Agreement” means with its grammatical variations and cognate expressions an agreement entered into by the Licensee and the consumer or User.

“Apparatus” means electrical apparatus and includes all machines, fittings, accessories and appliances in which conductors are used.

“Apparent Power” means the product of the root-mean-square (RMS) or effective value of the current and the root-mean-square value of the voltage. For AC circuits or systems, it is the square root of the sum of the squares of the active and reactive power and is measured in kilo volt-ampere (KVA) or multiples thereof;

“Area of Supply” means the area within which a Distribution Licensee is authorised by his license to supply electrical energy.

“ASEB” means the Assam State Electricity Board constituted before the commencement of the Electricity Act 2003 under section 5 of the Electricity (Supply) Act, 1948; .

“Black Start” means the process of recovery from Total System Blackout using a Generating Unit with the capability to start and synchronize without an external power supply.

“Breakdown” means an occurrence relating to the equipment of the electric energy supply system including electrical line that prevents its normal functioning.

“Captive Generating Plant” means a power plant set up by any person to generate electricity primarily for his own use and includes a power plant set up by any co-operative society or association of persons for generating electricity primarily for use of members of such co-operative society or association.

“Circuit” means an arrangement of conductor or conductors for the purpose of conveying energy and forming a system or branch of a system;

“Circuit Breaker” means a device, capable of making and breaking the circuit under all normal conditions, and unless otherwise specified, so designed to break current automatically under abnormal conditions;

“Commissioning” means putting into service a new/idled Equipment that has passed all required tests.

“Conductor” means any wire, cable, bar, tube, rail or plate used for conducting electrical energy and so arranged as to be electrically connected to a system.

“Connection Agreement” means an agreement setting out terms relating to a connection with the Distribution System (excluding any such agreement with the System Operator).

“Connection Point” means the point of commencement of supply from or to the Grid or the Distribution System by the User.

“Designated Person” means suitably authorized persons having responsibility for cross boundary safety in accordance with rule 3 (6) of the Indian Electricity Rules, 1956;

“Consumer” means any person who is supplied with electricity for his own use by a licensee or the Government or by any other person engaged in the business of supplying electricity to the public under the Act or any other law for the time being in force and includes any person whose premises are for the time being connected for the purpose of receiving electricity with the works of a licensee, the Government or such other person, as the case may be.

“Demand” means the power at a given instant or averaged over a specified interval of time that is actually delivered or is expected to be delivered by an electrical equipment or supply system expressed either in Kilo-Volt Ampere (kVA), or Kilo-Watts (KW) or KVAR and multiples thereof.

“Demand Control” means any or all of the methods of achieving reduction in Demand;:

- Consumer Demand Management initiated by Users;
- Consumer voltage reduction initiated by Users resulting into reduction of load (other than following an instruction from the SLDC);
- Consumer Demand Reduction by Disconnection implemented by Users (other than following an instruction from the SLDC);
- Consumer Demand Reduction instructed by the SLDC;
- Automatic Under-frequency Demand Disconnection or Automatic Load shading;
- Emergency Manual Demand Disconnection or Manual Load shading (MLS).

“Disconnection” means the opening of an electrical circuit to isolate an electrical system or equipment from a power source.

“Dispatch” means the apportioning of the total demand on a power system among the various generating plants to achieve the objectives of system operations.

“Dispute Resolution Panel” means a panel appointed by the Distribution Coordination Committee to deal with specific disputes related to the provisions of the Distribution Code.

“Dispute Resolution Process” means the procedure for the settlement of disputes between or among parties under the Grid Code or Distribution Code.

“Distribution of Electricity” means the conveyance of electric power by a distribution utility through its distribution system.

“Distribution Code or Code” means the set of rules, requirements, procedures, and standards approved by the Commission governing electric utilities in the operation and maintenance of their distribution systems, and which defines and establishes the relationship of the distribution systems with the facilities or installations of the parties connected thereto.

“Distribution Licensee” means a licensee authorised to operate and maintain a distribution system for supplying electricity to the consumers in his area of supply and includes ASEB and any of its successor entity deemed with a distribution license under the provisions of section 131 of the Act.

“Distribution Coordination Committee” means a committee constituted by the AERC, with equitable representation from the electric power industry participants and end-users, whose primary function is to monitor the implementation of the Distribution Code.

“Distribution Operations (DO)” means the rules and procedures to be followed by all Users of the Distribution System to ensure that reliable distribution services are achieved for all distribution Consumers. Sections on Demand Control, Emergency Operations, Safety Coordination, Testing and Monitoring, System Test, Maintenance Procedures, Operational Liaison, Operational Reports and Equipment Numbering and Nomenclature are likewise included in these guidelines.

“Distribution Planning (DP)” specifies the technical and design criteria and procedures to be applied in planning the development or reinforcement of a Distribution System. Sections on the demand forecasts and required technical studies are likewise included in this Chapter.

“Distribution System” means the system of wires and associated facilities between the delivery points on the transmission lines or the generating station connection and the point of connection to the installation of the consumers.

“Electricity System” means a system under the control of a generating company or licensee, as the case may be, having one or more

- (a) Generating Stations; or
- (b) Transmission lines; or
- (c) Electric lines and sub-stations

and when used in the context of a State or the Union, the entire electricity system within the territories thereof.

“Electricity Supply Code” means the Electricity Supply code specified by the Commission under section 50 of the Act.

“Embedded” means having a direct electrical connection to a Distribution System or the System of other Users to which Consumers and/or Power Stations are connected but with no other connection to the Grid.

“Embedded Generator” means a person or entity who generates electricity and whose

Generating Units are directly connected to a Distribution System and includes Consumer Captive Generating Plants.

“End-User” refers to any person or entity requiring the supply and delivery of electricity for its own use.

“Equipment” means all apparatus, machines, etc. used as part of, or in connection with, an electrical installation.

“Extra High Voltage Consumer” means a consumer to whom electricity supply is arranged by the Distribution Licensee from the Transmission system at extra high voltage. The EHV Consumer is a consumer of the Distribution Licensee.

“Event” means an unscheduled or unplanned occurrence of an abrupt change or disturbance in the System due to fault, equipment outage or adverse weather condition.

“Fault Level” means the current expected to flow into a short circuit at a stated point on the System, and which may be expressed in kA or in MVA.

“Frequency” means the number of complete cycles of alternating current or voltage per unit time, usually measured in cycle per second or Hertz.

“Generate” means to produce electricity from a generating station for the purpose of giving supply to any premises or enabling a supply to be so given.

“Generating Company” means any company or body corporate or association or body of individuals, whether incorporated or not, or artificial juridical person, which own or operate or maintains a generating station.

“Generator” has the same meaning as Generating Company.

“Generating Station or station” means any station for generating electricity, including any building and plant with step-up transformer, switch-gear, switch yard, cables or other appurtenant equipment, if any, used for that purpose and the site thereof; a site intended to be used for a generating station, and any building used for housing the operating staff of a generating station, and where electricity is generated by water-power, includes penstocks, head and tail works, main and regulating reservoirs, dams and other hydraulic works, but does not in any case include any sub-station.

“Generating Unit” means a conversion apparatus including auxiliary and associated equipment, functioning as a single entity, used to produce electric energy .

“Generation of Electricity” means the production of electricity by a generation company or a co-generation facility.

“Grid” means the high voltage backbone system of inter-connected transmission lines, sub-stations and generating plants. Also known as the Transmission System.

“Grid Code” means the set of rules, requirements, procedures approved by the Commission under clause (h) of sub-section (1) of section 86 of the Act for the Assam intra-State Transmission System covering all material technical aspects relating to connections to and the operation of the Grid, the use of a Distribution System, or (in so far as relevant to the operation and use of a Distribution System) the operation of electric lines and electrical plant connected to the Distribution System, the Distribution Systems, or the system of any Supplier, and shall include the Interim Grid Code.

“Grid Standards” means the standards specified by Central Electricity Authority under clause (d) of section 73 of the Act.

“Grounding” means a conducting connection, whether intentional or accidental, by which an electrical circuit or equipment is connected to the ground or to some conducting body of relatively large extent that serves in place of the ground.

“High Voltage” means a voltage, which is higher than 650 volts but does not exceed 33,000 Volts under normal conditions, subject to the percentage variation allowed under the Indian Electricity Rules 1956. See also Low, Medium and Extra High Voltage.

“High Voltage Consumer” or “High Tension Consumer (HT Consumer)” means a consumer who obtains supply from the Distribution Licensee at High Voltage.

“High Voltage Line” means the an electric line or cable of a nominal voltage higher than 650 volts but does not exceeds 33,000 volts 50 cycles under normal conditions.

“Isolation” means the electrical separation of a part or component from the rest of the electrical system to ensure safety when that part or component is to be maintained or when electric service is not required.

“Large Consumer” means a Consumer with a demand of 1 MW and above.

“Load” means an entity or electrical equipment that consumes electrical energy.

“Low Voltage” means a voltage, which does not exceed 250 Volts 50 cycles under normal conditions subject, however, to the percentage variation allowed under the Indian Electricity Rules 1956.

“Low Voltage Consumer” or “Low Tension Consumer” means a consumer who obtains supply from the Distribution Licensee at Low or Medium Voltage.

“Manual Load Shedding (MLS)” means the manual disconnection of a User’s circuit by tripping Under-frequency Relays or otherwise to remove the circuit’s load from the System.

“Material Effect” A resulting condition that would require works or change in the normal Operation of the Plant and/or Equipment at the Connection Point or site of connection which would involve considerable incremental cost as agreed between the Distributor and Users.

“Medium Voltage” means a voltage which is higher than 250 volts but which does not exceed 650 volts 50 cycles under normal conditions, subject, however, to the percentage variation allowed under the Indian Electricity Rules 1956.

“Minimum Generation” means the minimum stable Demand that a Generating Unit can safely maintain for an indefinite period.

“Normal Operating Frequency” means the frequency band specified in IEGC for secured and reliable Grid Operation. The System normally operates between 49.5 Hz to 50.5Hz.

“Occupier” means the owner or person in legal occupation of the premises where Electrical Energy supplied by the Licensee is used or proposed to be used.

“Operation” means a scheduled or planned action relating to the Operation of a System.

“Open Access” means the non-discriminatory provision for use of transmission lines or distribution system or associated facilities with such lines or system by any licensee or

consumer or a person engaged in generation in accordance with the regulations specified by the Appropriate Commission.

“Open Access Consumer” means a consumer who is eligible to receive supply of electricity from a person other than the distribution licensee of his area of supply.

“Open Access Customer” means a person using or intending to use the transmission system or the distribution system or both of the licensees in the state for transmission or wheeling of electricity in the State.

“Operational Boundary” means the boundary between the Equipment operated by the Distributor or a User and the Equipment operated by another, as specified in the relevant site responsibility schedules.

“Operational Effect” means any effect on the Operation that causes the Systems of the Distributors, the System Operator or a User to operate differently from the way in which they would be or may have normally operated.

“Outage” means the state of a component, such as an equipment or a plant, when it is not available to perform its intended function due to some event directly associated with that component.

“Out-of-Synchronism” means the condition where a System or Generating Unit cannot meet the requirements for it to be Synchronized with the Grid.

“Ownership Boundary” means the boundary between the Equipment owned by one Distributor or User and the Equipment owned by another.

“Planned Maintenance” means an outage of a Generating Plant, of part of the Grid, or of part of a Distribution System due to maintenance, coordinated by the System Operator, Distributor, or Generators, as the case may be.

“Plant” means fixed and movable items, other than an Equipment, used in the Generation, Supply, and/or Transmission of Electricity.

- (a) “Point of Commencement of Supply ” means the point at the incoming terminal of the cut-out /other isolating device installed by the consumer under rule 50 of the Indian Electricity Rules, 1956

“Power Factor” means the ratio of Active Power to Apparent Power.

“Power Station” has the same meaning as Generating Plant.

“Power System” means all aspects of generation, transmission, distribution and supply of electricity and includes one or more of the following, namely: generating stations; transmission or main transmission lines; sub-stations; tie-lines; load despatch activities; mains or distribution mains; electric supply lines; overhead lines; service lines; works;

“Primary Distribution System” means a system in the Licensee’s distribution system consisting of cables, service lines and overhead lines, and metering equipment having an operating voltage of 11KV used for transporting electricity to the consumers from the 33/11KV substations of the Distribution Licensee.

“Reactive Energy” means the integral of the reactive power with respect to time measured in VARh, or multiples thereof.

“Reactive Power” means the component of electrical power representing the alternating exchange of stored energy (inductive or capacitive) between sources and loads or between two systems, measured in VAR, or multiples thereof. For AC circuits or systems, it is the product of the RMS voltage and the RMS value of the out-of-phase component of alternating current. In a three-phase system, it is the sum of the reactive power of the individual phases.

“Regulations” means regulations made by the Commission under the provisions of the Act.

“Rules” mean the Indian Electricity Rules 1956 and any rules made under the Act;

“Safety Code” means the Code for Safety specified by the Commission for the Distribution Licensee.

“Secondary Distribution System” means a system in the Licensee’s distribution system consisting of service lines and overhead lines having an operating voltage of 433V used for transporting electricity from the 11/0.433KV distribution transformers to the service mains of the consumers.

“Schedule Day” means the period from 0000Hrs to 2400Hrs in a day.

“Significant Incident” means an event on the Distribution System or the System of the User that has a significant effect on the other’s system.

“SLDC” means the State Load Dispatch Centre established under sub-section (1) of section 31 of the Act located in the control room of the Transmission Licensee operating round the clock for the purpose of managing the integrated operation of power system and coordinating the state generation, transmission, distribution and load requirements with the Regional Load Dispatch Centre.

“State Transmission Utility” means the utility notified by the Government of Assam as State Transmission Utility under section 39 of the Electricity Act, 2003. State Transmission Utility (STU) owns and operates the transmission system of the State. Assam Electricity Grid Corporation Limited (Assam Gridco) is the State Transmission Utility for Assam as notified by the State Government.

“Sub-station” means a station for transforming or converting electricity for the transmission or distribution thereof and includes transformers, converters, switchgears, capacitors, synchronous condensers, structures, cable and other appurtenant equipment and any building used for that purpose and the site thereof.

“Sub-Transmission System” means the intermediate system between the Transmission System and Primary Distribution System of the Total Power System consisting of high voltage electric lines being operated at high voltage (excluding generator interconnection facilities) owned and/or operated by the Distribution Licensee for the purposes of distribution of electricity from one sub-station to another sub-station or to a consumer or from any external interconnection equipment up to the interconnection with the distribution system, and any plant and apparatus and meters owned or used by the Licensee in connection with the transmission and distribution of electricity;

“Synchronized” means the state where connected alternating current systems, machines, or a combination of these operate at the same frequency, and where the phase angle displacements between voltages in them are constant or vary about a steady and stable average value.

“System Control” means the administrative and other arrangements established to maintain the proper operation, safety, and security of the System.

“System Reliability” means the ability of a power system to continuously supply power to its consumers despite the occurrence of multiple credible contingency events.

“Total System” means the Grid and all User Systems connected to it.

“Total System Blackout” means the situation existing when all generation has ceased and, therefore, the Total System has Shutdown such that it is not possible for the Total System begin functioning again without the System Operator’s directions relating to a Black Start.

“Transformer” means an electrical device or equipment that converts voltage and current from one level to another.

“Transmission of Electricity” means conveyance of electricity through the high voltage backbone system/Grid System.

“Transmission System” means the system consisting of extra high voltage electric lines being operated at EHV (excluding generator interconnection facilities) owned and/or operated by the Transmission Licensee/Board for the purposes of the transmission of electricity from one power station to a sub-station or to another power station or between sub-stations or to or from any external interconnection equipment up to the interconnection with the distribution system, any plant and apparatus and meters owned or used by the Transmission Licensee or Board in connection with the transmission of electricity, but shall not include any part of the Licensee distribution system.

“User” means a person, including generating companies, Distribution Licensee and open access customers in the state of Assam who uses the Distribution System or Transmission System and related facilities and include a person to whom the Distribution Code and/or Grid Code apply.

“User System” means any System owned or operated by a User of the Grid (or Distribution System) where the User is involved in Generation and/or Distribution of Electricity and is connected to the Grid.

“Voltage” means the electromotive force (emf) or electric potential difference between two points, which causes the flow of electric current in an electric circuit.

All other words and expressions used herein and not defined have the meanings respectively assigned to item in the Act and Indian Electricity Rules 1956 or any Rules/Regulations made to replace the Indian Electricity Rules, 1956.

2.2 ABBREVIATIONS

AC	Alternating Current
AERC	Assam Electricity Regulatory Commission
ASEB	Assam State Electricity Board
BIS	Bureau of Indian Standards
CBIP	Central Board of Irrigation & Power
CPM	Critical Path Method
DCC	Distribution Coordination Committee
DO	Distribution Operations
DP	Distribution Planning
DSM	Demand Side Management
EAct	The Electricity Act 2003
HV	High Voltage
Hz	Hertz (Cycles per seconds)
IDMT	Inverse Definite Minimum Time
IEGC	Indian Electrical Grid Code
KA	Kilo Ampere
kW	KiloWatt
kWh	Kilowatt-hour
LV	Low Voltage
MLS	Manual Load Shedding
MV	Medium Voltage

MVA	Mega Volt-ampere
MVAr	MegaVAr
MVArh	Mega-VAr-hour
MW	Megawatt
MWh	Megawatt-hour
NDR	Neutral Displacement Relay
NEREB	North East Regional Electricity Board
NERLDC	North-East Regional Load Despatch Centre
PERT	Program Evaluation & Review Technique
PGCIL	Power Grid Corporation of India Limited
REC	Rural Electrification Corporation of India Limited
SLDC	State Load Despatch Centre
STS	State Transmission System
STU	State Transmission Utility
UFR	Under-frequency Relay
W	Watt
Wh	Watt-hour
X/R	Reactance/Resistance

Chapter 3: DISTRIBUTION CODE COORDINATION

3.1 Objectives

- (a) To ensure that Distribution Licensee and all Users of the Distribution System are represented and involved in setting standards and procedures for distribution system management and operations; and
- (b) To specify the process for the settlement of disputes that may arise when a provision of the Distribution Code is misapplied or violated.

3.2 Scope

The Distribution Code Coordination applies to all participants of Distribution System including:

1. Distribution Licensee;
2. Open Access Customers connected to Distribution Systems;
3. Other Distribution Licensee connected to the Distribution System;
4. Embedded Generators;
5. Large Consumers; and

3.3 Distribution Coordination Committee- Functions

A Distribution Coordination Committee (DCC) shall be constituted to ensure that Distribution Licensee and all Users of the Distribution System participate and involved in setting standards and procedures for distribution system management and operations. The Distribution Coordination Committee shall carry out the following functions:

1. Coordinate Distribution Code enforcement;
2. Review the Distribution Code, associated standards and their implementation;
3. Provide guidance to Distribution Licensee and Users in the implementation, performance, and interpretation of the Distribution Code and its provisions;
4. Review proposals for revision of the Distribution Code and recommend appropriate action to AERC; and
5. Monitor and report on overall distribution system operation.

3.4 Members of the DCC

The Distribution Coordination Committee shall be composed of the following members, who

shall be appointed by AERC:

1. CMD of each Distribution Licensees in the State
2. CMD of the Transmission Licensee functioning as State Transmission Utility
3. One member nominated by the SLDC
4. One member nominated by the AERC
5. One member representing Captive Generators;
6. One member representing open access customers;
7. One member representing Tea and Coffee Plantation;
8. One member representing commercial & Industrial consumers;
9. One member representing domestic consumers groups;
10. One member nominated by a government-accredited professional organization of electrical engineers like Institution of Engineers.
11. Other members as the Commission may find appropriate.

3.5 Terms of Office of the DCC Members

The Chairman of the Distribution Coordination Committee shall be from amongst the CMDs of Distribution Licensee and shall be appointed by the Commission for three-years term on rotation basis. The Distribution Coordination Committee shall however be perpetual under the Distribution Code. All other members of the Distribution Coordination Committee shall hold office until changed/replaced by the respective parent organization.

3.6 DCC Support Staff and Operating Cost

The CMD Distribution Licensee holding the office of Chairman of DCC at a given time shall provide secretarial staff required to support DCC operations. The cost associated with such secretarial assistance shall also be borne by that Distribution Licensee.

3.7 DCC Rules and Procedures

The Distribution Coordination Committee shall establish and observe its own rules and procedures relating to the conduct of its business. The procedures shall include:

1. Establishment of a regular meeting schedule at frequencies sufficient to do the business of the Committee;
2. Developing and submitting an annual Distribution Systems Operating Report to AERC;
and
3. Monitoring of compliance to the Distribution Code and to the established technical standards.

The Committee is expected to operate on a consensus or near consensus basis rather than by simple majority voting.

3.8 Distribution Coordination Sub-Committees

Distribution Coordination Committee shall establish sub-Committees, as it may consider appropriate for various functional area. The following is the suggestive list of the sub-committees that may established

1. Distribution Technical Standards Sub-committee

This sub-committee shall assist the DCC in the following functions

1. Distribution planning;
2. Distribution connectivity criteria;
3. Distribution operating procedures; and
4. Distribution performance standards.

2. Distribution Protection and Reliability Sub-committee

This sub-committee shall assist the DCC in the following functions:

1. Coordinating and recommending standards for distribution protection systems;
2. Reviewing and recommending distribution reliability performance standards; and
3. Coordinating data compilation and submission by Distribution Licensees to Commission and other agencies.

3. Distribution Metering and Settlements Sub-committee

This sub-committee shall assist the DCC in the following functions:

1. Reviewing Distribution Metering Code and standards and recommending changes; and
2. Acting as the dispute resolution panel for metering related disputes.

The above functional sub-committee shall have one member from each Distribution Licensee and Transmission Licensee in the State. The Distribution Coordination Committee shall select the members of the functional sub-committees. The rules and procedures relating to the conduct of business shall be prepared by the Sub-Committee itself and which shall be approved by the DCC. The DCC can refer any matter for sub-committee for examination and advice. However, the Distribution Coordination Committee is not bound to accept the recommendations of the sub-committee.

3.9 Distribution Code Revision Process

No change in the Distribution Code however small or large shall be made without being deliberated upon and agreed by the Distribution Coordination Committee and thereafter approval of Commission. If any Distribution Licensee or User believes that changes in the Distribution Code are necessary, they shall submit the proposed changes and supporting arguments and data to the Distribution Coordination Committee. The Distribution Coordination Committee either can deliberate the proposed changes itself or to refer the matter to the appropriate sub-committee. Any revisions to the Distribution Code, which the Distribution Coordination Committee recommends shall be submitted to AERC for approval.

If the Distribution Coordination Committee or its appropriate sub-committee rejects the proposed changes, it shall justify its decision in writing to the party proposing the changes. Those parties have the right to appeal the decision to the AERC.

3.10 Distribution Code Disputes

In the event of any dispute between any User/Consumer and the Licensee regarding interpretation of any regulations provided in the Distribution Code, the matter shall be resolved according to the procedures set down in this Code. The Distribution Code dispute resolution process outlined in this clause applies to the Distribution Licensee and all Users of the Distribution Systems.

3.11 Arbitration

Where any matter is directed to be determined by the arbitration, the Commission on application by either party shall nominate Arbitrator in accordance with Section 158 of the Act. The decision of the arbitration shall be final and binding on both the parties.

3.12 Distribution Code Dispute Resolution Panel

The Distribution Coordination Committee shall appoint a Distribution Code Dispute Resolution Panel to deal with specific disputes. The Dispute Resolution Panel shall have one member from each distribution licensee and one representative from Commission. The panel shall include members who have the technical background to understand and judge the technical merits of disputing parties' arguments.

The panel shall hold formal meetings to hear and receive testimony from the parties. The positions of the parties and the panel's decision shall be documented and provided to both parties and maintained as part of the Distribution Coordination Committee records. The cost of resolution dispute by Dispute Resolution Panel shall be borne by the parties as may be decided by the Panel.

3.13 Dispute Resolution Process

Distribution Code dispute resolution process includes the following steps:

When a dispute arises between parties which is not resolved informally, one of the parties shall, if he wishes, register the dispute in writing to the other party or parties;

The parties shall meet to discuss and attempt to resolve the dispute. If resolved, the resolution shall be documented, and a written record shall be provided to all parties;

If the dispute is not resolved, a committee of representatives from both parties shall be formed to discuss and attempt to resolve the dispute. If resolved, the resolution shall be documented and a written record provided to all parties; and

If the dispute is not resolved at step (c), the committee shall, at the request of one or both parties, refer the dispute to the Distribution Coordination Committee for resolution. The Distribution Coordination Committee may, at its option, refer the dispute to the Distribution Code Dispute Resolution Panel.

3.14 Appeals of Dispute Resolution Decisions

If one or both parties object to the Distribution Code Dispute Resolution Panel's decision, an appeal can be filed with AERC. The AERC shall hear such appeals only when the parties can make a strong showing that Distribution Code provisions have been violated or misinterpreted.

3.15 Distribution Management Reports

1 Annual Reports

The Distribution Coordination Committee shall issue an annual summary of Distribution Operations Report for the previous year before the end of June of the current year.

2 Significant Incident Reports

Within one month following a significant Incident in the Distribution System, the involved Distribution Licensee shall prepare a disturbance report and submit to the DCC and AERC. The disturbance report should describe the cause of the disturbance or event, the amount and duration of any outages and recommendations (if any) for changes in operating procedures, or Code provisions. In cases where any User has knowingly violated provisions of the Distribution Code, sanctions may be recommended as part of the disturbance report. The DCC shall define what constitutes a Significant Incident.

3 Special Reports

The Distribution Coordination Committee shall prepare Special reports as may be directed by the Commission and/or appropriate authority.

Chapter 4: DISTRIBUTION PLANNING

4.1 Introduction

The Distribution Planning Code specifies technical and design criteria and procedures to be followed for planning and development of the distribution system.

The Distribution System may necessitate extension or reinforcement for meeting of long-term demand estimation and/or requirement of the User system. In some cases the extension or reinforcement of capacity of Distribution system at the connection point may be needed for reasons mentioned below:

- (a) A development in User's system connected to Distribution system.
- (b) Introduction of a new connection point between the User's system and the Distribution System of the Licensee;
- (c) To increase the capacity of the Distribution System for meeting the security standards, removal of constraints in operation etc. and to accommodate a general increase in demand.
- (d) The reinforcement or extension of the Licensee's distribution system in view of above requirement may involve work at the following locations:
- (e) At a connection point between a User's system and a Licensee's distribution system.
- (f) On the distribution system or other facilities, which join a connection point to the remainder of the Licensee's system.
- (g) At or between points on the distribution system remote from connection points.

4.2 Scope

The Planning Code applies to the Distribution Licensee and all other users connected to and utilizing Distribution System including other licensees, embedded Generators, Open Access Customers and Large Consumers, in so far as they affect the Distribution System.

4.3 Objectives

Objectives of the Distribution Planning code are:

- (a) To enable planning, design and construction of Distribution System for a safe and economical operation with specified degree of reliability conforming to the following standards:
 - Safety requirements for the Distribution System,
 - Electricity Act 2003, codes, standards, rules & regulations made there under and IE Rules 1956 etc.,
 - BIS/CBIP/REC Construction Standards and manuals.
- (b) To facilitate use of Distribution System by a User and consumer connected to or seeking connection with it,

- (c) To formulate technical conditions to be followed by respective Licensees and Users in meeting the standards for an efficient operation of common electrical interface,
- (d) To formulate procedure for exchange of system planning data between licensee and Users,
- (e) To provide required information to Users for connection, planning and development of their own systems and make them compatible with the Distribution System,
- (f) To enable the licensee in furnishing required data detailed in the Grid Code under the Section "System Planning".

4.4 Development of Distribution Planning Procedure (DPP)

1 Well-documented procedures are essential for adopting orderly and consistent approach in planning and development of Distribution System on a long-term basis. Adherence to these procedures will enable Distribution Licensee to produce a long-term plan of five years to develop and maintain an efficient coordinated and economical distribution system to satisfy requirements of future demand.

2 Distribution Licensee shall develop and maintain the Distribution Planning Procedures in respect of following:

- (a) Database Management
- (b) Load Data Research
- (c) Long Term Demand Estimation Procedure
- (d) Opportunity Statement

3 The Distribution Licensee shall furnish the copy of Distribution Planning Procedures to the Commission in compliance.

4.5 Criteria for Development of Distribution System

1 All Distribution Systems shall conform to the statutory requirements and license conditions. The Distribution Licensee shall develop and maintain an efficient, secure and coordinated system of electricity supply that is economical, reliable and safe.

2 The development of the Distribution System shall be planned sufficiently in advance allowing for adequate time to obtain required statutory clearances, consents or way leaves and detailed engineering, design and construction work to be carried out. Action shall be initiated to augment/renovate existing elements of the distribution system whenever load on it exceeds its specified capacity. The management techniques such as PERT and CPM may be applied to co-ordinate activities in an efficient manner at the planning stage.

3 The Distribution Licensee while planning Distribution System shall take the following criteria into consideration:

- (a) Optimum network of sub-transmission system, primary distribution, LT feeders and substation location and feeder development;
- (b) Optimum distribution feeder voltages and conductor sizes;
- (c) Optimum reactive compensation

Requisite Investment approval and other applicable sanctions shall be obtained from the Commission.

4.6 Database management

1 The availability of accurate and reliable data is essential for planning and development of the Distribution System on long-term basis. Data management system facilitates storage, retrieval and updating of data for complying with the requirements of the Distribution Code and for other purposes like power system studies.

2 The User of Distribution System including embedded generators and large consumers (above 5 MW) shall furnish required data in prescribed manner as at Annexure 4 for long term planning by Distribution Licensee. Distribution Licensee shall supply system data to the Users embedded generators and large consumers, wherever required for their planning purpose. . A well maintained Data Management System would facilitate exchange of data between Users and Distribution Licensee required for long-term planning and distribution operation in an accurate and reliable manner. This will also help in Users, Large Consumers, open access customers and embedded generators to have access to data, which they may require for their planning purpose.

4.7 Load Data Research

1 The Distribution Licensee shall develop load data and load curves for the area fed by the concerned substation of the transmission licensee based on the metering data available at the inter-connection point. This data shall be compiled for the entire area of supply by combining the load curves of each substation feeding its Distribution System.

2 The Distribution licensee shall create a load database for each consumer category for the distribution system as a whole and update it on annual basis.

3 Actual energy consumption in the distribution system shall be worked based on energy recorded in the meters installed at inter-connection points, energy exported to other Distribution Licensees and Users and the energy generation by embedded generating stations. The Distribution Licensee shall work out the distribution losses based on energy consumption in the Distribution System and energy billed to the Consumers.

4 Distribution losses computed from this data shall be furnished to AERC every month.

5 A consumer seeking connection with a demand of 5 MW and above shall furnish load data to the licensee as detailed in Annexure-1. The licensee shall carefully monitor actual development of load in respect of any consumer desiring to avail load of 5 MW and above at a single point. If required by the consumer the licensee shall furnish relevant system data as

detailed in Annexure 2. The licensee shall furnish relevant system data of the whole Distribution Licensee area of supply, if required by a consumer, on payment as detailed in Annexure 3. The Distribution Licensee shall update the system data at least once a year.

4.8 Long Term Demand Estimation

1 The licensee shall formulate a circle wise long-term demand forecast considering the previous financial year as base and projecting demand for the succeeding five years. In the process review of status of load as per previous load forecast, past trends & pending applications shall be carried out.

2 Energy sales in each tariff class shall be projected for succeeding five years over the corresponding figures relating to the base year by adopting an appropriate statistical model.

3 The projections shall take into account assumed normal growth for non-specific loads, specific and identified loads of 1 MW and above and impact of Demand Side Management (DSM) and energy conservation.

4 Aggregate energy and peak load requirement at each connection point shall be estimated taking into account the distribution losses.

5 The licensee shall forward long-term demand forecast in the month of December each year for each connection point for his area of supply, on annual basis to the transmission licensee and AERC along with assumption data and methodology used for the forecast;

6 The licensee shall have a thorough knowledge of the usage of electricity by the consumers and the way they use electrical energy and other alternative sources of energy in its area. Load forecasting shall take into account all these alongwith other conservation programs and the demand side management or off-peak usage programs which the licensee may sponsor, resulting in reduction of energy and peak demand of the consumers over the years.

7 The licensee shall implement load research program for systematic collection of data describing consumer' energy usage patterns and analysis of data and demand forecast for all categories of consumers.

8 The pattern of energy consumed by each category of consumer and the load demand, period of peak demand etc. shall be developed on sample surveys taking representative samples from each sector for its different seasonal requirements. A suitable questionnaire shall be prepared for these sample surveys and data obtained shall be analyzed using suitable statistical models. Based on this, load profiles shall be drawn for implementing Demand Side Management techniques to match availability.

9 The licensee shall also maintain records of captive power plants of assessed capacity of 125 kVA and above already established in area of supply. Type of fuel used and the capacity of captive power plants shall be taken into account for reduction of contract demand from licensee's supply so as to correctly assess the industrial demand in its area. Such information shall be compiled yearly and furnished to the Commission.

4.9 Opportunity Statement

This statement provides the potential users with future power scenario for five years in distribution system. Opportunity statement helps in deciding potential for connection to the system, creation of new generation capacities and load on system. This statement serves as the basis for the selection of the best place to connect new load or a new generator. Distribution Licensee shall prepare an Opportunity Statement as a part of its Annual Report and shall submit to Commission.

4.10 Technical and Design criteria

The licensee shall prepare a circle wise plan for distribution system and develop a system on the basis of technical and design criteria such that demand of all the existing consumers connected or seeking connection with it shall be met for the next five years. All the apparatus and circuits shall have adequate capacity to cater to their need of electricity in a safe, economical and reliable manner.

The load research program shall assess the following:

1. Demand at the time of system peak-daily, monthly, annual and seasonal,
2. Hourly demand for the day of the system peak- daily, monthly, annual and seasonal,
3. Category wise Diversity Factor or the Coincidence Factor and Load Factor,
4. Total energy consumption for each category- daily, monthly, annual and seasonal,
5. Category wise non-coincident peak demand.

Based on the results of such research the five year demand forecast shall be made using appropriate modern forecasting tools. Optimum circuit loading and maximum number of circuits at any electrical interface between distribution and transmission system shall conform to requirement of all relevant codes and standards.

As far as practicable and only when it is justified on a benefits/costs basis, separate circuits shall be provided for the following:

- (a) Urban non-industrial power supply other than for agriculture supply
- (b) Industrial power supply,
- (c) Agriculture Supply.
- (d) Separate circuits preferably for rural industrial power supply as well as rural domestic and non-domestic supply to avoid single phasing during peak load hours.

The load shall be arranged in discrete load blocks to facilitate load management during emergency operations. Load blocks shall depend upon availability of separate circuits. Technical Feasibility Report shall prepare to finalise location of 33/11 kV substations, capacitor installations, and distribution transformers and to contain voltage variation and energy losses within reasonable limits. Distribution Licensee shall standardise the technical requirements and specifications of main equipments including but not limited to following:

1 Main equipments and materials

- (a) Power Transformers,
- (b) Distribution Transformers,
- (c) Circuit Breakers/Switch Gear/Control Gear
- (d) Instrument Transformers,
- (e) Earthing equipment
- (f) Lightning Arresters,
- (g) Control Panels,
- (h) Station Batteries,
- (i) Fire Extinguishers and other safety devices
- (j) Line material (conductor, insulator, cross arms, spacers ,connector etc)
- (k) Service Line material and accessories.
- (l) Meters, Meter box and meter panel

2 Construction Practices:

The Distribution Licensee shall standardise the construction and maintenance practices and adopt standard design layouts for lines and sub-stations. Standard construction practices shall be developed amongst other for the following:

- (a) 33 kV sub-station layout and construction
- (b) 11 kV sub-stations
- (c) Sizes of Bus Bar
- (d) Line construction
- (e) Service line construction

Planning of the distribution system shall always keep in view the cost effectiveness of achieving the distribution network performance standards and reduction in energy losses without sacrificing the requirements of Safety Standards mentioned above.

The licensee while planning the distribution system expansion and reinforcement shall incorporate the latest technology and keep the following in view

- (a) Economic Ratio of HT and LT line lengths,
- (b) Use of Aerial Bunched Conductors,
- (c) Underground Cables,
- (d) Increasing number of 33/11 kV & 11/0.4 kV transformers and their location at load centres.
- (e) Use of capacitors and capacitor banks.
- (f) Balancing of load between the three phases

4.11 Voltage Regulation

The Distribution Licensee shall plan and develop distribution network so as to achieve and maintained the distribution system in accordance with the Distribution Licensee Performance Standards specified by the Commission. The voltage regulation (VR) on 11 kV and 33 kV feeders shall not exceed such value, which makes the consumers voltage below the prescribed value when the voltages at injunction point into distribution system are within the norms. Whenever, the voltage regulation of 11 kV or 33 kV feeders exceeds such value, so that it is difficult to maintained the consumers' voltage within prescribed limits, the Distribution Licensee shall take action to bring the VR within the prescribed limit by either bifurcation of load or by drawing additional feeder(s) or augmenting transmission capacities etc. as may be considered techno economically viable. Similarly capacity of distribution sub-station or 33 kV S/S shall be augmented when the load exceeds rated capacity of the sub station. A new 33/11 kV S/S shall be created at the load centre in the area where voltage regulation of various 11 kV feeders are above prescribed limit and proposal is technically and financially viable i.e. benefit to cost ratio is more than specified limits.

4.12 Energy Audit

1 The licensee shall carry out energy audit of the total distribution system. The licensee shall create 'Responsibility Centre' at each sub-division. A particular area fed by a 33/11 kV substation or an Industrial area may also be carved out of a subdivision to create a Responsibility Centre. Energy sent out on each 11 kV feeder from a substation shall be metered at 11kV terminal switchgear. Monthly feeder meter readings shall be compared with energy sales to all consumers on that feeder as per their meter readings to work out distribution feeder losses.

2 Responsibility Centre shall carry out determination of loss on each feeder. Based on these losses of a subdivision, division and circle shall be compiled and an analysis of data generated shall be carried out and reported to the Commission.

Chapter 5: DISTRIBUTION CONNECTION REQUIREMENTS

5.1 Objective

- (a) To ensure that the technical, designed and operational criteria specified in the Distribution Code and Distribution Performance Standards are fully complied with for new connections or augmentation of existing connections with Distribution System;
- (b) To establish the general requirements for all Users seeking to connect to the Distribution System, or seeking to modify an existing connection;
- (c) To specify the technical arrangements required at the interface boundary between the Distribution System and the User's plant and equipment that are applicable at all voltage levels;
- (d) To ensure that a new connection to the distribution system does not exert any adverse effects on the existing Users nor shall a new connection suffer adversely due to existing Users;
- (e) To specify the requirements that are applicable to all existing or prospective embedded generators, including Consumer Captive Generating Plants; and
- (f) To facilitate data exchange between the Users, who are connected to the Distribution System.

5.2 Scope

Connection code applies to all entities/consumers, using or intending of using Distribution System including:

- (a) Distribution Licensees;
- (b) Open Access Customers connected to Distribution Systems;
- (c) Other Distribution Licensees connected to the Distribution System;
- (d) Embedded Generators; and
- (e) Large Consumers

5.3 Electricity Supply Code

The Distribution Code in so far as the consumers are concerned has been prepared such that it

is consistent with the Electricity Supply Code specified by the Commission for Distribution Licensee under section 50 of the Act. The provisions of the Electricity Supply Code shall have overriding effect for any inconsistency between the two.

5.4 Connection Application Procedure

1 Application For Connection

An entity seeking connection to Distribution System or an existing User seeking modification to an existing connection shall submit an application for connection to the Distribution Licensee as per the procedures and formats prescribed by the Licensee. Consumers seeking connection to Distribution System shall also observe the procedure laid down in the Electricity Supply Code specified by the Commission.

2 Data Requirement

Any entity seeking connection to a Distribution Licensee's system or an existing User seeking modification in an existing connection shall furnish data in prescribed form to the Distribution Licensee. Incomplete and insufficient data by the User/other applicant entitle the Distribution Licensee for refusal of connection.

Embedded Generator shall provide to the Distribution Licensee information on the Generating Plant and the proposed interface arrangements between the Generating Plant and the Distribution System. The Embedded Generator shall furnish the Generating Unit-wise data in the format specified at Annexure -4 alongwith their application for connection with Distribution System. In addition to supplying the information to Distribution Licensee there is a requirement to provide certain information to SLDC, under the Grid Code for specified capacity of generators.

The Distribution Licensee, when necessary, shall ask for any additional information as may be necessary to permit a full assessment of the effect of the User's load on the Distribution System. The entity seeking connection/ an existing User seeking modification in an existing connection shall submit such additional data to Distribution Licensee within the prescribed time.

5.5 Responsibility for operational safety

Distribution Licensee and the user shall be responsible for safety as indicated in Site Responsibility Schedules for each connection point.

1 Site Responsibility Schedule

For each new Connection with Distribution System or modification of existing connection required, Distribution Licensee shall prepare a Site Responsibility schedule indicating the following for each item of equipment installed at the Connection site as per format specified at Annexure 5.

- (a) The ownership of equipment.
- (b) The responsibility for control of equipment.

- (c) The responsibility for maintenance of equipment.
- (d) The responsibility for operation of equipment.
- (e) The coordinator at the site.
- (f) The responsibility for all matters relating to safety of persons at site.

2 Procedure for Site Access, Site Operational Activities and Maintenance Standards

The connection agreement will also indicate the procedure for the site access, operational activities at site and maintenance standards for equipments at inter-connection site in distribution system and at user/ consumer premises.

5.6 Connection Agreement

The connection agreement lay down the terms and conditions for connection to and use of the Distribution System. The connection agreement shall include (but not limited to), as appropriate, the following terms and conditions:

- (a) A condition is requiring both parties to comply with the Distribution Code
- (b) Details of connection, technical requirements and commercial arrangements including the schedule of tariff for access and use of the distribution system.
- (c) Details of any capital expenditure arising from necessary reinforcement or extension of the system and demarcation of the same between the concerned parties.
- (d) Site operational procedures & break down rectification obligations
- (e) Minimum requirement on protection.

5.7 Connection Points And Boundaries

1 Connection to Transmission System

This is governed by the relevant clauses of Grid Code Connectivity Conditions. The Distribution Licensee shall comply with Connectivity Code for State Transmission System.

2 Connection of Generators with distribution systems

Voltage for inter-connection with Generators shall be 11 kV/33 kV or as agreed with Distribution Licensee

Unless specifically agreed with Distribution Licensee, the Connection point shall be the incoming of the circuit breaker of the generating station through which the generating station is connected to the system of distribution licensee Generating Company/Generator shall maintain all the terminals, communication and protection equipment provided within the perimeter of generating station.

The provision, ownership, operation & maintenance of the metering system between Generating Company/Generator and Distribution Licensee at inter-connection point shall be as per the Distribution Metering Code.

The Distribution Licensee shall maintain all electrical equipment and other assets from the out going feeder gantry onwards.

3 HT consumers

The voltage may be 11 kV, 33 kV, 66 kV and 132 kV as provided in Electricity Supply Code.

The inter-connection boundary shall be the breaker or any other isolating devices installed at the point of commencement of supply in accordance with IE Rule 50 including transformer, protective switchgear installed at the termination of feeder in the premises of the Users. The provision, ownership, operation & maintenance of the metering system between Consumer and Distribution Licensee at inter-connection point shall be as per the Distribution Metering Code.

4 Low voltage consumers

The point of commencement of supply of energy to a consumer shall be at the incoming terminal of the cut-out /other isolating device installed by the consumer under rule 50 of IE Rules, 1956.

The provisions of Electricity Supply Code shall be applicable at the point of commencement of supply of energy to the Low Voltage Consumers.

The Distribution Metering Code shall govern the metering at the consumer's premises. The provision of sealing of meters and cut-out/isolating devices shall be as per the Distribution Metering Code.

5.8 Connected Equipment Requirement

The equipment connected to the Distribution System shall meet the following requirements:

- (a) All equipment connected to the Distribution System shall be of such design and construction as to satisfy the requirements of the relevant Indian Standard Specification. Where no BIS exist the appropriate IEC Standard or equivalent International Standard will apply.
- (b) Installation and commissioning of all electrical equipment/works shall comply with IE Rules 1956.
- (c) For every new connection sought, the Distribution Licensee shall specify the connection point and the voltage of supply, along with the metering and protection requirements as specified in the Metering and Protection Sections.
- (d) The system frequency excursions shall be as per the Indian Electricity Rules, 1956
- (e) Voltage variation on the Licensee's System shall be in accordance with the Indian Electricity Rules 1956.

- (f) Insulation co-ordination of the Users' equipment shall conform to applicable Indian Standards/Codes. Rupturing capacity of switchgear shall not be less than that specified by the Distribution Licensee in the Protection Manual.
- (g) Protection and Metering arrangement of the connected equipment shall be as detailed in the relevant Sections of the Protection Code (separate chapter of the Distribution Code) and the Distribution Metering Code.
- (h) Generators running in synchronisation with grid having salient pole alternators shall install filters to reduce harmonics.

5.9 Connected Plant Restrictions

Users connected to the distribution system can produce power disturbances, which propagate into the distribution system. If these disturbances are severe, the distribution system and other Users on the system will be adversely affected. To ensure system integrity and fairness to all Users, restrictions and controls have to be stipulated for compliance by the Users. Protection issues are dealt in Protection Code, a separate chapter of the Distribution Code.

1 Safety

All equipment of the Users including cables, wiring and overhead lines shall be compatible with safety standards in respect of

- (a) Manufacture quality.
- (b) Erection and location of installation

2 Insulation

The Users' systems must be designed with proper basic insulation level (BIL). Insulation of all components in service must have adequate insulation strength for the system operating voltages at all times.

3 Clearances

All overhead lines, equipment and facilities must have adequate horizontal and vertical clearances with respect to ground and with respect to one another as provided in the Indian Electricity Rules 1956 or other applicable standards.

4 Earthing

All components of Users' systems must be properly earthed as per Indian Electricity Rules 1956. The bodies/cases/trucks/enclosures of all items of equipment shall be properly earthed, with the actual earthing arrangements depending on the machine ratings. Metallic supports of overhead lines and cable sheaths and shields shall also be earthed appropriately.

5 Motor Starters

The starters provided for the motors of the Users shall be of such type and design that the starting current is less than six times the full-load current. The Licensee can advise the User to change over to "auto-transformer" starting if other type of starters for a particular motor causes unacceptable system distortions.

6 Access to Licensee

The Licensees and their authorized personnel shall have the right to inspect the plant of the User or consumer to ensure conformity to standards and restrictions before charging the User's system and periodically thereafter. The Users shall facilitate timely access to the authorized personnel of the Licensees.

The Distribution Licensee in accordance with provision of Section 163 of the Act shall have power to enter premises and to remove fitting or his other apparatus for the purpose of

- (a) inspecting, testing, repairing or altering the electric supply lines, meters, fittings, works and apparatus for the supply of electricity belonging to the licensee; or
- (b) ascertaining the amount of electricity supplied or the electrical quantity contained in the supply; or
- (c) removing where a supply of electricity is no longer required, or where the licensee is authorised to take away and cut off such supply, any electric supply-lines, meters, fittings, works or apparatus belonging to the licensee.

7 Unintended and Unscheduled Back-Energisation

The Users shall take adequate precautions to ensure that no part of the distribution system is energized by the User's system or from another source via the User's system unless the Licensee as an exceptional arrangement requisitions it in writing. The switchgear and controls of the User's systems shall be so designed as to prevent back-energisation. This does not apply to CPPs and small Generating units intended for parallel operation with the Licensee's System.

8 Harmonic Current

Equipment drawing harmonic currents such as furnaces, rolling mills and high power solid-state equipment adversely affects the distribution system and other Users connected to that part of the distribution system. Distribution Licensee shall incorporate necessary clause in connection agreement for restricting the harmonic induction by the consumer into distribution system.

9 Voltage Flicker generated by Consumers:

Some Loads of the consumers such as arc furnaces create current fluctuations, which in turn produce Voltage Flicker. The illumination quality in the premises of other consumers connected to the same feeder suffers. Distribution Licensee shall incorporate necessary clause in connection agreement for restricting the consumers create current fluctuations and causing voltage flicker

10 Power Factor

Low power factor results in under utilization of capacities of equipment, machines, overhead lines and cables of the Licensees and generators and causes direct revenue loss. The Connection Agreement shall specify the limit of power factor of the loads. The Power Factor at which energy is imported by any entity as measured at the connection point shall not be less than 90%. The onus for maintaining the power factor (by installing shunt capacitors if necessary) lies with the energy receiving entity.

11. Efficiency of Machines in Respect of Energy Consumption

All machines and devices shall be efficient and their efficiency shall not be less than the values acceptable in current sound industrial practices. The Licensees have a role in energy conservation and shall prevent wastage of energy by the Users in pursuance of Energy Conservation Act 2001.

5.10 Interface with small generating units including CPPs

If the Distribution Licensee has an interface with any generating unit including CPP and an Agreement for this purpose exists, the Distribution Licensee and the concerned owner of the generating unit shall abide by the following provisions in addition to the provisions contained in this code as applicable to all the Users:

1 Generating Units up to 5 MW

The owner shall provide suitable protection at the interface to protect his system from any damage due to normal and abnormal conditions in the distribution system. The owner shall install separate metering for the reactive load draw, in addition to operational metering. Generating units of above 5 MW

If the generator is an induction generator, the owner shall take adequate precautions to limit the system disturbance, when the induction generator is synchronised. Generators having induction generators shall install adequate capacitors to compensate the reactive power drawl. Also whenever the power is found very low during starting period and causes voltage dip in the Licensee's system and Licensee may advice the owner to install capacitors and generator shall comply.

In addition to the above provisions applicable to the Generating Units up to 5 MW, the Generating Company shall also comply with the provisions of the Grid Code. The owner of generating unit shall enter into an agreement with the Distribution Licensee and if required with Transmission Licensee in the State.

Chapter 6: DISTRIBUTION OPERATION CODE

6.1 Introduction

This chapter establishes rules, procedures and arrangements for efficient and safe operations of distribution system and provides guidelines to the Distribution Licensee and other Distribution system participants with regards to following:

- (a) Demand estimation;
- (b) Outage Planning;
- (c) Contingency Planning;
- (d) Demand Management and Load Shedding;
- (e) Interface with small generating plants including CPPs;
- (f) Monitoring and control of voltage, frequency and power factor;
- (g) Safety Co-ordination;
- (h) Major Incident and Accident reporting;
- (i) Maintenance and testing;
- (j) Tools and spares; and
- (k) Training.

6.2 Objectives

The objective of distribution Operation Code is to achieve the following:

- (a) To establish rules, procedures and arrangements for efficient and safe Distribution Operations;
- (b) To enable the Distribution Licensee to coordinate and integrate the operation and maintenance with other users, embedded generating stations, open access customers and large consumers connected to Distribution System;
- (c) To ensure safety of persons and properties while work is being done on the Distribution System; and
- (d) To provide for the exchange of information for operation actions and/or significant events.

6.3 Distribution Operating Procedure

1. To ensure the compliance of provisions of this Code, the Distribution Licensee shall develop and maintain documented Distribution Operating Procedures.
2. Distribution Licensee shall document the following Distribution Operating Procedures (DOPs) so that the each operating personnel work in consistent and coordinated manner to provide an efficient, reliable and safe distribution system.

- (a) Demand Estimation Procedure
 - (b) Demand Control Procedure
 - (c) Outage Planning Procedure
 - (d) Contingency Planning and System Restoration Procedure
 - (e) Safety Procedure
 - (f) Significant Incident and Accident Reporting Procedure
3. The Distribution Licensee shall furnish the copies of such Distribution Operating Procedures to the Commission in compliance this requirement.

6.4 Demand estimation

1. The Distribution licensee shall estimate demand for Distribution System on year ahead, month ahead and day ahead basis as per the Grid Code requirement on the basis of relevant load data and/or curves subject to modifications depending upon the communications received from any specific user or caused by any contingency. Demand estimation shall be made at an interval such as hourly or 15 minutes time block basis as may be required by SLDC.
2. Concerned major users identified by the distribution licensee shall furnish required data pertaining to the demand of their installations to the licensee. Distribution Licensee shall consolidate the requirement for entire Distribution System and shall furnish the same to SLDC as per the Grid Code/System Operation Procedures.

6.5 Demand Control

1. Temporary load shedding may be effected as per instructions of SLDC for maintaining load-generation balance, loss of any circuit or equipment or any other operational contingency.
2. The Distribution Licensee shall estimate loads that may be shed in discrete blocks at each inter-connection point in consultation with the users/ consumers supplied through independent circuits as required and submit the same to the SLDC. Such users/ consumers shall cooperate with the Distribution Licensee in this regard. The Distribution Licensee shall work out the sequence of load shedding operation and the detailed procedure shall be furnished to the SLDC and to the person in-charge of substation concerned where such load shedding has to be carried out. In case of automatic load shedding through under frequency or any other relays, the circuits and the amount of load to be interrupted with corresponding relay settings shall be intimated to the SLDC and person in charge of the substations of the licensee as necessary.
3. If the duration of planned load shedding to any part of the Distribution System exceeds a day it shall be notified to public through the media. Wherever possible, in case of emergency load shedding, consumers with contract demand of 1 MW and above and essential services such as Railways, Hospitals, Public Water Works etc. shall be intimated over the telephone also.

6.6 Outage Planning

1. The Distribution licensee shall furnish a proposed outage program of the Distribution System where aggregate generation or demand exceeds 5 MW to the SLDC for next financial year by 15th November of each year.
2. The outage programme affecting aggregate generation or demand exceeding 5 MW shall contain identification of lines and equipment of distribution system proposed to be taken out of service, date of start of outage, duration of outage and quantum of load restricted at any interconnection point during outage. Further the licensee shall get the information published in newspapers about the shut downs of the system one day prior to its occurrence.
3. The Licensee shall release the outage plan for distribution system based on final outage plan agreed with SLDC by 31st March 2003.
4. Before any lines or equipment is taken out of service, the licensee shall obtain consent of the designated officer of the SLDC even though the same is already included in the approved plan.
5. In addition to the above, in case of lines and equipments of 132 kV or above, specific release of SLDC shall be obtained.
6. The above procedure shall not apply under the following circumstances:
 - (a) In cases where the estimated draw at interconnection point is not affected;
 - (b) Emergency situations to save plant and machinery;
 - (c) In case of unforeseen emergency situations requiring isolation of line or equipment to save human life; and
 - (d) Disconnection to be effected on any user or consumer's installation due to violation of a connection or electricity supply agreement.
7. In such cases the SLDC shall be informed wherever the load to the extent of 5 MW or more is affected.

6.7 Contingency Planning

A contingency situation may arise in the event of a total or partial blackout in the transmission system. A contingency may also arise in part of the distribution system due to local breakdowns in the distribution system itself. It may also arise due to a breakdown in the apparatus of the transmission licensee at or before the point of interconnection.

Contingency procedure shall be documented unambiguously to achieve the restoration of the total system and associated demand, and re-synchronization of parts of the total system, which have become out of synchronism with each other, at the shortest possible time.

1. Intra-State Transmission system failure

In case of a total blackout at any point of inter-connection, the Distribution Licensee shall follow the step-by-step instructions of SLDC on system restoration, prioritising essential and non-essential loads and black start procedures of embedded generators as required in the Grid Code.

The Distribution licensee shall sectionalize the distribution system into discrete blocks of demand. The Distribution licensee shall inform the SLDC about the extent of load in MW likely to be picked up on switching each demand block.

The Distribution licensee shall prepare a schedule of essential and non-essential load in order of priority at each interconnection to be picked up during the restoration process and shall be intimated to SLDC in the format prescribed at Annexure 6.

The Distribution licensee shall ensure and maintain load generation balance under the direction of the SLDC as per Grid Code.

Till normalcy is restored the Distribution licensee shall maintain direct communication links with the SLDC as per Grid Code.

The Distribution licensee shall furnish the names, designations of the person(s) and their telephone numbers and stations, authorised to deal with contingency operations, to the SLDC as per Grid Code.

2. Distribution System Failure

1. Interruption of power supply in any part of the distribution system lasting for more than two hours due to breakdown in any part of the Distribution system may be termed as a distribution system failure.
2. The Distribution Licensee shall coordinate with SLDC for restoration process, which shall be as per Grid Code.
3. The Distribution Licensee shall designate a Nodal officer to coordinate with SLDC for transmission system restoration process.

3. Failure of the Apparatus of the transmission licensee

The Distribution Licensee shall immediately contact the authorised person at the grid substation of the transmission licensee and assess the probable period of restoration and the probable restriction of load draw from the affected substation. The Distribution Licensee shall affect the demand management plan accordingly.

6.8 Monitoring and Control of Voltage, Frequency and Power Factor

1. The Distribution Licensee shall operate and maintain his system such that power availability to consumers in terms of quality, continuity and reliability is in accordance with the Distribution Performance Standards laid down by the Commission.
2. The Distribution Licensee shall monitor the voltage, frequency and power factors in the distribution system at various sub-stations during peak and off-peak hours and take reasonable measures for improvement of the same in co-ordination with the consumers having Demand of more than 1 MW, and the transmission licensee.
3. The Distribution Licensee shall take power factor improvement measures at strategic points in the distribution system by carrying out system studies and installing required reactive compensation equipments.
4. Voltage in the distribution system may vary depending upon the available generation, system demand and the configuration of transmission and distribution system at any time.

Under normal operating conditions the Distribution Licensee shall exercise proper voltage management in the distribution system beyond the point of interconnection with the transmission system to maintain voltage at all levels according to the Distribution Performance Standards. The Capacitors, wherever required shall be provided at the 33 kV substations to maintain power factor within acceptable limits of 0.9 lagging. The distribution licensee shall provide the reactive compensation looking to 11 kV and 33 kV bus-voltages at 33 kV sub-stations through application of capacitors wherever available.

5. Users/ Consumers having loads with high harmonic content, low power factor and fluctuations shall install appropriate correction equipment to meet the minimum connectivity conditions with distribution system.
6. The Distribution Licensee shall abide by the instructions issued by the SLDC from time to time on load management for maintaining the frequency of supply within the specified limits.

6.9 Operational co-ordination

In the case of an operation on the User's system, which may have an operational effect on the distribution system, the concerned User shall notify the Distribution Licensee in accordance with procedure laid down in this Code. Similarly the distribution licensee shall also notify the affected User(s) in the case of an operation on the distribution system, which may have an operational effect on the User's System. Further the distribution operation may be caused by an Operation on another System. In such case, the information to be provided by the Distribution Licensee and/or the User shall reflect the linkage between the operations.

While in no way limiting the general requirement for advance notification, the following are examples of situations where notification shall be required, since they may have or have had an effect on the operation of the Distribution System or another System:

- (a) The implementation of a Scheduled Maintenance Program of Plant and/or Equipment, which has been arranged;
- (b) The Operation of any Circuit Breaker or Disconnect Switch or any sequence or combination of the two including any temporary overstressing or Generating Unit synchronizing; and
- (c) Voltage control.

1 Safety Management Systems

The Distribution Licensee and Distribution System Participants shall maintain a Safety Management System, which specifies the principles and procedures to ensure safety of persons and properties, while work is being done on the Distribution System

2 Operational Boundary

At sites or locations where an Operational Boundary exists, the Distribution Licensee and Users shall jointly agree on the adoption of a Safety Management System. This shall include the provision of personnel of the Licensee and/or user involved in work at operation site and public and property involved.

3 Safety Coordinator

Distribution Licensees and each Users shall nominate a person or persons who shall be responsible for the coordination of safety precautions at each Connection Point when work is to be carried out on a System on which safety from the system is required.

Each User prior to working on inter-connection point with Distribution System, give notice in writing to the Safety Coordinator of the Distribution Licensee and inform the name of person(s), who shall be responsible for the coordination of work at operational boundary.

Distribution Licensees also prior to issue authorization to any User to work on inter-connection point shall inform to that User of the identity of its designated officer who shall issue the permission to user to connect to distribution system and issue work permit for connection work at operational boundary.

4 Safety Precautions Document

The Distribution Licensees and Users shall maintain a suitable system of documentation, which records all relevant operational events that have taken place on the Distribution System or any other System connected to it and the coordination of relevant safety precautions for work. All documentation in this regards and safety precautions taken for work or test shall be preserved at least for one year for any evidential purpose including any investigation of any accident.

The Distribution Licensee and the Users shall observe the safety requirements as mentioned in the Safety Code while working at inter-connection boundary of the distribution system.

There shall be co-ordination between persons of the Distribution Licensee and the Users/consumers, between persons of two distribution licensees having electrical interfaces, for carrying out the work on any apparatus or lines etc. belonging to either party at the point of interconnection.

The provisions of the Grid Code shall be followed at interconnection points in co-ordination with the transmission licensee.

The disconnecting device(s) at each electrical interface, which shall be capable of effectively disconnecting the system of the licensee and Users/consumers and the grounding devices of the respective systems at the control boundary shall be identified and marked by the licensee and the respective Users/consumers. These shall be maintained in good condition at all times. To prevent inadvertent switching operations by unauthorized persons, such disconnecting devices shall be provided with interlocks.

If a Consumer installs an emergency power supply system, either an electronic system with storage batteries or with generation, the arrangement shall be such that the same cannot be operated without clearly isolating the system from the supply mains. The possibility of a feed back from these devices to the distribution system from any of the conductors including the neutral conductor shall be clearly ruled out.

Appropriate control person at electrical interface shall issue permission in writing to a counterpart for carrying out work on any apparatus, switchgear or lines beyond the electrical interfaces. Such permissions shall be termed as "Line Clear Permits" (LCP). The format for LCP shall be standardized by the licensee and shall be used by all concerned.

5 Safety Manual

The Distribution Licensee shall observe measures relating to safety in electricity supply as may be specified by the CEA in consultation with the State Government under Section 53 of the Act. Till such time the CEA issues measures relating to safety and electricity, the Distribution Licensee shall observe the General Safety Requirements as laid down in IE Rules, 1956 for construction, installation, protection, operation and maintenance of electric supply lines and apparatus.

Every person who is working on a electric line or apparatus or both shall be provided with tools and devices such as gloves, rubber shoes, safety belts ladders, earthing devices, helmets, line testers, hand lines and like for protecting him from mechanical and electric injury. Such tools and devices shall always be maintained in sound and efficient working conditions.

Distribution Licensee shall develop its Safety Manual taking into consideration the safety requirements for the construction, operation and maintenance of electrical plants and electric lines as may be specified by the Central Electricity Authority under Clause (c) of Section 73 of the Act. The copy of Safety Manual shall be furnished to Commission.

6.10 Major incident or Accident Reporting

Any of the following events that could affect the Distribution System requires reporting:

- (a) Major Blackout in power supply
- (b) Failure of Power Transformer affecting power supply in large area
- (c) Accidents-Fatal and Non-Fatal
- (d) Major fire incidents
- (e) Major failure of protection
- (f) Major breakdowns in the distribution system
- (g) Loss of major Generating Unit
- (h) Major break down in sub-transmission line
- (i) Serious equipment problem i.e. major circuit breaker, transformer or bus bar etc.
- (j) Any other incident which the licensee or the User may consider worth reporting in view of its repercussions on the safe and reliable operation of the distribution system
- (k) Major breakdowns of Equipment supplying power to the User's System

The Distribution licensee shall report to the AERC occurrence of any of the above incident in prescribed time and in specified format.

1 Reporting Procedure

All reportable incidents occurring in lines and equipment of 11 kV and above at the 33 kV substations shall be reported within 15 minutes of the incident telephonically by the Distribution Licensee whose equipment has experienced the incident, to all other significantly

affected Users identified by the licensee and the SLDC. The reporting Distribution Licensee should submit a report in writing to SLDC within one hour of such telephonic report. If the incident is of major nature, the report shall be submitted within two hours duly followed by a comprehensive report within 48 hours of the incident. In other cases, the reporting distribution licensee shall submit a report within five working days to the SLDC.

SLDC shall call for a report from any Distribution Licensee on any reportable incident affecting other consumers in case a consumer whose equipment might have been a source of the reportable incident does not report the same. However, this shall not absolve any User from obligation to report events in accordance with Rules.

2 Reporting Form

All reportable incidents except the accident cases shall be reported in standard format attached at Annexure 7.

The format for such a report shall be approved by the Distribution Code Coordination Committee and shall typically contain the following:

- (a) Location of the incident;
- (b) Date and time of the incident;
- (c) Plant or Equipment involved;
- (d) Supplies interrupted and the duration wherever applicable;
- (e) Amount of Generation lost, wherever applicable;
- (f) System Parameters before and after the incident (voltage, frequency, load, generation, etc.);
- (g) Network configuration before the incident;
- (h) Relay indications and performance of protection;
- (i) Brief description of the incident;
- (j) Estimated time of return to service;
- (k) Any other relevant information;
- (l) Recommendations for future improvement; and
- (m) Name and designation of the reporting person.

The Distribution Coordination Committee shall review any new requirement of reporting an incident and shall review the format as the need arise.

3 Accident Reporting

Reporting of accident shall be in accordance with section 161 of the Act read with rule 44A of the Indian Electricity Rules 1956 as reproduced at Annexure 8. If an accident occurs in the distribution system resulting in or likely to have resulted in loss or injury to human or animal life, the Distribution Licensee shall send a telephonic report to the Electrical Inspector within 24 hours of the knowledge of such occurrence. This shall be followed by a report in writing in the form set out in Annexure XIII of I.E. Rules, within 48 hours of the knowledge of occurrence of fatal and other accidents.

6.11 Maintenance and Testing

The level of performance of all line and sub-station equipment shall meet the standards as specified by the Central Electricity Authority under Section 73 of the Act and the standards of performance for the Distribution Licensee specified by the Commission.

1 Construction & Maintenance Practices

All electric supply lines and apparatus shall be of sufficient ratings for power, insulation and estimated fault current and of sufficient mechanical strength, for the duty which may be required to perform under the environmental conditions of installation, and shall be constructed, installed, protected, worked and maintained in such a manner as to ensure safety of human beings, animals and property.

The relevant code of practice of the Bureau of Indian Standards including National Electrical Code if any may be followed. The material and apparatus used shall conform to the relevant specification of Bureau of Indian Standards where such specifications have been already laid.

The Licensee if already not have shall prepare and observe the Construction & Maintenance Manuals for various equipment/works like 33 kV Lines, 11 kV Lines, LT Lines, 33 kV sub-station, 11 kV Pole Mounted and other types of sub-stations. The Construction & Maintenance Manual shall be prepared taking into consideration the following:

- (a) Technical Standards for construction of electrical plants, electric lines and connectivity to the grid specified by the Central Electricity Authority under section 73(b);
- (b) Safety requirements for construction, operation and maintenance of electrical plants and electric lines specified by the Central Electricity Authority under section 73(c);
- (c) REC Construction Standards and Standard design layouts;
- (d) CBIP Publications on Code of Practices;
- (e) Code of Practices issued by Bureau of Indian Standards for various equipment and maintenance practices; and
- (f) Instruction Manuals for installation, operation and maintenance issued by standard equipments by manufacturer concerned.

The standard tables for conductor size, fuse size, wire gauge, electrical clearance, ground wire size, insulation resistance and earth resistivity etc. shall be included in the Construction and Maintenance manual. Distribution Licensee shall ensure that its construction and maintenance staff strictly observe these Manuals. The copy of Construction & Maintenance Manual shall be furnished to Commission.

2 Preventive Maintenance Schedule and Inspection Manual

The Distribution Licensee shall prepare a Preventative Maintenance Schedule and Inspection manual for various line and sub-station equipment installed in distribution system. The Preventive Maintenance Schedule and Inspection Manual shall include the following important equipment:

- (a) Power Transformers and Distribution Transformers installed indoor;
- (b) Power Transformers and Distribution Transformers outdoor installed;
- (c) Pole Mounted Distribution Transformers;
- (d) 11 kV & 33 kV Circuit Breakers;
- (e) 11 kV & 33 kV Overhead Lines including G.O. Switches & Drop Out Fuses;
- (f) 11 kV & 33 kV Overhead Lines including G.O. Switches & Drop Out Fuses;
- (g) 11 kV & 33 kV Cable & Cable Boxes;
- (h) LT Lines; and
- (i) Service Connection.

The Preventive Maintenance Schedule and Inspection Manual shall have sections covering the following:

- (a) Recommended Schedule for inspection;
- (b) Recommended Schedule for preventive maintenance; and
- (c) Recommended Schedule for overhaul.

The inspection schedule and preventive maintenance schedule shall have daily, weekly, monthly quarterly and annual periodic activity to be carried out for various equipments.

3 Maintenance Record

The Distribution Licensee shall maintain records of periodic inspections carried out in the standard formats prescribed in Preventive Maintenance Schedule and Inspection Manual. Records shall be maintained in respect of following amongst others:

- (a) Power Transformers and Large Distribution Transformers installed indoor
- (b) Pole Mounted Distribution Transformers
- (c) 11 kV & 33 kV Circuit Breakers;
- (d) 33 kV and 11 kV Lines

Regular testing of all the equipments such as transformers, switchgear, protective relays, etc., should be carried out as recommended by the manufacturer and the relevant code of practice issued by the Bureau of Indian Standards and CBIP. These shall be carried out at the prescribed intervals and the test results shall be recorded in the maintenance registers. Wherever the test results indicate a decline in the insulation resistance and/or deterioration of the equipment, preventive maintenance shall be carried out to ensure serviceability, safety and efficiency. Presently maintenance and testing schedule shall be adopted as per the REC manual.

The Distribution Licensee shall maintain well trained hot-line personnel and all the required tools in good condition and conduct maintenance work by using hot-line technique, wherever possible, to reduce period of interruption.

The consumers shall maintain their apparatus and power lines at all times conforming to I.E. Rules, 1956 and these shall be suitable for connection to distribution system in a safe and reliable manner.

6.12 Tools and Spares

The Distribution Licensee shall ensure availability of proper tools and tackles. at all work places for carrying out the maintenance. The tools and tackles shall be checked from time to time and their serviceability shall be ensured. The Distribution Licensee shall maintain an inventory of spares required for maintenance and replacement purposes at suitable locations according to a clear policy to be laid down by the licensee.

6.13 Training

The Distribution Licensee shall impart necessary training to its officers/staff in distribution system operation and maintenance practices so as to implement the provisions of this Code. The Distribution Licensee shall make appropriate arrangements for imparting training in both cold line and hot-line work to workmen and supervisory staff, incorporating up-to-date techniques of distribution system design, construction and maintenance. Suitable syllabus shall be framed for this purpose.

6.14 Nomenclatures & Identification Coding

The Distribution Licensee shall prepared equipment nomenclatures and identification equipment for uniquely identifying various equipments in distribution system. The nomenclatures scheme shall be consistent with the scheme provided in the Grid Code for the intra State Transmission System.

6.15 Conservation of energy

The Distribution Licensee and the other participants including consumers shall comply with the relevant provisions of " Energy Conservation Act-2001" as applicable to them and the notification issued to this effect by the competent authorities.

6.16 Operational Communication

Reliable communication links shall be established for exchange of data, information and operating instructions between SLDC and the Distribution licensee, embedded generators, users and large consumers with a Demand of more than 5 MW.. The Distribution Licensee and the Users connected to its Distribution System shall designate officers and agree on communication channels for the exchange of information. Communication shall, as much as possible, be direct between the User and the operator of the Distribution System to which that User is connected.

List of telephone numbers and call signs shall be exchanged by the Distribution Licensee and concerned Users to enable control activities to be efficiently coordinated.

Chapter 7: DISTRIBUTION PROTECTION REQUIREMENT

7.1 Introduction

In order to safeguard Distribution System and prevent faults travelling into the Transmission System, it is essential that certain minimum standards for protection shall be specified for the Distribution Licensee and Users connected to Distribution System. This chapter describes these minimum standards.

7.2 Objective

The objective of this chapter is to define the minimum protection requirements for any equipment connected to the Distribution System, so that faulty distribution section can be isolated from rest of power system and thereby minimize disruption due to faults.

7.3 General Principles

1 No item of electrical equipment shall be allowed to remain connected to the distribution system unless it is covered by appropriate protection aimed at reliability, selectivity, speed and sensitivity of protective relays/devices. Distribution Licensee and users shall co-operate with Transmission Licensee to ensure correct and appropriate settings of protection to achieve effective, discriminatory removal of faulty equipment within the target clearance time specified in the Grid Code.

2 Protective relay settings shall not be altered or protection bypassed and/or disconnected without consultation and agreement of all the affected consumers and distribution licensee. In case the protection has been bypassed and/or disconnected by agreement, the same should be rectified and protection restored to normal condition as quickly as possible. If agreement is not reached all the electrical equipments shall be isolated forthwith.

7.4 Protection Manual

Distribution Licensee shall prepare and enforce standard manual of protection indicating minimum protection requirement within the distribution system and connected Users' system. The Protection Manual shall cover protection of 33 kV & 11 kV Lines Power and Distribution Transformers. The Protection Manual shall be prepared taking into consideration the Grid Code Protection requirement on Distribution/User System and shall contain relevant data on fault levels at various places, guidelines for setting standard relays for over current and earth faults, fuse rating selection criteria etc. A copy of Protection Manual shall be furnished to Commission in compliance of this requirement.

7.5 Protection at inter-connection point of EHV GSS

All 33 kV and 11 kV lines emanating from EHV GSS shall be provided with a minimum of over current and earth fault protection with or without directional features along with high set element as per the Grid Code requirement. Co-ordination with the originating EHV sub-station should be ensured to avoid major sub-station equipment / EHV transmission lines from tripping on through faults due to delayed fault clearance in the distribution feeders. Protection on 33 kV & 11 kV transformers and lines (or their sectionalising points) of HV

system of Distribution Licensee shall be coordinated with settings of protection provided on 33 kV & 11 kV feeders at EHV sub-stations.

7.6 33 kV and 11 kV line protection

1 The settings of protective relays for 33 kV and 11 kV lines shall be such that a fault in any section does not affect the upstream section between the generating unit/feeding substation and the faulty section under all conditions. 33 kV radial lines shall have two over current and one earth fault non-directional IDMT relay protection. The relays shall also have instantaneous over current element. Where 33 kV line is an interconnection between two substations or a generator unit and the substation, these relays shall have directional feature.

2 All 33 kV and 11 kV lines at connection points shall be provided with a minimum of over current and earth fault relays as follows:

1	Radial feeders	Non-directional time lag over current and earth fault relays with suitable settings to obtain discrimination between adjacent relays settings.
2	Parallel/ring feeders and inter-connected feeders	Directional time lag over current and earth fault relays.
3	Long feeders/transformer feeders	These feeders shall incorporate a high set instantaneous element.

7.7 Transformer Protection

The Minimum protection requirements of transformers installed in distribution system shall be as under:

On primary side of transformers:

On primary side of transformers a linked switch of such capacity as to carry the full load current and to break only the magnetising current of transformer provided the capacity of the transformer does not exceeds 1000 KVA.

Circuit breaker of adequate capacity for transformers having capacity above 1000 KVA

On secondary side of transformers:

- (a) All the transformers of capacity 630 KVA and above transforming HV to EHV, MV or LV a circuit breaker of adequate rating shall be provided.
- (b) In respect of transformers of capacity upto 630 KVA, a linked switch with fuse or circuit breaker of adequate rating shall be provided.

In addition to above transformers having high or extra high voltage on any side shall be provided with following protection:

- (a) Gas pressure type and winding and oil temperature protection to give alarm and tripping shall be provided on all transformers of rating 1000 KVA and above.

- (b) Transformers of capacity 10 MVA and above shall be protected against incipient faults by differential protection

7.8 Generator Protection

All generators with rating of 100 KVA and above shall be protected against earth fault/leakage. All generators of rating 1000 KVA and above shall be protected against faults within the generator winding using restricted earth fault protection or differential protection or both as per provisions under Rule 64 A (2) (e) of IE Rules 1956. The protection at inter-connection point with State Transmission Grid shall be in accordance with Grid Code requirements and connectivity criteria laid down therein.

7.9 Protection Coordination

1 The transmission licensee shall notify the initial settings and any subsequent changes to the Distribution Licensee and Users from time to time. Routine checks on the performance of protective relays shall be conducted and any malfunction shall be noted and corrected as soon as possible. The Distribution licensee shall decide the relay settings with the data collected from the transmission licensee and the Users on Fault Levels at various EHV Sub-Stations. Representatives of the generating companies, transmission licensees and distribution licensees shall meet periodically to discuss such malfunctions, changes in the system configuration, if any, and possible revised settings of relays.

2 SLDC shall be responsible for arranging periodical meetings between the generating companies, transmission licensee and the distribution licensees to discuss coordination of protection as per the Grid Code requirement. The transmission licensee shall investigate any malfunction of protection or other unsatisfactory protection issues. The distribution licensees shall take prompt action to correct any protection malfunction or activity in distribution system as discussed and agreed to in these periodical meetings.

List of Annexures

S.No	Title of Annexure	Annexure No.
1	Load Data for demands of 5 MW and above to be furnished by the User/Consumer (clause 4.7 sub-clause 5)	Annexure-1
2	System Data to be provided to the intending User/Consumer with contract demand of 5MW or more (Clause 4.7 sub-clause 5)	Annexure-2
3	System Data Of Whole Licensee System (Clause 4.7 -5)	Annexure-3
4	Embedded Generator Unit-Wise Data	Annexure-4
5	Site Responsibility Schedule	Annexure-5
6	Essential Loads And Priority Of Restoration	Annexure-6
7	Operational Event Reporting	Annexure-7
8	Rule No. 44 A of The Indian Electricity Rules, 1956	Annexure-8
9	Form for Reporting Electrical Accidents	Annexure XIII of IE Rules 1956

Annexure-1

Load Data for demands of 5 MW and above to be furnished by the User/Consumer
(clause 4.7 sub-clause 5)

Name & Address of User/Consumer:

S No	Description	Details
1	Type of Load	(State whether: - steel melting furnace loads, Rolling mills, traction loads, other industrial loads, pumping loads, etc.)
2	Maximum Demand (kVA) and Annual Energy Requirement in kWh	
3	Year/Years by which full/part Supply is required	
4	Location of Load	(Furnish location map to scale, indicate details of Consumer category/capacity, nearest Railway Station, and nearest EHV sub-station)
5	Rated Voltage at which supply is required. Whether Single phase or Three-phase supply required	
6	Type of supply	Normal/Alternate/Dedicated (specify details)
7	Description of Equipment	
A	<u>Motors</u> State purpose and number of installations, voltage and kW rating, starting current, type of motors, types of drives and control arrangements	
B	<u>Heating</u> Type and kW Rating	
C	<u>Furnace</u> Type, Furnace Transformer	

S No	Description	Details
	Capacity and Voltage Ratio	
D	<u>Electrolysis</u> Purpose, kVA capacity	
E	<u>Lighting</u> kW Demand	
8	Sensitivity of demand to fluctuations in voltage and frequency of supply at the time of Peak Demand (Give details)	
9	Voltage sensitivity	MW/kV MVar/kV
10	Frequency sensitivity	MW/Hz MVar/Hz
11	Phase unbalance imposed on system Maximum (%) Average (%)	
12	Maximum harmonic content imposed (Furnish details of devices included with the system for the suppression of harmonics, also furnish the harmonic currents of different orders drawn by each device without filters)	
13	Details of any loads, which may cause Demand fluctuations of greater than 10 MW at the point of connection, including Voltage Dips (percentage) lasting for 5 seconds and more. (Give details)	

Annexure-2

System Data to be provided to the intending User/Consumer with contract demand of

5MW or more (Clause 4.7 sub-clause 5)

- 1) 33 kV and above distribution line data relevant to the location where connection has been applied/feasible to provide.
- 2) Details of metering system and protection system proposed .
- 3) Fault levels at which the consumer should design his equipment.
- 4) Fault clearance time for consumer's switch gear and
- 5) Sub-station fault level.

ANNEXURE 3

System Data Of Whole Licensee System

(Clause 4.7 -5)

1. Topological map of Assam marking boundaries of Area of supply of the licensee.
2. Distribution map of the licensee drawn to scale of not less than 1 Cm to 2.5 Km showing the existing 11 kV and 33 kV lines and substations within the area of supply. Lines and substations under construction or planned for the next five years shall be shown in dotted lines.
3. Single line diagram of the distribution system showing line length, conductor sizes, substation capacity, capacitor sizes with locations of auto-reclosures/Kiosks/Breakers etc.
4. Details of Metering and relaying at 33/11 kV substations.
5. Details of Grid substations at the point of interconnections as follows:
 - i) MVA Capacity and voltage.
 - ii) Number of transformers, capacity of each transformer, voltage ranges of taps.
 - iii) Fault level at substation busbars,
 - iv) Bus impedance
 - v) Substation layout diagram.

Draw at interconnection points: Maximum and Minimum MW drawn during last six months from each interconnection with the transmission system or with other distribution licensees.

EMBEDDED GENERATOR UNIT-WISE DATA

(Clause 4.6 –2)

Name & Address of Generating Company:	
Location of Generating Plants (s):	
Terminal Volts (kV);	
Rated kVA;	
Maximum and minimum Active Power sent out (kWso) Reactive Power requirements (kVAr), if any;	
Type of Generating Plant—synchronous, asynchronous, etc.;	
Fault Level contribution	
Method of voltage control;	
Generator transformer details, if applicable;	
Requirements for Top-up supplies and/or standby supplies;	
Generator kW/kVAr capability chart (at lower voltage terminals);	
Type of excitation system;	
Inertia constant kW secs/kVA;	
Stator Resistance;	
Direct-Axis Reactance (Sub-transient, Transient & Synchronous);	
Quadrature-Axis Reactance (Sub-transient & Synchronous);	

Zero Sequence (Resistance & Reactance);	
Negative Sequence (Resistance & Reactance);	
Generator Transformer (Resistance, Reactance, kVA Rating, Tap Arrangement, Vector Group, Grounding, Connection & % Impedance);	
Automatic Voltage Regulator block diagram, including the data on the gains (forward and feedback), time constants, and voltage control limits;	
Speed Governor block diagram detailing the governor fly-ball, if applicable, and control system and Prime Mover time constants, together with the turbine rating and maximum power	
Standby Requirements:	
Rated Capacity and Minimum Generation of each Generating Unit and Power Station in kW for standby capacity requirements.	
Generating Unit and Power Station auxiliary Demand (Active Power and Reactive Power) in kW and kVAr, at rated capacity conditions. For Customers Self-Generating Plant, this shall include Top-up requirements.	
Interface Arrangements- the means of synchronization between the Distributors and User;	
Details of arrangements for connecting to ground that part of the Generator's System directly connected to the Distribution System;	
The means of connection and Disconnection which are to be employed	
Precautions to be taken to ensure the continuance of safe conditions should any grounded neutral point of the Generator's System become disconnected from ground.	

ANNEXURE 5

**CONNECTION AGREEMENT
SITE RESPONSIBILITY SCHEDULE
(Clause 5.5- 1)**

Name of Sub-station/Location

Site Owner

Name of co-ordination officer of site

Telephone No.

Fax No.:

Item of Plant / Apparatus	Plant Owner	Safety Responsibility	Control Responsibility	Operation Responsibility	Maintenance Responsibility	Remarks
.....kV Switchyard						
All equipment including bus-bars						
Feeders						
Generating Units						
Other (to be specified)						

Signatures

Plant Owner

Safety Responsibility Officer

Control Responsibility Officer

Operation Responsibility Officer

Maintenance Responsibility Officer

Annexure 6

ESSENTIAL LOADS AND PRIORITY OF RESTORATION

(Clause 6.6-1)

Priority	Type of Load	Name of the Sub-station feeding such loads
1.	Hospitals, Water Works,	
2.	Defence Establishments	
3.	Radio, Television Stations and telecommunication Exchanges/Stations	
4.	Air Port	
5.	Important cities	
6.	Police Stations	
7.	Fire Stations	
8.	Process Industries and Mining	

OPERATIONAL EVENT REPORTING

(Clause No. 6.6-1)

Name of the reporting Organisation

Date and Time of reporting the /event incident

- 1 Date and time of incident
- 2 Location of incident (Name of Sub-station/Line etc.)
- 3 Description of incident
- 4 System parameters before the incident (Voltage, Frequency, Flows, Generation, etc.)
- 5 Failure of protection at EHV GSS if any and relay indications.
- 6 Damage to equipment
- 7 Supplies interrupted and duration, if applicable
- 8 Amount of Generation lost, if applicable
- 9 Possibility of alternate supply arrangement
- 10 Estimate of time to return service
- 11 Cause of incident
- 12 Any other relevant information and remedial action taken
- 13 Recommendations for future improvement/repeat incident

Annexure 8

Rule No. 44 A of The Indian Electricity Rules, 1956 (Clause 6.10-2)

Rule no. 44 A – Intimation of Accident

If any accident occurs in connection with the generation, transmission, supply or use of energy in or in connection with any part of electric supply lines or other works of any person and the accident results in or is likely to have resulted in loss of human or animal life or in any injury to a human being or an animal, such person or any authorized person of the Distribution Licensee not below the rank of Junior Engineer or equivalent shall send to the Inspector a telegraphic report within 24 hours of the knowledge of the occurrence of the fatal accident and a written report in a form set out in Annexure XII within 48 hours of the knowledge of the occurrence of the fatal accident and all other accidents. Where practicable a telephonic message should also be given to the Inspector immediately the accident comes to the knowledge of authorized officer of Distribution Licensee or other person concerned.

Annexure XIII of IE Rules 1956

The Indian Electricity Rules, 1956

[ANNEXURE XIII]

FORM FOR REPORTING ELECTRICAL ACCIDENTS

(See Rule 44-A)

(Clause 6.10-3)

(To be furnished by Shift-in-Charge of the concerned ASEB sub-station/line where accident occurred)

- 1 Date and Time of accident
- 2 Place of accident
(Village/Town, Tehsil /Thana, District and State)
- 3 System and voltage of supply
(Whether EHV/HV/LV line, sub-station/generating station/consumer's installations/service lines/other installations)
- 4 Designation of the Officer-in-charge (in whose jurisdiction the accident occurred)
- 5 Name of owner/user of energy in whose premises the accident occurred.
- 6 Details of victim(s)

(a) Human

S.No.	Name	Father's Name	Sex of victim	Full Postal Address	Approx. Age	Fatal / Non-Fatal

(b) Animal

S.No.	Description of Animals	Number(s)	Name(s) of Owner(s)	Address (es) of owner(s)	Fatal / Non-Fatal

7 In case the victim(s) is are employee(s):

(a) designation of such person(s)

(b) brief description of the job undertaken, if any.

(c) Whether such person/persons was/were allowed to work on the job.

8 In case the victim(s) is/are employee(s) of a licensed contractor

(a) Did the victim(s) possess any electric workman's permits(s), supervisor's certificate of competency issued under Rule 45? If yes give number and date of issue and the name of issuing authority.

(b) Name and designation of the person who assigned the duties of the victim(s)

9 In case of accident in the Distribution Licensee system, was the Permit To Work (PTW) taken?

10 Describe fully the nature and extent of injuries, e.g. fatal/disablement (permanent or temporary) of any portion of the body or burns or other injuries.

In case of fatal accident, was the post mortem performed?

- 11 Detailed causes leading to the accident
(To be given in a separate sheet annexed to this form)
- 12 Action taken regarding first-aid, medical attendance etc. immediately after the occurrence of the accident (give details)
- 13 Whether the District Magistrate and Police Station concerned have been notified of the accident (if so, give details)
- 14 Steps taken to preserve the evidence in connection with accident to the extent possible.
- 15 Names and designation(s) of the person(s) assisting, supervising the person(s) killed or injured.
- 16 What safety equipments were given to and used by the person(s) who met with this accident (e.g. rubber gloves, rubber mats, safety belts and ladders etc.)?
- 17 Whether isolating switches and other sectionalising devices were employed to deaden the section for working on the same? Whether working section was earthed at the site of work?
- 18 Whether the work on live lines was undertaken by authorised person(s)?
If so, the name and the designation of such person(s) may be given.
- 19 Whether the artificial resuscitation treatment work on live lines was undertaken by authorised person(s)?
If yes, how long was it continued before its abandonment?
- 20 Names and designations of persons present at and witnessed the accident.
- 21 Any other information remarks.

Place
Time
Date

Signature
Name
Designation
Address of the person reporting

(By Order of the Commission)

Sd/- ILLEGIBLE
Secretary,
Assam Electricity Regulatory Commission