

HARYANA GOVERNMENT

HARYANA ELECTRICITY REGULATORY COMMISSION, PANCHKULA

Notification

The 12th May, 2009

HARYANA GRID CODE (HGC) REGULATIONS, 2009

Regulation No. HERC/ 22 /2009: In exercise of the powers conferred by sub-section (zp) of section 181 (2) read with sub-section (h) of section 86 (1) of the Electricity Act (36 of 2003), the Haryana Electricity Regulatory Commission hereby makes the following regulations namely:-

1. SHORT TITLE, COMMENCEMENT AND INTERPRETATION

- (i) These regulations may be called the Haryana Grid Code in short 'HGC'
- (ii) These regulations will be applicable to the State Load Despatch Centre, every transmission licensee in the State including STU and every user who is connected to and/or uses the State transmission system.
- (iii) These regulations shall extend to the State of Haryana.
- (iv) These regulations shall come into force on the date of their publication in the Haryana Government, Gazette.
- (v) The Punjab General Clauses Act 1898 (Act 1 of 1898), as applicable to the state of Haryana shall apply to the interpretation of these regulations.

2. DEFINITIONS:-

Item	Definition
(1) Act	The Electricity Act, 2003.
(2) Agency	A term used in the various sections of the HGC to refer to SGS and licensee that utilise the State transmission system.
(3) Apparatus	Electrical apparatus includes all machines, fittings, accessories and appliances in which conductors are used.
(4) Area Load Despatch Centre (ALDC)	The Area Load Despatch Centre to be established by the distribution licensees
(5) Area of Supply	As defined in the concerned licence.
(6) Authority	The Central Electricity Authority (CEA)
(7) Automatic Voltage Regulator (AVR)	A continuously acting automatic excitation control system to control the voltage of a generating unit measured at the generator terminals.

- (8) Beneficiary A person who has a share in State generating station and inter -State generating station.
- (9) BIS The Bureau of Indian Standards
- (10) Black Start The start up of a generating unit without use of external power following grid failure.
- (11) Bulk Power Consumer A person to whom electricity is provided and who has a dedicated supply at a voltage as agreed with the distribution licensee and transmission licensee.
- (12) Capacitor An electrical facility provided for generation of reactive power.
- (13) Captive Generating Plant (CGP) 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.
- (14)CGS Central Generating Station
- (15) Central Transmission Utility (CTU) Any Government Company, which the Government of India may so notify under sub-section (1) of section 38 of the Act.
- (16) CERC The Central Electricity Regulatory Commission.
- (17) Commission Haryana Electricity Regulatory Commission (HERC)
- (18) Connection The electric lines and electrical equipment used to effect connection of a user's system to the transmission system.
- (19) Connection Agreement An agreement between the STU/transmission licensee and a user setting out the terms relating to the connection to and/or use of the State transmission system as referred at section 4. 5 of the HGC.
- (20) Connection Conditions The technical conditions to be complied with by any user having a connection to the State transmission system as laid down in Chapter-4 'Connection Conditions' of the HGC.

(21) Connection Point	A point at which a user's plant and/or apparatus connects to the State transmission system.
(22) Contact Person	A person notified by SLDC and distribution company on their behalf to carry out responsibility as required under section-5.6(d) (ix) of the HGC.
(23) Data Acquisition System (DAS)	A device provided to record the sequence of operation in time, of the relays/equipments/system parameters at a location.
(24) Demand	The demand of active power in MW and reactive power in MVAr of electricity, unless stated otherwise.
(25) Designated Person	A person identified as having responsibility for inter-boundary safety under section 5.15.1 of the HGC.
(26) Despatch Schedule	The Ex-power plant net MW and MWH output of a generating station, scheduled to be exported to the Grid from time to time.
(27) Detailed Planning Data	As referred to in section 3.5.2 of the HGC.
(28) Directive	A policy directive issued by the State Government of Haryana under section 37 and by the Commission under section 128 of the Act.
(29) Disconnect	The act of physically separating user or bulk power consumer's electrical equipment from the transmission system.
(30) Disturbance Recorder (DR)	A device provided to record the behaviour of the pre-selected digital and analog values of the system parameters during an event.
(31) Distribution Licensee/ Discom	A licensee authorized by the Commission to operate and maintain the distribution system in the State for supplying electricity to the consumers in his area of supply.
(32) Distribution System	"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.

(33) Distribution System Operation & Control Centre (DSOCC)	The Distribution System Operation and Control Centre as established by the distribution licensee to carry out the functions as per the HGC.
(34) Drawal	The import from, or export to, State transmission system, of electrical energy and power or both active/ reactive power.
(35) Drawal Schedule	The, Ex-power plant, MW that a beneficiary is scheduled to receive from the SGS and ISGS, including bilateral exchanges from time to time.
(36) Electricity Operator	Any person who owns and/ or operates generating plant or who holds a licence under section 14 of the Act, connected to the transmission system and any bulk supplier.
(37) Event	An unscheduled or unplanned occurrence on the grid including faults, incidents and breakdowns.
(38) Event Logger (EL)	A device provided to record the sequence of operation in time, of the relays / equipments at a location during an event.
(39) Extra High Voltage (EHV)	Where the voltage exceeds 33 kV under normal conditions, subject, however, to the percentage variation allowed by the Authority.
(40) Ex-power Plant output	Net MW/MWH output of a generating station, after deducting auxiliary power consumption and transformation losses.
(41) Forced Outage	An outage of a generating unit or a transmission facility due to a fault or other reasons, other than planned outages.
(42) Generator	An organisation (including Central/ State or other generating station, in which the State has a full share) that generates electricity and who is subject to the HGC.
(43) Generating Company	Any company or body corporate or association or body individuals, whether incorporated or not, or artificial juridical person, which owns or operates or maintains one or more generating stations.
(44) Generating Unit	An electrical generating unit coupled to a turbine within a power station together with all plants and apparatus at that power station (up to the connection point) which relates exclusively to the operation of that turbo-generator.

(45) Governor Droop	In relation to the operation of the governor of a generating unit, the percentage drop in system frequency which would cause the generating unit under free governor action to change its output from zero to full load.
(46) Grid	The combination of the transmission system, distribution system and power stations.
(47) Grid Co-ordination Committee(GCC)	The Committee formed under Chapter 7 of the HGC.
(48) Grid Standards	Grid Standards specified by the Authority under sub-section (d) of section 73 of the Act.
(49) HGC	Haryana Grid Code.
(50) HPGCL	Haryana Power Generation Corporation Limited
(51) HVPNL	Haryana Vidyut Prasaran Nigam Limited.
(52) IEC	International Electro-Technical Commission.
(53) IE Rules	Regulations framed by CEA under section 53 of the Act.
(54) Indian Electricity Grid Code (IEGC)	A document describing the procedures and the responsibilities for planning and operation of Indian power system specified by the CERC in accordance with sub-section 1(h) of section 79 of the Act.
(55) Inter Connecting Transformer(ICT)	Transformer connecting EHV lines / bus bars of different voltages.
(56) Independent Power Producer (IPP)	A generating company not owned / controlled by the Central / State Government
(57) Inter-State Generating Station (ISGS)	A Central and other generating station in which two or more than two States have a share and whose scheduling is to be coordinated by the RLDC.
(58) Inter-State Transmission system (ISTS)	Inter-State Transmission system includes - (i) Any system for the conveyance of electricity by means of a main transmission line from the territory of one State to another State, (ii) The conveyance of energy across the territory of an intervening

State as well as conveyance within the State which is incidental to such inter-State transmission of energy, and
 (iii) The transmission of electricity within the territory of State on a system built, owned, operated, maintained or controlled by CTU.

(59) Lean Period	That period when electrical demand is at its lowest.
(60) Licensee	The holder of a licence in the State of Haryana who has been granted a license under section 14 of the Act.
(61) License	Any license granted by HERC under section 14 of the Act.
(62) Load	The MW/MWh consumed by a utility /installation
(63) Maximum Continuous Rating (MCR)	The normal rated full load MW output capacity of a generating unit that can be sustained on a continuous basis at specified conditions.
(64) National Grid	The entire inter-connected electric power network of the country, which would evolve after inter-connection of regional grids.
(65) Net Drawal Schedule	The drawal schedule of a beneficiary after deducting the apportioned transmission losses (estimated).
(66) Northern Region / Region	Region comprising of the States of Punjab, Haryana, Himachal Pradesh, J&K, Uttrakhand, Uttar Pradesh, Delhi, Chandigarh(UT) and Rajasthan for the integrated operation of the electricity system.
(67) Northern Regional Power Committee (NRPC)	Northern Regional Power Committee established by resolution by the Government of India for facilitating the integrated operation of the power system in Northern Region.
(68) NRLDC	Northern Regional Load Despatch Centre established under sub-section (1) of section 27 of the Act.
(69) NTPC	National Thermal Power Corporation Limited.
(70) Open Access	Open Access means the non-discriminatory provision for the 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.
(71) Open Access Customer	Open Access customer means a consumer who receives supply of electricity from a person other than the distribution licensees of his area of supply, and the expression includes a generating company and licensee, who has availed of or intends to avail of open access.

(72) Operation	A scheduled or planned action relating to the operation of a system
(73) Operation Co-ordination Committee (OCC)	A committee of NRPC with members from all constituents, which decides the operational aspects of the regional grid.
(74) Operating Margin	Contingency reserve plus operating reserve.
(75) Operating Range	The Operating Range of frequency and voltage as specified under the Operating Code (Chapter-5) of this HGC.
(76) Operating Reserve	The additional output from a generating plant, which must be realizable in real-time operation to correct any system frequency fall to an acceptable level, in the event of a loss of generation, or loss of import from an external interconnection, or mismatch between generation and demand.
(77) Outage	The reduction of capacity or taking out of service of a generating unit, power station or part of the transmission system or distribution system.
(78) Peak Period	That period when demand for power is highest.
(79) Power System Operational Co-ordination Committee	A committee of SLDC with members from all agencies, which decides the operational aspects of the State grid.
(80) Power Purchase Agreement (PPA)	The agreement between a generator and the licensee in which, subject to certain conditions, the licensee agrees to purchase the electrical output of the generating unit(s) of the generator and the generator agrees to provide electrical energy from his unit(s).
(81) Power Station	An installation of one or more generating units (even when sited separately) owned and/or operated by the same generator and which may reasonably be considered as being managed as a single integrated generating complex.

(82) Power System	Power System means all aspects of generation, transmission, distribution and supply of electricity and includes one or more of the following namely:- (a) generating stations; (b) transmission or main transmission lines; (c) sub-stations; (d) tie-lines; (e) load despatch activities; (f) mains or distribution mains; (g) electric supply lines; (h) overhead lines; (i) service lines; (j) works.
(83) PSS	Power System Stabilizers
(84) Protection Co-ordination Committee(PCC)	It is a committee of the STU as referred under section 4.8.4 and 5.2(i) of the HGC.
(85) Reactor	An electrical facility specifically designed to absorb reactive power.
(86) Regional Grid	The entire synchronously connected electric power network of the concerned region, comprising of ISTS, ISGS and intra-state systems.
(87) Regional Load Despatch Centre (RLDC)	Regional Load Despatch Centre means the Centre established under sub-section (1) of section 27 of the Act.
(88) Regional Transmission System (RTS)	The combination of EHV electric lines and electrical equipment owned or operated by Power Grid Corporation of India/BBMB/utilities in the Northern Region.
(89) RTU	Remote Transmitting Unit
(90) Section	A part of any Chapter of HGC, which is, identified as covering a specific topic.
(91) Single Line Diagram (SLD)	Diagrams, which are a schematic representation of the HV/EHV apparatus and connections to all external circuits at a connection point incorporating its numbering nomenclature and labelling.

(92) Site Common Drawing	Drawings prepared for each connection point, which includes layout drawings, electrical layout drawings, common protection/control drawings and common service drawings.
(93) Spinning Reserve	Partly loaded generating capacity with some reserve margin that is synchronized to the system and is ready to provide increased generation at short notice pursuant to despatch instruction or instantaneously in response to a frequency drop.
(94) State	The State of Haryana.
(95) State Generating Station (SGS)	A generating station other than CGS whose entire generation of electricity is dedicated to the State.
(96) State Load Despatch Centre (SLDC)	This means the centre established under sub section 31 of the Act
(97) Standard Planning Data	As referred to under section 3.5.1 of HGC.
(98) State Transmission System (STS)	A system built, owned, operated, maintained or controlled by STU / transmission licensee for transmission of electricity within the territory of State.
(99) State Transmission Utility (STU)	A Government company specified as such by the Govt. of Haryana under section 39 (1) of the Act.
(100) Static VAR Compensator (SVC)	An electrical facility designed for the purpose of generating or absorbing reactive power.
(101) Supervisory Control and Data Acquisition / SCADA	The combination of transducers, communication links and data processing Systems, which provide information to the SLDC on the operational state of the transmission system and the generators' generating units.
(102) Supplier	A person authorised to sell electricity to licensee(s) or consumer(s) under a license granted under the Act and who is subject to the HGC.
(103) Supply	Supply in relation to electricity, means the sale of electricity to a licensee or consumer.
(104) System Operational Procedure (SOP).	Procedure for various system operational activities as provided in the HGC.
(105) System Restoration Procedure	The process of recovery from a total or partial blackout of the transmission system

- (106) Technical Co-ordination Committee (TCC) The committee set up by NRPC to co-ordinate the technical and commercial aspects of the operation of the Regional Grid.
- (107) Time Block Block of 15 minutes each for which special energy meters record specified electrical parameters and quantities with first Time Block starting at 00.00 Hrs.
- (108) Transmission Licence The licence granted by the Commission to transmit electricity in the State under section 14 of the Act.
- (109) Transmission Licensee A holder of licence granted by the Commission to establish and/or operate transmission lines.
- (110) TMPC Transmission Metering and Protection Committee.
- (111) Transmission System Transmission system means the system consisting of extra high voltage electric lines, having design voltage of 33 kV or higher owned and/or operated by the licensee for the purpose of the transportation of electricity from a generating station to a substation or to another generating station or between substations or to or from any external interconnection including 33 kV and/or 11 kV bays/equipment up to the interconnection with the distribution system, any plant and apparatus and meters owned or used in connection with transmission, and such buildings or part thereof as may be required to accommodate such plant apparatus, other works and operating staff thereof.
- (112) User A term utilised in the various sections of the HGC to refer to the persons/agencies using the State transmission system.
- (113) Utility The electric lines or electrical plant and includes all lands, buildings, works and materials attached thereto belonging to any person acting as a generating company or licensee under provisions of the Act.

CHAPTER-1 GENERAL

1.1 OBJECTIVE

The Haryana Grid Code (HGC) is a document that governs the boundary between the transmission licensee and other users and establishes procedures for users of the state transmission system. It lays down the information requirements and the procedures governing the relationship between various users of state transmission system as well as the SLDC. The HGC is not concerned with the detailed design and operation of generators, power stations, suppliers and distribution systems, provided that their overall compatibility with the transmission system needs are assured. It requires that the transmission licensee in implementing and complying with the HGC shall neither discriminate against nor unduly prefer any user.

The HGC shall cover all technical aspects of connections to and operation and use of the transmission system including the operation of electric lines and electrical plant connected to the transmission system in so far as is relevant to the operation and use of the transmission system. It shall be designed so as to permit the planning, development, maintenance and operation of state transmission system in an efficient, co-ordinated and economical manner for transmission and supply including trading of electricity in the State.

The HGC shall provide facilitation for beneficial trading of electricity by defining a common basis of operation of the state transmission system (STS), applicable to all the users of the STS.

1.2 SCOPE

- (a) The HGC shall be complied with by the Haryana Vidyut Prasaran Nigam Limited (HVPNL) in its capacity as a STU and a transmission licensee, SLDC, Haryana Power Generation Corporation Limited (HPGCL) in its capacity as a generating company, other transmission licensees, trading licensees, distribution licensees, suppliers and bulk power consumers and open access customers in the course of their generation, supply, utilisation of electricity and facilitation for beneficial trading of electricity.
- (b) All persons whose utilities connect to and / or utilise the State transmission system (STS) of Haryana are required to abide by the principles and procedures defined in the HGC in so far as they apply to that utility.
The matters relating to STS and inter-State transmission system (ISTS) as provided in IEGC and its revisions shall be binding on the users.
- (c) The HGC shall not affect the obligations of the STU, SLDC and all other users as laid down under IEGC and/or Electricity Act, 2003 and rules and regulation framed under it.

1.3 IMPLEMENTATION AND OPERATION OF THE HGC

SLDC shall be the apex body to ensure integrated operation of the power system in the State.

It is the duty of the STU / SLDC and all users to implement the HGC. All users are required to comply with the HGC. Users must provide the STU reasonable rights of access, service and facilities necessary to discharge its responsibilities in the users' premises and to comply with instructions issued by the STU and/or SLDC, reasonably required to verify the implementation of HGC.

1.4 GENERAL REQUIREMENTS / LIMITATIONS OF HGC

The HGC contains procedures to permit equitable management of day-to-day technical situations in the electricity supply system (Grid), taking into account a wide range of operational conditions likely to be encountered under both normal and abnormal circumstances.

Users must, therefore, understand and accept that the transmission licensee in such unforeseen circumstances may be required to act decisively to discharge its obligations under its licence. Users shall provide such reasonable co-operation and assistance as the transmission licensee may request in such circumstances.

1.5 CODAL RESPONSIBILITIES

In discharging its duties under the HGC, the STU and/or SLDC have to rely on information, which users supply regarding their requirements and intentions. The STU / SLDC shall not be held responsible for any consequences that may arise from its reasonable and prudent actions on the basis of such information.

1.6 CONFIDENTIALITY

Under the terms of the HGC, the STU and/or SLDC shall receive information from users relating to their intentions in respect of their generation or supply businesses. The STU / SLDC shall not, other than as required by the HGC, disclose such information to any other person without the prior written consent of the provider of the information.

1.7 COMMUNICATION BETWEEN USERS

All communications between the STU and users shall be in accordance with the relevant provision of the HGC.

Unless otherwise specifically required by the HGC, all communications shall be in writing, save that where operation timescales require oral communications, these communications shall be confirmed in writing as soon as practicable.

1.8 PARTIAL INVALIDITY

If any provision or part of a provision of the HGC should become or be declared unlawful for any reason, the validity of all remaining provisions or parts of provisions, of the HGC shall not be affected.

1.9 DIRECTIVE

The State Government may issue policy directives in certain matters consistent with the provisions of the Act. The SLDC and transmission licensee shall promptly inform the Commission and all users of the requirement of such direction. The directions will be complied with by the users subject to section 128 read with section 37 of the Act.

1.10 COMPLIANCE

(a) STU/SLDC shall be responsible for monitoring the compliance by the users and transmission system licensees of the provisions contained in these regulations and with the rules and procedures developed under such provisions;

Provided that the STU/SLDC shall not unduly discriminate against or unduly prefer any user or transmission licensee.

(b) All directions issued by the Northern Region Load Despatch Centre to any transmission licensee or any other licensee of the state or generating company (other than those connected to inter-state transmission system) or sub-station in the state shall be issued through the SLDC and the SLDC shall ensure that such directions are duly complied with by the licensee or generating company or sub-station;

(c) SLDC may give such directions and exercise such supervision and control as may be required for ensuring the integrated grid operations and for achieving the maximum economy and efficiency in the operation of power system;

(d) Every transmission licensee and user connected with the operation of the power system shall comply with the directions issued by the SLDC under (c) above;

(e) Nothing contained in section 1.12 of these regulations shall in any manner impact the powers conferred upon the Commission to monitor and enforce compliance of the users and transmission system licensees with the provisions of Haryana Grid Code and with the rules and procedures developed under such provisions.

1.11 NON-COMPLIANCE

(a) In case of a persistent non-compliance of any of the stipulations of the HGC by any user /beneficiary (other than STU and SLDC), the matter shall be reported by any user / beneficiary to the Member Secretary of the Grid Co-ordination Committee (GCC). The Member Secretary of the GCC shall verify and take up the matter with the defaulting user / beneficiary for expeditious compliance. In case of continued non-compliance with the provisions of HGC and/or with the rules and procedures developed under such provisions even after perusal by the Member Secretary of GCC, such matter shall be reported to the Commission. The Commission, in turn after due process, may order the defaulting user / beneficiary for compliance, failing which the Commission may take appropriate action;

(b) Contravention of any of the provision(s) of this HGC or direction of the Commission as stipulated above may be dealt with as per section 142 and 146 of the Act. Consistent failure to comply with the provisions of the HGC or with the rules and procedures developed under such provisions, by the user or transmission licensee, may lead to disconnection of the plant and/or apparatus of such user or transmission licensee.

1.12 EXEMPTIONS

Any exemption from the provisions of HGC shall become effective only after approval of the Commission, for which the agencies will have to file a petition in advance to the Commission.

NOTE:-The roles of STU and SLDC shall be separated as per Chapter-2 of HGC when SLDC is made a separate company as per section 31(2)of EA,2003.

CHAPTER -2

ROLE OF VARIOUS ORGANISATIONS AND THEIR LINKAGES

2.1 INTRODUCTION

In the light of the Act, it has become necessary to re-define the role of SLDC, the State Transmission Utility (STU) etc. and their organisational linkage so as to facilitate development and smooth operation of State grid. This chapter defines the function of various organisations so far as it relates to the HGC.

2.2 ROLE OF CEA

2.2.1 According to section 73 of Electricity Act, 2003, the functions of CEA as relevant to Grid Code are as under:-

- (a) CEA shall formulate short-term and perspective plans for development of the electricity system and co-ordinate the activities of the planning agencies for the optimal utilization of resources to sub serve the interests of the national economy and to provide reliable and affordable electricity for all consumers;
- (b) to specify the technical standards for construction of electrical plants, electric lines and connectivity to the grid;
- (c) to specify the safety requirements for construction, operation and maintenance of electrical plants and electric lines;
- (d) to specify the Grid Standards for operation and maintenance of transmission lines;
- (e) to specify the conditions for installation of meters for transmission and supply of electricity.
- (f) to promote and assist in the timely completion of schemes and projects for improving and augmenting the electricity system;
- (g) to collect and record the data concerning the generation, transmission, trading, distribution and utilisation of electricity and carry out studies relating to cost, efficiency, competitiveness and such like matters;
- (h) to carry out, or cause to be carried out, any investigation for the purposes of generating or transmitting or distributing electricity.

2.2.2 CEA shall prepare a National Electricity Plan in accordance with the National Electricity Policy prepared by the Central Government under the provisions of section 3 (1) of Electricity Act, 2003 and modify such plan once in five years in accordance with the provisions of section 3(4) of the Act. The CEA shall notify the National Electricity Plan once in five years.

2.3 ROLE OF SLDC

2.3.1 As per section 32 of the Act, the functions of the SLDC are as follows:

- (1) The SLDC shall be the apex body to ensure integrated operation of the power system in the State.
- (2) SLDC shall-
 - (a) be responsible for optimum scheduling and despatch of electricity within the State in accordance with the contracts entered into with the licensees or the generating companies operating in Haryana;
 - (b) monitor grid operations;

- (c) keep accounts of the quantity of electricity transmitted through the State grid;
 - (d) exercise supervision and control over the state transmission system;
 - (e) be responsible for carrying out real time operations for grid control and despatch of electricity within the State through secure and economic operation of the State grid in accordance with the Grid Standards and the HGC;
- (3) SLDC may levy and collect such fee and charges from the generating companies and licensees using the State transmission system as may be specified by the Commission;

Provided that in event of a SLDC being operated by the STU, as per first proviso of sub-section (2) of section 31 of the Act, adequate autonomy shall be provided to the SLDC to enable it to discharge its functions in the above manner.

2.3.2 Compliance of directions as per section 33 of EA 2003:-

- (1) The SLDC may give such directions and exercise such supervision and control as may be required for ensuring the integrated grid operations and for achieving the maximum economy and efficiency in the operation of the power system in the region under its control;
- (2) Every licensee, generating company, generating station, substation and any other person connected with the operation of the power system shall comply with the directions issued by the SLDC under sub-section (1);
- (3) SLDC shall comply with the directions of the RLDC;
- (4) If any dispute arises with reference to the quality of electricity or safe, secure and integrated operation of the state grid or in relation to any direction given by the SLDC under sub-section (1), it shall be referred to the Commission for decision.

Provided that pending the decision of the Commission, the directions of the SLDC shall be complied with by the licensee or the generating company;

- (5). If any licensee, generating company or any other person fails to comply with the directions issued under sub-section (1), he shall be liable to a penalty not exceeding rupees five lacs.

2.3.3 The functions of SLDC under section 32 of EA 2003 include the following:-

- (a) system operation and control including intra-state transfer of power, covering contingency analysis and operational planning on real time basis;
- (b) scheduling / re-scheduling of generation;
- (c) system restoration following grid disturbances;
- (d) metering and data collection;
- (e) compiling and furnishing data pertaining to system operation;
- (f) operation of state unscheduled interchange (UI) pool account and State reactive energy account.

2.3.4 All complaints regarding unfair practices, delays, discrimination, lack of information, supply of wrong information or any other matter related to open access in intra-State transmission shall be directed to the SLDC. The SLDC shall investigate and endeavour to resolve the grievance. In case the SLDC is unable to resolve the matter, it shall be referred to the Commission for a decision.

2.3.5 STU/SLDC shall, for the purpose of payment of transmission charges/ capacity charges and incentives, certify: -

- (a) availability of state transmission system;
- (b) availability and plant load factor for SGS (Thermal);
- (c) capacity Index for SGS (Hydro).

2.4 ROLE OF STU

(1) As per section 39 of the Act, the functions of the STU are as follows: –

- (a) to undertake transmission of electricity through the state transmission system;
 - (b) to discharge all functions of planning and co-ordination relating to the state transmission system with
 - Central Transmission Utility;
 - State Governments;
 - Generating companies;
 - Regional Power Committees;
 - Authority;
 - Licensees;
 - Any other person notified by the State Government in this behalf;
 - (c) to ensure development of an efficient, co-ordinated and economical system of the state transmission lines for smooth flow of electricity from a generating station to the load centres;
 - (d) to provide non-discriminatory open access to its transmission system for use by -
 - (i) any licensee or generating company on payment of the transmission charges; or
 - (ii) any consumer as and when such open access is provided under sub-section (2) of section- 42 of the Act, on payment of transmission charges, surcharge, additional surcharge and any other charges thereon, as may be specified by the Commission.
- (2) In case of open access in intra-state transmission, the STU shall be the nodal agency for the short-term as well as long term transmission access. The procedure and modalities in regard to open access shall be as per the Haryana Electricity Regulatory Commission (Terms and Conditions of Open Access) Regulations, 2005, as amended from time to time.
- (3) Until a Government company or any authority or corporation is notified by the State Government, the STU shall operate the SLDC.

2.5 ROLE OF TRANSMISSION LICENSEE

As per section 40 of the Act, the functions of the transmission licensee are as follows:

- (a) to build, maintain and operate an efficient, co-ordinated and economical State transmission system;
- (b) to comply with the directions of SLDC;
- (c) to provide non-discriminatory open access to its transmission system for use by-
 - (i) any licensee or generating company on payment of the transmission charges; or
 - (ii) any consumer as and when such open access is provided by the Commission under sub-section (2) of section-42 of the Act, on payment of

transmission charges and a surcharge thereon, as may be specified by the Commission;

Provided that such surcharge shall not be leviable in case open access is provided to a person who has established a captive generating plant for carrying the electricity to the destination of his own use.

2.6 ROLE OF DISTRIBUTION LICENSEE

2.6.1 As per section 42 of the Act, the functions of the distribution licensee are as follows:

- (a) to develop and maintain an efficient, co-ordinated and economical distribution system in its area of supply;
- (b) to provide non-discriminatory open access to its distribution system for use by -
 - (i) any licensee or generating company on payment of the distribution charges; or
 - (ii) any consumer as and when such open access is provided by the Commission under sub-section (2) of section-42 of the Act, on payment of charges for wheeling and a surcharge thereon, as may be specified by the Commission;

Provided that such surcharge shall not be leviable in case open access is provided to a person who has established a captive generating plant for carrying the electricity to the destination of his own use.

2.6.2 Distribution licensee shall also in addition perform the following functions:-

- (1) to establish an Area Load Despatch Centre to carry out the following functions:
 - (a) to help in focussed monitoring and control of distribution system in its area of supply;
 - (b) to receive and carryout the instructions of SLDC on behalf of the distribution licensee;
 - (c) to co-ordinate with DSOCC and SLDC to streamline the operation and enhance operational efficiency.
- (2) to establish DSOCC(s) at strategic locations preferably near the geographical centre and load centre of the distribution licensee's area of supply, having adequate communication facilities. The DSOCC(s) shall be manned round the clock with the required staff. It shall take timely action in response to grid warnings as per standard instructions laid down by the distribution licensee and if necessary, issue suitable instructions in addition, if a particular situation so warrants. The SLDC shall intimate the distribution licensee through ALDC, regarding significant deviations in final schedules of State generators and Central Generating Station (CGS) on overall merit order. The ALDC shall undertake suitable load management and curtailment.

CHAPTER-3 PLANNING CODE

3.1 TRANSMISSION SYSTEM PLANNING

The Planning Code specifies the technical and design criteria and procedures to be adopted by STU and other transmission licensees for planning and development of the State transmission system. The users of the transmission system and other transmission licensees shall take into account the system planning made by STU for planning and development of their own systems.

3.1.1 Need for reinforcements and extensions to the state transmission system may arise due to various reasons; of which a few are mentioned below:-

- (a) a development on a user's system already connected to the transmission system;
- (b) introduction of a new connection point/ interface point between a user's system and transmission system;
- (c) the need to increase system capacity, removal of operational constraints, maintenance of security standards and meeting general increase in generation/demand;
- (d) evacuation system for generating stations within or outside the state;
- (e) reactive Compensation;
- (f) steady state and transient stability considerations;
- (g) cumulative effects of any combination of above.

3.1.2 The work of such reinforcement and extension to the state transmission system may also involve work at a connection point/interface point of a generating company/distribution licensee to the transmission system.

3.1.3 The development of the state transmission system must be planned in advance duly allowing sufficient lead time, considering the following:

- (a) Time required for detailed engineering, design and construction work to be carried out. This system planning, therefore, enforces the time scales for exchange of information between the STU and the user(s). All the concerned parties, wherever appropriate, shall have due regard to the confidentiality of such information;
- (b) Time required for obtaining all the necessary statutory approvals like notification in Government gazette and leading newspapers, clearance from Power and Telecommunication Co-ordination Committee (PTCC), forest clearance, railway clearance, clearance from aviation authorities, national highways, state highways etc., and the right of way permissions, wherever required.

3.2 PLANNING POLICY

3.2.1 STU shall carry out network studies and review fault levels for planning system strengthening and augmentation. The other users may consider these fault levels for planning of their systems.

3.2.2 STU shall keep in consideration the following for the purpose of preparing transmission system plan:-

- (a) Forecast the demand for power within the area of supply, based on the forecasts provided by distribution licensee, and provide to the Commission details of the demand forecasts, data, methodology and assumptions on which the forecasts are based. These forecasts would be annually reviewed and updated;
- (b) Prepare a proposal for the requirement of generation for the State to meet the load demand as per the forecast, after examining the economic, technical and environmental aspects of all available alternatives taking into account the existing contracted generation resources and effects of demand side management;
- (c) Prepare a Transmission Plan for the state transmission system compatible with the above load forecast and Generation Plan. This will include provision for VAr compensation needed in the state transmission system;
- (d) The reactive power planning exercise would be carried out by STU in consultation with NRLDC/NRPC and discoms, as per the Commission's directives and programme for installation of reactive compensation equipment by STU and distribution licensee;
- (e) STU's planning department shall use load flow, short circuit, and transient stability study, relay coordination study and other techniques for transmission system planning;
- (f) STU's planning department shall simulate the contingency and system constraint conditions for the system for transmission system planning;
- (g) STU would maintain a historical database based on operational data supplied by SLDC using the state-of-the-art tools such as Energy Management System (EMS) for demand forecasting;
- (h) The STU would coordinate with the CTU for eliminating transmission constraints in a cost effective manner.

3.3 PERSPECTIVE TRANSMISSION SYSTEM PLAN

3.3.1 The STU shall prepare the perspective transmission system plan on the basis of the data submitted by generation company(s) and distribution companies for the State transmission system to evolve an efficient, co-ordinated, secure and economical State transmission system in order to satisfy the requirements of generation expansion and transmission system expansion, to fully meet energy as well as peak demand for next five (5) years and create adequate reserve capacity margin. The STU shall publish on its internet website the perspective transmission system plan for the State transmission system and shall also make the same available to any person upon request.

Perspective transmission system plan shall be updated by the STU each year to take care of the revisions in load projections and generation capacity additions on the basis of the data submitted by generation company(s) and distribution companies. It shall be published by the 30th

day of September each year and shall cover a plan period of five (5) years commencing from the financial year immediately following the year in which it is published.

3.3.2 The transmission system plan shall describe the plan for the State transmission system and shall include the proposed intra-state transmission schemes and system strengthening schemes for the benefit of all users:

Provided that the transmission system plan may include information related not only to intra-state transmission lines but also additional equipment including transformers, capacitors, reactors etc.

Provided further that the transmission system plan shall also include information on progress achieved on the identified intra-state transmission schemes and system strengthening schemes.

3.3.3 The STU may, for the purpose of preparing the transmission system plan under these regulations, seek such information as may be required by it, including generation capacity addition, system augmentation and long-term load forecast and all applications for open access:

Provided that the distribution licensees shall have the primary responsibility for developing long term load forecasts for their respective license areas.

Provided also that the STU shall consider, but not be bound by, the information provided to it under this regulation in preparing the transmission system plan.

3.3.4 The STU shall also consider the following for the purpose of preparing the transmission system plan under these regulations -

- (i) plans formulated by the authority for the transmission system under the provisions of clause (a) of section 73 of the Act;
- (ii) Electric Power Survey of India report of the Authority;
- (iii) Grid Standards specified by the Authority under clause (d) of section 73 of the Act;
- (iv) transmission plan formulated by Central Transmission Utility under the provisions of Grid Code specified by Central Electricity Regulatory Commission under clause (h) of section 79 of the Act;
- (v) transmission planning criteria and guidelines issued by the Authority;
- (vi) recommendations / inputs, if any, of the Regional Power Committee;
- (vi) reports on National Electricity Policy which are relevant for development of State transmission system; and
- (viii) any other information/data source suggested by the Commission.

3.3.5 The STU shall, while submitting its application under sub-section (1) of section 64 of the Act to the Commission for approval, also submit therewith its investment plan based on the identified intra-state transmission schemes and system strengthening schemes projected in the transmission system plan.

3.3.6 The cost of the transmission system planning study undertaken in accordance with this regulation shall be allowed in the determination of the charges of the STU under clause (b) of sub-section (1) of section 62 of the Act.

3.4 PLANNING CRITERIA

3.4.1 The Planning criterion shall be based on the security philosophy on which the State transmission system has been planned.

Provided that STU shall carry out appropriate system studies while developing the transmission systems plan.

3.4.2 The State transmission system, as a general rule, shall be capable of withstanding and be secured against the following contingency outages without necessitating load shedding or rescheduling of generation during steady state operation:-

- (i) outage of a 132 kV D/C line or,
- (ii) outage of a 220 kV D/C line or,
- (iii) outage of a 400 kV S/C line or,
- (iv) outage of a single Interconnecting transformer

Provided that the above contingencies shall be considered assuming pre-contingency system depletion (planned outage) of another 220 kV D/C line or 400 kV S/C line in another corridor and not emanating from the same substation.

3.4.3 All the generating units may operate within their reactive power capability curves and the network voltage profile shall be maintained within voltage limits specified.

3.4.4 The State transmission system shall be capable of withstanding the loss of most severe single feed in without loss of stability.

3.4.5 Any one of the events defined in the regulation 3.4.2 above shall not cause:-

- (i) loss of supply;
- (ii) prolonged operation of the system at frequency below and above specified limits;
- (iii) unacceptable high or low voltage;
- (iv) system instability;
- (vii) unacceptable overloading of State transmission system elements.

3.4.6 In all substations (66 kV/132 kV and above), suitable number and capacity of transformers shall be provided to have adequate redundancy required to maintain firm capacity at the substation.

Explanation – for the purpose of the term firm capacity shall mean the minimum transformation capacity available at the substation in case of outage of any one transformer.

3.4.7 STU shall carry out planning studies for reactive power compensation of State transmission system including reactive power compensation at the intra-state generating station's switchyard.

3.5 PLANNING DATA

Transmission licensees and users are to supply following types of data to the STU for the purpose of developing the transmission plan:-

- (i) standard planning data;
- (ii) detailed planning data.

3.5.1 Standard Planning Data

3.5.1.1 Standard planning data shall consist of details which are expected to be normally sufficient for the STU to investigate the impact due to user's/transmission licensee's developments on the State transmission system.

3.5.1.2 Transmission licensees and users shall provide the following data to the STU from time to time in the standard formats provided by STU:-

- (a) preliminary project planning data;
- (b) committed project planning data; and
- (c) connected planning data.

Provided that the STU shall provide a date for submission of information in the said formats, after providing reasonable time to transmission licensees and users:

Provided that the STU shall develop standard formats, for submission of above mentioned data, within one (1) month from notification of these regulations and make the same available on its Internet website:

Provided also that the STU shall be guided by the formats, developed for submission of above mentioned data, under the provisions of Grid Code specified by Central Electricity Regulatory Commission under clause (h) of section 79 of the Act.

3.5.2 Detailed Planning Data

3.5.2.1 Detailed planning data shall consist of additional, more detailed data not normally expected to be required by STU to assess the impact of user/transmission licensee development on the State transmission system.

3.5.2.2 Detailed planning data shall be furnished by the users and transmission licensees as and when requested by the STU.

STU shall also furnish Annual Progress Report of transmission works, Power Map and any other information to all users, as the Commission may specify.

3.6 IMPLEMENTATION OF TRANSMISSION PLAN

The actual programme of implementation of transmission lines, inter-connecting transformers, reactors/capacitors and transmission elements will be determined by STU in consultation with the concerned agencies. The completion of these works, in the required time frame, shall be ensured by STU through the concerned agency.

CHAPTER– 4 CONNECTION CONDITIONS

4.1 INTRODUCTION

Connection conditions specify the minimum technical and design criteria, which shall be complied with by STU/transmission licensee and any agency connected to or seeking connection to the state transmission system. These also set out the procedures by which STU/transmission licensee shall ensure compliance by any agency with above criteria as pre-requisite for the establishment of an agreed connection.

4.2 OBJECTIVE

The objective of this section is to ensure the following:-

- (a) all users or prospective users are treated equitably;
- (b) any new or modified connection when established shall neither suffer unacceptable effects due to its connection to the state transmission system nor impose unacceptable effects on the system of any other connected agency;
- (c) the ownership and responsibility for all items of equipment is clearly specified in a schedule (Site Responsibility Schedule) for every site where a connection is made.

4.3 SCOPE

The connection conditions apply to all STU/transmission licensees/SGSs and any other user/licensee connected to and involved in developing the STS. These connection conditions also apply to all agencies, which are planning to generate/transmit/utilise and/or are generating / transmitting / utilising energy to/from the state transmission system. The connection conditions for generating units embedded in the distribution systems, and not connected to the transmission system shall be finalised by the respective distribution licensees and generators. The generators should ensure to cater to load flow through their switchyards.

4.4 PROCEDURE FOR CONNECTION TO AND/OR USE OF THE TRANSMISSION SYSTEM

4.4.1 Procedure for Application

(1) Prior to an agency is connected to the state transmission system, all necessary conditions outlined in the HGC in addition to other mutually agreed requirements to be complied with, must be fulfilled by the agency. Any agency `seeking to establish new or modified arrangements for connection to and/or use of the transmission system shall submit the following report, data and undertaking along with an application to the STU/transmission licensee:-

- (a) report stating purpose of proposed connection and/or modification, connection site, transmission licensee to whose system connection is proposed, description of apparatus to be connected or modification to apparatus already connected and beneficiaries of the proposed connection;
- (b) construction schedule and target completion date;

- (c) an undertaking that the user shall abide by the provisions of HGC, IEGC, Indian Electricity Rules and various standards including Grid Connectivity Standards made pursuant to the Act for installation and operation of the apparatus;

Provided that the standard format for application shall be developed by STU and shall be made available at its website within two (2) months of notification of these regulations.

- (2) However in case of the existing connections between State transmission system and State generating station, a relaxation of one year in respect of the connection conditions is allowed so that the present arrangements may continue. All the existing users shall modify their systems for complying the connection conditions within one year from the date this Code comes into effect. The process of re-negotiation of the connection conditions with generating station should be completed within a period of one year. In case it is determined that the compliance of connection conditions would be delayed further, the Commission may consider further relaxation for which a petition will have to be filed by the concerned user along with STU's recommendation/comments. The cost of modification, if any, shall be borne by the concerned user.
- (3) STU/transmission licensee shall normally make a formal offer to the user within 60 days of receipt of the application complete with all information as may reasonably be required, subject to provision in section 4.4.1(6) of HGC.
- (4) The offer shall specify and take into account any works required for the extension or reinforcement of the transmission system to satisfy the requirements of the connection application and for obtaining statutory clearances, way- leaves as necessary.
- (5) In respect of offers for modification of existing connection, the terms shall take into account, the existing Connection Agreement.
- (6) (a) if the nature of complexity of the proposal is such that the prescribed time limit for making the offer is not adequate, STU/transmission licensee shall make a preliminary offer within the prescribed time limit indicating the extent of further time required with the consent of the Commission for more detailed examination of the issues;
(b) on receipt of the preliminary offer, the user shall indicate promptly whether the STU/transmission licensee should proceed further to make a final offer within the extended time limit.
- (7) All offers (other than preliminary offers) including revised offers shall remain valid for sixty days from the date of issue of offer and unless accepted before the expiry of such period, shall lapse thereafter.
- (8) STU/transmission licensee shall make a revised offer, upon request by a user, if necessitated by changes in data earlier furnished by the user.
- (9) In the event of the offer becoming invalid or not being accepted by the applicant, STU/transmission licensee shall not be bound to consider any further application from the same applicant within 12 months unless the new application is substantially different from the original application.

4.4.2 Rejection of Application

STU/transmission licensee may reject any application for connection to and/or use of transmission system due to the following reasons apart from others as considered reasonable:-

- (a) if such proposed connection is likely to cause breach of any provision of its licence or any provision of the HGC or any provision of IEGC or any covenants or deeds or regulations by which STU/transmission licensee is bound;
- (b) if the proposed works stated in the application do not lie within the purview of the licence or do not conform to any provision of the HGC;
- (c) if the applicant fails to give confirmation and undertaking according to this section;
- (d) if the applicant does not undertake to be bound, in so far as applicable, by the terms of the HGC.

4.5 CONNECTION AGREEMENTS

A Connection Agreement shall include, as appropriate, within its terms and conditions the following:-

- (a) A condition requiring both parties to comply with the HGC;
 - (i) details of connection, technical requirements with specific references to reactive power compensation/operation of generating units and power station, if any, and commercial arrangements (in accordance with relevant provision of Indian Electricity Grid Code, wherever applicable);
 - (ii) details of connection charges and/or use of system charges;
 - (iii) details of any capital expenditure arising from necessary reinforcement or extension of the system, data communication, RTU etc. and demarcation of the same between the concerned parties;
 - (iv) a site responsibility schedule;
 - (v) general philosophy, guidelines on protection.
- (b) Protection Systems;
- (c) System recording instruments;
- (d) Communication facilities;
- (e) The procedure necessary for site access, site operational activities and maintenance standard for equipment; and
- (f) Any other information considered appropriate by STU/transmission licensee or the Commission;

Provided that the STU shall develop a model Connection Agreement within two (2) months and submit to the Commission for approval.

4.6 ACCESS AT CONNECTION SITE

- (a) The STU/transmission licensee or user owning the connection site shall provide reasonable access and other required facilities to another transmission licensee or user whose equipment is proposed to be installed at the connection site;
- (b) Written procedures and agreements shall be developed between transmission licensee and users to ensure that mandatory access is available to the concerned transmission licensee or user at the same time safeguarding the interest of transmission licensee and user at the connection site.

4.7 SYSTEM PERFORMANCE / TRANSMISSION SYSTEM PARAMETER VARIATIONS

4.7.1 General

Within the power system, instantaneous values of system frequency and voltage are subject to variation from their nominal value. All agencies shall ensure that plant and apparatus requiring service from/to the state transmission system is of such design and construction that satisfactory operation will not be prevented by such variation.

4.7.2 Frequency Variations

Rated frequency of the system shall be 50.00 Hz and shall normally be controlled within the limits as per regulations/standards framed by the Authority subject to allowable limit as specified by the manufacturer.

4.7.3 Voltage Variations

- (a) The variation of voltage may not be more than the voltage range specified in the regulations /standards framed by the Authority;
- (b) The agency engaged in sub-transmission and distribution shall not depend upon the state transmission system for reactive support when connected. The agency shall estimate and provide the required reactive compensation in its transmission and distribution network to meet its full reactive power requirement, unless specifically agreed to with STU/transmission licensee.

4.7.4 Insulation Co-ordination and Rupturing Capacity of Switchgear

Insulation co-ordination of the users' equipment shall conform to applicable Indian Standards/Codes. Rupturing capacity of switchgear shall not be less than that notified by STU/transmission licensee from time to time.

4.8 USER AND STU/ TRANSMISSION LICENSEE'S EQUIPMENT AT CONNECTION POINTS

4.8.1 General

Installation of all electrical equipment shall comply with IE Rules. For every new connection sought, the transmission licensee shall specify the connection point and the voltage to be used along with the metering and protection requirements as specified in the Metering and Protection Chapter.

4.8.2 Sub-station Equipment

- (a) All EHV sub-station equipments shall comply with Bureau of Indian Standards (BIS)/ IEC/prevaling Code of practice;
- (b) All equipment shall be designed, manufactured, tested and certified in accordance with the quality assurance requirements as per IEC/BIS standards;
- (c) Each connection between a user and state transmission system shall be controlled by a circuit breaker capable of interrupting, at the connection point, the short circuit current as advised by STU/transmission licensee in the specific Connection Agreement;

- (d) Before commissioning and connecting any new sub-station to the grid, the STU/ transmission licensee shall provide SEM Meters at all inter-utility points being supplied power from that sub-station.

4.8.3 Fault Clearance Times

(a) Fault clearance time when all equipments operate correctly, for a three phase fault (close to the bus-bars) on user's equipment directly connected to state transmission system and for a three phase fault (close to the bus-bars) on state transmission system connected to agency's equipment, shall be as per section 6.8.1 of HGC.

(b) Back-up protection shall be provided for required isolation/protection in the event of failure of the primary protection systems provided to meet the above fault clearance time requirements. If a generating unit is connected to the state transmission system directly, it shall withstand, until clearing of the fault by back-up protection on the STS.

4.8.4 Protection

Protection systems are required to be provided by all users connected to the state transmission system in co-ordination with STU. In case of installation of any device, which necessitates modification/replacement of existing protection relays/ scheme in the network, owner of respective part of network shall carry out such modification/ replacement.

Protection systems are required to isolate the faulty equipments and protect other components against all types of faults, internal/ external to them, within the specified fault clearance time with reliability, selectivity and sensitivity. All agencies connected to the state transmission system shall provide protection systems and metering systems as agreed in the Connection Agreement conforming to Protection and Metering Chapter 6 of the HGC.

Relay setting coordination shall be done at state level by the Protection Co-ordination Committee of the STU and at the Regional level by the Northern Regional Power Committee.

4.9 GENERATING UNITS AND POWER STATIONS

- (a) a generating unit shall be capable of continuously supplying its normal rated active / reactive output within the system frequency and voltage variation range subject to the design limitations specified by the manufacturer.
- (b) a generating unit shall be provided with an AVR, protective and safety devices, as set out in Connection Agreements.
- (c) each generating unit shall be fitted with a turbine speed governor having an overall droop characteristic within the range of 3% to 6% subject to design limitations specified by the manufacturer, which shall always be in service.
- (d) each generating unit shall be capable of instantaneously increasing output by 5% when the frequency falls, limited to 105% MCR, ramping back to the previous MW level (in case the increased output level cannot be sustained) shall not be faster than 1% per minute.
- (e) for existing power stations, the equipment for data transmission and communications shall be owned and maintained by the licensee i.e. STU/ transmission licensee, unless alternative arrangements are mutually agreed.

For new power stations, the equipment for data transmission and communications shall be owned and maintained by the respective generator.

4.10 REACTIVE POWER COMPENSATION

- (a) Reactive power compensation and/or other facilities should be provided by transmission licensee and distribution licensees as far as possible in the low voltage Systems close to the load points thereby avoiding the need for exchange of reactive power to/from state transmission system and to maintain transmission system voltage within the specified range.
- (b) Line reactors may be provided to control temporary overvoltage within the limits as set out in Connection Agreements.
- (c) The additional reactive compensation to be provided by the user shall be indicated by transmission licensee in the Connection Agreement for implementation.
- (d) Users shall endeavour to minimize the reactive power drawal at an interchange point when the voltage at that point is below 95% of rated voltage, and shall not inject reactive power when the voltage is above 105% of rated voltage. Interconnecting transformer taps at the respective drawal points may be changed to control the reactive power interchange as per user's request to the SLDC, but only at reasonable intervals.
- (e) Switching in/out of all 400 kV bus and line reactors throughout the grid shall be carried out as per instructions of SLDC. Tap changing on all 400/220 kV interconnecting transformers shall also be done as per the instructions of SLDC only.

4.11 DATA COMMUNICATION FACILITIES

Reliable and efficient speech and data communication systems shall be provided to facilitate necessary communication and data exchange, and supervision/control of the grid by the SLDC, under normal and abnormal conditions. All agencies including CGSs who are allowed open access shall provide systems to telemeter power system parameter such as flow, voltage and status of switches/ transformer taps etc. in line with interface requirements and other guidelines made available to SLDC. The associated communication system to facilitate data flow up to SLDC, as the case may be, shall also be established by the concerned agency as agreed by STU/transmission licensee in the Connection Agreement. All agencies in coordination with STU shall provide the required facilities at their respective ends and at SLDC as agreed in the Connection Agreement.

4.12 SYSTEM RECORDING INSTRUMENTS

Recording instruments such as Data Acquisition System / Disturbance Recorder/ Event Logger / Fault Locator (including time synchronization equipment) shall be provided in the state transmission system for recording of dynamic performance of the system. Users shall provide all the requisite recording instruments as stated in the Connection Agreement according to the agreed time schedule.

4.13 CONNECTION STANDARD

The applicable technical standards for construction of electrical plants, electric lines and connectivity to the State transmission system shall be the standards notified by the Authority under clause (b) of section 73 of the Act. The prevailing guidelines of the Authority shall be considered until the standards are notified by the Authority.

4.14 SAFETY STANDARD

The applicable safety requirements for construction, operation and maintenance of electrical Plants and electric lines shall be as per the standards notified by the Authority under clause (c) of section 73 of the Act. The prevailing guidelines of the Authority shall be considered until the standards are notified by the Authority.

4.15 RESPONSIBILITIES FOR OPERATIONAL SAFETY

4.15.1 Site Responsibility Schedule

STU / transmission licensee and other users concerned shall be responsible for safety as indicated in Site Responsibility Schedules for each connection point.

- (a) For every connection to the transmission system for which a Connection Agreement is required, a schedule of equipment shall be prepared by the transmission licensee with information supplied by the respective users. This schedule, called a Site Responsibility Schedule, shall state the following for each item of equipment installed at the connection site:-
- (i) the ownership of plant/apparatus;
 - (ii) the responsibility for operation of plant/apparatus;
 - (iii) the responsibility for maintenance of plant/apparatus;
 - (iv) the responsibility for control of plant/apparatus;
 - (v) the manager of the site;
 - (vi) the responsibility for all matters relating to safety of persons at site;

The format, principles and basic procedure to be used in the preparation of Site Responsibility Schedules shall be formulated by STU within three (3) months of notification of these regulations and shall be provided to each user and transmission licensee for compliance:

Provided that the STU shall put up the information related to above mentioned format, principles and procedures on its Internet Website.

- (b) The format, principles and basic procedure to be used in the preparation of Site Responsibility Schedules shall be formulated by STU and shall be provided to each agency/regional constituents for compliance;
- (c) All agencies connected to or planning to connect to STS would ensure providing of RTUs and other communication equipment, as specified by SLDC, for sending real-time data to SLDC at least before the date of commercial operation of the generating stations or sub-station/line being connected to STS.

4.15.2 Single Line Diagrams

- (a) Single line diagram shall include all high tension connected equipment and the connection to all external circuits and incorporate numbering, nomenclature and labelling;
- (b) Single line diagram shall be furnished for each connection point by the connected users to SLDC. These diagrams shall include all HV/EHV connected equipment and connections to all external circuits and incorporate numbering, nomenclature and labelling, etc. The diagram is intended to provide an accurate record of the layout and circuit connections, rating, numbering and nomenclature of HV/EHV apparatus and related plant;

- (c) Whenever any equipment has been proposed to be changed, then concerned user shall intimate the necessary changes to transmission licensee and to all concerned. When the changes are implemented, changed single line diagram shall be circulated by the user to SLDC / STU / transmission licensee.

4.15.3 Site Common Drawings

- (a) Site Common Drawing will be prepared for each connection point and will include site layout, electrical layout, details of protection/control and common services drawings. Necessary details shall be provided by the user to STU / transmission licensee;
- (b) Detailed drawing shall be prepared by transmission licensee and user in respect of their System/facility at each connection point and copies of the same shall be made available to concerned user and transmission licensee respectively;
- (c) In case any change in the site common drawings that are found necessary by transmission licensee or user in respect of their system/facility at the connection point, the details of such changes shall be furnished to the other party as soon as possible.

4.16 SCHEDULE OF ASSETS OF STATE GRID

STU / transmission licensee shall submit annually to HERC by 30th September each year a schedule of transmission assets, which constitute the State Grid as on 31st March of that year indicating ownership on which SLDC has operational control and responsibility.

4.17 CONNECTION POINT

4.17.1 Generator

Voltage may be 11 kV and above or as agreed with the transmission licensee. Unless specifically agreed with the transmission licensee, the connection point shall be the outgoing feeder gantry of power station switchyard. Metering point shall be at the outgoing feeder. All the terminal communication, protection and metering equipment owned by the generator within the premises of the generator's site should be maintained by the generator. The respective users shall maintain other users' equipment. From the outgoing feeder gantry onwards, the transmission licensee shall maintain all electrical equipment.

4.17.2 Distribution Company

Voltage may be 33/11 kV or as agreed with the transmission licensee. The connection point shall be the outgoing feeder gantry of the transmission licensee's sub-station. The metering point shall be at the outgoing feeder. The transmission licensee shall maintain all the terminal, communication, protection and metering equipments within the premises of the transmission licensee. From the outgoing feeder gantry onwards, the respective distribution company shall maintain all electrical equipment.

4.17.3 Northern Regional Transmission System

For the Northern Regional Transmission System, the connection, protection scheme, metering scheme, metering point and the voltage shall be in accordance with the mutual agreement between CTU and the State transmission licensee.

4.17.4 CGPs and Bulk Power Consumers

Voltage may be as agreed with the transmission licensee, distribution licensees, CGPs and bulk power consumers for their own sub-stations. The connection point shall be the feeder gantry on their premises. The metering point shall be at the transmission licensee's sub-station or as agreed with the transmission licensee/distribution licensee.

CHAPTER-5 OPERATING CODE FOR STATE GRID

5.1 OPERATING POLICY

- (a) The primary objective of integrated operation of the State grid is to enhance the overall operational economy and reliability of the entire electric power network spread over the geographical area of the State. Users shall cooperate with each other and adopt good operational practices at all times for stable and reliable operation of the State grid.
- (b) Overall operation of the State grid shall be supervised from the SLDC. The role of SLDC, STU/transmission licensee and distribution licensees shall be in accordance with the provisions made in Chapter-2 of the HGC.
- (c) All users shall comply with this operating code for deriving maximum benefits from the integrated operation and for equitable sharing of obligations.
- (d) A set of detailed internal system operational procedures for State grid shall be developed and maintained by the SLDC in consultation with the users and shall be consistent with HGC to enable compliance with the requirement of HGC. These internal operating procedures shall include the following:-
 - (i) system restoration procedures;
 - (ii) load shedding procedures;
 - (iii) islanding procedures; and
 - (iv) any other procedures considered appropriate by the SLDC,

Provided further that such procedures shall be submitted to the Commission for approval, within three (3) months.
- (e) The control rooms of the SLDC, power plants, all sub-stations of 66 kV and above, and any other control centres of all users except un-manned and remote-controlled sub-stations shall be manned round the clock by qualified and adequately trained personnel.

5.2 SYSTEM SECURITY

- (a) All users shall endeavour to operate their respective power systems and power stations in synchronism with each other at all times such that the entire system within the State operates as one synchronized system.
- (b) No part of the grid shall be deliberately isolated from the rest of the State grid, except
 - (i) under an emergency conditions in which such isolation would prevent a total grid collapse and/or would enable early restoration of power supply;
 - (ii) when serious damage to a costly equipment is imminent and such isolation would prevent it;
 - (iii) when such isolation is specifically instructed by SLDC.

Complete synchronization of grid shall be restored as soon as the conditions again permit it. The restoration process shall be supervised by SLDC, as per operating procedures formulated under section 5.1 (d) above.
- (c) No important element of the State grid shall be deliberately opened or removed from service at any time, except when specifically instructed by SLDC or with specific and prior clearance of SLDC. The list of such important grid elements on which the above stipulations apply shall be prepared by the SLDC in consultation with the users and notified by SLDC from time to time. In case of opening / removal of any important element of the grid under an emergency situation, the same shall be communicated to SLDC at the earliest possible time after the event.

- (d) Any tripping, whether manual or automatic of any of the above elements of State grid shall be precisely intimated by the users to SLDC as soon as possible, say within ten minutes of the event. The reason (to the extent determined) and the likely time of restoration shall also be intimated. All reasonable attempts shall be made for the restoration of elements as soon as possible.
- (e) All generating units, which are synchronized with the grid, irrespective of their ownership, type and size, shall have their governors in normal operation at all times except the case of non-operative zone of operation as per manufacturers guidelines. If any generating unit of over fifty (50) MW size is required to be operated without its governor in normal operation, the SLDC shall be immediately advised about the reason and duration of such operation. All governors shall have a droop of between 3% and 6% subject to design limitations specified by the manufacturer.
- (f) Facilities available within load limiters, automatic turbine run-up system (ATRS), turbine supervisory control, coordinated control system, etc., shall not be used to suppress the normal governor action in any manner. No dead bands and/or time delays shall be deliberately introduced.
- (g) All generating units, operating at or up to 100% of their maximum continuous rating (MCR) shall normally be capable of (and shall not in any way be prevented from) instantaneously picking up five per cent (5%) extra load when frequency falls due to a system contingency. The generating units operating at above 100% of their MCR shall be capable of (and shall not be prevented from) going at least up to 105% of their MCR when frequency falls suddenly. After an increase in generation as above, a generating unit may ramp back to the original level at a rate of about one percent (1%) per minute or as per manufacturer's limits, in case continued operation at the increased level is not sustainable. Any generating unit of over fifty (50) MW size not complying with the above requirements shall be kept in operation (synchronized with the State grid) only after obtaining the permission of SLDC. However, the user can make up the corresponding short fall in spinning reserve by maintaining an extra spinning reserve on the other generating units of the State.
- (h) The recommended rate for changing the governor setting, i.e. supplementary control for increasing or decreasing the output (generation level) for all generating units, irrespective of their type and size, would be one (1%) per minute or as per manufacture's limits. However, if frequency falls below 49.5 Hz, all partly loaded generating units shall pick up additional load at a faster rate, according to their capability and as per manufacturer's limits.
 Except under an emergency, or to prevent an imminent damage to costly equipment, no user shall suddenly reduce his generating unit output by more than a limit as specified by the SLDC, without prior intimation to and consent of the SLDC, particularly when frequency is falling or is below 49.0 Hz. Similarly, no user shall cause a sudden increase in its load by more than the limit as specified by the SLDC, without prior intimation to and consent of the SLDC.
 All generating units shall normally have their automatic voltage regulators in operation, with appropriate settings.
- (i) Provision of protections and relay settings shall be coordinated periodically throughout the State grid, as per a plan to be separately finalized by the Operational and Protection Co-ordination Committee of the STU.

Users and transmission licensees shall provide automatic under-frequency and df/dt relay-based load shedding/islanding schemes in their respective systems, wherever, applicable, to arrest frequency decline that could result in a collapse/disintegration of the State grid, as per the plan separately finalized by the Northern Regional Power Committee and shall ensure its effective application to prevent cascade tripping of units in case of any contingency.

Users and transmission licensees shall ensure that the under frequency and df/dt relay-based load shedding/islanding schemes are always functional, provided that the relays may be temporarily kept out of service, in extreme contingencies, with prior consent of SLDC.

All users shall also facilitate identification, installation and commissioning of system protection schemes (including inter-tripping and run-back) in the power system to protect against situations such as voltage collapse and cascade effect. Such schemes would be finalized by the Operational and Protection Co-ordination Committee of the STU, and shall be kept in continuous service. SLDC shall be promptly informed in case any of these are taken out of service.

- (j) SLDC in coordination with RLDC, users and transmission licensees shall make all possible efforts to ensure that the grid voltage always remains within the following operating range:-

Voltage(kV rms)		
Nominal	Maximum	Minimum
400	420	360
220	245	200
132	145	120
66	73	60

- (k) Procedures shall be developed to recover from partial/total collapse of the grid and periodically updated in accordance with the requirements given under section 5.11 of HGC. These procedures shall be followed by all the users to ensure consistent, reliable and quick restoration.
- (l) All stake holders shall provide adequate and reliable communication facility internally and with other generators/distribution licensees/users to ensure exchange of data/information necessary to maintain reliability and security of the grid. Wherever possible, redundancy and alternate path shall be maintained for communication along important routes i.e. SLDC to STU / ALDC / DSOCC(s).
- (m) The users shall send information/data including disturbance recorder /sequential event recorder output etc., to SLDC for purpose of analysis of any grid disturbance/event. No users shall block any data/information required by the SLDC for maintaining reliability and security of the grid and for analysis of an event.

5.3 FREQUENCY MANAGEMENT

- (a) SLDC in co-ordination with NRLDC shall make all possible efforts to ensure that the grid frequency always remains within the 49.0 to 50.5 Hz band. Any frequency deviation

beyond the normal range shall be jointly identified by SLDC and NRLDC and appropriate action taken.

- (b) Whenever system frequency is below 49.5 Hz, SLDC shall comply with the instructions of RLDC with regard to load management. The STU and distribution licensees shall restrict their net drawals from the grid within their drawal schedules. All the SGSs/CGPs (except those on peaking duty) shall maximize their generation up to the sustainable level. All partly loaded generating units shall pick up additional load at a faster rate according to their capability and as per manufacturer's limits.

When frequency falls below 49.0 Hz, SLDC shall carry out requisite load shedding as per directions of RLDC by instructing distribution companies as per prearranged schedules to curtail the over-drawal.

- (c) All users and transmission licensees shall ensure that automatic under frequency and df/dt load shedding schemes in their respective systems are fully functional in order to prevent the collapse of the grid.
- (d) Under rising frequency conditions, SLDC shall take appropriate action to issue instructions to SGSs/ CGPs, in co-ordination with NRLDC, to arrest the rising frequency and restore frequency within normal range.
- (e) Whenever the system frequency is higher than 50.5 Hz, SLDC shall endeavour to restrict the actual net injection into the grid which shall not exceed the scheduled despatch for that block. Also, while the frequency is above 50.5 Hz, the generating companies may (at their discretion) back down without waiting for an advice from SLDC to restrict the frequency rise.
- (f) SLDC shall monitor actual drawal against scheduled drawal and regulate internal generation/demand to maintain this schedule. Generators, CGPs and bilateral agencies shall follow the despatch instructions issued by SLDC. Distribution companies and bilateral agencies shall co-operate with SLDC in managing load on instructions from SLDC as required.

5.4 VOLTAGE MANAGEMENT

- (a) The transmission licensee shall carry out load flow studies from time to time to predict where voltage problems may be encountered and to identify appropriate measures to ensure that voltages remain within the defined limits.

Generators shall make available to SLDC the up-to-date capability curves for all generating units, indicating any restrictions, to allow accurate system studies and effective operation of the transmission system. CGPs shall similarly furnish the net reactive power capability that will be available for export to/ import from Transmission System.

On the basis of these studies SLDC shall instruct SGSs and CGPs to maintain specified voltage levels at interconnecting points.

- (b) The transmission licensee shall co-ordinate with the distribution companies to determine voltage levels at the external inter-connection points with distribution companies. Distribution companies shall participate in voltage management by regulating their drawal as may be required. The distribution companies shall endeavour to minimize the VAr drawal at an external inter-connection point.

- (c) SLDC shall continuously monitor voltage levels at strategic sub-stations and in co-ordination with NRLDC, regulate voltage levels so that there is minimal reactive power drawal from regional transmission system.
- (d) In general, the beneficiaries shall endeavour to minimize the VAr drawal at an interchange point when the voltage at that point is below 95% of rated, and shall not return VAr when the voltage is above 105%. Auto Transformer taps at the respective drawal points may be changed to control the VAr interchange as per a beneficiaries' request to the SLDC, but only at reasonable intervals.
- (e) The SLDC shall take appropriate measures to control transmission system voltages, which may include but not be limited to transformer tap changing and use of MVAR reserves with generating units and CGPs within technical limits agreed to between the transmission licensee and SGSs/CGPs.
- (f) Generators and CGPs shall inform SLDC of their reactive power reserve capability promptly on request.
- (g) All generating units shall normally have their Automatic Voltage Regulators (AVRs) in operation, with appropriate settings. In particular, if a generating unit of over fifty (50) MW size is required to be operated without its AVR in service, the SLDC shall be immediately intimated about the reason and duration, and its permission obtained. Power System Stabilizers (PSS) in AVRs of generating units (wherever provided), shall be got properly tuned by the respective generating unit owner as per a plan prepared for the purpose by the STU from time to time. STU will be allowed to carry out checking of PSS and further tuning it, wherever considered necessary.
- (h) All users shall make all possible efforts to ensure that the grid voltage always remains within the operating range specified under section 5.2 (j) above.
- (i) All users shall ensure functioning of system protection schemes in the power system, as finalized by Operational and Protection Coordination Committee of the STU, to protect against situations such as voltage collapse and cascading effect. Such schemes would be finalized by the STU.

5.5 REACTIVE POWER MANAGEMENT

- (a) Reactive power compensation should ideally be provided locally, by generating reactive power as close to the reactive power consumption as possible. The beneficiaries are therefore expected to provide local VAr compensation/ generation such that they do not draw VARs from the grid, particularly under low-voltage condition. To discourage VAr drawals by beneficiaries, VAr exchanges with State transmission system shall be priced as follows:-
 - the beneficiary pays for VAr drawal when voltage at the metering point is below 97% ;
 - the beneficiary gets paid for VAr return when voltage is below 97% ;
 - the beneficiary gets paid for VAr drawal when voltage is above 103% ;
 - the beneficiary pays for VAr return when voltage is above 103%;

Provided that there should be no charge /payment for VAr drawal / return by a beneficiary on its own line emanating directly from a SGS.
- (b) The charges/payment for VARs, shall be at a nominal paisa / kVArh rate as may be specified by the Commission from time to time, and will be between the beneficiary and the State pool account for VAr interchanges.

- (c) Notwithstanding the above, SLDC may direct a beneficiary to curtail its VAr drawal / injection in case the security of the grid or safety of any equipment is endangered.
- (d) The SGSs shall generate/absorb reactive power as per instructions of SLDC, within capability limits of the respective generating units that is without sacrificing on the active generation required at that time. No payments shall be made to the generating companies for such VAr generation/absorption.
- (e) VAr exchange directly between two beneficiaries on the interconnecting lines owned by them (singly or jointly) generally address or cause a local voltage problem, and generally do not have an impact on the voltage profile of the State grid. Accordingly, the management/control and commercial handling of the VAr exchanges on such lines shall be as per following provisions, on case-by-case basis:
- (i) The two concerned beneficiaries may mutually agree not to have any charge / payment for VAr exchanges between them on an interconnecting line;
 - (ii) The two concerned beneficiaries may mutually agree to adopt a payment rate/scheme for VAr exchanges between them identical to or at variance from the rate specified by the Commission for VAr exchanges with State transmission system. If the agreed scheme requires any additional metering, the same shall be arranged by the concerned Beneficiaries;
 - (iii) In case of a disagreement between the concerned beneficiaries (e.g. one party wanting to have the charge/payment for VAr exchanges, and the other party refusing to have the same), the scheme as specified in the following section shall be applied. The per KVARh rate shall be as specified by the Commission for VAr exchanges with State transmission system.

5.5.1 Scheme for payment of Reactive Energy Exchange

Case – 1: Interconnecting line owned by beneficiary - A
Metering Point: Substation of beneficiary- B

Case – 2: Interconnecting line owned by beneficiary - B
Metering point: Substation of beneficiary-A

Beneficiary -B pays to Beneficiary -A for

(i) Net VArh received from beneficiary -A while voltage is below 97%,
and

(ii) Net VArh supplied to beneficiary -A while voltage is above 103%

Note: Net VArh and net payment may be positive or negative

Case – 3: Interconnecting line is jointly owned by beneficiary-A and-B.

Metering points: Substations of beneficiary-A and beneficiary-B

- Net VArh exported from S/S-A, while voltage < 97% = X1

- Net VArh exported from S/S-A, while voltage > 103% = X2

- Net VArh imported at S/S-B, while voltage < 97% = X3

- Net VArh imported at S/S-B, while voltage > 103% = X4

(i) Beneficiary-B pays to Beneficiary-A for X1 or X3, whichever is smaller in magnitude;
and

(ii) Beneficiary-A pays to Beneficiary-B for X2 or X4, whichever is smaller in magnitude.

Note:

(a) Net VArh and net payment may be positive or negative;

- (b) In case X1 is positive and X3 is negative, or vice-versa, there would be no payment under (i) above;
- (c) In case X2 is positive and X4 is negative, or vice-versa, there would be no payment under (ii) above.

The reactive energy charges shall be 5 Paisa/ KVARh as on 01.01.2006 to be escalated @ 0.25 Paisa/ KVARh per annum as amended by CERC from time to time.

5.6 DEMAND ESTIMATION FOR OPERATIONAL PURPOSES

- (a) SLDC shall develop methodologies/mechanisms on the basis of the data submitted by generation company(s) and distribution companies for daily, weekly, monthly and yearly demand estimation (MW, MVAR and MWh) for operational purposes. The data for the estimation shall also include load shedding, power cuts, etc. SLDC shall also maintain historical database for demand estimation.
- (b) Distribution companies and other agencies involved in bilateral exchanges shall provide to the SLDC their estimates of demand/export for active power (MW), reactive power (MVAR) and energy consumption (MU) at each connection / external interconnection point on daily, weekly and monthly basis as per the formats to be finalized by SLDC. The distribution companies shall intimate to the SLDC the methodology used in producing their forecasts.
- (c) The SLDC shall use this data
 - (i) to determine the generation schedule for next day;
 - (ii) to determine the most onerous conditions affecting constraints and voltage performance for next week;
 - (iii) to check outage plan viability for peak and lean periods for next month.
- (d)
 - (i) The data shall be in the form of 96 blocks (15 minutes period) averaged demand figure for that day, weekly and monthly data shall be in the form of 24 hourly averaged demand figures for that week/month and yearly data shall be in the form of month wise energy requirement for the year. All the above data shall be in respect of each inter-connection point;
 - (ii) The demand /export estimates provided by the distribution companies and other users involved in bilateral exchanges shall be updated as necessary and sent each month to the SLDC 15 days ahead on daily, weekly and monthly basis;
 - (iii) The demand estimates shall be further updated and sent to SLDC in accordance with the provision of section 5.13 (Scheduling and Despatch) of HGC;
 - (iv) The SLDC shall make its own demand forecast using hourly demand summation of each sub-station and CGP import / export figures or by using suitable computer program, to compare with demand estimates provided by users;
 - (v) Distribution companies shall provide to SLDC estimates of load that may be shed, when required, in discrete blocks with the details of the arrangements of such load shedding;
 - (vi) While the demand estimation for operational purposes is to be done on a daily, weekly and monthly basis initially, mechanisms and facilities at SLDC shall be created at the earliest to facilitate on-line estimation for daily operational use;

- (vii) All data shall be collected in accordance with procedures and formats agreed between the SLDC and each user;
- (viii) SLDC shall maintain a database of State demand on a 15 minutes basis;
- (ix) SLDC shall notify a Contact Person who shall be responsible for day ahead demand forecast. The official and residential telephone numbers of the Contact Person shall be intimated to all the distribution companies. Similarly all the distribution companies shall notify their contact person with telephone numbers and intimate SLDC. In case of change of contact person, it should be intimated to SLDC and vice versa.

5.7 DEMAND MANAGEMENT

- (a) The Distribution Licensees and other users shall endeavour to restrict their net drawal from the grid to within their respective drawal schedules whenever the system frequency is below 49.5 Hz. When the frequency falls below 49.0 Hz, requisite load shedding (manual) shall be carried out to curtail the over-drawal.
- (b) Further, in case of certain contingencies and/or threat to system security, the SLDC may direct a user to decrease its drawal by a certain quantum. Such directions shall immediately be acted upon.
- (c) Each user shall make arrangements that will enable manual demand disconnection to take place, as instructed by the SLDC, under normal and/or contingent conditions.
- (d) The measures taken to reduce the users drawal from the grid shall not be withdrawn as long as the frequency/voltage remains at a low level, unless specifically permitted by the SLDC.

5.8 PERIODIC REPORTS

- a) A weekly report covering the performance of the State grid for the previous week shall be issued by SLDC to all users. Such weekly report shall also be available on the website of the SLDC for at least 12 weeks. The weekly report shall contain the following:-
 - (i) frequency profile;
 - (ii) voltage profile of selected substations;
 - (iii) major generation and transmission outages ;
 - (iv) transmission constraints;
 - (v) instances of persistent/significant non-compliance of HGC;
 - (vi) demand and supply situation
- b) The SLDC shall prepare a quarterly report which shall be issued to all the users, and shall bring out the system constraints, reasons for not meeting the requirements, if any, of security standards and quality of service, along with details of various actions taken by different users, and the users responsible for causing the constraints.
- c) The SLDC shall also provide information/report, which can be called for by users in the interest of smooth operation of the State transmission system.

5.9 OPERATIONAL LIAISON

a) Operations and events on the State Grid

- (i) before any operation is carried out on State grid, the SLDC will inform each user, whose system may, or will, experience an operational effect, and give details of the operation to be carried out;

- (ii) immediately following an event on State grid, the SLDC will inform each user, whose system may, or will, experience an operational effect following the event, and give details of what has happened in the event.

(b) Operations and events on a user's system.

- (i) before any operation is carried out on a user's system, the user will inform the SLDC, in case the State grid may, or will, experience an operational effect, and give details of the operation to be carried out;
- (ii) immediately following an event on a user's system, the user will inform the SLDC, in case the State grid may, or will, experience an operational effect following the event, and give details of what has happened in the event.

5.10 OUTAGE PLANNING

- (a) All users and transmission licensees shall intimate the SLDC about their proposed outage programmes in writing for the next financial year by 30th November of each year. These shall contain identification of each generating unit/transmission line/interconnecting transformer for which outage is being planned, reasons for outage, the preferred date for each outage and its duration and where there is flexibility, the earliest start date and latest finishing date.
- (b) SLDC shall come out with a draft outage programme for the next financial year by 31st December of each year for the State grid:
 - Provided that the outage plan shall be developed after giving due considerations to system security and reliability and shall be developed in such manner that the extent of unmet system demand on account of such a plan is kept to a minimum
 - Provided further that in case of hydro generating stations such a plan shall also endeavour to maximize the utilization of water for purpose of power generation subject to applicable constraints related to alternate use of such water.
- (c) Transmission outage planning shall be harmonized with generation outage planning and distribution system outage planning shall be harmonized with generation and transmission outage planning.
- (d) The final outage plan shall be intimated to all users and transmission licensee(s) latest by 31st January each year:
 - Provided that the SLDC shall finalise the outage plan in consultation with the users and transmission licensee:
 - Provided further that the above annual outage plan shall be reviewed by SLDC on monthly basis in coordination with all parties concerned, and adjustments made, wherever found to be necessary.
- (e) Each user or transmission licensee shall, at least two (2) weeks prior to availing an outage as per the planned schedule, inform the SLDC about the same and obtain prior approval from SLDC.
- (f) State Load Despatch Centre shall have the authority to defer any planned outage in case of occurrence of following events:
 - (i) major grid disturbances (e.g. total black out);

- (ii) system isolation;
- (iii) any other event in the System such as partial black out in the state that may have an adverse impact on the System security due to the proposed outage.

Provided that the State Load Despatch Centre shall inform about the revised Outage Plan, with appropriate reasons for revisions in the Outage Plan, as soon as possible.

5.11 RECOVERY PROCEDURES

5.11.1 OBJECTIVE

5.11.1.1 The objective of this section is to define the responsibilities of all the users for achieving the fastest possible recovery of the grid in the event of a failure in the transmission system, or any sudden loss of generation or a blackout caused due to the failure of the Northern Grid.

5.11.1.2 The procedure to be adopted for a fast recovery shall take into account the following:

- (a) the essential loads to be restored immediately;
- (b) the capabilities of the generating stations;
- (c) the possible transfer of power from the neighbouring systems through inter-State transmission lines;
- (d) the extent of immediate availability of power from the CGSs.

5.11.1.3 The main objective is to achieve the following:

- (a) restoration of the total system and associated demand in the shortest possible time;
- (b) resynchronisation of parts of the system which have ceased to be in synchronism;
- (c) to ensure that the communication arrangements for use in circumstances of serious disruption to the system, are available to enable senior management representatives of the SLDC, the transmission licensee and the users who are authorised to take decisions on behalf of the transmission licensee or the user;
- (d) to ensure that the transmission system can operate in the event the SLDC is incapacitated for any reason.

5.11.2 STRATEGY

5.11.2.1 The situation prevailing prior to the occurrence of the contingency, e.g. availability of specific generating stations, transmission lines, and load demands will largely determine the restoration procedure to be adopted in the event of a total blackout. The SLDC shall co-ordinate with NRLDC and other SLDCs in determining the extent of problems. The SLDC shall inform all the users of the situation and advise them to follow the strategy as outlined in this section for restoration. The personnel authorised by the users shall be readily available at the users' end for communication and acceptance of all operational communications throughout the period of contingency. The use of communication channels shall be restricted to the operational communications only, till normalcy is restored.

5.11.3 TOTAL REGIONAL BLACKOUT

5.11.3.1 In case of total regional blackout, the recovery shall be as per the system restoration procedure prepared by NRLDC in consultation with all the constituents of Northern region. As these procedures are updated periodically, the last updated procedures shall be followed during the total regional blackout.

5.11.4 TOTAL AND PARTIAL STATE TRANSMISSION SYSTEM BLACKOUT

5.11.4.1 In case of total and partial State transmission system blackout, the recovery shall be as per the restoration procedure prepared by SLDC in consultation with all the users. As these procedures are updated periodically, the last updated procedures shall be followed during the total and partial state transmission system blackout. The instruction issued by SLDC in restoration of system from total or partial black out shall be followed by all the users even though the same is not specifically mentioned in system restoration document.

5.11.5 RESPONSIBILITIES

5.11.5.1 The SLDC shall maintain a record of generating station black start capabilities and associated generating station black start operation plans.

5.11.5.2 STU shall prepare, distribute, and maintain up-to-date system restoration procedures covering the restoration of the transmission system following total or partial blackouts. The users shall agree to these system restoration procedures and promptly inform the SLDC in advance whenever they have difficulty in following the same.

5.11.5.3 The SLDC shall be responsible for directing the overall transmission system restoration process by co-ordination with all the users and in close co-ordination with the NRLDC.

5.11.5.4 The distribution licensees shall be responsible for sectionalising the distribution system into discrete, unconnected blocks of load. They shall intimate the SLDC as to the quantum of load likely to be picked up by the generator being synchronised.

5.11.5.5 The generating companies shall be responsible for commencing their planned Black Start procedure on the instruction of the SLDC and steadily increase their generation according to the demand intimated by the SLDC.

5.11.6 SPECIAL CONSIDERATIONS

5.11.6.1 During the process of restoration of the transmission system or regional system blackout conditions, the normal standards of voltage and frequency need not be applied, and left to the discretion of the SLDC as appropriate depending on the prevailing situation.

5.11.6.2 The distribution licensees shall separately identify non-essential components of the load, which may be kept off during system contingencies. They shall also draw up an appropriate schedule with corresponding load blocks in each case. The non-essential loads can be put on only when the system normalcy has been restored, and as advised by the SLDC.

- 5.11.6.3 All users shall pay special attention in carrying out the procedures to prevent secondary collapse of the system due to haste or inappropriate loading.
- 5.11.6.4 Despite the urgency of the situation, careful, prompt and complete logging of all operations and operational messages shall be ensured by all the users to facilitate subsequent investigation into the incident and the efficiency of the restoration process. Such investigation shall be conducted promptly after the incident, and placed before the GCC for appraisal in its next immediate meeting.

5.12 EVENT INFORMATION

5.12.1 Reportable Events

- (a) Any of the following events requires reporting by SLDC / STU/ users as the case may be:-
- (i) violation of security standards;
 - (ii) grid indiscipline;
 - (iii) non-compliance of SLDC's instructions;
 - (iv) system islanding/system split;
 - (v) state black out/partial system black out;
 - (vi) protection failure on any element of the State systems;
 - (vii) power System instability;
 - (viii) tripping of any element of the regional grid.
- (b) Typical examples of reportable incidents that could affect the state transmission system are the following:-
- (i) exceptionally high/low system voltage or frequency;
 - (ii) serious equipment problem, e.g. major circuit, transformer or bus bar;
 - (iii) loss of major generating unit;
 - (iv) transmission system breakaway or system restoration procedure;
 - (v) major fire incidents;
 - (vi) equipment and transmission line overload;
 - (vii) excessive drawal deviations;
 - (viii) minor equipment alarms.

5.12.2 Reporting Procedure

- (a) All reportable events occurring in lines and equipment of 11 kV and above at grid substations/generating stations shall promptly be reported orally by the user whose equipment has experienced the event (The Reporting User) to any other significantly affected users and to SLDC;
- (b) SLDC may ask for a written report on any event within 1 (one) hour of being informed by the Reporting user;
- (c) The Reporting user shall submit an initial written report within two hours of asking for a written report by SLDC. This has to be further followed up by the submission of a comprehensive report within 48 hours of the submission of the initial written report;
- (d) In the case of an event occurring in EHV system and generating equipment which was initially reported by STU / transmission licensee/ State generator, SLDC will give a written report to NRLDC;

SLDC shall also be responsible for reporting events to the users and for collection and reporting of all necessary data to users for monitoring, reporting and event analysis;

- (e) SLDC may call for a report from any user on any reportable event affecting other users and the licensee in case the same is not reported by such user whose equipment might have been source of the reportable event.

The above shall not relieve any user from the obligation to report events in accordance with the IE Rules.

5.12.3 Form of Written Reports:

A written report shall be sent to SLDC or to the users/transmission licensees as the case may be and will confirm the oral notification together with the following details of the event:-

- (a) time and date of event;
- (b) location;
- (c) plant and/or equipment directly involved;
- (d) description and cause of event;
- (e) antecedent conditions;
- (f) demand and/or generation (in MW) interrupted and duration of interruption;
- (g) all relevant system data including copies of records of all recording instruments including Disturbance Recorder, Event Logger, DAS etc;
- (h) sequence of tripping with time;
- (i) details of Relay Flags;
- (j) remedial measures;
- (k) estimate of time to return to service, possibility of alternate arrangement of supplies.

The standard reporting form may be finalized by SLDC in consultation with the users.

5.13 SCHEDULING AND DESPATCH

- (a) STU shall submit a draft of Scheduling and Despatch Code within six (6) months from the notification of these regulations:

Provided that the STU shall consult the SLDC in the development of the Scheduling and Despatch Code:

Provided that the Commission shall, before approval, put up the draft version of the Scheduling and Despatch Code on its website for inviting comments from the public and the interested parties:

Provided further that the Commission shall give a period of at least one (1) month for submission of comments by the public and the interested parties.

- (b) The Scheduling and Despatch Code shall contain provisions for the following:
- (i) actions and responsibilities of the SLDC and users in preparing and issuing generation/supply schedule on daily basis;
 - (i) modality of the flow of information between the SLDC and users for the purpose of scheduling and despatch;
 - (ii) modality of the flow of information between the SLDC and the transmission licensees for the purpose of scheduling and despatch;

- (iv) modality of the flow of information between the SLDC and the RLDC for the purpose of scheduling and despatch:
 Provided that such provisions shall be consistent with the Scheduling and Despatch Code included in the Grid Code specified by Central Electricity Regulatory Commission under clause (h) of section 79 of the Act;
- (v) procedures of issuing real time despatch/drawal instructions and rescheduling, if required, to the users and compliance with the same;
- (vi) appropriate arrangements for settlement of deviations of actual generation or actual drawal from schedules and mechanism for reactive power pricing:
 Provided that such settlement shall be carried out in a transparent manner and shall include adequate mechanisms for data verification;
- (vii) responsibilities of SLDC and users in voltage and frequency management; and
- (viii) any other issue considered appropriate by the Commission for inclusion in the Scheduling and Despatch Code.

5.14 MONITORING OF GENERATION AND DRAWAL

5.14.1 Introduction

The monitoring of SGS output and active and reactive reserve capacity is important to evaluate the performance of generating station.

The monitoring of actual drawal against schedule is important to ensure that STU and distribution licensees contribute towards improving system performance and observe grid discipline.

5.14.2 Objective

The objective of this section is to define the responsibilities of all the SGSs in monitoring of generating unit reliability and performance, and STU's/discoms' compliance with the scheduled drawal to assist SLDC in managing voltage and frequency.

5.14.3 Monitoring Procedure

- (a) For effective operation of the STS, it is important that a SGS's declared availability is realistic and that any departures are continuously and invariably fed back to the generator to help effect improvement;
- (b) SLDC shall continuously monitor generating units' outputs and bus voltages. More stringent monitoring may be performed at any time when there is reason to believe that SGS's declared availability may not match the actual availability or declared output does not match the actual output;

- (c) SLDC can ask for putting a generating station to demonstrate the declared availability by instructing the generating station to come up to the declared availability within time specified by generators;
- (d) SLDC shall inform a SGS, in writing, if the continuous monitoring demonstrates an apparent persistent or material mismatch between the despatch instructions and the generating unit output or breach of Connection Conditions. Continued discrepancies shall be resolved by the State Grid Code Coordination Committee with a view to either improve the performance in future, provide more realistic declarations or initiate appropriate actions for any breach of Connectivity Conditions. Continued default by the generating stations entails penalty as may be determined by the Commission;
- (e) SGSs (excluding CGPs) shall provide to SLDC 15-minute block-wise generation summation outputs where no automatically transmitted metering or SCADA/RTU equipment exists. CGPs shall provide to SLDC 15-minute details of block-wise export / import of MW and MVAR;
- (f) SGS shall provide any other logged readings that SLDC may reasonably require, for monitoring purposes where SCADA is not available.

5.14.4 Generating Unit Trippings

SGS shall promptly inform SLDC of the tripping of a generating unit, with reasons. SLDC shall intimate NRLDC about the trippings and their revival. SLDC shall keep a written log of all such trippings, including the reasons with a view to demonstrating the effect on system performance and identifying the need for remedial measures.

SGS shall submit a detailed report of generating unit tripping to SLDC on monthly basis.

5.14.5 Monitoring of Drawal

- (a) SLDC shall continuously monitor actual MW drawal by distribution licensees and other users against their schedules through use of SCADA equipment, wherever available, or otherwise using available metering. SLDC shall request NRLDC and adjacent States as appropriate to provide any additional data required to enable this monitoring to be carried out.
- (b) SLDC shall continuously monitor the actual MVAR drawal to the extent possible. This will be used to assist in State transmission system voltage management.

5.15 INTER- USER BOUNDARY SAFETY

5.15.1 Designated Officers

STU and all users shall nominate suitably authorized persons to be responsible for the co-ordination of safety across their boundary. These persons shall be referred to as Designated Officer(s).

5.15.2 Procedure

- (a) STU shall issue a list of Designated Officers (names, designations and telephone numbers) to all users who have a direct inter-user boundary with STU or other users. This list shall be updated promptly whenever there is change of name, designation or telephone number.
- (b) All users with a direct inter-boundary with STU or other user system shall issue a similar list of their Designated Officers to STU or other user(s), which shall be updated promptly whenever there is a change in the list.
- (c) Whenever work across an inter-user boundary is to be carried out, the Designated Officer of the user including STU itself, wishing to carry out work shall personally contact the other relevant Designated Officer. If the permit to work (PTW) cannot be obtained personally, the Designated Officers shall contact through telephone and exchange code words to ensure correct identification of both agencies.
- (d) Should the work extend over more than one shift, the Designated Officer shall ensure that the relieving Designated Officer is fully briefed on the nature of the work and the code words in operation.
- (e) The Designated Officer(s) shall co-operate to establish and maintain the precautions necessary for the required work to be carried out in a safe manner. Both the established isolation and the established earth shall be locked in position, where such facilities exist, and shall be clearly identified.
- (f) Work shall not commence until the Designated Officer of the user including STU itself, wishing to carry out the work, is satisfied that all the safety precautions have been established. This Designated Officer shall issue agreed safety documentation (PTW) to the working party to allow work to commence. The PTW in respect of specified EHV lines and other interconnections shall be issued with the consent of SLDC.
- (g) When work is completed and safety precautions are no longer required, the Designated Officer who has been responsible for the work being carried out shall make direct contact with the other Designated Officer to return the PTW and removal of those safety precautions. Return of PTW in respect of specified EHV lines and interconnections shall be informed to SLDC.
- (h) The equipment shall only be considered as suitable for connecting back to service when all safety precautions are confirmed as removed, by direct communication using code word contact between the two Designated Officers, and after ensuring that the return of agreed safety documentation (PTW) from the working party has taken place.
- (i) STU shall develop an agreed written procedure for inter-user boundary safety and continuously update it.
- (j) Any dispute concerning cross boundary safety shall be resolved at the level of STU, if STU is not a party. In case where STU is a party, the dispute shall be referred to the Commission for resolution.

5.15.3 Special Considerations

- (a) All the users shall comply with the agreed safety rules drawn up in accordance with IE Rules, 1956, which are in force for the time being and will be replaced by the rules made by the Authority under Electricity Act, 2003 for all cross boundary circuits.

- (b) All the equipment on cross boundary circuits, which may be used for the purpose of safety co-ordination and establishment of isolation and earthing, shall be permanently and clearly marked with an identification number or name being unique to the particular sub-station. These equipments shall be regularly inspected and maintained in accordance with the manufacturer's specifications.
- (c) Each Designated Officer shall maintain a legibly written safety log, in chronological order, of all operations and messages relating to the safety co-ordination sent and received by him. All these safety logs shall be retained for a period of not less than ten years.

Each of the distribution licensees connected to the transmission system shall maintain an updated map of his system pertaining to the area fed by each sub-station, and exhibit the same in the concerned area offices of the distribution licensee.

CHAPTER-6 METERING AND PROTECTION CODE

6.1 INTRODUCTION

This code provides guidelines for the following:-

- (a) minimum requirement of metering for commercial and operational purposes to be provided by the user at connection points/ interface points including generating stations, switching stations, sub-stations and also cross boundary circuits as per CEA (Installation & Operation of Meters) Regulation 2006 read with its amendments, if any
- (b) minimum requirement of protection to be provided to safeguard the system from faults which may occur.

6.2 METERING REQUIREMENTS

6.2.1 Generating Station Operational Metering

The generating companies shall install operational metering to the licensees' specifications so as to provide operational information for both real time and recording purposes to SLDC in relation to each generating unit at each generating station in respect of the following:-

- (a) Bus voltage;
- (b) Frequency;
- (c) MW;
- (d) MVAR;
- (e) Any other data agreed to between the licensee and the generating company

6.2.2 All the instrument transformers used in conjunction with the operational metering shall be of accuracy class 0.2 except where already existing CTs/PTs which are of 0.5 class, which may continue to be used. These shall be of suitable rating to meet the burden of lead wires and meters and shall conform to the relevant IEC or IS specifications.

6.2.3 All the meters shall be calibrated to achieve the overall accuracy of operational metering in accordance with the limits agreed to between the transmission licensee/distribution licensee and the generating company. Records of calibration shall be maintained for reference and shall be made available to the licensee, upon request.

6.3 TRANSMISSION SYSTEM OPERATIONAL METERING

6.3.1 The transmission licensee shall install operational metering for both real time and recording purposes at each sub-station as follows:-

- (a) For station bus-bars:-
 - (i) Bus Voltage;
 - (ii) Frequency;

(b) For outgoing/incoming lines, power transformers, auxiliary transformers and compensating devices:-

- (i) MW;
- (ii) MVA_r;
- (iii) Power Factor;
- (iv) Current.

6.4 SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA)

6.4.1 The transmission licensee shall install and make operative an operational metering data collection system under SCADA for storage, display and processing of operational metering data. All users shall make available outputs of their respective operational meters to the SCADA interface equipment.

6.4.2 The SLDC shall be the data collection, storage and display centre.

6.5 TARIFF METERING

6.5.1 The generating companies, CGPs, the transmission licensees and the distribution licensees and EHV consumers who intend to use open access provisions would need to install the meters suitable for Availability Based Tariff (ABT) at inter-utility exchange points which would record the parameters in accordance with the Central Electricity Authority Regulations on installation and operation of meters read with its amendment, if any.

6.5.2 The auxiliary transformers in generating stations shall be provided with the following meters:

- (a) MW;
- (b) Current;
- (c) Voltage;
- (d) Active Energy.

6.5.3 Each metering point associated with determination of energy exported or imported, between the generating companies, transmission licensees and distribution licensees shall be provided with both main and check meters on same core of CT & PT. The minimum standard of accuracy for these meters shall be Accuracy class 0.2. If present metering system needs up-gradation to class 0.2 it shall be completed within 6 months from effective date of this code.

6.5.4 All the instrument transformers used in conjunction with commercial (tariff) metering shall also be of accuracy class 0.2. These shall conform to the relevant IEC or IS specifications. The rating shall take into account the burdens imposed by lead wires and metering.

6.5.5 Data shall be collected from both the main and check metering schemes.

6.5.6 PT fuse failure relays shall be provided to initiate alarm on loss of one or more phases of the voltage supply to the meter.

- 6.5.7** All the interface meters shall be calibrated and periodically tested as per CEA (Installation & Operation of Meters) Regulation 2006 read with its amendments, if any.
- 6.5.8** In case of State transmission lines, meters suitable for Availability Based Tariff shall be provided having the following parameters:-
- (a) net active energy import/ export for each 15 minute time block of the day;
 - (b) net reactive energy import/ export for the day above 103% of voltage;
 - (c) net reactive energy export/ import when voltage is below 97%;
 - (d) cumulative active energy export/ import;
 - (e) average frequency for each 15 minute time block of the day;
 - (f) provision of storage of data in non-volatile memory for at least 35 days.
- 6.5.9** The generating companies, transmission licensees and distribution licensees shall formulate a procedure covering summation, collection and processing of tariff meter readings at various connection sites in their areas. Whenever necessary, these procedures can be revised.
- 6.5.10** The ownership, responsibility of maintenance and testing of these meters shall be as mutually agreed to between the users and the licensees.

6.6 PROTECTION REQUIREMENTS

6.6.1 General Principles

- (i) No item of electrical equipment shall be allowed to remain connected to the system unless it is covered by the appropriate protection aimed at reliability, selectivity, speed and sensitivity. All the generating companies and the distribution licensees shall co-operate with the transmission licensee to ensure correct and appropriate settings of protection to achieve effective, discriminatory isolation of faulty line/equipment within the target clearance times specified elsewhere in this code.
- (ii) Protection settings shall not be altered, or protection bypassed and/or disconnected without consultation and agreement of all affected users. In case the protection has been bypassed and/or disconnected by agreement due to any cause, the same should be rectified and protection restored to normal condition as quickly as possible. If agreement has not been reached, the electrical equipments shall be isolated forthwith.

6.7 PROTECTION COORDINATION

- 6.7.1** The settings of protective relays starting from the generating unit up to the remote end of 66 kV, 33 kV and 11 kV lines shall be such that only the faulty section is isolated under all circumstances. The transmission licensee shall notify the initial settings and any subsequent changes to the users from time to time. Routine checks on the performance of the protective relays shall be conducted and any malfunction shall be noted and corrected as soon as possible. The transmission licensee shall conduct the required studies for deciding the relay settings, with the data collected from the users. 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.

- 6.7.2** The transmission licensee shall be responsible for arranging periodical meetings between the generating companies and the distribution licensees to discuss coordination of protection. The transmission licensee shall investigate any malfunction of protection or other unsatisfactory protection issues. The concerned licensees shall take prompt action to correct any protection malfunction or issue as discussed and agreed to in these periodical meetings.

6.8 FAULT CLEARANCE TIME

- 6.8.1** From stability considerations, the maximum fault clearance time for faults on any user's system directly connected to the transmission system, or any faults on the transmission system itself, shall be as follows:

<u>Voltage Class</u>	<u>Target clearance time</u>
400 kV	100 m sec.
220 kV	160 m sec.
132 kV	160 m sec.
66 kV	300 m sec.

- 6.8.2** Lower fault clearance time than the above are preferable.
- 6.8.3** Lower fault clearance times for faults on a user's system may be agreed to, but only if, in the opinion of the transmission licensee, system conditions allow the same. At the generating stations, line faults should be cleared at the generating station end, within the critical time, to keep the generators in synchronism.

6.9 GENERATOR REQUIREMENTS

- 6.9.1** All generating units and all associated electrical equipment of the generating company connected to the transmission system shall be protected by adequate protection, so that the transmission system does not suffer due to any disturbances originating at the generating unit.

6.10 TRANSMISSION LINE REQUIREMENTS

Every EHV line taking off from a generating station or a sub-station or a switching station shall necessarily have distance protection along with other protections as follows:

- (a) 400 kV lines:- These lines shall have two numerical non-switched distance protection schemes with IEC 61850 communication protocol. The schemes will be designated as Main I and Main II with selectable inter-trip features for accelerated clearance of faults in Zone-II of the protected line. The scheme shall be suitable for single pole tripping and single shot single pole auto reclosing after an adjustable dead time. In addition to the above, these lines

shall have a directional earth fault relay as back up to the above distance protection scheme to clear earth faults on the transmission system. These shall have over load-alarm relay and over-voltage alarm relay too to fore-warn the operating personnel at the grid sub-station in regard to the over-load/over voltage conditions respectively on such circuits.

- (b) 220 kV lines:- These lines shall have two numerical non-switched distance protection schemes with IEC 61850 communication protocol. The schemes will be designated as Main I and Main II with selectable inter-trip features for accelerated clearance of faults in Zone-II of the protected line. The scheme shall be suitable for single pole tripping and single shot single pole auto reclosing after an adjustable dead time. In addition to the above, these lines shall have directional earth fault relay as back up to the above distance protection scheme. These shall have feeder over load alarm relay to fore-warn the operating personnel in regard to the over load condition on such circuits.
- (c) 132 kV & 66 kV lines:- These lines shall have numerical distance protection scheme with IEC 61850 communication protocol. The scheme shall have selectable inter-trip features for accelerated clearance of faults in Zone-II of the protected line. The said distance scheme shall be backed up by directional over current and directional earth fault relay.
- (d) Bus-bar Protection:- Numerical low impedance bus-bar protection scheme for 400 kV and 220 kV bus-bar sections at all 400 kV and 220 kV substations shall be provided.
- (e) Local Breaker Back up Protection scheme (LBB):- In the event of any circuit breaker failing to trip on receipt of trip command from protective relays, all circuit breakers connected to the bus section to which the faulty circuit breaker is connected are required to be tripped with minimum possible delay through LBB protection. This protection also provides coverage for faults between the circuit breaker and the current transformer, which are not covered by other protections. All 220 kV and 400 kV circuits at 400 kV and 220 kV grid sub-stations shall have local breaker backup protection scheme.
- (f) 400 kV & 220 kV class Power Transformers:- Numerical transformer differential protection with IEC 61850 communication protocol shall be provided for this class of power transformers. The above protection scheme shall be backed up by triple pole over current relay with high set elements, restricted earth fault protection, over fluxing protection and over load alarm relay. The bucholtz protection, winding temperature protection and oil temperature protection with alarm and trip facilities too will be provided.
- (g) 132 kV and 66 kV class Power Transformers:- This class of power transformers shall have numerical transformer differential protection with IEC 61850 communication protocol, restricted earth fault protection, triple pole over current relay with high set elements. These transformers shall also have bucholtz protection, winding temperature trip and oil temperature trip with usual alarm and trip features.

- (h) 33 kV class power transformers:- 10 MVA and above capacity power transformer of this class shall have numerical transformer differential protection whereas transformers having capacity less than 10 MVA shall have restricted earth fault protection. In both the cases, it will be backed up by triple pole over current relay with high set elements. These transformers shall have bucholtz protection, winding temperature protection and oil temperature protection with usual trip and non-trip features.
- (i) 220 kV, 132 kV, 66 kV, 33 kV and 11 kV transformers (incomer):- These transformers shall have non-directional over current and earth fault relays. Transformers (incomer) whose LV is connected in star (except auto transformers) shall additionally have restricted earth fault protection to protect the low voltage winding of the concerned step-down power transformers against earth fault and further 33 kV and 11 kV transformer (in-comer) shall also have an appropriate over- voltage relay to protect the 33 kV & 11 kV winding of the concerned power transformer against over-voltage.
- (j) 33 kV and 11 kV lines:- These lines shall have non-directional over current and earth fault relays with high set elements having low transient over-reach features for their adequate protection.

CHAPTER-7 MANAGEMENT OF THE HARYANA GRID CODE

7.1 MANAGEMENT OF HGC

- (a) The Commission shall put up a copy of the HGC on its internet website and make available, through SLDC and STU, a copy of the applicable HGC to any person requesting it, at a price not exceeding the reasonable cost of reproducing it.
- (b) The Commission shall make available a copy of the notified HGC to the SLDC and STU for being put up on their internet websites.
- (c) The HGC and its amendments shall be finalized and notified adopting the prescribed procedure followed for regulations issued by Commission.
- (d) Requests for amendments to / modifications in the HGC and for removal of difficulties shall be addressed to Secretary, HGC, for periodic consideration and disposal.
Such amendments/modifications suggested shall be finalized after obtaining opinions from all users of the State Grid.
- (e) Any dispute or query regarding interpretation of HGC shall be addressed to Secretary, HERC and clarification issued by the Commission shall be final and binding on all concerned.

7.2 GRID COORDINATION COMMITTEE (GCC)

7.2.1 A Grid Coordination Committee shall be constituted by the STU within 30 (thirty) days from the date of notification of these regulations.

7.2.2 The Grid Coordination Committee shall be responsible for the following matters, namely:-

- (a) facilitating the implementation of these regulations and the rules and procedures developed under the provisions of these regulations;
- (b) assessing and recommending remedial measures for issues that might arise during the course of implementation of provisions of these regulations and the rules and procedures developed under the provisions of these regulations;
- (c) periodical review of the HGC, in accordance with the provisions of the Act and these regulations;
- (d) analysing any major grid disturbance soon after its occurrence,
- (e) examining problems raised by the users,
- (f) investigating/ taking action in case any beneficiary is indulging in unfair gaming or collusion after getting report from SLDC.
- (g) initiating remedial action against persistent default in payment of UI and VAR charges as reported by SLDC.
- (h) deciding utilisation of money remaining in the State reactive energy account.
- (i) auditing the complete statement of the State UI and the State reactive energy account tabled by SLDC by its Commercial Committee (a sub-committee of GCC).
- (j) such other matters as may be directed by the Commission from time to time.

7.2.3 The Grid Coordination Committee shall comprise of the following members:-

- (a) one member from the SLDC;
- (b) one member from STU i.e. HVPNL,
- (c) one member to represent each of the generating companies in the State.
- (d) one member to represent the transmission licensees in the State, other than the STU;
- (e) one member to represent each of the distribution licensees in the State;
- (f) one member to represent the trading licensees in the State, if any,
- (g) one representative of captive generating plants from the State having installed capacity of more than 100 MW;
- (h) one representative from NRLDC;
- (i) one representative from Commission as an observer, and
- (j) such other persons as may be nominated by the Commission.

7.2.4 The Director (Technical) of STU shall be the Chairman of Grid Coordination Committee and the concerned Chief Engineer of SLDC shall be its Member Secretary.

7.2.5 The members of the GCC shall be selected as follows:-

- (i) the Director (Technical) of STU, shall be the member referred to in section 7.2.3.(b) above;
- (ii) the member referred to in section 7.2.3 (a) above, shall be the Chief Engineer of SLDC;
- (iii) the members referred to in clause (c), (d), (e), (f), (g) and (h) of section 7.2.3 above shall be nominated by their respective organizations;
- (iv) organizations referred under sections 7.2.3(d),(f) & (g) will be selected in rotation from among all such organizations in the State. The term of each such member, selected in rotation, shall be one (1) year.

Provided that the members nominated by each of the organisations to the above Committee shall be holding a senior position in their respective organisations.

7.2.6 Since SLDC would be represented as one of the members of the Committee, the decisions of the Committee arrived by consensus regarding operation of the State Grid and scheduling and despatch of electricity will be followed by SLDC subject to direction of the Commission, if any.

7.2.7 The Committee shall have a secretariat of its own which will be headed by the Member Secretary of the Committee. The Member Secretary as well as other staff for the secretariat shall be provided by the STU in the manner as decided by the Committee.

7.2.8 The Committee will frame its own rules of business for the conduct of its meeting and other related matters.

7.2.9 The Committee may constitute its sub-committees as deemed necessary for its efficient functioning. It may also set up, if required, Groups/Committees of eminent experts to advise on issues of specific nature.

7.2.10 The Committee shall meet at least once in a quarter and at such other times as may be considered necessary.

7.2.11 The Committee may constitute a Transmission Metering and Protection Committee (TMPC) to issue guidance and interpretation on the Metering and Protection Code and to review and publish recommendations for any changes in accordance with the present conditions.

7.3 GRID CODE REVIEW

- (a) State Grid Code shall be reviewed by the Grid Coordination Committee at least once in every twelve (12) months.
- (b) Upon completion of such review, the Grid Coordination Committee shall send a report to the STU providing information regarding:
 - (i) outcome of the review; and
 - (ii) any proposed revisions to the State Grid Code.
 The STU shall send to the Commission, the report, referred above.
- (c) The Commission shall continue to review the HGC to make it compatible with the IEGC. In the event of any inconsistencies; the provisions of IEGC shall prevail.

7.4 PROCEDURES TO SETTLE DISPUTE

- (a) If any dispute arises with reference to the quality of electricity or safe, secure and integrated operation of the State Grid or in relation to any direction given under section 1.10 (d) of HGC, it shall be referred to the Commission for decision.
Provided that pending the decision of the Commission, the direction of the SLDC shall be complied with by the transmission licensee or user.
- (b) In the event of any dispute regarding interpretation of any provisions of HGC between any user and the STU / SLDC, the matter shall be referred to the Commission for its decision. The Commission's decision shall be final and binding. In the event of any conflict between any provision of the HGC and any contract or agreement between the users, the provision of the HGC shall prevail.

7.5 POWER TO REMOVE DIFFICULTIES

If any difficulty arises in giving effect to the provisions of these regulations, the Commission may, by general or specific order, make such provisions, not inconsistent with the provisions of the Act, as may appear to be necessary for removing the difficulty.

7.6 POWER TO AMEND

The Commission may, at anytime, vary, alter, modify or amend any provisions of these regulations.

By order of the Commission

-Sd-

Secretary

Haryana Electricity Regulatory Commission, Panchkula