JAMMU AND KASHMIR STATE ELECTRICITY REGULATORY COMMISSION

(J & K State Electricity Grid Code) REGULATIONS

Contents

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Notification

No.8/J & K SERC/2007 Jammu dated 20-11-2007

In exercise of the powers conferred by Sections 8(1) (d) and 36 of the Jammu and Kashmir State Electricity Regulatory Commission Act 2000, the Jammu and Kashmir State Electricity Regulatory Commission, makes the following Regulations:-

SHORT TITLE, COMMENCEMENT AND EXTENT OF APPLICATION

I. These Regulations may be called "Jammu and Kashmir State Electricity Regulatory Commission (J & K State Electricity Grid Code) Regulations, 2007.
II. This Grid Code is applicable for the Jammu and Kashmir State Electricity Grid only. For the inter-state transmission, Indian Electricity Grid Code shall be applicable.
III. These regulations extend to the whole of the State of Jammu and Kashmir.
IV. They shall come into force on the date of their publication in the official Gazette.

Part- I

SECTION - 1

GENERAL

1.1 Introduction

Generation, Transmission, Distribution and Supply are the main functions in an electric system. Irrespective of whether there are different wings under the control of the same management or independent companies and licensees for these functions, the quality of service rendered to the end user depends upon the function of each wing.

The J & K State Electricity Grid Code (J & K SEGC) or in short referred as State Electricity Grid Code defines the main functions connected with the Intra State

Transmission System and also lays down the rules, the guidelines and standards to be followed by the various players (agencies and participants) in the system to plan, develop, expand, maintain and operate the power system in the most efficient, reliable, safer and economic manner. J & K is connected to and utilize Inter-state transmission system (ISTS), as such is required to abide by the principles and procedures defined in Indian Electricity Grid Code (IEGC) to the extent applicable to J & K. So, this Code has been framed such that it is consistent with the IEGC and Grid Standards formulated under various regulations by Central Electricity Authority (CEA).

The State Electricity Grid code lays down the rules, guidelines and standards to be followed by all Users of the State Grid to operate and maintain an efficient and coordinated power system in the State in integration with the Northern Regional Grid as per the provisions of Indian Electricity Grid Code (IEGC). The State Electricity Grid code further lays down what is technically optimal with respect to operation and defines standards and common terms to reduce ambiguity and avoid discrimination.

The State Load Despatch Centre (SLDC) shall 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 Grid Standards and the J & K State Electricity Grid code.

1.2 Objectives

The J & K State Electricity Grid code governs the boundary between State Transmission Utility (STU) and Users as well as establishes guidelines for operation of facilities for those who are connected and will use the State Transmission System. It lays down both the information requirements and procedures governing the relationship between STU and Users. The principal objectives of the State Electricity Grid code are:

- To provide clarity and certainty to the STU, State Genco, IPPs/CPPs within J & K, Distribution Utilities/Licensees and any Open Access Consumers by stating their respective roles, responsibilities and obligations with respect to the operation of the State Transmission System.

- Planning of the State Electricity Grid and making arrangements for its operation, maintenance, development and expansion.
- Operation of Grid under normal, abnormal and emergency conditions.
- Procedures for black start, fast restart, restoration of supply after major disturbances

- ❖ To improve the grid stability and set minimum standards of system performance.
- ❖ To define requirement for new entrants i.e. future new generating companies, licensees, CPPs and consumers.
- ❖ To document the common knowledge or normal practice in writing for ease of reference and help in compliance.
- ❖ To lay down in consultation with generators, performance characteristics of generating plants.
- ❖ To improve co-operation by providing a mechanism for clear and consistent disclosure of all information.
- ❖ To provide a level playing field.
- ❖ To indicate how generation is to be scheduled and despatched.
- ❖ To actually enforce what is verbally agreed.

1.3 Scope of J & K State Electricity Grid Code

The Grid Code is designed to facilitate the development, operation and maintenance of an efficient, coordinated and economical J & K Sate Electricity Grid by specifying to STU/SLDC/transmission utilities/licensees and all the users connected to that system for their technical and procedural obligations. It seeks to be non discriminatory and to ensure that interfaces are not areas of weakness in the supply chain

1.4 Interpretation

The meaning of certain terms used in the J & K State Electricity Grid code shall be in accordance with the definitions listed in Section 2, "Definitions", of the State Electricity Grid code. Section 2 of this Code has been developed on the premise that accepted engineering terms do not require additional definitions.

The term "J & K State Electricity Grid code" means any or all parts of this document.

1.5 J & K State Grid

1) J & K State Power System operates in synchronism with Northern Regional Grid. Northern Regional Grid System consists of power systems of constituent States and Union Territory namely Haryana, Punjab, Rajasthan, Uttar Pradesh, Uttrakhand, Himachal Pradesh, Delhi, Jammu & Kashmir, Chandigarh, Railways, Inter-State Generating Stations of National Thermal Power Corporation (NTPC), National Hydro Power Corporation (NHPC), Nuclear Power Corporation (NPC), Bhakra Beas Management Board (BBMB), Satluj Jal Vidyut Nigam (SJVNL), Tehri Hydro Development Corporation Limited (THDCL), Inter-State Transmission System of Power Grid Corporation of India Limited (PGCIL) and transmission system of BBMB.

2) J & K Grid have generating stations of J & K State Power Development Corporation (SPDC) connected to State Transmission System, the distribution network of Distribution Utility/ Licensee connected to State Transmission System at various inter-connection points on 132 KV, 66 KV, 33 KV and 11 KV.

3) 400 KV Grid Diagram of Northern Region and Single line Grid Diagram of J & K are shown in NRLDC web-site www.nrldc.org and can be downloaded by the Users. The latest position of allocation of capacity to J & K in ISGS is shown on web site of NRPC and interested Users may download the same from web site.

1.6 Implementation and Operation of the J & K State Electricity Grid code

1) The date of commencement of this code shall be the date of its publication in the Govt. Gazette. The concerned Utilities/Users shall commence its implementation accordingly.

2) The connectivity criteria and other provisions of the State Electricity Grid code shall be applicable to the new Connections and equipments procured/provided for new works/ replacements from the date the State Electricity Grid code is made effective.

3) The existing connections and equipment shall continue to operate till such time the State Electricity Grid code Review Committee considers alterations necessary. However, operational aspects of the State Electricity Grid code shall have no such relaxation and shall apply with immediate effect.

4) The State Electricity Grid code shall apply to Users, STU and any future transmission licensee. The STU has the responsibility of implementing the State Electricity Grid code.

5) All Users are required to comply with State Electricity Grid code, which shall be enforced by STU. Users must provide STU reasonable rights of access; service and facilities necessary to discharge its responsibilities in the Users premises and to comply with instructions as issued by STU reasonably required to implement and enforce the State Electricity Grid code.

6) STU shall not unduly discriminate against or unduly prefer any one or any group of persons.

7) If any User fails to comply with any provision of the State Electricity Grid code, the User shall inform State Electricity Grid code Review Committee

without delay the reason for its non-compliance and shall remedy its non-compliance promptly.

8) Consistent failure to comply with the State Electricity Grid code provisions may lead to disconnection of the User's plant and /or facilities.

9) The operation of the State Electricity Grid code will be reviewed regularly by the State Electricity Grid code Review Committee in accordance with the provisions of the relevant section of the State Electricity Grid code.

1.7 Limitations of the Grid Code

1) The J & K State Electricity Grid code contains procedures to permit equitable management of day-to-day technical situations in the power system, taking into account a wide range of operational conditions likely to be encountered under both normal and abnormal circumstances. It is nevertheless necessary to recognise that the State Electricity Grid code cannot foresee all possible operational conditions.

2) Users must therefore understand and accept that STU/ SLDC/ transmission utility/ licensee in such unforeseen circumstances may be required to act decisively to discharge its obligations as well as to maintain the security of the system shall provide such reasonable co-operation and assistance as STU/ Transmission utility/ Licensee may require in such circumstances. The STU/ Transmission utility/ Licensee / SLDC shall however refer all such cases for ratification in the next meeting of the State Electricity Grid Code Review Committee.

1.8 Code Responsibilities

1) In discharging its duties under the J & K State Electricity Grid code, STU has to rely on information which Users shall supply regarding their requirements and intentions.

2) STU shall not be held responsible for any consequences that arise from its reasonable and prudent actions on the basis of such information.

1.9 Confidentiality

1) Under the terms of the J & K State Electricity Grid code, STU will receive information from Users relating to their intentions in respect of their Generation or Supply businesses.
2) STU shall not, other than as required by the State Electricity Grid code, disclose such information to any person other than Central or State Government without the written consent of the provider of the information.

1.10 Dispute Settlement Procedures

1) In the event of any dispute regarding interpretation of any part/section of the State Electricity Grid code provision between any User and STU, the matter may be referred to the Commission for its decision. The Commission's decision shall be final and binding.

2) In the event of any conflict between any provision of the State Electricity Grid code and any contract or agreement between STU and Users, the provision(s) of the State Electricity Grid code will prevail.

1.11 Communication between STU and Users:

1) All communications between STU and Users shall be in accordance with the provision of the relevant section of the State Electricity Grid code and shall be made to the designated nodal officer appointed by STU.

2) Unless otherwise specifically required by the State Electricity Grid code all communications shall be in writing, save that where operation time scales require oral communication, such communications shall be confirmed in writing as soon as practicable.

3) In case of oral communication the voice shall be recorded at SLDC and such record shall be preserved for a reasonable time to be decided by the State Electricity Grid code Review Committee.

1.12 Provision of exclusions.

The Commission may issue appropriate direction relieving the STU or any other user of the obligations to implement or comply with the J & K SEGC to the extent as may be specified in the directions.

1.13 Partial invalidity.

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

1.14 Directive

State Government may issue policy directives in certain matters. STU / SLDC/ Transmission Licensee shall promptly inform the Commission and all Users of the requirement of such directives.

1.15 Compatibility with Indian Electricity Grid Code (IEGC)

This State Electricity Grid code is consistent/compatible with the IEGC. However, in matters relating to inter-State transmission, if any provisions of the State Electricity Grid Code are inconsistent with the provisions of the IEGC, then the provisions of IEGC as approved by CERC shall prevail.

1.16 Power Development Department functioning as integrated Utility.

As long as Power Development Department (PDD) continues to function as an integrated utility, the functions of STU, SLDC and Distribution utility shall be performed by the officers authorized by PDD.

1.17 Structure of the Jammu and Kashmir Sate Electricity Grid Code: The State Electricity Grid Code is structured in 17 distinct sections as follows:

Part-I

Section-1: **General –** This section gives a brief background for the issuance of this "J & K State Electricity Grid Code-2007". It is intended to ensure that all other sections of the State Electricity Grid code work together in the management of the State Electricity Grid code.

Section-2: **Definitions -** Various terms used in the State Electricity Grid Code are defined under this section.

Section-3 **Management of Grid Code -** This section specifies the procedures for the management and review/revision of the State Electricity Grid Code.

Section-4: **Functional Responsibilities of different Entities linked with the operations of the State Electricity Grid –** This section defines the role of the various entities and their functional responsibilities so far as these relate to J & K State Electricity Grid Code.

Part-II

Planning:

Section-5: **System Planning –** This section specifies planning procedure to be adopted by the State Transmission Utility for the development of the State Transmission System and also the requisite inputs to be provided by different users to the STU in connection with the same.

Section-6: **Connection Conditions –** This section specifies the technical criteria and standards to be complied with by STU, Transmission Utilities/Licensees, the Generating utilities/Companies, the Distribution Utilities/Licensees and other Users connected or seeking connection to the Transmission System.

Part- III

Load Despatch and system operation:

Section-7: **Operation Planning system, security and outage planning –** This section specifies the process by which STU has to carry out the planning of intra state transmission system, including interface co-ordination with the Users, for the satisfactory operation of the State Electricity Grid and system integrity. Also specifies the procedure relating to the coordination of outages for scheduled maintenance of the transmission network, generating units and distribution system that will use the State Transmission System.

Section-8: **Scheduling And Dispatch –** This Section sets out the procedure to be adopted by SLDC for the scheduling and despatch of the Generating Stations to meet the demand and drawl allocations. This section also lays down the responsibilities of different users connected to the State Electricity Grid towards submission of relevant data to the SLDC for preparing these schedules.

Section-9: **Frequency And Voltage Management–** This Section specifies steps to be taken by SLDC for maintaining the System Frequency and Voltage within the limits prescribed in the IEGC and the necessary co-operation and compliance to be extended by different Users of the Transmission System in the management of the same.

Section-10: **Monitoring of Generation and drawal –** This section specifies the procedure to be followed by the State Load Despatch Center for monitoring the generation output, active and reactive reserve capacity required for evaluation of the performance of Generating Stations. The monitoring of scheduled drawal by SLDC is important for ensuring Grid discipline.

Section-11: **Contingency Planning –** This section specifies the recovery and normalization of power supply process to be followed by all the Users in the event of the failure of Jammu and Kashmir power grid, or the Northern Grid resulting in total or partial collapse of the System causing blackouts.

Section-12: **Safety and Line Clear Permits** – This section sets out the procedure to be adopted for the issuance of Line Clear Permits and safety precaution to be taken in the management for effective safety of the working personnel.

Section-13: **Inter user Boundary Safety –** This section specifies the requirements for safe working practices for maintenance of equipment associated with cross boundary operations and also the procedure to be followed when the work is carried out on electrical equipment connected to another User's System.

Section-14: **Operational Event and Incident Reporting –** This section specifies the details of minimum requirement for the exchange of information relating to Operations and/or Events on the total System including the Northern Grid which may have an operational effect.

Part-IV

Protection

Section-15: **Protection–** This section specifies basic protection requirement that shall be installed and maintained by STU/Transmission Utilities/Licensee and all other Users connected with the State Electricity Grid for safe guarding the system as well as the equipments.

Part- V

Metering

Section-16: **Transmission Metering –** This Section specifies the minimum operational and commercial metering to be provided by each User at the Connection points/Interface points including Generating Stations, Switching Stations, Sub-Stations and also at the Cross Boundary Circuits.

Section-17: **Data Registration –** This section specifies a list of all the data required by STU/Transmission Utility/Licensee which is to be provided by the Users and the data required by the Users to be provided by the STU/ Transmission Utility/ Licensee at the required time specified in the various sections of the State Electricity Grid Code.

SECTION - 2

DEFINITIONS

In the Grid Code the following words and expressions shall, unless the subject matter or context otherwise requires or is inconsistent therewith, bear the following meanings:

Act	"Act" means the Jammu and Kashmir State Electricity Regulatory Commission Act 2000.
Active Energy	'Active Energy' means the electricity supplied or consumed during a time interval, being the integral of Active Power with respect to time, measured in the units of 'Watt – hours' or standard multiples thereof. One 'kilowatt – hour' (kWh) is one unit;
Active Power	'Active Power' means the electrical power, being the product of root mean square (rms) voltage, root mean square (rms) current and cosine of the phase angle between the voltage and current vectors and measured in units of 'Watt' (W) or in standard multiples thereof;
Apparatus	All the electrical apparatus like machines, fittings, accessories and appliances in which electrical conductors are used.
Apparent Power	The product of voltage and alternating current measured in units of volt-amperes and standard multiples thereof, i.e., 1000 VA = 1 kVA 1000 kVA = 1 MVA
Area Load Despatch Centre	Station in J & K State being established under Northern Region System Unified Load Despatch Scheme, with as main functions of Data acquisition and transfer to SLDC; and supervisory control of load centre in their respective area
Area of supply	Area within which a Distribution Licensee is authorised by his License to supply Electricity
Automatic Voltage Regulator (AVR)	A continuously acting automatic excitation control system to control a Generating Unit terminal voltage.
Availability Based Tariff	'Availability Based Tariff (ABT)' means a tariff structure based on availability of generating units and having components, viz, Capacity Charges (CC), Energy Charges (EC) or Variable Charges (VC) and charges for Unscheduled Interchange (UI);
Backing Down	Reduction of generation on instructions from SLDC/NRLDC by a Generating Unit under abnormal conditions.
Black Start procedure	The process of recovery from a total or partial blackout of the State Transmission System.

Break Down	An occurrence relating to equipment of supply system which prevents its normal functioning
Black Start Stations	Generating Stations having Black Start Capability.
BIS	The Bureau of Indian Standards.
Captive Power Plant (CPP)	For the purpose of Grid Code, a Power Station that is primarily operated to meet a captive demand and is connected to State Transmission System but not supplying power to the Grid under normal circumstances.
Caution Notice	A notice conveying a warning against interference.
CBIP	Central Board of Irrigation and Power.
Central Generating Station (CGS)	Power Station which is owned and or controlled by central Government
CEA	Central Electricity Authority.
(CTU)	Central Transmission Utility
Commission	"Commission" means Jammu and Kashmir State Electricity Regulatory Commission.
Connection	The electric power lines and electrical equipment used to effect a connection of a User's System to the Transmission System.
Connection Point/ Interface Point	An electrical point of connection between the Transmission System and the User's System.
Consumer	"Consumer" means any person who is supplied with electricity for his own use by a utility/licensee or the Government or by any other person engaged in the business of supplying electricity to the public under the J & K Electricity Act of Svt 1997 or any other law for the time being in force and includes any person whose premises are for the time being connected for the purpose of receiving electricity with the works of a utility/licensee, the government or such other person, as the case may be;
CERC	Central Electricity Regulatory Commission
Control Person	A person identified as having technical capability and responsibility for cross boundary safety under the section "Cross Boundary Safety" of the Grid Code.
Data acquisition system (DAS)	A device provided to record the sequence of operations in time, of the relays/equipments/ system parameters at a location.
Demand	The demand in MW and MVA of electricity (i.e. both Active and Apparent Power), unless otherwise stated.
Despatch Instructions	An instruction by SLDC to SSGS (other than CPP) to despatch generation and to Distribution Utility/Licensee to regulate drawal in accordance with the Scheduling & Despatch procedure of Grid Code.
De-Synchronize	The act of taking a Generating Unit off a system to which it has been Synchronized.

Disconnection	The physical separation of Users or Consumers from the System.
Distribution Licensees	A Licensee authorized to operate and maintain a Distribution System for supplying electricity to the Consumers in his Area of Supply.
Distribution System	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.
Drawal	The import/export of electrical energy from/to the grid.
Earthing	Connecting the conducting parts of an equipment or machinery with the general mass of earth, in such a manner ensuring at all times an immediate discharge of energy without danger, by maintaining the same efficiently at earth's potential.
Earthing Device	A means of providing connection between a conductor and earth being of adequate strength and capability.
Extra high voltage (EHV)	Nominal voltage level of higher than 33,000 volts.
Exciter	The source of electrical power providing the field current of a synchronous machine.
Forced Outage	An Outage of a SSGS or any of Power Station Equipment, generally due to sudden failure of one or more parts of equipment at a generating station, of which no notice can be given by the Generator to STU and also include outage of transmission line and any substation equipment of which no notice can be given by STU or transmission licensee to Distribution Utility/Licensee or vice versa.
Frequency	The number of alternating current cycles per second (expressed in Hertz) at which the system is operating.
Generating Company	Any company or body corporate or association or body of individuals, whether incorporated or not, or artificial juridical person, which owns or operates or maintains a Generating Station.
Generating Station	Any station for generating electricity, including any building and plant with step-up transformer, switchyard, switch gear, cables or other appurtenant equipment, if any used for that purpose and the site thereof, a site intended to be used for a generating station, and any building used for housing the operating staff of a generating station, and where electricity is generated by water – power, includes penstocks, head and tail works, main and regulatory reservoirs, dams and other hydraulic works, but does not in any case include any substation.
Generating Unit	The combination of an electric power generator and its prime mover and all of its associated equipment, which together constitutes a single generating machine
Generation	The despatch schedule of a Generating Station.

Schedule	
Generator Capability Curve	A diagram, which shows the MW and MVAR capability limits within which a Generating Unit will be expected to operate under steady state conditions.
Grid	High Voltage backbone system of inter-connected Transmission Lines, Substations and Generating Stations.
Grid Code	"J & K State Electricity Grid Code" - a document describing the procedures and the responsibilities for planning and operation of J & K Grid.
Grid Disturbance	Grid Disturbance is the situation where disintegration and collapse of grid either in part or full take place in an unplanned and abrupt manner, affecting the power supply in a large area of the region.
Good Utility practices	Any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period which could have been expected to accomplish the desired results at a reasonable cost consistent with good business practices, reliably, safely and with expedition
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 a free governor action to change its output from zero to full load
High Voltage (HV)	Nominal Voltage level higher than 650 volts but less than 33,000 volts.
IEC	International Electro-Technical Commission
IEC Standard	A standard approved by the International Electro-Technical Commission.
IEEE	Institution of Electrical and Electronic Engineers, Inc., USA.
IEGC	Indian Electricity Grid Code.
Indian Standards ("IS")	Standards and specifications approved by the Bureau of Indian Standards.
Inter-State Generating Station (ISGS)	A Generating Station in which two or more than two States have a share and whose scheduling is to be coordinated by Regional Load Despatch Centre.
Inter-State Transmission System (ISTS)	Inter-state Transmission System includes: (a) Any system for the conveyance of electricity by means of a main Transmission Line from the territory of one State to another State; (b) the conveyance of electricity across the territory of an intervening State as well as conveyance within a State, which is incidental to such inter-state transmission of electricity. (c) The transmission of electricity within the territory of a State built, owned, operated, maintained or controlled by the Central Transmission Utility.

Interconnecting Transformer (ICT)	Transformer connecting EHV lines of different voltage systems.
Intertripping	(a) The tripping of circuit-breaker(s) by commands initiated from Protection at a remote location independent of the state of local Protection; or (b) Operational intertripping.
Intra-state Transmission System	Any system for transmission of electricity other than an Inter-State Transmission System.
Isolation	The disconnection of EHV/ HV Apparatus from the remainder of the System in which that EHV/ HV Apparatus is situated.
J & K SERC	Jammu & Kashmir State Electricity Regulatory Commission.
J&K SEGC	Jammu & Kashmir State Electricity Grid code.
Lean Period	That period in a day when the electrical power demand is lowest.
Licensee	"Licensee" means a person licensed under part-II of the Jammu and Kashmir Electricity Act, 1997 (Act No. XIV of 1997 Svt./1940 AD) to supply energy or a person who has obtained sanction under 28 of that Act to engage in the business of supplying energy;
Load	The Active, Reactive or Apparent Power as the context requires, generated, transmitted or distributed.
Load Crash	Sudden or rapid reduction of electrical load connected to a system that could be caused due to tripping of major transmission line(s), feeder(s), power transformer(s) or natural causes like rain etc.
Low Voltage (LV)	Nominal voltage not exceeding 250 volts under normal conditions subject however to the permissible variations.
Merit Order Operation	Priority order of various generating units under ISGS/ SSGS, operating in synchronism with Western Grid System, compiled by SLDC pursuant to schedule and despatch requirements, generally in ascending order of cost of energy.
Medium Voltage (MV)	Nominal voltage not exceeding 650 volts under normal conditions subject however to the permissible variation.
Maximum Continuous Rating (MCR)	The normal rated full load output capacity of a generating unit, which can be sustained on a continuous basis at specified conditions.
NREB	Northern Regional Electricity Board.
NRLDC	Northern Regional Load Despatch Centre
NRPC	Northern Regional Power Committee
National Grid	The entire interconnected electric power network of the country, which would evolve after interconnection of regional grids.

NPC	Nuclear Power Corporation Limited
NTPC	National Thermal Power Corporation Limited
Open Access	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 Commission
Open Access Customer	Open Access Customer means a consumer permitted by the Commission to receive supply of electricity from a person other than distribution licensee of his area of supply, and the expression includes a generating company and a licensee, who has availed of or intends to avail of open access.
Operating Margin	Aggregate available capacity of Generating Station in the system on real time basis, which is over and above the operating level to the maximum capacity of the Generating Units limited by technical parameters for short duration.
Operation	A scheduled or planned action relating to the operation of a System.
Operational Procedures	Management instructions and procedures, both for the Safety Rules and for the local and remote operation of plant and Apparatus, issued in connection with the actual operation of plant and/or Apparatus at or from a connecting site.
Out of Synchronism	The condition where a System or Generating Unit can not meet the requirements to enable it to be Synchronised.
Outage	
Part Load	The condition of a Generating Station which is loaded but is not running at its declared availability.
Peak Period	That period in a day when the electrical power Demand is highest.
Person	Any company or body corporate or association or body of individuals, whether incorporated or not, or artificial juridical person.
PGCIL	Power Grid Corporation of India Limited.
Planned Outage	An outage of Generating Plant or part of the Transmission System, or part of a User's system co-ordinated by SLDC/in advance in terms of the timing of the same.
Power Station	An installation of one or more Generating Units (even when sited separately) owned and/or operated by the same SSGS and which may reasonably be considered as being managed as a single integrated generating complex.
Power Factor	The ratio of Active Power (kW) to Apparent Power (KVA) i.e cosine of the electrical angle between the voltage and current vectors in an AC electrical circuit.
Premises	Any land, building or structure

Reactive Power	'Reactive Power' means the product of root mean square (rms) voltage, root mean square (rms) current and the sine of the electrical phase angle between the voltage complexor and current complexor, measured in 'Volt – ampere reactive' (VAr) and in standard multiples thereof;
Reactive Energy	'Reactive Energy' means, the integral of Reactive Power with respect to time and measured in the units of 'Volt-Ampere hours reactive (VARh) or in standard multiples thereof;
RLDC	Regional Load Despatch Center.
Regional Power Committee	Committee established by resolution by the Central Government for a specified region for facilitating the integrated operation of the power system in the region.
SLDC	State Load Despatch Centre.
Standing Instructions	An instruction issued by SLDC to a Generating Company whereby, in specified circumstances, the Generating Company should take specified action, as though a valid dispatch instruction has been issued by SLDC.
Start-Up	The action of bringing a Generating Unit from shutdown to synchronous speed.
State Transmission Utility (STU)	"State Transmission Utility" means The Utility or any Government Company specified as such by the State Government.
State Electricity Grid Code	"J & K State Electricity Grid Code" - a document describing the procedures and the responsibilities for planning and operation of J & K Grid.
Substation	Station for transforming or converting electricity for the transmission or distribution thereof and includes transformers, converters, switchgears, capacitors, synchronous condensers, structures, cable and other appurtenant equipment and any buildings used for that purpose and the site thereof.
Supervisory Control and Data Acquisition or (SCADA)	The communication links and data processing systems, which provide information to enable implementation of requisite supervisory and control actions.
Supplier	'Supplier' means any generating company or licensee from whose system electricity flows into the system of another generating company or licensee or consumer;
Synchronized	Those conditions where an incoming Generating Unit or System is connected to the bus bars of another System so that the frequencies and phase relationships of that Generating Unit or System as the case may be, and the System to which it is connected are identical.

System	Any Transmission and Distribution System and/or Transmission System, as the case may be.
Transmission Licensee	A Licensee authorised to establish and operate transmission lines.
Transmission Line	All high pressure cables and overhead lines (not being an essential part of the distribution system of a Licensee) transmitting electricity from a Generating Station to another Generating Station or a Substation, together with any step-up and step-down transformers, switch-gear and other works necessary to and used for the control of such cables or overhead lines, and such buildings or part thereof as may be required to accommodate such transformers, switch-gear and other works
Transmission System	The system consisting of high pressure cables and overhead lines of Transmission Licensee for transmission of electrical power from the Generating Station up to Connection Point/ Interface Point with the Distribution System. This shall not include any part of the Distribution System.
User	A term utilised in various sections of Grid Code to refer to the persons using the J & K Grid, as more particularly identified in each section of the Grid Code and who must comply with the provisions of the J & K SEGC.
NRLDC	Northern Regional Load Despatch Centre.

Words and expressions used and not defined in this Code shall have the meanings assigned to them in the J & K State Electricity Act Svt 1997 or the J & K Electricity Duty Act 1963 or the J & K State Electricity Regulatory Commission Act 2000. Expressions used herein but not specifically defined in this Code or in these said Acts but defined under any law passed by a competent legislature and applicable to the electricity industry in the state shall have the meaning assigned to them in such law. Subject to the above, expressions used herein but not specifically defined in this Code or in these Acts or any law passed by a competent legislature shall have the meaning as is generally assigned in the electricity industry.

INTERPRETATION

In the interpretation of this Code, unless the context otherwise requires:

- words in the singular or plural term, as the case may be, shall also be deemed to include the plural or the singular term, respectively;
- the terms "include" or "including" shall be deemed to be followed by "without limitation" or "but not limited to" regardless of whether such terms are followed by such phrases or words of like import;
- references herein to the “code" shall be construed as a reference to this code as amended or modified by the J&KSERC from time to time in accordance with the applicable laws in force.

- the headings are inserted for convenience and may not be taken into account for the purpose of interpretation of this Code.
- references to any statutes, regulations or guidelines shall be construed as including all statutory provisions consolidating, amending or replacing such statutes, regulations or guidelines, as the case may be, referred to.

SECTION 3

MANAGEMENT OF THE STATE ELECTRICITY GRID CODE

3.1 Introduction

1) This section specifies the section to be followed by STU in managing the State Electricity Grid code and also in pursuing any change.
2) STU is required to implement and comply with the State Electricity Grid code and periodically review the same and its implementation. For periodic review and amendments of this code, State Electricity Grid Code Review Committee, as per sub-regulation 3.4, shall be constituted.

3.2 Objective

The objective of this procedure is to define the method of managing the State Electricity Grid Code, submitting and pursuing of any proposed change to it and the responsibilities of all Users to effect that change.

3.3 Responsibilities

1) STU shall be responsible for managing and servicing the State Electricity Grid code.
2) STU shall establish and service the requirements of the State Electricity Grid code Review Committee in accordance with provisions of section 3.5 of the State Electricity Grid code.
3) All users of the Grid shall be responsible to comply with the provisions of the State Electricity Grid code.

3.4 State Electricity Grid Code Review Committee

1) The State Electricity Grid code Review Committee shall be chaired by the, Head of STU (Presently STU is headed by Development Commissioner Power) and shall consist of the following members:

    a) Head of STU - Chairman
    b) Executive Director of State PDC- Member
    c) Chief Engineer, System and Operation, Wing Jammu - Member
    d) Chief Engineer, System and Operation, Wing Srinagar.- Member
    e) Chief Engineer, M & RE Wing, Jammu-Member
    f) Chief Engineer, M & RE Wing, Srinagar-Member
    g) Chief Engineer, Commercial and Survey- Member/Secretary and Convener.
    h) Chief Engineer, Planning and Design- Member.
    i) One representative of IPP/CPP – Member

j) One representative from NRPC. - Member
k) One representative from NRLDC - Member
l) One representative from J & K SERC- Member

Note: Notice of the meeting would be served to all the members. However, the minimum quorum to review any of the regulations of the Grid Code shall be of seven members including Chairman of the committee.

2) STU shall inform all Users of the names and addresses of the Chairman, Member Secretary and other members of the committee immediately after approval of the State Electricity Grid Code, and shall inform Users in writing of any subsequent changes.

NRPC, NRLDC, shall inform the Committee Member Secretary of the name and designation of their representative and shall also inform the Committee Member Secretary, in writing, of any subsequent change.

3.5 State Electricity Grid Code Review Committee Proceedings

1) The Rules to be followed by the Committee in conducting their business shall be formulated by the Committee itself and approved by the Commission. The Committee shall meet at least once in three months.

2) The functions of the State Electricity Grid Code Review Committee shall be as follows:

a) Facilitating the implementation of these Regulations and 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 procedures developed under the provisions of these Regulations.
c) To propose any revision, if necessary, in the State Electricity Grid Code consequent to analysis report on major grid disturbance soon after its occurrence. The recommendations of the Committee shall be submitted to the Commission for approval and issue of directives to the Users for taking necessary remedial measures, as may be deemed fit, to prevent recurrence.
d) To consider all requests for amendment to the State Electricity Grid Code as may be made by the Users.
e) To issue guidance on the interpretation and implementation of the State Electricity Grid Code.
f) To examine problems raised by the Users.
g) Any other work which the Commission may assign from time to time.

3) Sub-meetings may be held by STU with a User to discuss individual requirements and with groups of Users to prepare proposals for the Committee meeting. The Committee may set up sub committees for detailed studies of related problems.

3.6 State Electricity Grid Code Review and Revisions

1) STU shall, in consultation with Users and NRPC and such other persons as the Commission may direct, at least once in a year, or earlier if required by the Commission, review the State Electricity Grid Code and its implementation.
2) The Commission shall reserve the right to review the State Electricity Grid Code as and when required.
3) The Member Secretary shall present all proposals for revisions of the State Electricity Grid Code to the Committee for its consideration.
4) Proposals for all revisions in the State Electricity Grid Code shall be finalized by consensus in the meeting of State Electricity Grid Code Review Committee with majority of members voting. In the event of no consensus being reached, the matter shall be referred to the Commission for decision. All proposals for revisions in the State Electricity Grid Code shall be submitted to the committee for approval.
5) In any unusual situation where normal day-to-day operation is not possible without revision of some section(s) of the State Electricity Grid Code, a provisional revision may be implemented before approval of the Commission is received, but only after discussions at a special meeting of State Electricity Grid Code Review Committee convened on emergency basis. The Commission shall be intimated at the earliest but not later than 15 days about the provisional revision by recorded means of communication.
6) The changes/revisions proposed by the State Electricity Grid Code Review Committee shall be consistent/ compatible with IEGC.
7) The Commission may issue directives requiring STU to revise, supplement or replace the State Electricity Grid Code in such manner as may be specified in those directives and STU shall forthwith comply with any such directives.
8) STU shall send to the Commission following reports at the conclusion of each review meeting of the Committee.

    i. A report on the outcome of such a review;
    ii. Any proposed revisions to the State Electricity Grid Code along with justification there for.

9) All revisions to the State Electricity Grid Code shall require the approval of the Commission.
10) After approval by the Commission, STU shall convey to all concerned, the revisions to the State Electricity Grid Code and the same shall be incorporated in the subsequent version of the State Electricity Grid Code Regulations.

3.7 Functional Committees

1) The State Electricity Grid Code Review Committee shall constitute following functional committees for implementation of the State Electricity Grid code:

    a) System Planning: Transmission Planning Committee (TPC)
    b) System Operation: Operation and Co-ordination Committee (OCC)
    c) Protection: Protection Co-ordination Committee (PCC)
    d) Energy Accounting & Metering: Commercial & Transmission Metering Committee (CTMC)

2) The State Electricity Grid Code Review Committee can formulate any other operational committee as it deems fit for the implementation of the State Electricity Grid Code.

3) The State Electricity Grid Code Review Committee shall nominate the members of the functional committees. Chairman and Member Secretary of the functional committees shall be from STU.

1. Transmission Planning Committee (TPC)

Transmission Planning Committee shall coordinate the implementation of the provisions under the section System Planning (Part II) to ensure system planning coordination for the state as a whole.

TPC shall comprise of Chief Engineer level members to be nominated by the State Electricity Grid Code Review Committee, which shall meet at least once every three months and deliberate on all technical and operational aspects of system Planning and shall give their recommendations to the State Electricity Grid code Review Committee.

The rules to be followed by the committee in conducting their business shall be formulated by the committee itself and shall be approved by the State Electricity Grid code Review Committee.

The committee shall perform the following functions:

i. Co-ordination of system planning, execution of works, maintenance schedule and contingency plan to ensure adequate transmission and distribution system
ii. Review of existing interconnection equipment for alteration, if necessary, so as to comply with the Connection Conditions provided for in the State Electricity Grid code.

iii. Review the load forecast and the methodology and assumptions made by Users.
iv. Review and finalise the proposals identified on the basis of planning studies.
v. Any other work which STU may assign from time to time.

2. Operation and Co-ordination Committee (OCC)

Operation and Co-ordination Committee shall coordinate the implementation of Load Despatch & System Operation (Part III) to ensure that respective Generators and Distribution Companies using State Transmission System discharge their obligations under the State Electricity Grid Code.

OCC shall comprise of Chief Engineer level members to be nominated by the State Electricity Grid Code Review Committee from each Distribution Utility/ Licensee, STU and J&K SPDC, which shall meet every month and deliberate on all technical and operational aspects of Load Despatch and System Operation and shall give their recommendations to the State Electricity Grid code Review Committee.

The rules to be followed by the committee in conducting its business shall be formulated by the committee itself and shall be approved by the State Electricity Grid code Review Committee.

The committee shall perform the following functions:

i. Review the reactive compensation in the State Transmission System.
ii. Review the load shedding mechanisms.
iii. Review and analyse the grid disturbances and system restoration procedure
iv. Finalisation, review and amendment of Outage Plan of State Transmission System
v. Deliberate and prepare the Under Frequency Load Shedding Schemes and the mechanism to be adopted for the same for various sub-stations to ensure that the frequent tripping of same feeder is avoided.
vi. Review the installation of Disturbance Recorders, Event Loggers in the State Transmission System.
vii. Any other work which STU may assign from time to time

3. Protection Co-ordination Committee (PCC) - Protection Co-ordination Committee shall coordinate the implementation of the provisions contained in the section Protection (Part IV) to ensure that respective Users using State Transmission System discharge their obligations under this section of the Electricity Grid Code .

Protection Co-ordination Committee shall comprise of Chief Engineer level members to be nominated by the State Electricity Grid code Review Committee, which shall meet once every three months and shall give their recommendations to the State Electricity Grid Code Review Committee.

The rules to be followed by the Protection Co-ordination Committee in conducting its business shall be formulated by the committee itself and shall be approved by State Electricity Grid Code Review Committee. The committee shall perform the following functions.

i. Keep provisions contained in protection section and their implementation under scrutiny & review and to ensure compliance thereof;
ii. Consider all requests for amendment to the Protection section which any User makes;
iii. Create awareness about various issues related to the Protection Section.
iv. Deliberate and decide various protection settings, testing procedure and periodicity.
v. Review and specify the minimum protection requirements for the User's system connected to the State Transmission System.
vi. Deliberate and decide regarding up gradation of protection schemes and necessary switchgear equipments.
vii. Review and analyse the failure of protection system in case of major grid disturbance and recommend modifications and improvements.
viii. Any other work which STU may assign from time to time.

4. **Commercial & Transmission Metering Committee (CTMC)** - Commercial & Transmission Metering Committee shall coordinate the implementation of the provision contained in the Transmission Metering section. The committee shall also be responsible for coordinating the preparation of state energy account in accordance with the provisions of the State Electricity Grid code.

The committee shall comprise of Chief Engineer level members to be nominated by the State Electricity Grid code Review Committee, which shall meet every month.

The rules to be followed by the Commercial & Transmission Metering Committee in conducting its business shall be formulated by the committee itself and shall be approved by the State Electricity Grid code Review Committee.
The committee shall perform the following functions.

i. Commercial and Transmission Metering committee shall coordinate the implementation of the provision contained in the section

Transmission Metering to ensure that the respective users using state transmission system discharge their obligations under this section of the State Electricity Grid code.

ii. Consider request(s) for amendments to the Metering which any User makes.

iii. Create awareness about various issues related to Metering.

iv. Review deviations in the existing CTs and PTs/CVTs from the minimum specifications prescribed in the State Electricity Grid code and up gradation/ replacement of the same within two years of coming into effect of the State Electricity Grid Code.

v. Deliberate and decide the issues relating to the monthly energy account and settlement of dispute prepared by SLDC.

vi. Resolve any energy accounting and settlement of disputes arising out of metering failure.

vii. Review and amend, if necessary, the methodology and principles for maintaining State Energy Accounts.

viii. Any other work which STU may assign from time to time.

3.8 Non-Compliance & Derogation

1) If any User fails to comply with any of the provision(s) of the State Electricity Grid Code, the User shall inform STU without delay of the reason for its non-compliance and shall remedy its non-compliance promptly.
2) Wrong declaration of capacity, non-compliance of SLDC's load despatch instructions, non-compliance of SLDC's instructions for backing down without adequate reasons, non-furnishing of data etc. shall constitute non-compliance of State Electricity Grid Code and shall be subject to financial penalty as may be decided by the Commission.
3) Consistent failure to comply with the State Electricity Grid Code may lead to disconnection of the User's plant and/or facilities.
4) Derogation, if any, for any particular section or chapter of the State Electricity Grid code shall be with the express permission of the Commission for a specified time. Derogation of any requirement of the State Electricity Grid code shall be exception and not the norm, and will be allowed only when it is impossible and not just difficult or inconvenient for the User to comply with in the required time-scale. Failure to comply with fixed-time derogation by any User shall carry a financial penalty as shall be decided by the Commission while allowing derogation.

3.9 Power to Remove Difficulties

If any difficulty arises in giving effect to any provision of this Code, the Commission may by general or special order, direct the State Transmission Utility, State Load Despatch Centre, Generators, CPPs, Licensees and the Open Access Customers, to take such action as may appear to the Commission to be necessary or expedient for the purpose of removing difficulties.

SECTION-4

FUNCTIONAL RESPONSIBILITIES OF DIFFERENT ENTITIES LINKED WITH THE OPERATIONS OF STATE ELECTRICITY GRID.

4.1 Introduction

To facilitate development of smooth operation of State Electricity Grid and the Regional Grid, it is necessary to know the role of State Transmission Utility (STU), State Load Despatch Centre (SLDC), Regional Load Despatch Centre (RLDC), Transmission Licensees, Regional Power Committees, the CEA, the Central Transmission Utility (CTU), J & K State Electricity Regulatory Commission, Govt. of Jammu & Kashmir etc. and their organizational linkages.

In J & K, Power Development Department (PDD) which is a department of the Govt. of J & K is functioning as an integrated Utility encompassing the functions of STU, SLDC, Transmission Licensee and Distribution Licensee.

This chapter defines the functions of the various organizations so far as it relates to State Electricity Grid code.

(A) Role of State Transmission Utility (STU):

The STU plays a key role in the entire system by control and authority over the entire power transmission highway. The STU shall:-

(a) Be responsible to undertake transmission of electricity through Intra State Transmission System.

(b) Discharge all functions of planning and coordination relating to intra state transmission system with
   i. Central Transmission utility
   ii. State Government
   iii. Generating Stations
   iv. Regional Power Committee
   v. Central Electricity Authority
   vi. All Licensees
   vii. Any other person notified by the State Government in this behalf

(c) Ensure development of an efficient, coordinated and economical system of intra state transmission lines for smooth flow of electricity from a generating station to the load centers.

(d) Provide non-discriminatory open access to its transmission system as per Open Access Regulations approved by the Commission.

(e) STU shall not engage in the business of trading of electricity

(B) Role of State Load Despatch Center (SLDC)

The SLDC shall be the apex body to ensure integrated operation of the power system in the State. The 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 the State.
b. Monitor J & K State Grid operation;
c. Keep accounts of the quantity of electricity transmitted through the State Grid;
d. Exercise supervision and control over the intra state transmission system; and
e. Be responsible for carrying out real time operations for Grid control and despatch of the electricity within the State through secure and economic operation of the J & K State Grid in accordance with the Grid standards and this Code.
f. Not engage in the business of trading in Electricity.
g. The SLDC may levy and collect such fee and charges from the generating companies and licensees engaged in intra state transmission of electricity as may be specified by the Commission.
h. SLDC may give such directions and exercise such supervision and control as may be required for ensuring the integrated Grid operation and for achieving the maximum economy and efficiency in the operation of the power system.
i. Every licensee, generating company, generating station, substation and any other person connected with the operation of the power system shall comply with the direction issued by the SLDC.

(C) Role of Transmission Licensees

Every Transmission Licensee shall comply with such technical standards of operation and maintenance of transmission lines, in accordance with this Code, Grid Standards, as may be specified by the Central Electricity Authority and the Indian Electricity Grid Code as applicable to the Intra State Transmission System. It shall be the duty of the transmission licensee

a. To maintain and operate the transmission system which are licensed to him in the intra state transmission system and comply with the directions of RLDC and SLDC as the case may be
b. Provide non discriminatory open access, in accordance with Open Access Regulations to its transmission system for use by any licensee or generating company or other users on payment of the charges as determined by the Commission

(D) Role of Regional Load Despatch Centre (RLDC):

The RLDC is the apex body to ensure integrated operation of the power system within the concerned regional grid. In respect of wheeling, optimum scheduling and despatch of electricity, the RLDC shall comply with the principles, guidelines and methodology as specified by the CERC. The RLDC may give such directions and exercise such supervision and control as may be required for ensuring integrated grid operations and for achieving the economy and the efficiency in the operation of the power system in the region under its control. Every licensee including transmission licensee, distribution licensee, STU, generating company, and any other person connected with the operation of power system shall comply with the direction issued by RLDC. All directions issued by the RLDC to any STU or any other licensee of the State or generating company or substation in the State shall be issued through SLDC and SLDC shall ensure that such directions are duly complied with by the licensee or generating company or substation.

(E) Regional Power Committee (RPC)

Regional Power Committee, established by Government of India for the region may, from time to time, issue guidelines on matters concerning the stability and smooth operation of the Grid and economy and efficiency in the operation of the power system in that region. Such directions shall be binding on all the entities covered by this Code and to the extent they are applicable to the intra state transmission system and State Electricity Grid.

(F) Central Electricity Authority (CEA):

Central Electricity Authority may make regulations, which may provide for the following matters.

- Grid Standards.
- Measures relating to safety of Electric Supply
- Installation and operation of meters
- Technical standards for the construction of electrical plants, electric lines and connectivity to the Grid and other matters
- The form and manner in which and time at which the State Government and the licensee shall furnish statistics and return and other information.

Irrespective of whether the provisions under the regulations stated above are explicitly provided for or not in this Code, the said regulations and standards shall be binding on all the entities covered by this Code provided these are not inconsistent with J & K Laws and this code.

(G) Role of Central Transmission Utility (CTU):

Power Grid Corporation of India Limited (PGCIL) is the Central Transmission Utility as notified by Government of India. CTU is responsible for the entire inter state transmission and in that context, the relevance of this Code shall be limited to the connectivity between the intra state transmission system and the inter- state transmission system.

(H) Jammu and Kashmir State Electricity Regulatory Commission (J & K SERC)

The functions of J & K SERC with relevance to J & K SEGC are:

i. To determine the rate, charges and terms for the use of the transmission facilities of Licensees/Utilities
ii. To specify the fees and charges payable to SLDC
iii. To resolve any dispute that has arisen with reference to the quality of electricity or safe, secure and integrated operation of the State Grid or in the relation to any direction given by the SLDC.
iv. To issue amendments to the J & K SEGC as and when required.

(I) Government of Jammu and Kashmir

Government may issue directions to SLDC(through PDD as long as it is functioning as an integrated utility) to take measures as may be necessary for maintaining smooth and stable transmission and supply of electricity. SLDC shall abide by such directions if they are not inconsistent with the provisions of the various J & K Electricity Acts and this Code.

Part-II

SECTION 5

SYSTEM PLANNING

5.1 Introduction

1) This section specifies the procedure to be applied by STU in planning and development of the State Transmission System. This section also specifies the method for data submissions by Users to STU for planning and development of the State Transmission System.

2) A requirement for reinforcement or extension of the State Transmission System may arise for a number of reasons, including but not limited to the following:
   - (i) Development on a User's system already connected to the State Transmission System.
   - (ii) The introduction of a new Connection point between the User's system and the State Transmission System.
   - (iii) Evacuation system for Generating Stations within or outside the State.
   - (iv) Reactive Compensation.
   - (v) A general increase in system capacity (due to addition of generation or system load) to remove operating constraints and maintain standards of security.
   - (vi) Transient or steady state stability considerations.
   - (vii) Cumulative effect of any of the above.

3) Accordingly, the reinforcement or extension of the State Transmission System may involve work at an entry or exit point (Connection point) of a User to the State Transmission System. Since development of all User's systems must be planned well in advance to permit consents and way leaves to be obtained and detailed engineering design/construction work to be completed, STU will require information from Users and vice versa. To this effect, the planning imposes time scale, for exchange of necessary information between STU, and Users having regard, where appropriate, to the confidentiality of such information.

5.2 Objective

The provisions of this section are intended to enable STU to produce a plan in consultation with Users, to provide an efficient, coordinated, secure and economical State Transmission System to satisfy requirement of future demand. The system planning therefore:

1) Defines the procedure for the exchange of information between STU and a User in respect of any proposed User development on the User's system, which may have an impact on the performance of the User.
2) Details the information which STU shall make available to Users in order to facilitate the identification and evaluation of opportunities for use of or connection to State Transmission System;
3) Details the information required by STU from Users to enable STU to plan the development of its Transmission System to facilitate proposed User developments;
4) Specifies planning and design standards, which will be applied by STU in planning and development of the power system.

5.3 Transmission System Planning

1) STU would develop a perspective transmission plan for the next 10 years for State Transmission System, which shall be updated every year to take care of the revisions in load projections and generation capacity additions. The perspective plans shall be submitted to Commission for approval.

2) STU shall carry out annual planning process corresponding to a 5 year forward term for identification of major State Transmission System, which shall fit into National Electricity Plan plan prepared by CTU and perspective long term plan developed by CEA.

3) STU shall follow the following steps in planning:
   (i). Forecast the demand for the next 10 years for power within the Area of Supply, based on the forecasts provided by Distribution Utility/ 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.
   (ii). Prepare a proposal for 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.
   (iii). 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.
   (iv). STU shall carry out reactive power planning exercise in consultation with NRLDC/NREB, Distribution Utility/ Licensee, for installation of reactive compensation equipment by STU & Distribution Utility/ Licensee, from time to time.

v) The transmission system plan shall describe the plan for the Intra-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, Static VAR Compensators and Flexible Alternating Current Transmission Systems:

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.

(vi). STU's planning department shall use load flow, short circuit, and transient stability study, relay coordination study and other techniques for transmission system planning.

(vii). STU's planning department shall simulate the contingency and system constraint conditions for the system for transmission system planning.

(viii). 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.

(ix) The STU would coordinate with the CTU for eliminating transmission constraints in a cost effective manner.

(x). STU shall be responsible to prepare and submit a long-term (10 years) plan to the Commission for the requirement of generation expansion and transmission system expansion to meet the future demand growth.

4) All the Users shall supply to STU, the planning data prescribed in Appendix-A and Appendix-B of data registration section within 6 months from the effective date of the J & K Electricity Grid Code and there after such data shall be furnished by 31st March every year to enable STU to formulate and finalise the plan by 30th September each year for the next 5 years.

5) The State Transmission Utility shall, also submit its investment plan based on the identified intra-State transmission schemes and system strengthening schemes projected in the transmission system plan.

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 State Transmission Utility.

5.4 Planning Standards and procedures.

1) The planning criterion shall be based on the security philosophy on which the Intra State Transmission System has been planned. The security philosophy may be as per the Transmission Planning Criteria and other guidelines as given by the Authority. Provided that State Transmission Utility shall carry out appropriate system studies while developing the transmission system plans.

2) The intra-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 110kV/132kV D/C line or,
(ii) Outage of a 220kV D/C line or,
(iii) Outage of a 400kV S/C line or,
(iv) Outage of a single Interconnecting Transformer or,
(v) Outage of a one pole of HVDC Bipole line or,
(vi) Outage of a 765kV S/C line.

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

3) All the Generating Units may operate within their reactive capability curves and the network voltage profile shall be maintained within voltage limits specified.

4) The intra-State transmission system shall be capable of withstanding the loss of most severe single in -feed without loss of stability.

5) Any one of the events defined in the Regulation 5.4-2) above shall not cause:
   (i) Loss of supply;
   (ii) Prolonged operation of the system frequency below and above specified limits;
   (iii) Unacceptable high or low voltage;
   (iv) System instability;
   (v) Unacceptable overloading of intra-State transmission system elements.

6) In all substations (132kV and above), except HVDC, suitable number and capacity of transformers shall be provided to have adequate redundancy required to maintain firm capacity at the substation. In HVDC substations, at least one spare converter/inverter transformer shall be kept ready to use at any time.

   Explanation – for the purpose of Regulation 5.4-6), the term firm capacity shall mean the minimum transformation capacity available at the substation in case of outage of any one transformer.

7) State Transmission Utility shall carry out planning studies for Reactive Power compensation of intra-State transmission system including reactive power compensation at the in-State Generating Station's switchyard.

5.5 Planning Responsibility

1) The primary responsibility of load forecasting within Distribution Utility / Licensee's Area of Supply rests with respective Distribution Utility/ Licensee. The Distribution Utility/ Licensee shall determine peak load and energy forecasts of their areas for each category of loads for each of the succeeding 10 years and submit the same annually by 31st March to STU along with details of the demand forecasts, data, methodology and assumptions on which the forecasts are based along with their proposals for transmission system augmentation. The load forecasts shall be made for each of the present as well as proposed interconnection points between STU and Distribution Utility/ Licensee and shall include annual peak load and energy projections. The demand forecasts shall be updated annually or whenever major changes are made in the existing forecasts or planning. While indicating requirements of single consumers with large demands (1 MW or higher) the Distribution Utility/ Licensee shall satisfy itself as to the degree of certainty of the demand materialising.

2) J & K SPDC shall provide their generation capacity to STU for evacuating power from their power stations for each of the succeeding 10 years along

with their proposals for transmission system augmentation and submit the same annually by 31st March to STU.

3) The planning for strengthening the State Transmission System for evacuation of power from outside state stations shall be initiated by STU.

4) Transmission Planning Committee shall review and approve the load forecasts and the methodology followed by each of the Distribution Utility/ Licensee.

5) The State Transmission System proposals identified based on planning studies would be discussed, reviewed and finalised by the Transmission Planning Committee.

5.6 Planning Data

1) To enable STU to conduct System Studies and prepare perspective plans for electricity demand, generation and transmission, the Users shall furnish data, to STU from time to time as detailed under Data Registration section as under:
   (a) Standard Planning Data (Generation)/ Standard Planning Data (Distribution)
   (b) Detailed Planning Data (Generation)/ Detailed Planning Data (Distribution)

2) To enable Users to co-ordinate planning, design and operation of their plants and systems with the State Transmission System they may seek certain salient data of Transmission System as applicable to them, which STU shall supply from time to time as detailed under Data Registration section and categorized as:
   (a) Standard System Data (Transmission).
   (b) Detailed System Data (Transmission).

3) STU shall also furnish to all the Users, Annual Transmission Planning Report, Power Map and any other information as the Commission may prescribe.

5.7 Implementation of Transmission Plan

The actual programme of implementation of transmission lines, substations, reactors and capacitors will be determined by STU in consultation with other transmission licensees. The STU/ Transmission Licensee shall ensure the completion of these works in the required time frame.

SECTION 6

CONNECTION CONDITIONS

6.1 Introduction

Connection Conditions specify the minimum technical, design and operational criteria which must be complied with by every User connected to the State Transmission System. They also set out the procedure by which STU shall ensure compliance by any agency with the above criteria as pre-requisite for establishment of an agreed connection.

6.2 Objective

The objective of this section is to ensure the following:

(i) All Users or prospective Users are treated equitably.

(ii) Any new Connection shall not impose any adverse effects on existing Users, nor shall a new Connection suffer adversely due to existing Users.

(iii) By specifying minimum design and operational criteria, to assist Users in their requirement to comply with License obligations and hence ensure that a system of acceptable quality is maintained.

(iv) 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.

6.3 Connection Standards

The applicable technical standards for construction of electrical plants and electric lines connected to the intra-State transmission system shall be as per the standards notified by the Authority to the extent not inconsistent with the provisions of this code.

6.4 Safety Standards

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 to the extent not inconsistent with the provisions of this code.

6.5 Procedure for Application

(i). Any User 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 and prescribed fee as decided by J & K SERC duly observing the procedural requirements to the Transmission Licensee:

(a) Report stating the purpose of the proposed connection and/or modification, connecting site, description of apparatus to be connected or modification to the Apparatus already connected.

(b) Applicable data along with the data listed in the Appendix A and B of Section -17.

(c) Confirmation that the prospective installation complies with the provisions of J & K Electricity Rules 1978.

(d) Construction Schedule and target completion date.

(e) An undertaking to the effect that the User shall abide by the Grid Code and IEGC.

(f) For special loads like arc furnaces, rolling mills etc., Real and Reactive Power values of the Load with time and harmonic level.

(ii) STU shall make a formal offer within 60 days of the receipt of the application.
The offer shall specify and take into account any works required for the extension or reinforcement of the State Transmission System necessitated by the applicant's proposal and for obtaining any consent necessary for the purpose.

(iii) If the prescribed time limit for making the offer against any application is not adequate, STU shall make a preliminary offer within the prescribed time indicating the extent of further time required for detailed analysis.

(iv) Any offer made by STU shall remain valid for a period of 120 days and unless accepted before the expiry of such period shall lapse thereafter.

(v) In the event of offer becoming invalid or not accepted by the applicant, STU shall not be required to consider any further application from the same applicant within 12 months unless the new application is substantially different from the original application.

(vi) STU shall be entitled to reject any application for connection to/or use of State Transmission System on the following conditions apart from others as considered reasonable:

(a) If such proposed connection is likely to cause breach of any provision of its license or any provision of the State Electricity Grid Code or any provision of IEGC or any provision criteria or any covenants, deeds or regulations by which STU is bound.

(b) If the applicant does not undertake to be bound, in so far as applicable, by the terms of State Electricity Grid Code.

(c) If the applicant fails to give confirmation and undertakings according to this section.

(vii) In case of the existing connections between State Transmission System (STS) and State constituent/ SSGS a relaxation of one year in respect of connection conditions is allowed so that the present arrangement may continue. The process of renegotiation of the connection conditions with SSGS/ State constituent should be completed within one year. In case it is determined that the compliance of connection conditions would be delayed further, J & K SERC may consider further relaxation. The cost of modification if any shall be borne by the concerned constituent.

6.6 Connection Agreement

A Connection Agreement (or the offer for a Connection Agreement) shall include, as appropriate, within its terms and conditions the following:

(a) A condition requiring both parties to comply with the State Electricity Grid Code.
(b) Details of connection and/or use of system charges.
(c) Details of any capital related payments arising from necessary reinforcement or extension of the system.
(d) Diagram of electrical system to be connected.
(e) General philosophy, guidelines etc on protection.
(f) A Site Responsibility Schedule (Appendix F).
(g) System recording instruments.
(h) Communication facilities

6.7 Responsibilities for operational safety:

1) STU and the Users shall be responsible for safety as indicated in Site Responsibility Schedules for each connection point.

2) For every Connection to the State Transmission System for which Connection Agreement is required, STU shall prepare a schedule of equipment with information supplied by the respective Users. This schedule, called a **Site Responsibility Schedule (Appendix-F)**, shall indicate the following for each item of equipment installed at the Connection site.
   (i). The ownership of Plant / Equipment.
   (ii). The responsibility for control of Plant / Equipment.
   (iii). The responsibility for maintenance of Plant / Equipment.
   (iv). The responsibility for operation of Plant / Equipment.
   (v). The manager of the site.
   (vi). The responsibility for all matters relating to safety of persons at site.

(vii). The responsibility for all matters relating to safety of equipment at site.

3) Single Line Diagrams
   (i) Single Line Diagram shall be furnished for each Connection Point by the connected user to SLDC. These diagrams shall include all HV connected equipment and the connections to all external circuits and incorporate numbering, nomenclature and labeling, etc. The diagram is intended to provide an accurate record of the layout and circuit connections, rating, numbering and nomenclature of HV apparatus and related plant.
   (ii) Whenever any equipment has been proposed to be changed, then concerned user shall intimate the necessary changes to STU and to all concerned.
   (iii) When the changes are implemented, changed Single Line Diagram shall be circulated by the user to SLDC/STU.

4) Site Common Drawings
   (i) Site Common Drawing will be prepared for each Connection Point and will include site layout, electrical layout, details of protection and common services drawings. Necessary details shall be provided by the users to STU.
   (ii) The detailed drawings for the portion of the user and of STU at each Connection Point shall be prepared individually and exchanged between user and STU.

   (iii) If any change in the drawing is found necessary, either by user or by STU, the details will be exchanged between user and STU as soon as possible.

5) Each Site Responsibility Schedule in addition to the above shall contain all other information set out in the State Electricity Grid Code. As an illustration Site Responsibility Schedule is furnished in Appendix-F

6.8 System Performance

1) All equipment connected to the State Transmission System shall be of such design and construction that satisfactory operation of such plant and apparatus will not be prevented by variation in instantaneous values of system frequency and voltage from their nominal values and that such Plant and Apparatus shall not induce any adverse affect on the intra-State transmission system.

2) Any user seeking to establish new or modified arrangement(s) for Grid connection and/or use of transmission system of STU shall submit the application in the form as may be specified by STU.

3) For every new /modified Connection sought, STU shall specify the Connection Point, technical requirements and the voltage to be used, along with the metering and protection requirements as specified in the Transmission Metering and Protection sections of this Code.

4) SSGS (except CPPs) 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 State Transmission System. CPPs shall similarly furnish the net reactive capability that will be available for Export to / Import from State Transmission System.

5) Rated frequency of the system is 50.0 Hz and all efforts shall be made to operate at frequency close to nominal as possible. The frequency shall not be allowed to go beyond 49.0 to 50.5 HZ except during transient accompanying tripping or connection of loads as per regulations specified by the Authority.

6) The User shall however be subject to the Grid discipline prescribed by SLDC/ NRLDC as per guidelines mutually agreed with NREB / NRLDC.

   The variation of voltage at the inter connection point may not be more than the voltage range specified below:

Limits of Voltage Variation		
Nominal (kV)	**Maximum (kV)**	**Minimum (kV)**
400	420	360
220	245	200
132	145	120

7) Distribution Utility/ Licensee and Open access users shall ensure that their loads do not affect STU system in terms of causing any:
   i. Unbalance in the phase angle and magnitude of voltage at the interconnection point beyond the limits prescribed by Transmission Performance Standards.
   ii. Harmonics in the system voltage at the interconnection point beyond the limits prescribed by Transmission Performance Standards.

   STU may direct the Distribution Utility/ Licensee to take appropriate measures to remedy the situation.

8) In the event of Grid disturbances / Grid contingencies in the Northern Regional grid, STU shall not be liable to maintain the system parameters within the normal range of voltage and frequency.

9) Insulation Co-ordination of the User's equipment shall conform to values as specified by STU from time to time as per applicable Indian Standards / Codes of practices. Rupturing capacity of switchgear shall not be less than that specified by STU from time to time based on system studies.

10) Protection schemes and metering schemes shall be as detailed in the Protection and Transmission Metering sections of the Code.

6.9 Equipment of Users / State Transmission System at Connection Points:

1) Sub-station Equipment
   i) All EHV sub-station equipments shall comply with Bureau of Indian Standards (BIS)/IEC/ prevailing Code of practice.
   ii) All equipment shall be designed, manufactured and tested and certified in accordance with the quality assurance requirements as per IEC/BIS standards.
   iii) Each connection between User and STS shall be controlled by a circuit breaker capable of interrupting, at the connection point, the short circuit current as advised by STU in the specific Connection Agreement.

2) Fault Clearance Time (basic step operation time i.e. Zone 1 time): The fault clearance time of the equipment directly connected to the STS shall be as per the Protection Section of this code.

3) Back-up protection shall be provided for required isolation/protection in the event of failure of the primary protection system provided to meet the fault clearance time requirements as defined in Protection Section of this code.

4) If a Generating Unit is connected to the STS directly, it shall withstand, until clearing of the fault by back-up protection on the STS.

5) All users connected to STS shall provide protection system as specified in the Protection Section and this shall be made the part of the Connection Agreement.

6.10 Generating Units and Power Stations

1) A Generating Unit shall be capable of continuously supplying its normal rated active/reactive output within the system frequency and voltage variation range indicated at section 6.8 above, subject to the design limitations specified by the manufacturer.

2) A generating unit shall be provided with the protection, as specified in the Protection section and shall be made a part of the Connection Agreement.

6.11 Reactive Power Compensation

1) Reactive Power compensation and/or other facilities should be provided by User of the State Transmission System including the Distribution Utility/ Licensee 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 State Transmission System voltage within the specified range.

2) Switched Shunt Reactors at 400 kV may be provided to control temporary over voltage within the limits and this shall be made a part of Connection Agreement.

3) The addition of reactive compensation to be provided by the User shall be indicated by STU in the Connection Agreement for implementation.

6.12 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 Users shall provide the required facilities at their respective ends and this shall be indicated in the Connection Agreement.

6.13 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 STS for recording of dynamic performance of the system. Users shall provide all the requisite recording instruments as specified in the Connection Agreement according to the agreed time schedule.

6.14 Procedure for Site Access, Site operational activities and Maintenance Standards:

The Connection Agreement will also indicate any procedure necessary for Site access, Site operational activities and maintenance standard for STU equipment at User premises and vice versa.

6.15 Schedule of assets of State Transmission Grid:

STU shall submit annually to SERC by 30th September each year a schedule of transmission assets which constitute the State Grid i.e. State Transmission System

as on 31st March of that year indicating ownership on which SLDC has operational control and responsibility.

6.16 Connection Point

1) State Sector Generating Station (SSGS)
   Voltage may be 400/220/132kV or as agreed with STU. Unless specifically agreed with STU the Connection point shall be the outgoing feeder gantry of Power Station Switchyard.

   All the terminals, communication and protection equipment owned by SSGS within the perimeter of the Generator's site shall be maintained by the SSGS.

   The provisions for the metering system shall be as per the Metering Section. The other User's equipment shall be maintained by respective Users. From the out going feeders' gantry onwards, all electrical equipment shall be maintained by STU.

2) Distribution Utility/Licensee

   Voltage may be LV side of power transformer i.e. 66,33 or 11kV or as agreed with STU. For EHV consumer directly connected to transmission system, voltage may be 220kV or 132kV. The Connection point shall be the outgoing feeder gantry/cable termination on transmission tower/pole at STU's substation. STU shall maintain all the terminals, communication and protection for the metering system as per the Metering Section. From the outgoing feeder gantry / transmission line cable terminal structure onwards, all electrical equipment shall be maintained by the respective Distribution Utility/ Licensee.

3) Northern Regional Transmission System
   For the Northern Regional Transmission System, the Connection, protection scheme, metering scheme and the voltage shall be in accordance with the provisions of IEGC.

4) IPPs, CPPs, EHV Consumers and Open access users
   Voltage may be 220/132kV or as agreed with STU. When sub-stations are owned by IPPs, CPPs, EHV Consumers or the Open access users, the Connection point shall be the outgoing feeder gantry on their premises.

6.17 Data Requirements

Users shall provide STU with data for this section as specified in the Data Registration section. Unless otherwise agreed in Connection Agreement, the equipments for data transmission and communication shall be operational and maintained by the user in whose premises they are installed irrespective of ownership.

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Part-III

SECTION 7

OPERATIONAL PLANNING, SYSTEM SECURITY AND OUTAGE PLANNING

7.1 Introduction

This section describes the process by which the SLDC carries out the operational planning and demand control procedures to permit reduction in Demand for any reason.

7.2 Objective

The detailed provision is required to enable SLDC to achieve a reduction in demand to avoid Operating problems on all or part of the State Transmission System. SLDC will utilise Demand Control in a manner, which does not unduly discriminate against any one or group of customers.

7.3 Demand Estimation

1) The long-term demand estimation/ load forecast (for more than 1 year) shall be done by the planning department of STU in accordance with the provisions of Section 5 System Planning. SLDC shall be provided with a copy of the same as and when it is finalised. Demand Estimation for period up to 1 year ahead shall be done by SLDC.

2) Distribution Utility/Licensee shall provide to the SLDC their estimates of demand for the year ahead on month-basis at each inter connection point for the next financial year by 15th November each year. Distribution Utility/ Licensee shall also provide daily demand on month ahead at each inter connection point by 25th for the next month.

3) Distribution Utility/Licensee shall provide to SLDC estimates of load that may be shed when required, in discrete blocks with the details of arrangements of such load shedding.

4) Distribution Utility/Licensee shall also furnish realistic category-wise demand for their respective companies along with details of essential loads, supply hours to be maintained in rural areas, details of power cuts imposed or to be imposed and specific requirements, if any.

5) The demand estimation shall cover active power as well as reactive power requirements forecasted for each substation.

6) The SLDC would update the demand forecast (in MW as well as MWh) on quarterly, monthly, weekly and ultimately on daily basis, which would be used in the day-ahead scheduling. Attention shall also be paid by SLDC in demand forecasting for special days such as important festivals and National Holidays having different crests and troughs in the daily load-curve as compared to normal weather conditions & days.

7) STU and SLDC would maintain a historical database for the purpose of Demand Estimation and shall be equipped with the state-of-the-art tools such as Energy Management System (EMS) for demand forecasting.

8) SLDC shall furnish data for and participate in deliberations of data for load generation balance or Annual Demand, availability and shunt capacitors requirement studies of NREB. It shall take into consideration their reports for demand estimation.

7.4 Demand Control

1) Primarily the need for demand control would arise on account of the following conditions:

   i. Variations in demand from the estimated or forecasted values, which cannot be absorbed by the grid, and
   ii. Unforeseen generation / transmission outages resulting in reduced power availability, and
   iii. Heavy reactive power demand causing low voltages,

2) SLDC shall match the consolidated demands of the Distribution Utility/Licensee with consolidated generation availability from SSGS, ISGS, IPP/CPP and other sources and exercise the Demand Control to ensure that there is a balance between the energy availability and the Distribution Utility/Licensee demand plus losses plus the required reserve.

3) SLDC would maintain a historical database for the purpose of Demand Estimation and shall be equipped with the state-of-the-art tools such as Energy Management System (EMS) for short-term demand estimation to plan in advance, as to how the load would be met without overdrawing from the grid.

4) SLDC shall advice STU for planning of Automatic load shedding schemes and rotational load shedding through installation of Under Frequency Relays. The guidelines for under frequency load shedding shall be prepared, in accordance with the instructions from NRLDC/NREB, by the Operation and

Co-ordination Committee and shall be approved by the Grid Code Review Committee.

5) The particulars of feeders or group of feeders at a STU sub-station which shall be tripped under under-frequency load shedding scheme whether manually or automatic on rotational basis or otherwise shall be placed on Notice board and will also be available at the sub-station for information of the consumer(s).

6) Demand control can also be exercised by the SLDC through direct circuit breaker tripping affected from SLDC using RTUs and under frequency detection by SLDC SCADA or through telephonic instructions. No demand shed by operation of under frequency relays shall be restored without specific directions from SLDC.

7) Rotational Load Shedding Schemes using Under Frequency Relay (UFR) shall be prepared time to time by the Utility in accordance with the guidelines/instructions issued by NRLDC/NREB. The STU shall inform such decisions to J & K SERC with in seven days from the issue of instructions by NRLDC/NREB.

7.5 Load Crash

1) In the event of load crash in the system due to weather disturbance or any other reasons, the situation would be controlled by the SLDC by the following methods:

   (i). Backing down of hydel stations for short period immediately
   (ii). Lifting of the load restrictions, if any
   (iii). Exporting the power to neighbouring regions
   (iv). Backing down of thermal stations with a time lag of 5-10 minutes for short period
   (v). Closing down of hydel units (subject to non spilling of water and effect on irrigation).

   The above methodology shall be reviewed from time to time in Operation and Coordination Committee.

2) While implementing the above, the system security aspects should not be violated as per provisions in section 6.2 of IEGC and the State Electricity Grid Code. Further, in case of hydro generation linked with irrigation requirements, the actual backing down or closing down of such hydro units shall be subject to limitations on such account & to avoid spillage of water.

7.6 System Security Aspects

1) All Users shall endeavour to operate their respective power system and generating stations in synchronism with each other at all times, such that the whole State Transmission System operates as synchronised system as integrated part of Northern Regional Grid. STU shall endeavour to operate the inter state links so that inter state transfer of power can be achieved smoothly when required. Security of the power system and safety of power equipment shall enjoy priority over economically optimal operations.

2) All switching operations, whether affected manually or automatic, will be based on policy guide lines of:
   (a) IEGC
   (b) NRLDC's instructions/Guidelines under IE Rules
   (c) Grid Code
   (d) Grid Code Review Committee's decisions
   (e) State Government's directives
   (f) J & K SERC's directives

   In case of any over-lapping or contradiction in the directives from the aforementioned 6 agencies, the decision of the Grid Code Review Committee shall be final.

3) No part of the State Transmission System shall be deliberately isolated from the integrated Grid, except
   (a) Under an emergency, and conditions in which such isolation would prevent a total Grid collapse and/or enable early restoration of power supply,
   (b) When serious damage to a costly equipment is imminent and such isolation would prevent it
   (c) When such isolation is specifically advised by SLDC and
   (d) On operation of under frequency/islanding scheme as approved by NREB/J & K SERC.

   All such isolations shall be either as per standing guidelines approved by NREB/J & K SERC or shall be put up in the Grid Code Review Committee for ratification. Complete synchronisation of integrated Grid shall be restored, as soon as the conditions again permit it. The restoration process shall be supervised by SLDC as per relevant procedures separately finalised.

4) The 66kV and above transmission lines and ICTs (except radial lines which do not affect the operation of the Grid) shall not be deliberately opened or removed from service at any time except when advised by SLDC or with specific and prior clearance of SLDC.

Where prior clearance from SLDC is not possible it should be intimated to SLDC at the earliest possible time after the incident. Any emergency tripping not advised or permitted by SLDC shall be put up to the Grid Code Review Committee for ratification in the next meeting.

5) Any tripping, whether manual or automatic, of any of the elements mentioned above, shall be precisely reported to SLDC at the earliest. The reason (to the extent determined) and the likely time of restoration shall also be intimated. All reasonable attempts shall be made for the elementary restoration at the earliest. The information/ data including disturbance recorder, sequential event recorder outputs etc. containing the sequence of tripping and restoration shall be sent to SLDC for the purpose of analysis.

6) 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. If any generating unit of over fifty (50) MW size is required to be operated without its governor in normal operation, the NRLDC through SLDC shall be immediately advised about the reason and duration of such operation. The exemption from free governor mode operation in respect of run of river hydro stations without any pondage, steam turbine of thermal and gas based power stations not having free governor mode facility shall be sought from CERC under clause 1.6 of IEGC. Such petitions for exemption shall be preceded by a study preferably by CEA.

7) Facilities available with/in Load Limiters, Automatic Turbine Run-up System (ATRS), Turbine Supervisory Coordinated Control system etc. shall not be used to bypass the normal governor action in any manner. No dead bands and time delays shall be deliberately introduced.

8) All Generating Units, operating at/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 for at least five (5) minutes or within technical limits prescribed by the manufacturer 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. Any generating unit of over fifty (50) MW size not complying with the above requirement shall be kept in operation (synchronised with the Regional grid) only after obtaining the permission of NRLDC through SLDC. However, the constituent can make up the corresponding short fall in spinning reserve by maintaining an extra spinning reserve on the other generating units of the constituent. Any generating units not capable to complying with above provision either due to not having requisite facilities or otherwise shall seek exemption from CERC under clause 1.6 of IEGC.

9) In case frequency falls below 49.5 Hz, all partly loaded Generating Units shall pick up additional load at a faster rate, according to their capability. SLDC in consultation with NREB/NRLDC and Distribution Utility/Licensee shall prepare a plan for automatic load relief during the low frequency conditions. In case frequency rises to 50.5 Hz or higher, neither any generating unit shall be synchronized with the Grid nor shall generation at any generating station (irrespective of type of ownership) be increased without obtaining approval from SLDC.

10) Except under an emergency, or to prevent an imminent damage to costly equipment, no User shall suddenly decrease/increase its generation without prior intimation to the SLDC. Similarly, no User shall cause a sudden decrease/increase in its load due to imposition/lifting of power cuts etc., without prior intimation to and consent of the SLDC, particularly when frequency is deteriorating.

11) All Generating Units shall normally have their Automatic Voltage Regulators (AVRs) in operation, with appropriate settings. In particular, if a Generating Unit of over one hundred and twenty five (125) MW capacity is required to be operated without its AVR in service, the SLDC shall be immediately intimated about the reason and duration, and its concurrence obtained.

12) Each Generating Unit must be fitted with a turbine speed governor having an overall droop characteristic within the range of 3% to 6%, which shall always be in service.

13) SSGS shall follow the instructions of SLDC for backing down/boxing up (ramping-up) and shutting down the generating unit(s). SLDC shall provide the certificate for the period of the backing down/boxing up or shutting down for the purpose of computing the deemed generation, if required.

14) Provision of protections and relay settings shall be coordinated in the State Transmission System, as per a plan to be separately finalised by the Protection Co-ordination Committee.

15) Various steps shall be taken for frequency management (Section 9) and voltage management (Section 9) so as to ensure system security from these considerations.

16) All Generating Units with capacity of 30MW and above, sub-stations with operating voltage of 220kV & above and important 132kV sub-stations with transformation capacity of 100 MVA and above shall be provided with the facilities of Disturbance Recorders (DRs) and Event Loggers (ELs). STU shall submit time-bound plan to install DRs wherever it is required as per this Code.

17) All Users shall provide automatic under-frequency load shedding in their respective premises, to arrest frequency decline that could result in a collapse/disintegration of the grid, as per the plan separately finalised by the concerned NREB forum, and shall ensure its effective application to prevent cascade tripping of .generating units in case of any contingency. All Users shall ensure that the under frequency load shedding/islanding schemes are functional. However, in case of extreme exigencies, under-frequency relays may be temporarily kept out of service with prior consent of SLDC. SLDC shall promptly inform NREB about the locations at which these relays are temporarily out of service. SLDC shall also inform REB about instances when the desired load relief is not obtained through these relays in real time operation.

    SLDC shall carry out periodic inspection of the under frequency relays and maintain proper records of the inspection.

18) Procedures shall be developed to recover from partial/total collapse of the grid and periodically updated in accordance with the requirements given under section 11.4. These procedures shall be followed by all the Users to ensure consistent, reliable and quick restoration.

19) Each User shall provide adequate and reliable communication facility with SLDC 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, e.g. User to SLDC.

20) 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 User shall block any data/information required by the SLDC for maintaining reliability and security of the grid and for analysis of an event.

7.7 Outage Planning Process

Each User shall provide their outage programme for ensuing financial year to the STU for preparing an overall outage plan for State Transmission System as a whole. STU shall be responsible for analyzing the outage schedules of the SSGS, Distribution Utility/Licensee and outage schedule of Transmission Utility/Licensee and preparing a draft annual outage Plan for State Transmission System in coordination with the Outage Plan prepared for the region by the NREB. However, SLDC is authorised to defer the planned outage in case of any of the following events:

(a) Major grid disturbance
(b) System Isolation
(c) Black out in the State

(d) Any other event in the system that may have an adverse impact on system security by the proposed outage

Each User shall obtain approval of SLDC, prior to availing the Outage. SLDC while releasing any circuit for outage shall issue specific code. Similarly, no inter user boundary circuits shall be connected back to the State Transmission System without specific code/approval by SLDC.

This restriction shall however not be applicable to individual Generating Unit(s) of a CPP.

7.8 Annual Outage Planning

1) Scheduled outage of power stations of capacity 25 MW & above will be subject to annual planning.

2) Provided that scheduled outage of power station of 50 MW and above and EHV lines as notified by NRLDC, will also be subject to annual planning by NRLDC in co-ordination with SLDC/STU.

3) SSGS and CPP connected to State Grid shall furnish their proposed Outage programme for the next financial year in writing by 15th November and 30th November of each year respectively.

4) SSGS Outage programme shall contain details like identification of unit, reason for outage, generation availability affected due to such outage, outage start date and duration of outage. STU will review the outage programme received from SSGS on monthly basis to chalk out the outage of state transmission system.

5) Transmission Licensee shall also give their outage programme for Transmission lines, equipments and sub-stations etc. for next financial year by 15th November each year.
However, Transmission Outage Planning shall be harmonized with Generation Outage Planning and Distribution System Outage Planning shall be harmonized with Generation and Transmission Outage Planning.

6) STU 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 outage plan shall be developed after giving due considerations to system security and reliability and shall be developed such 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 endeavor to maximize the utilization of water for purpose of power generation subject to applicable constraints related to alternate use of such water.

7) Scheduled outage of power stations of capacity 25MW and above, of all EHV lines and HV lines forming interconnection between two EHV sub-stations (and notified as such by SLDC) shall be approved by SLDC, 24 hours in advance based on prevalent operating conditions.

8) The final outage plan shall be intimated to all Users and Transmission Licensee latest by 15th Feb each year:

Provided that the STU shall finalise the outage plan in
Consultation with the Users, Transmission Licensee and SLDC

Provided further that the above annual outage plan shall be reviewed by STU on monthly basis in coordination with all parties concerned, and adjustments made wherever found to be necessary.

9) Each User or Transmission Licensee shall, at least two (2) weeks prior to availing an outage as per the planned schedule, inform the State Load Despatch Centre about the same and obtain prior approval from State Load Despatch Centre for the same.

10) In respect of scheduled outage referred in this section a calendar shall be formulated in respect of annual outage planning for the ensuing financial year. Such outage plan shall be deliberated and finalized in the meeting of Operation and Coordination Committee.(OCC)

9 Availing of shutdowns schedule

1) SLDC would review on daily basis the outage schedule for the next two days and in case of any contingency or conditions described in section 6.7.4(g) of the IEGC, defer any planned outage as deemed fit clearly stating the reasons thereof. The revised dates in such cases would be finalized in consultation with the User.

2) The shutdowns for scheduled outage shall be taken in accordance with the provisions of Section 13 of Grid Code to ensure inter-user coordination.

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SECTION 8

SCHEDULING AND DESPATCH

8.1 Introduction

This section specifies the procedure to be adopted for the scheduling and despatch of SSGS, ISGS and to meet system demand and Drawal allocation requirements of Distribution Utilities/Licensees

8.2 Objective

The objective of this section is to detail the actions and responsibilities of SLDC in preparing and issuing a daily schedule of generation and the responsibilities of Users to supply the necessary data and to comply with that schedule.

8.3 General

1) The following specific points would be taken into consideration while preparing and finalising the schedules:
   (a) SLDC will issue despatch instructions required to regulate all generation from SSGs, IPPs, CPPs and NCES and imports according to the 15 minutes day ahead generation schedule, unless rescheduling is required due to unforeseen circumstances.
   (b) However the SLDC shall regulate the overall state generation in such a manner that generation from following types of power stations where energy potential, if unutilized, goes as a waste shall not be curtailed:
   - Run of river or canal based hydro stations.
   - Hydro-station where water level is at peak reservoir level or expected to touch peak reservoir level (as per inflows).
   - Wind power stations.
   - Solar power stations (Other than hybrid).
   - Hybrid solar power stations with minimum generation from conventional fuel required to utilize available solar power.
   - Nuclear power stations (to avoid poisoning of fuel).

   (c) The SLDC shall have the total responsibility for:

   - Scheduling/ dispatching the generation of all SSGS, IPPs, Non-Conventional Energy Sources (NCES), Co-Generators, etc. connected to the Grid.
   - Regulating the demand of the Distribution licensee/ other beneficiaries in the Sate.
   - Scheduling the drawal from the Central Generating stations and regulating the bilateral interchanges, if there is any.

- Adopting merit order dispatch, ABT procedures and free governor operation at power stations wherever possible.

2) Despatch instructions shall be in standard format. These instructions will recognize declared availability and other parameters that have been made available by the SSGS to SLDC. These instructions shall include time, Power Station, Generating Units, (Total export in case of CPP), name of operators Sending and receiving the same.

3) Standard despatch instructions may include:
   - To switch a SSGS into or out of Service.
   - Details of reserve to be carried on a unit.
   - To increase or decrease MVAr generation to assist with voltage profile as per unit capability at that time
   - To begin pre-planned Black Start procedures.
   - To hold spinning reserve.
   - To hold Generating Units of SSGS on standby.
   - To control MW/MVAr Drawl by Distribution Companies.

8.4 Scheduling and Despatch procedure

A. Steps in scheduling

1) The generation scheduling and despatch data shall be as per format in Appendix C-2. The procedure has been devised taking into account the ABT (Availability Based Tariff) regime.

2) Each day starting from 00.00 hours will be divided into 96 time blocks of 15 minutes interval.

3) By 9.00 a.m. every day all the generating stations in the State shall furnish to SLDC, the station wise ex-power plant MW and MWh capability foreseen for each time block of the next day i.e. from 00.00 hours to 24.00 hours of the following day.

4) Provided that in working out the MW/MVAr availability, Hydro Power Stations shall report their respective levels or any other restrictions to SLDC**.** Full generation at all Hydel stations will be included .When reservoirs are full.
5) By 9.00 hours every day each Distribution Utiltiy/ Licensee shall intimate SLDC the sub- station wise and overall requirement in MW and MWh for the next day at 15 minutes interval.

6) The SLDC shall collect information from RLDC regarding the MW and MWh entitlements from Central Generating stations for different hours and blocks for the next day by 10.00 AM.

7) The SLDC may also give standing instructions to the NRLDC such that the NRLDC itself may decide the drawal schedules for the States based on merit order.

8) After receipt of information from all sources the SLDC shall review the foreseen load pattern and the generation capacity available including bilateral exchanges if any, and advise the NRLDC by 3.00 PM. their drawal schedule for the next day for each of the generating stations in which they have shares. SLDC shall also intimate the other generating companies in the State regarding their despatch schedule by 3.00 P.M.

9) By 5.00 PM each day, the NRLDC shall convey the ex-power plant "dispatch schedule" to each of the Inter State Generating Stations, and "net drawal schedule" to each SLDC / beneficiary in MW for different hours, for the next day.

10) By 6.00 PM each day, the SLDC shall convey the ex-power plant "dispatch schedule" to each of the State sector generating stations and "net drawal schedule" to each of the State beneficiary / distribution licensee through ALDCs in MW for different hours, for the next day.

11) The summation of the station-wise ex-power plant generation schedules for all generating stations after deducting the apportioned transmission losses (estimated), shall constitute the State beneficiaries / distribution licensee's drawal schedule.
12) SSGS and each Distribution Utiltiy/Licensee may inform the modifications / changes to be made, if any, in the above schedule to SLDC by 21.00 hours.
13) SLDC after considering the same shall convey revised schedule to NRLDC by 22.00 hrs.
14) On receipt of information and after due consultations, the NRLDC shall issue the final generation and drawal schedule by 23.00 hrs, and SLDC shall inform the same to all concerned.

15) SLDC shall prepare the day ahead generation schedule keeping in view the followings:

    a) Transmission System constraints from time to time.
    b) 15 minute load requirements as estimated by SLDC.
    c) The need to provide operating margins and reserves required to be maintained.
    d) The availability of generation from SSGS and Central Sector Generators together with any constraint in each case.

16) Revision in drawal schedule on real time basis.
    a) In case of forced outage of a unit, the SLDC shall revise the schedules on the basis of revised declared capability. The revised declared capability and the revised schedules shall become

effective from the 4th time block, counting the time block in which the revision is advised by the ISGS or SSGS to be the first one.

b) In the event of bottleneck in evacuation of power due to any constraint, outage, failure or limitation in the transmission system, associated switchyard and sub- stations owned by the owned by the State Transmission Utility or any other transmission licensee involved in intra-state transmission (as certified by SLDC) necessitating reduction in generation, the SLDC shall revise the schedules which shall become effective from the 4th time block, counting the time block in which the bottleneck in evacuation of power has taken place to be the first one. Also, during the first, second and third time blocks of such an event, the scheduled generation of the SSGS shall be deemed to have been revised to be equal to actual generation, and the scheduled drawals of the beneficiaries shall be deemed to have been revised to be equal to their actual drawals.

c) In case of any grid disturbance, scheduled generation of all the SSGS and scheduled drawal of all the beneficiaries shall be deemed to have been revised to be equal to their actual generation/drawal for all the time blocks affected by the grid disturbance. Certification of grid disturbance and its duration shall be done by the SLDC.

d) Revision of declared capability by the SSGS(s) and requisition by beneficiary (ies) for the remaining period of the day shall also be permitted with advance notice. Revised schedules/declared capability in such cases shall become effective from the 6th time block, counting the time block in which the request for revision has been received in the SLDC to be the first one.

17) If, at any point of time, the SLDC observes that there is need for revision of the schedules in the interest of better system operation, it may do so on its own, and in such cases, the revised schedules shall become effective from the 4th time block, counting the time block in which the revised schedule is issued by the SLDC to be the first one.

18) To discourage frivolous revisions, SLDC may, at its sole discretion, refuse to accept schedule/capability changes of less than two (2) percent of the previous schedule/capability.

19) After the operating day is over at 2400 hours, the schedule finally implemented during the day (taking into account all changes in dispatch schedule of generating stations and drawal schedule of the States) shall be issued by SLDC. These schedules shall be the datum for commercial

accounting. The average ex-bus capability for each SSGS shall also be worked out based on all before-the-fact advice to SLDC.

20) SLDC shall properly document all above information i.e. station-wise foreseen ex-power plant capabilities advised by the generating stations, the drawal schedules advised by beneficiaries, all schedules issued by the SLDC, and all revisions/updating of the above.

21) The procedure for scheduling and the final schedules issued by SLDC shall be open to all constituents for any checking/verification, for a period of 5 days. In case any mistake/omission is detected, the RLDC shall forthwith make a complete check and rectify the same.

8.5 Generation Despatch

1. SSGS shall comply promptly with a despatch instruction issued by SLDC unless this action would compromise the safety of plant or personnel. SSGS shall promptly inform SLDC in the event of any unforeseen difficulties in carrying out an instruction.
2. Despatch instructions shall be issued by E-Mail /Fax/ telephone, confirmed by exchange of name of operators sending and receiving the same and logging the same at each end. All oral instructions shall be complied with forthwith and written confirmation shall be issued promptly by FAX, tele-printer or otherwise

8.6 Data Requirements

Users shall provide SLDC with data for this section as specified in the Data Registration section.

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SECTION 9

FREQUENCY & VOLTAGE MANAGEMENT

9.1 Introduction

This section describe the method by which all Users of the State Transmission System shall co-operate with SLDC and STU in contributing towards effective control of the system frequency and managing the voltage of the State.

The State Transmission System normally operates in synchronism with the Northern Region Grid and NRLDC has the overall responsibility of the integrated operation of the Northern Regional Power System. The constituents of the Region are required to follow the instructions of NRLDC for backing down generation, regulating loads, MVAR drawal etc. to meet the objective.

SLDC shall accordingly instruct Generating Units to regulate Generation/Export and hold reserves of active and reactive power within their respective declared parameters. SLDC shall also regulate the load as may be necessary to meet the objective.

The State Transmission System voltage levels can be affected by Regional operation. The STU/SLDC shall optimize voltage management by adjusting transformer taps (On Line Tap Changers) to the extent available and switching of circuits/capacitors/reactors and other operational steps. SLDC will instruct SSGS to regulate MVAr generation within their declared parameters. SLDC shall also instruct Distribution Utility/Licensee to regulate demand, if necessary.

9.2 Objective

The objectives of this section are as follows:

- To define the responsibilities of all Users in contributing to frequency and voltage management.
- To define the actions required to enable SLDC and STU to maintain the State Transmission System voltages and frequency within acceptable levels in accordance with IEGC guidelines as well as Planning and Security Standards for the State Transmission System specified by the Commission, if any.

9.3 Frequency Management

1) The rated frequency of the system shall be 50 Hz and shall normally be regulated within the limits prescribed in IEGC Clause 4.6(b) as also specified in Connection Conditions. STU & SLDC as constituent of Northern Region shall make all possible efforts to ensure that grid frequency remains within 49.0 – 50.5 Hz band.

2) Falling frequency

   Under falling frequency conditions, SLDC shall take appropriate action to issue instructions, in co-ordination with NRLDC to arrest the falling frequency and restore frequency within permissible range. Such instructions may include despatch instruction to SSGS and/or instruction to Distribution Utility/ Licensee and Open Access Customers to reduce load demand by appropriate manual and/or automatic load shedding.

3) Rising Frequency

   Under rising frequency conditions, SLDC shall take appropriate action to issue instructions to SSGS in co-ordination with NRLDC to arrest the rising frequency and restore frequency within permissible range. SLDC shall also issue instructions to Distribution Utility/ Licensee and Open Access Customers in coordination with NRLDC to lift Load shedding (if exists) in order to take additional load. In case of Load Crash, SLDC shall take steps as per Section Operation Planning of the Code.

9.4 Responsibilities

1) SLDC shall monitor actual power drawal against scheduled power drawal and regulate internal generation and demand to maintain this schedule. SLDC shall also monitor reactive power drawal and availability of capacitor banks.
2) State Sector Generating Stations within J & K shall follow the despatch instructions issued by SLDC.
3) Distribution Utility/ Licensee and Open Access Customers shall comply with the instructions of SLDC for managing load & reactive power drawal as per system requirement.

9.5 Voltage Management

1) Users using the State Transmission System shall make all possible efforts to ensure that the grid voltage always remains within the limits specified in IEGC at clause 5.2 (r) as re-produced below:

Nominal	As per IEGC	
	Maximum	Minimum
400	420	360
220	245	200
132	145	120

2) STU and/or SLDC shall carry out load flow studies based on operational data 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. On the basis of these studies, SLDC shall instruct SSGS to maintain specified voltage level at interconnecting points. SLDC and STU shall co-ordinate with the Distribution Utility/ Licensee to determine voltage level at the interconnection points.

   SLDC shall continuously monitor 220/132/66 KV voltage levels at strategic sub-stations.

3) SLDC shall take appropriate measures to control State Transmission System voltages, which may include but not be limited to transformer tap changing, capacitor / reactor switching including capacitor switching by Distribution Utility/ Licensee at 66 KV & 33 KV substations, operation of Hydro unit as synchronous condenser and use of MVAr reserves with SSGS within technical limits agreed to between STU and Generators. Generators shall inform SLDC of their reactive reserve capability promptly on request.
4) SSGS (except CPPs) shall make available to SLDC the up to date capability curves for all Generating Units, as detailed in SECTION CONNECTION CONDITIONS, indicating any restrictions, to allow accurate system studies and effective operation of the State Transmission System. CPPs shall similarly furnish the net reactive capability that will be available for Export to / Import from State Transmission System.
5) Distribution Utility/ Licensee and Open Access Customers shall participate in voltage management by providing Local VAR compensation (as far as possible in low voltage system close to load points) such that they do not depend upon EHV grid for reactive support.

9.6 General

Close co-ordination between Users and SLDC and STU shall exist at all times for the purposes of effective frequency and voltage management.

SECTION 10

MONITORING OF GENERATION & DRAWAL

10.1 Introduction

The monitoring of SSGS output and active and reactive reserve capacity is important to evaluate the performance of generation plants. The monitoring of actual Drawal against schedule is important to ensure that STU and Distribution Utility/ Licensee contribute towards improving system performance and observe Grid discipline.

10.2 Objective

The objective of this section is to define the responsibilities of all SSGS in the monitoring of Generating Unit reliability and performance, and STU's/ Distribution Utility's/ Licensee's compliance with the scheduled Drawal to assist SLDC in managing voltage and frequency.

10.3 Monitoring Procedure

1) For effective operation of the State Transmission System, it is important that a SSGS's declared availability is realistic and that any departures are continually and invariably fed back to the Generator to help effect improvement.
2) The SLDC shall continuously monitor Generating Unit outputs and Bus voltages. More stringent monitoring may be performed at any time when there is reason to believe that a SSGS's declared availability may not match the actual availability or declared output does not match the actual output.
3) 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.
4) SLDC shall inform a SSGS, in writing, if the continual monitoring demonstrates an apparent persistent or material mismatch between the despatch instructions and the Generating Unit output or breach of the Connection Conditions. Continued discrepancies shall be resolved by the State Electricity Grid code Review Committee with a view to either improve performance in future, providing 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.
5) SSGS (excluding CPPs) shall provide to SLDC 15-minute block-wise generation summation outputs where no automatically transmitted metering or SCADA/RTU

equipment exists. CPPs shall provide to SLDC 15-minute block-wise export / import MW and MVAr.

6) The SSGS shall provide any other logged readings that SLDC may reasonably require, for monitoring purposes where SCADA data is not available.
7) The Connection Points / Interface Points with the Inter State Transmission Systems including the Transmission Lines and Substations of the Central Transmission Utility, the metering arrangements including installation, testing, operation and maintenance of meters and processing of data required for accounting of energy exchanges and the average frequency, on 15 minute time block basis shall be provided by the Central Transmission Utility / NRLDC. The timely collection, transmission, and transportation of data shall be the responsibility of the concerned constituents in whose Premises the meters are installed. The NRLDC shall be responsible for computation of actual net injection of each ISGS and actual net drawal of the state based on meter readings. In line with the provisions of IEGC, NRLDC shall forward these data by each Thursday noon for the seven day period ending on the previous Sunday mid night. All computations carried out by NRLDC shall be open for checking / verification for a period of 15 days. In case any omission/ mistake is detected, NRLDC shall forthwith make a complete check and rectify the same.

10.4 Generating Unit Trippings

1) SSGS shall promptly inform SLDC of the tripping of a Generating Unit, with reasons in accordance with the guidelines given in the Section 'Operational Event/incident Reporting'. 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.
2) SSGS shall submit a more detailed report of Generating Unit tripping to SLDC on monthly basis by first week of the succeeding month.

10.5 Monitoring of Drawal

1) SLDC shall continuously monitor actual MW Drawal by Distribution Utility/ 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.
2) SLDC shall continuously monitor the actual MVAr drawal to the extent possible. This will be used to assist in State Transmission System voltage management.

10.6 Energy Accounting

1) SLDC shall prepare every month, the accounts of energy injection and energy drawal by:-
    - Distribution Licensees

- Open Access Customers within J & K
- SSGS, CPP connected to the State Grid.
- Injection/drawal by NRPC as reflected in Monthly Regional Energy Account (REA).

2) The monthly state energy accounts so prepared by SLDC shall be sent to all concerned for the purpose of monthly billing.
3) In the preparation of such energy accounts, SLDC shall take into consideration:-

   i. Bulk Supply Agreements for supply and/or transmission of power, bilateral agreements, short term and spot purchases affected by any licensee, and
   ii. Policy guidelines or decisions of State Electricity Grid code Review Committee
   iii. Decisions/directives of the Commission,
   iv. Components of tariff as approved by the Commission, and
   v. Such accounts by NRPC.

4) For the purpose of preparation of energy accounts, the joint meter reading(s) taken on 1st of every month at inter connection points between STU and State Genco or any IPP or CPP or Open Access Customers and between STU and Distribution utility/ licensee or between two distribution licensees shall be conveyed to SLDC by 5th of every month.
5) Monthly State Energy accounts for J & K shall be prepared by SLDC by 7^{th} of every month and shall be conveyed to all concerned for raising bills. Such energy accounts shall be subject to inspection/verification/checking and raising any objection within 15 days of date of issue. If no objection is raised, energy accounts shall be finalized. In case, any objection is raised, same shall be deliberated in Commercial and Transmission Metering Committee and finalized as per their decision. Supplementary bills/credit note shall be raised accordingly.
6) In case energy accounts prepared/finalized by SLDC require any change on account of revisions of energy accounts by NRPC, SLDC shall suo-moto or on the request of Commercial & Transmission Metering Committee shall effect changes following the provisions of Sub-regulation 5 above.
7) The revised IEGC as issued by CERC on 6^{th} Jan 2005 specifies payment mechanism for Reactive VAr exchanges between the beneficiaries under clause 6.6. Payment of reactive charges to the central pool is the obligation of the beneficiaries connected to the State Grid. Therefore, STU/Transmission Licensee, in consultation with the beneficiaries, shall in the light of above scheme in the IEGC, propose a scheme for settlement of reactive VAr drawal by different beneficiaries within the State, for approval by the Commission. Till such time STU proposes a payment scheme for exchange of reactive VAr among beneficiaries, the reactive charges paid/received by it shall be adjusted in its ARR and recovered from beneficiaries through Transmission charges.

10.7 Data Requirement

The Generating utilities/Companies and the CPPs shall submit the following data on monthly basis to the SLDC in the first week of every succeeding month:

(a) Generating utilities/Companies:

(i) Quarter hourly generation and summation on real time basis,

(ii) Logged readings of Generating Units as required,

(iii)Detailed report of the Generator Unit trippings.

(b) CPPs (above 5 MW): Quarter hourly export/import MW on real time basis.

SECTION 11

CONTINGENCY PLANNING

11.1 Introduction

This section describes the steps in the recovery process to be followed by all Users in the event of total or partial blackouts of the State Transmission System or Regional System.

11.2 Objective

The objective of this section is to define the responsibilities of all Users to achieve the fastest recovery in the event of the State Transmission System or Regional System blackout, taking into account essential loads, generator capabilities and system constraints.

11.3 Contingency Planning Procedure

SLDC shall be prepared to face and efficiently handle the following types of contingencies and restoration of system back to normal in accordance with the System Restoration Procedure of Northern Region prescribed under IEGC:

- Partial system black out in the state due to multiple tripping of the transmission lines emanating from power stations/sub-stations
- Total black out in the state/region
- Synchronisation of system islands and system split

In case of partial black out in the system/state, priority is to be given for early restoration of generating station units, which have tripped. Start up generating for the generating station shall be extended through shortest possible route and within shortest possible time from adjoining sub-station/ generating station where the supply is available. Synchronising facility at all power stations and 220 kV sub-station having inter-connection with ISTS shall be available.

In case of total regional black out, SLDC In-charge shall co-ordinate and follow the instructions of NRLDC for early restoration of the entire grid. Start-up power to the thermal stations shall be given by the hydel stations or through interstate supply, if available. All possible efforts shall be made to extend the hydel supply to the thermal power stations through shortest transmission network so as to avoid high voltage problem due to low load conditions. For safe and fast restoration of supply, SLDC shall formulate the proper sequence of operation for major generating units, lines, transformers and load within the state in consultations with NRLDC. The sequence of operation shall include opening, closing/tripping of circuit breakers, isolators, on-load tap-changers etc.

11.4 Restoration Procedure

J & K falls in the Northern Regional Grid. SLDC shall follow the sequence prescribed for restoration procedure, avail start-up power and synchronize the system elements as per the directions and instructions prescribed for it. Detailed procedure for restoration of the State Transmission System shall be prepared by SLDC for the following contingencies and shall be in conformity with the System Restoration Procedure of the Northern Region prescribed under IEGC.

- Total System Black out
- Partial System Blackout
- Synchronisation of System Islands and System Split

The restoration process shall take into account the generator capabilities and the operational constraints of Regional and the State Transmission System with the object of achieving normalcy in the shortest possible time. All Users should be aware of the steps to be taken during major Grid Disturbance and system restoration process.

11.5 Special Considerations

During restoration process following the State Transmission System or Regional System blackout conditions, normal standards of voltage and frequency shall not apply.

Utility/ Licensee with essential loads shall separately identify non-essential components of such loads, which may be kept off during system contingencies. Utility/Licensee shall draw up an appropriate schedule with corresponding load blocks in each case. The non-essential loads can be put on only when system normalcy is restored, as advised by SLDC.

All Users shall pay special attention to carry out the procedures so that secondary collapse due to undue haste or inappropriate loading is avoided.

Despite the urgency of the situation, careful, prompt and complete logging of all operations and operational messages shall be ensured by all Users to facilitate subsequent investigation into the incident and the efficiency of the restoration process. Such investigation shall be conducted promptly after the incident.

11.6 Post Disturbance Analysis

SLDC as per guidelines and instructions from NRLDC shall carryout the post disturbance analysis of all major grid disturbances resulting into total or partial system blackout and system split and desynchronism of any part of the State

Electricity Grid. All users shall co-ordinate and furnish the data pertaining to the system disturbance to enable SLDC to analyse the system disturbance and furnish report to NRLDC in accordance with Section 5.9 of the IEGC.

Protection Coordination Committee shall also review the data collected and analyse the failure of protection system either of STU or any User and recommend modification and / or improvement in the protection system/ relay setting schemes and, if necessary, of the islanding and restoration scheme of Northern Region, to be carried out by the Grid Users.

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SECTION 12

SAFETY AND LINE CLEAR PERMITS

12.1 Introduction:

This section sets out the procedure for the record of the Line Clear Permit and sets guidelines for ensuring safety from electrical hazards to the Consumers, general public and working personnel.

12.2 Objective:

The main objective of this section is to ensure safety to the working personnel of STU/ Transmission Licensee and the Users and maintenance of proper records for the issue of Line Clear Permits for allowing the working personnel to carryout the works.

12.3 Safety Standards:

1) STU/ Transmission Licensee shall prepare his own "Safety Manual" for the Transmission Lines and Substations. For the guidance of the Shift Operators, "Operation and Maintenance Manuals" for each Sub-station shall be prepared by the Licensee. These manuals shall contain all the maintenance and operation schedules based on the recommendations of the manufacturers of the various equipments installed in the Substation. These manuals shall be periodically reviewed based on the experience gained and replacement of equipments. A maintenance register for the equipments including the station batteries shall be maintained at the respective Substations. These shall be updated as and when the maintenance work is carried out and shall be periodically reviewed by the appropriate higher authority in whose control the Substation falls. Similar registers shall be maintained for the Transmission Lines.
2) The Operation Manual shall contain the details of isolation and earthing to be provided for allowing work on the equipments. The Single Line Diagram of the Substation indicating the positions of various isolating devices shall be prominently displayed in the station. Charts showing the clearances from live parts (section clearance) for working on the isolated equipments where workmen are allowed to work shall be displayed prominently at each Substation.
3) "Danger" boards shall be displayed at places approachable by the general public.
4) Regular maintenance shall be carried out on all the Transmission Lines in accordance with IS: 5613 and records of all these shall be maintained. Wherever possible hot line checking and replacement of failed insulators shall be made before and after monsoon.
5) All the equipment in the receiving stations and Substations shall be maintained in good condition as per the manufacturers' manuals and relevant Indian and/or International standards wherever available. The relays and circuit breakers shall

be checked for their proper operation whenever these are taken out for maintenance purposes. The station batteries shall be maintained in good working condition by carrying out routine checks and maintenance works. The DC system provided in all these stations shall be properly maintained with no appreciable leakage current. An on-line monitoring system for monitoring of leakage and detection of ground faults shall be provided.

12.4 Line Clear Permit (LCP):

The format under Annexure 1, 2 and 3 shall be used. The form under Annexure 1 and designated as "Requisition for Line Clear Permit" shall be used by the requesting Safety Coordinator who is an authorised person. The form under Annexure 2 and designated as "Check List for Line Clear Permit And Line Clear Permit" shall be used at the time of issue of Line Clear Permit. The form under Annexure 3 and designated as "Line Clear Return" shall be used for the return of the Line Clear Permit after the work for which the Line Clear Permit was taken is completed.

ANNEXURE - 1

REQUISITION FOR LINE CLEAR PERMIT

Date …… Time ……..

I Sri/Srimati ---------- request Line Clear Permit on the following HT/EHT Line/Equipment.

HV/EHV Apparatus/Line Identification:

Details of works to be carried out:

Estimated time required for completion:

Name and Signature …….

……

(Requesting Safety Coordinator) (Incharge of the Crew)

Designation…… …….

Date…… ……..…

(FOR USE IN SUBSTATION FROM WHERE LINE CLEAR PERMIT WILL BE ISSUED)

(a) Line Clear Permit issued : Yes/No

(b) Number and Date of Issue (Code No.):

(c) Time of Issue:

(d) Date & Time of Return:

(e) Remarks: See Check List LCP - F

RECEIPT OF LCP

I have received confirmation from …….. (Name of Issuing Safety Coordinator) at ……. (Location) that the safety precautions have been established and the instructions will not be issued at his location for their removal until his LCP-E is cancelled.

Name and Signature……

(Requesting Safety Coordinator)

In charge of the Crew at …….. (Time) on …… (Date)

(To be printed on the reverse of LCP-E: Checklist of Line Clear Permit)

CONDITIONS:

(a) This permit is valid only for working in the Feeder/Equipment mentioned herein and not in any other Feeder/Equipment.

(b) Only authorised persons are allowed to work on Feeders/Equipments for which the permit has been issued.

(c) Works as per requisition only should be carried out.

(d) Before touching any part of the Feeder/Equipment the same should be Earthed at two points on either side through standard discharge rods connected with good Earths. Temporary Earths may only be removed after completion of all works and after all the men have come down from the Feeder/Equipment.

(e) Work should be so planned that the Line Clear is returned before or at the time indicated. If unavoidable delay is anticipated advance information should be given to the location from where the Line Clear is issued.

(f) Before return of the Line Clear, it should be ensured that all the men, materials, tools/tackles etc. on line have returned and reported that all temporary earths removed. There should also be a check on the material, Tools and Plant issued for the work to ensure that nothing is left behind on the Line or Equipment.

(g) Only authorised persons should return Line Clear.

(h) In case the Line Clear cannot be returned in person, the same may be returned to the Line Clear Issuing Authority over Telephone by naming the Code Words assigned and the telephone number which is used for naming the Code Words assigned. In case two or more different Code Words are issued to the two or more persons in whose favour the permit is given, those persons must jointly return the Line Clear by naming their own Code Words. The Line Clear Return will not be deemed to be accepted unless returned by all these persons.

(i) The Line Clear issuing authority should go over the checklist of Line Clear Return before accepting it.

(j) If Line Clear is returned over telephone, the Line Clear Return Form duly filled and signed should be sent to the Line Clear Issuing Authority by post immediately for record.

(k) Control persons should keep all the required data of LCP issued & LCR received. He should monitor and keep specific note in log sheet when more than one LCP are issued on same line/ equip/bay along with code words.

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ANNEXURE - 2

check list FOR LINE CLEAR PERMIT AND LINE CLEAR PERMIT

LCP-F Number…….
Dated……Time.....

CHECK LIST OF THE LINE CLEAR PERMIT:

(a) Name of location for which line clear is issued.

(b) Reference and Authority requisitioning line clear: (Indicate original LCP-E number including suffix and prefix).

(c) Identity of HV Apparatus.

(d) Sources from which the Line/Equipment is charged.

(e) No./name of Circuit Breaker/Isolating Switch open at each of above sources.

(f) Whether confirmed that the Line is disconnected at both ends.

(g) Whether line is Earthed at both ends.

(h) Whether the Circuit Breaker truck removed in case of indoor switchgear controlling the Feeder/Equipment for which line clear is given.

(i) Whether fuses of control supply voltage of the Circuit Breaker/Isolating Switches controlling the feeder/equipment for which line clear is given are removed and kept in safe custody.

(j) Time of issue of Line Clear Permit and LCP-E No.

(k) Name of requesting Safety Coordinator on whom LCP-E is issued.

(l) Approximate Time for returning LCP-E as ascertained from the Requesting Coordinator.

Name and Signature……..
(Issuing Safety Coordinator)
Designation…….

LINE CLEAR PERMIT

LCP - F No…….
I Sri/Srimati ---------- (Issuing Safety Coordinator) do hereby issue permission to Sri/Srimati---------- (Requesting Safety Coordinator) for carrying out works as per requisition No……..date……..Time .....
The EHV/ HV Line/equipment herein described are declared safe. The permission is subject to the conditions given in LCP-E.
Name and Signature……..
(Person issuing Line Clear Permit)
Designation…….

****

ANNEXE 3

Line Clear Return

LCP - G Number…….
Date ……Time.....
LCP-F No…….. Dated…….
I Sri/Srimati ---------- hereby return the LCP no -----at time ------- for the following HT/EHT Line/Apparatus. I declare that all the crew who were sent on work have been withdrawn, temporary earth(s) removed, all repair tools and materials checked and the Feeders/Equipments mentioned below are safe to be energised.

(a) HV/EHV Apparatus/Line Identification:

(b) Safety Precaution no longer required:

(c) Isolation [State locations and each point of Isolation indicating means by which Isolation was achieved.]

(d) Earthing [State location at which Earthing was established and identify each point of Earthing means, which achieved Earthing.]

(e) Details of work done

CHECK LIST TO BE TICKED OFF:

(a) Whether all men withdrawn: Yes ☐

(b) Whether all temporary Earth removed: Yes ☐

(c) Whether materials, Tools and Plant used in the work have been checked: Yes ☐

(d) Code Number (If used when Line Clear is returned over phone) ----------

Name and Signature…….
(Requesting Safety Coordinator)
Designation……
Incharge of the Crew ----------
(Designation)

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SECTION 13

INTER USER BOUNDARY SAFETY

13.1 Introduction

This section specifies the requirements for maintaining safe-working practices associated with inter user boundary operations. It lays down the procedure to be followed when work is required to be carried out on electrical equipment that is connected to another User's system.

13.2 Objective

The objective of this section is to achieve agreement and consistency on the principles of safety as prescribed in the J & K Electricity Rules when working across the inter user boundary between one User and another User.

13.3 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).

13.4 Procedure

1) 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.
2) All Users with a direct inter user 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.
3) Whenever work across an inter-user boundary is to be carried, 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.
4) Should the work extend over more than one shift, the Designated Officer shall ensure that the relief Designated Officer is fully briefed on the nature of the work and the code words in operation.
5) 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.

6) 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.
7) 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.
8) 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.
9) STU shall develop an agreed written procedure for inter-user boundary safety and continually update it.

Any dispute concerning inter user Boundary Safety shall be resolved at the level of Operation & Co-ordination Committee.

13.5 Special Consideration

1) For inter-user boundary between STU and other User's circuits, all Users shall comply with the agreed safety rules, which must be in accordance with J & K Electricity Rules.
2) Each Designated Officer shall maintain a legibly written safety log, in chronological order, of all operations and messages relating to safety co-ordination sent and received by him. All safety logs shall be retained for a period of not less than 10 years.

SECTION 14

OPERATIONAL EVENT AND INCIDENT REPORTING

14.1 Introduction

This section describes the reporting procedure of reportable events in the State Transmission System

14.2 Objective

The objective of this section is to define the events/ incidents to be reported, the reporting route to be followed and the information to be supplied to ensure a consistent approach to the reporting of incidents and accidents on the State Transmission System.

14.3 Reportable Events

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

- Exceptionally high / low system voltage or frequency.
- Serious equipment problem relating to major circuit breaker, transformer or bus bar.
- Loss of major Generating Unit.
  System split, State Transmission System breakaway or Black Start.
- Tripping of Transmission Line, ICT (Inter connecting transformer) and capacitor banks.
- Major fire incidents.
- Force-Majeure condition like flooding or lightening etc.
- Major failure of protection.
- Equipment and Transmission Line overload.
- Accidents-Fatal and Non-Fatal.
- Load Crash / Loss of Load
- Excessive Drawal deviations.
- Minor equipment alarms.

The last two reportable incidents are typical examples of those which are of lesser consequence, but which still affect the State Transmission System and can be reasonably classed as minor. They will require corrective action but may not warrant management reporting until these are repeated for sufficient time.

14.4 Reporting Procedure

1) Reporting Time for events and accidents

   All reportable incidents occurring on lines and equipment of 132 KV and above and all the lines on which there is the inter user flow affecting the State Transmission System shall promptly be communicated by the User whose equipment has experienced the incident (the reporting User) to any other significantly affected Users and to SLDC.

   Within 1 (one) hour of being informed by the Reporting User, SLDC should ask for a written report on any incident.

   If the reporting incident cannot be classified as minor then the Reporting User shall submit an initial written report within two hours to 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.

   In other cases the Reporting User shall submit a report within 5 (five) days to SLDC.

2) SLDC shall call for a report from any User on any reportable incident affecting other Users and STU, in case the same is not reported by such User whose equipment might have been source of the reportable incident.

   The above shall not relieve any User from the obligation to report events in accordance with J&K Electricity Rules.

   The format of such a report shall be as agreed by the State Electricity Grid code Review Committee, but will typically contain the following information:

   i. Location of incident.
   ii. Date and time of incident.
   iii. Plant or equipment involved.
   iv. Details of relay indications with nature of fault implications.
   v. Supplies and quantum interrupted and duration if applicable.
   vi. Amount of generation lost if applicable.
   vii. Brief description of incident.
   viii. Estimate of time to return to service.
   ix. Name of originator.
   x. Possibility of alternate arrangement of supply

14.5 Reporting Form

The standard reporting form other than for accidents shall be as agreed from time to time by the State Electricity Grid code Review Committee. A typical form is attached (APPENDIX-G).

14.6 Major Failure

Following a major failure, SLDC and other Users shall co-operate to inquire and establish the cause of such failure and make appropriate recommendations. SLDC shall report the occurrence of major failure to the Commission immediately for information and shall submit the enquiry report to the Commission within two months of the incident.

14.7 Accident Reporting

Reporting of accidents shall be in accordance with J & K Electricity Rules 1978. Notice of accident and failure of supplies or transmission of electricity shall be in the specified form to the Commission and the Electrical Inspector.

SECTION 15

PROTECTION

15.1 Introduction

In order to safeguard the State Transmission System and Users' system from faults occurring in other User's system, it is essential that certain minimum standards for protection be adopted. This section describes these minimum standards.

15.2 Objective

The objective of this section is to define the minimum protection requirements for any equipment connected to the State Transmission System and thereby minimise disruption due to faults.

15.3 General Principles

1) Protection standards are treated as interface issues because of the possible severe inter-user boundary repercussions of faults that occur in the system of any entity. Minimum protection requirements are prescribed in this section because inadequate protection or mal-operation of protection system of any entity may result in far reaching consequences, disturbances and even damages to the systems of other entities.
2) No item of electrical equipment shall be allowed to remain connected to the State Transmission System unless it is covered by minimum specified protection aimed at reliability, selectivity, speed, stability and sensitivity.
3) All Users shall co-operate to ensure correct and appropriate settings of protection to achieve effective, discriminatory removal of faulty equipment within the time for target clearance specified in this section.
4) Protection settings shall not be altered, or protection relays bypassed and/or disconnected without consultation and agreement between all affected Users. In a case where protection is bypassed and/or disconnected by an agreement, then the cause must be rectified and the protection restored to normal condition as quickly as possible. If agreement has not been reached, the electrical equipment shall be removed from service forthwith.
5) STU shall follow the guideline issued by NRLDC regarding:

    i. Planning for upgrading and strengthening protection system based on analysis of grid disturbance and partial/total blackout in the State Transmission System.
    ii. Planning of Islanding and System Split schemes and installation of Under Frequency Relays and df/dt relays. The Protection Practices and Protocol Manual shall have provision for the same.

15.4 Protection Co-ordination

A Protection Coordination Committee (PCC) shall be constituted as per SECTION -3 of the State Electricity Grid code and shall be responsible for all the protection coordination functions. PCC shall investigate any malfunctioning of protection or other unsatisfactory protection issues. Users shall take prompt action to correct any protection mal-function or issue as discussed and agreed to in these periodical meetings. Protection Coordination Committee shall decide the date from which the existing protection provided in STU and/ or User systems not meeting the minimum requirement as stipulated in this Section is required to be changed.

15.5 Fault Clearance Times & Short-time Ratings

1) From stability consideration, the minimum short circuit current rating and time and the maximum fault clearance times for faults on any User's system directly connected to the State Transmission System, or any faults on the State Transmission System itself, are as follows:

Nominal Voltage	**Minimum Short Circuit current rating & duration for Switchgear**		**Target Fault clearance Time**
KV	KA(rms)	Seconds	msec.
400 KV	40	1	100
220 KV	40	1	160
132 KV	31.0	3	160

2) Lesser fault clearance time than the above are preferable.
3) Slower fault clearance times for faults on a Users system may be agreed to but only if, in STU's opinion, system conditions allow this. STU shall specify the required opening time and rupturing capacity of the circuit breakers at various locations for STU and Distribution Utility/ Licensee/Open Access Customers directly connected to Transmission System. At generating stations, line faults should be cleared at the generation station end within the critical clearing time so that the generators remain in synchronism.

15.6 Generator Requirements

The guidelines mentioned in the Manual on Protection of generator, generator transformer and 220 KV and 400 KV networks vide publication No. 274 of CBIP shall be kept in view.

All Generating Units and all associated electrical equipment of the Generating Units connected to the State Transmission System shall have adequate protection so that the State Transmission System does not suffer due to any disturbances originating from the Generation units. The generator protection schemes shall cover at least Differential protection, back up protection, Stator & Rotor Earth fault protection, field ground/field failure protection (not applicable to brush-less excitation system), negative sequence protection, under frequency, over flux protection, inter-turn Differential protection for generator, restricted E/F for Generator Transformer, back- up impedance protection, pole slipping protection (applicable to units above 200MW), reverse power protection etc.

15.7 Transmission Line Requirements

1) General

Every EHV line taking off from a Power Station or a sub-station shall have protection and back up protection as mentioned below. STU shall notify Users of any changes in its policy on protection.

Switchgear equipment and Relay Panels for the protection of lines of STU taking off from a Power Station shall be owned and maintained by the Generator. Any transmission line related relay settings or any change in relay settings will be carried out by the Generator in close co-ordination and consultation with STU. All such issues shall be put up in the next meeting of Protection Coordination Committee for ratification. Carrier cabinets / equipment, Line matching units including wave traps and communication cable shall be owned and maintained by STU. All Generators shall provide space, connection facility, and access to STU for such purpose.

For short transmission lines, alterative appropriate protection schemes may be adopted.

2) 400kV Transmission Lines

All 400kV transmission lines owned by STU shall have two fast acting protection schemes, the voltage of the two relays shall be fed from two different cores of the line CVT and the currents of the two relays shall be fed from two different cores of the line CTs.

Main 1 protection scheme shall be numerical, three zone, non-switched fast acting distance protection scheme with permissible inter-trip at remote end (in case of zone-2 fault)

Main 2 protection scheme shall be either similar type of numerical, three zone, nonswitched fast acting distance protection scheme with permissible inter-trip at remote end (in case of zone-2 fault) OR a unit protection scheme employing transient wave detection, directional comparison or phase comparison carrier

relaying scheme. One pole tripping and single shot auto-reclosing with adjustable dead-time shall be provided.

3) 400kV Bus-bars
All 400kV sub-station shall have bus bus-bar differential protection scheme along with LBB and auto-reclosures for transmission lines.

4) 220 KV Transmission Lines

All 220 KV transmission lines owned by STU shall have two fast acting protection schemes.

Main 1 protection scheme shall be numeric, three zone, non-switched fast acting distance protection scheme with permissible inter-trip at remote end (in case of zone-2 fault). The scheme shall have power swing blocking, location of fault recording, disturbance recording, event logger, communication port, single and three shot auto reclosing as well as Local Breaker Backup (LBB).

Main 2 protection scheme shall be static/ numeric, three zone, switched/ non-switched fast acting distance protection scheme having all features as main- 1 except auto reclosing & Local Breaker Backup)LBB).

For back-up protection, three directional IDMTL over current relays and unidirectional earth fault relay shall be provided.

5) 132 KV and 66 KV Lines

A single scheme three zone, non-switched numeric distance protection with standard built in features like single and three phase tripping, carrier inter-tripping, IDMT over current and earth fault, power swing blocking and LBB protection shall be provided as main protection.

The backup protection shall be at least two directional IDMTL over current relays and one directional earth fault relay.

For short transmission radial lines, appropriate alternative protection schemes may be adopted.

6) Busbar Protection: - Adequate busbar protection for the Station Busbar sections in all 400 kV and 220 kV class substations shall be provided.
7) Local Breaker Backup Protection (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 shall have Local Breaker Backup Protection.

15.8 Transformer Requirements

1) The protection of EHV Transformers, Power Transformers and Distribution Transformers shall be as per revised manual on transformers published by Central Board of Irrigation and Power (CBIP) Publication No. 275.
2) All windings of Auto Transformers and power transformer of EHT class shall be protected by differential relays having percent bias and harmonic restraint features.

3) Over-fluxing relays shall be provided for EHT transformers.
4) All 400kV class transformers shall have Restricted Earth Fault (REF) protection for
winding.
5) In addition, there shall be back up IDMTL over current and earth fault protection.

6) For parallel operation, such back up protection shall have directional feature. For protection against heavy short circuits, the over current relays should incorporate a high set instantaneous element, wherever overall co-ordination permits the same. However, it should not rip due to inrush of the magnetising current and should not be set to such a high value, which is not beneficial to transformer.
7) In addition to electrical protection, gas operated relays, winding temperature protection and oil temperature protection shall be provided.
8) It is recommended that the following minimum protections should be provided for transformers:

(a) All 400kV class power transformers shall be provided with differential, REF, open delta (Neutral Displacement Relay) and over-fluxing relays. In addition, there shall be back up IDMTL over current and earth fault protection. For parallel operation, such back up protection shall have inter-tripping of both HT and LT breakers. For protection against heavy short circuits, the over current relays should incorporate a high set instantaneous element. In addition to electrical protection, transformer own protection viz. buchholz, OLTC oil surge, gas operated relays, winding temperature protection, oil temperature protection, PRV relay shall be provided for alarm and trip functions. It is recommended to have Double PRV protection scheme for transformer tank.

(b) All 220kV class power transformers shall have same protections as mentioned in Sections 15.8-8 (a) except REF protection.

(c) For 132kV and 33kV class transformers of capacity 5 MVA and above, the protections shall be same as mentioned in Sections 15.8-8 (a) above except over fluxing relays, REF and PRV.

(d) For 33kV class power transformers less than or equal to 5 MVA provided on either Transmission or Distribution System, over-current with high set

instantaneous element along with auxiliary relays for transformer trip and alarm functions as per transformer requirements, shall be provided.

15.9 Sub-Station Fire Protection

Adequate precautions shall be taken and protection shall be provided against fire hazards to all Apparatus of the Users conforming to relevant Indian Standard Specification and provisions in J & K Electricity Rules.

15.10 Calibration & Testing

The protection scheme shall be tested at each 400 KV, 220 KV, 132 KV, sub-station by STU once in six months or immediately after any major fault, which ever is earlier.

Setting, co-ordination, testing and calibration of all protection schemes pertaining to generating units/stations shall be responsibility of respective SGS.

The overall co-ordination between Generators, Distribution Utility/ Licensee and STU shall be decided in meeting of Protection Co-ordination Committee. The Protection Co-ordination Committee shall review the testing and calibration procedures as and when needed.

15.11 Data Requirements

Users shall provide STU with data for this section as specified in the Data Registration section.

SECTION 16:

PART V

TRANSMISSION METERING

16.1 Introduction

1) This Section prescribes a uniform policy in respect of electricity metering for State Transmission Utility (STU), Generating Companies, inter-utility metering and any metering for all Users of Transmission System including open access customers using transmission system of State Transmission Utility and any new system interfacing with State Transmission Utility system in the state of J&K.

The objective is to define minimum acceptable metering standards which will affect proper metering of the system parameters for the purpose of accounting, commercial billing and settlement of electrical energy and will also provide information which will help to optimize the system planning.

16.2. Definitions. -

Definitions of some of the terms which have been used in this section are given hereunder-

(1) In these regulations, unless the context other wise requires, -

a) 'Accredited Test Laboratory' means a test laboratory accredited by National Accreditation Board for Testing and Calibration Laboratories (NABL);

b) 'Active Energy' means the electricity supplied or consumed during a time interval, being the integral of Active Power with respect to time, measured in the units of 'Watt – hours' or standard multiples thereof. One 'kilowatt – hour' (kWh) is one unit;

c) 'Active Power' means the electrical power, being the product of root mean square (rms) voltage, root mean square (rms) current and cosine of the phase angle between the voltage and current vectors and measured in units of 'Watt' (W) or in standard multiples thereof;

d) ‘Buyer’ means any generating company or licensee or consumer whose system receives electricity from the system of generating company or licensee;

e) ‘Check Meter’ means a meter, which shall be connected to the same core of the Current Transformer (CT) and Voltage Transformer (VT) to which main meter is connected and shall be used for accounting and billing of electricity in case of failure of main meter;

f) ‘Consumer Meter’ means a meter used for accounting and billing of electricity supplied to the consumer but excluding those consumers covered under Interface Meters;

g) ‘Correct Meter’ means a meter, which shall at least have, features, Accuracy Class and specifications as per the Standards on Installation and Operation of Meters given in Schedule of these Regulations;

h) ‘Energy Accounting and Audit Meters’ means meters used for accounting of the electricity to various segments of electrical system so as to carry out further analysis to determine the consumption and loss of energy therein over a specified time period;

i) ‘Instrument Transformer’ means the ‘Current Transformer’ (CT), ‘Voltage Transformer’ (VT) and ‘Capacitor Voltage Transformer’ (CVT);

j) ‘Interface Meter’ means a meter used for accounting and billing of electricity, connected at the point of interconnection between electrical systems of generating company, licensee and consumers, directly connected to the Inter-State Transmission System or Intra-State Transmission System who have to be covered under ABT and have been permitted open access by the Appropriate Commission;

k) ‘Main Meter’ means a meter, which would primarily be used for accounting and billing of electricity;

l) ‘Meter’ means a device suitable for measuring, indicating and recording consumption of electricity or any other quantity related with electrical system and shall include, wherever applicable, other equipment such as Current Transformer (CT), Voltage Transformer (VT) or Capacitor Voltage Transformer (CVT) necessary for such purpose;

m) 'Power Factor' means the cosine of the electrical angle between the voltage and current vectors in an AC electrical circuit;

n) 'Prepaid Meter' means a meter which facilitates use of electricity only after advance payment;

o) 'Reactive Energy' means, the integral of Reactive Power with respect to time and measured in the units of 'Volt-Ampere hours reactive (VARh) or in standard multiples thereof;

p) 'Reactive Power' means the product of root mean square (rms) voltage, root mean square (rms) current and the sine of the electrical phase angle between the voltage complexor and current complexor, measured in 'Volt – ampere reactive' (VAr) and in standard multiples thereof;

q) 'Standards' means 'Standards on Installation and Operation of Meters' given in the Schedule of this section unless otherwise any other standard specifically referred;

r) 'Standby Meter' means a meter connected to CT and VT, other than those used for main meter and check meter and shall be used for accounting and billing of electricity in case of failure of both main meter and check meter;

s) 'Time of the Day (TOD) Meter' means a meter suitable for recording and indicating consumption of electricity during specified time periods of the day.

(2) The words and expressions used and not defined in this section shall have the meaning assigned to them in section '2' "Definations".

16.3. Applicability of regulations. -

(1) These Regulations shall be applicable to meters installed and to be installed by all the generating companies and utilities/licensees who are engaged in the business of generation, transmission, trading and to all categories of Open Access consumers.

(2)These regulations provide for type, standards, ownership, location, accuracy class, installation, operation, testing and maintenance, access, sealing, safety, meter reading and recording, meter failure or discrepancies, anti tampering features, quality assurance, calibration and periodical testing of meters, additional meters and adoption of new technologies in respect of following meters for correct accounting, billing and audit of electricity:

(i) Interface meter

(ii) Energy accounting and audit Meter

16.4. Type of meters. -

(1) All interface meters, and energy accounting and audit meters shall be of static type.

(2) The meters not complying with these regulations shall be replaced by the licensee on his own or on request of the consumer. The meters may also be replaced as per the regulations or directions of the Commission or pursuant to the reforms programme of the Government.

16.5. Standards. -

All interface meters, consumer meters and energy accounting and audit meters shall-

(a) comply with the relevant standards of Bureau of Indian Standards (BIS). If BIS Standards are not available for a particular equipment or material, the relevant British Standards (BS), International Electro-technical Commission (IEC) Standards, or any other equivalent Standard shall be followed:
Provided that whenever an international Standard or IEC Standard is followed, necessary corrections or modifications shall be made for nominal system frequency, nominal system voltage, ambient temperature, humidity and other conditions prevailing in India before actual adoption of the said Standard;

(b) conform to the standards on 'Installation and Operation of Meters' as specified in Schedule annexed to these regulations and as amended from time to time.

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16.6. Ownership of meters. -

(1) **Interface meters**

(a) All interface meters installed at the points of interconnection with Inter-State Transmission System (ISTS) for the purpose of electricity accounting and billing shall be owned by CTU as per CEA regulations notified under no.-502/70/CEA/DP & D dt. 17.03.2006.

(b) All interface meters installed at the points of interconnection with Intra-State Transmission System excluding the system covered under sub-clause (a) above for the purpose of electricity accounting and billing shall be owned by STU.

(c) All interface meters installed at the points of inter connection between the two licensees excluding those covered under sub-clauses (a) and (b) above for the purpose of electricity accounting and billing shall be owned by respective licensee of each end.

(d) All interface meters installed at the points of inter connection for the purpose of electricity accounting and billing not covered under sub-clauses (a), (b) and (c) above shall be owned by supplier of electricity.

(2) **Energy accounting and audit meters**

Energy accounting and audit meters shall be owned by the generating company or Utility/licensee, as the case may be.

16.7. Locations of meters.-

(1) The location of interface meters and energy accounting and audit meters shall be as per the Table given below :

Provided that the generating companies or utility/licensees may install meters at additional locations in their systems depending upon the requirement.

Table

Sl. No	Stages	Main meter	Check meter	Standby meter
A.	**Generating Station**	On all outgoing feeders	On all outgoing feeders.	(i) High Voltage (HV) side of Generator Transformers (ii) High Voltage (HV) side of all Station Auxiliary Transformers
Explanation: The location of main, check and standby meters installed at the existing generating stations shall not be changed unless permitted by the (CEA) Authority.				
B.	**Transmission and Distribution System**	At one end of the line between the sub-stations of the same licensee, and at both ends of the line between sub-stations of two different licensees. Meters at both ends shall be considered as main meters for respective Utilities/licensees	-	There shall be no separate standby meter. Meter installed at other end of the line in case of two different licensees shall work as standby meter.
C.	Inter-Connecting Transformer (ICT)	High Voltage (HV) side of ICT.	-	Low Voltage (LV) side of ICT.
D.	Consumer directly connected to the Inter-State Transmission System or Intra-State Transmission System who have to be covered under ABT and have been permitted open access by the Appropriate Commission or Any other system not covered above	As decided by the Appropriate Commission.		

(a) **Interface Meters**

(i) Consumers who have interconnection with the Inter-State Transmission System or Intra-State Transmission System and have been permitted open access by the Commission shall be provided with interface meters.

(ii) The scheme for location of interface meters shall be submitted to the CTU or the STU or the utility/licensee by owner of the meter in advance, before the installation of the scheme.

(b) **Energy accounting and audit meters**

Energy accounting and audit meters shall be installed at such locations so as to facilitate to account for the energy generated, transmitted, distributed and consumed in the various segments of the power system and the energy loss. The location of these meters shall be as under:

(i)Generating Stations

(1) at the stator terminal of the generator;

(2) on HV and LV sides of the station and the unit auxiliary transformers;

(3) on feeders to various auxiliaries.

(ii)Transmission System

All incoming and out going feeders (If the interface meters do not exist).

16.8. Accuracy Class of meters. -

Every meter shall meet the requirement of accuracy class as specified in the standards given in the Schedule.

16.9. Installation of meters. -

(1) Generating company or utility/licensee, as the case may be, shall examine, test and regulate all meters before installation and only correct meters shall be installed.

(2) The meter shall be installed at locations, which are easily accessible for installation, testing, commissioning, reading, recording and maintenance. The place of installation of meter shall be such that minimum inconvenience and disruptions are caused to the site owners and the concerned organizations.

(3) In case CTs and VTs form part of the meters, the meter shall be installed as near the instrument transformers as possible to reduce the potential drop in the secondary leads.

16.10. Operation, Testing and Maintenance of meters. -

The operation, testing and maintenance of all types of meters shall be carried out by the generating company or the utility/licensee, as the case may be.

16.11 Access to meter. -

The owner of the premises where, the meter is installed shall provide access to the authorized representative(s) of the utility/licensee for installation, testing, commissioning, reading and recording and maintenance of meters.

16.12. Sealing of meters. -

(1) Sealing Arrangements

(a) All meters shall be sealed by the manufacturer at its works. In addition to the seal provided by the manufacturer at its works, the sealing of all meters shall be done as follows at various sealing points as per the standards given in the Schedule:

(i) Sealing of interface meters, shall also be done by both the supplier and the buyer.

(ii) Sealing of energy accounting and audit meters shall be done by the utility/licensee or generating company as the case may be.

(b) A tracking and recording software for all new seals shall be provided by the manufacturer of the meter so as to track total movement of seals starting from manufacturing, procurement, storage, record keeping, installation, series of inspections, removal and disposal.

(c) Seal shall be unique for each utility and name or logo of the utility shall be clearly visible on the seals.

(d) Only the patented seals (seal from the manufacturer who has official right to manufacture the seal) shall be used.

(e) Polycarbonate or acrylic seals or plastic seals or holographic seals or any other superior seal shall be used.

(f) Lead seals shall not be used in the new meters. Old lead seals shall be replaced by new seals in a phased manner and the time frame of the same shall be submitted by the utility/licensee to the Commission for approval.

(2) Removal of seals from meters

(a) Interface meters

Whenever seals of the interface meters have to be removed for any reason, advance notice shall be given to other party for witnessing the removal of seals and resealing of the interface meter. The breaking and re-sealing of the meters shall be recorded by the party, who carried out the work, in the meter register, mentioning the date of removal and resealing, serial numbers of the broken and new seals and the reason for removal of seals.

(c) Energy accounting and audit meters

Seal of the energy accounting and audit meter shall be removed only by the generating company or the utility/licensee who owns the meter.

16.13. Safety of meters. -

(1) The supplier or buyer in whose premises the interface meters are installed shall be responsible for their safety.

(2) utility/Licensee shall be responsible for the safety of the consumer meter located outside the premises of the consumer and the consumer shall be responsible for the safety of the real time display unit installed by the utility/licensee in consumer premises.

(3) The generating company or the utility/licensee who owns the energy accounting and audit meters shall be responsible for its safety.

16.14. Meter reading and recording. -

(1) **Interface meters**

It shall be the responsibility of the Transmission Utility /licensee to take down the meter reading and record the metered data, maintain database of all the information associated with the interface meters and verify the correctness of metered data and furnish the same to various agencies as per the procedure laid down by the Commission.

(2) Energy accounting and audit meters

It shall be the responsibility of the generating company or utility/licensee to record the metered data, maintain database of all the information associated with the energy accounting and audit meters and verify the correctness of metered data. Each generating company or utility/licensee shall prepare quarterly, half-yearly and yearly energy account for its system for taking appropriate action for efficient operation and system development.

16.15. Meter failure or discrepancies. -

(1) Interface meters

(a) Whenever difference between the readings of the Main meter and the Check meter for any month is more than 0.5%, the following steps shall be taken:

(i) checking of CT and VT connections;

(ii) testing of accuracy of interface meter at site with reference standard meter of accuracy class higher than the meter under test.

If the difference exists even after such checking or testing, then the defective meter shall be replaced with a correct meter.

(b) In case of conspicuous failures like burning of meter and erratic display of metered parameters and when the error found in testing of meter is beyond the permissible limit of error provided in the relevant standard, the meter shall be immediately replaced with a correct meter.

(c) In case where both the Main meter and Check meter fail, at least one of the meters shall be immediately replaced by a correct meter.

(d) Billing for the Failure period:

(i) Whenever a main meter goes defective, the consumption recorded by the check meter stand by meter / secondary backup (i.e. receiving end meters) shall be referred to. The details of the malfunctioning along with date and time and snaps shot parameters along with load survey shall be retrieved from the main meter. The exact nature of the mal-functioning shall be brought out after analyzing the data so retrieved and the consumption / losses to have been recorded by the main meter shall be assessed accordingly. If main as well as stand by metering systems become defective, the assessment of energy consumption for the outage period shall be done from the secondary backup meters by the concerned agencies as mutually agreed or at the level of Commercial & Metering Committee

(ii) Readings recorded by Main, Check and Standby meters for every time slot shall be analysed, crosschecked and validated by the Appropriate Load Despatch Centre (LDC). The discrepancies, if any, noticed in the readings shall be informed by the LDC in writing to the energy accounting agency for proper accounting of energy. LDC shall also intimate the discrepancies to the Appropriate Transmission Utility or the licensee, who shall take further necessary action regarding testing, calibration or replacement of the faulty meters in accordance with the provisions laid down.

(e) The defective meter shall be immediately tested and calibrated

(2) Energy accounting and audit meters

Energy accounting and audit meters shall be rectified or replaced by the generating company utility/licensee immediately after notice of any of the following abnormalities:

(a) the errors in the meter readings are outside the limits prescribed for the specified Accuracy Class;

(b) meter readings are not in accordance with the normal pattern of the load demand;

(c) meter tampering, or erratic display or damage.

16.16. Anti-tampering features of meters. -

The meters shall be provided with such anti-tampering features as per the Standards on Installation and Operation of Meters given in the Schedule.

16.17. Quality assurance of meters. -

(1) The distribution utility/licensee shall put in place a system of quality assurance and testing of meters with the approval of Commission.

(2) The utility/licensee shall set up appropriate number of accredited testing laboratories or utilize the services of other accredited testing laboratories. The utility/licensee shall take immediate action to get the accreditations of their existing meter testing laboratories from NABL, if not already done.

(3) The generating company or licensee shall ensure that all type, routine and acceptance tests are carried out by the manufacturer complying with the requirement of the relevant IS or BS or IEC as the case may be.

16.18. Calibration and periodical testing of meters. –

(1) **Interface meter**

(a) At the time of commissioning, each interface meter shall be tested by the owner at site for accuracy using standard reference meter of better accuracy class than the meter under test.

(b) All interface meters shall be tested at least once in five years. These meters shall also be tested whenever the energy and other quantities recorded by the meter are abnormal or inconsistent with electrically adjacent meters. Whenever there is unreasonable difference between the quantity recorded by interface meter and the corresponding value monitored at the billing center via communication network, the communication system and terminal equipment shall be tested and rectified. The meters may be tested using NABL accredited mobile laboratory or at any accredited laboratory and recalibrated if required at manufacturer's works.

(c) Testing and calibration of interface meters may be carried out in the presence of the representatives of the supplier and buyer. The owner of the meter shall send advance notice to the other party regarding the date of testing.

(2) Energy accounting and audit meters

Energy accounting and audit meters shall be tested at site at least once in five years or whenever the accuracy is suspected or whenever the readings are inconsistent with the readings of other meters, e.g., check meters, standby meters. The testing must be carried out without removing the CTs and VTs connection. Testing may be carried out through NABL accredited mobile laboratory using secondary injection kit, measuring unit and phantom loading or at any accredited test laboratory and recalibrated if required at manufacturer's works.

16.19. Additional meters. -

In addition to any meter which may be placed for recording the electricity consumed by the consumer, the utility/licensee may connect additional meters, maximum demand indicator or other apparatus as he may think fit for the purposes of ascertaining or regulating either the quantity of electricity supplied to the consumer, or the number of hours during which the supply is given, or the rate per unit of time at which energy is supplied to the consumer, or any other quantity or time connected with the supply to consumer:

Provided that the meter, indicator or apparatus shall not, in the absence of an agreement to the contrary, be placed otherwise than between the distributing mains of the utility/licensee and any meter:

Provided further that, where the charges for the supply of energy depend wholly or partly upon the reading or indication of any such meter, indicator or apparatus as aforesaid, the utility/licensee shall, in the absence of an agreement to the contrary, keep the meter, indicator or apparatus correct.

16.20. Adoption of new technologies. -

The distribution utility/licensee shall make out a plan for introduction and adoption of new technologies such as pre-paid meters, time of the day meters (TOD), automatic remote meter reading system through appropriate communication system with the approval of the Commission or as per the regulations or directions of the Commission or pursuant to the reforms programme of the Government.

SCHEDULE

(see regulations 16.2,16.5,16.8,16.12 and 16.16)

Part A

Standards Common To All Type of Meters

(1) These standards provide for specification of meters, immunity to external factors, sealing points and functional requirements that are required from regulatory perspective. Detailed technical specification shall be prepared by the purchaser of the meter.

(2) **Specifications of meters**

<table>
<tr><td>Standard Reference Voltage</td><td>As per IS</td></tr>
<tr><td>Voltage Range</td><td>As per IS</td></tr>
<tr><td>Standard Frequency</td><td>As per IS</td></tr>
<tr><td>Standard Basic Current</td><td>As per IS(Current range of consumer meters shall be so chosen as to record the load current corresponding to the sanctioned load)</td></tr>
<tr><td>Accuracy Class</td><td>Meters shall meet the following requirements of Accuracy Class:

<table><tr><td>Interface meters</td><td>0.2S</td></tr><tr><td colspan="2">Energy accounting and audit meters

The accuracy class of meters in generation and transmission system shall not be inferior to that of 0.2S Accuracy Class. The accuracy class of meters in distribution system shall not be inferior to that of 0.5S Accuracy Class</td></tr></table></td></tr>
<tr><td>Starting Current and Maximum Current</td><td>As per IS</td></tr>
<tr><td>Power Factor Range</td><td>As per IS</td></tr>
</table>

Power Frequency Withstand Voltage	As per IS
Impulse Voltage Withstand Test for 1.2/50 micro sec	As per IS
Power Consumption	As per IS

(3) Meter shall have downloading facilities of metered data through Meter Reading Instrument (MRI).

(4) **Immunity to External Factors**

The meter shall be immune to external influences like magnetic induction, vibration, electrostatic discharge, switching transients, surge voltages, oblique suspension and harmonics and necessary tests shall be carried out in accordance with relevant standard.

(5) **Sealing Points**

Sealing shall be done at the following points (as applicable):
(a) Meter body or cover
(b) Meter terminal cover
(c) Meter test terminal block
(d) Meter cabinet

(6) The accuracy class of Current transformers (CTs) and Voltage transformers (VTs) shall not be inferior to that of associated meters. The existing CTs and VTs not complying with these regulations shall be replaced by new CTs and VTs, if found defective, non-functional or as per the directions of the Commission. In case the CTs and VTs of the same Accuracy Class as that of meters can not be accommodated in the metering cubicle or panel due to space constraints, the CTs and VTs of the next lower Accuracy Class can be installed.

(7) The Voltage Transformers shall be electromagnetic VT or Capacitive Voltage Transformer (CVT).

Part B

Standards for interface meters

(1) Functional Requirements:

(a) The Interface meters suitable for ABT shall be static type, composite meters , as self –contained devices for measurement of active and reactive energy, and certain other parameters as described in the following paragraphs. The meters shall be suitable for being connected directly to voltage transformers (VTs) having a rated secondary line-to-line voltage of 110 V, and to current transformers (CTs) having a rated secondary

current of IA (Model-A :3 element 4 wire or Model C: 2 element , 3 wire) or 5A (model-B: 3 element , 4 wire or Model D: 2 element 3 wire). The reference frequency shall be 50Hz.

(b) The meters shall have a non-volatile memory in which the following shall be automatically stored:

(i) Average frequency for each successive 15-minute block, as a two digit code (00 to 99 for frequency from 49.0 to 51.0Hz).

(ii) Net Wh transmittal during each successive 15-minute block, upto second decimal, with plus/minus sign.

(iii) Cumulative Wh transmittal at each midnight, in six digits including one decimal.

(iv) Cumulative VArh transmittal for voltage high condition, at each midnight, in six digits including one decimal.

(v) Cumulative VArh transmittal for voltage low condition, at each midnight, in six digits including one decimal.

(vi) Date and time blocks of failure of VT supply on any phase, as a star(*) mark.

(c) The meters shall store all the above listed data in their memories for a period of at least ten days. The data older than ten days shall get erased automatically. Each meter shall have an optical port on its front for tapping all data stored in its memory using a hand held data collection device. The meter shall be suitable for transmitting the data to remote location using appropriate communication medium.

(d) The active energy (Wh) measurement shall be carried out on 3-phase, 4-wire principle, with an accuracy as per class 0.2 S of IEC-687/IEC-62053-22. In model-A and C, the energy shall be computed directly in CT and VT secondary quantities, and indicated in watt-hours. In model-B and Model D , the energy display and recording shall be one fifth of the Wh computed in CT and VT secondary quantities.

(e) The Var and reactive energy measurement shall also be on 3-phase, 4 wire principle, with an accuracy as per class 2 of IEC-62053-23 or better. In model-A or Model C, the Var and VArh computation shall be directly in CT and VT secondary quantities. In model-B or Model D, the above quantities shall be displayed and recorded as one-fifth of those computed in CT and VT secondary quantities. There shall be two reactive energy registers, one for the period when average RMS voltage is above 103% and the other for the period the voltage is below 97%.

(f) The 15-minute Wh shall have a +ve sign when there is a net Wh export from substation busbars, and a –ve sign when there is a net Wh import. The integrating (cumulative) registers for Wh and Varh shall move forward when there is Wh/Varh export from substation busbars, and backward when there is an import.

(g) The meters shall also display (on demand), by turn, the following parameters :

(i) Unique identification number of the meter

(ii) Date

(iii) Time
(iv) Cumulative Wh register reading
(v) Average frequency of the previous 15-minute block
(vi) Net Wh transmittal in the previous 15-minute block, with +/-sign
(vii) Average percentage voltage
(viii) Reactive power with +/- sign
(ix) Voltage-high VArh register reading
(x) Voltage-low VArh register reading.

(h) The three line-to-neutral voltages shall be continuously monitored, and in case any of these falls below 70%, the condition shall be suitably indicated and recorded. The meters shall operate with the power drawn from the VT secondary circuits, without the need for any auxiliary power supply. Each meter shall have a built-in calendar and clock, having an accuracy of 30 seconds per month or better.

(i) The meters shall be totally sealed and tamper-proof, with no possibility of any adjustment at site, except for a restricted clock correction. The harmonics shall be filtered out while measuring Wh, Var and VArh, and only fundamental frequency quantities shall be measured/computed.

(j) The Main meter and the Check meter shall be connected to same core of CTs and VTs.

Part C

Standards for energy accounting and audit meters

(1) The energy accounting and audit meters shall be suitable for measurement, recording and display of cumulative active energy with date and time.

(2) The energy accounting and audit meters may also have the facility to measure, record and display one or more of the following parameters depending upon the energy accounting and audit requirement. All parameters excluding instantaneous electrical parameters shall also be stored in memory.

(a) Apparent power

(b) Phase wise kilowatt at peak KVA

(c) Phase wise KVA(reactive) at peak KVA

(d) Phase wise voltage at peak KVA

(e) Power down time

(f) Average power factor

(g) Line currents

(h) Phase voltages

(i) Date and time

(j) Tamper events

(3) The energy accounting and audit meter shall have data storage capacity for at least 35 days in a non-volatile memory.

(4) Energy accounting and audit meters shall have facility to download the parameters through meter reading instruments as well as remote transmission of data over communication network.

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SECTION-17

DATA REGISTRATION

17.1 Introduction:

This section specifies a list of all the data required by STU and SLDC, which is to be provided by the Users, and the data required by the Users to be provided by STU at the required time specified in the various Sections of the Grid Code. The corresponding Sections of the Grid Code contain the obligation to submit the data and define the times at which the data is to be supplied by the Users.

17.2 Objective:

The objective of this section is to list all the data and the corresponding sections of the Grid Code to be provided by the Users to STU and vice versa in accordance with the provisions of the State Electricity Grid Code.

17.3 Responsibility:

1) All the Users are responsible for submitting the up-to-date data in accordance with the provisions of the Grid Code. All the Users shall provide STU and SLDC, the names, addresses and the telephone numbers of the persons responsible for sending the data. STU shall inform all the Users and SLDC of the names, addresses and telephone numbers of the persons responsible for receiving the data.
2) STU shall provide up-to-date data to Users as provided in the relevant Sections of the Grid Code.
3) Responsibility for the correctness of these data rests with the concerned Users providing the data.

17.4 List of Data to be Registered:

The following data are required to be furnished by the Utilities/ Licensees:-

Appendix: - A

Standard planning Data (Generation)	As per	appendix	A-1	By SSGS
Standard planning Data (Transmission)	As per	-do-	A-2	By STU/ Transmission/ Licensee
Standard planning Data (Distribution)	As per	-do-	A-3	by Distribution Utility/Licensee

Appendix – B

Detailed Planning Data (Generation)	As per	appendix	B-1	By SSGS
Detailed Planning Data (Transmission)	As per	-do-	B-2	By STU/ Transmission Licensee
Detailed Planning Data (Distribution)	As per	-do-	B-3	By Distribution Utility/ Licensee

Appendix – C
Operational Planning Data

Outage Planning Data

Demand Estimates	As per	appendix	C-1.1	By Distribution Utility/Licensee
Estimates of load shedding	As per	-do-	C-1.2	By Distribution Utility/Licensee
Year Ahead Outage Programme (Generator Outage Programme)	As per	-do-	C-1.3.1	By SSGS
Year Ahead NREB Outage Programme	As per	-do-	C-1.3.2	By NREB
Year Ahead CPP's Outage Programme	As per	-do-	C- 1.3.3	By CPP's
Year Ahead Distribution Utility's/Licensee's Outage Programme	As per	-do-	C-1.3.4	By Distribution Utility/Licensee
STU's Overall Outage Programme	As per	-do-	C-1.3.5	

Generation Scheduling Data	As per	-do-	C-2	By SSGS
Capability Data	As per	-do-	C-3	By SSGS
Response to frequency Change	As per	-do-	C-4	By SSGS
Monitoring of Generation	As per	-do-	C-5	By SSGS
Essential and Non-Essential Load Data	As per	-do-	C-6	By Distribution Utility/Licensee

Appendix-D

Protection Data	As per	appendix	D	By SSGS

Appendix-E

Metering Data	As per	appendix	E	By SSGS

Appendix-F

Site Responsibility Schedule	As per	appendix	F	By STU

Appendix -G

Operational Event/ Incident Reporting	As per	appendix	G	

17.5 Methods of submission of Data:

1) The data schedules are structured to serve as standard formats for data submission and these formats shall be used for written data submission. Wherever standard data formats are not given, these should be developed by SLDC/STU in consultation with the Users.
2) All the data to be submitted to SLDC/STU or to such other department including any other Transmission utility/Licensee as STU may from time to time notify to Users. The name of the person who submits each schedule of data shall be indicated.

3) Wherever a computer data link exists between the User and SLDC/STU, data may be submitted through this link. The data shall be in the same format as specified for paper transmission except for electronic encoding for which some other format may be more appropriate. The User shall specify the method to be used in consultation with STU/SLDC/ and resolve issues such as protocols, transmission speeds etc., at the time of transmission.

17.6 Changes in User's Data:

Whenever the User becomes aware of the change to any items of the data registered under License, the User must promptly notify the STU of the changes. STU on receipt of the changes shall promptly correct the database accordingly. This shall also apply to any data compiled by STU regarding his own System.

17.7 Data not Supplied:

All the Users are obliged to supply the data referred to in the individual Sections of the Grid Code. In case any data is missing and not supplied by the User, STU/ SLDC may act reasonably. If and when necessary, the may estimate such data depending upon the urgency of the situation. Similarly in case any data is missing and not supplied by STU, the concerned User may, act reasonably. If and when necessary, he may estimate such data depending upon the urgency of the situation. Such estimates, in each case, shall be based upon the corresponding data for similar Plant or Apparatus, or upon such other information, the User or STU or SLDC as the case may be, deems appropriate.

17.8 Special Considerations:

STU or SLDC or any User may at any time make reasonable request for extra data as necessary.

STU shall supply data required/requested by SLDC for system operation, from data back to SLDC.

Secretary.

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APPENDICES

Appendix A: STANDARD PLANNING DATA

Standard Planning Data consist of details, which are expected to be normally sufficient for STU to investigate the impact on the State Transmission System due to User development.

Standard planning data covering (a) preliminary project planning
REFERENCE TO:

SECTION - 5 SYSTEM PLANNING

SECTION - 6 CONNECTION CONDITION

A-1 STANDARD PLANNING DATA (GENERATION)

For **SSGS** – Thermal

A.1.1 THERMAL (COAL / GAS/FUEL LINKED)

A.1.1.1 GENERAL

i	Site	Give location map to scale showing roads, railway lines, Transmission lines, canals, pondage and reservoirs if any.
ii	Coal linkage/ Fuel (Like Liquefied Natural Gas, Naphtha etc.) Linkage	Give information on means of coal transport / carriage. In case of other fuels, give details of source of fuel and their transport.
iii	Water Sources	Give information on availability of water for operation of the **Power Station**.
iv	Environmental	State whether forest or other land areas are affected.
v	Site Map (To Scale)	Showing area required for **Power Station** coal linkage, coal yard, water pipe lines, ash disposal area, colony etc.
vi	Approximate period of construction	

A.1.1.2 CONNECTION

i	Point of **Connection**	Give single line diagram of the proposed **Connection** with the system.
ii	Step up voltage for **Connection** (kV)	

A.1.1.3 STATION CAPACITY

i	Total **Power Station** capacity (MW)	**State** whether development will be carried out in phases and if so, furnish details.
ii	No. of units & unit size (MW)	

A.1.1.4 GENERATING UNIT DATA

I	Steam **Generating Unit**	State type, capacity, steam pressure, steam temperature etc.
ii	Steam turbine State type, capacity.	

iii Generator	Type
	Rating (MVA)
	Speed (RPM)
	Terminal voltage (kV)
	Rated Power Factor
	Reactive Power Capability
	(MVAr) in the range of 0.95 of leading and 0.85 lagging
	Short Circuit Ratio
	Direct axis (saturated) transient reactance (% on MVA rating)
	Direct axis (saturated) sub-transient reactance (% on MVA rating)
	Auxiliary Power Requirement
	MW and MVAr Capability curve
IV Generator Transformer	Type
	Rated capacity (MVA)
	Voltage Ratio (HV/LV)
	Tap change Range (+ % to - %)
	Percentage Impedance (Positive Sequence at Full load)

A.1.2 HYDRO ELECTRIC

For **SSGS** – Hydro

A.1.2.1 GENERAL

Site	Give location map to scale showing roads, railway lines, and transmission lines.
Site map (To scale)	Showing proposed canal, reservoir area, water conductor system, fore-bay, power house etc.
Submerged Area	Give information on area submerged, villages submerged, submerged forest land, agricultural land etc
Whether storage type or run of river type	
Whether catchments receiving discharges from other reservoir or power plant.	
Full reservoir level	
Minimum draw down level.	
Tail race level	
Design Head	
Reservoir level v/s energy potential curve	
Restraint, if any, in water discharges	
Approximate period of construction.	

A.1.2.2 CONNECTION

i Point of Connection	Give single line diagram proposed Connection with the Transmission System.
ii Step up voltage for Connection (kV)	

A.1.2.3 STATION CAPACITY

i Total **Power Station** capacity (MW)	State whether development is carried out in phases and if so furnish details.
ii No. of units & unit size (MW)	

A.1.2.4 GENERATING UNIT DATA

i Operating Head (in Metres)	a. Maximum	
	b. Minimum	
	c. Average	
Hydro Unit	Capability to operate as synchronous condenser	

	Water head versus discharges curve (at full and part load)
	Power requirement or water discharge while operating as synchronous condenser
i Turbine State	Type and capacity
iii Generator	Type
	Rating (MVA)
	Speed (RPM)
	Terminal voltage (kV)
	Rated Power Factor
	Reactive Power Capability (MVAr) in the range 0.95 of leading and 0.85 of lagging
	MW & MVAr capability curve of generating unit
	Short Circuit Ratio
	Direct axis transient (saturated) reactance (% on rated MVA)
	Direct axis sub-transient (saturated) reactance (% on rated MVA)
	Auxiliary Power Requirement (MW)
iv Generator - Transformer	a. Type
	b. Rated Capacity (MVA)
	c. Voltage Ratio HV/LV
	d. Tap change Range (+% to -%)
	e. Percentage Impedance (Positive Sequence at Full Load).

A.2 <u>STANDARD PLANNING DATA (TRANSMISSION)</u>

For STU and Transmission Licensees

Note: The compilation of the data is the internal matter of STU, and as such STU shall make arrangements for getting the required data from different Departments of STU/other transmission licensees (if any) to update its Standard Planning Data in the format given below:

i. Name of line (Indicating Power Stations and substations to be connected).
ii. Voltage of line (kV).
iii. No. of circuits.
iv. Route length (km).
v. Conductor sizes.
vi. Line parameters (PU values).
  a. Resistance/km
  b. Inductance/km
  c. Susceptance/ km (B/2)
vii. Approximate power flow expected- MW & MVAr.
viii. Terrain of the route- Give information regarding nature of terrain i.e. forest land, fallow land, agricultural and river basin, hill slope etc.
ix. Route map (to scale) - Furnish topographical map showing the proposed route showing existing power lines and telecommunication lines.
x. Purpose of Connection- Reference to Scheme, wheeling to other States etc.
xi. Approximate period of Construction.

A.3. STANDARD PLANNING DATA (DISTRIBUTION)
For Distribution Utility/ Licensee

A.3.1 GENERAL

i.	Area Map (to scale) for	Marking the area in the map of Jammu and Kashmir

		which Distribution **License** is applied. .
ii	Consumer Data	Furnish categories of consumers, their numbers and connected loads.
iii	Reference to Electrical Divisions presently in charge of the Distribution.	

A.3.2 CONNECTION

.i	Points of **Connection**	Furnish single line diagram showing points of **Connection**
ii	Voltage of supply at points of **Connection**	
iii	Names of Grid Sub-Stations feeding the points of **Connection**	

A.3.3 LINES AND SUBSTATIONS

i	Line Data Furnish lengths of line and voltages within the Area.
Ii	Sub-station Data Furnish details of 33/11kV sub-station, 11/0.4kV sub-stations, capacitor installations

A.3.4 LOADS

i	Loads drawn at points of **Connection**.
ii	Details of loads fed at **EHV**, if any. Give name of consumer, voltage of supply, contract demand and name of Grid Sub-station from which line is drawn, length of **EHV** line from Grid Sub-station to consumer's premises.
iii	Reactive Power compensation installed

A.3.5 DEMAND DATA (FOR ALL LOADS 1 MW AND ABOVE)

i	Type of load	State whether furnace loads, rolling mills, traction loads, other industrial loads, pumping loads etc.
ii	Rated voltage and phase	
iii	Electrical loading of equipment	State number and size of motors, types of drive and control arrangements.
iv	Power Factor	
v	Sensitivity of load to voltage and frequency of supply.	
vi	Maximum Harmonic content of load.	
vii	Average and maximum phase unbalance of load.	
viii	Nearest sub-station from which load is to be fed.	
ix	Location map to scale	Showing location of load with reference to lines and sub-stations in the vicinity.

A.3.6 LOAD FORECAST DATA

Peak load and energy forecast for each category of loads for each of the succeeding 5 years.

Details of methodology and assumptions on which forecasts are based.

If supply is received from more than one substation, the sub-station wise break up of peak load and energy projections for each category of loads for each of the succeeding 5 years along with estimated Daily load curve.

Details of loads 1 MW and above.

Name of prospective consumer.

Location and nature of load/complex.

Sub-Station from which to be fed.

Voltage of supply.

Phasing of load.

Appendix B: DETAILED PLANNING DATA

REFER TO:

SECTION – 5 SYSTEM PLANNING

SECTION -- 6 CONNECTION CONDITIONS

B.1 DETAILED PLANNING DATA (GENERATION)

PART-I FOR ROUTINE SUBMISSION

B.1.1 THERMAL POWER STATIONS

For **SSGS** – Thermal

B.1.1.1 GENERAL

1. Name of **Power Station**.
2. Number and capacity of **Generating Units** (MVA).
3. Ratings of all major equipments (Boilers and major accessories, Turbines, Alternators, Generator Unit Transformers etc).
4. Single line Diagram of **Power Station** and switchyard.
5. Relaying and metering diagram.
6. Neutral Grounding of **Generating Units**.
7. Excitation control- (What type is used? e.g. Thyristor, Fast Brushless Excitors)
8. Earthing arrangements with earth resistance values.

B.1.1.2 PROTECTION AND METERING

i. Full description including settings for all relays and protection systems installed on the **Generating Unit**, Generator unit Transformer, Auxiliary Transformer and electrical motor of major equipments listed.
ii. Full description including settings for all relays installed on all outgoing feeders from **Power Station** switchyard, Tie circuit breakers, and incoming circuit breakers.
iii. Full description of inter-tripping of circuit breakers at the point or points of **Connection** with the **Transmission System**.
iv. Most probable fault clearance time for electrical faults on the **User's** System.
v. Full description of operational and commercial metering schemes.

B.1.1.3 SWITCHYARD

In relation to interconnecting transformers:

i. Rated MVA.
ii. Voltage Ratio.
iii. Vector Group.
iv. Positive sequence reactance for maximum, minimum, normal Tap. (% on MVA).
v. Positive sequence resistance for maximum, minimum, normal Tap. (% on MVA).
vi. Zero sequence reactance (% on MVA).
vii. Tap changer Range (+% to -%) and steps.
viii. Type of Tap changer. (off/on load).

In relation to switchgear including circuit breakers, isolators on all circuits connected to the points of **Connection**:

i. Rated voltage (kV).
ii. Type of circuit breaker (MOCB/ABCB/SF6).
iii. Rated short circuit breaking current (kA) 3 phase.
iv. Rated short circuit breaking current (kA) 1 phase.
v. Rated short circuit making current (kA) 3 phase.
vi. Rated short circuit making current (kA) 1-phase.
vii. Provisions of auto reclosing with details.

Lightning Arresters -

Technical data

Communication -

Details of communication equipment installed at points of connections.

Basic Insulation Level (kV) -

i. Bus bar.
ii. Switchgear.
iii. Transformer bushings.
iv. Transformer windings.

B.1.1.4 GENERATING UNITS

(a) Parameters of Generating Units:

i. Rated terminal voltage (kV).
ii. Rated MVA.
iii. Rated MW.
iv. Speed (rpm) or number of poles.
v. Inertia constant H (MW Sec./MVA).
vi. Short circuit ratio.
vii. Direct axis synchronous reactance (% on MVA) Xd.
viii. Direct axis (saturated) transient reactance (% on MVA) Xd'.
ix. Direct axis (saturated) sub-transient reactance (% on MVA) Xd".
x. Quadrature axis synchronous reactance (% on MVA) Xq .
xi. Quadrature axis (saturated) transient reactance (% on MVA) Xq'.
xii. Quadrature axis (saturated) sub-transient reactance (% on MVA) Xq".
xiii. Direct axis transient open circuit time constant (Sec) $T'd_o$.
xiv. Direct axis sub-transient open circuit time constant (See) $T"d_o$.
xv. Quadrature axis transient open circuit time constant (Sec) $T'q_o$.
xvi. Quadrature axis sub-transient open circuit time constant (Sec) $T''q_o$.
xvii. Stator Resistance (Ohm)R_a.
xviii. Neutral grounding details.
xix. Stator leakage reactance (Ohm) X_1.
xx. Stator time constant (Sec).
xxi. Rated Field current (A).
xxii. Open Circuit saturation characteristic for various terminal Voltages giving the compounding current to achieve the same.
xxiii. MW and MVAr Capability curve

B.1.1.5 Parameters of excitation control system:

i. Type of Excitation.
ii. Maximum Field Voltage.
iii. Minimum Field Voltage.
iv. Rated Field Voltage.
v. Details of excitation loop in block diagrams showing transfer functions of individual elements using I.E.E.E. symbols.

vi. Dynamic characteristics of over - excitation limiter.
vii. Dynamic characteristics of under-excitation limiter.

B.1.1.6 Parameters of governor:

i. Governor average gain (MW/Hz).
ii. Speeder motor setting range.
iii. Time constant of steam or fuel Governor valve.
iv. Governor valve opening limits.
v. Governor valve rate limits.
vi. Time constant of Turbine.
vii. Governor block diagram showing transfer functions of individual elements using I.E.E.E. symbols.

B.1.1.7 Operational parameters:

i. Minimum notice required to synchronise a **Generating Unit** from de-synchronization.
ii. Minimum time between synchronizing different **Generating Units** in a **Power Station**.
iii. The minimum block load requirements on synchronizing.
iv. Time required for synchronizing a **Generating Unit** for the following conditions:
a. Hot
b. Warm
c. Cold
v. Maximum Generating Unit loading rates for the following conditions:
a. Hot
b. Warm
c. Cold
vi. Minimum load without oil support (MW).

B.1.1.8 GENERAL STATUS

i. Detailed Project report.
ii. Status Report
(a) Land
(b) Coal
(c) Water
(d) Environmental clearance
(e) Rehabilitation of displaced persons
iii. Techno-economic approval by **Central Electricity Authority** (**CEA**)**.**
iv. Approval of **State** Government/Government of India.
v. Financial Tie-up.

B.1.1.9 CONNECTION

i. Reports of Studies for parallel operation with the **State Transmission System**.
(a) Short Circuit studies
(b) Stability Studies.
(c) Load Flow Studies.
ii. Proposed **Connection** with the **State Transmission System**.
(a) Voltage
(b) No. of circuits
(c) Point of **Connection**.

B.1.2 HYDRO - ELECTRIC STATIONS

For **SSGS** – Hydro

B.1.2.1 GENERAL

i. Name of **Power Station**.
ii. No and capacity of units. (MVA)
iii. Ratings of all major equipment.
  a) Turbines (HP)
  b) Generators (MVA)
  c) Generato**r** Transformers (MVA)
  d) Auxiliary Transformers (MVA)
iv. Single line diagram of **Power Station** and switchyard.
v. Relaying and metering diagram.
vi. Neutral grounding of Generator.
vii. Excitation control.
viii. Earthing arrangements with earth resistance values.
ix. Reservoir Data.
  a) Salient features
  b) Type of Reservoir
    i. Multipurpose
    ii. For Power
  c) Operating Table with
    i. Area capacity curves and
    ii. Unit capability at different net heads

B.1.2.2 PROTECTION

i. Full description including settings for all relays and protection systems installed on the **Generating Unit**, Generator transformer, auxiliary transformer and electrical motor of major equipment included.
ii. Full description including settings for all relays installed on all outgoing feeders from **Power Station** switchyard, tiebreakers, and incoming breakers.
iii. Full description of inter-tripping of breakers at the point or points of **Connection** with the **Transmission System**.
iv. Most Probable fault clearance time for electrical faults on the **User**'s System.

B.1.2.3 SWITCHYARD

(a) Interconnecting transformers:
  i. Rated MVA
  ii. Voltage Ratio
  iii. Vector Group
  iv. Positive sequence reactance for maximum, minimum and normal Tap.(% on MVA).
  v. Positive sequence resistance for maximum, minimum and normal Tap.(% on MVA).
  vi. Zero sequence reactance (% on MVA)
  vii. Tap changer range (+% to -%) and steps.
  viii. Type of Tap changer (off/on load).
  ix. Neutral grounding details.
(b) Switchgear (including circuit breakers, Isolators on all circuits connected to the points of **Connection**).
  i. Rated voltage (kV).
  ii. Type of Breaker (MOCB/ABCB/SF6).
  iii. Rated short circuit breaking current (kA) 3 phase.
  iv. Rated short circuit breaking current (kA) 1 phase.
  v. Rated short circuit making current (kA) 3 phase.
  vi. Rated short circuit making current (kA) 1 phase.

vii. Provisions of auto reclosing with details.

(c) Lightning Arresters

Technical data

(d) Communications

Details of Communications equipment installed at points of connections.

(e) Basic Insulation Level (kV)

i. Bus bar.
ii. Switchgear.
iii. Transformer Bushings
iv. Transformer windings.

B.1.2.4 GENERATING UNITS

(a) Parameters of Generator

i. Rated terminal voltage (kV).
ii. Rated MVA.
iii. Rated MW.
iv. Speed (rpm) or number of poles.
v. Inertia constant H (MW sec./MVA).
vi. Short circuit ratio.
vii. Direct axis synchronous reactance Xd (% on MVA).
viii. Direct axis (saturated) transient reactance (% on MVA) X'd.
ix. Direct axis (saturated) sub-transient reactance (% on MVA) X"d.
x. Quadrature axis synchronous reactance (% on MVA) Xq.
xi. Quadrature axis (saturated) transient reactance (% on MVA) X'q.
xii. Quadrature axis (saturated) sub-transient reactance (% on MVA) X"q.
xiii. Direct axis transient open circuit time constant (sec) $T'd_o$.
xiv. Direct axis sub-transient open circuit time constant (sec) $T''d_o$.
xv. Quadrature axis transient open circuit time content (sec) $T'q_o$.
xvi. Quadrature axis transient open circuit time constant (sec) $T''q_o$.
xvii. Stator Resistance (Ohm) R_a.
xviii. Stator leakage reactance (Ohm) X_1.
xix. Stator time constant (Sec).
xx. Rated Field current (A).
xxi. Neutral grounding details.
xxii. Open Circuit saturation characteristics of the Generator for various terminal voltages giving the compounding current to achieve this.
xxiii. Type of Turbine.
xxiv. Operating Head (Metres)
xxv. Discharge with full gate opening (cumecs)
xxvi. Speed Rise on total Load throw off(%).
xxvii. MW and MVAr Capability curve

(b) Parameters of excitation control system:
As applicable to thermal **Power Stations**

(c) Parameters of governor:
As applicable to thermal **Power Station**

(d) Operational parameter:

i. Minimum notice required to Synchronise a **Generating Unit** from desynchronisation.
ii. Minimum time between Synchronising different **Generating Units** in a **Power Station**.
iii. Minimum block load requirements on Synchronising.

B.1.2.5 GENERAL STATUS

i. Detailed Project Report.
ii. Status Report.
   (a) Topographical survey
   (b) Geological survey
   (c) Land
   (d) Environmental Clearance
   (e) Rehabilitation of displaced persons.
iii. Techno-economic approval by Central Electricity Authority.
iv. Approval of State Government/Government of India.
v. Financial Tie-up.

B.1.2.6 CONNECTION

i. Reports of Studies for parallel operation with the **State Transmission System**.
   (a) Short Circuit studies
   (b) Stability Studies.
   (c) Load Flow Studies.
ii. Proposed **Connection** with the **State Transmission System**.
   (a) Voltage
   (b) No. of circuits
   (c) Point of **Connection**.

B.1.2.7 RESERVOIR DATA

(a) Dead Capacity
(b) Live Capacity

B.1.3 GAS POWER STATIONS

For SSGS – Gas

B.1.3.1 GENERAL

i. Name of **Power Station**.
ii. Number and capacity of **Generating Units** (MVA).
iii. Ratings of all major equipments (Turbines, Alternators, Heat Recovery Boiler, Generator Unit Transformers etc)
iv. Single line Diagram of **Power Station** and switchyard.
v. Relaying and metering diagram.
vi. Neutral Grounding of **Generating Units**.
vii. Excitation control- (What type is used? e.g. Thyristor, Fast Brushless Excitors)
viii. Earthing arrangements with earth resistance values.
ix. Start up Engine
x. Turbine Details

B.1.3.2 PROTECTION AND METERING

i. Full description including settings for all relays and protection systems installed on the Generating Unit, Generator unit Transformer, Auxiliary Transformer and electrical motor of major equipments listed.
ii. Full description including settings for all relays installed on all outgoing feeders from Power Station switchyard, Tie circuit breakers, and incoming circuit breakers.
iii. Full description of inter-tripping of circuit breakers at the point or points of Connection with the Transmission System.
iv. Most probable fault clearance time for electrical faults on the User's System.
v. Full description of operational and commercial metering schemes.

B.1.3.3 SWITCHYARD

In relation to interconnecting transformers:

i. Rated MVA.
ii. Voltage Ratio.
iii. Vector Group.
iv. Positive sequence reactance for maximum, minimum, normal Tap.(% on MVA).
v. Positive sequence resistance for maximum, minimum, normal Tap.(% on MVA).
vi. Zero sequence reactance (% on MVA).
vii. Tap changer Range (+% to -%) and steps.
viii. Type of Tap changer. (off/on load).

In relation to switchgear including circuit breakers, isolators on all circuits connected to the points of Connection:

i. Rated voltage (kV).
ii. Type of circuit breaker (MOCB/ABCB/SF6).
iii. Rated short circuit breaking current (kA) 3 phase.
iv. Rated short circuit breaking current (kA) 1 phase.
v. Rated short circuit making current (kA) 3 phase.
vi. Rated short circuit making current (kA) 1-phase.
vii. Provisions of auto reclosing with details.

Lightning Arresters -
Technical data
Communication -

Details of communication equipment installed at points of connections.

Basic Insulation Level (kV) -

i. Bus bar.
ii. Switchgear.
iii. Transformer bushings.
iv. Transformer windings.

B.1.3.4 GENERATING UNITS

(a) Parameters of Generating Units:

i. Rated terminal voltage (kV).
ii. Rated MVA.
iii. Rated MW.
iv. Speed (rpm) or number of poles.
v. Inertia constant H (MW Sec./MVA).
vi. Short circuit ratio.
vii. Direct axis synchronous reactance (% on MVA) Xd.
viii. Direct axis (saturated) transient reactance (% on MVA) Xd'.
ix. Direct axis (saturated) sub-transient reactance (% on MVA) Xd".
x. Quadrature axis synchronous reactance (% on MVA)Xq .
xi. Quadrature axis (saturated) transient reactance (% on MVA) Xq'.
xii. Quadrature axis (saturated) sub-transient reactance (% on MVA) Xq".
xiii. Direct axis transient open circuit time constant (Sec) $T'd_o$.
xiv. Direct axis sub-transient open circuit time constant (Sec) $T"d_o$.
xv. Quadrature axis transient open circuit time constant (Sec) $T'q_o$.
xvi. Quadrature axis sub-transient open circuit time constant (Sec) $T''q_o$.
xvii. Stator Resistance (Ohm) R_a.
xviii. Neutral grounding details.
xix. Stator leakage reactance (Ohm) X_1.
xx. Stator time constant (Sec).
xxi. Rated Field current (A).

xxii. Open Circuit saturation characteristic for various terminal Voltages giving the compounding current to achieve the same.

xxiii. MW and MVAr Capability curve

B.1.3.5 Parameters of excitation control system:

i. Type of Excitation.

ii. Maximum Field Voltage.

iii. Minimum Field Voltage.

iv. Rated Field Voltage.

v. Details of excitation loop in block diagrams showing transfer functions of individual elements using I.E.E.E. symbols.

vi. Dynamic characteristics of over - excitation limiter.

vii. Dynamic characteristics of under-excitation limiter.

B.1.3.6 Parameters of governor:

i. Governor average gain (MW/Hz).

ii. Speeder motor setting range.

iii. Time constant of steam or fuel Governor valve.

iv. Governor valve opening limits.

v. Governor valve rate limits.

vi. Time constant of Turbine.

vii. Governor block diagram showing transfer functions of individual elements using I.E.E.E. symbols.

B.1.3.7 Operational parameters:

i. Minimum notice required synchronising a Generating Unit from de-synchronization.

ii. Minimum time between synchronizing different Generating Units in a Power Station.

iii. The minimum block load requirements on synchronizing.

iv. Time required for synchronizing a Generating Unit for the following conditions:

a. Hot

b. Warm

c. Cold

v. Maximum Generating Unit loading rates for the following conditions:

a. Hot

b. Warm

c. Cold

vi. Minimum load without oil support (MW).

B.1.3.8 GENERAL STATUS

i. Detailed Project report.

ii. Status Report

(a) Land

(b) Gas/Liquid Fuel

(c) Water

(d) Environmental clearance

(e) Rehabilitation of displaced persons

iii. Approval of **State** Government/Government of India.

iv. Financial Tie-up.

B.1.3.9 CONNECTION

i. Reports of Studies for parallel operation with the State Transmission System.
   (a) Short Circuit studies
   (b) Stability Studies.
   (c) Load Flow Studies.
ii. Proposed Connection with the State Transmission System.
   (a) Voltage
   (b) No. of circuits
   (c) Point of Connection.

B.2 DETAILED SYSTEM DATA - TRANSMISSION

For **STU** and Transmission Licensees

B.2.1 GENERAL

i. Single line diagram of the Transmission System down to 33kV bus at Grid Sub-station detailing:
   (a) Name of Sub-station.
   (b) Power Station connected.
   (c) Number and length of circuits.
   (d) Interconnecting transformers.
   (e) Sub-station bus layouts.
   (f) Power transformers.
   (g) Reactive compensation equipment.
ii. Sub-station layout diagrams showing:
   (a) Bus bar layouts.
   (b) Electrical circuitry, lines, cables, transformers, switchgear etc.
   (c) Phasing arrangements.
   (d) Earthing arrangements.
   (e) Switching facilities and interlocking arrangements.
   (f) Operating voltages.
   (g) Numbering and nomenclature:
      i. Transformers.
      ii. Circuits.
      iii. Circuit breakers.
      iv. Isolating switches.

B.2.2 LINE PARAMETERS (for all circuits)

i. Designation of Line.
ii. Length of line (km).
iii. Number of circuits.
iv. Per Circuit values.
   (a) Operating voltage (kV).
   (b) Positive Phase sequence reactance (pu on 100 MVA) X_1
   (c) Positive Phase sequence resistance (pu on 100 MVA) R_1
   (d) Positive Phase sequence susceptance (pu on 100 MVA) B_1
   (e) Zero Phase sequence reactance (pu on 100 MVA) X_0
   (f) Zero Phase sequence resistance (pu on 100 MVA) R_0
   (g) Zero Phase sequence susceptance (pu on 100 MVA) B_0

B.2.3 TRANSFORMER PARAMETERS (For all transformers)

i. Rated MVA
ii. Voltage Ratio
iii. Vector Group
iv. Positive sequence reactance, maximum, minimum and normal (pu on 100 MVA) X_1
v. Positive sequence resistance, maximum, minimum and normal (pu on 100 MVA) R_1
vi. Zero sequence reactance (pu on 100 MVA).
vii. Tap change range (+% to -%) and steps.
viii. Details of Tap changer. (Off/On load).

B.2.4 EQUIPMENT DETAILS (For all substations)

i. Circuit Breakers
ii. Isolating switches
iii. Current Transformers
iv. Potential Transformers

B.2.5 RELAYING AND METERING

i. Relay protection installed for all transformers and feeders along with their settings and level of co-ordination with other Users.
ii. Metering Details.

B.2.6 SYSTEM STUDIES

i. Load Flow studies (Peak and lean load for maximum hydro and maximum thermal generation).
ii. Transient stability studies for three-phase fault in critical lines.
iii. Dynamic Stability Studies
iv. Short circuit studies (three-phase and single phase to earth)
v. Transmission and Distribution Losses in the Transmission System.

B.2.7 DEMAND DATA (For all substations)

i. Demand Profile (Peak and lean load).

B.2.8 REACTIVE COMPENSATION EQUIPMENT

i. Type of equipment (fixed or variable).
ii. Capacities and/or Inductive rating or its operating range in MVAr.
iii. Details of control.
iv. Point of Connection to the System.

B.3. DETAILED PLANNING DATA (DISTRIBUTION)

For Distribution Utility/Licensees

B.3.1 GENERAL

i. Distribution map (To scale). Showing all lines up to 11kV and sub-stations belonging to the Supplier.
ii. Single line diagram of Distribution System (showing distribution lines from points of Connection with the Transmission System, 33/11kV substations, 11/0.4kV substation, consumer bus if fed directly from the Transmission System).
iii. Numbering and nomenclature of lines and sub-stations (Identified with feeding Grid sub-stations of the Transmission and concerned 33/11kV substation of Supplier).

B.3.2 CONNECTION

i Points of Connection (Furnish details of existing arrangement of Connection).

ii Details of metering at points of Connection.

B.3.3 LOADS

i. Connected load - Active and Reactive Load. Furnish consumer details, Number of Consumers category wise, details of loads 1 MW and above, power factor.

ii. Information on diversity of load and coincidence factor.

iii. Daily demand profile (current and forecast) on each 33/11kV sub-station.

iv. Cumulative demand profile of Distribution System (current & forecast.

Appendix C: OPERATIONAL PLANNING DATA

C.1 OUTAGE PLANNING DATA

REFER TO:

SECTION 7 OUTAGE PLANNING

C.1.1 DEMAND ESTIMATES
For Utility/Distribution Licensees

Item	Due date/ Time
Estimated aggregate annual sales of Energy in Million Units and peak and lean demand in MW & MVAr at each Connection point for the next financial year.	15th November of current year
Estimated aggregate monthly sales of Energy in million Units and peak and lean demand in MW & MVAr at each Connection point for the next month.	25th of current month
Hourly demand estimates for the day ahead.	9.00 Hours every day.

C.1.2 ESTIMATES OF LOAD SHEDDING

For Distribution Utility/ Licensee

Item	Due date/ Time
Details of discrete load blocks that may be shed to comply with instructions issued by SLDC when required, from each Connection point.	Soon after Connection is made.

C.1.3 YEAR AHEAD OUTAGE PROGRAMME (For the financial year)
C.1.3.1 GENERATOR OUTAGE PROGRAMME
For **SSGS**

Item	**Due date/ Time**
Identification of Generating Unit.	15th November each year
MW, which will not be available as a result of Outage.	15th November each year
Preferred start date and start-time or range of start dates and start times and period of Outage.	15th November each year
If outages are required to meet statutory requirements, then the latest- date by which Outage must be taken.	15th November each year

C.1.3.2 YEAR AHEAD NREB OUTAGE PROGRAMME
(**Affecting Transmission System**)

Item	**Due date/ Time**
MW, which will not be available as a result of Outage from Imports through external Connections.	1st November each year
Start-date and start-time and period of Outage.	1st November each year

C.1.3.3 YEAR AHEAD CPP's OUTAGE PROGRAMME

Item	Due date/ Time
MW, which will not be available as a result of Outage.	30th November each year
Start-date and start time and period of Outage.	30th November each year

C.1.3.4 YEAR AHEAD DISTRIBURION UTILITY'S/LICENSEES OUTAGE PROGRAMME

Item	Due date/ Time
Loads in MW not available from any Connection point.	15th November each year
Identification of Connection point.	15th November each year
Period of suspension of Drawal with start-date and start-time.	15th November each year

C.1.3.5 STU's OVERALL OUTAGE PROGRAMME

Item	Due date/ Time
Report on proposed Outage programme to **NREB**.	15th February each year
Release of finally agreed Outage plan.	15th February each year

C-2. GENERATION SCHEDULING DATA

REFER TO:

SECTION 8: SCHEDULING AND DESPATCH
For SSGS
Item Due date/ Time

Appendix C-2

GENERATION SCHEDULING AND DESPTACH DATA
(Refer clause)
To be furnished to the SLDC :

	Schedule and Despatch	**Submitted by**
1	Day ahead 15 minutes block wise MW/MVAr availability (0.00 - 24.00 Hrs) of SSGS .	9.00 hours daily
2	Status of Generating unit Excitation AVR in service (Yes/No)	---------do-------
3	Status of Generating Unit Speed Control System Governor in service (yes/No)	---------do-------
4	Spinning Reserve Capability (MW)	---------do-------
5	Backing down Capability with / without Oil Support (MW)	---------do-------
6	Hydro Reservoir Levels and restrictions	---------do-------
7	Day ahead 15 minutes block wise MW import/export from CPP's	---------do-------
8	Distribution Utility's Sub station wise 15 minutes block wise MW and MWh requirements from 00.00 hrs to 24.00 hours of following day to SLDC	---------do-------
9	15 minutes block wise MW and MWh entitlements from CGS	10.00 hours daily
10	Tentative Drawal schedule for the next day by SLDC to RLDC and despatch schedules for all generating stations in the State	15.00 hours daily
11	RLDC to convey the Net Drawal schedules to all beneficiaries, stations and distribution in charges and ex power plant despatch schedule to each ISGS	17.00 hours daily
12	SLDC to convey for the next day the Ex power plant desptach schedule to each SSGS and net drawal schedule to each beneficiary	18.00 hours daily
13	State sector generating companies and distribution utilities/ licensees to inform modification if any to SLDC	21.00 hours daily
14	SLDC to inform RLDC the revised schedule	22.00 hours daily
15	NRLDC to issue final generation and drawal schedule	23.00 hours daily
16	SLDC to convey the revised schedules for the next day to all concerned	23.30 hours daily.

C-3 CAPABILITY DATA

REFER TO:

SECTION 9 : FREQUENCY AND VOLTAGE MANAGEMENT
For SSGS

Item	
Generators and IPPs shall submit to STU up-to-date capability curves for all Generating Units.	On receipt of request from STU/SLDC
CPPs shall submit to STU net return capability that shall be available for Export/Import from Transmission System.	On receipt of request from STU/ SLDC

C-4 RESPONSE TO FREQUENCY CHANGE

REFER TO:

SECTION 9 - FREQUENCY AND VOLTAGE MANAGEMENT

For SSGS

Item	
Primary Response in MW at different levels of loads ranging from minimum Generation to registered capacity for frequency changes resulting in fully opening of governor valve.	On receipt of request from STU/ SLDC
Secondary response in MW to frequency changes	On receipt of request from STU/ SLDC.

C-5 MONITORING OF GENERATION

REFER TO:

SECTION -10 MONITORING OF GENERATION AND DRAWAL

For SSGS

Item	
SSGS shall provide quarter hourly generation summation to SLDC.	Real time basis
CPPs shall provide quarter hourly export/ import MW to SLDC.	Real time basis
Logged readings of Generators to SLDC.	As required
Detailed report of Generating Unit tripping on monthly basis.	In the first week of the succeeding month

C-6 ESSENTIAL AND NON-ESSENTIAL LOAD DATA

REFER TO:

SECTION -11 CONTINGENCY PLANNING
For Distribution Utility/Licensee

Item	**Due Date/ Time**
i. Schedule of essential and non-essential loads on each discrete load block for purposes of load shedding.	As soon as possible after **Connection**

Appendix D: PROTECTION DATA

REFER TO:

SECTION 15 - PROTECTION

Item	Due date/ Time
For SSGS	
Generators / CPPs / IPPs shall submit details of protection requirement and schemes installed by them as referred to in B-1. Detailed Planning Data under sub-section "Protection And Metering".	As applicable to Detailed Planning Data
For STU /Transmission Licensee	
The STU shall submit details of protection equipment and schemes installed by them as referred to in B-2. Detailed system Data, Transmission under sub-section "Relaying and Metering" in relation to Connection with any User.	As applicable to Detailed Planning Data

Appendix E: METERING DATA

REFER TO:

SECTION – 16 METERING

Item	**Due date/ Time**
For SSGS	
SSGS shall submit details of metering equipment and scheme installed by them as eferred in B-1. Detailed Planning Data under sub-section "Protection and Metering".	As applicable to Detailed Planning Data
For STU /Transmission Licensee	
STU shall submit details of metering equipment and schemes installed by them as referred in B-2. Detailed System Data, Transmission under sub-section "Relaying and Metering" in relation to Connection with any User.	As applicable to Detailed Planning Data

Appendix F: SITE RESPONSIBILITY SCHEDULE

REFER TO:

SECTION – 6 CONNECTION CONDITIONS

Name of Power Station/Sub-Station
Site Owner:
Tel. Number:
Fax Number:

Item of Plant/ Apparatus	Plant Owner	Safety Responsibility	Control Responsibility	Operation Responsibility	Maintenance Responsibility	Remarks
……kV Switchyard						
All equipment including bus bars						
Feeders						
Generating Units						

Note:- Please attach single line diagram and site common drawings for each connection point.

Appendix G: INCIDENT REPORTING

REFER TO:SECTION – 14: OPERATIONAL EVENT /INCIDENT REPORTING

FIRST REPORT……. Date: ……
Time: ……

Date and time of incident
Location of incident
Type of incident
System parameters before the incident (Voltage, Frequency, Flows, Generation, etc.)
Relay indications received and performance of protection
Damage to equipment
Supplies interrupted and duration, if applicable
Amount of Generation lost, if applicable
Possibility of alternate supply arrangement
Estimate of time to return service
Cause of incident
Any other relevant information and remedial action taken
Recommendations for future improvement/repeat incident
Name of the Organisation