JHARKHAND STATE ELECTRICITY REGULATORY COMMISSION,
RANCHI

Draft JHARKHAND STATE ELECTRICITY REGULATORY COMMISSION
(STATE GRID CODE) REGULATIONS 2026
The ____ April, 2026

No JSERC/_____ -- In exercise of the powers conferred by clause (zp) of section 181 read along with clause (h) of section 86 of the Electricity Act, 2003 (36 of 2003), and all other powers enabling on that behalf, the Jharkhand State Electricity Regulatory Commission hereby makes the following regulations, namely: -

1. Short title, extent and commencement

1.1 These Regulations may be called the Jharkhand State Electricity Regulatory Commission (State Grid Code) Regulations, 2026.

1.2 These Regulations shall extend to the whole of the State of Jharkhand.

1.3 These Regulations shall come into force from the date of their publication in the Official Gazette.

2. Introduction

2.1 The State Grid Code lays down the rules, guidelines and standards to be followed by various agencies and participants in the Jharkhand State Electricity Grid to plan, develop, maintain and

operate the state grid system, in the most efficient, reliable, and economic manner, while facilitating a healthy competition in the generation and supply of electricity.

2.2 This State Grid Code contains the following parts, namely:

Part A: General- This part deals with the scope and application of these regulations and constitutions, powers and functions of Grid Coordination Committee;

Part B: Planning Code - This Code specifies the principles, procedures and criteria that shall be used in planning and development of Jharkhand State Grid System.

Part C: Connection Code- Connection Code specify the minimum technical and design criteria that shall be complied with by a Transmission Licensee and User connected to or seeking connection to the State Grid including conditions, principles and procedures for same.

Part D: Protection Code- This Code covers the protection protocol, protection settings and protection audit plan of electrical systems to be adopted in order to safeguard the State Transmission System and User's system from faults.

Part E: Operating Code - This Code describe the conditions under which the State Load Despatch Centre shall operate the State Grid System and under which Users shall operate their facilities, to maintain the security and reliability and economy of Grid operation of the State Grid System, under both normal and abnormal operating conditions and operating principles, procedures and practices for the same.

Part F: Scheduling and Despatch Code – Scheduling and Despatch Code deals with the principles and procedures to be adopted for Scheduling and Despatch Code for generation and supply of electricity in the State of Jharkhand on daily basis and flow of information between State Generators, Users, Licensees, SLDC and RLDC.

Part G: Commercial Code- This part deals with the commercial mechanism complimentary to Scheduling and Despatch for settlement of account between the concerned parties.

Part H: Cyber Security Code – This part deals with measures to be taken to safeguard the State grid from spyware, malware, cyber-attacks, network hacking, procedure for security audit from time to time, upgradation of system requirements and keeping abreast of latest developments in the area of cyber-attacks and cyber security requirements.

Part I: Miscellaneous Code - This part deals with miscellaneous aspects including compliance requirement with the State Grid Code and dispute resolution etc.

2.3 Definitions

2.3.1 In these Regulations unless the context otherwise requires:

a) "ABT" means Availability Based Tariff.

b) "Act" means the Electricity Act, 2003 (36 of 2003), including amendments thereto;

c) Agency: A term used in various section of Jharkhand State Electricity Grid Code (JSGC).

d) "Automatic Voltage Regulator" means a continuously acting automatic excitation control system to control the voltage of a Generating Unit measured at the generator terminals;

e) "Black Start Procedure" means procedure necessary to recover the grid from a partial or a total blackout;

f) Captive Generating Plant- "Captive generating plant" means a power plant set up by any person to generate electricity primarily for his own use and includes a power plant set up by

any co-operative society or association of persons for generating electricity primarily for use of members of such cooperative society or association;

g) "Commission" means the Jharkhand State Electricity Regulatory Commission;

h) "Connection Point" means a point at which a User's generation/supply or Transmission Licensee's Plant and/or Apparatus connects to the State Grid system.

i) Constituent: All Licensee of the State including deemed licensee, all the State generating stations including captive generating stations, IPPs and Non-Conventional Energy Sources: STU, and open access consumers.

j) "Continuous rating" means the normal rated full Load output capacity of Generating Unit which can be sustain on continuous basis at a specified condition.

k) 'df/dt Relay' means a relay which operates when the rate of change of system frequency (over time) goes higher than a specified limit and provides command for load management.

l) "Disturbance Recorder" means a device provided to record the behaviour of the pre-selected digital and analog values of the system parameters.

m) "Data Acquisition System" means a device provided to record the sequence of operation in time, of the relays/equipments/system parameters at a location;

n) DVC means – Damodar Valley Corporation – a deemed licensee as provided in the section 14 proviso 4 of the Electricity Act 2003.

o) "Energy Storage System (ESS)" in relation to the electricity system, means a facility where electrical energy is converted into any form of energy, which can be stored and subsequently reconverted into electrical energy and injected back into the grid.

p) "Event" means an unscheduled or unplanned occurrence in the State Grid System including faults, incidents and breakdowns;

q) "Event Logger" means a device provided to record the sequence of operation in time, of the relays/ equipments at a location during an Event;

r) "Fault Locator" means a device provided in transmission line to measure/indicate the distance at which a line fault may have occurred;

s) "Forced Outage" means an outage of Generating Unit or Transmission Facility due to a fault or other reasons which has not been planned.

t) "Flexible Alternating Current Transmission (FACT)" means facilities that enable power flows on A.C. lines to be regulated, to control loop flows, line loading etc.

u) "Grid" means the high voltage backbone system of interconnected Transmission Lines Substations and Generating Plants.

v) "Generating Company" means any company or body corporate of association of body individuals, whether incorporated or not or artificial judicial person, which owns or operates or maintains a Generating Station.

w) "Generating Unit" means an electrical Generating Unit coupled to a turbine within a power station together with all plant and apparatus within a power station (Up to the connection point) which relates exclusively to that Turbo-Generator.

x) "Governor Droop" In relation to the operation of the Governor of Generating Unit means the percentage droop in system frequency which would cause the Generating Unit under free Governor action to change its output from Zero to full load.

y) "High Tension" or "HT" means all voltages defined as "high" or "extra high" voltage under clause (av) of sub-rule (1) of Rule 2 of the Indian Electricity Rules, 1956 and corresponding voltage classifications as may be specified in accordance with clause (c) of sub-section (2) of Section 185 of the Act;

z) "Inter –State Transmission system" includes-

   i) Any system for the conveyance of electricity by means of main transmission line from the territory of one State to another State

ii) the conveyance of electricity across the territory of an intervening State as well as conveyance within the State which is incidental to such inter-State transmission of electricity

iii) The transmission of electricity within the territory of a State on a system built, owned, operated, maintained or controlled by Central Transmission Utility

aa) "Intra-State Transmission System" means any system for transmission of electricity other than an inter-State Transmission system.

bb) "JSEB"- Jharkhand State Electricity Board or its unbundled organizations as provided in section 172 of the Act.

cc) "Load Control Centre" means the facilities of Generating company/Licensee/Users set up to supply and control of load.

dd) "Low Tension" or "LT" means all voltages other than those defined as "high" or "extra high" voltage under clause (av) of sub-rule (1) of Rule 2 of the Indian Electricity Rules, 1956 and corresponding voltage classifications as may be specified in accordance with clause (c) of sub-section (2) of Section 185 of the Act;

ee) "Licensee" means a person who has been granted Licensee under section 14.

ff) "Minimum Continuous Rating (MCR)" means the maximum continuous output in MW at the generator terminals guaranteed by the manufacturer at rated parameters.

gg) "Off- Bar declared Capacity" means the difference between Declared Capacity and On-Bar Declared Capacity in MW;

hh) "On- Bar declared Capacity" in relation to a generating station means the capability to deliver ex-bus electricity in MW from the units on-bar declared by such generating station in relation to any time block of the day or whole of the day, duly taking into account the availability of fuel and water and subject to further qualification in the relevant Regulations.

ii) “Single Line Diagram” means diagrams which are a schematic representation of the LT/HV/EHV apparatus and the connections to all external circuits at a Connection Point incorporating its numbering nomenclature and labelling;

jj) “Site Common Drawing” means drawings prepared for each Connection Point, which incorporates layout drawings, electrical layout drawings, single line diagram common protection/control drawings and common service drawings;

kk) “Spinning Reserve” means generating capacity with some reserve margin, at standard rated frequency of 50 Hz, that is synchronized to the system and is ready to provide increased generation at short notice pursuant to dispatch instruction or instantaneously in response to a frequency drop;

ll) “State Generating Station”- All generating Station in the state of Jharkhand connected to State Grid.

mm) “Static VAR Compensator” means an electrical facility designed for the purpose of generating or absorbing Reactive Power;

nn) “STU”: mean State Transmission utility –the Government company/entity specified as such by the State Government under sub-section (1) of section 39;

oo) “Under Frequency Relay” means a relay which operates when the system frequency falls below a specified limit and initiates commands for system operation to achieve stability.

pp) “User” means persons, including State Generating Stations, Distribution Licensees Consumers of the Distribution Licensees directly connected to inra-State Transmission System and persons availing of Open Access, who are connected to and/or use the intra State Transmission System.

qq) WS Seller” means a seller in case of a generating station based on wind or solar or hybrid of wind-solar resources.

Words or expressions used herein and not defined shall have the meanings assigned to them under the Act, Indian Electricity Grid Code (IEGC) formulated by Central Electricity Regulatory Commission (CERC) or any other Regulations of the Commission.

Reference to any Acts, Rules and Regulations shall include amendments or consolidation or re-enactment thereof.

PART A: GENERAL

3.1 Scope of regulation and extent of application

These regulations shall apply to-

(1) State Load Despatch Centre;

(2) State Transmission Utility;

(3) Intra-State Transmission Licensee;

(4) Generating Stations in the State connected to the State Grid system;

(5) Distribution Licensee (s);

(6) User who is connected to and/or uses the State Grid system;

Provided that the Commission may issue directions relieving any Transmission Licensee or User, either suo-moto or based on an application submitted by such Transmission Licensee or User, of their obligations to implement or comply with the State Grid Code to the extent as may be stipulated in the directions:

Provided further that the provisions under these Regulations shall be construed in consistency with the Indian Electricity Grid Code (IEGC) notified by the Central Electricity Regulatory Commission under section 79(1)(h) of the Electricity Act, 2003.

3.2 Transmission Licensee and User having connections to the State Grid system as on date of notification of these Regulations shall ensure forthwith compliance with the following requirements under these Regulations with immediate effect:

(i) Entering into a connection agreement in accordance with Section 14;

(ii) Developing Site Responsibility Schedules in accordance with Section 19.2.2;

(iii) Developing Single Line Diagrams in accordance with Section 19.3.1; and

(iv) Developing Site Common Drawings in accordance with Section 19.4.2.

3.3 The applicability of provisions related to Free Governor Action, as provided in Section 23.9, Section 23.10, Section 23.11 and Section 23.12 of these Regulations, shall be consistent with relevant provisions as provided in the Indian Electricity Grid Code (IEGC) specified by Central Electricity Regulatory Commission under clause (h) of Section 79 of the Act.

4. State Grid Code

4.1 The Commission shall put up a copy of the State Grid Code on its website and make available, through State Load Despatch Centre and State Transmission Utility, a copy of State Grid Code to any person requesting it, at a price not exceeding the reasonable cost of reproducing it.

4.2 The Commission shall make available a copy of the notified State Grid Code to the State Load Despatch Centre and State Transmission Utility for it to be put up on their respective websites.

4.3 **Monitoring of Non- Compliance**

(i) State Transmission Utility and State Load Despatch Centre shall be responsible for monitoring the compliance of Users and State Transmission Licensees with the provisions, contained in the Jharkhand State Electricity Grid Code and with the procedures developed under such provisions:

Provided that the State Transmission Utility and/ or State Load Despatch Centre shall not unduly discriminate against or unduly prefer any User or Transmission Licensee.

(ii) If any User fails to comply with any of the provision(s) of the Grid Code, it shall be required to inform STU without any delay, the reason for its non-compliance and shall remove its non-compliance promptly.

(iii) Wrong declaration of capacity, non-compliance of SLDC's instructions, noncompliance of SLDCs instructions for backing down without adequate reasons, non-furnishing data, non-payment of charges such as Deviation settlement charges, scheduling and system operation

charges, Open Access charges, etc. shall constitute non-compliance of Grid Code and shall be subject to financial penalty as may be decided by the Commission.

(iv) Non- compliance of the provisions of the Code shall be taken into cognizance by the Commission or by Grievance Redressal Forum as specified under JSERC (Guidelines for Establishment of Forum for Redressal of Grievances of the Consumers and Electricity Ombudsman) Regulations, as amended from time to time, as the case may be, either Suo-Moto or through an application submitted by the stakeholders.

(v) In case of persistent non-compliance of the provisions of the Grid Code and/ or with the procedures developed under such provisions, such matter shall be reported to the Commission by SLDC. Consistent failure to comply with the Grid Code may lead to disconnection of the User's plant and/or facilities.

(vi) State Load Despatch Centre may give such directions and exercise such supervision and control as provided under this Code that may be required for ensuring the integrated grid operations and for achieving the maximum economy and efficiency in the operation of power system in the State.

(vii) Every Transmission Licensee and User connected with the operation of the power system shall comply with the directions issued by the State Load Despatch Centre.

(viii) If any dispute arises with reference to the quality of electricity or safe, secure and integrated operation of the State grid or in relation to any direction given under the provisions of the Jharkhand State Electricity Grid Code, it shall be referred to the Commission by SLDC for decision:

Provided that till the time the decision of the Commission is pending; the direction of the State Load Despatch Centre shall be complied with by the Transmission Licensee or User.

(ix) The Commission may order independent third-party compliance audit for any User, as deemed necessary based on the facts brought to the knowledge of the Commission.

5. **Grid Coordination Committee**

5.1 A Grid Coordination Committee (GCC) shall be constituted by the Commission.

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

(i) implementation of these Regulations and the rules and procedures developed under the provisions of these Regulations;

(ii) operational coordination including coordination of relay planned outage and maintenance among members i.e. SLDC, STU, State Generating Station, Licensee and Users;

(iii) carrying out all functions of planning of Intra-State Transmission system including review and approval of transmission schemes and planning for maintaining proper voltage by re-active compensation;

(iv) reviewing the results of the planned schemes submitted by STU along with results of system studies, scenarios, investments, cost-benefit analysis, assumptions, methodologies, planning criteria, stakeholder comments etc. The members of the GCC shall review the proposal of the STU in totality and give comments/ suggestions. In case any modifications are required, it shall suggest the modifications to STU. The revised schemes, after incorporating the suggested modification (if any), will again be submitted to GCC for review;

(v) evolving consensus in the finalization of planned Intra-State Transmission scheme (s) and seek feedback of all stakeholders involved. The members of GCC to undertake prudence check and give their consent to the planned scheme (s) in the form of a joint sign-off. In case, GCC does not reach to a consensus upon receipt of the modified proposal, then the GCC shall approach the Commission with the points of contention and represent a detailed case for review. In case STU is of the view that the scheme is in interest of grid security/ stability or decongesting the network or overcoming a contingency, it shall record this in writing and submit the same before the Commission;

(vi) develop the protection protocol and revise the same, after review from time to time, in consultation with the stakeholders in the State and discharge other functions as specified in the Protection Code;

(vii) evolving consensus on all issues relating to secure, reliable and economic operation of the State Grid;

(viii) review of the State Grid Code and assessing and recommending remedial measures for issues that might arise during the course of implementation of provisions of these Regulations and the rules and procedures developed under the provisions of these Regulations;

(ix) commercial coordination among members including State Level Energy Accounting with the consent of all the members;

(x) preparation of data formats and to prescribe such formats for collection of data from relevant stakeholders for transmission planning. GCC shall also prescribe formats for collecting the implementation status of Generation/ Transmission projects under construction and intending to connect to Intra-State Transmission System;

(xi) such other matters as may be directed by the Commission from time to time.

5.3 The decision of the Grid Coordination Committee arrived by consensus regarding operation of State Grid and Scheduling and Despatch of electricity will be followed by SLDC subject to direction of JSERC, if any.

5.4 The Grid Coordination Committee shall comprise of the following members:

(i) One member from State Transmission Utility;

(ii) One member of the State Load Despatch Centre;

(iii) One member to represent each generating company in the State;

(iv) One member to represent each Transmission Licensee in the State, other than the State Transmission Utility;

(v) One member to represent each Distribution Licensee in the State including that of Deemed Licensee;

(vi) One member to represent each Intra-State Trading Licensee;

(vii) One member to represent the State Government;

(viii) Such other persons as may be nominated by the Commission.

Provided that the member from State Transmission Utility shall be the Chairperson of the Committee:

Provided that the representative of State Load Despatch Centre shall be Convener of the Grid Coordination Committee:

Provided further that the State Transmission Utility in coordination with State Load Despatch Centre, shall set up a dedicated Secretariat for the Grid Co-ordination Committee to facilitate and manage the functioning of the Grid Coordination Committee.

5.5 The members of the Grid Coordination Committee shall be selected as follows:

(i) the Chairperson or Director of Board of Directors of State Transmission Utility, having the responsibility of looking after technical activities/ operations of State Transmission Utility shall be the member referred to in clause (a) of Section 5.4 above;

(ii) the member referred to in clause (b) of Section 5.4 above shall be the head of State Load Despatch Centre;

(iii) the members referred to in clauses (c), (d), (e), (f), (g) and (h) of Section 5.4 above shall be nominated by their respective organizations;

(iv) The Commission shall approve the constitution of Grid Coordination Committee through separate order on receipt of proposal from the SLDC within 30 days from the date of issue of this Code.

Provided that the members nominated by each of the organization to the above Committee shall be holding very senior position (not below a rank of Chief Engineer in case of government utilities and functional director in case of private companies or equivalent) in their respective organization and would be from Engineering discipline. Members can co-opt another eligible person from same group to support/ substitute during their absence.

6. **Meeting of the Grid Coordination Committee**

6.1 Member Secretary of the Grid Coordination Committee shall be responsible for arranging the meetings in a timely manner. The procedure to be followed by the Committee in conducting its business shall be formulated by the Committee and shall be approved by the Commission.

6.2 Grid Coordination Committee shall meet at least once in a Quarter with pre-notified Agenda. The Chairperson of the Grid Coordination Committee shall submit list of attendees and minutes of meeting to the Commission every Quarter for information. The member (s) of the GCC will be required to attend the scheduled meetings and in case of repeated absence/ abstention, the Chairperson of the GCC shall bring it to the notice of the Commission. The Commission may seek clarification/ response from such member(s) and may undertake necessary action.

6.3 Grid Coordination Committee shall send to the Commission, the following Reports within 15 days after the conclusion of every meeting:

(i) An Action Taken report on the outcome of such review meetings

(ii) Any proposed revisions to the Grid Code as STU reasonably thinks necessary for removal of difficulty/inconsistency discovered in implementation of the provisions of this Code.

(iii) All written representations or objections from Users arising during the review/consultation process

6.4 All revisions in the Grid Code shall be made by the Commission. The Commission shall reserve the right to review the Grid Code as and when required.

7. State Load Despatch Centre shall discharge the functions assigned to it under the provisions of the Act and these Regulations in an independent and unbiased manner:

Provided that in event of a State Load Despatch Centre being operated by the State Transmission Utility, as per first proviso of sub-section (2) of Section 31 of the Act, adequate

autonomy shall be provided to the State Load Despatch Centre for it to able to discharge its functions in the abovementioned manner.

PART B: PLANNING CODE

8. Transmission System Planning

8.1 The nodal agency for planning of State Transmission System shall be STU.

8.2 The State Transmission Utility shall publish on its website the transmission system plan for the Intra-State Transmission system and shall also make the same available to any person upon request for making investment/connection decision. STU shall also co-ordinate development of inter-state transmission system passing through or related to state of Jharkhand through CTU.

8.3 The transmission system plan shall cover a plan period of five (5) years commencing from the financial year in which this regulation is published:

Provided that the transmission system plan shall be updated by the State Transmission Utility each year and published in the manner specified in Regulation 8.1 by the 30th day of September each year and shall cover a plan period of five (5) years commencing from the financial year in which it is published.

Provided that inter-state transmission system and intra-state transmission system shall be developed to complement and supplement each other with reference to the State Grid.

8.4 As per JSERC Regulations for providing Open Access in Intra-State Transmission System, the nodal agency providing long term Transmission Access shall be STU and for short term Transmission Access the nodal agency shall be SLDC.

8.5 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, grid stability and grid efficiency.

Provided that the transmission system plan should 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.

8.6 The State Transmission Utility may, for the purpose of preparing the transmission system plan under these Regulations, seek such information as may be required by it, including generation capacity addition, inter-state transmission system plan covering State of Jharkhand and neighbouring States, system augmentation and long-term load forecast and all applications for long term Open Access in State Transmission networks:

Provided that the State Transmission Utility shall consider, but not be bound by, the information provided under this Regulation in preparing the transmission system plan.

8.7 The State Transmission Utility shall also consider the following for the purpose of preparing the transmission system plan under these Regulations –

(i) Plans formulated by the Authority for the transmission system under the provisions of clause (a), (b), (c) of Section 73 of the Act;

(ii) Electric Power Survey of India report of the Authority;

(iii) Grid Standards specified by the Authority under clause (d) of Section 73 of the Act;

(iv) Transmission Plan formulated by Central Transmission Utility;

(v) Transmission Planning Criteria and Guidelines issued by the Authority;

(vi) Recommendations/ inputs, if any, of the Regional Power Committee and Grid Coordination Committee;

(vii) Reports on National Electricity Policy which are relevant for development of intra-State Transmission System; and

(viii) Any other information/data source suggested by the Commission.

8.8 The State Transmission licensee shall, while submitting its application under subsection (1) of Section 64 of the Act to the Commission for approval, also submit therewith its investment plan based on the identified intra-State transmission schemes and system strengthening schemes projected in the transmission system plan.

8.9 The cost of the transmission system planning study undertaken in accordance with this Regulation shall be allowed in the determination of the Transmission charges for the State Transmission Licensee under clause (b) of sub-section (1) of Section 62 of the Act.

9. Planning Criterion

9.1 The planning criterion shall be based on the security philosophy on which the State Grid 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 plan in consultation with CTU/Authority.

9.2 The State Grid 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.

Provided that the above contingencies shall be considered assuming a pre-contingency system depletion (planned outage) of another 132 KV D/C line or 220 kV D/C line or 400 kV S/C line in another corridor and not emanating from the same substation.

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

9.4 The Intra-State Transmission System shall be capable of withstanding the loss of most severe single infeed without loss of stability.

9.5 Any one of the events defined in the Section 9.2 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.

9.6 In all substations (110kV/132kV and above), at least two transformers shall be provided.

9.7 State Transmission Utility shall carry out planning studies for Reactive Power compensation of State Grid System including reactive power compensation at the State Generating Station's switchyard.

10. **Planning Data**

10.1 Transmission Licensees and Users are to supply following types of data to the State Transmission Utility for purpose of developing the transmission plan:

(i) Standard Planning Data;

(ii) Detailed Planning Data

10.2 **Standard Planning Data**

10.2.1 Standard Planning Data shall consist of details which are expected to be normally sufficient for the State Transmission Utility to investigate the impact on the intra- State Transmission System due to User/Transmission Licensee development.

10.2.2 Transmission Licensees and Users shall provide the following data to the State Transmission Utility from time to time in the standard formats provided by State Transmission Utility:

(i) Preliminary project planning data;

(ii) Committed project planning data; and

(iii) Connected planning data.

Provided that the State Transmission Utility shall develop standard formats, for submission of above mentioned data and make the same available on its website:

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

10.3 **Detailed Planning Data**

10.3.1 Detailed Planning Data shall consist of additional, more detailed data not normally expected to be required by State Transmission Utility to assess the impact of User/Transmission Licensee development on the intra-State Transmission System.

10.3.2 Detailed Planning Data shall be furnished by the state Generation stations, Users and Transmission Licensees as and when requested by the State Transmission Utility.

10.4 **Schedule of Assets**

STU shall submit annually to JSERC by 30th September each year a schedule of Assets of State Grid giving details of transmission lines, State Generating Stations, their ownership with basic capacity & production/utilization details and list of distribution licensee & bulk consumers giving details of annual power, active & reactive energy drawl.

10.5 **Implementation of Transmission Plan**

The actual programme of implementation of Transmission lines, interconnecting Transformers, substations, Reactors/capacitors and other Transmission elements will be determined by STU in consultation with concerned agencies. The completion of these works/Projects in the time frame, shall be ensured by STU through proactive actions through concerned agencies.

PART C: CONNECTION CODE.

11. **Connection Code**

11.1 The applicable technical standards for construction of electrical plants and electric lines connected to the State Grid system shall be as per the standards notified by the Authority under clause (b) of Section 73 of the Act.

11.2 The applicable safety requirements for construction, operation and maintenance of electrical plants and electric lines shall be as per the standards notified by the Authority under clause (c) of Section 73 of the Act.

12. **Objective and Scope**

12.1 Objective

The connection codes are designed to ensure that

(i) The basic rules for connection are complied with to treat all agencies in a non-discriminatory manner.

(ii) Any new or modified connection when established shall neither suffer unacceptable effects due to its connections to State Transmission Grid nor impose unacceptable effects on any other agency. Harmonisation of State Grid with connected agency for efficient grid operation would be the aim to be achieved.

(iii) Responsibility and ownership of equipment shall be clearly specified in a schedule (standard life responsibility schedule) for every connection point. Minimum deviations would be permitted from standards so that clarity of scope remains near the set standards. Deviations, if any, from standards shall be clearly brought out in the site responsibility schedule by STU.

12.2 Scope

The connection condition shall apply to all constituents, STU, CTU, State Generating Stations and any other agency/licensee connected to or involved in developing the State Grid and SLDC. This connection Code also applies to all agencies, which are planning to

generate/Transmit and/or are generating/Transmitting energy to/from State Transmission Grid.

13. **Application for connection**

13.1 Application for establishing new arrangement or modifying existing arrangement of connection to and/or use of the State Grid System shall be submitted by the concerned Transmission Licensee, State Generating Stations or User to the State Transmission Utility:

Provided that the standard format for application mentioned in the Section 13.1 shall be developed by State Transmission Utility and shall be made available at STU website within two (2) months of notification of these Regulations after approval from JSERC.

Provided further that the prospective users shall be required to pay to the Steam/Transmission Licensees the charges as approved by the Commission, for the purpose of conducting initial inter connection studies, any additional studies as well as processing the application.

13.2 The application mentioned in Section 13.1 shall include the following details:

(i) Report stating the purpose of the proposed connection and/or modification, transmission licensee to whose system connection is proposed, description of apparatus to be connected or modification of the apparatus already connected and beneficiaries of the proposed connection;

(ii) Construction schedule and target completion date; and

(iii) Confirmation that the Transmission Licensee or the User shall abide by the provisions of State Grid Code, Indian Electricity Rules and various standards etc, including Grid Connectivity Standards made pursuant to the Act.

Provided that the applicant shall supply any further details/information as required by State Transmission Utility.

13.3 The State Transmission Utility shall forward a copy of the application to the Transmission Licensee in whose system the connection is being sought, to State Load Despatch Centre,

CTU, and to every Transmission Licensee within the State whose Transmission System is likely to be affected by such application, for their comments and suggestions.

13.4 The State Transmission Utility shall, within Thirty (30) days, from the receipt of an application under Regulation 13.1 and after considering all suggestions and comments received by the parties identified under Regulation 13.3: make a formal offer the applicant setting out the requirements, procedures, terms and conditions including connection agreement to be entered into.

13.5 Upon compliance of the required terms and conditions of offer by the concerned Transmission Licensee/ User, State Transmission Utility shall notify the concerned Transmission Licensee/User that it can be connected to the State Grid System.

14. Connection Agreement

14.1 Connection Agreement shall include (but not limited to), as appropriate, within its terms and conditions, the following information relating to the connection of the User or Transmission Licensee to the State Grid system:

(i) A condition requiring both parties to comply with the State Grid Code;

(ii) Details of connection, technical requirements and commercial arrangements;

(iii) Details of any capital expenditure arising from necessary reinforcement or extension of the system and demarcation of the same between the concerned parties;

(iv) Site Responsibility Schedule;

(v) General philosophy and guidelines on protection;

(vi) Protection systems;

(vii) System recording instruments;

(viii) Communication facilities; and

(ix) Any other details considered appropriate by the State Transmission Utility or the Commission.

15. Grid Parameter Variations

15.1 General

Transmission Licensees and Users shall ensure that Plant and Apparatus requiring service from or providing service to the State Grid System is of such design and construction that satisfactory operation of such Plant and Apparatus will not be prevented by normal instantaneous variation in Grid operational parameters.

15.2 Frequency Variation

Rated frequency of the system shall be 50.0 Hz and shall normally be controlled within the limits as per regulations / standards specified by Authority.

15.3 Voltage Variation

The variations of voltage may not be more than the voltage range specified in the regulations/Standards framed by Authority.

16. Equipment at Connection Points

16.1 Sub-station Equipment

(i) All EHV/High/LT tension sub-station equipment's shall comply with Bureau of Indian Standards/International Electro Technical Commission.

(ii) All equipment shall be designed, manufactured and tested and certified in accordance with the quality assurance requirements as per the standards of International Electro Technical Commission / Bureau of Indian Standards.

(iii) Each connection between a User and intra-State Transmission System shall be controlled by a circuit breaker appropriate of short circuit with stand capability and interrupting capacity, at the connection point, as advised by State Transmission Utility in the specific Connection Agreement.

16.2 **F**ault Clearance Times

16.2.1 The fault clearance time for primary protection schemes, for a three phase fault (close to the bus-bars) on Users' equipment directly connected to intra-State Transmission System and for a three phase fault (close to the bus-bars) on intra-State Transmission System connected to Users' equipment, shall be as given below or as per the CEA Technical Standards for Construction Regulations and amendments thereof, whichever is lower:

(i) 100 milli seconds for 800 kV class & 400 kV

(ii) 160 milli seconds for 220 kV & 132 kV/110kV

16.2.2 Back-up protection shall be provided for required isolation/protection in the event of failure of the primary protection systems provided to meet the above fault clearance time requirements. If a Generating Unit is connected to the State Grid System directly, it shall be capable of withstanding, until clearing of the fault by back-up protection on the State Grid System.

16.3 **Reactive Power Compensation**

16.3.1 Reactive Power compensation and/or other facilities shall be provided by Users, as far as possible, in the low voltage systems close to the load points thereby reducing the need for exchange of Reactive Power to/from the State Grid System and to maintain the State Grid System voltage within the specified range.

16.3.2 Line Reactors may be provided by licensee to control temporary over voltage within the limits as set out in grid standard / connection agreement.

16.3.3 The additional reactive compensation to be provided by the User shall be indicated by State Transmission Utility in the Connection Agreement for implementation. Further additional reactive compensation equipment based on actual performance may have to be provided as required by STU by Distribution Licensee/Users.

16.3.4 Users shall endeavour to minimize the Reactive Power drawal at an interchange point when the voltage at that point is below 95% of rated voltage, and shall not inject Reactive Power when the voltage is above 105% of rated voltage. Interconnecting Transformer taps at the

respective drawal points may be changed to control the Reactive Power interchange as per a User's request to the State Load Despatch Centre, but only at reasonable intervals.

16.3.5 Switching in/out of all 400/220/132 kV bus and line Reactors throughout the grid shall be carried out as per instructions of State Load Despatch Centre. Tap changing on Interconnecting Transformers shall also be done as per the instructions of State Load Despatch Centre only.

16.3.6 The State Generating Station shall generate/absorb reactive power as per instructions of SLDC, within the capability limit of respective Generating Units.

16.3.7 Notwithstanding above SLDC may direct a User/Licensee to curtain its VAR drawal /injection in case the security of the Grid or safety of any equipment is endangered.

16.4 **Communication Facilities**

16.4.1 Reliable and efficient speech and data communication systems shall be provided to facilitate necessary communication and data exchange, and supervision/control of the State Grid by the State Load Despatch Centre, under normal and abnormal conditions on continuous basis.

16.4.2 All Users and Transmission Licensees shall provide the required facilities at their respective ends as specified in the Connection Agreement.

16.4.3 All agencies shall provide system to telemeter power system operational parameters such as flow, voltage, status of switches /Transformer taps etc. in line with interface requirement and other guidelines made available by SLDC or RLDC through SLDC. Associated communication system to facilitate data flow up to SLDC shall also be established by concerned agency as required by STU.

16.4.4 All agencies in co-ordination with STU shall provide required facilities at their respective ends and at SLDC.

17. **Generating units and Power stations**

17.1 **Generating units and Power Stations**

(i) A Generating Unit shall be capable of continuously supplying its normal rated active/reactive output within the system frequency and voltage variation range, above subject to design imitations specified by the manufacturer.

(ii) A generating unit shall be provided with an AVR, protective and safety devices, as set out in connection agreements.

(iii) Subject to size of generating unit required for auto governor operation made. Each Generating Unit shall be fitted with a turbine speed governor having an overall droop characteristic within the range of 3% to 6% (for thermal generating units and WS Seller) or 0-10% (for hydro generating units) as specified in the CEA Technical Standards for Connectivity Regulations, which shall always be in service. The primary response requirement of various types of generating units shall be as mentioned below:

Fuel/ Source	**Minimum unit size/ Capacity**	**Up to**
Coal/Lignite Based	200 MW and above	±5% of MCR
Hydro	25 MW and above	±10% of MCR
Gas based	Gas Turbine above 50 MW	±5% of MCR (corrected for ambience temperature)
WS Seller	Capacity of Generating station more than 10 MW and connected at 33 kV and above	As per CEA Technical Standards for Connectivity Regulations.

Provided that:

a) WS Sellers commissioned after the date as specified in CEA Technical Standards for Connectivity Regulations, shall have the option to provide primary response individually through ESS or through a common ESS installed at its pooling station.

b) Nuclear generating stations and hydro generating stations (with pondage up to 3 hours or Run of the river projects) shall be exempt from mandatory primary response.

They may provide the primary response to the extent possible, considering the safety and security of machines and humans.

(iv) Each Generating Unit as mentioned in the above Table shall be capable of instantaneously increasing output by 5% when the frequency falls limited to 105% of the MCR and thus providing primary response whenever conditions arise.

(v) All generating stations, including the WS seller as mentioned in above table, shall have the capability of reducing output at least by 5% or 10%, as applicable, of their operating level and up to 5% or 10% of their MCR, as applicable, limited to the minimum turndown level when the frequency rises above the reference frequency and thus, providing primary response, whenever condition arise.

(vi) Any generating station not complying with the above requirements shall be kept in operation (synchronized with the regional grid) only after obtaining permission from SLDC.

(vii) The ramping up / ramping down rates in respect of different categories of stations would be as follows:

i) Coal or lignite fired plants shall declare a ramp up or ramp down rate of not less than 1% of ex-bus capacity corresponding to MCR on bar per minute;

ii) Gas power plants shall declare a ramp up or ramp down rate of not less than 3% of ex-bus capacity corresponding to MCR on bar per minute;

iii) Hydro power plants shall declare a ramp up or ramp down rate of not less than 10% of ex-bus capacity corresponding to MCR on bar per minute;

iv) Renewable Energy generating stations shall declare a ramp up or ramp down rate as per CEA Technical Standards for Connectivity Regulations.

(viii) Secondary Control and Tertiary Control shall be such as may be notified by the Commission separately.

18. **System Recording Instruments**

18.1 Recording instruments such as Data Acquisition System/Disturbance Recorder/Event Logger/Fault Locator (including time synchronization equipment) shall be provided in the State Grid system for recording of dynamic performance of the system

18.2 All Users and Transmission Licensees shall provide all the requisite recording/indicating/integrating instruments as specified in the connection agreement in accordance with the agreed time schedule.

19. **Responsibilities for operational safety**

19.1 Transmission Licensees and the Users shall be responsible for safety as indicated in Site Responsibility Schedules for each connection point.

19.2 **Site Responsibility Schedule**

19.2.1 Site Responsibility Schedule shall be produced by the concerned Transmission Licensee and the User detailing the ownership responsibilities of each, before execution of the project or connection, including safety responsibilities.

19.2.2 The Site Responsibility Schedule shall be developed by the concerned Transmission Licensee pursuant to the relevant Connection Agreement and shall state the following for each item of plant and apparatus installed at the Connection point:

i) Ownership of the Plant/Apparatus;

ii) Responsibility for control of the Plant/Apparatus;

iii) Responsibility for operation of the Plant/Apparatus;

iv) Responsibility for maintenance of the Plant/Apparatus; and

v) Responsibility for all matters relating to safety of any persons at the connection point.

19.2.3 The format, principles and basic procedure to be used in the preparation of Site Responsibility Schedules shall be formulated by State Transmission Utility within three (3) months of notification of these Regulations and shall be provided to each User and Transmission Licensee for compliance and submit the compliance Report to the Commission thereafter:

Provided that the State Transmission Licensee shall also put up the information related to above mentioned format, principles and procedures on its Website.

19.3 Single Line Diagrams

19.3.1 Single Line Diagram shall be furnished for each connection point by the connected User or Transmission Licensee to the State Load Despatch Centre.

19.3.2 Single Line Diagram shall include all High Voltage (HV) connected equipment and the connections to all external circuits and incorporate numbering, nomenclature, rating and labelling.

19.3.3 In the event of a proposal to change any equipment, the concerned User or Transmission Licensee shall intimate the necessary changes to State Transmission Utility and to all concerned. Single Line Diagram shall be updated appropriately by the concerned Users or Transmission Licensee and a copy of the same shall be provided to the State Load Despatch Centre.

19.4 Site Common Drawings

19.4.1 Site Common Drawings shall be prepared for each Connection Point and will include the following information:

i) Site Layout;

ii) Electrical Layout;

iii) Details of Protection; and

iv) Common Services Drawings.

v) Division/boundary between user and Transmission Licensee.

19.4.2 Detailed drawings shall be prepared individually by Transmission Licensee and User in respect of their system/facility at each Connection Point and copies of the same shall be made available to the other party.

19.4.3 In case of any changes in the Site Common Drawings that are found necessary by Transmission Licensee or User in respect of their system/facility at the Connection Point, the details of such changes shall be furnished to the other party as soon as possible.

20. **Access at Connection Site**

20.1 The Transmission Licensee or User owning the Connection Site shall provide reasonable access and other required facilities to another Transmission Licensee or User whose equipment is proposed to be installed / installed at the Connection Site for installation, operation, maintenance, etc.

20.2 Written procedures and agreements shall be developed between STU, Transmission Licensees and Users to ensure that mandatory access is available to the concerned Transmission Licensee or STU or User for installation, inspection, maintenance and recording as and when needed.

PART D: PROTECTION CODE

21. Protection Code

21.1 The chapter covers the protection protocol, protection settings and protection audit plan of electrical systems to be adopted in order to safeguard the State Transmission System and User's system from faults. The objective of this chapter is to define the minimum protection requirements for any equipment connected to the State Transmission System and thereby minimize the disruption due to faults.

21.2 **Protection Protocol**

i) All Users connected to the State grid shall provide and maintain effective protection system having reliability, selectivity, speed and sensitivity to isolate faulty section and protect element(s) as per CEA Technical Standards for Connectivity Regulations, CEA Grid Standards Regulations, CEA Technical Standards for Communication Regulations, CEA Technical Standards for Construction Regulations and amendments thereof and any other applicable CEA Standards specified from time to time.

ii) Back-up protection system shall be provided to protect an element in the event of failure of the primary protection system.

iii) Grid Coordination Committee (GCC) shall develop the protection protocol and submit to the Commission and revise the same, after review from time to time, in consultation with the stakeholders in the State, and in doing so shall be guided by the principle that minimum electrical protection functions for equipment connected with the grid shall be provided as per CEA Technical Standards for Connectivity Regulations, CEA Grid Standards Regulations, CEA Technical Standards for Communication Regulations, CEA Technical Standards for Construction Regulations, CEA Safety Regulations and amendments thereof and any other CEA standards specified from time to time. The Commission may make necessary changes, if required, in the Protection Protocol.

iv) The protection protocol in a particular system may vary depending upon operational experience. Changes in protection protocol, as and when required, shall be carried out after deliberation and approval of the Grid Coordination Committee.

v) Violation of the protection protocol of the State shall be brought to the notice of Grid Coordination Committee by SLDC.

21.3 **Protection Settings**

i) Grid Coordination Committee shall undertake review of the protection settings, assess the requirement of revisions in protection settings and revise protection settings in consultation with the stakeholders of the State from time to time and at least once in a year. The necessary studies in this regard shall be carried out by the Grid Coordination Committee. The data including base case (peak and off-peak cases) files for carrying out studies shall be provided by SLDC and STU to Grid Coordination Committee.

ii) All Users connected to the grid shall:

a) furnish the protection settings implemented for each element to Grid Coordination Committee in a format to be prescribed by GCC

b) obtain approval of Grid Coordination Committee for any revision in settings and implementation of new protection system;

c) Intimate to Grid Coordination Committee about the changes implemented in protection system or protection settings within a fortnight of such changes;

d) ensure correct and appropriate settings of protection as specified by Grid Coordination Committee; and

e) ensure proper coordinated protection settings.

iii) SLDC shall maintain a centralized database and update the same on periodic basis in respect of State containing details of relay settings for grid elements connected to 66 kV and above.

21.4 Protection Systems shall be provided by all Transmission Licensees and Users to isolate the faulty equipments and protect the other components against all types of faults, internal/external to them, within specified fault clearance time with reliability, selectivity and sensitivity:

Provided that all Users or Transmission Licensees connected to the State Grid System shall provide protection systems as specified in the Connection Agreement.

21.5 Relay setting coordination shall be done at State level by Grid Coordination Committee. The Grid Coordination Committee would also identify critical locations where a particular type of protection needs to be provided if not available already.

21.6 **Protection Audit Plan**

i) Generating Stations shall conduct internal audit of their protection systems annually and any shortcomings identified shall be rectified and informed to Grid Coordination Committee and SLDC. The audit report along with action plan for rectification of deficiencies detected if any, shall be shared with Grid Coordination Committee and SLDC.

ii) All Users except those under Regulation 21.6(a) of the Grid Code and having sub-stations at voltage level 230 kV and above shall conduct internal audit of their protection systems annually and third-party protection audit of each substation once in five (5) years. The audit report along with action plan for rectification of deficiencies detected if any, shall be shared with Grid Coordination Committee and SLDC.

iii) All Users except those under Regulation 21.6(a) of the Grid Code and having sub-stations at voltage level 66 kV / 110 kV shall conduct internal audit of their protection systems once in three (3) years. The audit report along with action plan for rectification of deficiencies detected if any, shall be shared with Grid Coordination Committee and SLDC.

iv) After analysis of any event, Grid Coordination Committee shall identify a list of sub-stations/ generating stations where third-party protection audit is required to be carried out and accordingly advise the respective Users to complete third-party audit within three months.

v) The third-party protection audit report shall contain information sought in the format enclosed as Appendix–I. The protection audit reports along with action plan for rectification of deficiencies detected, if any, shall be submitted to Grid Coordination Committee and SLDC within a month of submission of third-party audit report. The

necessary compliance to such protection audit report shall be followed up regularly in Grid Coordination Committee meetings.

vi) Annual audit plan for the next financial year shall be submitted by the Users to Grid Coordination Committee and SLDC by 31st October. The Users shall adhere to the annual audit plan and report compliance of the same to Grid Coordination Committee and to SLDC for record purposes.

vii) Users shall submit the following protection performance indices of previous month to Grid Coordination Committee and SLDC on monthly basis for 66 kV and above system, which shall be reviewed by the Grid Coordination Committee:

The Dependability Index defined as D =Nc/ (Nc+Nf);
The Security Index defined as S =Nc/(Nc+Nu); and
The Reliability Index defined as R =Nc/ (Nc+Ni);

where,
Nc is the number of correct operations at internal power system faults;
Nf is the number of failures to operate at internal power system faults;
Nu is the number of unwanted operations; and
Ni is the number of incorrect operations and is the sum of Nf and Nu.

viii) Each User shall also submit the reasons for performance indices less than unity of individual element-wise protection system to Grid Coordination Committee and action plan for corrective measures. The action plan will be followed up regularly by the Grid Coordination Committee.

ix) In case any User fails to comply with the protection protocol specified by Grid Coordination Committee or fails to undertake remedial action identified by the Grid Coordination Committee within the specified timelines, Grid Coordination Committee / STU may approach the Commission with all relevant details for suitable directions.

PART E: OPERATING CODE

22. Operating Code

22.1 State Load Despatch Centre shall supervise the overall operation of the State Grid System including import to and export from State of active and reactive power. Export from and import to shall be supervised in close co-ordination with RLDC. RLDC shall supervise and control inter-state transmission lines as per Section 28(2) (d) of the Act as well as be responsible for overall scheduling and dispatch on the regional basis is concerned.

22.2 State Load Despatch Centre shall develop, document and maintain detailed internal operating procedures for managing the State Grid.

Provided that such procedures shall be developed in consultation with RLDC, STU, Transmission Licensees and Grid Coordination Committee.

Provided further that such procedures shall be consistent with State Grid code and IEGC.

22.3 The control rooms of the State Load Despatch Centre including load control centres of Licensee/State generating stations Power Plants, substations of 132 kV and above and any other control Centres of Transmission Licensees and Users shall be manned round-the-clock by qualified and adequately trained personnel.

23. System security aspects

23.1 All Users and Transmission Licensees shall endeavour to operate their respective power systems and power stations in synchronism with each other at all times, such that the entire system within the State operates as one synchronised system.

23.2 No part of the State Grid shall be deliberately isolated from the rest of the intra-State Transmission System except

i) Under an emergency, and conditions in which such isolation will prevent a total grid collapse and/or will enable early restoration of power supply;

ii) When serious damage to a costly equipment is imminent and such isolation will prevent it;

iii) When such isolation is specifically instructed by the State Load Despatch Centre.

23.3 Complete synchronism of the State Grid shall be restored as soon as the conditions again permit it. The restoration process shall be supervised by State Load Despatch Centre as per the operating procedures separately formulated by State Load Despatch Centre.

23.4 No important element of the State Grid shall be deliberately opened or removed from service at any time, except when specifically instructed by State Load Despatch Centre or with specific and prior clearance of State Load Despatch Centre. The list of such important grid elements on which the above stipulations apply shall be prepared by the State Load Despatch Centre in consultation with the Transmission Licensees and Users and shall be available at the State Load Despatch Centre and concerned Transmission licensee and users.

23.5 Any tripping, whether manual or automatic, of any of the elements of the State Grid, referred in Section 23.4, shall be precisely intimated by the concerned Transmission Licensee or User to the State Load Despatch Centre as soon as possible. The reason, to the extent determined, and the likely time of restoration shall also be intimated. All reasonable attempts shall be made for the elements' restoration as soon as possible.

23.6 An in-State Generating Unit shall be capable of continuously supplying its normal rated active/reactive output at the rated system frequency and voltage, subject to the design limitations specified by the manufacturer.

23.7 A Generating Unit shall be provided with an Automatic Voltage Regulator, protective and safety devices, as set out in Connection Agreement.

23.8 Each In-State Generating Unit shall be fitted with a turbine speed governor having an overall droop characteristic within the range of 3% to 6% (for thermal generating units and WS Seller) or 0-10% (for hydro generating units) as specified in the CEA Technical Standards for Connectivity Regulations and such turbine speed governor shall always be in service:

Provided that if any in-State generating unit of over fifty (50) MW size is required to be operated without its governor in normal operation, the State Load Despatch Centre shall be immediately advised about the reason and duration of such operation.

23.9 Facilities available with/in load limiters, Automatic Turbine Run-up System, Turbine supervisory control, coordinated control system, etc., shall not be used to suppress the

normal governor action in any manner. No dead bands and/or time delays shall be deliberately introduced.

23.10 Each in-State Generating Unit shall be capable of instantaneously increasing output by 5%, when the frequency falls, subject to limit of 105% of Maximum Continuous Rating. This shall be in accordance with Regulations 17.1.

Ramping back to the previous generation level, in case the increased output level cannot be sustained, shall be in accordance with Regulations 17.1.

Provided that any in-State generating unit of over Fifty (50) MW size not complying with the above requirements, shall be kept in operation (synchronized with the State Grid) only after obtaining the permission of State Load Despatch Centre:

Provided also that User can make up the corresponding short fall in spinning reserve by maintaining an extra spinning reserve on the other generating units of the User

23.11 The recommended rate for changing the governor setting, i.e., supplementary control for increasing or decreasing the output (generation level) for all generating units, irrespective of their type and size, would be one (1.0) per cent per minute or as per manufacturer's limits. However, if frequency falls below 49.5 Hz, all partly loaded generating units shall pick up additional load at a faster rate, according to their capability.

23.12 Except under an emergency, or to prevent an imminent damage to costly equipment, no User shall suddenly reduce his generating unit output by more than one hundred (100) MW without prior intimation to and consent of the State Load Despatch Centre, particularly when frequency is falling or is below 49.0Hz. Similarly, no User shall cause a sudden increase in its load by more than one hundred (100 MW) without prior intimation to and consent of the State Load Despatch Centre.

23.13 All generating units shall normally have their Automatic Voltage Regulators in operation, with appropriate settings.

Provided that in case a generating unit of over fifty (50) MW is required to be operated without its Automatic Voltage Regulator in service, the State Load Despatch Centre shall be

immediately intimated about the reason and duration, and its permission be obtained and written confirmation obtained from SLDC.

23.14 Power System Stabilizers in Automatic Voltage Regulators of generating units, wherever provided, shall be properly tuned by the respective generating unit owner as per a plan prepared for the purpose by the State Transmission Utility from time to time. State Transmission Utility will be allowed to carry out checking of Power System Stabilizer and further tuning it, wherever considered necessary.

23.15 Provision of protections and relay settings shall be coordinated periodically throughout the State grid, as per a plan to be separately finalized by Grid Coordination Committee and RLDC.

23.16 The rated frequency of the system shall be 50.000 Hz and shall normally be regulated within the allowable band of 49.900-50.050 Hz in line with IEGC. The frequency shall be measured with a resolution of +/- 0.001 Hz by SLDC and such frequency data measured every second shall be archived by SLDC. State Load Despatch Centre, in coordination with Regional Load Despatch Centre, Users and Transmission Licensees shall make all possible efforts to ensure that the grid frequency always remains within the band as specified by IEGC, the frequency range within which steam turbines conforming to the IEC specifications can safely operate continuously.

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

23.18 Users and Transmission System Licensees shall ensure that the under-frequency and df/dt relay-based load shedding/islanding schemes, mentioned in Section 23.17 are always functional:

Provided that the relays may be temporarily kept out of service, in extreme contingencies, with prior consent of State Load Despatch Centre.

23.19 Sub-Committee constituted by Grid Coordination Committee for this purpose shall carry out periodic inspection of the under frequency and df/dt relays and Grid Coordination Committee shall maintain proper record of these inspection.

23.20 Users and Transmission Licensees shall facilitate identification, installation and commissioning of System Protection Schemes, as finalized by Grid Coordination Committee, in the power system to protect against situations such as voltage collapse and cascading:

Provided that such schemes shall always be kept in service and in case any of these are taken out of service, SLDC shall be promptly informed.

23.21 Each User and Transmission Licensee shall provide adequate and reliable communication facility internally and with State Load Despatch Centre, other Users and other Transmission Licensees 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., SLDC to Users.

23.22 User and Transmission Licensee shall send the requested information/data including disturbance recorder/sequential event recorder output etc to State Load Despatch Centre for purpose of analysis of any grid disturbance/event. No User or Transmission Licensee shall block any data/information required by the State Load Despatch Centre Data required may also cover data for maintaining reliability and security of the State or Regional Grid and for analysis of an event.

23.23 State Load Despatch Centre, State Generating Stations Users and Transmission Licensees shall make all possible efforts to ensure that the grid voltage as per CEA Grid Standards Regulations and amendments thereof always remains within the following operating range:

Voltage (kV rms)		
Nominal	**Maximum**	**Minimum**
765	800	728
400	420	380

Voltage (kV rms)		
Nominal	**Maximum**	**Minimum**
220	245	207
132	145	120
66	72	60

24. **Demand forecast**

24.1 Each distribution Licensee and User shall develop methodology/mechanism for daily/weekly/monthly/early demand estimation of active power as well as reactive power. STU shall provide for procedures as well as time guidelines to be followed for exchange of information between concerned entities for arriving at these estimates/forecasts.

24.2 The demand estimation shall cover the time scales as applicable for operational purposes. The time scales should be decided after giving due considerations to the requirements under other existing regulations for furnishing demand forecast related information.

25. **Manual Demand Disconnection**

25.1 Users shall endeavour to restrict their actual drawal within their respective drawal schedules whenever the system frequency is below 49.9 Hz:

In case of falling Frequency, SLDC shall take appropriate action to issue instructions, in co-ordination with ERLDC to arrest the falling frequency and restore it, within permissible range. Such instructions may include dispatch instruction to generators under control area of SLDC and/or instruction to DISCOMs/Users to reduce load demand manually and/or through automatic load shedding.

In case of rising Frequency, SLDC shall take appropriate action to issue instructions to the generators under its control in co-ordination with ERLDC, to arrest the rising frequency and

restore frequency within permissible range. SLDC shall also issue instructions to DISCOMs/ Users in coordination with ERLDC to lift Load shedding, in any persist.

25.2 In case of certain contingencies and/or threat to system security, the State Load Despatch Centre may direct Distribution Licensees and Users to decrease their drawals by certain quantum and such Users shall act upon such directions immediately.

25.3 Users shall make arrangements that will enable manual disconnection to take place as instructed by the State Load Despatch Centre.

25.4 The measures taken to reduce Users drawal from the State Grid shall not be withdrawn so long as frequency/voltage remains at low level unless specifically permitted by SLDC.

26. **Reports**

26.1 A weekly report shall be issued by State Load Despatch Centre to STU, Transmission Licensees, users and Grid-coordination Committee to inform about the performance of the State Grid for the previous week. The weekly report shall contain the following:

i) Frequency profile;

ii) Voltage profile of selected substations;

iii) Major Generation and Transmission Outages;

iv) Transmission constraints;

v) Instances of persistent / significant non-compliance of State Grid Code; and

vi) Grid Security events, leading to curtailment along with reasons.

Provided that the weekly report shall also be available in copying mode on the website of State Load Despatch Centre for at least twelve (12) weeks:

26.2 The State Load Despatch Centre shall prepare a quarterly report which shall bring out the system constraints, reasons for not meeting the requirements, if any, of security standards and quality of service, along with details of various actions taken by different Users/Transmission Licensees, and the Users/Transmission Licensees responsible for causing the constraints.

26.3 SLDC shall also provide information/report which can be called by Grid Coordination Committee in the interest of smooth operation of State Grid.

Provided further that SLDC shall also endeavour to provide Real time information of the Grid on its website.

27. Operational Liaison

27.1 Operations and events on the State Grid

i) State Load Despatch Centre shall, before any Operation is carried out on State grid, inform RLDC each User and Transmission Licensee, whose system may or will experience an operational effect, and give details of the operation to be carried out.

ii) State Load Despatch Centre shall, immediately following an event on State grid, inform each User and Transmission Licensee, whose system may or will experience an operational effect following the event, and give details of what happened in the event but need not give the reasons for the same.

27.2 Operations and events on Users' or Transmission Licensees' System

i) Before any Operation is carried out on system of a User or a Transmission Licensee, the concerned User or Transmission Licensee shall inform the State Load Despatch Centre, in case the State Grid may or will, experience an operational effect, and shall give details of the operation to be carried out.

ii) User or a Transmission Licensee shall, immediately following an event on its system, inform the State Load Despatch Centre, in case the State Grid may or will, experience an operational effect following the event, and give details of what happened in the event but need not give the reasons for the same.

28. Outage planning and coordination

28.1 Introduction

i) This section sets out the procedure for preparation of outage schedules for State Grid as well as planning for the elements of State Grid in a co-ordinated and optimum manner

keeping in view the condition of State Grid, State Generation and status of export import and load demand.

ii) Transmission system and State Generation including export/import should be adequate after taking into account the outages to achieve security standards.

iii) Annual outage plan should be prepared in advance for the financial year by Grid Coordination Committee for the State Grid and reviewed on quarterly and monthly basis.

28.2 **Objective**

i) To develop a co-ordinated Generation/Transmission line outage programme for State Grid taking into account State Generation, Transmission line constraints and load demand.

ii) To minimize demand supply gap for power demand, active energy demand and reactive energy demand to achieve proper security standards.

iii) To optimize Transmission line outage of State transmission line and other transmission networks to achieve proper security standards.

28.3 **Outage Planning Process**

i) All Users and Transmission Licensees shall provide Grid Coordination Committee with their proposed outage programmes in writing for the next financial year by 30th November of each year. These shall contain identification of each Generating Unit/Transmission Line/Interconnecting Transformer for which outage is being planned, reasons for outage, the preferred date for each outage and its duration and where there is flexibility, the earliest start date and latest finishing date.

ii) Grid Coordination Committee 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 endeavour to maximize the utilization of

water for purpose of power generation subject to applicable constraints related to alternate use of such water.

iii) Transmission Outage Planning shall be harmonized with Generation Outage Planning and Distribution System Outage Planning shall be harmonized with Generation and Transmission Outage Planning.

iv) The final outage plan shall be intimated to all Users and Transmission Licensee latest by 31st January each year:

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

v) 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 availing the schedule plan. Without prior approval from SLDC, scheduled plan should not be availed.

vi) The State Load Despatch Centre shall have the authority to defer any planned outage in case of occurrence of following events:

(i) Major grid disturbances (total black out);

(ii) System isolation;

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

(iv) Black out in User area.

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

29. **Recovery Procedures**

29.1 Detailed plans and procedures for restoration after partial/total blackout shall be developed by State Load Despatch Centre in coordination with the Users and Transmission Licensees and Grid Coordination Committee.

29.2 The procedure shall be reviewed, confirmed and/or revised once every subsequent year. Mock trial runs of the procedure for different sub-systems shall be carried out by the State Load Despatch Centre, in coordination and consultation with Users and Transmission Licensees, at least once every six months under intimation to the Regional Load Despatch Centre

29.3 List of State Generating Stations with black start facility, inter-State ties, synchronizing points and essential loads to be restored on priority, shall be prepared by SLDC and be available with State Load Despatch Centre.

29.4 State Load Despatch Centre shall be authorized during the restoration process following a black out, to operate with reduced security standards for voltage and frequency as necessary in order to achieve the fastest possible recovery of the grid in consultation with RLDC. Reduced security standards shall be documented in consultation with RLDC.

29.5 All communication channels required for restoration process shall be used for operational communication only, till grid normalcy is restored.

30. **Event information**

i) This section deals with reporting procedure in writing of all reportable events in State Grid.

ii) The objective of this section is to define the events to be reported along with reporting route and details of information to be reported to achieve consistency of approach.

iii) This Section cover all Users, Transmission Licensees, STU, SLDC and RLDC.

31. **Reportable Events**

31.1 Any of the following events shall require reporting by User, Transmission Licensee, STU or State Load Despatch Centre as the case may be.

(i) Violation of security standards;

(ii) Grid indiscipline;

(iii) Non-compliance of State Load Despatch Centre's instructions;

(iv) System islanding/system split;

(v) Black out/partial system black out;

(vi) Protection failure on any element of intra-State Transmission System;

(vii) Power system instability; and

(viii) Tripping of any element of the State Grid.

32. **Reporting Procedure**

i) User or Transmission Licensee, after having initially reported about the event orally to the State Load Despatch Centre, shall provide a written report within 72 hours of the occurrence of the event to the State Load Despatch Centre.

ii) State Load Despatch Centre, after having initially reported about the event orally to the Users/Transmission Licensees, shall provide a written report within 72 hours of the occurrence of the event to the concerned Users/Transmission Licensees.

iii) A written report shall be sent to State Load Despatch Centre or Users/Transmission Licensees, as the case may be, and shall confirm the oral notification together with the following details of the event:

a. Time and date of event;

b. Location;

c. Plant and/or Equipment directly involved;

d. Description and cause of event;

e. Antecedent conditions;

f. Demand and/or Generation (in MW) interrupted and duration of interruption;

g. All relevant system data including copies of records of all recording instruments including Disturbance Recorder, Event Logger and Data Acquisition System;

(i) Sequence of tripping with time;

(ii) Details of Relay Flags; and

(iii) Remedial measures.

Provided that a copy of the report shall be forwarded to the Commission

33. **State Load Despatch Centre and Sub-Load Despatch Centres**

33.1 Procedures and processes developed by State Load Despatch Centre, in discharge of its functions under the provisions these Regulations, shall clearly provide for the following aspects, wherever applicable:

i) Roles and Responsibilities of Load Control Centres;
ii) Communication facilities between the State Load Despatch Centre and Load Control Centres;
iii) Information flow between State Load Despatch Centre and Load Control
iv) Centres; and
v) Any other aspect considered appropriate by the State Load Despatch Centre
vi) or the Commission.

34. **State Load Despatch Centre, Transmission Licensees and Users.**

34.1 Procedures and processes developed by State Load Despatch Centre, in discharge of its functions under the provisions these Regulations, shall clearly provide for the following aspects, wherever applicable:

i) Roles and Responsibilities of State Load Despatch Centre, Users and Transmission Licensees;
ii) Information flow between State Load Despatch Centre, Users and Transmission Licensees; and
iii) Any other aspect considered appropriate by the State Load Despatch Centre or the Commission.

PART F: SCHEDULING AND DESPATCH CODE

35. SLDC has the exclusive responsibility for optimum scheduling and dispatch of electricity within the state in accordance with the contracts entered into between Licensees, Users and State Generating Stations including captives and non-conventional energy sources.

36. The following specific points would be taken into consideration while preparing and finalizing the schedules:

i) SLDC will issue despatch instruction for all State Generating Stations and imports from ISGS, IPPs, CPPs and NCES as 15-min day ahead generation schedule, unless rescheduling is required due to unforeseen circumstances.

ii) SLDC shall despatch 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).
- Renewable Energy Sources.

iii) Despatch instructions shall be in Annexure D-1. These instructions will recognize declared availability and other parameters that have been made available by the generators to SLDC. These instructions shall include time, power station, generating units, (total export in case of CPP) and name of operators sending and receiving the same.

iv) Standard despatch instructions may include:

- To switch a generator 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 on standby.
- To control MW/MVAr drawal by Users / Distribution Licensees.

37. **Demarcation of responsibilities**

37.1 The SLDC shall have the total responsibility for:

i) Scheduling / despatching the generation of all agencies including the Utilities, IPPs, NCES (excluding windmills)., Co-Generators, etc. connected to the Grid.

ii) Regulating the demand of the Users / Distribution Licensee in the State.

iii) Regulating the drawal from the central generating stations and regulating the bilateral interchanges, if there is any.

iv) Adopting merit order despatch, ABT procedures and free governor operation at power stations wherever possible.

37.2 SLDC shall always endeavour to restrict its net drawal from central generating stations and other generating stations within their respective drawal schedules and the guidelines of ABT.

37.3 The generating stations shall be responsible for power generation generally according to the daily schedule provided to them by the SLDC on the basis of the drawal schedules received from the Users /Distribution Licensee and also in accordance with Merit Order Despatch and Connectivity Agreements. However, the generating stations may deviate from the given schedules depending on the plant and system conditions with the prior approval from SLDC. Provided that when, the frequency is higher than the specified frequency Band, the actual net injection shall not exceed the scheduled despatch for that hour. Also, while the frequency is above specified frequency Band, the generating stations may (at their discretion) back down without waiting for the advice from SLDC. When the frequency falls below specified frequency Band, the generation at all stations (except those on peaking duty) shall be maximized, at least up to the level, which can be sustained, without waiting for the advice from SLDC.

Notwithstanding the above, the SLDC may direct the generating stations / beneficiaries to increase / decrease their generation / drawal in case of contingencies e.g. overloading of lines / transformers, abnormal voltages, threat to system security. Such directions shall immediately be acted upon.

37.4 For all outages of generation and transmission system, which may have an effect on the State Grid, all entities shall co-operate with each other and co-ordinate their actions as per the approved procedures prepared separately. In particular, outages requiring restriction of generation which a user/ Distribution Licensee can receive (and which may have a commercial implication) shall be planned carefully to achieve the best optimization. The entities shall furnish to the SLDC all requisite information for billing purposes.

37.5 All entities shall abide by the concept of frequency linked load dispatch and pricing of deviations from schedule i.e. unscheduled interchanges. All generating units of the entities and the licensees shall normally be operated according to the standing frequency linked load dispatch guidelines issued by the SLDC to the extent possible, unless otherwise advised by the SLDC.

37.6 The STU shall opt to install special energy meters on all inter connections between the State entities and other identified points for recording of actual net MWh interchanges and MVArh drawal. The SLDC shall be responsible for computation of actual net MWh injection of each generating stations and actual net drawal of each beneficiary, 15 minute wise, based on the above meter readings. The SLDC shall be responsible 55 for Intra-State Energy Accounting as per the scheme approved by Grid Coordination Committee, and all entities shall extend the necessary assistance to the SLDC personnel in timely collection of metered data. The generators shall furnish the data as per Annexure D-2.

37.7 The STU will undertake necessary Energy Audits in the Grid.

38. **Scheduling and Despatch procedure**

38.1 The generation scheduling and despatch data shall be as per format in Annexure D-1. The procedure has been devised taking into account the ABT (Available Based Tariff) regime.

38.2 Each day starting from 00.00 hours will be divided into 96 time blocks of 15 minutes intervals.

38.3 The following scheduling related activities shall be carried out daily for regional entities, on day ahead basis, 'D-1' day, for supply of power on 'D' day, as follows:

a) Declaration of Declared Capacity by generating stations

By 6 AM on 'D-1' day, each Intra-State SSGS/IPPs/CGPs/REGS/other generators connected with the intra-state transmission system will intimate SLDC, station wise ex-power plant MW and MWH capabilities foreseen for the next day 'D', i.e., between 0000 hours to 2400 hours, at 15-minute intervals in the formats prescribed by SLDC. The Generating Stations shall submit the following information:

(i) Generating Station based on coal, gas and lignite:

1. Time block-wise On-bar Declared Capacity (MW) for on-bar units.
2. Time block-wise Off-bar Declared Capacity (MW) for off-bar units.
3. Time block-wise Ramp up rate (MW/ min) for on-bar capacity.
4. Time block-wise Ramp down rate (MW/min) for on -bar capacity.
5. MWh capability for the day.
6. Minimum turndown level (MW) and in percentage (%) of ex-bus capacity on-bar.

Note:- Declared Capacity shall be given as per unit wise/plant wise as requested by SLDC.

(ii) Generating Station based on hydro energy:

1. Time block-wise ex-bus declared capacity.
2. MWh capability for the day.
3. Ex-bus peaking capability in MW and MWh.
4. Time block-wise Ramp up rate (MW/min) for on-bar capacity.
5. Time block-wise Ramp down rate (MW/min) for on-bar capacity.
6. Unit-wise forbidden zones in MW and percentage (%) of ex-bus installed capacity.

7. Minimum MW and duration corresponding to requirement of water release for irrigation, drinking water and other considerations.

8. Unit-wise maximum MW along with probable combination of unit maximum in case adequate water is not available.

(iii) The renewable energy generating station based on wind/ solar, hybrid of wind and solar, individually or represented by a lead generator or Qualified Coordinating Agency (QCA), shall submit aggregate available capacity of the pooled generation and aggregate schedule along with contract-wise breakup for each time block for 0000 hours to 2400 hours of the 'D' day, by 6 AM on 'D-1' day. The source-wise breakup of aggregate available capacity of the pooled generation shall also be furnished.

(iv) ESS including pumped storage plant, individually or represented by the lead ESS or QCA on their behalf, shall submit aggregate available capacity of the pooled generation and aggregate schedule along with contract-wise breakup for each time-block for 0000 hours to 2400 hours of the 'D' day, by 6 AM on 'D-1' day. The source-wise breakup of aggregate available capacity of the pooled generation shall also be furnished.

(v) The availability declaration by generating station shall have a resolution of two decimal (0.01) MW and three decimal (0.001) MWh.

(vi) The entitlement of each Beneficiary or Buyer, from generating stations, shall be in accordance with Regulation 49.1(b) of Indian Electricity Grid Code and amendments thereof.

b) ERLDC shall declare share of each Beneficiary or Buyer for 0000 hours to 2400 hours of 'D' day, by 7 AM on 'D-1' day.

c) SLDC will compile the generator-wise availability for ISGS/ other agreements /SSGS/ IPPs/REGS entitlement of each Beneficiary or Buyer for 'D' day at 15-minute interval and shall intimate the same to the Distribution Licensee(s) including Deemed Licensees by 07:15AM on 'D-1' day.

d) By 07:45 AM of 'D-1' day, the Distribution Licensee(s) including Deemed Licensees will furnish requisition to SLDC in each ISGS, other agreements, Intra-State, SSGS/ IPPs/ REGS for 0000 hours to 2400 hours of 'D' day.

e) By 8 AM of 'D-1' day, SLDC shall convey the requisition of the State to ERLDC from ISGS/other agreements/SSGS/ IPPs/ REGS for 0000 hours to 2400 hours of 'D' day.

f) The SLDC on behalf of the intra-State entities while furnishing time block-wise requisition under this Grid Code, subject to technical constraints, duly factor in merit order of the generating stations with which intra-State entities has entered into contract(s) for drawal of power:

Provided that the renewable energy generating stations shall not be subjected to merit order despatch, and subject to technical constraints shall be requisitioned first followed by requisition from other generating stations in merit order.

g) ERLDC shall check if drawal schedules as requisitioned can be allowed based on available transmission capability:

Provided that in case of constraint in transmission system, the available transmission corridor shall be allocated in proportion depending upon the transmission constraint, whether it is within the region or from outside the region, as the case may be. The same shall be intimated by 8:15 AM on 'D-1' day.

h) The Intra-State Entity shall revise their requisition for drawal schedule based on availability of transmission corridors by 8:30 AM on 'D-1' day.

i) ERLDC shall issue initial drawal schedules and injection schedules for the State by 9 AM on 'D-1' day. ERLDC shall convey the generating station-wise drawal schedule of the State by 9:00 AM on 'D-1' day.

j) The SLDC shall issue initial dispatch/drawl schedules at 9.15 AM on '-1' day for the intra-state entities under SLDC purview.

k) In case a generating station under the purview of ERLDC other than REGS intends to replace its schedule by power supplied from REGS, it shall intimate the quantum and source of

power in the ERLDC/NLDC website by which it intends to replace the power already scheduled by 9:15 AM on 'D-1' day.

l) ERLDC and subsequently SLDC, shall incorporate the request from the above said generating station and finalize the injection and drawal schedules by 9:45 AM on 'D-1' day.

m) SLDC shall issue modified dispatch/drawl schedules at 10 AM on 'D-1' day for the intra-state entities under SLDC purview if there are any changes in the intra-state entities.

n) ERLDC shall release the balance corridors after finalisation of schedules for day ahead collective transactions.

o) Power Exchange(s) shall open bidding window for day ahead collective transactions from 10:00 AM to 11:00 AM of 'D-1' day. NLDC shall validate the same from system security point and inform the Power Exchange(s) with revisions required, if any, due to transmission congestion or any other system constraint by 12:15 PM of 'D-1' day. The Power Exchange(s) shall submit the final trade schedules to NLDC for regional entities and to SLDC for intra-State entities by 1:00 PM of 'D-1' day.

p) ERLDC shall release balance corridors after finalisation of schedules under day ahead collective transactions by 1:00 PM of 'D-1' day.

q) ERLDC/ SLDC shall process exigency applications received till 1:00 PM of 'D-1' day for 'D' day by 2:00 PM of 'D-1' day.

r) ERLDC, and subsequently SLDC, shall update the availability of balance transmission corridors, if any, after finalisation of schedules for exigency applications by 2:00 PM of 'D-1' day on its website. The balance transmission corridor may be utilised by way of revision of schedule, under any contract for exigency applications or in real time market on first-come-first-served basis.

s) SLDC shall issue dispatch/drawl schedules for State entities at 22:45 hours on 'D-1' day as final revision before real-time market operation.

t) All the entities participating in the real-time market may place their bids and offers on the Power Exchange(s) for purchase and sale of power. The window for trade in real-time market for 'D' day shall open from 22:45 hours to 23:00 hours of 'D-1' for the delivery of

power for the first two time-blocks of 1st hour of 'D' day, i.e., 0000 hours to 0030 hours, and will be repeated every half an hour thereafter. NLDC shall indicate to the Power Exchange(s) the available margin on each of the transmission corridors before the gate closure. The Power Exchange(s) shall clear the real-time bids from 23:00 hours till 23:15 hours of 'D-1' day based on the available transmission corridor and the buy and sell bids for the real time market (RTM) for the specified duration and intimate the cleared bids to NLDC by 23:15 hours, for scheduling.

u) NLDC shall finalise schedules under real time market (RTM) by 23:30 hours of 'D-1' day and ERLDC, subsequently SLDC, shall publish the final schedules for dispatch by 23:35 hours of 'D-1'day. Subsequently, the SLDC shall publish the schedules during intra-day operations.

v) Scheduling process for the inter-state entities liable to change as per the IEGC and its relevant regulations. Subsequently, SLDC shall change the scheduling process by incorporating the changes in the inter-state entities whenever, there is change in scheduling timeline.

w) The scheduled finalized by SLDC shall have the following:

- Ex-power plant generation schedule of SSGS/IPPs and other State generators including wind/solar generators, Hybrid of wind and solar Generating Stations and Energy Storage System (ESS).
- Drawal schedule of State Distribution Licensees including Deemed Licensees.

38.4 **Rules for revision in schedule**

a) In the event of a situation arising due to bottleneck in evacuation of power due to transmission constraint, SLDC shall revise the schedule, which shall become effective from 4thtime block, counting the time block in which the transmission constraint has been brought to the notice of SLDC as the first one.

b) In case of any grid disturbance, the scheduled generation of all the generating stations and scheduled drawal shall be deemed to have been revised to be equal to their actual generation/ drawal for all the time blocks affected by grid disturbance. The certificate of grid

disturbance and its duration shall be declared by SLDC/ERLDC and the same will be binding on all intra-State transmission system Users:

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

d) Revision of Declared Capacity and schedule shall be allowed on account of forced outage of a unit of an intra-State generating station or ESS (as an injecting entity) only in case of bilateral transactions and not in case of collective transaction. Such generating station or ESS (as injecting entity) or the electricity trader or any other agency selling power from the unit of the generating station or ESS shall immediately intimate the outage of the unit along with the requisition for revision of Declared Capacity and schedule and the estimated time of restoration of the unit, to SLDC. The schedule of beneficiaries, sellers and buyers of power from this generating unit shall be revised on pro-rata basis for all bilateral transactions. The revised Declared Capacity and schedules shall become effective from 6th time block, counting the time block in which revision is advised by the generators to be the first one:

e) Provided that the generating station or ESS (as injecting entity) or Trading Licensee or any other agency selling power from a generating station or unit(s) thereof or ESS, may revise its estimated restoration time once in a day and the revised schedule shall become effective from 6th time block, counting the time block in which the revision is informed by the generator or ESS to be the first one:

Provided further that the SLDC shall inform the revised schedule to the seller and the buyer. The original schedule shall become effective from the estimated time of restoration of the unit.

f) The generating station (other than lignite, gas based thermal generating station, and hydro generating station) or ESS (as an injecting entity) shall be allowed a maximum of 4 (four) revisions of Declared Capacity and schedule in a day subject to a maximum of 60 (sixty)

revisions during a month, due to reasons such as a partial outage of the unit or variation of fuel quality or any other technical reason to be recorded in writing:

Provided that RLDC may allow upward revision of DC beyond the above limit keeping in view grid requirements.

g) The generating station based on lignite, gas, or hydro generating station shall be allowed 6(six) revisions of Declared Capacity and schedule in a day subject to a maximum of 120 (One hundred twenty) revisions during a month, due to reasons such as a partial outage of the unit or water availability for hydro generating stations or fuel quality or variations in the supply of gas for gas generating stations or any other technical reason to be recorded in writing: Provided that SLDC may allow upward revision of DC beyond the above limit keeping in view grid requirements.

h) In case of requirement of revision of schedule due to forecasting error, a WS seller may revise its schedule only in case of bilateral transactions and not in case of collective transaction. Such revision of schedule shall become effective from 6th time block, counting the time block in which the revision is informed by WS seller to be the first one.

i) In case of requirement of revision of Declared Capacity due to forecasting error, a Run-of-River generating station may request for revision of its Declared Capacity and schedule only in case of bilateral transactions and not in case of collective transaction. Such revision shall become effective from 6th time block, counting the time block in which the revision is informed to SLDC to be the first one.

j) If a revision is received from any ISGS stations, RLDC will flash the information in real-time basis containing all the relevant information needed to revise the schedule based on which SLDC will process the revision in parallel. The implementation time of revision will be same for RLDC and SLDC.

k) SLDC, on behalf of intra-State drawee entities may revise their schedules, which shall become effective from 6th time block, counting the time block in which the revised schedule is issued by SLDC to be the first one:

Provided that scheduled transactions under short term open access once scheduled cannot be revised.

l) After the operating day is over at 24:00 hours, the schedule finally implemented during the 'D' day (taking into account all before-the-fact changes in Despatch Schedule of Electricity Generating Stations and Drawal Schedule of the other Intra-State Entities) shall be issued by SLDC within three (3) days or on receipt of ERLDC implemented schedule. Further, the implemented schedule may be revised by SDLC, if Ex-post facto revision in implemented schedule is made by ERPC. These Schedules shall form the basis for commercial accounting. The average ex-bus capability for each SSGS and IPPs shall also be worked out based on all before-the-fact advice to SLDC.

38.5 **Scheduling from alternate source of power by a generating station**

a) A generating station may supply power from alternate source in case of Unit Shut Down (USD) or forced outage of unit(s). This facility shall also be available to a generating station other than REGS replacing its scheduled generation by REGS, irrespective of whether such identified sources are located within or outside the premises of the generating station.

b) The methodology for scheduling of power from alternate sources covered under USD or forced outage of unit(s) shall be as per the following steps:

(i) The generating station may enter into contract with alternate supplier under bilateral transaction or collective transaction.

(ii) In case of bilateral transaction, the generating station shall request SLDC to schedule power from such alternate supplier to its beneficiaries, which shall become effective from 6th time block.

(iii) The power scheduled from alternate supplier shall be reduced from the schedule of the generating station.

(iv) In case of alternate supply is arranged through collective transactions, the transacted quantum shall be reduced from the scheduled generation of the generating station.

(v) The generating station shall not be required to pay the transmission charges and losses for such purchase of power to supply to the buyer from alternate sources.

c) The methodology for scheduling of power from alternate sources for a generating station other than REGS replacing its scheduled generation by power supplied from REGS shall be as per the following steps:

(i) The generating station shall enter into contract with REGS for supply of power from alternate sources.

(ii) The generating station shall request SLDC to schedule power from such alternate source to its beneficiaries, which shall become effective from 4th time block.

(iii) The power scheduled from alternate source shall be reduced from the schedule of the generating station.

(iv) The generating station shall not be required to pay the transmission charges and losses for such purchase and supply from alternate sources to the buyer.

d) In case of a generating station whose tariff is determined by the Commission under Section 62 of the Act, supply of power by such generating station to its buyer from an alternate source, shall be subject to the Commission's Regulations/Orders issued from time to time.

e) In case of a generating station other than whose tariff is determined by the Commission under Section 62 of the Act, supply of power by such generating station to its buyer from an alternate source shall be in accordance with the contract with the buyer and in the absence of a specific provision in the contract, in terms of mutual consent including on sharing of net savings between the generating station and the buyer.

38.6 The SLDC shall properly document all the above information i.e. station-wise foreseen ex-power plant capabilities advised by the generating stations, the drawal schedule indented by

the Users / Distribution Licensees, all schedules issued by the SLDC and all revisions / updating of the above.

38.7 The procedure for scheduling carried out by SLDC, shall be open to all entities for any checking / verification. In case any mistake / omission is detected, the SLDC shall forthwith make a complete check and rectify the same.

38.8 A procedure for recording the communication regarding changes to schedules duly taking into account the time factor shall be evolved by Grid Coordination Committee.

38.9 **Minimum Turndown Level for operation of Thermal Generating Stations**

a) The technical minimum level for operation in respect of thermal generating units connected to STU network and which is in control area of SLDC shall be 55% of the MCR of the said unit or such other minimum power level as specified in the CEA Flexible Operation Regulations as amended from time to time, whichever is lower:

Provided that the Commission may, through an order, fix a different minimum turndown level of operation in respect of specific unit(s) of a thermal generating station:

Provided further that such generating station on its own option may declare a minimum turndown level below the minimum turndown level specified in this Regulation:

Provided also that the Generating stations whose tariffs are determined under Section 62 or Section 63 of the Act, shall be compensated for part load operation, i.e., for generation below the normative level of operation as per the mechanism specified in the JSERC (Terms and Conditions for Determination of Generation Tariff) Regulations, 2025 as amended from time to time.

b) The SSGS having 100% installed capacity tied up/contracted with DISCOM(s) of the State through long-term PPA and whose tariff is determined by the Commission, may be directed by SLDC to operate below normative plant availability factor but at or above technical minimum. In such cases, SSGS shall be compensated on the below mentioned parameters on monthly basis duly supported by relevant data verified by SLDC:

c) The compensation so computed shall be borne by the entity who has caused the plant to be operated at schedule lower than corresponding to Normative Plant Availability Factor

up to technical minimum based on the compensation mechanism finalized by SLDC, which shall be guided by the mechanism finalized by ERPC.

d) There shall be reconciliation of compensation at the end of financial year taking into due consideration of actual weighted average operational parameters of station heat rate, auxiliary energy consumption and secondary oil consumption.

e) No compensation for Heat Rate degradation and Auxiliary Energy Consumption shall be admissible, if the actual Station Heat Rate and/ or actual Auxiliary Energy Consumption are lower than normative Station Heat Rate and / or normative Auxiliary Energy Consumption applicable to unit or generating station in a month or after annual reconciliation at the end of year.

f) In case of generating stations other than SSGS, wherein the 100% installed capacity is not tied up with DISCOM(s) of the State or whose tariff for only partial/contracted capacity is determined by the Commission, such generating station may have to appropriately factor in the above provisions in their PPAs entered with DISCOM(s) for sale of power, in order to claim compensation for operating at the technical minimum schedule.

38.10 Data Registration

User shall provide SLDC with requisite data as mentioned above in this chapter within 20 days of such information called for by SLDC.

PART G: COMMERCIAL CODE

39. Commercial Issues

In regard to central sector allocation of power, the CERC has full jurisdiction to determine the tariff and other commercial issues.

39.1 Subject to any scheme of tariff, as may be approved by the JSERC, the bulk power supply agreements between the constituents shall duly specify the relationship between capacity charges to be paid and plant availability, and energy charge rates (in rupees per MWh) for each station, in ex-power plants. Regarding the other commercial issues, the following are applicable:

39.1.1 The transmission charges and other open access charges shall be paid to the respective constituents as per the JSERC regulations issued time to time.

39.1.2 The summation of the station-wise ex-power plant drawal schedules for all generating stations after deducting the apportioned transmission losses (estimated), shall constitute the State beneficiaries / distribution licensees drawal schedule which in turn shall be used for billing.

39.1.3 In case of a deviation from the generation schedule, the frequency linked Unscheduled Interchanges Charges (UI charges) shall be applicable for such deviations as may be approved by the CERC/JSERC from time to time and dependent on average frequency for the concerned 15-minute block.

39.1.4 Energy Accounts shall be prepared by the SLDC on a monthly basis. The Users / Distribution Licensees as per provision in the respective PPAs shall pay these bills.

39.1.5 The SLDC shall in parallel issue the weekly bills for UI charges and Reactive Energy Charges to all constituents by Tuesday for the seven-day period ending on the penultimate Sunday mid night. These bills shall have a higher priority, and the generating stations and Users / Distribution Licensees shall pay the billed amounts within 10 days of billing date.

39.1.6 If payments against the above bills are delayed beyond 10 days, the defaulting entities shall have to pay a simple interest rate of 0.04 percent for each day of delay. The

interest so collected shall be paid to the entities who have to receive the payment which got delayed.

39.1.7 SLDC shall periodically review the actual deviation from the generation and net drawal schedules to check whether any of the entities is indulging in unfair gaming. In case any such practice is detected the matter shall be reported to the Grid Coordination Committee for further investigation /action and if so needed the Grid Coordination Committee shall refer the matter to the Commission with their recommendation for appropriate action.

39.1.8 All energy accounting calculation carried out by SLDC shall be open to all the users of the State Grid for any checking / verification. In case any mistake is detected, the SLDC shall forthwith make a complete check and rectify the mistake.

39.1.9 Energy accounting (including billing of UI charges and reactive energy charges) is one of the most important and critical function of SLDC. Any flaw in the energy accounting will lead to serious financial consequences. Hence, a Sub-committee to be designated by the Grid Coordination Committee will conduct annual audit on the accounting and technical performance of SLDC and present a report to the Commission before the end of May every year for the previous financial year.

39.1.10 Regarding VAR drawal / absorption from Inter State Grid, the SLDC has to follow IEGC. The charge/payment for VARs, shall be at a nominal paise / kVARh rate as may be approved by CERC / JSERC from time to time, and will be between the beneficiary and the Pool Account and between two beneficiaries. The generating stations shall generate / absorb reactive power as per instructions of SLDC, within the capability limits of the respective generating units. No payments shall be made to the generating companies for such VAR generation / absorption.

39.1.11 The basic rules for absorption / generation of VAR are:

- The Beneficiary pays for VAR drawal when voltage at the metering point is below 97%.
- The Beneficiary gets paid for VAR return when voltage is below 97%.

- The Beneficiary gets paid for VAR drawal when voltage is above 103%.
- The Beneficiary pays for VAR return when voltage is above 103%

PART H: CYBER SECURITY CODE

40. General

a) This chapter deals with measures to be taken to safeguard the State grid from spyware, malware, cyber-attacks, network hacking, procedure for security audit from time to time, upgradation of system requirements and keeping abreast of latest developments in the area of cyber-attacks and cyber security requirements.

b) All Users, SLDC and STU shall have in place, a Cyber Security framework in accordance with Information Technology Act, 2000, CEA Technical Standards for Connectivity Regulations, CEA (Cyber Security in Power Sector) Guidelines, 2021 and any such Regulations issued from time to time, by an appropriate authority to identify the critical cyber assets and protect them so as to support reliable operation of the grid.

41. Cyber Security Audit

All Users, SLDC and STU, shall conduct Cyber Security Audit as per the guidelines mentioned in the CEA (Cyber Security in Power Sector) Guidelines, 2021 and any other guidelines issued by an appropriate Authority.

42. Mechanism of Reporting

a) All entities shall immediately report to the appropriate government agencies in accordance with the Information Technology Act, 2000, as amended from time to time, and CEA (Cyber Security in Power Sector) Guidelines, 2021, in case of any cyber- attack.

b) SLDC and the Commission shall also be informed by such entities in case of any instance of cyber-attack.

43. Cyber Security Coordination Forum

a) The sectoral CERT (Computer Emergency Response Team) for wings of power sector, as notified by Government of India, from time to time, shall form a Cyber Security Coordination Forum with members from all concerned utilities and other statutory agencies

to coordinate and deliberate on the cyber security challenges and gaps at appropriate level. A sub-committee of the same shall be formed at the regional level.

b) The sectoral CERT shall lay down rules of procedure for carrying out their activities.

PART I: MISCELLANEOUS CODE

44. Dispute

44.1 In the event of any dispute, regarding interpretation of any provision of the State Grid Code or rules and procedures notified under the provisions of the State Grid Code, the matter may be referred to the Commission for its decision:

Provided that the dispute may be referred to a forum as specified by the Commission.

45. Compliance

45.1 As stipulated under Section 33 (2), (4) and (5) of the Act, every licensee, user, generating company, generating station, substation and any other person connected with the operation of the power system shall comply with the directions issued by SLDC. If any dispute arises with reference to the quality of electricity or safe, secure and integrated operation of the State Grid or in relation to any direction given by SLDC, it shall be referred to the Commission for decision. Pending decision of the Commission the licensee or the user or the generating company shall comply with the directions of the SLDC. JSERC, in turn, after due process, may order the defaulting entity for compliance, failing which it may take penal action and other regulatory measures, which includes termination of connectivity agreement/ de-linking from the Grid etc., through STU/SLDC.

46. Non-payment of dues

In case of non-payment of capacity and energy charges, unscheduled interchange charges, transmission/SLDC charges, etc. by any beneficiary of the State Grid, the affected beneficiary shall report the matter to the Grid Coordination Committee. The latter shall verify and take up the defaulting entity for paying up the dues. In case of inadequate response, the Grid Coordination Committee shall report the same to JSERC. JSERC in turn, after due process, may order the defaulting entity to pay the dues within a certain period, failing which the JSERC may initiate necessary regulatory measures.

47. Power to amend

The Commission may, at any time, vary, alter, modify or amend any provisions of these Regulations

48. Power to remove difficulties

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

Annexure D-1

GENERATION SCHEDULING DATA

(Refer clause 36.1)

To be furnished to the SLDC:

Schedule and Despatch	**Time**
	6.00 Hrs. (every day)

1. Day ahead hourly MW/MVAr availability (0.00 - 24.00 Hrs) for all Generator Units including

   i) Generating Station based on coal, gas and lignite:

   a) Time block-wise On-bar Declared Capacity (MW) for on-bar units.
   b) Time block-wise Off-bar Declared Capacity (MW) for off-bar units.
   c) Time block-wise Ramp up rate (MW/ min) for on-bar capacity.
   d) Time block-wise Ramp down rate (MW/min) for on -bar capacity.
   e) MWh capability for the day.
   f) Minimum turndown level (MW) and in percentage (%) of ex-bus capacity on-bar.

   ii) Generating Station based on hydro energy:

   g) Time block-wise ex-bus declared capacity.
   h) MWh capability for the day.
   i) Ex-bus peaking capability in MW and MWh.
   j) Time block-wise Ramp up rate (MW/min) for on-bar capacity.
   k) Time block-wise Ramp down rate (MW/min) for on-bar capacity.
   l) Unit-wise forbidden zones in MW and percentage (%) of ex-bus installed capacity.
   m) Minimum MW and duration corresponding to requirement of water release for irrigation, drinking water and other considerations.

Schedule and Despatch	Time
n) Unit-wise maximum MW along with probable combination of unit maximum in case adequate water is not available. iii) Renewable energy generating station o) aggregate available capacity of the pooled generation p) aggregate schedule along with contract-wise breakup for each time block for 0000 hours to 2400 hours iii) Energy Storage System q) aggregate available capacity of the pooled generation r) aggregate schedule along with contract-wise breakup for each time block for 0000 hours to 2400 hours	
MW and MWh entitlements from ISGS for different hours for the next day	07:15 AM (every day)
Distribution Licensee(s) including Deemed Licensees will furnish requisition to SLDC in each ISGS, other agreements, Intra-State, SSGS/ IPPs/ REGS	07:45 AM (every day)
SLDC shall convey the requisition of the State to ERLDC from ISGS/other agreements/SSGS/ IPPs/ REGS	8 AM (every day)
ERLDC shall check if drawal schedules as requisitioned can be allowed based on available transmission capability and intimate by	8:15 AM (every day)
Intra-State Entity shall revise their requisition for drawal schedule based on availability of transmission corridors	8:30 AM (every day)
ERLDC shall issue initial drawal schedules and injection schedules	9:00 AM (every day)
SLDC shall issue initial dispatch/drawl schedules	9:15 AM

Schedule and Despatch	**Time**
	(every day)
Generating station under the purview of ERLDC other than REGS intends to replace its schedule by power supplied from REGS, it shall intimate the quantum and source of power in the ERLDC/NLDC website by which it intends to replace the power already scheduled	9:15 AM (every day)
ERLDC and subsequently SLDC, shall incorporate the request from the above said generating station and finalize the injection and drawal schedules	9:45 AM (every day)
SLDC shall issue modified dispatch/drawl schedules	10:00 AM (every day)
ERLDC shall release the balance corridors after finalisation of schedules for day ahead collective transactions	10:00 AM (every day)
Power Exchange(s) shall open bidding window for day ahead collective transactions	from 10:00AM to 11:00 AM (every day)
NLDC shall validate the same from system security point and inform the Power Exchange(s) with revisions required, if any, due to transmission congestion or any other system constraint	12:15 PM (every day)
The Power Exchange(s) shall submit the final trade schedules to NLDC for regional entities and to SLDC for intra-State entities	1:00 PM (every day)
ERLDC shall release balance corridors after finalisation of schedules under day ahead collective transactions	1:00 PM (every day)
ERLDC/ SLDC shall process exigency applications received till 1:00 PM	2:00 PM (every day)
ERLDC, and subsequently SLDC, shall update the availability of balance transmission corridors, if any, after finalisation of schedules for exigency applications	2:00 PM (every day)

Schedule and Despatch	Time
SLDC shall issue dispatch/drawl schedules for State entities at 22:45 hours on 'D-1' day as final revision before real-time market operation.	22:45 Hrs (every day)
All the entities participating in the real-time market may place their bids and offers on the Power Exchange(s) for purchase and sale of power. The window for trade in real-time market for 'D' day shall open from 22:45 hours to 23:00 hours of 'D-1' for the delivery of power for the first two time-blocks of 1st hour of 'D' day, i.e., 0000 hours to 0030 hours, and will be repeated every half an hour thereafter	22:45 Hrs to 23:00 Hours (every day)
NLDC shall indicate to the Power Exchange(s) the available margin on each of the transmission corridors before the gate closure. The Power Exchange(s) shall clear the real-time bids from 23:00 hours till 23:15 hours of 'D-1' day based on the available transmission corridor and the buy and sell bids for the real time market (RTM) for the specified duration and intimate the cleared bids to NLDC by 23:15 hours, for scheduling.	23:00 Hrs to 23:15 Hrs (every day)
NLDC shall finalise schedules under real time market (RTM) by 23:30 hours of 'D-1' day and ERLDC, subsequently SLDC, shall publish the final schedules for dispatch by 23:35 hours of 'D-1'day. Subsequently, the SLDC shall publish the schedules during intra-day operations.	23:30 Hrs and 23:35 Hrs (every day)

...

Annexure D-2

MONITORING OF GENERATION

(Refer clause 35.6)

Item	Description	submitted by
1.	Generating stations shall provide generation Summation to SLDC in 15 minutes block	Real time basis
2.	CPP's shall provide hourly export/ import MW to 15 minutes block	Real time SLDC in
3.	Logged readings of Generators to SLDC	As required
4.	Detailed report of Generating Unit tripping on Monthly basis.	First week of the succeeding month

Appendix-I: Third Party Protection System Checking & Validation

Template for A Sub-Station

(Refer Clause 21.6)

1. INTRODUCTION

(i) The audit reports, along with action plan for rectification of deficiencies found, if any, shall be submitted to GCC and/or SLDC within a month of submission of report by auditor.

(ii) The third-party protection system checking shall be carried at site by the designated agency. The agency shall furnish two reports:

(a) Preliminary Report: This report shall be prepared on the site and shall be signed by all the parties present.

(b) Detailed Report: This report shall be furnished by agency within one month after carrying out detailed analysis.

2. CHECKLIST

(i) The protection system checklist shall contain information as per this Regulation.

(a) General Information (to be provided prior to the checking as well as to be included in final report):

(i) Sub-station name

(ii) Name of Owner Utility

(iii) Voltage Level (s) or highest voltage level?

(iv) Short circuit current rating of all equipment (for all voltage level)

(v) Date of commissioning of the sub-station

(vi) Checking and validation date

(vii) Record of previous trippings (in last one year) and details of protection operation

(viii) Previous Relay Test Reports

(ix) Overall single line diagram (SLD)

(x) AC aux SLD

(xi) DC aux SLD

(xii) SAS architecture diagram

(xiii) SPS scheme implemented (if any)

(b) The preliminary report shall inter-alia contain the following:

TABLE: FORMAT OF PRELIMINARY REPORT

S.No.	Issues	Remarks
1	Recommendation of last protection checking and validation	Status of works and pending issues if any
2	Review of existing settings at sub-station	Recommended Action
3	Disturbance Recorder output available for last 6 trippings (Y/N)	Recommended Action
4	Chronic reason of tripping, if any	Recommended Action
5	Major non-conformity / deficiency observed	Recommended Action

(c) The relay configuration checklist for available power system elements at station:

(i) Transmission Line

(ii) Bus Reactor/Line Reactor

(iii) Inter-connecting Transformer

(iv) Busbar Protection Relay

(v) AC auxiliary system

(vi) DC auxiliary system

(vii) Communication system

(viii) Circuit Breaker Details

(ix) Current Transformer Details

(x) Capacitive Voltage Transformers Details

(xi) Any other equipment/system relevant for protection system operation

(d) The minimum set of points on which checking and validation shall be carried out is covered in this Regulation. The detailed list shall be prepared by checking and validation team in consultation with concerned entity, GCC and SLDC.

(e) Transmission Line Distance Protection/Differential Protection

i Name and Length of Line

ii Whether series compensated or not

iii Mode of communication used (PLCC/OPGW)

iv Relay Make and Model for Main-I and Main-II

v List of all active protections & settings

vi Carrier-aided scheme if any

vii Status of Power Swing/Out of Step/SOTF/Breaker Failure/Broken Conductor / STUB/Fault Locator/DR/VT fuse fail/ Overvoltage Protection /Trip Circuit supervision/Auto-reclose/Load encroachment etc.

viii Relay connected to Trip Coil-1 or 2 or both

ix CT ratio and PT ratio

x Feed from DC supply-1 or 2

xi Connected to dedicated CT core (mention name)

xii Other requirements for protection checking and validation

(f) Shunt Reactor & Inter-connecting Transformer Protection

i Whether two groups of protections used (Group A and Group B)

ii Do the groups have separate DC sources

iii Relay Make and Model

iv List of all active protections along with settings

v Status of Differential Protection/Restricted Earth Fault Protection/Back-up Directional Over current/Backup Earth fault/ Breaker Failure

vi Status of Oil Temperature Indicator/Winding Temperature Indicator / Bucholz/Pressure Release Device etc.

vii Relay connected to Trip Coil-1 or 2 or both

viii CT ratio and PT ratio

ix Feed from DC supply-1 or 2

x Connected to dedicated CT core (mention name)

xi Other requirements for protection checking and validation

(g) Bus-bar Protection Relay

i Bus-bar and redundant relay make and model

ii Type of Bus-bar arrangement

iii Zones

iv Dedicated CT core for each busbar protection (Yes/No)

v Breaker Failure relay included (Yes/No), if additional then furnish make and model

vi Trip issued to both Busbar protection in case of enabling

vii Isolator indication and check relays

viii Other requirements for protection checking and validation

(h) AC auxiliary system

i Source of AC auxiliary system

ii Supply changeover between sources (Auto/Manual)

iii Diesel generator (DG) details

iv Maintenance plan and supply changeover periodicity in DG

v Single Line Diagram

vi Other requirements for protection checking and validation

(i) DC auxiliary system

i Type of Batteries (Make, vintage, model)

ii Status of battery Charger

iii Measured voltage (positive to earth and negative to earth)

iv Availability of ground fault detectors

v Protection relays and trip circuits with independent DC sources

vi Other requirements for protection checking and validation

vii Communication system

1. Mode of communication for Main-1 and Main-2 protection
2. Mode of communication for data and speech communication
3. Status of PLCC channels
4. Time synchronization equipment details
5. OPGW on geographically diversified paths for Main-1 and main-2 relay
6. Other requirements for protection checking and validation

(j) Circuit Breaker Details

i Details and Status

ii Healthiness of Tripping Coil and Trip circuit supervision relay

iii Single Pole/Multi pole operation

iv Pole Discrepancy Relay available(Y/N)

v Monitoring Devices for checking the dielectric medium

vi Other requirements for protection checking and validation

(k) Current Transformer (CT)/Capacitive Voltage Transformer (CVT) Details

i CT/CVT ID name and voltage level

ii CT/CVT core connection details

iii Accuracy Class

iv Whether Protection/Metering

v CT/CVT ratio available and ratio adopted

vi Details of last checking and validation of CT/CVT healthiness

vii Other requirements for protection checking and validation

viii Other protections: Direction earth fault, negative sequence, over current, over voltage, over frequency, under voltage, under frequency, forward power, reverse power, out of step/power swing, HVDC protection etc.

3. SUMMARY OF CHECKING:

The summary shall specifically mention minimum following points:

(i) The settings and scheme adopted are in line with agreed protection philosophy or any accepted guidelines

(ii) The deviations from the RPC protection philosophy, if any and reasons for taking the deviations shall be recorded.

(iii) All the major general deficiency shall be listed in detail along with remedial recommendations.

(iv) The relay settings to be adopted shall be validated with simulation based or EMTP studies and details shall be enclosed in report.

(v) The cases of protection mal-operation shall be analysed from protection indices report furnished by concerned utility, the causes of failure along with corrective actions and recommendations based on the findings shall be noted in the report.