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PART I—Orders and Notifications by the Governor of West Bengal, the High Court, Government Treasury, etc.

WEST BENGAL ELECTRICITY REGULATORY COMMISSION

NOTIFICATION

No. 26/WBERC Dated, the 12.01.2006.

In exercise of the powers conferred by clause (h) of sub-section (1) of section 86 read with sub-section (1) and clause (zp) of sub-section (2) of section 181 of the Electricity Act, 2003 (36 of 2003) and all powers enabling on that behalf, the West Bengal Electricity Regulatory Commission (WBERC) hereby makes the following Regulations:—

CHAPTER 1

GENERAL

1.1 **Short title, commencement and interpretation:**

(i) These Regulations may be called the West Bengal Electricity Regulatory Commission (West Bengal Electricity Grid Code) Regulations, 2006.

(ii) These Regulations shall come into force on the date of their publication in the official Gazette unless otherwise stated in these Regulations and shall be concurrent within the area of jurisdiction of the West Bengal Electricity Regulatory Commission.

(iii) The General Clauses Act, 1897 (10 of 1897) shall apply to the interpretation of these regulations unless otherwise indicated in these Regulations or inconsistent with the provisions of the Electricity Act, 2003.

1.2 **Definitions:**

In these Regulations, unless the context otherwise requires:

(a) The Act means the Electricity Act, 2003;

(b) Agency/Entity stands for a term used in the various regulations of the WBEGC to refer to a person authorised under section 14 or is exempt under section 13 of the Act, generating company, generating station, captive power plant and consumer.

(c) Automatic Voltage Regulator (AVR) means a continuously acting automatic excitation control system to control the voltage at the generator terminals of a generating unit;

(d) ABT means Availability Based Tariff;

(e) Beneficiary means an agency who draws/injects power from/to State Power System;

(f) BIS means Bureau of Indian Standards;

(g) Black Start Procedure (BSP) means the Procedure necessary to bring back normalcy in the Grid from a black out;

(h) CCGT means Combined Cycle Gas Turbine;

(i) Commission means the 'West Bengal Electricity Regulatory Commission' in short, called WBERC;

(j) Connection Agreement means an agreement setting out the terms relating to the connection to STU;

(k) Connection Point means a point at which an agency's Plant and/or Apparatus connects to the STU;

(l) Constituent means any agency/entity connected to the State Power System;

(m) Consumer shall include an open access consumer i.e., a person who is using or intends to use a transmission system or a distribution system of an entity within the State of West Bengal for transmitting and/or wheeling of electricity within the State or any consumer permitted by the Commission to receive supply of electricity from an entity other than the distribution licensee of his area of supply or a person who is exempt under section 13 of the Act;

(n) CPP means Captive Power Plant;

(o) CTS means Central Transmission System;

(p) Demand means the demand of Active Power in MW, Reactive Power in MVAR and apparent power in MVA of electricity unless otherwise stated;

(q) Disturbance Recorder (DR) means a device provided to record the behavior of the pre-selected parameters of the system during an Event;

(r) DPL means Durgapur Projects Limited;

(s) DPSCL also means Disergarh Power Supply Company Limited (erstwhile);

(t) DVC means Damodar Valley Corporation;

(u) EHV means where the voltage exceeds 33000 volts under normal conditions subjects to the percentage variations allowed by Indian Electricity Rules, 1956;

(v) EHT means Extra High Tension or Extra High Voltage (EHV) when the voltage exceeds 33000 Volts;

(w) Event means an unscheduled or unplanned occurrence on a Grid including faults, incidents and breakdowns;

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

(y) Ex-Power Plant means net MW/MWH output of a generating station measured at all outgoing lines/feeders from the generating station;

(z) EREB means Eastern Regional Electricity Board established by Government of India;

(aa) ERLDC means Eastern Regional Load Despatch Center;

(bb) ERPC means Eastern Regional Power Committee;

(cc) Fault Locator (FL) means a device installed at the end of a transmission line to measure/indicate the distance at which a line fault may have occurred;

(dd) Force Majeure means any event which is beyond the control of the parties which they could not foresee or with a reasonable amount of diligence could not have foreseen or which could not be prevented and which substantially affect the performance by either party such as but not limited to:—

(i) Acts of god, natural phenomena, including but not limited to floods, droughts, earthquakes and epidemics;

(ii) Acts of any Government, domestic or foreign, including but not limited to war declared or undeclared, hostilities, priorities, quarantines, embargoes;

(iii) Riot or Civil commotion;

(iv) Grid's failure not attributable to parties;

(ee) Forced Outage means an outage of a Generating Unit or a transmission facility due to a fault or other reasons, which has not been planned;

(ff) Governor Droop means in relation to the operation of the governor of a Generating Unit, the percentage drop in speed which would cause the Generating Unit under free governor action to change its output from zero to full load;

(gg) GT means Gas Turbine;

(hh) HT means High Tension or High Voltage (HV) where the voltage exceeds 650 Volt but not exceeding 33,000 volts under normal conditions, subject, however, to the percentage variation allowed by the Indian Electricity Rules, 1956;

(ii) ICT means Inter Connecting Transformer;

(jj) Independent Power Producer (IPP) means a generating company not owned/controlled by the Central/State Government;

(kk) Independent Private Transmission Company (IPTC) means an agency not owned/controlled by the Central/State Government, involved in the business of transmission of electrical energy;

(ll) Inter State Generating Station (ISGS) means a Central/MPP/other generating station in which two or more than two States have a share and whose scheduling is to be coordinated by the RLDC;

(mm) Inter State Transmission System (ISTS) means—

(i) Any system for the conveyance of energy by means of a main transmission line from the territory of one State to another State;

(ii) The conveyance of energy across the territory of an intervening State as well as conveyance within the State, which is incidental to such inter-State transmission of energy;

(iii) The transmission of energy within the territory of a State on a system built, owned, operated, maintained or controlled by the Central Transmission Utility or by any person/agency under the supervision and control of a Central Transmission Utility;

(nn) IEC means International Electro Technical Commission;

(oo) LNG means Liquefied Natural Gas;

(pp) LT means Low Tension or Low Voltage (LV) where the voltage does not exceed 250 Volts;

(qq) Maximum Continuous Rating (MCR) means the maximum MW output capacity of a Generating Unit which can be sustained on a continuous basis at specified conditions;

(rr) Mega Power Project (MPP) means a generating station having two or more States as beneficiaries;

(ss) NHPC means National Hydro Power Corporation;

(tt) NTPC means National Thermal Power Corporation;

(uu) PGCIL means Power Grid Corporation of India Limited;

(vv) Pool Account means an account to be prepared & operated by SLDC for payments regarding unscheduled interchanges and reactive energy exchanges in the Intra-State System;

(ww) Power Grid means Power Grid Corporation of India Limited which has been notified as CTU;

(xx) Power Purchase/Supply Agreement between the Utilities means the Commercial Agreement between two agencies for the purchase/sale of power;

(yy) REF Relays means Restricted Earth Fault Relay;

(zz) Regional Grid means the entire synchronously connected electric power network of the concerned region, comprising of ISTS, ISGS and Intra-State Systems;

(aaa) Rules means the Rules made under the 'Act' by the Govt. of West Bengal (the State Government);

(bbb) ROR means Run of the River;

(ccc) Site Common Drawing means Drawings prepared for each Connection Point, which incorporates layout drawings, electrical layout drawings, common protection/control drawings and common service drawings;

(ddd) Spinning Reserve means part loaded generating capacity with some reserve margin that is synchronized to the system and is ready to provide increased generation at short notice pursuant to despatch instruction or instantaneously in response to a frequency drop;

(eee) Standing Committee for Transmission Planning means a committee constituted by the CEA to discuss, review and finalize the proposals for ISTS and associated Intra-State Systems;

(fff) SLDC means State Load Despatch Centre;

(ggg) SSLDC means Sub-State Load Despatch Centre which may be declared as such by SLDC with the approval of the Commission;

(hhh) STS means State Transmission System;

(iii) STU means State Transmission Utility;

(jjj) Static VAR Compensator (SVC) means an electronically controlled facility designed for the purpose of generating or absorbing Reactive Power;

(kkk) User means a term utilized in the various sections of the WBEGC to refer to the person/agencies using the Intra State Transmission System;

(lll) VAR means Reactive Power;

(mmm) WBPDCL means West Bengal Power Development Corporation Limited;

(nnn) WBSEB means West Bengal State Electricity Board;

(ooo) WBEGC means the West Bengal Electricity Regulatory Commission (West Bengal Electricity Grid Code) Regulations, 2006;

(ppp) Words and expression used and not defined in any of the Regulations shall have the meanings as defined in the Act.

1.3 Introduction, Objective, Structure and Functional Responsibilities:

1.3.1 Introduction:

West Bengal Power System is unique in nature, due to presence and operation of multiple agencies and licensees in the State. At present Central Sector Generation Companies like NTPC, NHPC, Central Transmission Utility (PGCIL), State Transmission Utility (WBSEB), State Generation Company (WBPDCL), distribution licensees like WBSEB, CESC Limited, DPL, DPSCL and DVC are operating. The State Load Despatch Centre (SLDC), Eastern Regional Load Despatch Centre (ERLDC) and Eastern Regional Electricity Board (EREB)/Eastern Regional Power Committee (ERPC) operate the Power System of State and Eastern Region respectively.

As the State Power System is a part of Eastern Regional Power System and inter connected to Central Transmission System (CTS) the grid code for the State shall be consistent with the Indian Electricity Grid

Code specified by Central Electricity Regulatory Commission having regard to Grid standards to be specified by the Authority. In so far as the WBEGC is inconsistent with the IEGC, the provision of IEGC shall prevail.

This Grid Code may be called "West Bengal Electricity Grid Code".

Explanation: IEGC means Indian Electricity Grid Code.

1.3.2 **Objective:**

1.3.2.1 The WBEGC lays down the rules, the guideline and standards to be followed by various agencies and participants in the system to plan, develop, expand, maintain & operate the Power System in most efficient, equitable, reliable, safe and economic manner.

1.3.2.2 Documentation of the principles and procedures, which define the relationship between various users of the Intra-State Transmission System and State Load Despatch Centre.

1.3.2.3 Suitable measures for connectivity with Grid for all generating stations, transmission licensees, and distribution licensees.

1.3.2.4 The standard (with regard to quality and reliability) of the service for compliance by all participants;

1.3.2.5 Planning of the State Electricity Grid, its development.

1.3.2.6 Operation of the Grid under normal, abnormal/emergency conditions.

1.3.2.7 Facilitation for beneficial trading of electricity by a common basis of operation of Intra-State Transmission System applicable to all users of the system.

1.3.2.8 To ensure economy and efficiency in the operation of the Power System in the State and to achieve compliance with the Grid Standard on direction of SLDC by every licensee and others involved in operation of the Power System.

1.3.3 **Structure:**

The Code is structured in the following manner:

(a) Functional responsibility of entities connected with the State Grid (Regulation 1.3.4 in Chapter 1);
(b) System Planning (Chapter 2);
(c) Grid connectivity (Chapter 3);
(d) Operation guideline (Chapter 4);
(e) Scheduling and dispatching (Chapter 5);
(f) Non-compliance (Chapter 6);
(g) Commercial issues (Chapter 7);

1.3.4 **Functional responsibilities:**

The functions of State Transmission Utility (STU), State Load Despatch Centre (SLDC), other licensees, generating stations and consumers shall be consistent with the provisions of the Act. As relevant to West Bengal Electricity Grid Code, their functions shall be as follows:

1.3.4.1 *State Transmission Utility (STU):*

STU shall play the main role for evacuation of generated power by generating stations, supply of power to entities engaged in distributing electricity, exchange of power among entities, exchange of power through inter-connection with Central Transmission Utility including:

(i) Responsible for coordinating, managing and servicing of the Grid Code;
(ii) STU shall discharge functions of planning and co-ordination relating to Intra-State Transmission System with (i) Central Transmission Utility, (ii) State Government, (iii) Entities

and EREB/ERPC, (iv) CEA, (v) any other person notified by the State Government;

(iii) Provide non-discriminatory open access to its Transmission System subject to availability of adequate transmission facility for use by any licensee or generating company, CPPS and any consumer on payment of necessary transmission charges, other charges, fees and surcharges as provided in WBERC (Terms & Conditions for Open Access–Schedule of Charges, Fees & Formats for Open Access) Regulations, 2005 as amended from time to time.

1.3.4.2 *State Load Despatch Centre (SLDC):*

The SLDC shall be the apex body to ensure integrated operation of the power system in the State in coordination with ERLDC and EREB/ERPC:

(i) The SLDC shall give such directions and exercise supervision and control not inconsistent with the provisions of the Acts, Regulations, Codes and Standards made thereunder but as may be required for ensuring secured integrated operation and for achieving economy and efficiency in the operation of the power system in the State;

(ii) All directions issued by ERLDC to any transmission licensee of the State or generating company in the State shall be issued through SLDC;

(iii) The SLDC will be responsible for scheduling and dispatch of electricity within the State;

(iv) The SLDC will be responsible for carrying out real time operation for grid control within the state and exercise supervision and control over the Intra-State Transmission System; keep accounts of the quantity of electricity transmitted through the State Grid;

(v) Every licensee, generating company, generating station, grid substation and other entities in the State shall comply with the direction by the SLDC.

1.3.4.3 *Distribution Licensee:*

Shall inform STU and SLDC about the contracts entered into for importing power from different sources and shall follow the directions of SLDC in controlling the operation of the system by adjustment of drawal from the system. They shall take special care for drawal/injection of reactive power from/to the State Power System.

1.3.4.4 *Distribution Licensee having own generation:*

Shall inform STU & SLDC about the contracts entered into for importing/exporting power from/to different entities and shall assist and co-ordinate with SLDC in real time operation and control of the System. Also assist/follow instruction of SLDC in scheduling its exchange from/to STU.

1.3.4.5 *Transmission Licensee:*

Every Transmission Licensee shall comply with such technical standards of operation and maintenance of transmission line, in accordance with this Code & Grid Standards as may be specified by the authority and IEGC as applicable to the Intra State Transmission System:

(i) To maintain and operate the Transmission System which are licensed to transmission licensee in the Intra State Transmission System and comply with directions of SLDC;

(ii) To provide non-discriminatory open access to its Transmission System subject to availability of adequate transmission facilities for use by any licensee or generating company on payment of the charges as determined by the Commission.

1.3.4.6 *Generating Station:*

The generating stations connected to STU and evacuating their generation through STU, shall inform STU and SLDC about the contracts entered into with different parties for exporting power along with its schedule from individual generating station under the company. They should follow the instruction of SLDC and assist in the real time operation & control of the system and scheduling of generation.

1.3.4.7 *Free Governor Action:*

(i) All generating stations shall keep their governor under Free Governor Operations as per Grid Code with effect from the date to be separately notified by the Commission;

(ii) Any exemption from the above may be granted by the Commission for which the concerned utility shall file a petition in advance;

(iii) The gas turbines/combined cycle power plants and nuclear power stations shall be exempted from Regulations 4.2.5, 4.2.6, 4.2.7 and 4.2.8 till the Commission reviews the situation.

CHAPTER 2

STATE TRANSMISSION SYSTEM PLANNING

2.1 Introduction:

In accordance with Section 39(2)(b) of the Electricity Act 2003, the State Transmission Utility (STU) shall discharge all functions of planning and co-ordination relating to Intra-State Transmission System (STS) with CTU, State Government, Central Electricity Authority and other related organizations etc. who shall utilize the Intra-State Transmission System for evacuation or drawal of power. This chapter specifies the policy and procedures to be applied in planning of the State Grid.

2.2 Objective:

The objectives of Planning Guidelines are:

(a) To specify the principles, procedures and criteria which shall be used in the long and medium term planning and development of the STS;

(b) To specify an integrated approach for evacuating power from different generating stations within the State of West Bengal, irrespective of their ownership and delivering it to the beneficiaries as per the contract over an optimally designed power transmission system with reliability, security and economy;

(c) To promote co-ordination amongst all entities in the State in any proposed development of the STS.

2.3 Scope:

The Planning guidelines applies to State/Central Government sponsored generating companies, IPPs, SEB, STU, licencees having generation, transmission and distribution, Independent Private Transmission Companies (IPTCs), Distribution and Supply Companies and other entities engaged in electricity industry, desirous of using the transmission facilities of STS.

2.4 Planning Procedure:

2.4.1 *Load Forecasting:*

Power Supply Planning starts with a forecast of anticipated future load requirements of both demand and energy. The primary responsibility of load forecasting rests with the distribution entities. The detailed power survey for assessing the category wise rate of growth of consumption shall be carried out for low-tension services and high-tension service and also services having connected load of 1 MW and above. The overall peak and energy demand projection shall also take into account the past growth trend of last five years. The load forecast shall be consolidated transmission sub stationwise (132 kV and above). The periodicity of the survey shall synchronize with the studies conducted by Central Electricity Authority. The STU may conduct the load survey in lesser intervals of time in case of need. For services having connected load of 1 MW and above the growth for future years is to be ascertained from the individual consumers. At present WBSEB (having transmission, distribution and hydel generation), the licensees and future distribution entities if any, shall furnish the required data to STU as specified by the STU. The formats for the demand

and energy forecast shall be identical to the ones prescribed by CEA for the Power Survey. The STU shall integrate the load forecast and determine the long-term (10 years) load forecast for the State. The resulting overall load forecast including its spatial distribution will form the basis for expansion of generation and transmission and distribution system. The planning process shall consider an extended study period of 10 years beyond the base period of 10 years:

2.4.2 *Planning:*

Technical component of transmission and distribution losses shall be estimated based on sample studies, measurements, load flow studies etc. The STU shall work out on the basis of projected loads and losses of the system, the net energy requirement and peak load requirement at generation end. The installed capacity, peak availability, surplus and deficit both in demand and energy shall also be worked out by the STU. The demand forecasts shall be used to determine the capacity of generation, transmission and distribution systems and energy forecast along with the load duration curve, to determine the type of generation facilities required. The generation criteria shall be applied while arriving at the generation capacity.

The STU shall workout the additional generating capacity required after taking into account, the existing capacity, assistance from captive power plants, if any, projects under construction, proposed projects in the State sector, projects by IPPs and share of the State from Central sector Power Projects both within and outside the State of West Bengal. While calculating the availability for existing units, the trend of generation shall be considered and for projects under construction 80% availability shall be considered. For hydro power station, generating capacity shall be considered on a case specific basis after considering the results of requisite detailed investigation studies.

The STU shall carry out planning process from time to time as per the requirement for identification of major intra-state transmission system, which shall fit in with the perspective plan developed by CEA. While planning schemes, the following shall be considered in addition to the data of authenticated nature collected from and in consultation with various generating stations, licensees, State Government etc.

(i) Long-term perspective plan developed by CEA;

(ii) Latest Electric power survey report of CEA;

(iii) Transmission planning criteria, Generation expansion planning criteria and guidelines issued by the CEA;

(iv) Reports on National Power Policy issued by Govt. of India, which are relevant for development of STS;

(v) Any other authenticated report on demand forecast carried out by agencies like Advisory Board on Energy (ABE), Planning Commission, CERC, WBERC, Govt. of West Bengal;

(vi) Capacity addition utilizing renewable energy resources;

(vii) System strengthening schemes need for which may arise to overcome the constraints in power transfer and to improve the overall performance of the Grid.

(viii) Plans prepared by Central Transmission Utility in order to plan for evacution of power as required for the State from or to the inter-state transmission system. In case of long term Open Access applications requiring any strengthening in the inter-state transmission system to absorb/evacuate power beyond intra-state transmission system, the applicant shall co-ordinate with the concerned STU and CTU as deemed necessary.

2.4.3 The plan shall indicate and include a Chapter on proposed STS scheme open for private investors/ generation expansion identified by the STU, based on which the entrepreneurs can formulate primary investment decisions.

2.4.4 The Planning Report shall also indicate the action taken to fulfill the additional requirements and actual progress made on new schemes. These reports will be available to any interested party for making investment decision/connection to the STS.

2.4.5 As "Voltage Management" plays an important role in the State Transmission system, special attention shall be accorded to planning of VAR compensation in the network so that voltage instability does not occur and line can transfer designed power with designed voltage regulation.

2.4.6 Based on the load forecast and the additional generation required for 10 years period the STU shall develop a long-term plan for State Transmission System considering additional generation resources and expansion in distribution network. Extension of the study period for 10 years beyond the base period of 10 years shall help in smoothening out the end effects due to different types of generation at the end of base period.

2.4.7 Medium Term Planning: A 5 year rolling plan shall also be finalized every year for generation expansion and for transmission and distribution system expansion to meet the future demand and to ensure quality supply to consumers. The rolling plan will take into account the previous year's achievements.

2.4.8 The STU shall submit copies of approved long term and medium term plans to the State Commission and to the State Government.

2.5 **Planning Criteria:**

The planning criteria are based on the security philosophy on which the STS is planned. The guidelines in general are detailed for distribution, transmission and generation.

2.5.1 Distribution:

(i) The distribution system shall be developed to meet the load demand of all existing users connected to it and all users seeking connection including programmed rural electrification and rural household connection. Based on load forecast and its spatial distribution, the distribution network is to be planned. Power flow studies shall be carried out wherever necessary. The rolling 5 year plan shall be evolved for achieving target levels in aspects like reduction of losses by proper choice of the length of Low Tension (LT) lines, improvement of power factor, voltage regulation etc.;

(ii) Separate High Tension (HT) overhead feeders are to be planned to cater to discrete load blocks to facilitate load management during emergency operations. Use of sectionalisers or other devices to reduce interruption to be progressively introduced;

(iii) The network may provide alternative feeding arrangements for high load density areas and for essential services wherever possible;

(iv) In addition to catering the active power demand, reactive power components of power requirement should be studied and adequate VAR compensation are to be installed at different voltage levels to improve power factor and cause reduction of losses. The distribution company in their supply conditions shall include installation of reactive compensation at load end depending on the type of load used;

(v) The voltage regulation in the distribution system shall be maintained at statutory levels. Voltages at the consumer terminals shall be maintained as specified in the Indian Electricity Rules or as may be specified by CEA in terms of Section 53 of Electricity Act, 2003;

(vi) The level of harmonics generated by user's equipments are to be controlled as per the limits specified in the grid connectivity standards specified by CEA;

(vii) The voltage flickers caused by customer loads shall have to be controlled within the permissible limits as per grid connectivity standards.

2.5.2 Transmission:

2.5.2.1 *Permissible limits:*

(i) The permissible voltage excursions for transmission and sub transmission system during the steady state operation is +/- 5% for 400 and 220 kV level and +/- 10% for 132 kV and below.

This limit may be exceeded only during the outages of 400 kV lines and in such cases, use of dynamic VAR source may be considered if necessary;

(ii) The standard rating of switchgear at 132 kV is 31.5 kA, 220 kV and 400 kV is 40 kA. It is to be used for the transmission system;

(iii) The capacity of any single sub station shall not normally exceed 1000 MVA for 400 kV, 500 MVA for 220 kV and 250 MVA for 132 kV;

(iv) Size and number of EHT/HT transformers in a substation shall be planned in such a way that in the event of outage of any single unit, the remaining unit(s) would still supply the load for 80% duration of the time;

(v) The line loading limits shall be based on the thermal/surge impedance loading depending on the line sections and VAR support provided.

2.5.2.2 *Contingencies (Under Steady State conditions):*

As a general rule, the STS 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:—

—Outage of a 132 kV D/C line (except for radial lines) or,

—Outage of a 220 kV D/C line (except for radial lines) or,

—Outage of a 400 kV S/C line (except for radial lines) or.

—Outage of single Interconnecting Transformer

The above contingencies shall be considered assuming a pre-contingency system depletion (Planned outage) of another 220 kV D/C line or 400 kV S/C line in another corridor and not emanating from the same substation & during the period other than the peak.

In all sub-stations (132 kV and above), at least two transformers shall be provided;

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

In addition to the above accepted standards, the STS shall be capable of withstanding the loss of the most severe single system in-feed transmission or generation. Any one of these events defined above shall not cause:

(i) Prolonged operation of the system frequency below and above specified limits;

(ii) Unacceptable high or low voltage;

(iii) System instability;

(iv) Unacceptable overloading of STS elements.

2.5.2.3 *Transient stability constraints:*

The system shall be designed to maintain synchronism and system integrity under the following disturbances:

(i) Outage of one of the largest size generating unit. For this the generating companies should get clearance from STU regarding the choice of unit size if the capacity of unit exceeds 500 MW;

(ii) A single line to ground fault on a 400 kV line, single pole opening of the faulted phase (5 cycles) with unsuccessful reclosure (dead time 1 sec) followed by three pole opening (5 cycles) of the faulted line;

(iii) A permanent three phase fault with duration of 8 cycles in 220 kV and 132 kV systems assuming three poles opening.

2.5.3 Generation:

2.5.3.1 Generation Planning mainly concerns with the expansion of the generation and attention should be given to:

(i) Capacity addition by distribution licensees, IPPs, CPPs, renewable source of energy etc.;
(ii) Flows from Central Sector Power Stations;
(iii) Adoption of demand side management and energy conservation;
(iv) Pumped Storage Plants.

The key issue is the establishment of new generation and their location and also decommissioning/ de-rating of existing generation.

2.5.3.2 Firm Peaking Capacity to be considered in Planning including operation at minimum load without or with a minimum secondary fuel support other than the main fuel:

(i) The firm peaking capability of each Hydroelectric Plant is the maximum capacity that a plant can produce through the daily peak period using 90% dependable hydrology;
(ii) For new thermal units and existing thermal units (generating units of COD up to 31.12.2005) with capacity of above 200 MW as well as new units in Central Sector, firm peaking capacity is estimated to be 86 per cent of installed capacity. For existing units (generating units of COD up to 31.12.2005) with capacity not exceeding 200 MW, the firm peaking capacity is estimated to be average of the last two years;
(iii) The plant load factor, auxiliary consumption, availability factor, heat rate etc. should be specified by the WBERC.

2.5.3.3 *Capacity Reserve Criteria:*

Adequate reserve capacity shall be available to ensure sufficient generation reserve to meet the system load even if the largest unit in the system goes out of service.

2.5.3.4 *Firm Energy:*

(i) Annual firm energy from a Hydro Plant is defined as that Energy which could be generated in a 90 percent dependable year with 95 percent availability of installed capacity of the station (as defined in the Power Policy by GOI);
(ii) For new thermal units in the State, except for the first six months of operation, firm energy is estimated from the corresponding installed capacities and assuming 6,000 hours of operation per year unless differently agreed and a PPA signed to that effect. For the first six months of operation (the stabilization period), firm energy is estimated assuming 2,250 hours of operation unless differently agreed and a PPA signed to that effect.

CHAPTER 3

CONNECTIVITY CONDITIONS

3.1 **Introduction**:

The Connectivity Conditions specify the minimum technical and design criteria which shall be complied with by any agency connected to, or seeking connection to STS to transmit electrical energy eitherway from/to STS. The STU shall ensure compliance by any agency with the above criteria as a pre-requisite for the establishment of an agreed connection;

3.2 **Objective:**

The Connectivity Conditions are designed to ensure the following:

(a) To inform the prospective user in advance of the standards and conditions its system has to meet to get integrated with the existing power system;

(b) The basic rules for connections are complied, so as to treat all agencies in a non-discriminatory manner;

(c) Any new or modified connections, when established, shall neither suffer unacceptable effects due to its connection to STS nor impose unacceptable effects on the system of any other connected agency;

(d) The ownership and responsibility for all the equipments, shall be clearly specified in a schedule (**Site Responsibility Schedule as in Annexure–I**) for every site, where a connection is made.

3.3 **Scope:**

The Connectivity conditions apply to all State/Central Government sponsored generating Companies, IPPs, SEB, STU, licensees having generation, transmission and distribution, Transmission Companies and other entities, desirous of using the transmission facilities of STS, for planning, generating and / or transmitting of energy to/from STS. The provision applies to all new connections and existing power system. All existing users shall modify their system for complying with the standard on grid connectivity as stated in 5.4.4.

3.4 **Procedure for connection:**

3.4.1 Prior to an agency being connected to the STS, all necessary conditions outlined in the WBEGC in addition to other mutually agreed requirements to be complied with, must be fulfilled by the agency. Any agency seeking to establish new or modified arrangement of connection to and/or use of STS, shall submit an application on prescribed format to STU along with the following details:

(i) Report stating the purpose of the proposed connection and/or modification, connection point, description of apparatus to be connected or modification of the apparatus already connected and beneficiaries of the proposed connection;

(ii) All prospective users shall be required to pay to STU the charge as prescribed by WBERC for the purpose of conducting the initial interconnection studies, additional study as well as for processing the application.

(iii) Construction schedule and target completion date;

(iv) Confirmation that the agency shall abide by WBEGC and provisions of IE rules or as may be specified in the Regulations made by CEA under the Act. The STU shall normally make a formal offer to the agency within two months. The offer shall specify and take into account any works required for the extension or reinforcement of the Transmission System to satisfy the requirements of the connection application and for obtaining statutory clearances, way leaves as necessary.

3.4.2 If the nature and complexity of the proposal is such that the prescribed time limit for making the offer is not adequate, the STU shall make a preliminary offer within the prescribed time limit indicating the extent of further time required with the consent of the WBERC for more detailed examination of the issues.

3.4.3 The STU shall make a revised offer, upon request by a User, if necessitated by changes in data earlier furnished by the User.

3.4.4 All offers (other than preliminary offers) including revised offers shall remain valid for 60 days of issue of offer. In the event of the offer becoming invalid or not being accepted by any User within the validity period, no further action shall be taken by the STU on the connection applications. In the offer, details of the requirements and procedures for connection to the STS and the resulting Connection Agreement with the agency will be set out. Upon compliance, STU shall notify the agency that it can be connected to the STS. However in case of the existing connections between STS network and State entities, the WBERC may allow relaxation up to one year in respect of Connection Agreements and the present agreements/ present practice as followed may continue in order to avoid the whole process of re-negotiation with the existing entities.

3.4.5 Prior to providing any connectivity to a consumer with inter-state or intra-state transmission system, the licensee shall take approval of STU and SLDC after meeting all technical and commercial requirements of STU and SLDC.

3.5 **Connection Agreement:**

A connection agreement shall include (but not limited), as appropriate, within its terms and conditions, the following:

(i) A condition requiring both parties to comply with the WBEGC and IEGC;

(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) Metering arrangement;

(vi) Procedure necessary for site access, site operational activities and maintenance standard for STU equipment at the premises of the user and vice-versa;

(vii) Commitment to provide data requirement as per Annexure.

3.6 **Connection Point:**

3.6.1 Generating Station Switchyard Voltage may be 400/220/132 kV or as agreed with the STU. Unless specifically agreed with the STU, the Connection point shall be the outgoing feeder gantry of Power Station switchyard. All the terminal, communication, protection and metering equipment owned by the Generating Company within the perimeter of their site shall be maintained by them. From the outgoing feeder gantry onwards, all electrical equipment shall be maintained by the STU/a Transmission Company, as the case may be.

3.6.2 Distribution Company Voltage may be 33//11/6 kV or as agreed with the STU. The Connection point shall be the outgoing feeder gantry of the STU's sub-station. All the terminal, communication, protection and metering equipment within the premises of the STU shall be maintained by the STU. From the outgoing feeder gantry onwards, all electrical equipment shall be maintained by the respective Distribution Company;

3.6.3 For the Eastern Regional Transmission System, the connection point, protection scheme, metering scheme, metering point and the voltage shall be in accordance with the mutual agreement between CTU (Power Grid) and the STU, till they are specified by CEA in its Regulations under the Act.

3.6.4 CPPs and EHT/HT Consumers Voltage may be 220/132/66/33 kV or as agreed with STU. Sub-stations, owned by CPPs and EHT/HT Consumers, shall be maintained by them or as mentioned in the Agreement. The Connection point shall be the feeder gantry on their premises in case of EHT/HT Consumers and at STU gantry in case of CPPs.

3.7 **STS Parameter Variations:**

3.7.1 General:

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

3.7.2 Frequency Variations:

Rated frequency of the system shall be 50.0 Hz and shall normally be controlled within the limits as stipulated in IEGC.

3.7.3 Voltage Variations:

The variation of voltage may not be more than the voltage range specified in the IE Rules, 1956 as amended from time to time or as may be specified by CEA in its Regulations under the Act. The agency

engaged in sub-transmission and distribution shall not depend upon the STS for reactive support when connected. To avoid need of exchange of reactive power to/from STS, the agency shall estimate and provide the required reactive compensation in its sub-transmission and distribution network for maintaining a cumulative power factor of 0.85 to 0.95 to meet its full Reactive Power requirement, unless specifically agreed to with STU.

3.8 **Equipment installed by Agency and STU at Connection Points:**

3.8.1 Sub-Station Equipment:

(i) All EHV outdoor switchyard equipment shall comply with Bureau of Indian Standards (BIS)/ IEC/prevailing Code of practice;

(ii) All equipment shall be designed, manufactured and tested and certified in accordance with the quality assurance requirements as per IEC/BIS standards;

(iii) Each connection between an agency and STS shall be controlled by a circuit breaker capable of interrupting, at the connection point, the short circuit as advised by STU in the specific Connection Agreement.

3.8.2 Fault Clearance Times:

(i) The total fault clearance time, for faults on agency's equipment directly connected to STS and for faults on STS connected to agency's equipment, from fault inception to the circuit breaker arc extinction, shall not be more than–

(a) 100 milli seconds (ms) for 400 kV,

(b) 160 milli seconds (ms) for 220 kV & 132 kV,

(c) 160/400 milli seconds (1st/2nd Zone);

(ii) Back-up protection shall be provided for 132 kV system and above 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 STS directly, it shall withstand, until clearing of the fault by back-up protection on the STS side.

3.8.3 Protection:

(i) Protection systems are required to be provided by all State Entities connected to the STS and as specified by STU. These are required to isolate the faulty equipments and protect the other components against all types of faults, internal/external to them, within the specified fault clearance time with reliability, selectivity and sensitivity. Protective Relay settings shall not be altered, or protection bypassed and/or disconnected, without consultation and agreement of all the affected users. In the case where protection is bypassed and/or disconnected by agreement, then the cause must be rectified and protection shall be restored to normal condition as quickly as possible. If agreement has not been reached, the electrical equipment shall be removed from service forthwith in case it is affecting the security of the system. Relay setting co-ordination shall be done by STU. The STU shall arrange periodic meetings of the entities to discuss co-ordination of protection. The STU shall investigate into any malfunctioning of protection or other unsatisfactory protection issues. The concerned Licensees shall take prompt action to correct any protection malfunction or issue as discussed and agreed to in these periodical meetings;

(ii) *Generating Unit Requirements:*

All Generating Units and associated electrical equipments connected to the Transmission System shall be protected by adequate protection so that the Transmission System does not suffer due to any disturbance originating from the Generating Unit;

(iii) *Transmission Line Requirements:*

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

(a) 400 kV Lines:

Three-zone non-switched Main-1 and Main-2 distance protection with different technical philosophy shall be provided. In addition to the above, single pole tripping and single shot single pole auto-reclosing after an adjustable dead time shall be provided. There need be no other back-up protection;

(b) 220 kV Line:

Three-zone non-switched distance protection with permissive inter trip and a suitable back-up protection is to be provided. Single pole tripping with single shot auto re-closing with adjustable dead time shall be provided;

(c) 132 kV Lines:

Three-zone non-switched distance protection with suitable back-up protection is to be used;

For cable feeders—cable differential/suitable fast protection to be used;

(d) General:

For short transmission lines alternative appropriate protection schemes may be adopted;

(iv) *Distribution Line Requirements:*

All 33 kV and 11/6 kV lines at Connection points shall be provided with a minimum of over current and earth fault protection with or without directional features as given below;

(a) Single Radial Feeders:

Non-directional time lag over current and earth fault relay with suitable settings to obtain discrimination between adjacent relay stations;

(b) Parallel Feeders/ Ring Feeders:

Directional time lag over current and earth fault relays;

(c) Long Feeders/Transformer Feeders:

For long feeders or transformer feeders, the relays should incorporate a high set instantaneous element.

(v) *Transformer Requirements, Generator Step up, Auto and Power Transformers:* All windings of Auto Transformers and power transformers of EHV class shall be protected by differential relays and REF relays. In addition there shall be back-up time lag over current and earth fault protection. For parallel operation such back up protection shall have directional feature. For protection against heavy short circuits, the over current relays should incorporate a high set instantaneous element. In addition to electrical protection, gas operated relays, winding temperature protection and oil temperature protection shall be provided. For smaller transformers of HV class, differential protection shall be provided for 10 mVA and above along with back-up time lag over current and earth fault protection (with directional feature for parallel operations);

Transformers 2.5 MVA and above and less than 10 MVA shall be protected by time lag over current, earth fault and instantaneous REF relays. In addition, all transformers 2.5 MVA and above shall be provided with gas-operated relays, winding temperature and oil temperature protection;

(vi) *Sub-station Bus Bar Protection and Fire Protection:* All Users shall provide suitable bus bar protection for sub-station bus bars in all 400 kV, 220 kV and 132 kV class substations or generating stations. Adequate precautions shall be taken and protection shall be provided against lightning and fire hazards to all apparatus of the Users conforming to relevant Indian Standard Specification and/or provisions in IE Rules.

3.8.4 Metering:

(i) This section specifies the commercial metering requirements to be provided at the interconnection points to STS, cross boundary circuits, low voltage or high voltage side of all power transformers connected in STS, sub-stations, and distribution feeders. It also specifies the operational metering requirements to be provided at the connection points sub-stations, generator ends etc. The agency who has to provide, operate and maintain the metering arrangements at various locations will be specified by the STU in the connection agreement;

(ii) *Commercial Metering:* The commercial metering is designed to ensure the following:

To compute the actual net drawal by STU for the time blocks to be specified by STU through reading of special energy metering installed at all locations of interconnections;

To measure energy supplied by the various generators;

To measure total energy supplied to High-tension consumers at various voltages and to measure energy at sub-station end of 6 kV/11 kV/33 kV distribution feeders of the distribution companies;

To measure the import and export of energy into and from 33/66/132/220/400 kV grid system so as to arrive at the losses at various voltage levels;

To measure the VAR flow at various nodes of the grid;

To strike an energy balance in each financial year;

(iii) *Commercial Metering details:* MW, MWh and MVARh flow are to be measured at interconnection points, power transformer locations, distribution feeders at sub-station end and consumption by HT consumers. The information is to be provided in the specified formats. Each metering point associated with determination of energy exported or imported shall be provided with both main and check meter or as per the agreement between the STU and the entities. Minimum standards of accuracy of meter shall be of class 0.2 or as specified by STU. All current transformers and voltage transformers used in conjunction with commercial (tariff) metering shall conform to the relevant Indian Standards or IEC. These shall be of accuracy class of not more than 0.5 and of suitable rating to cater the meter and lead wire burden. Voltage supply to the metering shall be assured with necessary voltage selection schemes. Voltage failure relays shall be provided which shall initiate alarms on loss of one or more phases of the voltage supply to any meter. Meters shall be tested and calibrated by a neutral agency at least once in a year or such as mutually agreed between the STU and the entities according to the guidelines in the standards/supplier's recommendations. Records of meter calibration test shall be maintained for future reference;

Wherever a meter goes defective, consumption recorded by the Check meter shall be referred for a mutually agreed period. The details of malfunctioning along with date, time and other data including load survey data shall be retrieved from the Main meter. The exact nature of malfunctioning shall be brought out after analyzing the data so retrieved and the consumption/ losses recorded by the Main meter shall be assessed accordingly;

If the Main as well as the Check metering systems become defective, the assessment of energy consumption for the outage period shall be done by the concerned parties on mutually agreed basis;

A procedure shall be drawn up between the STU and the entities and between STU and CTU

covering summation, collection, processing tariff meter readings at various connection sites. This may be revised from time to time as needed;

The ownership and responsibility of maintaining and testing of meters shall be mutually agreed between the entities and STU;

Any disputes relating to inter-utility metering between STU and Generating Company/ Distributing Licensee/Open Access Users shall be settled in accordance with the procedures stipulated under relevant Power Purchase Agreement/ Connection Agreement as the case may be. In case of unresolved dispute, the matter may be referred to WBERC;

(iv) *Operational Metering:*

The Generating Company shall install operational metering to STU's specification so as to provide operational information for both real time and recording purposes in relation to each generating unit at each power station in respect of bus voltage, frequency, MW, MVAR and any other additional data as required by STU;

All current transformers and voltage transformers used in conjunction with operational metering shall conform to the relevant standards and shall be of accuracy class 0.5 and of suitable ratings to cater to the meter and lead wire burden;

Meters shall be calibrated so as to achieve overall accuracy of operational metering in the limits as specified by STU;

Records of calibration shall be maintained for reference and shall be made available to STU on request;

Generating Companies shall furnish recorded data of all electric measurements and events recorded by the operational metering to the SLDC as requested by them;

STU shall be responsible to formulate the metering procedure and implement it with other Users;

3.8.5 *Data Requirements:*

Users shall provide STU with data for this Section as specified in the formats under Annexure–II

3.8.6 Communication Facilities:

The following communication facilities as relevant and applicable to the User shall be decided and finalized at the initial stage and incorporated in the Connectivity Agreement:

(a) *Speech Communication:*
Reliable and efficient speech communication system shall be provided to the SLDC/State Sub-Load Dispatch Centre to facilitate supervision/control/direction of the Grid under both normal and abnormal operating conditions;

(b) *Data Communication:*
Real time telemetered data (SCADA) and Off-line data through suitable and reliable data communication facilities so as to facilitate efficient and uninterrupted data exchange with SLDC/SSLDC under both normal and abnormal operating conditions;

(c) *Data Entry Terminals:*
Data entry facilities as advised by SLDC for exchange of information between SLDC and State Entities.

3.9 **Reactive Power Compensation:**

3.9.1 Reactive power compensation and/or other facilities, should be provided by the STU or agencies engaged in distributing electricity as far as possible in the low voltage systems close to the load points thereby avoiding the need for exchange of Reactive Power to/from STS and to maintain STS voltage within the specified range.

3.9.2 Fixed Line Reactors may be provided to control temporary over voltage within the limits as set out in connection agreements.

3.9.3 The addition of reactive compensation to be provided by the agency (including generating station) shall be indicated by STU in the Connection Agreement for implementation on the basis of planning studies.

3.10 **Responsibilities for Operational Safety:**

STU and the User entities/agency shall be responsible for safety as indicated in Site Responsibility Schedules for each connection point.

(i) *Site Responsibility Schedules:*

A Site Responsibility Schedule shall be produced by STU and agency detailing the ownership, control, maintenance and operational responsibilities of each, before execution of the project or connection including safety responsibilities. The format, principles and basic procedures to be used in the preparation of Site Responsibility Schedules shall be formulated by STU and shall be provided to each agency/State entities for compliance.

(ii) *Single Line Diagrams:*

Single Line Diagram shall be furnished for each Connection Point by the connected agencies in concurrence with STU to SLDC. These diagrams shall include all HV connected equipment and the connections to all external circuits and incorporate numbering, nomenclature and labelling, etc. The diagram is intended to provide an accurate record of the layout and circuit connections, rating, numbering and nomenclature of HV apparatus and related plant. Whenever any equipment has been proposed to be changed, then concerned agency shall intimate the necessary changes to STU and to all concerned. When the changes are implemented, changed Single Line Diagram shall be circulated by the agency to SLDC/ STU;

(iii) *Site Common Drawings:*

Site Common Drawing will be prepared for each Connection Point and will include site layout, electrical layout details of protection and common services drawings. The detailed drawings for the portion of the agency and STU at each Connection Point shall be prepared individually and exchanged between agencies and STU. If any change in the drawing is found necessary, either by agency or STU, the details will be exchanged between agency and STU as soon as possible.

3.11 **Procedure for Site Access, Site Operational Activities and Maintenance Standards:**

The Connection Agreement will also indicate any procedure necessary for site access, site operational activities and maintenance standards for STU equipment at the premises of the Users and vice versa.

CHAPTER 4

OPERATION OF THE STATE GRID

4.1 **Operation Policy:**

4.1.1 The primary objective of integrated operation of the State grid is to enhance the overall operational economy and reliability of the entire electric power network spread over the geographical area of the State.

4.1.2 Overall real time operation of the State grid shall be supervised from the State Load Dispatch Centre (SLDC). The roles of SLDC and STU shall be in accordance with the provisions of WBEGC.

4.1.3 All State entities shall comply with these Operation Guidelines and co-ordinate with each other, for deriving maximum benefits from the integrated operation and for equitable sharing of obligations.

4.1.4 A set of detailed internal operating procedures for the State Grid shall be developed and maintained by the SLDC in consultation with the State entities and shall be consistent with WBEGC and IEGC.

4.1.5 The control rooms of the SLDC, Power Plants and EHV sub-stations and any other control centers of all State entities shall be manned round the clock by qualified personnel with adequate training.

4.2 **System Security Aspects:**

4.2.1 All State entities shall endeavour to operate their respective power systems and Power Stations in synchronism with each other at all times, such that the entire system within the State operates as one synchronized system.

4.2.2 No part of the grid shall be deliberately isolated from the rest of the State grid, except—

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

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

(iii) When such isolation is specifically instructed by SLDC, complete synchronization of grid shall be restored as soon as the conditions again permit. The restoration process shall be supervised by SLDC, as per operating procedures separately formulated.

4.2.3 No important element of the State grid shall be deliberately opened or removed from service at any time, except when specifically instructed by SLDC or with specific and prior clearance of SLDC. The list of such important grid elements on which the above stipulations apply shall be prepared and be available at SLDC. In case of opening/removal of any important element of the grid under an emergency situation as mentioned in 4.2.2 (i) and (ii), the same shall be communicated to SLDC at the earliest possible time after the event.

4.2.4 Any tripping, whether manual or automatic, of any of the above elements of State grid shall be precisely intimated by the concerned State entities to SLDC as soon as possible, say within ten minutes of the event. The reason (to the extent determined) and the likely time of restoration shall also be intimated. All reasonable attempts shall be made for the elements' restoration as soon as possible. Similarly any incident of outage significantly affecting the system of any agency will be intimated to the agency by SLDC within the above time.

4.2.5 All generating units, which are synchronized with the grid, irrespective of their ownership, type and size, shall have their governors in normal operation at all times. If any generator of over 50 MW rating is required to be operated without its governor in normal operation, the SLDC shall be immediately advised about the reason and duration of such operation. All governors shall have a droop between 3% and 6%.

4.2.6 Facilities available with load limiters, Automatic Turbine Run-up System (ATRS), Turbine supervisory control, coordinated control system, etc., shall not be used to suppress the normal governor action. No dead bands and/or time delays shall be deliberately introduced.

4.2.7 All generating units, operating at or upto 100% at their Maximum Continuous Rating (MCR) shall normally be capable of (and shall not in any way be prevented from) instantaneously picking up five per cent (5%) extra load for at least five (5) minutes when frequency falls due to a system contingency. However, for existing generating units (generating units of COD upto 31.12.2005) this may be within technical limits as prescribed by the manufacturer. The generating units operating at above 100% of their effective MCR shall not be prevented from going at least up to 105% of their effective MCR when frequency falls suddenly. Any generating unit of over fifty (50) MW size, not complying with the above requirement, shall be kept in operation (synchronized with the State grid) only after obtaining the permission of SLDC. However, the entity can make up the corresponding shortfall in spinning reserve by maintaining an extra spinning reserve on the other generating units of the entity.

4.2.8 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) percent 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.

4.2.9 Except under an emergency, or to prevent an imminent damage to personnel and equipment, no entity shall suddenly reduce its generating unit output by more than one hundred (100) MW without prior intimation to and consent of the SLDC, particularly when frequency is falling or is below 49.0. Similarly, no entity shall cause sudden increase in its load by more than one hundred (100) MW without prior intimation to and consent of the SLDC.

4.2.10 All Generating Units shall normally have their AVRs in operation, with appropriate settings. In particular, if a generating unit of over fifty (50) MW size is required to be operated without its AVR in service, the SLDC shall be immediately intimated about the reason and duration, and its permission obtained.

4.2.11 Provision of protections and relay settings shall be co-ordinated periodically throughout the state grid, as per a plan to be separately finalized by the STU in co-ordination with all entities.

4.2.12 All State entities shall ensure that the grid frequency always remains within the 49.0 - 50.5 Hz band. However, all possible efforts shall be made to reduce the frequency range of operation to 49.7 - 50.2 Hz progressively.

4.2.13 All State entities shall provide automatic under-frequency load shedding in their respective systems, to arrest frequency decline that could result in a collapse/disintegration of the grid, as per the plan separately finalized by STU, and shall ensure its effective application to prevent cascaded tripping of generating units in case of any contingency. All State entities shall ensure that the under-frequency load shedding/islanding schemes are functional and no under-frequency relay is by-passed or removed without prior consent of SLDC.

4.2.14 Procedures shall be developed to recover from partial/total collapse of the grid and periodically updated in accordance with the requirements given under. These procedures shall be followed by all the State entities to ensure consistent, reliable and quick restoration for which SLDC shall co-ordinate with all entities.

4.2.15 Each State entity shall provide adequate and reliable communication facility internally and with SLDC and with other entities, if required, 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. SLDCs to SSLDCs and generating stations.

4.2.16 The State entities shall furnish on request information/data including disturbance recorder/sequential even recorder output etc., to SLDC for purpose of analysis of any grid disturbance/event. No State entity shall block any data/ information required by the SLDC for maintaining reliability and security of the grid and for analysis of an event.

4.2.17 All State entities shall make all possible efforts to ensure that the grid voltage always remains within the following operating range as specified for different equipment.

Nominal	Maximum	Minimum
Voltage in (kV rms)		
400	420	380
220	231	209
132	145	119
66	72	60

4.3 **Demand Estimation for Operational Purposes:**

SLDC shall develop methodologies/mechanisms for daily/weekly/monthly/yearly demand estimation (MW, MVAR and MWh) mainly based on the data furnished by the distribution agencies for operational purposes. The data for the estimation shall also include loadshedding, power cuts etc., SLDCs shall also maintain historical database for demand estimation. The demand estimates are to enable the SLDC to conduct system studies for operational planning purposes.

4.4 **Demand Control:**

4.4.1 Introduction:

This section is concerned with the provisions to be made by SLDC to permit the reduction of demand in the event of insufficient generating capacity, and transfers from external interconnections being not available to meet demand, or in the event of breakdown or operating problems (such as frequency, voltage levels or thermal overloads) on any part of the grid.

4.4.2 Manual Demand Disconnection:

4.4.2.1 The entities shall endeavor to restrict their net drawal from the grid to within their respective drawal schedules whenever the system frequency is below 49.5 Hz., when the frequency falls below 49.0 Hz., requisite load shedding (manual) shall be carried out to curtail the over drawal. Such load shedding shall be pre-planned for each level of under frequency.

4.4.2.2 Further, in case of certain contingencies and/or threat to system security, the SLDC may direct the sub-stations/distribution licensee to decrease its drawal by a certain quantum. Such directions shall immediately be acted upon.

4.4.2.3 Each State entity shall make arrangements that will enable manual demand disconnection to take place, as instructed by the SLDC under normal and/or contingent conditions.

4.4.2.4 The measures taken to reduce the entities' drawal from the grid shall not be withdrawn as long as the frequency /voltage remains at a low level, unless specifically permitted by the SLDC/SSLDC. If required, necessary rescheduling of drawal for the entities shall be done by SLDC.

4.5 **Periodic Reports:**

4.5.1 A weekly report shall be issued by SLDC to the Commission, STU, licensees and Generating Companies of the State and shall cover the performance of the State grid for the previous week. The weekly report shall contain the following:

4.5.1.1 *Frequency profile:* Maximum and minimum frequency recorded daily on 15 minutes time block basis;

4.5.1.2 *Voltage profile:* The voltage profile of selected substations;

4.5.1.3 *Major Generation and Transmission outages;*

4.5.1.4 *Transmission constraints;*

4.5.1.5 *Daily Demand Profile:*

(i) Daily maximum demand (MW) with corresponding frequency (HZ) and energy (MU) with corresponding average frequency;
(ii) Daily load shedding at peak hours (MW);
(iii) Daily load shedding in MU;
(iv) Daily technical interruption losses in MW at peak hours; and
(v) Daily technical interruption losses in MU.

4.5.1.6 *Daily Generation Performance Status:*

Generating station wise daily schedule for availability declared, actual generation, non-drawal by the system (if any), reason for non-drawal, reason for less generation;

4.5.1.7 Instances of persistent/significant non-compliance of WBEGC.

4.5.2 **Other Reports:**

The SLDC shall also 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 agencies, and the agencies responsible for causing the constraints. To facilitate the above one **State Level Co-ordination Forum (SLCF)** may be constituted with one member from all State agencies connected to STS. SLDC will arrange for the monthly meeting of the Committee and act as a convener for the purpose.

4.6 **Operational Liaison:**

4.6.1 This section sets out the requirements for the exchange of information in relation to Operations and/or Events on the total grid system, which have had or will have an effect on:

The State grid

Inter State links

The system of a State entity

The above generally relates to notifying of what is expected to happen or what has happened and not the reasons why. The Operational Liaison function is a mandatory built-in hierarchical function of the SLDC and its entities, to facilitate quick transfer of information to operational staff. It will correlate the required inputs for optimization of decision-making and actions.

4.6.2 **Procedure for Operational Liaison:**

4.6.2.1 *Operations and events on the State grid:*

Before any operation is carried out on State grid, the SLDC will inform each State entity, whose system may, or will, experience an operational effect, and give details of the operation to be carried out. Immediately following an event in the State grid, the SLDC will inform each State entity, whose system may, or will, experience an operational effect following the event and give details of what has happened in the event but not the reasons why.

4.6.2.2 *Operations and events on an entity's system:*

Before any operation is carried out on an entity system, the entity will inform the SLDC, in case the State grid may, or will, experience an operational effect, and give details of the operation to be carried out. Immediately following an event on an entity system, the entity will inform the SLDC, in case the State grid may, or will, experience an operational effect following the event, and give details of what has happened in the event but not the reasons why.

4.7 **Outage Planning:**

4.7.1 **General:**

4.7.1.1 This section sets out the procedure for preparation of outage schedules for the elements of the State grid in a co-ordinated and optimal manner keeping in view the State system operating conditions and the balance of generation and demand. (List of elements of grid covered under these stipulations shall be prepared and be available with SLDC).

4.7.1.2 The generation output and transmission system should be adequate after taking into account the outages to achieve the security standards.

Outage planning is prepared in advance for the current year and reviewed during the year on quarterly and monthly basis.

4.7.2 **Objective:**

4.7.2.1 To produce a co-ordinated generation outage programme for the State grid, considering all the available resources and taking into account transmission constraints, as well as, irrigational requirements.

4.7.2.2 To minimize surplus or deficits, if any, in the system requirement of power and energy and help operate the system within Security Standards.

4.7.2.3 To optimize the transmission outages of the elements of the State grid without adversely affecting the grid operation but taking into account the Generation Outage Schedule, outages of constituent systems and maintaining system security standards.

This section is applicable to all State entities including SLDC, STU, Generating Companies and Transmission Licensees;

4.7.3 **Outage Planning Process:**

4.7.3.1 The STU, Generating companies, distribution licensees with generation shall provide SLDC their proposed outage programs in writing for the next financial year by 1st August each year. These shall contain identification of each generating unit/line/ICT, the preferred date for each outage and its duration and where there is flexibility, the earliest start date and latest finishing date.

4.7.3.2 SLDC shall then come out with a draft outage programme for the next financial year by 15th November each year for the State grid taking into account the available resources in an optimal manner and to maintain security standards. This will be done after carrying out necessary system studies and, if necessary, the outage programmes shall be rescheduled. Adequate balance between generation and load to be ensured while finalizing outage programme.

4.7.3.3 SLDC shall inform EREB/ERPC Secretariat of its proposed outages in writing by 30th November for each financial year.

4.7.3.4 EREB/ERPC Secretariat will then come out with an outage programme for the next financial year for the Regional Grid as per IEGC.

4.7.3.5 SLDC shall interact with all Users as necessary to review and optimize the outage plan, agree to any changes and produce an acceptable co-coordinated generation and transmission Outage plan.

4.7.3.6 SLDC shall release the finally agreed outage plan, which takes account of Regional and User requirements, to all Users by 1st March each year.

4.7.3.7 SLDC shall review the final outage plan quarterly in consultation with ERLDC and Users, who shall be informed by SLDC of any proposed changes. Users' requests for additional outages will be considered by SLDC and accommodated to the extent possible. SLDC shall inform Users promptly of any changes that affect them.

4.7.3.8 In case of emergency in the system viz., loss of generation, break down of transmission line affecting the system, grid disturbance, system isolation, SLDC, may conduct studies again before clearance of the planned outage.

4.7.3.9 SLDC is authorized to defer the planned outage in case of any of the following:

(i) Major grid disturbance;

(ii) System isolation;

(iii) Blackout in a constituent system;

(iv) Any other event in the system that has an adverse impact on the system security by the proposed outage.

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

4.7.3.11 Each State entity shall obtain the final approval from SLDC prior to availing an outage.

4.8 **Recovery Procedures:**

4.8.1 Introduction:

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

4.8.2 Objective:

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

4.8.3 Strategy:

The situation prevailing prior to the occurrence of the contingency, e.g. availability of specific generators, transmission circuits and load demands, will largely determine the restorations process to be adopted in the event of a total blackout. ERLDC and SLDC shall co-ordinate to determine the extent of the problem. SLDC shall advise all Users of the situation and follow the strategy as outlined below for restoration.

User's persons authorised for operation and control shall be available at User's end for communication and acceptance of all operational communications throughout the contingency. Communication channels shall be restricted to operational communications only till normalcy is restored.

4.8.3.1 Total Regional Blackout:

SLDC shall instruct all relevant Generators having Power Stations with Black Start capability to commence their pre-planned Black Start procedure. SLDC may require CPPs to extend start-up power supply to Generators as may be feasible.

SLDC shall prepare the Transmission System for restoration by creating discrete power islands with no interconnection. Close co-ordination with concerned entities shall be maintained during the restoration process to arrange for discrete demand blocks becoming available to stabilize Generating Units, as these become available in individual islands. Generators, to whom start up power supply is made available, shall sequence their start up to match their auxiliary power demand with supply available.

Generators shall inform SLDC as Generating Units become available to take load, in order that the Licensee may assess the MW demand, which the Generating Unit is likely to pick up on circuit breaker closure.

SLDC shall co-ordinate with Generators and Distribution Companies to:

(1) Form discrete power islands with one Generating Unit feeding some local demand;

(2) Extend islands by adding more Generating Units and more demand in a co-ordinated manner maintaining load Generations balance;

(3) Synchronize islands to form a larger, more stable island.

SLDC shall, taking into account sites where system synchronizers are available, gradually extend the synchronization until all demand is restored.

SLDC shall utilize any Regional or interstate assistance available, if appropriate, at any time to assist in the above process.

4.8.4 **Responsibilities:**

4.8.4.1 Detailed plans and procedures for restoration of the State grid under partial/total blackout shall be developed by SLDC in consultation with all State Entities and ERLDC and shall be reviewed/updated annually and be communicated to all transmission and distribution licensees and generating companies.

4.8.4.2 Detailed plans and procedures for restoration after partial/total black out of each constituent's system within the State, will be finalized by the concerned entity in co-ordination with the SLDC. The procedure will be reviewed, confirmed and/or revised once every year.

4.8.4.3 List of generating stations with Black Start facility, inter-State, synchronizing points and essential loads to be restored on priority, should be prepared and be available with SLDC.

4.8.4.4 The SLDC is authorized during the restoration process following a blackout, to operate with reduced security standards for voltage and frequency as necessary in order to achieve the fastest possible recovery of the grid.

4.8.4.5 SLDCs shall always endeavour to restrict their net drawal from the inter-state/regional Grid to within the respective drawal schedules of licensees of the state by directing appropriate instruction to the licensees, whenever the frequency system is below 49.5 MHz. When the frequency falls below 49.0 MHz, requisite load shedding shall be carried out in the concerned licensed area to curtail the over-drawal;

4.8.4.6 The SLDC is required to advise the intra-state entities about their respective entitlement from allocation/share of Inter-State Generating Stations (ISGSs) to West Bengal, collection of their requisition, compiling them into State's total requisition from ISGS, etc. in accordance with the principle laid down by the policy of the State Government or Government of India.

4.8.5 **Special Considerations:**

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

A list of essential loads and priority of restoration is to be prepared by each entity.

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

All Users shall pay special attention in carrying out the procedures so that secondary collapse due to undue haste or in-appropriate loading is avoided.

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

4.9 **Operational Event/Accident Reporting**:

4.9.1 **Introduction:**

This section describes the requirements for reporting, in writing, incidents, which were initially reported orally by/to other Users.

4.9.2 **Objective:**

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

4.9.3 **Reportable Incidents:**

Typical examples of reportable incidents that could affect the grid are the following:

(i) Exceptionally high/low system voltage or frequency;

(ii) Serious equipment problem i.e. major circuit, transformer or bus bar fault;

(iii) Loss of major Generating Unit;

(iv) System split, Transmission System breakaway or Black Start;

(v) Major fire incidents;

(vi) Major failure of protection;

(vii) Equipment and transmission line overload;

(viii) Excessive Drawal deviations.

4.9.4 **Reporting Procedure:**

(i) All reportable incidents occurring in lines and equipment of 33 KV and above at grid sub-stations and generating stations shall promptly be reported orally/message by the User whose equipment has experienced the incident. The Reporting User to any other significantly affected Users and to SLDC;

(ii) Depending on the nature of incidence, SLDC may ask for a detailed written report, which should be submitted within 4 days;

(iii) In the case of an event occurring in EHV system and Generating equipment which was initially reported by a Regional constituent or SLDC/the constituent, SLDC will give a written report to ERLDC within a week;

(iv) SLDC may call for a report from any User on any reportable incident affecting other Users and the Licensee in case the same is not reported by such User whose equipment might have been source of the reportable incident;

(v) The above shall not relieve any User from the obligation to report events in accordance with IE Rules.

The format of such a report will be as agreed at the Grid Code Review Panel, but will typically contain the following information:

Location of incident;

Date and time of incident;

Plant or equipment involved;

Supplies interrupted and duration if applicable;

Amount of generation lost if applicable;

Brief description of incident;

Estimate of time to return to service;

Name of originator.

4.9.5 The standard reporting form would be as follows:

INCIDENT REPORTING

Date:..... Time:.....

1. Date and time of incident,
2. Location of incident,
3. Type of incident,
4. System parameters before the incident (Voltage, Frequency, Flows, Generation, etc.),
5. System parameters after the incident;
6. Network configuration before the incident,
7. Relay indications received and performance of protection;
8. Damage to equipment,
9. Supplies interrupted and duration, if applicable;

10. Amount of Generation lost, if applicable,
11. Estimate of time to return service,
12. Cause of incident;
13. Any other relevant information [and remedial action taken],
14. Recommendations for future improvement/repeat incident;
15. Name of the Organisation.

4.9.6 **Major Failure:**

Following a major failure, the Licensee and other Users shall co-operate to inquire and establish the cause of such failure and produce appropriate recommendations. Licensee/Users shall report the major failure to Commission immediately for information and shall submit the enquiry report to the Commission within 2 (two) months of the incident;

4.9.7 **Accident Reporting:**

Reporting of accidents shall be in accordance with Section 161 of the Electricity Act, 2003. In both fatal and non-fatal accidents, the report shall be sent to the Electrical Inspector in the prescribed form and to such other authorities as the State Government may, by general or special order, direct.

CHAPTER 5

SCHEDULING AND DESPATCHING

5.1 **Introduction:**

This Chapter sets out the

(a) Demarcation of responsibilities between various entities and SLDC in scheduling and dispatch;
(b) The procedure for scheduling and dispatch;
(c) The reactive power and voltage control mechanisms.

5.2 **Objective:**

Procedures to be adopted after introduction of intra-state ABT for scheduling of generations by all generating agencies connected with the STU, share of Central Sector generation and scheduling of drawal by all licensees connected to STU of the State on a daily basis are dealt herein.

The procedure for submission of availability by each Generating Company and submission of drawal schedule by each licensee connected with the STU is intended to enable SLDC to prepare the generation and drawal schedule. It also provides methodology for issuing real time dispatch/drawal instructions and rescheduling, if required, along with the commercial arrangement for the deviation from the schedule.

SLDC shall schedule and regulate the overall state generation in such a manner that preference given to power station where energy potential of the power station if unutilized goes as a waste like i) run of the river ii) canal based hydro station iii) hydro station where water level is at peak reservoir level and inflow of water goes as a waste iv) renewable energy sources.

5.3 **Scope:**

These guidelines will be applicable to SLDC, all generating stations connected with STU, transmission entities, distribution licensees and open access users in the state grid. For drawal of power from central sector generation and for transfer of inter-state power, SLDC shall follow IEGC and coordinate with ERLDC. SLDC shall also co-ordinate with SSLDC of all entities.

5.4 **Demarcation of Responsibilities:**

(i) The SLDC shall have the total responsibility for scheduling/dispatching by generating stations,

CPPs and open access users connected to the STU, the drawal/injection by the licensees, the drawal from the central generating stations and the bilateral interchanges, if there is any;

(ii) The SLDC, if required, through STU, shall always endeavour to restrict net drawal from central generating stations and other generating stations within their respective drawal schedules;

(iii) The generating stations connected to the STU shall be responsible for power generation generally according to the daily schedule advised to them by the SLDC;

(iv) However, the generating stations may deviate from the given schedules depending on the plant and system conditions. In particular, they would be allowed/encouraged to generate beyond the given schedule under deficit conditions as per guidance of SLDC;

(v) Provided that when, the frequency is higher than 50.3 Hz, the actual net injection shall not exceed the scheduled dispatch for that hour. Also while the frequency is above 50.3 Hz, the generating stations may back down their generation in concurrence with SLDC to restrict the frequency rise. When the frequency falls below 50.0 Hz, the lifting of backing down should be as per guidance of SLDC;

(vi) However, 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;

(vii) 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 procedures finalized separately. In particular, outages requiring restriction of generation, which a beneficiary can receive (and which may have a commercial implication) shall be planned carefully to achieve the best optimization;

(viii) The State entities shall furnish to the SLDC all requisite information for billing purposes;

(ix) 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;

(x) The SLDC shall be responsible for intra-State energy accounting as per the scheme approved by STU, and all entities shall extend the necessary assistance to the STU personnel in timely collection of metered data.

5.5 **Scheduling and Despatch Procedure:**

(i) By 11:00 a.m. every day, all the generating stations connected to the STU shall furnish their expected generation (in terms of Ex-bus MW, for all the 15 minutes time blocks and also in terms of MU or MWH for the whole day) for the next day to SLDC;

(ii) The distribution licensees shall furnish by 11:00 a.m MW and MWH drawal/export, including that of open access users in block-wise manner for the next day i.e. from 00:00 hrs to 24:00 hrs of the following day to SLDC;

(iii) The SLDC shall receive ISGS schedule of the next day by 11:00 hours from ERLDC and in turn after exploring all availabilities and exchanges (both bilateral and through traders and with licensees) prepare their expected drawal schedule and send their requisition for the next day by 3:00 p.m. to ERLDC;

(iv) While finalizing the above daily generation schedules for the generating stations, the SLDC shall ensure that the same are on merit order basis as far as possible, operationally reasonable, particularly in terms of ramping-up /ramping-down rates and the ratio between minimum and maximum generation levels;

(v) The generating agencies connected to STU may inform any modification/changes to be made in station wise foreseen capabilities, if any, to SLDC by 10:00 p.m. Distribution licensee may also inform any modification/change of their drawal/export, if any, to SLDC by 10:00 p.m.;

(vi) Based on the surplus, if any, the concerned parties may arrange for bi-lateral exchanges. Such arrangement shall be intimated to ERLDC by the SLDC by 10:00 p.m. The SLDC shall receive the final 'drawal schedule' against Central Sector allocation along with bilateral exchange of power, if any by 11:00 p.m.;

(vii) The SLDC shall inform the final generation /drawal schedule for the next day to all concerned by 11:30 p.m.;

(viii) In the event of any contingency, during the course of the day of operation, ERLDC or any Generating station connected to STU or every entity may revise its dispatch schedule and its foreseen capability, drawal/export, for the balance period of the day. The SLDC shall then revise the concerned 'drawal schedule' and 'dispatch schedule' in consultation with the concerned beneficiaries and issue the same. All such revisions shall be effective one hour after the first advice is received by the SLDC;

(ix) While finalizing the drawal and dispatch schedules as above, the SLDC shall also check that the resulting power flows do not give rise to any transmission constraint. In case any impermissible constraints are foreseen, the SLDC shall moderate the schedules to the required extent, under intimation to the concerned Users. The revised schedule will be made effective from the fourth time blocks counting the issuing time as the first time block. In case of any grid disturbance, the scheduled generations of all generating stations connected to STU and scheduled drawal of all beneficiaries and licensees shall be deemed to have been revised to be equal to their actual generation/drawal for all the time blocks affected by grid disturbance;

(x) On completion of the operating day, by 24.00 hours, the schedule finally implemented during the day (taking into account all before-the fact changes in dispatch schedule of generating stations and drawal schedule of the Users) shall be issued by SLDC. This schedule shall be the datum for commercial accounting. The average ex-bus capability for each of the generating stations connected with the STU shall also be worked out based on all before-the-fact advice to SLDC;

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

(xii) 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.

5.6 **Reactive power and voltage control:**

(i) Regarding VAR drawal/absorption from inter State Grid, the SLDC has to follow IEGC;

(ii) All the distribution licensees, transmission licensees and STU are expected to provide local VAR compensation such that they do not draw VARs from the HV Grid. VAR compensation has to commence in the following order:

Consumer end,

Distribution transformer end,

At the substations end of 6/11/33 kV distribution feeders,

Substations of STU,

Generating stations;

(iii) While tap changing on all 400/220 kV ICTs of CTU shall be done as per the instruction of ERLDC, tap changing of other ICTs shall be done as per the instructions of SLDC;

(iv) 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;

(v) SLDC may direct a beneficiary to curtail its VAR drawal/injection in case security of the grid or safety of any equipment is endangered;

(vi) At interchange point the VAR drawal/injection shall be minimum when voltage at that point is below 97% or above 103%.

CHAPTER 6

NON-COMPLIANCE

6.1 As stipulated under section 33(2), (4) and (5) of the Act, every licensee, generating company, generating station, EHT S/S and any other entity connected with the operation of the power system shall comply with directions issued by SLDC. If any dispute arises with reference to the safe, secure and integrated operation of the State Grid or interpretation of clauses of State Grid Code or in relation to any direction given by SLDC, it shall be referred to WBERC for decision. Pending decision of the Commission, the concerned party raising the dispute shall comply with direction of SLDC. WBERC, in turn, after due process may order the defaulting entity for compliance or otherwise. The non-compliance of the same may lead to penal action, which includes termination of connectivity agreement and de-linking from the grid.

6.2 In case of non-payment of dues i.e. bills by any beneficiary, the affected entity shall report the matter to STU and SLDC. STU shall verify and take up with the defaulting entity for paying up of the dues. In case of non-compliance by the defaulting entity, WBERC shall be informed by STU. WBERC will initiate necessary action.

CHAPTER 7

COMMERCIAL ISSUES

7.1 In regard to allocation from Central Sector Generation (or ISGS) CERC has full jurisdiction to determine tariff & other commercial issues and IEGC is to be followed.

7.2 Subject to any scheme of tariff, as may be approved by WBERC the bulk power purchase/supply agreements between the utilities in the State power system shall contain such elements in the tariff so that application of ABT in the State power system can be applied.

7.3 The summation of input meter readings at the connection points with STU of Generating Stations, entities engaged in distribution of electricity and inter-connection points with CTU and other entities gives the total flow into STU. Similarly, summation of export at the connection points with STU of Generating Stations, entities engaged in distribution of electricity and inter connection points with CTU and other entities gives the total outflow from STU. The difference between the inflow and outflow is the transmission loss of STU. As the connection points with distribution entity will be huge in number, initially it may not be possible to apply the above principle to determine transmission loss. In that case several load flow studies representing different load conditions covering at least three seasons and three hours of the day may be carried out to determine the transmission loss. The transmission losses determined either way shall be apportioned to the distribution entity consuming power and energy from STU network and added to their metered drawal, to arrive at the billing figure.

7.4 Variation between actual generation or actual drawal and scheduled generation or scheduled drawal shall be accounted for by SLDC as per the methodology finalized by WBERC. For a generating station connected to STU, this deviation shall be equal to its actual generation minus its scheduled generation. For a beneficiary connected to STU, this deviation shall be equal to its total drawal minus its total scheduled drawal. Weekly bills of variation shall be prepared and issued by SLDC. These bills will have higher

payment priority and the concerned entities shall make payment of the billed amount within 10 days of billing date. If the payments against the above bills are delayed, the defaulting entities shall have to pay simple interest @ 0.04% for each day of delay. The interest so collected shall be paid to the entities who had to receive the payment. In case of continued payment default, the matter should be brought to the notice of WBERC by SLDC.

7.5 Energy accounts shall be prepared by SLDC on monthly basis and shall be issued to all concerned entities within 3 clear working days of the succeeding month.

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

7.7 Regarding VAR drawal/absorption (its rate and payment) from inter-State grid, the SLDC has to follow IEGC, and will be between the beneficiary and the pool account and between the beneficiaries. The generating stations shall generate/ absorb reactive power as per instruction of SLDC, within the capability limits of the generating units. No payments shall be made to generating companies for that.

CHAPTER 8

POWER OF THE COMMISSION TO AMEND

8.1 The Commission may, at any point of time, at its sole discretion, vary, alter, modify, add or amend any provisions of these Regulations.

8.2 Nothing in these regulations shall be deemed to limit or otherwise affect the inherent powers of the Commission to make such orders as may be necessary for meeting ends of justice or to prevent the abuse of the process of the Commission.

8.3 **Powers to remove difficulties:**

8.3.1 If any difficulty arises in giving effect to any of the provisions of these Regulations, the Commission may, with reasons to be recorded in writing, direct the licensees, the consumers or the applicants for Open Access, by general or special order, for taking suitable action not inconsistent with the provisions of the Act, as may appear to be necessary for removing the difficulty.

ANNEXURE I

SITE RESPONSIBILITY SCHEDULE

[*See* Regulation 3.2 (d)]

Name of Power Station/Sub-Station owner:
Tel. Number:
Fax Number:
Permanent Address:

Item of Plant/ Apparatus	Plant Owner	Responsibility for				Remarks
		Safety	Control	Operation	Maintenance	
...kV Switchyard						
All equipments including Bus bars						
Feeders						
Generating Units						

ANNEXURE II

PLANNING/CONNECTIVITY DATA

[*See* Regulation 3.8.5]

Generation

1. Name of Power Station

2. Station type—Thermal (coal, gas, oil), Hydro (Reservoir type), ROR (with hours of Storage/ Pump Storage),
GT/CCGT.

3. Station capacity—

(i) Total capacity (ii) Number of units and size

4.1 Thermal Station –

(i) Rating of Boiler, Turbine and major auxiliaries

(ii) Peaking availability and peaking capability

4.2 GT/CCGT –

(i) Natural gas/LNG/Oil

(ii) Salient details of GT/CCGT

(iii) Peaking availability and peaking capacity

4.3 Hydro—

(i) Schematic layout showing dam reservoir area, water conductor system, fore bay, powerhouse etc.

(ii) Rating of turbine and other major equipment

(iii) Reservoir data and operating table

(iv) Operating head maximum and minimum

4.4 Captive power plant

(i) Salient details including plant capacity and exchange of power.

5.1 Generators –

(i) Type

(ii) Rating/MVA

(iii) Voltage

(iv) Speed

(v) Inertia constant H (MW Sec/MVA)

(vi) Rated P.F

(vii) Reactive power capability

(viii) S.C. ratio

(ix) X_d, X^{I}_{d}, X^{II}_{d} (Saturated and Unsaturated)

(x) X_q, X^{I}_{q}, X^{II}_{q} (Saturated and Unsaturated)

(xi) T^{I}_{do}, T^{II}_{do}

(xii) T^{I}_{qo}, T^{II}_{qo}

(xiii) Stator resistant and leakage reactance or Potier Reactance

(xiv) Stator time constant

(xv) Rated field current

(xvi) Neutral grounding

(xvii) Generator Capability Curve

6. Generators Transformer—

(i) Type

(ii) Rated capacity/MVA

(iii) Voltage ratio and vector group

(iv) Tap changer range

(v) On load/Off load tap changer

(vi) Percentage impendence – Positive and Zero Sequence

(vii) Grounding of Generator Transformer

(viii) X/R Ratio

7.1 Excitation—

(i) Type of excitation

(ii) Rated field voltage, maximum and minimum field voltage

(iii) Details of excitation loop block diagram showing transfer functions

8. Governor System—

(i) Governor droop

(ii) Speeder motor setting range

(iii) Governor block diagram showing transfer functions and different time constant

(iv) Dead band, if any.

9. Protection & metering—

(i) Description of all relays and protection system installed in generating unit.

(ii) Description of all relays and protection system installed on all outgoing feeders

(iii) Full description of operational and commercial metering schemes.

10. Operational parameters—

(i) Minimum time required to synchronize a generating unit from de-synchronization (hot start).

(ii) Maximum time to synchronize a unit from rest (cold start).

(iii) The maximum load

(iv) Maximum unit loading and unloading rates.

Transmission data

1.1 Single line diagram of transmission system down to 132/33 kV S/S.

(i) Name of S/S

(ii) Power Station connection

(iii) Number and length of circuits

(iv) S/S bus layout (Main and transfer, 2 Main and transfer, 2 Main, Breaker and half)

(v) Power transformers

(vi) Reactive compensation equipment

(vii) Grounding arrangement

1.2 Transformer parameters – Rated MVA, Voltage rating and vector group, Positive and zero sequence Impedance, Tap Changer (on/off load) and range, Transformer Grounding and X/R Ratio.

1.3 Component details—

(i) Circuit breaker, Isolating switches, current & potential transformers.

1.4 Relays ans meters—

(i) Relay protection for all transformers and feeders

(ii) Metering detail

1.5 Line parameters – Line designation, Year of commissioning, Length of line (Km), Line capacity (Thermal & surge impedance), No. of circuits, Per unit circuit impedance on 100 MVA and admittance values (positive and zero sequence).

Distribution data

1. Name of S/S of STU from where connection shall be made.

1.2 Quantum of power (MW)/MVA to be drawn/injected from/to of STU S/S and voltage and no. of circuits required.

1.3 The length and size of the feeder and no. of distribution S/S connects to the feeder for supply of load to distribution area.

1.4 Reactive compensation used to control reactive drawal from STU, feeder-wise.

1.6 Details of protection and metering for the feeders.

1.7 Type of Load or Load characteristic (whether constant power or Voltage impendence, etc.)

Load forecast data

1. Consumer data – Furnish categories of consumers, their nos., connected load.
2. Peak load and energy forecast for each connection point/in the face point for each category of load for each of the succeeding 10 years.
3. Methodology and assumptions on which forecast made.
4. If supply is received from more than one STU S/S, the S/S-wise break-up of peak load and energy projections for each of succeeding 10 years with estimated daily load curve.
5. Details of bulk load 5 MW and above, Voltage of supply, S/S from which is to be fed.

By Order of the Commission,

Place: Kolkata
Dated: 12.01.2006

K. L. BISWAS,
Secretary of the Commission.

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